2016

REPORT OF THE THIRTY-THIRD ANNUAL MEETING OF THE COUNCIL

BAD NEUENAHR-AHRWEILER GERMANY

7 - 10 JUNE 2016

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

CNL(16)68

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

Steigenberger Hotel, Bad Neuenahr-Ahrweiler, Germany

7 - 10 June 2016

1. Opening of the Meeting

1.1 The President of NASCO, Mr Steinar Hermansen (Norway), opened the meeting and introduced Dr German Jeub, Director General for EU Policy, International Co-operation and Fisheries in the German Federal Ministry of Food and Agriculture, who welcomed delegates to Bad Neuenahr-Ahrweiler (Annex 1). The President then made an Opening Statement (Annex 2).

1.2 Written Opening Statements were tabled by Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Norway, the Russian Federation and the United States (Annex 3).

1.3 A written Opening Statement was tabled by the European Inland Fisheries and Aquaculture Advisory Committee (EIFAAC) (Annex 4).

1.4 A written Opening Statement was tabled on behalf of all the Non-Government Organisations (NGOs) attending the Annual Meeting (Annex 5).

1.5 Presentations were made by Mr Clemens Fieseler (European Union) on the Atlantic Salmon in Germany, CNL(16)55, and Dr Laura Gangi (International Commission for the Protection of the Rhine) on the Atlantic salmon in the Rhine, CNL(16)56.

1.6 The President expressed appreciation for these statements and presentations.

1.7 A list of participants is given in Annex 6.

2. Adoption of Agenda

2.1 The Council adopted its Agenda, CNL(16)53 (Annex 7).

3. Election of Officers

3.1 The Council re-elected Mr Steinar Hermansen (Norway) as its President and Mr Jóannes Hansen (Denmark (in respect of the Faroe Islands and Greenland)) as its Vice-President.

4. Financial and Administrative Issues

4.1 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(16)5. On the recommendation of the Committee, the Council took the following decisions:

(i) to accept the 2015 Audited Accounts, FAC(16)2;

(ii) to adopt a Budget for 2017 and to note a Forecast Budget for 2018, CNL(16)62 (Annex 8);

(iii) to confirm the appointment of Saffery Champness as auditors for the 2016 accounts;

(iv) to ask that the President write to the Chairman of the OSPAR Commission 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;

(v) to adopt the report of the Finance and Administration Committee, CNL(16)5.

5. Scientific, Technical, Legal and Other Information

5.1 Secretary's Report

The Secretary made a report to the Council, CNL(16)6, on: the status of ratifications of, and accessions to, the Convention and membership of the regional Commissions; the receipt of contributions for 2016; 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; and any new studies relating to the socio-economic values of the wild Atlantic salmon.

The Secretary reported that 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 2016 had been received, and there were no arrears. He reported that no applications had been made to conduct scientific research fishing under the NASCO Resolution during 2015.

There had been two applications for NGO status since the last Annual Meeting. Der Atlantische Lachs, based in Germany, has as its objective the reintroduction and protection of Atlantic salmon in central Europe. An application was also received from Salmon & Trout Conservation Scotland. The objectives of Salmon & Trout Conservation Scotland are to protect fisheries, fish stocks and the wider aquatic environment for the public benefit. Following consultation with the President, observer status had been granted to both organisations. NASCO now has 37 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 2015 – 31 March 2016. 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 co-operation of NEAFC and NAFO in reporting on any suspected IUU salmon fishing activities that may be detected in their Monitoring, Control and Surveillance operations. A report on liaison with NEAFC and NAFO is contained in CNL(16)16.

5.2 **Progress Report on the Proposed International Year of the Salmon**

At its 2014 Annual Meeting, 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 the resource 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 had asked that the Secretary and the Head of the US Delegation, Mr Dan Morris, continue to liaise with NPAFC on arrangements for an IYS and to consider NASCO's possible involvement in, and contribution to, such an initiative.

A report on liaison with NPAFC since the last Annual Meeting regarding the IYS was presented by Mr Morris, CNL(16)7 (Annex 9). Annex 3 of that report included an Outline Proposal for an International Year of the Salmon (entitled 'Salmon and People in a Changing World'). It included a proposed rationale, vision, themes and timings for the IYS, together with details of its scope and a governance model and initial budgetary considerations.

The Council recognised that an IYS could provide a very good opportunity to raise awareness of the factors driving salmon abundance and the environmental and anthropogenic challenges they face and the measures being taken to address these.

The Council expressed broad acceptance of Annex 3 of document CNL(16)7, with the following provisional points of clarification:

- in view of the need to coordinate at different jurisdictional levels, the desire to ensure that the IYS is well-planned and as successful as possible and the potentially substantial workload involved, the Council would designate 2019 as the focal year. However, it recognises that some events may commence before and others continue after 2019. In particular, the Council's preference would be that the IYS International Symposium would be held in the autumn of 2018 so that the collaboration on science and management will be well established at the start of the focal year;
- the IYS Coordinating Committee will conduct its work in accordance with recommendations from the RFMO Steering Committees;

- the Council agreed that it would make a sum of £60,000 available for an IYS Special Fund to be established in accordance with Financial Rule 6.1. This sum is included in the 2017 Budget and could be carried forward until the expenditure is needed. The Fund will be used in accordance with a spending plan proposed by the North Atlantic Steering Committee and to be agreed by the Parties. The Council further agreed that any surplus funds available at the end of the 2016 financial year (and subsequent financial years) which are not needed for the Contractual Obligation Fund should be credited to the IYS Special Fund.

The Council agreed that the Secretary should consult the Parties and NGOs shortly after the 2016 Annual Meeting requesting that they confirm by 15 July 2016 who their representative will be on the North Atlantic Steering Committee. Mr Dan Morris was asked to chair this Committee.

The North Atlantic Steering Committee would be asked to develop recommendations for a half-day session on the IYS at the 2017 Annual Meeting and on IYS activities for 2018.

The Council agreed that the NASCO representatives on the IYS International Symposium Steering Committee would be the Secretary, a scientific representative nominated by the European Union and a manager nominated by Canada.

The Council agreed that the NASCO representatives on the Coordinating Committee should initially be Mr Dan Morris and the Secretary, but that further participation could also be agreed at a later stage.

The Council noted that the success of the IYS will depend on the involvement of, and co-operation with, a wide range of partners and the approach to its implementation would, therefore, need to be flexible, inclusive and adaptable.

The Council expressed its appreciation to NPAFC for inviting NASCO to join it in this important initiative that could support salmon conservation and restoration efforts and stimulate new research.

5.3 **Report on the Activities of the Organization in 2015**

In accordance with Article 5, paragraph 6 of the Convention, the Council adopted a Report on the Activities of the Organization in 2015, CNL(16)8.

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

The President announced that the winner of the 2016 Grand Prize in the Tag Return Incentive Scheme was Mr Maxim Mamaev, Saint Petersburg, Russian Federation. The winning tag was applied to an autumn run female salmon on the Falls Creek beat of the Ponoi River and was recaptured on the Hourglass beat of the Ponoi River. The fish was subsequently released. The Council offered its congratulations to the winner.

5.5 **Scientific Advice from ICES**

The representative of ICES presented the report of the Advisory Committee (ACOM), CNL(16)9 (Annex 10). The ICES presentation is available as document CNL(16)64.

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

The Report of the Meeting of the International Atlantic Salmon Research Board, CNL(16)10 (Annex 11), was presented by its Chairman, Mr Rory Saunders (USA). A presentation on tagging and tracking work undertaken by the Atlantic Salmon Federation was presented by Mr Dave Meerburg (NGOs), CNL(16)63.

5.7 **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). The Working Group was asked to, *inter alia,* 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. It was also asked to recommend changes to the NASCO Rivers Database to implement the recommended classification system. The Group had conducted its work through correspondence and had also met during the 2015 Annual Meeting. The Chairman of the Working Group presented the Group's report, CNL(16)11 (Annex 12).

The Council adopted the new classification system as proposed by the Working Group and asked that the information currently held in the Rivers Database be sent by the Secretary to the Parties/jurisdictions in Excel spreadsheet form for updating. The Council recognised that updating this information would be a substantial undertaking and agreed that the Parties/jurisdictions should be asked to complete the update using the new stock categories by 31 December 2017. However, the Council encouraged Parties/jurisdictions to provide the information earlier where feasible, to allow earlier updating of the Rivers Database. Information for all fields in the Rivers Database should be updated or completed. A 'State of the Salmon' report could then be prepared for consideration at the 2018 Annual Meeting.

The representative of Norway reported to the Council on its National Quality Norm for Wild Salmon, CNL(16)19. The experience in Norway is that an approach based only on conservation limits will not adequately classify the status and well-being of salmon stocks.

5.8 **Report of the Standing Scientific Committee**

The Chairman of the Standing Scientific Committee (SSC), Dr Paddy Gargan (European Union), presented a draft request to ICES for scientific advice. The Council adopted a request for scientific advice from ICES, CNL(16)12 (Annex 13).

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

6.1 **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 2016 APRs are contained in documents CNL(16)21 to CNL(16)38, with supplementary information from Canada provided in CNL(16)40. A summary of the 2016 returns (CNL(16)14) was presented.

The 2016 APRs had been subject to a critical evaluation by the Implementation Plan/Annual Progress Report Review Group 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. The Chairman of the Group, Mr Ted Potter (European Union) presented its report, CNL(16)13 (Annex 14), 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(16)20 (Annex 15). There were wide-ranging discussions during the Special Session and these are contained in CNL(16)59 (Annex 16).

The Council accepted the recommendations of the Review Group for changes to the reporting template and appointed Mr Lawrence Talks (European Union) to serve on the Review Group.

6.2 **Theme-based Special Session: 'Addressing impacts of salmon farming on wild Atlantic salmon: challenges to, and developments supporting, achievement of NASCO's international goals'**

At its Thirty-Second Annual Meeting, the Council had 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 Mr Willie Cowan (European Union), Ms Kimberly Damon-Randall (Chair) (USA), Dr Paddy Gargan (European Union), Ms Heidi Hansen (Norway) and Mr Paul Knight (NGOs) was appointed to work with the Secretary in developing a Programme and Objectives for the session.

The Steering Committee had decided that the title of the 2016 Theme-based Special Session should be '*Addressing impacts of salmon farming on wild Atlantic salmon: challenges to, and developments supporting, achievement of NASCO's international goals*'. A Programme for the session had been developed, CNL(16)15 and subsequently updated (CNL(16)39). The overarching objective for the session was to facilitate an exchange of information relating to protecting wild Atlantic salmon stocks from impacts of salmon farming and to promote sustainable salmon farming practices by:

- reviewing the latest scientific information on the impacts of salmon farming on the wild salmon stocks, with particular focus on the impacts of sea lice and escaped farmed salmon;
- reviewing progress and sharing best practice on approaches, including regulatory frameworks, to implement effective sea lice management at salmon farms;

- reviewing progress and sharing best practice on approaches, including regulatory frameworks, to ensure that 100% of farmed fish are retained in both freshwater and marine production facilities; and
- reviewing new developments that could facilitate achievement of NASCO's international goals for sea lice and containment including technology development (e.g. cage design and closed containment), rearing strategies, access to a broad suite of therapeutants, biological controls, monitoring regimes, training and recapture efforts.

The NGOs tabled a paper entitled 'Salmon farming: the continuing damage and required solutions', CNL(16)54. A report of the Theme-based Special Session will be prepared by the Steering Committee. The Council agreed to hold a half-day Theme-based Special Session during its 2017 Annual Meeting on the theme of risks and benefits to Atlantic salmon populations from hatchery and stocking activities. A Steering Committee, comprising representatives to be nominated by Canada, the European Union, Norway and the NGOs will be appointed to work with the Secretary in developing a Programme and Objectives for the session.

6.3 **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(16)16 (Annex 17). 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); and
- 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 Council agreed that the NASCO Secretary should accept the invitation from the Secretary of NEAFC to make a presentation on the work of NASCO and its IASRB, including concerns about by-catch.

6.4 **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 Atlantic 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.

ISFA were represented at the Thirty-Third Annual Meeting by Professor Phil Thomas and Mr Knut Hjelt.

Professor Thomas thanked the Council for the opportunity to contribute to the Annual Meeting and the German hosts for the arrangements made. He noted that his comments were made on behalf of the salmon farming industry generally. He expressed disappointment since, while the Theme-based Special Session had been well-intended and there were some excellent presentations, the balance of the session had not been as envisaged. He expressed disappointment with the usual annual cycle of opportunity for NGOs to score points off jurisdictions and many of the points raised could have been raised with individual jurisdictions by telephone rather than at the meeting. The biggest concern is that the industry is developing rapidly and these advances had not been reflected in the presentations. He suggested that ISFA should have been involved in planning for the session. He also indicated that there is an assumption in NASCO Parties that there is a natural mortality of salmon that is high, but there is a lack of understanding of the factors responsible. He indicated that reference had been made to high predation levels and this had been confirmed through studies in Scotland. Furthermore, he indicated that it is clear from the ICES advice that exploitation in rivers is a significant source of mortality and some jurisdictions have not introduced adequate controls. He stressed that any salmon farming development application must take into account its relationship with wild fish. In summary, ISFA is supportive of NASCO but not the process and he suggested that the proposed celebration of the wonders of wild salmon should be matched by one for farmed salmon which is crucial as a production system with a low carbon footprint and that nobody now needs to catch wild fish for food.

The representative of the NGOs indicated how much the NGOs had appreciated the Theme-based Special Session. He indicated that the intervention from ISFA just confirmed the NGOs' frustration with the salmon farming industry which is in denial about impacts on the wild fish, and that that is why the NGOs came to the Theme-based Special Session where they can express their concerns. He stressed that NASCO is a wild salmon conservation organisation. The NGOs fully accept that there are many issues facing wild salmon, but salmon farming has been proven to have impacts. He indicated that until the industry comes to the table willing to find solutions, which exist, then the NGOs will continue to support similar sessions at NASCO.

The representative of the European Union expressed appreciation for the Theme-based Special Session that had facilitated an open and transparent dialogue and she looked forward to receiving the report from the Steering Committee summarising outcomes and highlighting best practices that can be taken forward. She questioned whether bilateral discussions would have been as productive. She referred to ISFA's statement about new technological developments and asked that these be brought to the attention of NASCO under this agenda item. Over the last 20 years, the European Union has spent considerable sums on research to improve technology and address the various challenges of the aquaculture sector, but not all had been presented because of a lack of time.

The Council agreed that this item will be retained on the Agenda for its 2017 Annual Meeting.

6.5 **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 annually and ICES had been requested to provide relevant information, which is contained in document CNL(16)9. Information had been provided on:

- ocean migration and feeding areas of DST tagged Icelandic hatchery smolts;
- changing trophic structure and energy dynamics in the Northwest Atlantic: implications for Atlantic salmon feeding at West Greenland;
- diseases and parasites (red vent syndrome and UDN);
- progress with implementing the Quality Norm for Norwegian salmon populations;
- progress on development of reference points for Atlantic salmon in Canada that conform to the Precautionary Approach;
- review of proposed smolt-to-adult supplementation (SAS) activity in the Northwest Miramichi River, Canada;
- progress in stock assessment models - Embedding Atlantic salmon stock assessment within an integrated Bayesian life cycle modelling framework; and
- new opportunities for sampling salmon at sea.

Relevant information is also presented in the summary of Annual Progress Reports, CNL(16)14.

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

In 2014, the Council agreed 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 and that Parties/jurisdictions be requested to advise the Secretariat of any new studies relating to the socio-economic values of the wild Atlantic salmon. None had been provided.

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

A report on the Management and Sampling of the St Pierre and Miquelon Salmon Fishery, CNL(16)17 (Annex 18), was presented by the representative of France (in respect of St Pierre and Miquelon). This report was also considered in the North American Commission.

6.8 **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.

7. Other Business

7.1 The representative of the European Union informed the Council about potential funding of €600,000 that the European Union could be providing to NASCO in 2017 for research

projects focussing on sea lice models and telemetry. This funding would ideally be used during 2017 or 2018 and hopefully a contract will be in place by the end of 2016. Under its rules, the European Union can only contribute 80% of the cost of any specific project but several EU Member States/jurisdictions have signified that they will explore ways to complement this funding. She indicated that this was good news given the discussions on the IYS and an expression of the European Union's commitment to improving understanding of various challenges facing wild Atlantic salmon. She hoped that this funding arrangement might continue in future years.

7.2 The representative of Canada referred to new investment in the science sector in Fisheries and Oceans Canada of CAN$40million. As a consequence, 135 new scientists are to be hired to work in Atlantic, Arctic and Pacific regions, including six new scientists to work on Atlantic salmon and other diadromous species in Eastern Canada. He referred to a new Atlantic Salmon Research Joint Venture to enhance the effectiveness and efficiency of the salmon science community and maximise the support it provides to salmon conservation programmes. He referred to the desirability of links with those working on salmon in the North-East United States.

7.3 A Closing Statement was tabled by the representative of the North Pacific Anadromous Fish Commission (Annex 19).

8. Date and Place of Next Meeting

8.1 The Council accepted an invitation to hold its Thirty-Fourth Annual Meeting in Varberg, Sweden during 6 - 9 June 2017.

8.2 The Council accepted an invitation to hold its Thirty-Fifth Annual Meeting in the United States of America during 12 - 15 June 2018.

9. Report of the Meeting

9.1 The Council agreed the report of its meeting.

10. Press Release

10.1 The Council agreed a Press Release, CNL(16)67 (Annex 20).

Note: The annexes mentioned above begin on page 23, following the French translation of the report of the meeting. A list of Council papers in included in Annex 21.

CNL(16)68

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

Steigenberger Hotel, Bad Neuenahr-Ahrweiler, Allemagne

7 - 10 juin 2016

1. Ouverture de la session

1.1 Le Président de l'OCSAN, M. Steinar Hermansen (Norvège), a ouvert la session et présenté le Dr German Jeub, Directeur général pour la politique de l'UE, la coopération internationale et les pêcheries dans le Ministère fédéral allemand de l'alimentation et de l'agriculture, qui a accueilli les délégués à Bad Neuenahr-Ahrweiler (Annexe 1). The Président a ensuite fait une déclaration d'ouverture (Annexe 2).

1.2 Des déclarations d'ouverture écrites ont été présentées par le Canada, le Danemark (pour les Iles Féroé et le Groenland), l'Union européenne, la Norvège, la Fédération de Russie et les Etats-Unis (Annexe 3).

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

1.4 Une déclaration d'ouverture écrite a été présentée au nom de toutes les Organisations non gouvernementales (ONGs) qui ont participé à la session annuelle (Annexe 5).

1.5 Des présentations ont été effectuées par M. Clemens Fieseler (Union européenne) sur le Saumon atlantique en Allemagne, CNL(16)55, et le Dr Laura Gangi (Commission internationale pour la Protection du Rhin) sur le Saumon atlantique dans le Rhin, CNL(16)56.

1.6 Le Président a exprimé son appréciation pour ces déclarations et présentations.

1.7 Une liste des participants est donnée en Annexe 6.

2. Adoption de l'ordre du jour

2.1 Le Conseil a adopté son ordre du jour, le CNL(16)53 (Annexe 7).

3. Election des Membres du Bureau

3.1 Le Conseil a réélu M. Steinar Hermansen (Norvège) en tant que Président et M. Jóannes Hansen (Danemark (pour les Iles Féroé et le Groenland)) en tant que Vice-Président.

4. Questions financières et administratives

4.1 Rapport du Comité financier et administratif

Le Président du comité financier et administratif, M. Raoul Bierach (Norvège), a présenté le rapport du Comité, CNL(16)5. Sur les conseils du Comité, le Conseil a pris les décisions suivantes :

(i) accepter les comptes vérifiés de 2015, FAC(16)2 ;

(ii) adopter un budget pour 2017 et noter un budget prévisionnel pour 2018, CNL(16)62 (Annexe 8) ;

(iii) confirmer la nomination de Saffery Champness en tant que commissaires aux comptes de 2016 ;

(iv) demander que le Président écrive au président de la Commission OSPAR concernant 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 ;

(v) adopter le rapport du Comité financier et administratif, CNL(16)5.

5. Informations scientifiques, techniques, juridiques et autres

5.1 Rapport du Secrétaire

Le Secrétaire a fait un rapport au Conseil, CNL(16)6, sur : les statuts de ratification de la Convention et d'accession à celle-ci et le statut de membre des Commissions régionales; la réception des contributions pour 2016 ; les demandes effectuées pour le statut d'observateur de l'OCSAN ; les demandes effectuées pour mener une pêche à des fins de recherches scientifiques ; pêche au saumon en eaux internationales par des Parties extérieures à l'OCSAN ; travail de relations publiques de l'OCSAN ; le partenariat FAO FIRMS ; et toutes nouvelles études relatives aux valeurs socio-économiques du Saumon atlantique sauvage.

Le Secrétaire a rapporté qu'il n'y avait eu aucun changement aux statuts de ratification de la Convention ou d'accession à celle-ci, ni au statut de membre des Commissions régionales. Toutes les contributions pour 2016 ont été reçues, et il n'y avait pas d'arriérés. 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.

Il y avait eu deux candidatures au statut d'ONG depuis la dernière session annuelle. Der Atlantische Lachs, basé en Allemagne, a pour objectif de réintroduire et protéger le Saumon atlantique en Europe centrale. Une candidature a aussi été reçue de la part de Salmon & Trout Conservation (Scotland). Les objectifs de Salmon & Trout Conservation (Scotland) sont de protéger les pêcheries, les stocks de pêche et plus largement l'environnement aquatique pour le bien du public. Suite à une consultation avec le Président, le statut d'observateur a été accordé aux deux organisations. L'OCSAN comporte désormais 37 organisations détenant le statut d'observateur accrédité.

Le Secrétaire a rapporté que les garde-côtes norvégiens et islandais avaient encore été contactés pour obtenir des informations relatives aux 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 allant du 1er avril 2015 – 31 Mars 2016. Aucunes nouvelles informations n'ont été obtenues de la part des ports ni sur des débordements et transbordements au cours de l'année dernière suggérant qu'une quelconque pêche au saumon aurait été effectuée par des navires de parties extérieures à l'OCSAN. Le Comité externe de révision de la performance avait conclu que l'OCSAN avait fait preuve d'une réaction rapide pour traiter la pêche INN au-delà de la zone de juridiction de pêche par des navires enregistrés par des parties extérieures à l'OCSAN. Cependant il considérait que l'OCSAN devrait envisager d'améliorer ses efforts actuels de surveillance en faisant appel à la coopération de la CPANE et l'OPANO pour rapporter toute activité suspecte de pêche au saumon INN détectable lors de leurs opérations de Suivi, de Contrôle et de Surveillance. Un rapport sur la coopération avec la CPANE et l'OPANO est inclus en CNL(16)16.

5.2 Rapport sur le progrès de la suggestion d'Année internationale du saumon

Lors de sa session annuelle de 2014, le Conseil a été avisé 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 pourrait constituer une bonne occasion de sensibiliser le public au sujet du saumon au niveau mondial, les défis qui se présentent et les efforts considérables qui sont effectués pour conserver et restaurer la ressource et avait demandé que le Secrétaire entre en contact avec le Secrétariat du CPAPN et rapporte tous nouveaux développements. Un représentant de la CPAPN, M. Mark Saunders, a assisté à la session annuelle de 2015 et a effectué des présentations auprès du Comité international de rechercher sur le Saumon atlantique (CIRSA), son Groupe consultatif scientifique (GCS) et le Conseil. Le Conseil avait demandé que le Secrétaire et le Président de la délégation des Etats-Unis, M. Dan Morris, continuent de travailler avec la CPAPN sur des dispositions pour une IYS et d'envisager l'éventuelle implication et contribution de l'OCSAN dans une telle initiative.

Un rapport sur la liaison entretenue avec la CPAPN depuis la dernière session annuelle concernant l'IYS a été présenté par M. Morris, CNL(16)7 (Annexe 9). L'Annexe 3 de ce rapport incluait une Proposition succincte pour une Année internationale du saumon (intitulée 'Du saumon et des hommes dans un monde changeant'). Il incluait une proposition de justification, une vision, des thèmes et délais pour l'IYS, de même que des informations détaillées sur sa portée et le modèle de gouvernance et des considérations budgétaires initiales.

Le Conseil a reconnu qu'une IYS pourrait présenter une excellente opportunité pour sensibiliser le public aux facteurs déterminant l'abondance du saumon et les défis environnementaux et anthropogéniques auxquels ils font face et les mesures entreprises pour les traiter.

Le Conseil a exprimé son acceptation générale de l'Annexe 3 du document CNL(16)7, sous réserve des points de clarification provisoires suivants :

- compte tenu du besoin de coordination à différents niveaux de juridiction, le désir de s'assurer que l'IYS est bien planifiée pour un maximum de succès possible et l'éventuelle charge de travail considérable que cela implique, le Conseil désignerait

2019 comme année focale. Cependant, il reconnait que certains événements pourraient débuter avant 2019, et d'autres se poursuivre après cette date. Le Conseil préférerait en particulier que le Symposium international IYS ait lieu en automne 2018 pour que la collaboration en matière de science et de gestion soit bien établie au début de l'année focale ;

- le Comité de coordination de l'IYS mènera son travail conformément aux conseils des Comités de direction des ORGP ;
- le Conseil a convenu qu'il mettrait une somme de £60 000 à disposition pour qu'un Fond spécial pour l'IYS soit établi conformément au Règlement financier 6.1. Cette somme est incluse dans le budget pour 2017 et pourrait être reportée jusqu'à ce que la dépense soit nécessaire. Le Fond sera utilisé conformément à un programme de dépenses proposé par le Comité de direction de l'Atlantique Nord et devra être convenu entre les Parties. Le Conseil a aussi convenu que tout surplus de fonds disponible à la fin de l'année financière 2016 (et années financières ultérieures) qui ne sont pas nécessaires pour le Fond d'obligation contractuelle devrait être crédité au Fond spécial de l'IYS.

Le Conseil a convenu que le Secrétaire devrait consulter les Parties et les ONGs dans un bref délai suivant la session annuelle de 2016 pour leur demander de confirmer d'ici au 15 juillet 2016 qui sera leur représentant dans le Comité de direction de l'Atlantique Nord. Il a été demandé à M. Dan Morris de présider ce Comité.

Il serait demandé au Comité de direction de l'Atlantique Nord de développer des recommandations pour une session d'une demi-journée sur l'IYS lors de la session annuelle de 2017 et sur les activités de l'IYS pour 2018.

Le Conseil a convenu que les représentants de l'OCSAN au sein du Comité de direction du Symposium international IYS seraient le Secrétaire, un représentant scientifique nominé par l'Union européenne et un directeur nominé par le Canada.

Le Conseil a convenu que les représentants de l'OCSAN au sein du Comité de coordination seraient initialement M. Dan Morris et le Secrétaire, mais qu'une participation plus importante serait convenue à un stade ultérieur.

Le Conseil a noté que le succès de l'IYS dépendra de l'implication et de la coopération d'une multitude de partenaires et que l'approche pour sa mise en œuvre devrait, par conséquent, être flexible, inclusive et adaptable.

Le Conseil a exprimé son appréciation à la CPAPN d'avoir invité l'OCSAN à le rejoindre dans cette initiative importante qui pourrait soutenir les efforts de conservation et de restauration du saumon et stimuler des nouveaux projets de recherche.

5.3 **Rapport sur les activités de l'Organisation en 2015**

Conformément à l'Article 5, paragraphe 6 de la Convention, le Conseil a adopté un Rapport sur les activités de l'Organisation en 2015, CNL(16)8.

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

Le Président a annoncé que le gagnant du Grand Prix de 2016 du Programme incitatif de l'OCSAN au renvoi des étiquettes était M. Maxim Mamaev, Saint Petersburg, Fédération de Russie. L'étiquette gagnante avait été appliquée à un saumon femelle dans la section de Falls Creek de la Rivière Ponoi après qu'il soit retourné à la rivière en automne. Il a été repris dans la section Hourglass dans la rivière Ponoi et a ensuite été relâché. Le Conseil a adressé ses félicitations au gagnant.

5.5 **Conseils scientifiques du CIEM**

Le représentant du CIEM a présenté le rapport du Comité consultatif (ACOM), CNL(16)9 (Annexe 10). La présentation du CIEM est disponible dans le document CNL(16)64.

5.6 **Rapport de la Commission internationale de recherche sur le Saumon atlantique**

Le rapport de la session du Comité international de recherche sur le Saumon atlantique, CNL(16)10 (Annexe 11), a été présenté par son Président, M. Rory Saunders (Etats-Unis). Une présentation sur le travail d'étiquetage et de suivi entrepris par la Fédération du Saumon atlantique a été présenté par M. Dave Meerburg (ONGs), CNL(16)63.

5.7 **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 à l'état des stocks devant être utilisées avec la Base de données des rivières et avait établi un Groupe de travail comprenant Raoul Bierach (Norvège), Gérald Chaput (Canada), Stephen Gephard (Etat-Unis) (Président) et John McCartney (Union européenne). Il a été demandé au Groupe de travail de, *inter alia*, recommander un système de classification à employer dans les juridictions pour indiquer l'état des stocks relatif aux limites de conservation ou, quand celles-ci n'ont pas été établies, d'autres points de référence ou indicateurs d'abondance. Il leur a aussi été demandé de recommander des changements de la Base de données des rivières de l'OCSAN pour mettre en œuvre le système de classification recommandé. Le Groupe avait mené son travail par correspondance et s'était réuni durant la session annuelle de 2015. Le Président du Groupe de travail a présenté le rapport du Groupe, CNL(16)11 (Annexe 12).

Le Conseil a adopté le nouveau système de classification proposé par le Groupe de travail et a demandé que les informations actuellement conservées dans la Base de données des rivières soient envoyées par le Secrétaire aux Parties/juridictions dans un tableau Excel pour qu'elles soient mises à jour. Le Conseil a reconnu que la mise à jour de ces informations serait une entreprise importante et a convenu qu'il faudrait demander aux Parties/juridictions de remplir les mises à jour en utilisant les nouvelles catégories de stock d'ici au 31 décembre 2017. Cependant, le Conseil a encouragé les Parties/juridictions à fournir les informations avant ce délai si cela était possible, pour permettre de mettre la Base de données des rivières à jour plus tôt. Les informations pour tous les champs de la Base de données des rivières devraient être mises à jour ou complétées. On pourrait alors préparer un rapport sur 'l'Etat du saumon' qui serait étudié lors de la session annuelle de 2018.

Le représentant de la Norvège a fait un rapport au Conseil sur la Norme de qualité nationale pour le saumon sauvage, CNL(16)19. L'expérience en Norvège est qu'une approche fondée seulement sur les limites de conservation ne classifiera pas de façon appropriée le statut et le bien-être des stocks de saumon.

5.8 Compte rendu du Comité scientifique permanent

Le Président du Comité scientifique permanent (SSC), le Dr Paddy Gargan (Union européenne), a présenté une demande provisoire de conseil scientifique au CIEM. Le Conseil a adopté une demande de conseil scientifique du CIEM, CNL(16)12 (Annexe 13).

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

6.1 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 (APRs) conformément aux Programmes d'application de 2013 – 2018 est de fournir des informations sur toutes modifications du régime de gestion du saumon et sur les changements des Programmes d'application qui en découlent ; les mesures qui ont été prises conformément aux Programmes d'application au cours de l'année précédente ; les changements significatifs au statuts des stocks, et un rapport sur les prises ; et les mesures prises conformément aux dispositions de la Convention. Les APRs de 2016 sont contenus dans les documents CNL(16)21 à CNL(16)38, des informations supplémentaires du Canada sont fournies dans le CNL(16)40. Un résumé des rapports de 2016 (CNL(16)14) a été présenté.

Les APRs de 2016 avaient fait l'objet d'une évaluation critique par le Comité de révision des Programmes d'application/des APRs pour s'assurer que les juridictions avaient fourni un compte rendu clair du progrès de l'application et l'évaluation des mesures détaillées dans leurs Programmes d'application, de même que les informations requises en vertu de la Convention. Le Président du Groupe, M. Ted Potter (Union européenne) a présenté son rapport, CNL(16)13 (Annexe 14), au cours de la séance spéciale du Conseil. En cas de manques dans les APRs, 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 dans le CNL(16)20 (Annexe 15). Il y a eu des discussions assez larges au cours de la séance spéciale et celles-ci sont incluses en CNL(16)59 (Annexe 16).

Le Conseil a accepté les recommandations du Groupe de révision relatives à des changements au modèle de reporting et a nommé M. Lawrence Talks (Union européenne) pour travailler au sein du Groupe de révision.

6.2 **Séance spéciale thématique : Traiter les impacts de l'élevage de saumon sur le Saumon atlantique sauvage : défis et développements favorables pour atteindre les objectifs internationaux de l'OCSAN**

Lors de sa trente-deuxième session annuelle, le Conseil a convenu d'avoir une séance spéciale thématique sur une durée d'une journée lors de sa 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 M. Willie Cowan (Union européenne), Mme Kimberly Damon-Randall (Présidente) (Etats-Unis), le Dr Paddy Gargan (Union européenne), Mme Heidi Hansen (Norvège) et M. Paul Knight (ONGs) a été nommé pour travailler avec le Secrétaire sur le développement d'un Programme et Objectifs pour la séance.

Le Comité de direction avait décidé que le titre de la séance spéciale thématique de 2016 devrait être '*Traiter les impacts de la culture de saumon sur le Saumon atlantique sauvage : défis, et développements soutenant la réalisation des objectifs internationaux de l'OCSAN'*. Un programme pour la séance a été développé, CNL(16)15 et mis à jour ultérieurement (CNL(16)39). L'objectif d'ensemble pour la séance était de faciliter les échanges d'informations relatives à la protection des stocks de Saumon atlantique sauvage des impacts de la culture salmonicole et de promouvoir des pratiques de culture salmonicole durables par les moyens suivants :

- passer en revue les informations scientifiques les plus récentes sur les impacts de la culture salmonicole sur les stocks de saumon sauvage, en se concentrant en particulier sur les impacts des poux du poisson et des saumons de culture qui se sont échappé ;
- passage en revue du progrès et partage des meilleures pratiques sur les approches, y compris les cadres de règlementation, pour mettre en œuvre une gestion efficace des poux du poisson dans les exploitations salmonicoles ;
- passage en revue du progrès et partage des meilleures pratiques sur les approches, y compris les cadres de règlementation, pour s'assurer que 100% du poisson d'élevage sont retenus aussi bien en eau douce que dans les aménagements de production marins ; et
- passage en revue des nouveaux développements qui pourraient faciliter la réalisation des objectifs internationaux de l'OCSAN pour les poux du poisson et le confinement y compris les développements technologiques (e.g. conception des cages et confinement fermé), les stratégies d'élevage, l'accès à un large choix de soins thérapeutiques, les contrôles biologiques, les régimes de suivi, la formation et les efforts de recapture.

Les ONGs ont enregistré un article intitulé 'Elevage de saumon : dommages persistants et solutions requises', CNL(16)54. Un rapport de la séance spéciale thématique sera préparé par le Comité de direction. Le Conseil a convenu de tenir une session spéciale thématique sur une demi-journée au cours de sa session annuelle de 2017 sur le thème des risques et avantages pour les populations de Saumon atlantique des activités d'élevage en écloserie et d'empoissonnement. Un comité de direction, comprenant des représentants devant être nommés par le Canada, l'Union européenne, la Norvège et les ONGs sera nommé pour travailler avec le Secrétaire sur la question du développement d'un Programme et Objectifs pour la session.

6.3 **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 a adopté un 'Plan d'action pour mettre en œuvre les conseils de l'étude externe des performances et la révision des 'Prochaines étapes' 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(16)16 (Annexe 17). Les conseils figurant dans le Plan sont liés à :

- des actions planifiées ou mises en œuvre à l'époque du développement du 'Plan d'action' 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 de l'étude externe des performances et la révision des 'Prochaines étapes' de l'OCSAN (section 2) ; et
- actions pour renforcer le travail de gestion des pêcheries au saumon de l'OCSAN (section 3).

Le Conseil a accueilli le progrès effectués pour mettre en œuvre les recommandations. Le Conseil a convenu que le Secrétaire de l'OCSAN devrait accepter l'invitation du Secrétaire de la CPANE d'effectuer une présentation du travail de l'OCSAN et de sa CIRSA, y compris les inquiétudes que soulèvent les prises accessoires.

6.4 **Liaison avec l'industrie salmonicole**

En 2013, le Conseil a convenu qu'un point devrait être maintenu dans son ordre du jour intitulé 'Liaison avec l'industrie salmonicole', au cours duquel un représentant de l'Association des producteurs de saumons internationaux (ISFA) serait invite à participer à un échange d'informations sur des questions relatives à l'impact de l'aquaculture sur le Saumon atlantique sauvage. Les réunions régulières du Groupe de Liaison ne se poursuivraient pas, mais, si un besoin particulier se posait, on pourrait envisager de convoquer un groupe mixte *Ad hoc*. L'ISFA était représenté à la trente-troisième session annuelle par le Professeur Phil Thomas et M. Knut Hjelt.

Le Professeur Thomas a remercié le Conseil pour l'occasion de contribuer à la session annuelle et les hôtes allemands pour les dispositions qu'ils avaient prises. Il a noté que ses commentaires étaient effectués au nom de l'industrie salmonicole en général. Il a exprimé la déception qu'il éprouvait du fait que, bien que la séance spéciale thématique était le produit d'une bonne intention et qu'il y avait eu d'excellentes présentations, la séance n'était pas aussi équilibrée qu'il l'aurait souhaité. Il s'est dit déçu du cycle annuel habituel lors duquel les ONGs avaient l'occasion de marquer des points hors juridictions et nombre des points qui ont été soulevés auraient pu être soulevés avec les juridictions individuelles par téléphone plutôt que lors de la séance. Sa plus grosse inquiétude étant que l'industrie se développe rapidement et que ces avancées n'avaient pas été reflétées dans les présentations. Il a avancé que l'ISFA aurait dû être impliquée dans la planification de la session. Il a aussi indiqué qu'il y avait une présomption au sein des Parties de l'OCSAN que la mortalité naturelle des saumons est élevée, mais les facteurs responsables de cette mortalité sont mal connus. Il a indiqué que référence avait été faite à des niveaux élevés de prédation et ceci avait été confirmé au travers des études effectuées en Ecosse. De plus, il a indiqué qu'il était clair dans les conseils du CIEM

que l'exploitation dans les rivières constitue une source importante de mortalité et que certaines juridictions n'avaient pas introduit des contrôles adéquats. Il a souligné que toute application de développement d'élevage de saumon doit tenir compte de sa relation avec le poisson sauvage. En résumé, l'ISFA soutient l'OCSAN mais ne soutient pas le processus et il a suggéré que la célébration des merveilles du saumon sauvage envisagée devrait correspondre celle des saumons d'élevage qui est essentiel en tant que système de production avec une empreinte carbone faible et que personne n'a désormais besoin de pêcher des poissons sauvages pour se nourrir.

Le représentant des ONGs a indiqué à quel point les ONGs avaient apprécié la séance spéciale thématique. Il a indiqué que l'intervention de l' ISFA ne faisait que confirmer la frustration des ONGs envers l'industrie salmonicole qui est dans le déni quant aux impacts sur le poisson sauvage, et que ceci est la raison pour laquelle les ONGs ont assisté à la séance spéciale thématique où elles peuvent exprimer leurs inquiétudes. Il a souligné que l'OCSAN est une organisation de conservation du saumon sauvage. Les ONGs acceptent pleinement que le saumon sauvage puisse être confronté à de nombreux problèmes, mais qu'il s'était avéré que l'élevage de saumon avait des impacts. Il a indiqué qu'en attendant que l'industrie ne se présente à la table de discussion prête à étudier les solutions, qui existent, alors les ONGs continueront à soutenir des sessions semblables au sein de l'OCSAN.

La représentante de l'Union européenne a exprimé son appréciation pour la séance spéciale thématique qui avait facilité un dialogue ouvert et transparent et elle espérait recevoir le rapport du Comité de direction résumant les résultats et soulignant les meilleures pratiques auxquelles il était possible de donner suite. Elle s'est interrogée pour savoir si des discussions bilatérales auraient été aussi productives. Elle a fait référence à la déclaration de l'ISFA concernant les nouveaux développements technologiques et a demandé si l'on pouvait attirer l'attention de l'OCSAN sur ceux-ci dans ce point de l'ordre du jour. Au cours de 20 dernières années, l'Union européenne a dépensé des sommes considérables dans la recherche pour améliorer la technologie et traiter les différents défis du secteur aquacole, mais elles n'ont pas toutes été présentées pour cause de manque de temps.

Le Conseil a accepté que ce point serait maintenu à l'ordre du jour pour sa session annuelle de 2017.

6.5 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 dans l'ordre du jour du Conseil et il a été demandé au CIEM de fournir des informations adéquates, contenues dans le document CNL(16)9. Les informations ont été fournies sur :

- la migration océanique et les zone d'alimentation des saumoneaux d'élevage en écloserie islandais étiquetés d'étiquettes de stockage de données (DST) ;
- le changement de la structure trophique et des dynamiques énergétiques dans l'Atlantique Nord-Ouest : implications pour le Saumon atlantique se nourrissant au Groenland occidental ;
- maladies et parasites (syndrome inflammatoire périanal et l'UDN) ;

- progrès dans la mise en œuvre de la Norme de qualité pour les populations de saumon norvégien ;
- progrès du développement des points de référence pour le Saumon atlantique au Canada conformes à l'Approche de précaution ;
- passage en revue de l'activité suggérée de l'ensemencement avec des saumons juvéniles/saumoneaux élevés en captivité jusqu'à l'âge adulte (ESA) dans la rivière Miramichi Nord-Ouest, Canada ;
- progrès des modèles d'évaluation de stock – Ancrer l'évaluation du stock de Saumon atlantique dans un cadre de modèle Bayésien de cycle de vie intégré ; et
- nouvelles opportunités pour échantillonner le saumon en mer.

Des informations pertinentes sont aussi présentées dans le résumé des rapports de progrès annuel, CNL(16)14.

6.6 **Incorporation des facteurs sociaux et économiques dans la gestion du saumon**

En 2014, le Conseil a convenu qu'à l'avenir les séances spéciales thématiques auront lieu sur l'intégration des facteurs socio-économiques dans les décisions relatives à la protection, la restauration et l'accroissement des habitats et à l'aquaculture et il sera demandé aux Parties/juridictions d'informer le Secrétariat de toutes nouvelles études relatives aux valeurs socio-économiques du Saumon atlantique sauvage. Aucunes n'ont été fournies.

6.7 **Pêcherie de saumons à St Pierre et Miquelon – Gestion et Échantillonnage**

Un rapport sur la gestion et l'échantillonnage de la pêcherie au saumon à St Pierre et Miquelon, CNL(16)17 (Annexe 18), a été présenté par la représentante de la France (pour St Pierre et Miquelon). Ce rapport a aussi été étudié par la Commission Nord-américaine.

6.8 **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.

7. Divers

7.1 La représentante de l'Union européenne a informé le Conseil du financement potentiel d'un montant de €600,000 que l'Union européenne pourrait mettre à la disposition de l'OCSAN en 2017 pour des projets de recherche se concentrant sur les modèles de poux du poisson et la télémétrie. Ce financement serait dans l'idéal employé au cours de l'année 2017 ou 2018 et dans l'espoir qu'un contrat serait en place d'ici la fin 2016. En vertu de ses règlements, l'Union européenne peut seulement contribuer à 80% du coût de tout projet spécifique mais plusieurs Etat/juridictions membres de l'UE ont signifié qu'ils exploreraient des façons de compléter ce financement. Elle a indiqué qu'il s'agissait d'une bonne nouvelle compte tenu des discussions sur l'IYS et une expression de l'engagement de l'Union européenne dans l'amélioration de la compréhension de divers défis auxquels le Saumon atlantique est confronté. Elle espérait que cette

disposition financière se poursuivrait à l'avenir.

7.2 Le représentant du Canada a fait référence à un nouvel investissement dans le secteur de la science pour les Pêcheries et les Océans Canada de CAN$40million. En conséquence, 135 scientifiques devraient être recrutés pour travailler dans les régions Atlantique, Arctique, et Pacifique, y compris six nouveaux scientifiques qui travailleraient sur le Saumon atlantique et autres espèces diadromes au Canada oriental. Il a fait référence à une nouvelle coentreprise de recherche sur le saumon de l'Atlantique pour valoriser l'efficacité et l'efficience de la communauté scientifique spécialiste du saumon et maximiser le soutien qu'elle apporte aux programmes de conservation de saumon. Il a fait référence au caractère désirable de liens avec les personnes qui travaillent sur le saumon aux Etats-Unis du Nord-Est.

7.3 Une Déclaration de clôture a été enregistrée par le représentant de la Commission de poisson anadrome du Pacifique Nord (Annexe 19).

8. Date et lieu de la prochaine session

8.1 Le Conseil a accepté une invitation de tenir sa trente-quatrième session annuelle à Varberg, Suède au cours des 6 - 9 juin 2017.

8.2 Le Conseil a accepté une invitation de tenir sa trente-cinquième session annuelle aux Etats-Unis au cours des 12 - 15 juin 2018.

9. Compte-rendu de la session

9.1 Le Conseil a accepté le compte-rendu de la session.

10. Communiqué de presse

10.1 Le Conseil a convenu d'un communiqué de presse, CNL(16)67 (Annexe 20).

Note: Une liste d'articles du Conseil est incluse en Annexe 21.

Annex 1

Welcoming Address made by Dr German Jeub, Director General for EU Policy, International Cooperation and Fisheries in the German Federal Ministry of Food and Agriculture at the Thirty-Third Annual Meeting of NASCO

It is a great pleasure for me to welcome you today for the 33rd Annual Meeting of the North Atlantic Salmon Conservation Organization (NASCO) in Bad Neuenahr-Ahrweiler, one of Germany's most popular wine and spa towns that is known throughout the world for the Apollinaris Mineral Water spring. Federal Minister Christian Schmidt has asked me to pass on to you his very best regards. He wishes you every success and the best of luck for this year's meeting.

At this point, I would like to express my particular thanks to Mr Steinar Hermansen, the President of NASCO, for having accepted our invitation to hold the event in Germany and for giving us, for the first time, the opportunity, by acting as host, to be able to support NASCO in its important work to preserve this fantastic fish species – Atlantic salmon.

NASCO's Annual Meeting is a good opportunity for all stakeholders to draw the attention of the German public both to the major international efforts to protect salmon and to the successful national measures to re-introduce salmon in order to raise people's awareness.

You will surely have noticed that your conference hotel is located right on the bank of the river Ahr. The Ahr is a tributary of the Rhine and once harboured an excellent salmon population. What was probably the last Ahr salmon was spotted in 1960 below the estuary of the Ahr where it flows into the Rhine. Afterwards, the Ahr river's original salmon population was irretrievably extinct.

All salmon stocks in Germany suffered the same fate, unfortunately, not only in the Rhine catchment area but also key salmon stocks of the Elbe and Weser, for example. The extinction of original salmon populations means more than just one fish species having vanished. The disappearance of salmon deprived those who lived on the banks of the rivers of important fisheries that had shaped their economy and culture over many centuries.

There were some committed citizens, however, who did not want to resign themselves to this deplorable situation. Thus, at the end of the 1970s, initial attempts at a re-settlement of salmon in Germany were made in tributaries of the Lower Elbe. As the water quality generally improved in many rivers, more and more idealists followed suit throughout Germany. Today, we have re-settlement projects for salmon in all major river catchment areas that are mostly implemented in co-operation with fishing associations and fisheries and nature conservation authorities.

Over the past two to three decades, we had to learn that salmon re-settlement is a very difficult and lengthy undertaking. This is compounded by the fact that the native parent stock of this fish species, that is particularly closely adapted to the environmental conditions of its home rivers, is no longer available for re-settlement purposes. Major work is therefore still needed in order to re-establish self-sustaining salmon stocks in Germany.

Most of the work to re-settle salmon in Germany is done in the federal states, with fishermen's and anglers' associations in particular being the most active protagonists in returning salmon. In the Rhine catchment area, the International Commission for the Protection of the Rhine is doing excellent work in co-ordinating individual initiatives.

During the excursions which we have organised along the Ahr and Sieg on Friday and Saturday, you will have the opportunity to get to know, on the ground, two examples of successful salmon re-introduction projects in the Rhine catchment area.

Tonight, I will have the pleasure to invite you, on behalf of the Federal Ministry of Food and Agriculture, which is also competent for fisheries policy within the Federal Government, to a reception in the Roman villa - one of the main attractions of Bad Neuenahr-Ahrweiler.

Tomorrow evening we would then be delighted to welcome you to a joint dinner here at the Steigenberger Hotel.

I wish you every success for your Annual Meeting here in Bad Neuenahr-Ahrweiler and hope that you will have good and productive talks and discussions and, above all, that you will have some spare time to enjoy the beautiful scenery of the Ahr valley with its vineyards and exceptional rock formations.

You are most welcome as our guests.

Thank you for your attention.

Annex 2

Opening Statement made by the President of NASCO

Distinguished Delegates, Observers, Ladies and Gentlemen,

I would like to thank Dr Jeub for his warm welcome and our German hosts for the excellent arrangements made for this the Thirty-Third Annual Meeting of NASCO.

It is a great pleasure to add my welcome to you all and to be here with you in the beautiful town of Bad Neuenahr-Ahrweiler in Rheinland-Pfalz. We are meeting in the catchment of the mighty River Rhine, a vital artery for the communities and industries that utilise its waters and an important link between northern and southern Europe since Roman times. Once a hugely productive salmon river, severe industrial pollution and the creation of barriers to migration resulted in the loss of salmon from the river in the 1950s.

However, we should not dwell on past environmental failings but rather celebrate the commitment and dedication that are being devoted to restoring salmon to this most international of rivers; indeed the salmon was adopted as a symbol of the river's recovery. We will hear more about the important work being undertaken to restore salmon in the Rhine and other rivers in Germany later on.

We have much to occupy us over the next four days. Our programme includes a Theme-based Special Session to review progress in addressing the impacts of salmon farming on the wild stocks. The purpose of these sessions is to allow for a more detailed exchange of information on a topic related to one of NASCO's agreements and consideration of best practice. I will have more to say at the start of the session tomorrow.

In addition there will be a Special Session on the evaluation of progress on the important actions contained in the Implementation Plans. We are now about half way through the second reporting cycle and our Review Group has taken a close look at progress to date. We will also be considering a proposal to hold an International Year of the Salmon with our colleagues in the North Pacific. This surely could be opportunity to raise awareness of the challenges and uncertainties facing salmon as well as highlighting how to improve understanding of the factors driving abundance. We will also consider a new stock classification system for use with our Rivers Database, an important outreach tool that we intend to use to develop a State of the Salmon report.

Continuing poor, and in some areas critically low, salmon abundance mean that effective action is vital both domestically and internationally. We will need to critically review our efforts, focusing on all known impact factors, if we are to conserve and restore the wild Atlantic salmon as the Convention requires of us. The need for international co-operation and exchange of information has probably never been more vital.

We will surely need to work efficiently in the time available to us, so it is good to know that we can benefit from an excellent spirit of co-operation and a wide-range of experience and expertise. And of course our highly effective Secretariat will, as always, support us well.

With that, I would like to move on noting that, although there will be no verbal statements by Parties and observers, written statements provided to the Secretariat will be distributed and annexed to our report.

Thank you for your attention.

Annex 3

Opening Statements submitted by the Parties

Opening Statement submitted by Canada

Distinguished Delegates, Ladies and Gentlemen, it is a pleasure for the Canadian delegation to participate at this Annual Meeting in the wonderful city of Bad Neuenahr-Ahrweiler, Germany. I want to commend our hosts, the city of Bad Neuenahr-Ahrweiler, Germany, and the EU for selecting this venue and the excellent arrangements that have been made by the Secretariat.

The importance of this meeting and NASCO in general continues to be reinforced by the situation facing many of our salmon stocks. In 2014 some of the Canadian stocks had their worst years in recent memory. This trend continued for most of our salmon stocks in 2015. We are here to address this challenge, and to represent a great number of people and communities who depend on salmon in some way.

Last year, we had a challenging but productive meeting in Happy Valley - Goose Bay, Newfoundland and Labrador. We believe the difficult discussions and decisions made during that meeting marked an important turning point for NASCO. While we continue to be concerned with the level of Greenland's unilateral catch level, in particular their 'factory landings', we greatly appreciate the extensive work they have done, as outlined in their progress report. This was a challenging process for Greenland, but one that must continue. As Canada stated in 2015, we offer our support for continued implementation of the regulatory measure by Greenland throughout 2016 and 2017.

At the core of our discussions last year was the recognition that the effective management of a dynamic and complex stock like Atlantic salmon requires clear catch monitoring, control and surveillance, comprehensive scientific advice and fundamental co-operation at both the domestic and international levels. Co-operation last year led to progress, but there is more to be done.

We continue to encourage France (in respect of St Pierre and Miquelon) to join NASCO as a formal member, and to implement a comprehensive approach to the management of Atlantic salmon, in accordance with the objectives of NASCO, and in particular the six tenets for effective management.

Working together with conservation as our top priority will benefit all of our communities.

In Canada, the importance of Atlantic salmon and the need to strengthen our management measures have been the focus of a Ministerial appointed Advisory Committee. The Committee has been active over the last year and has produced a fulsome set of recommendations on Atlantic salmon, which we will speak to during this week.

I am pleased to note that the Canadian government has allocated a permanent augmentation to our ocean and fisheries science budgets of $40 million Canadian dollars annually. For Atlantic salmon this will translate into six new biologists and researchers and the proposed establishment of a science partnership called the Atlantic Salmon Research Joint Venture. This will allow Canada to have more capacity to tackle the science questions of Atlantic salmon particularly the marine survival issue.

We also look forward to discussing a range of other issues with you, including the opportunities that we have regarding the International Year of the Salmon.

I look forward to working closely with all of you and to a productive meeting this week.

Thank you.

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

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

On behalf of Greenland and the Faroe Islands I would like to begin by thanking our German hosts for arranging this meeting in this beautiful location of Bad Neuenahr-Ahrweiler.

Commercial salmon fisheries at sea were once of utmost importance both to the Faroe Islands and to Greenland. It was therefore at great expense to our fishing industries that the Faroese and Greenlandic governments decided to take responsibility and refrain from all commercial fishing of wild salmon in our waters with a view to re-building the stocks. Still, even though we have stopped our commercial salmon fisheries, we retain our full rights to conduct fishing in accordance with NASCO's guidelines. It is not the limited fishery in Greenland that has prevented the recovery of the salmon.

Despite the sacrifices made by our commercial salmon fishing industries, we have not seen any significant recovery of the stocks and it must thus be concluded that we need to consider other factors and measures in order to improve the stocks. It is important to focus on all aspects of the life-cycle of the salmon. The river nations must step-up and keep their side of the bargain too and create the best possible conditions for re-building the salmon stocks.

Greenland and the Faroe Islands are of the opinion that it was a step in the right direction to establish a procedure where the Parties now submit a written Annual Progress Report. The reports show that there is progress in the management of wild salmon, even though we also see examples of different challenges in some jurisdictions. Although there is still room for improvement in the reporting, we want to emphasise the importance of ensuring full transparency on how the Parties manage wild salmon in their rivers and waters.

We would like to take this opportunity to reiterate what we have stated at a number of previous meetings, namely that the best and fairest solution would be if NASCO could regulate fisheries for wild salmon in the home waters of all Parties and jurisdictions of NASCO.

Salmon farming in the North Atlantic has increased significantly since NASCO was established. The industry has become a central part of the economies of several North Atlantic countries, including the Faroe Islands. The aquaculture industry can pose a threat to the wild salmon stocks, if the industry is not regulated carefully. This year's Theme-Based Special Session addressing the impacts of salmon farming on wild Atlantic salmon is therefore of great interest to all countries in the region with aquaculture industries, as it is important to implement and maintain high regulation standards in our industry in order to safeguard wild salmon stocks.

Mr President, the Faroe Islands and Greenland are looking forward to a productive week in this lovely Steigenberger Hotel and will assure you that we are prepared to work in a constructive way so that we collectively can contribute to a successful outcome of this 33rd Annual NASCO Meeting.

Thank you.

Opening Statement submitted by the European Union

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

The European Union is honoured to host the 33rd Annual Meeting of NASCO in this enchanting corner of Germany. I would like to acknowledge the hospitality and generosity of the German authorities, as well as the relentless work of our German colleagues and of the Secretariat for the excellent organisation of this meeting in Bad Neuenahr-Ahrweiler.

There is certainly no more appropriate place for a NASCO meeting than here, at the heart of a region that several years ago was home to Atlantic salmon and that now is a symbol of unprecedented re-stocking efforts and ecological river restoration. None of these achievements could have been possible without the concerted action and the close co-operation among the States and Regions of the Rhine watershed.

It is exactly this spirit of co-operation that has shaped NASCO since its creation. And we need to strengthen this co-operation even further. Atlantic salmon stocks are under pressure. Some of these pressures know no borders. No single country or region can solve the resulting challenges alone, no matter how big they might be. In 2014 many southern European rivers hit historically low levels in salmon return rates. The returns in 2015 did not show significant signs of improvement. We all know that the path of recovery may take years, probably decades. But we also know that business as usual is not an option. So, we need to continue working together to see where and how the existing framework could be improved, what we can better achieve by strengthening our commitment and how we can mutually benefit from each other's experiences.

At the same time, Atlantic salmon stocks also face pressures requiring bold action and strong political commitment at a domestic level. The EU Member States and jurisdictions have several examples to offer. The most remarkable and recent one is the package of new conservation measures that took effect in Scotland from 31 March 2016 and that, among other things, prohibits any killing of salmon in coastal waters for a period of three years.

Even when pressures are better addressed at the domestic level, NASCO has an important role to play. It can raise awareness, catalyse discussions, draw up guidelines and facilitate knowledge-sharing and exchange of best practices. It is exactly this type of open and transparent dialogue that we expect from the Theme-based Special Session on aquaculture this year.

Last but not least, we should not forget that without sufficient knowledge, we are essentially acting in the dark. Only armed with knowledge and sound scientific results can we ensure a better management and conservation of Atlantic salmon stocks. This year the EU has earmarked 600,000 € as a voluntary contribution to NASCO to fund two projects. One intended to shed further light on the mortality at sea of Atlantic salmon and one to develop a sea lice model that would contribute to improved best management practices for sea lice control.

The EU is looking forward to a fruitful co-operation with all of you during this meeting and beyond, to collectively pave the way to the achievement of the long-term objectives of NASCO and ensure that Atlantic salmon remains an integral part of our ecological legacy to the future generations.

Opening Statement Submitted by Norway

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

On behalf of Norway, I would like to thank the EU and Germany for hosting the Thirty-Third Annual Meeting of NASCO.

In Norway, the wild Atlantic salmon runs have reduced by more than half during the last three decades. One of the main reasons seems to be reduced survival at sea. But there are local and regional differences, most likely due to adverse human impacts on the stocks.

Revised fisheries regulations have been adopted this year. The regulations have to a large extent compensated for reduced salmon runs, and, with the exception of the Tana river, overharvesting is no longer a major threat.

The work on combating the salmon parasite *Gyrodactylus salaris* has given good results in recent years. The parasite has been eradicated from many large and important salmon rivers. After the parasite eradication, the local salmon stocks are quickly re-built from the gene bank.

One of the items we will discuss in depth this week is aquaculture. Aquaculture is a major Norwegian industry. There is a broad political will to facilitate increased aquaculture production in Norway, provided the environmental impact is within acceptable limits. Last year, the Norwegian Parliament decided, based on a White Paper presented by the Government, on the principles for further growth in Norwegian aquaculture. For NASCO, it is of particular interest that it is the impact of aquaculture on wild salmonids that in the short term will decide the growth rate in aquaculture production. My delegation will present this in more detail during the Theme-based Special Session later this week.

A Quality Norm for wild stocks of Atlantic salmon in Norway was adopted in 2013. This Norm is a classification tool that is used to assess the status of individual salmon stocks and guide the management authorities in their decisions that may have implications for wild salmon. The first classification was conducted in 2016 for 104 rivers. The classification includes nearly all of the most important Norwegian salmon rivers, representing 76% of the total combined Norwegian spawning target.

The results indicate that the stock situation in Norway is far from as good as a categorisation based on management target attainment alone would suggest. The experience of utilising the Quality Norm in Norway suggests that an approach based only on conservation limits will not adequately classify the status and well-being of salmon stocks, and that the approach being suggested by NASCO's Stock Classification Working Group will be more appropriate for use with the NASCO Rivers Database.

On this background, the Norwegian Parliament has asked the Government for a plan addressing the status of the stocks of anadromous salmonids, and how both management and dissemination of knowledge can be strengthened to secure sustainable development.

The Norwegian delegation would like to thank Germany and the Secretariat for the excellent preparations for this meeting. We look forward to a productive and successful meeting.

Opening Statement submitted by the Russian Federation

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

On behalf of the Russian delegation I am delighted to greet all participants of the Thirty-Third Annual Meeting of NASCO in Bad Neuenahr-Ahrweiler, Germany.

I would like to thank Germany for hosting this meeting in the beautiful Ahr valley on the bank of the salmon spawning tributary of the River Rhine, renowned in the salmon world for its unique Atlantic salmon restoration programme.

This year the Theme-Based Special Session will focus on the theme of developments in relation to minimising the impacts of farmed salmon on wild salmon stocks. The threats of aquaculture to the wild salmon stocks such as sea lice, genetic interactions and spread of diseases are well known and NASCO has adopted a number of agreements and guidelines designed to minimise their impacts on the wild salmon stocks. However an exchange of information among Parties/jurisdisctions is required and we believe that this Theme-based Special Session will provide a unique international forum for, and facilitate information exchange and collaboration relating to, protecting wild Atlantic salmon stocks from impacts of salmon farming and to promote sustainable salmon farming practices.

Another important issue for the Russian Federation concerns management of salmon mixed-stock fisheries in coastal areas. In autumn 2015 the Russian Federation and Norway signed the Memorandum of Understanding between the Ministry of Climate and Environment (Norway) and the Federal Agency for Fishery (the Russian Federation) on co-operation in management of, and monitoring and research on, wild Atlantic salmon in Finnmark County (Norway) and the Murmansk region (the Russian Federation). A joint Working Group was established under the Memorandum to deal with relevant issues. We do believe that the joint effort of the two NASCO Parties will lead to regulatory measures for mixed-stock fisheries which will help to minimise interceptory harvests in the area of fisheries jurisdiction of one Party of salmon originating in the rivers of another Party.

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

Thank you for attention.

Opening Statement submitted by the United States

Mr President, Secretary Hutchinson, distinguished Delegates, Observers, Ladies and Gentlemen,

The U.S. Delegation to the 33rd Annual Meeting of NASCO is delighted to join our NASCO colleagues and friends here in beautiful Bad Neuenahr-Ahrweiler, Germany. These Annual Meetings are an opportunity for us to work together to achieve NASCO's goal of conserving, restoring, enhancing and rationally managing Atlantic salmon through international co-operation taking into account the best available scientific information.

On behalf of the United States, I offer my sincere thanks to our German hosts for their hospitality and for the excellent accommodations and also to the European Union for inviting us to such a beautiful meeting location. Being close to the Rhine River, which historically was the largest salmon river in Europe and is now undergoing extensive efforts to restore a salmon run, offers us inspiration for the work we will be doing here this week. I also wish to express our sincere appreciation to our Secretary and his staff, whose hard work each year sets the stage for our deliberations. Thank you for your tireless efforts in support of this body.

On Sunday, the West Greenland Commission held an important Inter-sessional Meeting that gave us an early opportunity to learn more about Greenland's efforts to improve the monitoring, control and catch accountability of their mixed-stock fishery. While it is clear that more work is needed, we greatly appreciate the management actions taken by Greenland over the past year. We look forward to continued progress and discussions on this important issue during this Annual Meeting.

As we have stated at past meetings, many Atlantic salmon stocks in North America continue to be at great risk. The United States has made significant progress on our 'Species in the Spotlight' initiative, which aims to turn the tide for this species from a declining trend toward recovery. In the context of this initiative, we are working with our other federal and non-federal partners to take specific action to address the threats to Atlantic salmon. One key area of U.S. focus, which was highlighted during last year's Theme-based Special Session, is restoring connectivity to important habitats by replacing culverts, removing dams and ensuring that fish passage meets very high standards for passage efficiency and survival at those barriers that cannot be removed.

Another important U.S. initiative, called NOAA's 'Habitat Blueprint', provides an important framework that has facilitated further progress in Atlantic salmon recovery. This has been accomplished by aligning the priorities of concerned U.S. federal agencies in a manner that gives special emphasis to the Penobscot River in support of protections, collaborative restoration efforts and education about the importance of healthy rivers. This is important for Atlantic salmon since approximately 75% of all U.S. returns come from this river.

Similar to Canada's recent convening of a Ministerial Advisory Committee on Atlantic Salmon, these two domestic programmes have brought welcomed and much needed visibility and support to Atlantic salmon in the United States. And we are excited about the prospect of further expanding attention to salmon conservation, science and recovery through adoption of the proposal for an International Year of the Salmon (IYS). The IYS would create forums for scientific collaboration between parties in the Atlantic and the Pacific, and it would provide vehicles for public engagement regarding the conservation and management of salmon, the

restoration and protection of rivers and the responsibilities of those of us who live within the 'salmosphere'.

During the Theme-based Special Session on aquaculture this week, we intend to share some of the lessons we have learned on actions to minimise to the greatest extent possible, impacts of salmon aquaculture on wild Atlantic salmon stocks in U.S. waters. Our aquaculture industry has made great strides in this regard and has been recognised as a leader in producing sustainable farmed Atlantic salmon. We look forward to sharing some details behind the success of this collaboration at the Theme-based Special Session on Wednesday and to learning from all of the Parties this week as we take a good look at the science, the status and trends in Atlantic salmon and consider possible ways to enhance the protection and restoration of salmon.

We also look forward to the Special Session on the Annual Progress Reports. Describing the efforts we all undertake to conserve and rationally manage Atlantic salmon in our home waters and our accountability relative to NASCO agreements is primarily driven by the Implementation Plan process. As such, we must continue to strive to make this process, including the development and review of Annual Progress Reports, as robust and effective as possible. We hope to have a rigorous discussion of the 2015 annual reports this year. We urge everyone to take full advantage of this Special Session.

In closing, I would like to reiterate that the United States remains very concerned about the global status of Atlantic salmon and, in particular, the critically endangered nature of salmon populations of U.S. origin. The risk of extinction of many 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 and to a successful meeting.

Thank you.

Annex 4

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

Mr 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 33rd 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 currently has 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;
- the downstream passage of fish at hydropower dams.

The EIFAAC project on recreational angling which culminated in an EIFAAC Symposium hosted by the Norwegian Government in Lillehammer from 15 - 17 June 2015, may be of particular interest. This project supported in-depth discussions between stakeholders, including anglers, managers, scientists, commercial interests, equipment providers and legislators on the future of recreational fisheries. NASCO was actively involved in this important symposium and indeed jointly recognised the best paper with a joint EIFAAC/NASCO award. EIFAAC's 29th Session will take place in Poland from 26 – 30 June 2017, with the associated symposium entitled 'Adapting Inland Fisheries to Climate Change'.

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 life-cycle.

I would like to take this opportunity to thank our hosts and facilitators for their wonderful welcome to Bad Neuenahr-Ahrweiler and for the facilities and hospitality provided. Finally, may I wish all of you a productive and enjoyable NASCO session.

Annex 5

Opening Statement submitted by NASCO's accredited Non-Government Organisations

The NGOs welcome the opportunity to participate in the 33rd Annual Meeting of NASCO in Bad Neuenahr-Ahrweiler, Germany, and appreciate NASCO's inclusive approach to our involvement in the proceedings.

We call on the Parties to NASCO to be far less complacent in their actions to conserve and restore wild Atlantic salmon. Around the North Atlantic, 2014 was one of the poorest years for salmon runs ever and the situation scarcely improved in 2015, especially for the large salmon so important to seeding our rivers.

The NGOs have had an active year. We helped organise the Theme-based Special Session on aquaculture and we served on the Review Group that assesses the Annual Progress Reports by Parties in reaching the goals set out in their Implementation Plans. NGOs are leaders in at-sea mortality research that entails tracking salmon during their migration and we eagerly participate in ICES and NASCO to share what we have learned. We were represented on NASCO's Working Group on Monitoring and Control to encourage progress in not only the salmon fishery at Greenland, but also the salmon fisheries of all Parties to the West Greenland Commission and we participated in a Scoping Session for the International Year of the Salmon, proposed for 2018.

The Implementation Plan and Annual Review process was adopted by NASCO to provide more insight, transparency and accountability by Parties to NASCO. All Parties have signed agreements that would improve fisheries management, the protection of wild Atlantic salmon from the impacts of salmon aquaculture and result in the restoration and protection of salmon habitat. For the NGOs, the review process has become increasingly tedious, as some Parties, despite many polite requests, continually submit unclear reports and insufficient data and measurements to indicate whether progress is being made.

The NGOs can only hope that the presentations by Parties to this year's Theme-based Special Session are not just glowing reports on the implementation of policy and regulation, but on the actual results that are being achieved to protect wild Atlantic salmon from the impacts of salmon aquaculture, backed up by data. Let us keep in mind that the reason for which we are all gathered here is not to protect the aquaculture industry, but to protect wild Atlantic salmon from the impacts of that industry.

We would like to hear that Parties recognise the impacts on wild Atlantic salmon of their sea cage salmon farming operations. We want to know that they are taking steps with measurable outcomes to protect wild Atlantic salmon. We will be delighted to hear about their plans to move to closed containment facilities. It is commonly accepted that Norway has the most progressive standards and regulations to protect wild Atlantic salmon from the impacts of aquaculture, and yet salmon farming is having disastrous impacts on Norwegian wild salmon, with massive sea lice outbreaks and escapes and loss of genetic diversity in wild stocks because of inter-breeding. In Scotland, Canada and Ireland, where government control of the impacts are not as high as in Norway, salmon farming is wreaking havoc on wild salmon and sea trout. Closed containment facilities are the answer to this dire situation.

All salmon fisheries should be taking place in rivers where the populations of these specific rivers are known to be surpassing conservation limits, yet mixed-stock fisheries continue in Greenland, Norway, England and Canada. The NGOs acknowledge and appreciate that Scotland has announced the closure of coastal netting for three years, and that the Faroe Islands continue to keep their marine salmon fishery closed.

Our Atlantic salmon's only hope is to turn bureaucratic reports by Parties on their Implementation Plans into actual measurable actions to conserve and restore them. As an example, let us have Canada, Scotland, Denmark on behalf of the Faroes and the Russian Federation provide, in a transparent manner, actual baseline data to allow measureable action in reaching the international goals for sea lice and containment as set out in the NASCO Guidelines.

The NGOs hope that, at this meeting in Germany, a re-energised commitment to precautionary management on behalf of wild Atlantic salmon will be applied throughout the North Atlantic and all Parties commit to doing their part in at-sea research into salmon mortality to help guide management measures, such as controlling the impacts of predation. Restoration of the species depends on it.

Annex 6

List of Participants

* Denotes Head of Delegation

CANADA

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DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

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Annex 7

CNL(16)53

Agenda

1. Opening of the Meeting

2. Adoption of Agenda

3. Election of Officers

4. Financial and Administrative Issues

4.1 Report of the Finance and Administration Committee

5. Scientific, Technical, Legal and Other Information

5.1 Secretary's Report

5.2 Progress Report on the Proposed International Year of the Salmon

5.3 Report on the Activities of the Organization in 2015

5.4 Announcement of the Tag Return Incentive Scheme Grand Prize

5.5 Scientific Advice from ICES

5.6 Report of the International Atlantic Salmon Research Board

5.7 Report of the Working Group on Stock Classification

5.8 Report of the Standing Scientific Committee

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

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

6.2 Theme-based Special Session: Addressing impacts of salmon farming on wild Atlantic salmon: challenges to, and developments supporting, achievement of NASCO's international goals

6.3 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

6.4 Liaison with the Salmon Farming Industry

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

6.6 Incorporating Social and Economic Factors in Salmon Management

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

6.8 Reports on the Conservation Work of the Three Regional Commissions

7. **Other Business**

8. **Date and Place of Next Meeting**

9. **Report of the Meeting**

10. **Press Release**

Annex 8

CNL(16)62

North Atlantic Salmon Conservation Organization
2017 Budget, 2018 Forecast Budget and Five-Year (2017 - 2021) Budgeting Plan

		Budget 2017	Forecast 2018
	Expenditure		
1.	Staff-related costs	339,600	352,000
2.	Travel and subsistence	28,000	30,000
3.	Research and advice	61,000	62,000
4.	Contribution to Working Capital Fund	0	0
5.	Meetings	11,000	11,000
6.	Office supplies, printing and translation	26,000	27,000
7.	Communications	16,500	17,500
8.	Headquarters Property	40,000	42,000
9.	Office furniture and equipment	6,500	6,500
10.	Audit and other expenses	10,000	10,000
11.	Tag Return Incentive Scheme	4,800	4,800
12.	International Atlantic Salmon Research Fund	0	0
13.	Contribution to Contractual Obligation Fund	35,000	35,000
14.	Contribution to Recruitment Fund	15,000	15,000
15.	Contribution to IYS Fund	60,000	60,000
	Total Expenditure	**653,400**	**672,800**
	Income		
16.	Contributions - Contracting Parties	601,400	620,800
17.	General Fund – Interest	2,000	2,000
18.	Income from Headquarters Property	50,000	50,000
19.	Surplus or Deficit (-) from 2015	0	0
	Total Income	**653,400**	**672,800**

2017 Budget & 2018 Forecast Budget (Pounds Sterling) - Expenditure by Sub-section

		Budget 2017	Forecast 2018
1.	**Staff-related costs**		
1.1	Secretariat members	227,300	235,000
1.2	Support staff	28,300	30,000
1.3	Staff Fund contributions, allowances, & other costs	84,000	87,000
	Total	**339,600**	**352,000**
2.	**Travel and subsistence**		
2.1	Travel to post and Annual Meeting	8,000	9,000
2.2	Official travel and subsistence	20,000	21,000
	Total	**28,000**	**30,000**
3.	**Research and advice**		
3.1	Annual contribution to ICES	61,000	62,000
3.2	Other research and advice	0	0
	Total	**61,000**	**62,000**
4.	**Contribution to Working Capital Fund**	**0**	**0**
5.	**Meetings**		
5.1	Costs of Annual Meeting	4,000	4,000
5.2	Costs of other meetings	7,000	7,000
	Total	**11,000**	**11,000**
6.	**Office supplies, printing and translation**		
6.1	Office supplies	17,000	18,000
6.2	Printing	7,000	7,000
6.3	Translations	2,000	2,000
	Total	**26,000**	**27,000**
7.	**Communications**		
7.1	Telecommunications	5,000	6,000
7.2	Postage and courier services	3,000	3,000
7.3	IT support & website	8,500	8,500
7.4	Communications, professional support and design	0	0
	Total	**16,500**	**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	1,500	1,500
9.2	Equipment	6,000	5,000
	Total	**6,500**	**6,500**
10.	**Audit and other expenses**		
10.1	Audit and accountancy fees	5,000	5,000
10.2	Bank charges and insurances	1,000	1,000
10.3	Miscellaneous	4,000	4,000
	Total	**10,000**	**10,000**
11.	**Tag Return Incentive Scheme**	**4,800**	**4,800**
12.	**Contribution to IASRF**	**0**	**0**
13.	**Contribution to Contractual Obligation Fund**	**35,000**	**35,000**
14.	**Contribution to Recruitment Fund**	**15,000**	**15,000**
15.	**Contribution to IYS Fund**	**60,000**	**60,000**
	Total Expenditure	**653,400**	**672,800**

2016 Budget Contributions (Pounds Sterling) Adjusted for Confirmed rather than Provisional 2014 Catches (tonnes)

Party	2014 catch (provisional)	2014 catch (confirmed)	2016 contribution (provisional)	2016 contribution (confirmed)	Adjustment
Canada	106	118	69,196	73,070	3,875
Denmark (Faroe Islands and Greenland)	58	58	50,795	50,438	-357
European Union	308	313	146,634	146,626	-8
Norway	490	490	216,404	213,392	-3,013
Russian Federation	81	81	59,612	59,114	-498
USA	0	0	28,560	28,560	0
Total	**1,043**	**1,060**	**571,200**	**571,200**	**0**

Note: A positive adjustment represents an underpayment in 2016.

NASCO Budget Contributions for 2017 and Forecast Budget Contributions for 2018 (Pounds Sterling)

Party	2015 catch (provisional)	2017 contribution	Adjustment from 2016	2017 adjusted contribution	2018 forecast contribution
Canada	134	78,953	3,875	82,828	81,500
Denmark (Faroe Islands and Greenland)	58	51,228	-357	50,872	52,881
European Union	299	139,145	-8	139,138	143,634
Norway	583	242,749	-3,013	239,736	250,759
Russian Federation	80	59,254	-498	58,756	61,165
USA	0	30,070	0	30,070	31,040
Total	**1,155**	**601,400**	**0**	**601,400**	**620,800**

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

Five-year NASCO Budgeted Expenditure and Income Projections 2017 - 2021

		2017	Forecast 2018	Forecast 2019	Forecast 2020	Forecast 2021
	Expenditure					
1.	Staff related costs	339,600	352,000	360,000	365,000	372,000
2.	Travel & Subsistence	28,000	30,000	21,000	30,000	30,000
3.	Research & advice	61,000	62,000	65,000	68,000	70,000
4.	Contribution to Working Capital	0	0	0	0	0
5.	Meetings	11,000	11,000	35,000	11,000	11,000
6.	Office supplies, printing and translations	26,000	27,000	28,000	29,000	30,000
7.	Communications	16,500	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	10,000	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	35,000	35,000	20,000	20,000	20,000
14.	Contribution to Recruitment Fund	15,000	15,000	15,000	15,000	15,000
15.	Contribution to IYS Fund	60,000	60,000	0	0	0
	Total	**653,400**	**672,800**	**626,800**	**622,300**	**635,300**
	Income					
16.	Contributions of Contracting Parties	601,400	620,800	574,800	570,300	583,300
17.	Interest Received on General Fund	2,000	2,000	2,000	2,000	2,000
18.	Income from HQ property	50,000	50,000	50,000	50,000	50,000
	Total	**653,400**	**672,800**	**626,800**	**622,300**	**635,300**

Annex 9

CNL(16)7

Progress Report on the Proposed International Year of the Salmon

Background

1. At NASCO's Thirty-First (2014) Annual Meeting, the Council was informed that the North Pacific Anadromous Fish Commission (NPAFC) was considering organising an International Year of the Salmon (IYS). The NPAFC Secretariat had indicated that it would be keen to have NASCO as a core partner and would keep NASCO informed as the initiative developed. The Council had agreed that this may be a very good opportunity to raise awareness of the issues facing the salmon globally and the considerable efforts being made to conserve and restore them and asked that the Secretary liaise with NPAFC. Last June, at NASCO's Annual Meeting in Happy Valley-Goose Bay, a representative of NPAFC, Mr Mark Saunders (Chairman of NPAFC's IYS Working and Study Groups), made a presentation outlining NPAFC's ideas for an IYS. He indicated that NPAFC had endorsed, in principle, the concept of an IYS and had held a Scoping Workshop in February 2015 with a further Scoping Meeting planned for 2016.

2. Because of time constraints at NASCO's 2015 Annual Meeting, the Council did not have an opportunity to discuss the IYS, but asked that the Secretary and the Head of the US Delegation, Mr Dan Morris, continue to liaise with NPAFC on arrangements for an IYS and to consider NASCO's possible involvement in, and contribution to, this initiative. Accordingly, a background document, APR38.512, was prepared and circulated to NASCO Parties for comments and the feedback received was summarised in document APR38.545 (Annex 1) and formed the basis of the consultations with NPAFC.

NPAFC's Initial Vision for the IYS

3. NPAFC conceived the IYS as an intensive burst of internationally coordinated, interdisciplinary, stimulating scientific research focused on salmon, and their relation to people. NPAFC considered that the current pace of research to be too slow in the face of environmental change and that additional marine research, focused on distribution and abundance, is needed. NPAFC proposed that the theme of the IYS should be 'Salmon and People in a Changing World'. The species covered would include salmon, trouts and char and the research would examine the cumulative effects of a broad array of human and natural factors affecting these species in order to manage what can be controlled and to mitigate what cannot. NPAFC considers that the IYS should not include research related to farmed salmon production, but research related to understanding interactions between wild and farmed salmon would be considered. The IYS would include a comprehensive communications and engagement plan to facilitate two-way communication between researchers and target audiences, including: students and their teachers; new researchers and their professors; indigenous peoples; communities with salmon; resource managers; the general public; salmon fishers and industry. New technologies would be used both to inform and to receive input through citizen science. While the IYS would be a multi-year initiative, NPAFC noted the benefits of having a year as a 'call to action'. Further details are available on the NPAFC website at www.npafc.org/new/science_IYS.html.

Views of the NASCO Parties

4. Despite the limited deliberations within NASCO prior to and during the 2015 Annual Meeting, the Council had confirmed that the IYS may be a very good opportunity to raise awareness of the salmon globally, the issues facing them and the considerable conservation and restoration measures being taken. It would also be a good opportunity to build closer cooperation with those involved in salmon conservation and management in the North Pacific Ocean, Baltic Sea and possibly the Arctic Ocean. In 2002, NASCO, ICES, NPAFC, the North Pacific Marine Science Organization (PICES) and the International Baltic Sea Fishery Commission (IBSFC) cooperated in holding a workshop entitled 'Causes of Marine Mortality of Salmon in the North Pacific and North Atlantic Oceans and in the Baltic Sea'. The report of the meeting was published as an NPAFC Technical Bulletin. The workshop demonstrated the benefits of cooperation and information exchange and there was support for an expanded international symposium to build on the initial exchanges during the workshop.

5. Following inter-sessional consultations with NASCO Parties, it was confirmed that there is unanimous support for an IYS. NASCO Parties favour a clearly defined, one year initiative (consistent with the NPAFC 'call to action') to raise awareness of the challenges and opportunities facing salmon and in support of fund-raising for new research to better understand the factors driving salmon abundance throughout the 'salmosphere'. The theme of the IYS proposed by NPAFC, 'Salmon and People in a Changing World' captures both the need for a major outreach programme and further research. NASCO Parties consider that focusing the IYS on public relations and outreach activities should not diminish the importance of, or the need for, new research or improved exchanges of information and enhanced cooperation among scientists working in the North Pacific and North Atlantic Oceans and the Baltic Sea. On the contrary, such an initiative could greatly assist in levering new funds from the public and private sectors. NASCO Parties considered that the nature and scope of the research proposed in the three areas may, however, differ and identification of research priorities could best be dealt with on a regional basis. In that regard, NASCO's International Atlantic Salmon Research Board is developing an international telemetry programme, SALSEA - Track, to partition marine mortality along the salmon's migration routes.

6. It was suggested that 2018 (or possibly 2019) might be a more realistic target year for the IYS than 2017 (as originally envisaged by NPAFC) if the outreach and public relations initiatives are to be well-planned and coordinated throughout the 'salmosphere'. That does not preclude other activities being undertaken in parallel as resources permit. There is unanimous support among NASCO Parties for a major international symposium to launch the IYS and to allow for a review of the state of the 'salmosphere', highlight the challenges and opportunities facing salmon, identify research priorities and possibly develop a declaration on exchanging information on methodologies, data and research findings. This could be in addition to a dénouement symposium at the end of the research programme. Other outreach initiatives that might be considered could include:

   - exhibits e.g. at natural history museums, aquaria etc. In this regard, the Natural History Museum in London attracts more than 5 million visitors each year and importantly has partners worldwide;
   - seeking cooperation from international fisheries organisations to include themes and sessions relating to salmon in their annual conferences during the IYS;

- development of curriculum packs for schools (e.g. through the Atlantic salmon conservation schools network);
- development of an IYS website or agreed pages for inclusion on the partners' websites;
- IYS Declarations relating to commitments to salmon conservation, research and management in the legislative bodies of Parties/jurisdictions to NASCO and NPAFC;
- production of information packs or templates to be adapted by Parties/jurisdictions on specific issues.

Liaison with NPAFC

7. NPAFC organised a second Scoping Meeting and Working Group meeting that were held in Vancouver, Canada, on 15 - 16 March 2016 and 17 March 2016, respectively. Dan Morris and the NASCO Secretary participated in a series of preparatory conference calls in the weeks prior to the meetings and attended the meetings themselves. NASCO had been asked to identify core partners that might participate in the IYS and an initial list was developed (NASCO's accredited NGOs, EIFAAC, ICES and the OSPAR Commission) and these organisations were invited to attend the meetings in Vancouver. EIFAAC, the OSPAR Commission and ICES were unable to attend, but it is clear from feedback received from these organisations (Annex 2) that they are supportive of the IYS. Sue Scott, Co-Chair of NASCO's accredited NGOs, participated in the Scoping Meeting and her input and expertise in communications were very much appreciated.

8. The purpose of the two-day Scoping Meeting was to seek input to inform the development of a comprehensive strategy for taking forward the IYS. Approximately 60 participants attended the meeting, including representatives of the NPAFC and NASCO Parties and Secretariats, their core partners, potential funders and other stakeholders. The objectives of the Scoping Meeting included to:
   - develop a common understanding of the IYS initiative, scope and purpose;
   - elaborate on, and further develop, the major components of the IYS strategy; and
   - identify the actions needed and the next steps to create a comprehensive IYS strategy.

9. Fifteen participants attended the Working Group meeting which reviewed the outcome of the Scoping Meeting and considered the priority actions needed, the timeframe and how to take the IYS initiative forward. The goals for the meeting included to:
   - outline the components and elements of the final IYS strategy;
   - identify the priority next steps and responsibilities, including timelines, to finalise the IYS strategy; and
   - determine the governance arrangement (process and accountabilities) and the organisations that will be involved.

10. NASCO's views were presented at both the Scoping and Working Group Meetings and appeared to have been well received. This opportunity is very much appreciated. The Workshop developed an outline proposal for the IYS (Annex 3), that provides a rationale and vision for the IYS, considers its nature, scope and timing, proposes a governance model, suggests an initial budget and identifies the possible next steps. In summary, the outline proposal recommends the following:

- that the main vision for, and aims of, the IYS include improving understanding and awareness of the factors driving salmon abundance, the environmental and anthropogenic challenges facing salmon and the measures being taken to mitigate these and to generate further support for action to implement effective management strategies to conserve and restore salmon;
- that the focus of the IYS will be during a single (launch) year when there will be special emphasis on salmon throughout the 'salmosphere', comprising concerted and coordinated public outreach, engagement and education activities to increase awareness and understanding of the issues facing salmon and in support of fundraising for research. There would be a major international symposium to launch the IYS in order to review the state of the 'salmosphere';
- that there be three phases to the IYS: an initial planning phase; a launch year (2018 or 2019); and a period for implementing new research under the IYS brand (a five-year period from the launch year);
- that the IYS brand and organisational/communication structure will persist throughout the three phases but the nature and scope of the activities undertaken will be largely a matter for decision at regional/RFMO and Party/jurisdiction levels;
- that the governance of the IYS needs to be inclusive, flexible and supportive and its success will depend on the involvement of a wide range of partners. The governance model would include a low level of common services, such as branding, information exchange on outreach initiatives and coordination of salmosphere-wide research efforts. However, most IYS activities would be conducted at regional/RFMO and Party/jurisdiction levels;
- initial budgetary provision would be needed in 2017 (if the launch year is 2018) and possibly in 2016 and the budgetary requirements could be reviewed in 2017 in the light of progress in planning the IYS; and
- NPAFC and NASCO should consider and, where necessary, revise the outline proposal for endorsement at their 2016 Annual Meetings.

11. It is recognised that there is very limited time in which to prepare for the IYS if the launch is to be in 2018. If further work and consultations are required before adoption of the outline proposal then 2019 might be a more realistic option for the launch year (although the launch symposium might still be scheduled for the last quarter of 2018).

12. The Council is asked to consider the outline proposal for the IYS and decide on appropriate action. If the Council does decide to proceed with the IYS in 2018, a number of decisions will need to be taken, ideally during the 2016 Annual Meeting, including:

    - endorsing the IYS outline proposal including nature and scope, timing and governance model;
    - agreeing an appropriate budget contribution for 2017 (the outline proposal recommends a contribution of £60,000 each from both NPAFC and NASCO);
    - appointing NASCO representatives to the IYS Coordinating Committee (not more than four, including one from the Secretariat);
    - appointing NASCO representatives to the IYS Symposium Steering Committee (not more than three, including one from the Secretariat);
    - appointing a Regional/Steering Committee (one from each Party and core partners);

- requesting that the Secretary liaise with NPAFC on the arrangements for the work of the IYS Coordinating Committee and IYS Symposium Steering Committee and with NASCO Parties on the work of the Regional Steering Committee; and
- requesting that the Secretary liaise with the European Union and the Russian Federation concerning the possible involvement of representatives from the Baltic and with the Vice-President of NASCO concerning the possible involvement of a representative of the Arctic Council.

13. Mark Saunders will again represent NPAFC at the Thirty-Third Annual Meeting of NASCO and will provide an update on the deliberations on the IYS at NPAFC's Annual Meeting (16 – 20 May 2016).

Secretary and Head of US Delegation
Edinburgh
9 May 2016

Summary of responses to the questions raised in the Discussion Document on the IYS

1. Do you support the concept of organising a clearly defined, one year (2017 or 2018) call to action or IYS initiative to raise awareness of the challenges and opportunities facing salmon in the 'salmosphere' and in support of fund-raising for new research including that envisaged under the SALSEA-Track programme, or do you support a multi-year IYS including the research programme?

There is unanimous support for an IYS. In general, NASCO Parties support a clearly defined, one year initiative to raise awareness of challenges and opportunities facing salmon and in support of fund-raising for research. Two Parties suggest that 2018 might be more appropriate as the designated IYS. It is suggested by two Parties that there may be a need to consider the duration of the IYS further when additional information is to hand on NASCO's involvement.

2. Do you support establishing a joint Steering Committee to work with partners in planning the activities for the IYS recognising that the identification of research priorities and fund-raising would be a matter for each Organisation? The Secretary and Head of the US Delegation have already been asked to liaise with NPAFC but it may be desirable to expand NASCO representation on this Steering Committee once the nature and scope of the IYS are agreed?

There is support for the establishment of a Steering Committee but a recognition of the need to define that Committee's role and composition and consider budgetary issues once the nature and scope of the IYS are agreed. Two Parties have indicated that the identification of research priorities and fund-raising should be conducted at a regional level (i.e. North Pacific, North Atlantic etc.).

3. Do you agree that the Secretary and Head of the US Delegation should participate in the next scoping meeting that NPAFC is planning in early 2016 in order to progress the initiative and that potential funders should not be approached until such time as the nature and scope of the IYS are agreed?

There is general support for the Secretary and Head of the US Delegation should participate in the next scoping meeting. One Party has suggested that either the Secretary or Head of the US Delegation should participate but we feel that it would be helpful for both to attend and NPAFC are likely to have many representatives at the meeting. There is general agreement that potential funders should not be approached until the nature and scope of the IYS but one Party has suggested that it would not have an issue with potential funders being invited to attend the meeting so long as it is made clear that the scope of the IYS has not yet been finalised.

4. Do you agree with the proposals for NASCO's core partners to cooperate in the development and implementation of the IYS?

Most Parties support involving NASCO's core partners such as its accredited NGOs and IGOs (including ICES, EIFAAC and the OSPAR Commission). One Party has suggested that it will be important that there is a global agenda and that local issues do not predominate. One Party has suggested that there is a need to resolve the nature and scope of the IYS before involving partners.

5. Do you support the proposal to hold a joint symposium with NPAFC and other core partners during the IYS to review the state of salmon in the 'salmosphere' and to identify approaches to further improve cooperation and coordination among scientists working in the North Pacific and North Atlantic Oceans and the Baltic Sea?

There is general support for a joint symposium to review the state of the salmon in the 'salmosphere', to increase awareness of the challenges and opportunities for salmon and to improve cooperation and coordination among scientists in the different regions. One Party has recognised the need to have clarification of how the symposium would be funded and that it should be focused over no more than 3 days. One Party has noted that NPAFC's vision of the IYS includes salmon, trout and char and, if the symposium is to proceed, it should cover these species.

6. Do you support the focus on other public relations initiatives outlined above or do you have other suggestions that could be considered?

There is general support for the public relations initiatives identified in the discussion document. No additional proposals were made.

7. Do you support the need to provide funds through the NASCO budget in 2017 and/or 2018 in support of the IYS, the extent to be determined in the light of the Steering Group's recommendations and that the Secretary be authorised to incur expenditure in relation to the IYS from the 2015 and 2016 budget subject to existing budgetary provision?

It is recognised that further clarification is required on the budget implications once the nature and scope of the IYS are resolved. There will be a need for further consideration of the financial implications of the IYS at NASCO's Thirty-Third Annual Meeting. Most Parties agree that the Secretary be authorised to incur expenditure in relation to the IYS from the 2015 and 2016 budget subject to existing budgetary provision. One Party has asked for further clarity on what funds are available and what they might otherwise be used for. No expenditure related to the IYS will be incurred from the 2015 budget and it is anticipated that expenditure in 2016 will be limited to attendance at the scoping meeting with the costs found from within the existing travel budget.

8. Additional comments made on the Discussion Document

One Party has suggested some additional areas of research including interactions between wild and farmed salmon, the economic and social value of moving from wild salmon fisheries to aquaculture, understanding of 'cumulative impact' and the role of citizen science for promoting the IYS and in data collection.

Statements of support for the IYS received from NASCO Core Partners (EIFAAC, ICES and the OSPAR Commission)

European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC)

EIFAAC would welcome an opportunity to support this important initiative and is particularly interested in supporting the exchange of knowledge and research as it pertains to the freshwater element of the life-cycle. While there are many issues to be considered here, we would like to ensure that specific issues associated with land locked salmon are also considered.

EIFAAC concurs that the theme 'Salmon and People in a Changing World' captures the threats and research requirements to support the conservation of the species. EIFAAC has several research projects and initiatives that could contribute to this discussion. EIFAAC would support the moving of the proposed IYS to 2018 as we already have plans and initiatives defined for 2017, for example the EIFAAC 29th Session and Symposium to be held in Poland. We have contacted the symposium hosts and can confirm that consideration could be given to the dedication of a small section of the symposium to the IYS. EIFAAC would also be supportive of an international symposium (2018) to highlight the IYS and to support the exchange of research and knowledge on global salmon issues.

International Council for the Exploration of the Sea (ICES)

ICES is considering the potential to participate in the International Year of the Salmon pending further information. There are ongoing initiatives within ICES which are relevant to highlight:

- ICES provides scientific advice to competent authorities on salmon. An example of work conducted in support of this advice is the recent ICES workshop to address the NASCO request for advice on possible effects of salmonid aquaculture on wild Atlantic salmon populations in the North Atlantic (WKCULEF) which took place 1–3 March 2016;
- ICES is an extensive network of scientists, with already existing Working Groups dealing with salmon issues, and the infrastructure exists to further activate this network on specified marine science topics, related to salmon; and
- The ICES Annual Science Conference takes place every September, and in 2017 will be in Fort Lauderdale, US. This conference could be used as a venue for activities relating to an International Year of Salmon.

More information is provided below.

Options for ICES involvement and contribution

ICES recognises that the IYS 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. It is also a good opportunity to build closer cooperation with those involved in salmon science and advice on conservation and management in the North Atlantic, North Pacific Ocean and Baltic Sea. ICES therefore endorses the concept of an IYS. However, the process is still at an early stage and there is a need to carefully consider ICES involvement in, and contribution to, such an initiative and the resources it wishes to make available to support the IYS, so that informed discussions can be held with NPAFC.

NASCO and ICES have organized several international symposia that have been well attended, well reported (both in scientific journals and reports targeting a broader audience) and with media coverage. Such initiatives could be developed directly with NPAFC and other IYS partners during the IYS. The ICES Journal of Marine Science is an excellent vehicle for publishing symposia special volumes and ICES could consider making this available for a specific high quality symposium during the IYS.

ICES have a wide range of Expert Groups dealing in many of the scientific issues requiring focus during the IYS. The information would be available to the IYS programme and possibly joint participation at some ICES Expert Groups could be arranged. ICES have infrastructure and support mechanisms for establishing Expert Groups for a wide range of ecosystem assessment challenges.

ICES have been a forerunner in developing approaches for the Ecosystem Approach to management of marine resources and in applying integrated ecosystem assessments of major fisheries resources.

IYS could submit proposals for Joint Theme Sessions during the ICES Annual Science Conference in 2017 or 2018 to showcase important research and developments in understanding marine mortality of salmonids. Joint symposia could be developed based on IYS activities which ICES could provide support for.

ICES have a very active communications section who could support any joint initiatives in publicizing and outreach activities.

International Collaboration

ICES note previous collaborations with NPAFC on salmon, notably the workshop entitled 'Causes of Marine Mortality of Salmon in the North Pacific and North Atlantic Oceans and in the Baltic Sea' which was held in 2002, and co-operatively hosted by NASCO, ICES, NPAFC, PICES and the International Baltic Sea Fishery Commission (IBSFC). There was clear feedback at this workshop on the value on maintaining links between the groups and in furthering investigations into areas of common concern which would lead to better understanding of factors affecting survival of salmonids at sea. There was also a clear understanding that it was unlikely that options for management and conservation would be improved without such an initiative.

In the intervening period, climate change processes have continued to affect major salmonid stocks. While some excellent research has been carried out in the intervening period, notably resulting in outputs from the BASIS programmes in the North Pacific and the SALSEA initiatives in the North Atlantic, there is a clear need to develop and focus programmes of research on key aspects of marine ecology affecting salmonid species and population status and in particular to co-ordinate actions across jurisdictions and salmonid species.

NPAFC has now proposed, in principle, the concept of an International Year of the Salmon and has already held the first Scoping Meeting to further develop ideas for the IYS a multi-year (2015–2022) programme centred on an intensive burst of internationally coordinated, interdisciplinary, stimulating scientific research on salmon, and their relation to people. This first scoping Workshop was held in February 2015, and ICES was identified as a key potential partner.

The NPAFC is hosting a Second IYS Scoping Meeting on March 15–16, 2016, in Vancouver, BC, and has invited ICES to join this meeting to advise and support in planning this initiative. NPAFC note that ICES share alignment with the goals of the IYS and/or its research themes and request that ICES consider joining the Second Scoping Meeting to help shape the initiative at this critical stage.

ICES considers this to 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.

This document outlines NPAFC's vision of the IYS, where ICES has a common involvement makes some suggestions for ICES possible involvement.

NPAFC's Vision for the IYS

The information presented here is based on NPAFC documents related to the IYS, the NPAFC presentation made at NASCO's Annual Meeting in Goose Bay, Canada June 2015.

NPAFC views the IYS as an intensive burst of internationally coordinated, interdisciplinary, stimulating scientific research focused on salmon, and their relation to people. It considers that new technologies, new observations and new 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. It considers that the current pace of research is too slow in the face of this change and that a burst of activity is needed to develop new tools, a coordinated approach to their development and application and field observations to close information gaps.

ICES concurs with the above statements and we are very keen, therefore, that The Scoping Meeting in Vancouver clarifies the proposed nature, scope and timing of the IYS. ICES also considers the theme of the IYS proposed by NPAFC as 'Salmon and People in a Changing World' to be appropriate.

Timing

ICES would support the current move towards a clearly defined, one year initiative (consistent with the NPAFC call to action) to raise awareness of the challenges and opportunities facing salmon and in support of fund-raising for new and important research to better understand the factors driving salmon abundance throughout the 'salmosphere'.

Nature and scope

It will include salmon, trouts and char. The rationale for the research, predominantly in the ocean and focused on distribution and abundance, is that environmental changes are occurring in the 'salmosphere' that will affect salmon. Resource managers, fishers, processors, businesses and governments need a better understanding of the future of salmon populations but there is currently insufficient knowledge to understand how the changes will play out. NPAFC considers that new insights will require an understanding of the cumulative effects of a broad array of human and natural factors affecting salmon in order to manage what can be controlled and to mitigate what cannot. *ICES concurs with this view.*

Selected key studies envisaged by NPAFC and current ICES activities include:

- comparative studies across the 'salmosphere' to understand what is driving variability and survival;

ICES have a theme session scheduled at their 2016 Annual Science Conference on "Ecosystem changes and impacts on diadromous and marine species productivity".

- application of climate forcing models up to higher trophic levels and salmon to project changes in the ecosystem and salmon;

ICES have Expert Groups active in this area and have held a number of ASC relevant theme sessions in recent years.

- winter and summer distribution in the first and second year in the open ocean;
- limitations of productivity in the open ocean;

ICES have Expert Groups active in this area and have held a number of ASC relevant theme sessions in recent years.

- application of new tagging technology to understand salmon migration and survival;
- optimal hatchery production;
- application of genomic technologies to understand the factors affecting salmon;

ICES have a dedicated Expert Group deal with these issues.

- the role of salmon in food security;
- changes in salmon and the effect on communities;
- aquaculture interactions with wild fish would be considered.

ICES have a number of relevant Expert Groups active in this area. Further, ICES have recently provided advice to OSPAR on interactions between wild salmonids and aquaculture and been asked by NASCO for advice regarding interactions of aquaculture on wild salmonids which is currently being prepared.

NPAFC considers that the IYS should include a comprehensive Communications and Engagement Plan to facilitate two-way communication between researchers and target audiences (including: students and their teachers; new researchers and their professors; indigenous peoples; communities with salmon; resource managers; the general public; salmon fishers and industry). New technologies will be used both to inform and to receive input through citizen science.

In this regard, ICES have a very active communications department who could support any joint initiatives in publicising and outreach

The OSPAR Commission

- The OSPAR Commission, and its Contracting Parties consider Atlantic salmon (*Salmo salar)* to be a species of particular concern. As such the species was added to the OSPAR list of threatened and/or declining species and habitats in 2003 (OSPAR agreement 2008-06).
- The OSPAR Commission are in the process of considering a Draft Recommendation to address conservation concerns for the Atlantic salmon that fall within the competence of OSPAR. This is seen as an important issue for OSPAR and we are keen to ensure that, within our remit, the OSPAR Commission can make a contribution to a global effort.
- OSPAR could be supportive of a focused initiative such as the proposed International Year of the Salmon. Timing-wise, if the year was 2018 or 2019 this would help any potential engagement/ alignment of activities from the OSPAR side.

Relevant information from the 2008 International Year of the Reef:

(1) despite an early proposal http://www.coralreef.gov/meeting15/dawson_iyor.pdf (from early 2006), ICRI reached final agreement that it should go ahead in October 2006 – this gave 15/16 months planning from agreement until the launch date of 21 Jan 2008.

ToRs for the coordination group were agreed in 2007

http://02cbb49.netsolhost.com/secretariat/japangm/docs/ToR_IYOR_CU.pdf

(2) the following presentation introduces the International Year of the Reef and sets out the agreed objectives as well as providing information on various activities, side events etc., to give a feel for the types of activities that were undertaken – everything from children's drawing competitions to a UNEP small grants initiative, and a campaign to raise awareness about precious corals.

https://www.cbd.int/cepa/cepafair/2008/icri-2008-05-en.pdf

(see http://www.toopreciousto wear.org/_partners/ecofriendly.html)

(3) the IYOR action plan

http://www.env.go.jp/nature/biodic/coralreefs/pdf/international/w_meeting_20/international20_10_eng.pdf

(4) you tube channel https://www.youtube.com/user/IYOR2008

(5) a review of all that went on http://www.reefcheck.org/reef-news/international-year-of-the-reef-2008-in-review

Outline proposal for an International Year of the Salmon (IYS)

'Salmon and People in a Changing World'

This proposal was developed at a meeting of an International Year of the Salmon (IYS) Working Group convened by NPAFC and comprising representatives of NPAFC and NASCO. The meeting was held in Vancouver, Canada on 17 March 2016. The proposal is intended to support NPAFC and NASCO in deciding how best to take forward the exciting prospect of an international focus on salmon and their importance to people in the North Pacific and North Atlantic Oceans and potentially also the Baltic and Arctic regions. While NPAFC and NASCO and several of their core partners have endorsed the concept of an IYS in principle, this proposal differs somewhat from an earlier proposal considered by NPAFC and presented to NASCO.

1. Rationale

Salmon are an important biological and economic resource throughout their range, including in the North Pacific and North Atlantic Oceans and the Baltic Sea (collectively referred to as the 'salmosphere'). They face many challenges and uncertainties not least those associated with climate change. There is a need to advance understanding and awareness of the issues facing salmon around the salmosphere, and their implications for communities that benefit from the resource, through implementation of a programme of new research, collaboration and outreach.

2. Vision

The overall theme of the International Year of the Salmon (IYS) is 'Salmon and people in a changing world'. The extraordinary life history of salmon exposes them to many environmental and anthropogenic factors influencing their health and abundance. The IYS seeks to raise awareness of what humans can do to better ensure salmon and their varied habitats are conserved and restored. Increasingly the pace of our scientific efforts to understand the factors affecting salmon under a changing climate is not rapid enough to effectively support the management of salmon and allow us to realize the important social and economic benefits that salmon provide now and into the future. Therefore the IYS also seeks to stimulate an investment in research which will leave a legacy of knowledge, data/information systems, tools and a new generation of scientists equipped to provide timely advice that will inform the conservation, restoration and rational management of salmon.

The proposed aims of the IYS are to:

- improve scientific understanding and public and political awareness of the factors driving salmon abundance, the environmental and anthropogenic challenges facing salmon and the measures being taken to mitigate these;
- generate further support for strategies to conserve, restore and rationally manage salmon;
- develop a legacy of collaboration among organisations and researchers across disciplines in countries throughout the salmosphere;
- inspire and support a new generation of researchers and managers;

- improve understanding and awareness of the ecological, social, cultural and economic values of salmon; and
- engender a call to action to support research and conservation of salmon and their supporting environment throughout the salmosphere.

3. Themes

The proposed core outreach, engagement, and education themes for the IYS include improving public and political awareness of the status of salmon stocks and their cultural, social and economic importance and of the challenges they face from major environmental changes and a variety of anthropogenic factors. The outreach and education initiatives could be adapted in scale to address these ideas across the salmosphere, in the individual jurisdictions and even in communities adjoining salmon rivers.

The proposed research themes for the IYS are as follows:

- *Status of Salmon:* to understand the present status of salmon and their environments;
- *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;
- *New Frontiers:* to develop new technologies and analytical methods to advance salmon science and to explore the uncharted regions of the salmosphere;
- *Human Dimension:* to improve the resilience of people and salmon through the connection and collaboration of salmon-dependent communities, indigenous peoples, youth, harvesters and resource managers across the salmosphere;
- *Information Systems:* to develop an integrated archive of accessible electronic data collected during the IYS and tools to support future research.

4. Timing

It is proposed that the focus of the IYS will be during a single year when there will be special emphasis on salmon throughout the salmosphere, comprising concerted and coordinated public outreach, engagement and education activities to increase awareness and understanding of the issues facing salmon and in support of fundraising for research. Any programme of research requires extensive planning, funding, data collection and analysis before the findings can be disseminated; this process will take many years. Throughout this period, the IYS brand and organisational/communication structure will persist. The nature and scope of the activities undertaken will, however, be largely a matter for decision at regional/RFMO and party/jurisdiction levels. The IYS initiative will, therefore, comprise three phases (planning, launch and research) with the intention that the IYS focal year will be held in 2018. These phases are as follows:

Planning (2016 – 2017): develop an IYS brand, website, brochures, posters newsletters and other materials; develop an outreach approach and communications strategy; confirm research themes, identify research priorities and develop research plans; develop criteria for IYS endorsement of research proposals; identify and engage core partners; agree the governance model and appoint members of Committees; identify capacity requirements; develop a fund-raising strategy; and further develop and refine budgets.

Launch (2018): launch the IYS focal year, possibly during 2018, by convening an international symposium focusing on the state of the salmosphere and to facilitate the development of a legacy of improved collaboration among organisations and scientists throughout the salmosphere; initiate a significant outreach and communications initiative to raise awareness of the values of salmon, the uncertainties and challenges facing salmon and the measures being taken to conserve, restore and rationally manage them and in support of fund-raising for new research to better understand the future of salmon in a rapidly changing salmosphere. Outreach activities could include exhibits at museums and aquaria; themes and sessions related to the IYS at the annual meetings of international fisheries organizations and regional science societies; symposia and workshops; development of educational materials for schools; development of IYS webpages and newsletters; IYS Declarations in the legislative bodies of the Parties to NASCO and NPAFC and core partners; preparation of a State of the Salmon report (reports) or an Atlas (Atlases) of salmon distribution and abundance.

Implement and report on new research (2018 – 2022): conduct research; analyse and publish results; and disseminate findings through convening an international dénouement symposium to review the accomplishments of IYS, to share findings, and to consider whether coordination at the salmosphere-level should continue. Local symposia or workshops with IYS endorsement might also be organised. Research priorities would be resolved at the regional (e.g. Pacific, Atlantic and Baltic) level but new and ongoing research proposals could seek IYS endorsement. There would be a need to maintain a level of outreach activities during the implementation of the IYS research.

5. Scope

All life history stages of salmon of the sub-family Salmoninae to reflect the different mandates of the partner organisations. In the case of the North Atlantic and Baltic, the IYS would focus on Atlantic salmon (*Salmo salar*) while in the North Pacific it would cover Pink salmon (*Oncorhynchus gorbuscha*), Chum salmon *(O. keta),* Sockeye salmon *(O. nerka),* Coho salmon *(O. kisutch*), Chinook salmon (*O. tshawytscha*), Cherry salmon (*O. masou*) and Steelhead trout (*O. mykiss).* Each lead organisation (i.e. NPAFC and NASCO) would resolve if it wishes to expand this scope to cover other species (e.g. char and trout) or non-anadromous forms of the species listed above in its own research plan, outreach plan, and other IYS activities. The lead organisations would also liaise with organizations dealing with the Arctic and Baltic to seek their involvement in the IYS.

6. Governance

The governance of the IYS needs to be inclusive, flexible and supportive and its success will depend on the involvement of a wide range of partners It is recognised that there may be different issues affecting salmon around the salmosphere, different research priorities and a different focus of activities in different regions. The IYS will be adaptable in scale depending on funding received and support for regional/RFMO and party/jurisdiction specific initiatives. The governance structure may need to be reviewed occasionally for its adequacy and effectiveness, depending on how the initiatives develop. It is anticipated that most of the IYS activities will be undertaken at the regional/RFMO and party/jurisdiction levels and there will be a range of objectives that will need to be coordinated at different levels (salmosphere, regional/RFMO (i.e. North Pacific, North Atlantic and Baltic) and within individual Parties/jurisdictions) (see attached organizational chart on page 9). The Baltic could have a separate Steering Committee but there is no RFMO for the Baltic and the advice of the EU and Russia would need to be sought on an appropriate approach for implementing the IYS in that

region (either a separate Regional Steering Committee or jointly with the Atlantic through NASCO). There may also be benefits from involving organisations concerned with the Arctic region. The objectives at different levels of governance are as follows:

Activities applying throughout the salmosphere (IYS Coordinating Committee):

- Develop an IYS brand (logo, slogan and messages) and guidelines for its use;
- Develop, maintain and possibly host IYS web pages, possibly including templates for use by participants in the IYS;
- Develop and distribute newsletters, posters, brochures and other materials concerning IYS activities at a salmosphere level;
- Define broad outreach principles;
- Develop criteria for IYS endorsement of research and review research proposals and other activities seeking IYS endorsement;
- Identify research priorities at a salmosphere level and coordinate any research programmes implemented, recognising that most IYS research is expected to be at regional/RFMO or party/jurisdiction levels;
- Coordinate fundraising activities in support of the IYS Coordinating Committee functions;
- Organise the IYS international symposia through dedicated Symposia Steering Committees; and
- Establish a hub for compilation and sharing of information on IYS activities.

Regional/RFMO level (IYS Regional Steering Committees):

- Engage core partners;
- Resolve species, life stages and geographical areas to be included in the IYS in addition to those listed under section 5 above;
- Identify research priorities and develop research plans;
- Develop outreach activities, target audiences and messages;
- Establish a hub for compilation and sharing of information on IYS activities; and
- Coordinate fund-raising in support of the IYS Regional Steering Committee functions.

Party/jurisdiction specific level (Individual Parties/jurisdictions, NGOs and core partners):

- Conduct the primary IYS functions of research and public engagement, informed by IYS core principles and branding;
- Seek and disburse funding e.g. to State/Provincial/Local governments and RFMOs;
- Undertake outreach activities;
- Organise or support regional symposia and workshops or other events; and
- Engage with First Nations.

It is envisaged that the IYS Coordinating Committee would comprise nominated representatives appointed by the lead organisations that would undertake activities at the salmosphere level such as: development of an IYS logo, slogan and web page; organise symposia through a separate Symposium Steering Committee; identify data needs and research priorities across the salmosphere and coordinate activities undertaken across more than one region in the salmosphere; and review and endorse research proposals conducted at a regional or party/jurisdiction level. The Committee would work wherever possible by correspondence but would need to meet perhaps on an annual basis and would report back to the lead organisations on its work. There would likely be the need for professional support in developing the IYS brand materials, including the web page, logo and slogan, and possibly in support of regional activities. The Symposium Steering Committee for the international symposium planned for the IYS launch would need to commence its work no later than the autumn of 2016 if a symposium is to be held to mark the launch of the IYS in 2018.

There would be Regional Steering Committees in the North Pacific, North Atlantic and possibly the Baltic, led by NPAFC in the Pacific and NASCO in the Atlantic and supported by the Secretariats of those organisations. These Committees would provide the fora for cooperation between the lead organizations and core partners and propose outreach activities. They would coordinate the activities being undertaken in their regions and share information with the overall IYS Coordinating Committee. It would also be a matter for those Regional Committees to identify research gaps and priorities, seek funding, organise calls for research proposals and disburse sums raised noting that NASCO has already established its International Atlantic Salmon Research Board (and Scientific Advisory Group) for this purpose. If this proposal is accepted, it is suggested that the Steering Committees be established at the 2016 annual meetings of NPAFC and NASCO with a view to commencing their work at the earliest opportunity thereafter, including further consideration of budgetary needs.

7. Initial budgetary considerations

NPAFC and NASCO provide adequate and appropriate fora for developing and advancing the basic concept of the IYS among their member parties and core partners and would be the lead organisations. It is anticipated that a relatively small centralised budget, shared by the two lead organizations (and possibly their core partners and external sources), would be required to support initial activities but the IYS governance structure proposed allows for regional implementation that would be adaptable in terms of nature and scale of the activities undertaken. If NPAFC and NASCO agree at their 2016 annual meetings to proceed with an IYS there will be a need for further consideration of budgetary issues. This would predominantly be a task at the Regional/RFMO level, through the IYS Regional Steering Committees, but would involve the Coordinating Committee in the case of activities applying throughout the salmosphere. Further consultation should occur well in advance of the 2017 annual meetings of the lead organizations to clarify anticipated future expenditure (2018-), e.g. the need for regional coordinators or an IYS project officer.

The most immediate need is to approve funding to support the initial planning stage of the IYS activities (2016 and 2017). Given the budgeting cycles of both organizations, initial funding for the planning stage will need to be agreed at the 2016 meetings. While the funding strategy could include Commission funds or funds raised externally, it is recommended that NPAFC and NASCO make budgetary provision to allow for the development of the IYS brand and towards the cost of the 2018 symposium. It is recognised that the NASCO budget has already been agreed for the calendar year 2016 so, if funds cannot be found from within that budget,

then the earliest a contribution could be made to the IYS would be 2017 unless external funds could be raised.

As previously noted the main planning activities for 2016 and 2017 are as follows:

- complete and implement the IYS governance model and appoint members of the IYS Coordinating Committee, Regional/RFMO IYS Steering Committee and Symposium Steering Committee;
- identify and engage core partners;
- identify capacity requirements in the NPAFC and NASCO Secretariats; develop a fund-raising strategy; and prepare budgets;
- develop an IYS brand, website, brochures, posters newsletters and other materials;
- develop an outreach approach and communications strategy;
- develop criteria for IYS endorsement of research proposals;
- plan 2018 Symposium; and
- confirm research themes, identify research priorities and develop research plans;

It is anticipated that many of these initial planning activities could be undertaken without the need for specific budget provision using existing resources within the Secretariats and that some of the work would be undertaken by correspondence. However, initial funding will be needed in 2016 and/or 2017 with regard to the 2018 symposium and developing the IYS brand. A strategy for communications and fundraising for activities at a salmosphere level may also be required and the Working Group discussed some options. The costs of any activities at a salmosphere level should be shared equally among the lead organisations.

Professional support, such as marketing expertise, will be required, e.g. for the development of an IYS brand and webpages to ensure a uniform identity across all participating parties and organisations. A request for proposals to provide the services may be needed to make a reliable cost estimate but a figure of £30,000 (CAN$56,000), shared between the lead organisations, might be required in 2017.

One major activity will be to convene an international symposium to launch the focal year of the IYS in 2018. It is suggested that a budget of around £40,000 (CAN$75,000), shared between lead organisations, might be required. As costs may be incurred in advance of the symposium (e.g. deposit for symposium venue), it is recommended that budgetary provision be made by NPAFC and NASCO in 2017. Additional funding would be expected to be raised from registration fees and sponsorship.

Activities at a regional level would be a matter for the Steering Committees to resolve but given budget cycles it is recommended that initial funds be provided to support those activities. An initial budget of £25,000 (CAN$47,000) for each of the lead organisations might be appropriate but would need to be reviewed as the IYS activities develop. There may be a need for additional capacity within the NPAFC and NASCO Secretariats to be resolved once the nature and scope of the IYS are agreed.

Thus, it is proposed that both NPAFC and NASCO make base budget provision of £60,000 (CAN$112,000) in 2017. This sum is seen as modest given the perceived benefits of the IYS to the lead organisations and others.

It should be recognised that within each region, implementation of the IYS may be managed differently. A large portion of the coordination effort in the North Atlantic is expected to be undertaken by the NASCO Secretariat and the participation of NASCO Parties in the IYS Regional Steering Committee and the Symposium Steering Committee should not require financial assistance through the NASCO budget. This may be handled differently in the North Pacific where funding may be required for these activities.

8. Next Steps

It is recognised that while both NPAFC and NASCO, and several core partners, have endorsed the concept of an IYS in principle, this revised proposal differs somewhat in nature and scope from earlier proposals. The first step will be for NPAFC and NASCO to consider this proposal with a view to its endorsement at their 2016 Annual Meetings (NPAFC: 16 -20 May; NASCO: 7 - 10 June). There should be a media release, developed by NASCO and NPAFC jointly, individually or a combination of both, immediately after the endorsement by both organisations.

NASCO and NPAFC have already identified core partners but this will need further consideration. With regard to the Arctic, the NASCO Secretariat should consult with the Arctic Council Secretariat, Tromso, Norway and the NPAFC Secretariat should consult relevant agencies. The NASCO Secretariat should consult the EU and the Russian Federation about possible involvement from the Baltic.

It is recognised that there is very limited time in which to prepare for the IYS if the focal year is to be held in 2018, depending on whether or not the proposal is acceptable to both organisations at their annual meetings. If further work is required before adoption of the proposal, then 2019 might be a more realistic option for the focal year (although the launch symposium might still be scheduled for the last quarter of 2018).

If the IYS is endorsed at the 2016 annual meetings of NPAFC and NASCO, there will be a need to appoint representatives to serve on the Coordinating Committee, the regional Steering Committees and the Symposium Steering Committee and for these committees to start work in the autumn of 2016. There is urgency about this if the IYS focal year and symposium are to be held in 2018. The tasks and composition of these Committees might be as follows:

Coordinating Committee

Activities: As detailed in section 6 above and such other tasks as may be identified by the lead organisations.

Composition: Not more than four appointed representative from each lead organisation, including a representative of the Secretariats of each lead organisation. The Committee should appoint one Co-chairperson from among the representatives of each of the two lead organizations. It would be desirable to have both managers and scientists involved and ideally representatives with experience of outreach initiatives. Additional expertise could be co-opted to the Coordinating Committee as required depending on the nature and scope of the IYS.

Symposium Steering Committee

Activities: Plan for, organise and run the international IYS symposium to launch the IYS. This will involve: agreeing on dates and venue; developing objectives and the programme, including inviting keynote speakers and soliciting contributed papers; establishing a web page for registrations; seeking sponsors and supporters; dealing with all financial matters; and making arrangements for publication of the proceedings (in this regard ICES has indicated that a symposium issue of the ICES Journal of Marine Science may be an option). It is envisaged that a joint symposium account will be needed and that depending on the venue of the symposium this be held by either NPAFC or NASCO.

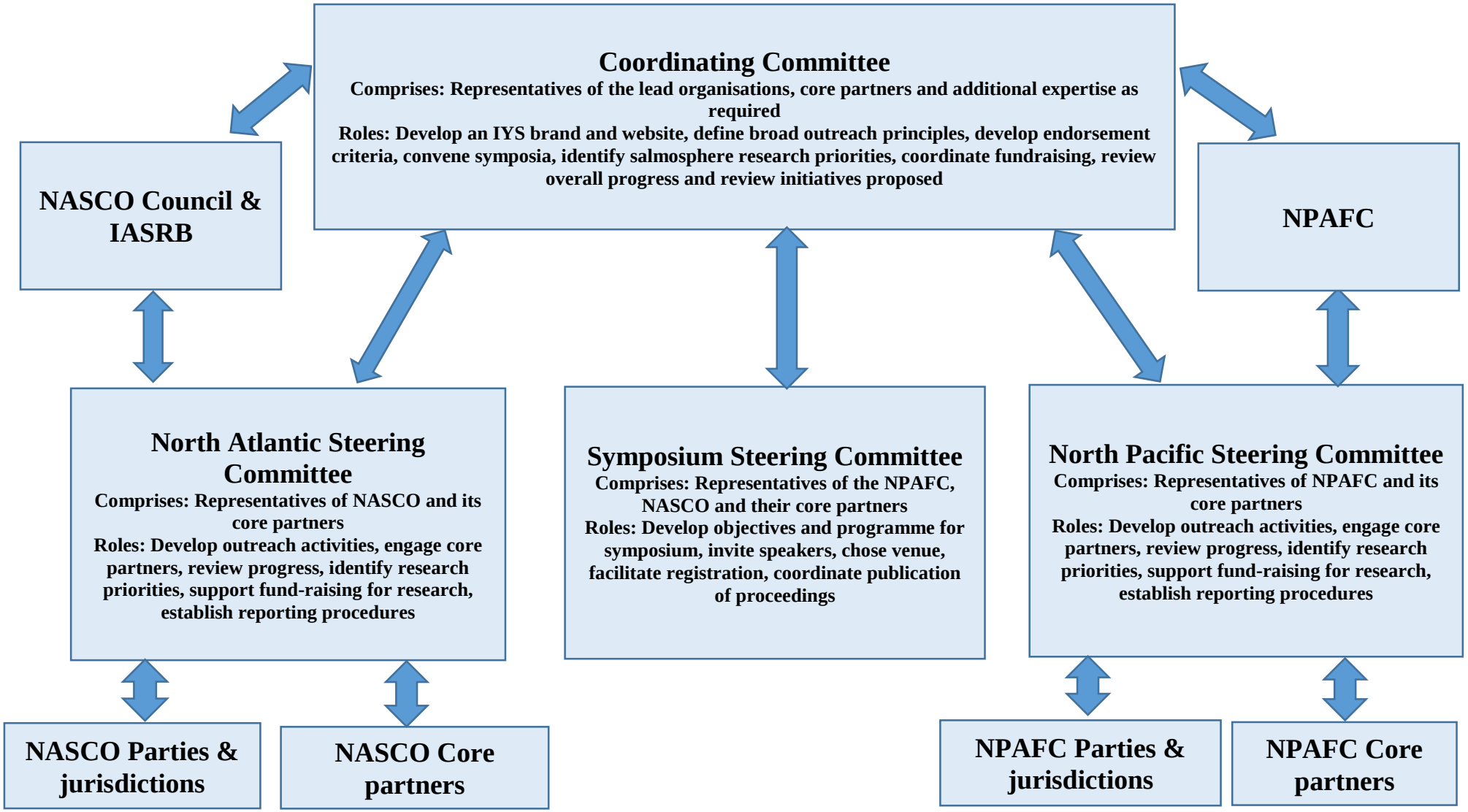
Composition: Not more than three representatives from each lead organisation, including one representative of the Secretariats of each lead organisation, and one representatives from any co-convening organisation. It would be desirable to have both managers and scientists involved with subject matter representatives for each research theme. Additional expertise could be co-opted to the Steering Committee as required depending on the nature and scope of the IYS.

Regional Steering Committees

Activities: As detailed in section 6 above and such other tasks as may be identified by the lead organisations.

Composition: One representative from each Party from the lead organisation, a representative of the Secretariat from the lead organisation and invited representatives from core partners. It would be desirable to have both managers and scientists involved and ideally representatives with experience of outreach initiatives and additional experts, as needed, to support IYS functions.

Proposed IYS Governance Model



Annex 10

Council

CNL(16)9

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 2015 Statutory Meeting, ICES resolved (C. Res. 2015/2/ACOM10) that the Working Group on North Atlantic Salmon [WGNAS] (chaired by Jonathan White, Ireland) would meet at ICES HQ, 30 March–8 April 2016 to consider questions posed to ICES by the North Atlantic Salmon Conservation Organization (NASCO).

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

Question		Section
1	With respect to Atlantic salmon in the North Atlantic area:	10.1
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];	10.1.5
1.2	report on significant new or emerging threats to, or opportunities for, salmon conservation and management[2];	10.1.6
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];	10.1.7
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];	10.1.8
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;	10.1.9
1.6	provide a compilation of tag releases by country in 2015; and	10.1.10
1.7	identify relevant data deficiencies, monitoring needs and research requirements.	10.1.12
2	With respect to Atlantic salmon in the North-East Atlantic Commission area:	10.2
2.1	describe the key events of the 2015 fisheries[5];	10.2.2
2.2	review and report on the development of age-specific stock conservation limits;	10.2.3
2.3	describe the status of the stocks;	10.2.4
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;	10.2.5
	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	10.2.6
2.6	update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice.	10.2.7
3	With respect to Atlantic salmon in the North American Commission area:	10.3
3.1	describe the key events of the 2015 fisheries (including the fishery at St Pierre and Miquelon)[5];	10.3.2
3.2	update age-specific stock conservation limits based on new information as available;	10.3.3
3.3	describe the status of the stocks;	10.3.4
	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	NA†
3.5	update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice.	NA†
4	With respect to Atlantic salmon in the West Greenland Commission area:	10.4
4.1	describe the key events of the 2015 fisheries[5];	10.4.2
4.2	describe the status of the stocks[7];	10.4.3
4.3	compare contemporary indices of abundance of salmon in the West Greenland fishery to historical estimates and suggest options for improving future estimates;	10.4.4
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;	10.4.5

4.5	advise on changes to temporal and/or spatial fishery patterns that may provide increased protection for weaker stocks;	10.4.6
	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	NA†
4.7	update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice.	NA†

Notes:

* NASCO informed ICES in January 2015 of the outcome of utilizing the FWI.

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 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. 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.

NA†: With regard to questions 3.4 and 3.5, 4.6 and 4.7, the FWI did not indicate that reassessment was required and so these questions were not posed.

In response to the terms of reference, the working group considered 37 working documents. A complete list of acronyms and abbreviations used in this report is provided in Annex 1. References cited are given in Annex 2.

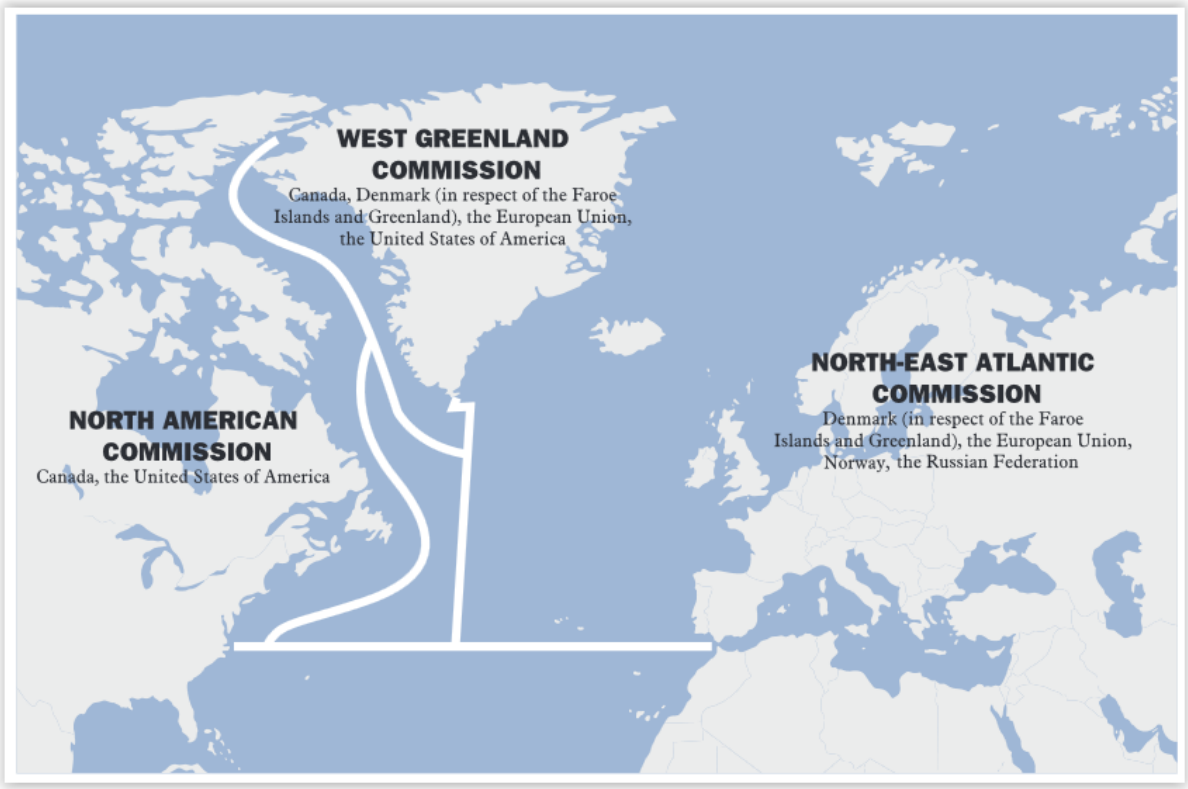
Please note that for practical reasons the tables are found at the end, immediately before the annexes.

10.1.2 Management framework for salmon in the North Atlantic

The advice generated by ICES is in response to terms of reference posed by the North Atlantic Salmon Conservation 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's three Commission areas, the North American Commission (NAC), the West Greenland Commission (WGC), and the North-East Atlantic Commission (NEAC) are shown below. The mid-Atlantic area is not covered by any of the three NASCO Commissions but, under Article 4 of the NASCO Convention, NASCO provides a forum for consultation and cooperation on matters concerning the salmon stocks in this area.



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 a 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 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 one-sea-winter (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 multi-sea-winter (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.

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 2015. Nominal catches reported by country 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.

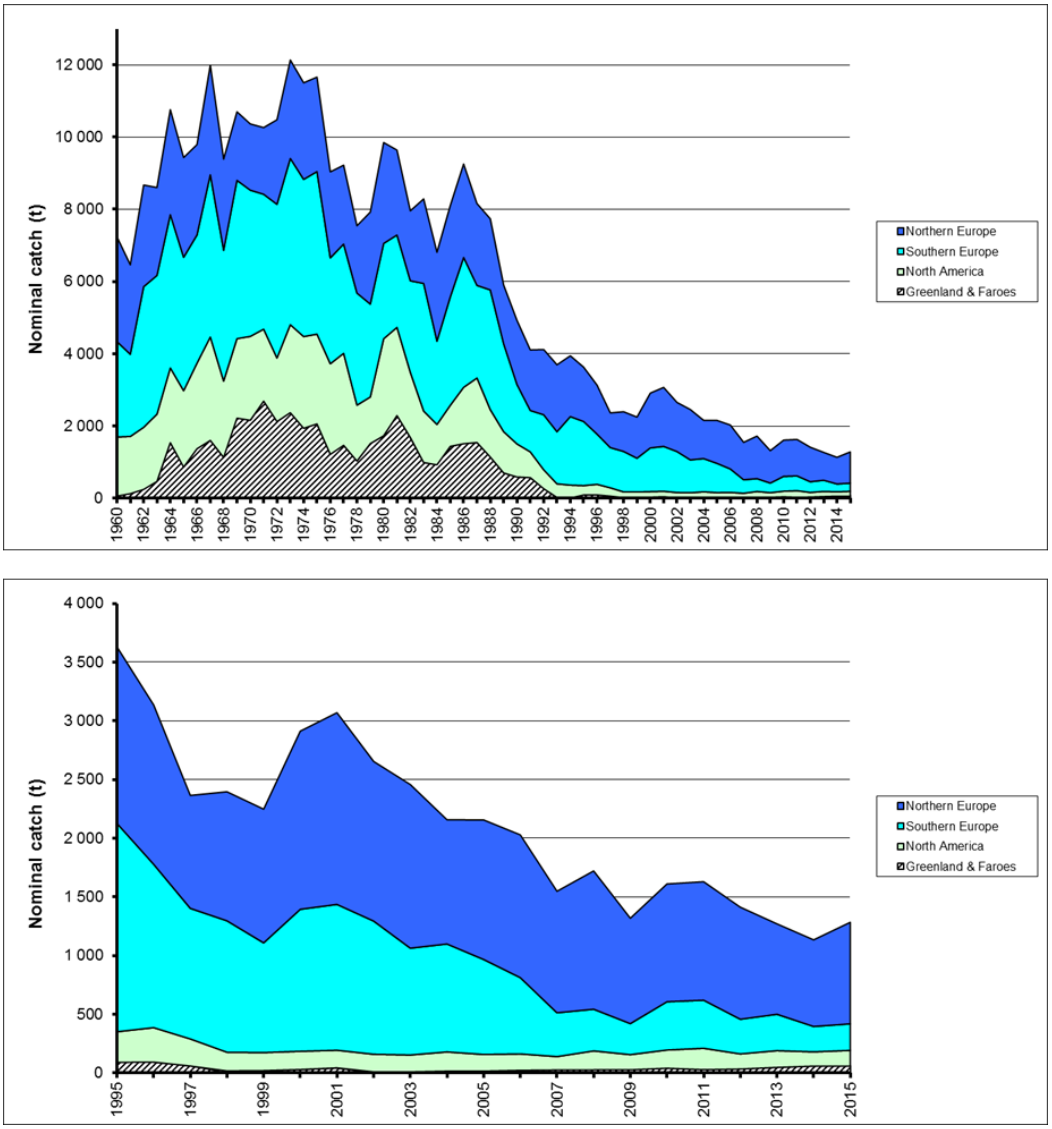


Figure 10.1.5.1 Total reported nominal catch of salmon (tonnes round fresh weight) in four North Atlantic regions, 1960–2015 (top) and 1995–2015 (bottom).

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 2015 (Table 10.1.5.1). Catches in Sweden are also 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 2006–2015 are provided below.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
NEAC	1866	1409	1533	1162	1414	1419	1250	1080	954	1091
NAC	140	114	162	129	156	182	129	143	122	137
WGC	22	25	26	26	40	28	33	47	58	57
Total	2028	1548	1721	1318	1610	1629	1412	1270	1134	1285

The provisional total nominal catch for 2015 was 1285 t, 151 t up on the updated catch for 2014 (1134 t). The 2014 catch was the lowest in the time-series, with the previous year (2013) being the next lowest in the time-series, followed by the catch in 2015. Catches were below the previous five- and ten-year averages in the majority of countries, except France and Greenland.

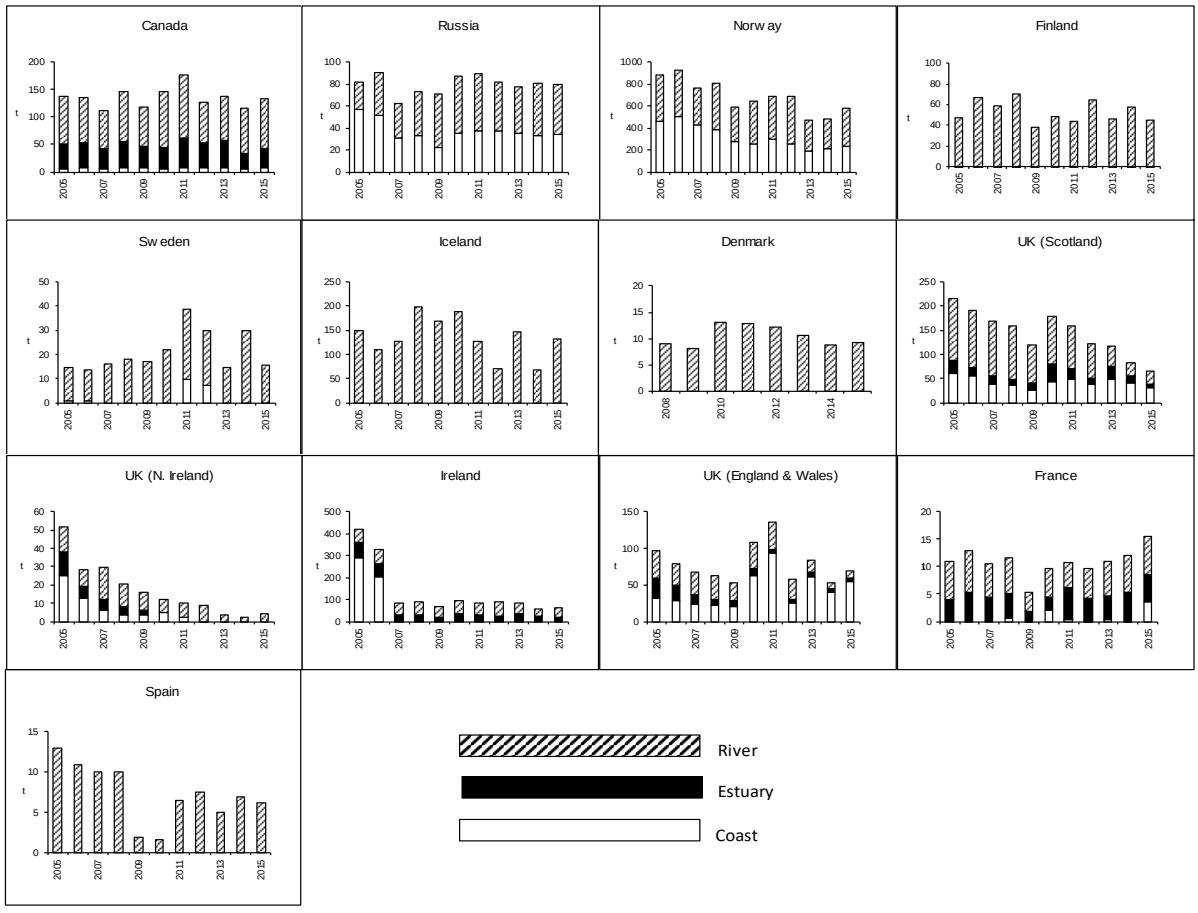


Figure 10.1.5.2 Nominal catch (t) by country taken in coastal, estuarine, and riverine fisheries, 2005–2015 (except Denmark: 2008–2015). Note that the *y*-axes scales vary.

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 2015 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 across the time-series 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 2015	356	33	40	4	695	64	1091
NAC 2015	12	9	35	25	91	66	137

Coastal, estuarine, and riverine catch data aggregated by region are presented in Figure 10.1.5.3 and Table 10.1.5.2. In Northern NEAC, a steadily decreasing proportion and weight of the nominal catch has been taken in coastal regions (from 44% to 31% and 522 t to 267 t, in 2005 and 2015 respectively), noting that there are no coastal fisheries in Iceland and Finland, that in-river catch has stayed fairly consistent over this time period, and that estuarine catches represent a negligible component of the catch in this area. In Southern NEAC, catches in all fishery areas have declined dramatically since 2005. While coastal fisheries 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 this area has been taken in freshwater. In NAC, the total catch over the period 2005–2015 has been fluctuating around 140 t. The majority of the catch in this area has been taken in riverine fisheries; the catch in coastal fisheries has been relatively small in any year (13 t or less).

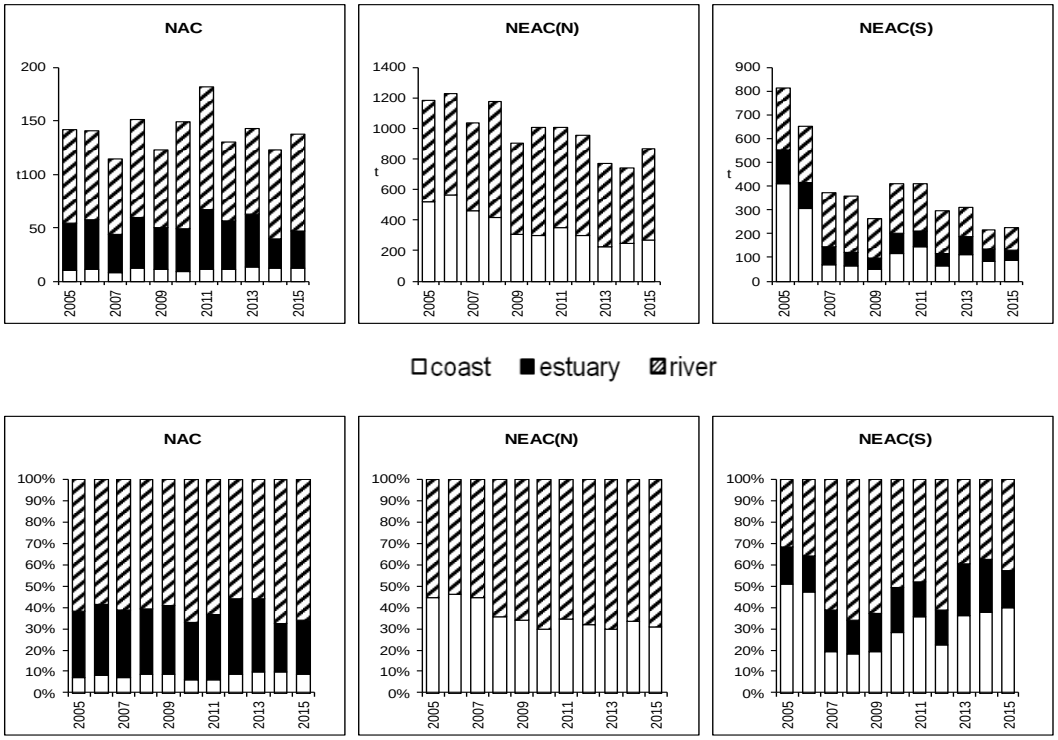


Figure 10.1.5.3 Percentages of nominal catch (top panel) and nominal catch in tonnes (bottom panel) taken in coastal, estuarine, and riverine fisheries for the NAC area, and for the Northern and Southern NEAC areas, 2005–2015. Note that scales of vertical axes vary across bottom panels.

10.1.5.2 Unreported catches

The total unreported catch in NASCO areas in 2015 was estimated to be 325 t. There was no estimate for Russia, or for Spain and St. Pierre and Miquelon, although reported catches in the latter two areas are small. The unreported catch in the NEAC area in 2015 was estimated at 298 t, and that for the West Greenland and North American commission areas at 10 t and 17 t, respectively. The following table shows unreported catch by NASCO commission areas in the last ten years:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
NEAC	604	465	433	317	357	382	363	272	256	298
NAC	56	-	-	16	26	29	31	24	21	17
WGC	10	10	10	10	10	10	10	10	10	10
Total	670	475	443	343	393	421	403	306	287	325

The 2015 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 2015 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 2015 this ranged from 19% in Norway (this is a minimum figure, as statistics were collected on a voluntary basis) to 84% in UK (Scotland), reflecting varying management practices and angler attitudes among countries. C&R rates were typically high in Russia, averaging 81% over the 17-year period 1992 to 2008; however, records since then 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 195 000 salmon were reported to have been caught-and-released around the North Atlantic in 2015.

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 2015 was more than 1648 kt. The production of farmed salmon in this area has been over one million tonnes since 2009. The 2015 total represents a 1% increase on 2014, and a 15% increase on the previous five-year mean. Norway and UK (Scotland) continue to produce the majority of the farmed salmon in the North Atlantic (80% and 11%, respectively). Farmed salmon production in 2015 was above the previous five-year averages in all North Atlantic salmon producing countries except Canada and Russia.

Worldwide production of farmed Atlantic salmon has been in excess of one million tonnes since 2001 and has been over two million tonnes since 2012. The total worldwide production in 2015 is provisionally estimated at around 2374 kt (Figure 10.1.5.4), a 0.7% increase on 2014. Production outside the North Atlantic is estimated to have accounted for 31% of the total in 2015. Production outside the North Atlantic is dominated by Chile.

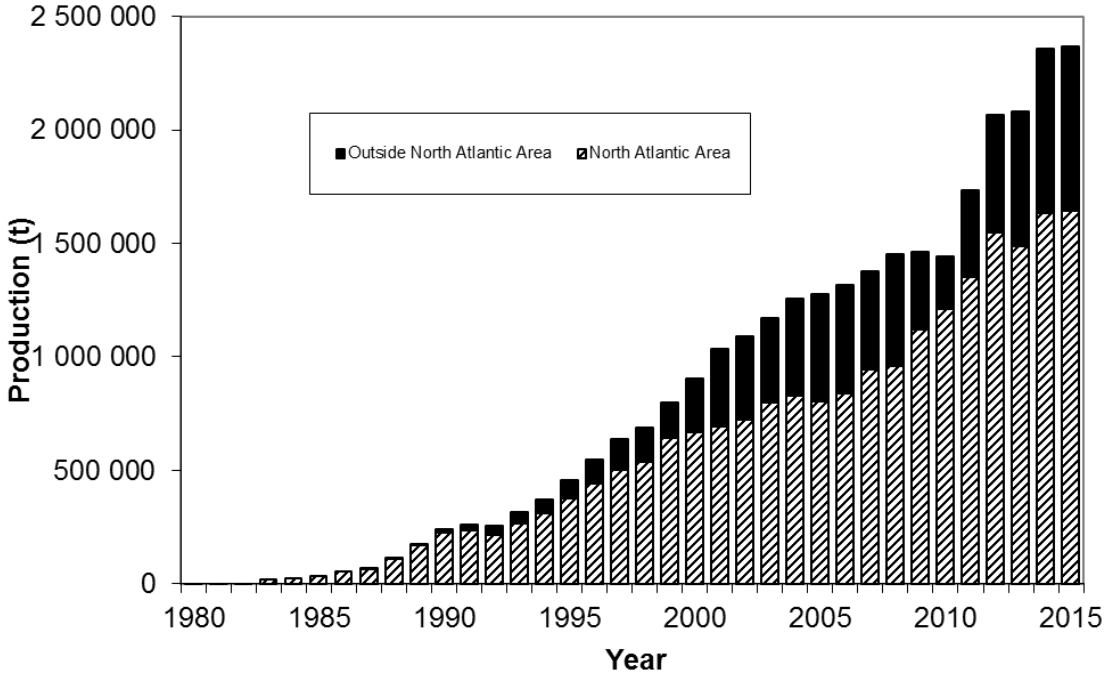


Figure 10.1.5.4 Worldwide production of farmed Atlantic salmon, 1980 to 2015.

The reported nominal catch of Atlantic salmon in the North Atlantic was in the order of 0.05% of the worldwide production of farmed Atlantic salmon in 2015.

The total harvest of ranched Atlantic salmon in countries bordering the North Atlantic in 2015 was 40 t, all taken in Iceland, Sweden, and Ireland (Figure 10.1.5.5) with the majority of the catch taken in Iceland (29 t). No estimate of ranched salmon production was made in Norway in 2015, where such catches have been very low in recent years (< 1 t), or in UK (N. Ireland), where the proportion of ranched fish has not been assessed between 2008 and 2015 owing to a lack of microtag returns.

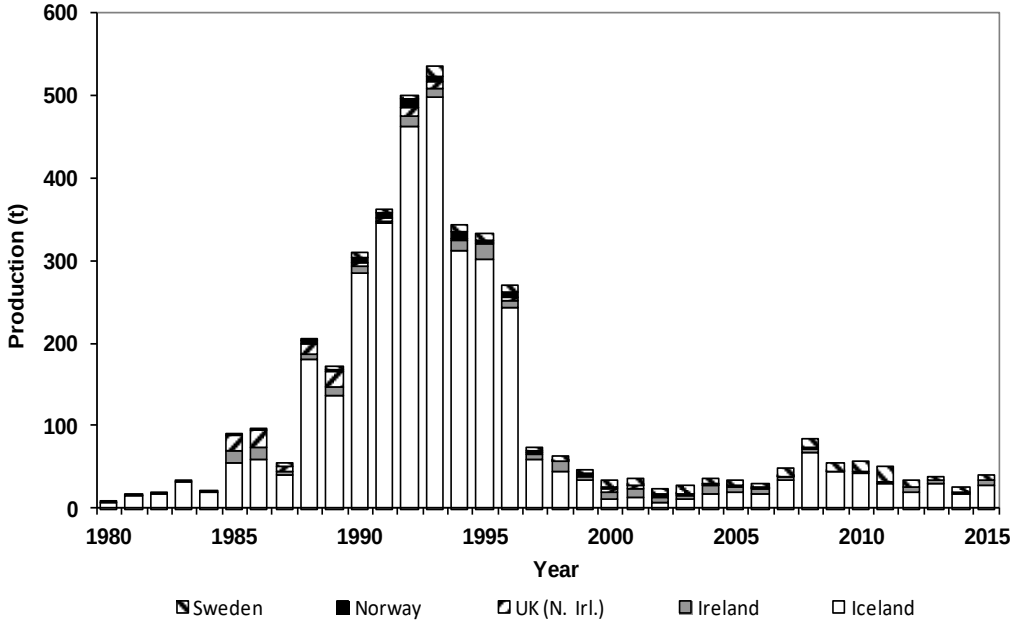


Figure 10.1.5.5 Production of ranched Atlantic salmon (tonnes round fresh weight) in the North Atlantic, 1980 to 2015.

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 Ocean migration and feeding areas of DST tagged Icelandic hatchery smolts

There has been little information of the the main marine feeding areas of Icelandic salmon since the closure of the ocean fishery in 1932. In 2005 and 2006, 598 hatchery smolts (weighing 60–100 g) were released in west Iceland with internal data storage tags (DST) measuring depth (pressure) and temperature at one-hour intervals (Gudjonsson *et al.*, 2015). Five tagged salmon returned in 2006 and two in 2007, and all had spent one year at sea. Six tags had complete temperature and depth profiles of their ocean migration, and one had partial measurements. Depth profiles showed the salmon stayed close to the surface for most of the time, showing some degree of diurnal behaviour by staying deeper during the day. The tagged salmon also took short deep dives (>100 m) during the latter part of their ocean migration. Temperature data indicated that salmon remained in areas where temperatures ranged from 6°C to 15°C, with warmer temperatures being experienced in the summer.

DST temperature data were compared to available sea surface temperatures (SST) (NOAA database) to estimate the location of fish at different times within the observed temperature range. All fish stayed southwest of Iceland in the Irminger Sea during the first summer before migrating east towards the Faroe Islands during the autumn and early winter (Figure 10.1.6.1). In late winter they migrated south and westward back to the Irminger Sea before returning to the river where they were released. These results show further support for the use of DST tags in studying migrations, migration behaviour, and feeding areas of salmon at sea. This will inform on locations where research activites need to be undertaken to understand factors that affect marine survival.

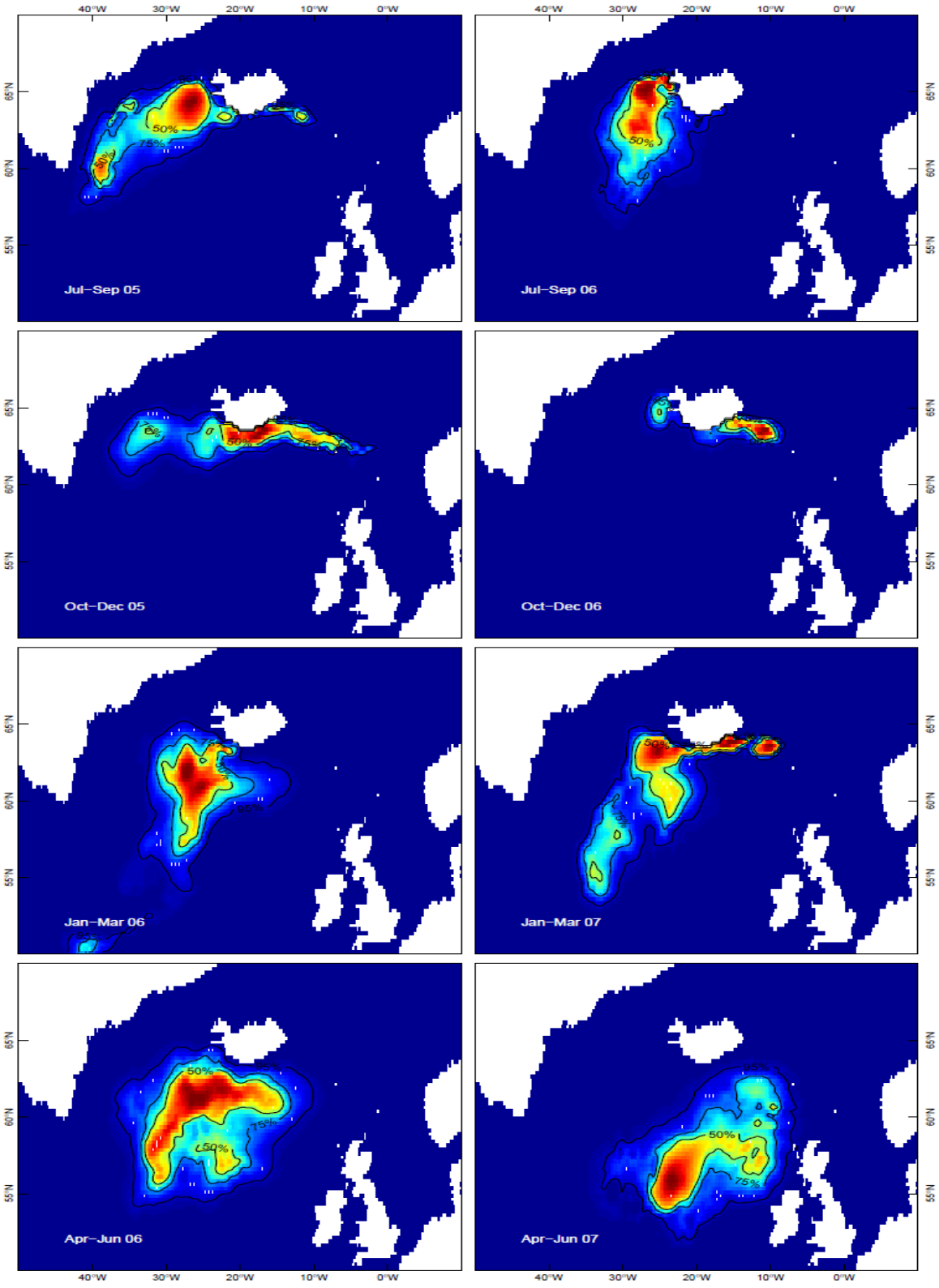


Figure 10.1.6.1 Probability density of the likely estimated location of Icelandic salmon tagged with DST tags, shown by quarter year. Five fish (5) released in 2005 are on the left, and two fish released in 2006 are on the right. The mean posterior probability is calculated for each cell, and the top 50%, 75%, and 95% areas are shown along with a more precise distribution by the colour gradient (Gudjonsson *et al.*, 2015).

10.1.6.2 Changing trophic structure and energy dynamics in the Northwest Atlantic: implications for Atlantic salmon feeding at West Greenland

Diverse population structures and management regimes are apparent across the North Atlantic. Concurrent abundance declines of these salmon populations suggest that marine mortality experienced at common marine areas may be the primary cause of population declines (Chaput *et al.*, 2005; Mills *et al.*, 2013). To investigate if altered trophic mechanisms are contributing to population declines, Atlantic salmon stomachs were collected and examined from individuals caught between 2006 and 2011 at the West Greenland feeding grounds. These contemporary data were compared to historical samples collected in the late 1960s/early 1970s from the sampled Greenland feeding areas (Templeman, 1967, 1968; Lear, 1972, 1980).

Primary prey items in both the contemporary and historical samples were capelin (*Mallotus villosus*) and amphipods (*Themisto* sp.), accounting for over 60% of the diet. Contemporary samples had 12% less biomass and 21% less capelin biomass compared to historical samples. Furthermore, from 1968 to 2008 the mean size of capelin in the Northwest Atlantic decreased by 12% and its mean energy density (kJ g^{-1} of wet weight) has decreased by approximately 34% (Figure 10.1.6.2). Energy density estimates for all identified Atlantic salmon prey were applied to the stomach contents data to estimate the total amount of energy consumed at the time of sampling. Applying prey-specific energy densities, including the high capelin energy density values for the historical samples and the low capelin energy density values for the contemporary samples, suggested lower estimates of total energy consumption (20%–58%) by Atlantic salmon over time based on historical and contemporary consumption levels (Figure 10.1.6.3).

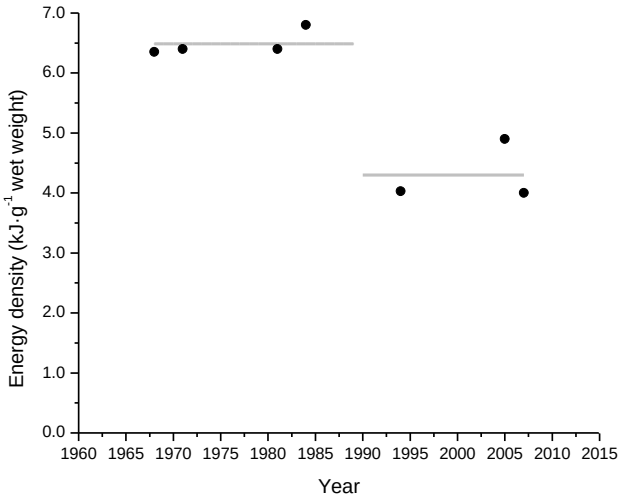


Figure 10.1.6.2 Energy density estimates (black dots; kJ·g^{-1} wet weight) of capelin and mean (grey bars) energy densities before (6.49 kJ·g^{-1}) and after (4.30 kJ·g^{-1}) the year 1990. (See Renkawitz *et al.*, 2015 for data sources used in this figure.)

Small pelagic fish are critical components in marine foodwebs, linking lower and higher trophic levels by providing a vector for energy transfer. Determining the factors that influence lower trophic level dynamics is paramount to understanding mechanisms that affect the survival, abundance, and productivity of higher trophic predators, including Atlantic salmon.

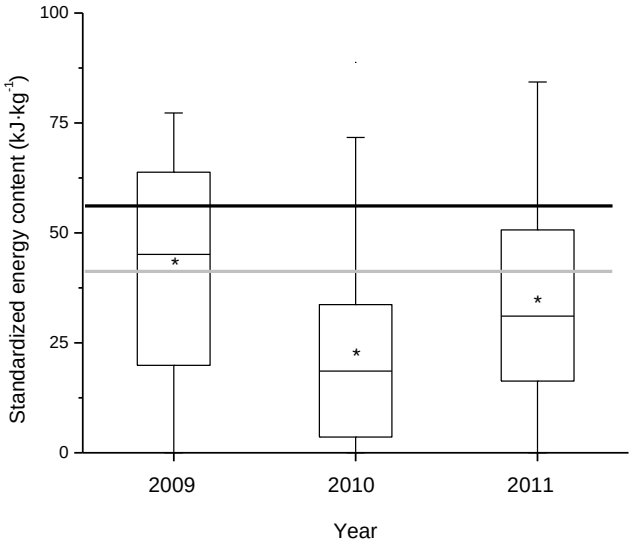


Figure 10.1.6.3 Standardized energy content (kJ·kg^{-1} fish weight) of frozen stomach contents from Atlantic salmon sampled from West Greenland during 2009–2011. The box denotes the upper and lower quartile and the whiskers indicate the 5% and 95% confidence intervals. The horizontal line in the box is the median and the asterisk (*) indicates the mean. The grey horizontal line represents the mean standardized energy content of stomach contents from research surveys from 1965 to 1970 using contemporary energy equivalents, and the black horizontal line represents the energy equivalent adjusted for the higher energy content of capelin in historical samples.

10.1.6.3 Diseases and parasites

Update on red vent syndrome (Anisakiasis)

Over recent years, there have been reports across NEAC and NAC areas of salmon returning to rivers with swollen and/or bleeding vents (ICES, 2015). The condition, known as red vent syndrome (RVS or Anisakiasis), noted since 2004, 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 to 2011 (ICES, 2009, 2010a, 2011).

Trapping records for rivers in UK (England & Wales) and France suggested levels of RVS increased again in 2013, with observed levels being the highest recorded for some monitored stocks (ICES, 2014b). Monitoring for the presence of RVS continued on three rivers (Tyne, Dee, and Lune) in UK (England & Wales). In 2015, RVS levels on the Tyne and Dee, 10% and 24% respectively, were at or close to the highest values recorded for these rivers. The level on the Lune (14%) was at the lower end of the range of observed values, although the sample size was small.

In Ireland in 2015, reports were also received of a high prevalence of red vent in fish taken in the Galway weir salmon fishery.

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, 2014b).

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 2015 (Nilsen *et al.*, 2015). In 2015, the surveillance programme focused on further development of the model-based approach for evaluating infection pressure, where data from weekly sea lice counts at fish farms are coupled with a detailed hydrodynamic model to predict the distribution of seal lice larvae and infection pressure on wild salmonids. Model results are verified by field sampling of wild salmon and trout in the modelled areas. Predictions of infection levels from the model, and observed levels from field investigations were in good agreement for most investigated locations, demonstrating the usefulness of the model-based approach for predicting sea lice infections.

In general, the surveillance programme demonstrated varying infection pressure along the coast during the salmon smolt migration period in 2015. Even though infection levels were low at some of the field sampling stations, there was a general increase in infection levels compared to 2014. In the counties Hordaland (areas Hardanger and Nordhordland), Sogn og Fjordane (outer Sognefjord area), Møre og Romsdal (Storfjord area), and Nordland (Nordfolda area), migrating salmon smolts may have been negatively affected by salmon lice infections in 2015.

Sea lice are still generally regarded as a serious problem for salmonids (Skilbrei *et al.*, 2013; Krkošek *et al.*, 2013) and especially sea trout (Nilsen *et al.*, 2015). The use of chemicals to keep lice levels on fish below a threshold value of 0.5 mature female lice per salmon has shown a sharp increase in later years, as sea lice have developed resistance towards one or several of the most commonly used chemical agents. Multi-resistant sea lice are now present in all areas, including Finnmark County in northernmost Norway (Aaen *et al.*, 2015; www.mattilsynet.no). As chemical treatments have become less effective alternative methods, some based on mechanical removal of sea louse from the fish are being developed and increasingly put to use to try to reduce the use of chemicals. The increased application of such methods is expected to reduce the use of chemicals in the future, thus saving costs and reducing other environmental effects.

UDN in Sweden and Russia

During the summer of 2015 sick and dead salmon infected with the fungus *Saproplegnia* were observed in some northern Baltic rivers in Sweden. Skin samples were taken from salmon in the border river Tornijoki between Finland and Sweden. The Swedish National Veterinary Institute found that tissue deformations typical of UDN (Ulcerative dermal necrosis) were present in the dead fish. It was not possible to quantify the total mortality. A similar outbreak in 2014 did not reduce the number of salmon fry (0+) in 2015. These outbreaks have coincided with large spawning runs, i.e. dense populations.

In Russia in 2015 a mass mortality of adult salmon occurred in the Kola River, Murmansk region. Two hundred salmon died in a cage holding broodstock near the river's counting fence and another 500 salmon were found dead on the counting fence. Dead adult salmon were also regularly found by rod anglers over the whole catchment area. In August, the decision was taken by the Murmansk Regional Commissions on Regulation of Harvesting Anadromous Fish to close the salmon recreational fisheries in the Kola River for the remainder of the 2015 season. A sample of dead salmon was analyzed in Murmansk, Moscow and at the Norwegian Veterinary Institute, Oslo; however, no common disease agents or pathogens were identified. The outward symptoms appear similar to those often described for UDN, but no diagnostic test is available to confirm this suggestion. The total number of salmon killed by this outbreak is

unknown. However, electrofishing parr surveys conducted in September showed no adverse effect on salmon juvenile densities. The impact of this event on the spawning stock will be assessed in the autumn of 2016.

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") – 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., 2011). 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. In 2016, the first classification of populations based on both dimensions (harvest potential relative to conservation limit, and genetic integrity) was conducted. An estimate of the degree of introgression from farmed Atlantic salmon in a high number of salmon populations was available, and a combined classification in both dimensions of the quality norm could be made. Of the 104 populations considered, 23 (22%) were classified as being in good or very good condition, 29 (28%) populations were classified as being in moderate condition, while 52 (50%) were in poor or very poor condition.

10.1.6.5 Progress on development of reference points for Atlantic salmon in Canada that conform to the precautionary approach

The working group was presented with an update on progress undertaken in Canada to review and revise reference points for Atlantic salmon in the context of the precautionary approach framework (PA). In 2009, Fisheries and Oceans Canada published the Sustainable Fisheries Framework (DFO, 2009a) that provides the basis for ensuring Canadian fisheries are conducted in a manner which supports conservation and sustainable use. The framework consists of a number of policies for the conservation and sustainable use of fisheries resources, including "A Fishery Decision-Making Framework Incorporating the Precautionary Approach" (DFO, 2009b). Fisheries and Oceans Canada (DFO) Ecosystems and Fisheries Management Branch asked for science advice on the development of reference points for Atlantic salmon. The request follows on an action item associated with the implementation of the Wild Atlantic Salmon Conservation Policy (DFO, 2009c) to review benchmarks / reference points for Atlantic salmon that conform to the PA.

At present five regionally specific reference values for Atlantic salmon in eastern Canada are referred to as conservation objectives, which are considered equivalent to limit reference points. Reference points have been used informally to provide advice for Atlantic salmon fisheries management since the 1970s (CAFSAC, 1991; Chaput *et al*., 2013) and pre-dates the development of the Sustainable Fisheries Framework (DFO, 2009b). The conservation requirement has been used both domestically and internationally to guide fisheries management actions, including the provision of catch advice for the mixed-stock Atlantic salmon fishery at West Greenland. Individual river values based on the conservation requirement have also been proposed as limit reference points that conform with the PA for stocks in the DFO Maritimes Region (DFO, 2012).

The reference points and the population dynamics of Atlantic salmon have most often been presented as a stock and recruitment diagram with spawning-stock abundance on the horizontal

axis and the subsequent recruitment abundance resulting from the spawning stock on the vertical axis (Figure 10.1.6.4). The conservation requirement for Atlantic salmon is expressed in terms of a spawning stock value. This is somewhat different from the PA framework that presents stock status on the horizontal axis and the removal rate on the *y*-axis. In the PA framework, the stock status axis refers to total stock abundance or an index of total abundance prior to fishing. The single reference point and fixed escapement strategy used for Atlantic salmon can be reconciled with the PA framework by translating the recruitment indicator from the stock and recruitment plot onto the PA framework stock status indicator (Figure 10.1.6.4).

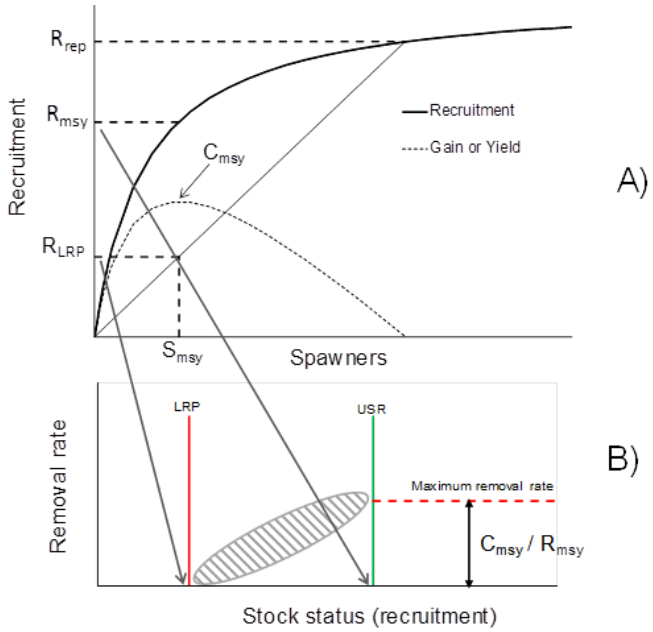


Figure 10.1.6.4 Transposing a spawning stock to recruitment relationship (upper panel A) to the removal rate and stock status axes (lower panel B) within the PA framework. The example is for an upper stock reference corresponding to R_{MSY}, a limit reference point equal to S_{MSY}, and a removal rate corresponding to F_{MSY}. The exploitation rate in the cautious zone (grey hatched oval) could be defined on the basis of a risk analysis of the chance that abundance after exploitation would be less than the LRP. R_{rep} is the abundance at replacement.

As the limit reference point (LRP) is defined as the stock level below which productivity is sufficiently impaired to cause serious harm, DFO (2015) recommended that the LRP should be defined on the basis of conservation of the salmon population rather than to fishery exploitation objectives. One approach consistent with this objective is to maintain production from freshwater to provide for sufficient numbers of adult returns, despite wide variations in environmental conditions in the marine environment, for the purpose of ensuring adequate opportunity for expression of the diversity of adult phenotypes and to maintain genetic variability. Potential candidate reference points that could satisfy this objective include:

- $S_{0.5Rmax}$: spawner abundance that produces 50% of maximum recruitment.
- S_{gen}: spawner abundance that will result in recruitment to S_{MSY} in one generation in the absence of fishing under equilibrium conditions.
- S_{LRP}: spawner abundance that results in a risk of ≤ 25% of recruitment being less than 50% of maximum recruitment.

As a minimum, the LRP should be determined based on a risk analysis of the spawning escapement that results in an agreed probability of the recruitment being less than 50% R_{max}. A risk tolerance of no greater than 25% of recruitment being < 50% R_{max} is proposed.

When establishing an LRP for small populations, conservation genetics should be considered in complement to stock and recruitment information. For conservation purposes, maintaining 90% of genetic diversity over 100 years, as used for other species, could be an appropriate objective (Frankham *et al*., 2014).

A number of candidate upper stock reference (USR) points were considered:

- $80\%B_{MSY}$: recruitment corresponding to 80% of R_{MSY} as per the PA policy.
- R_{MSY}: recruitment at S_{MSY}.
- $X\%R_{MAX}$: a percentage (X%) of maximum recruitment expected for the stock.

No recommendation for a specific USR was made as the choice depends upon the objectives of the users and the risk profile and risk tolerance of the management strategy. Upper stock reference points are best determined using full life cycle considerations as recruitment could be subject to reduced productivity and therefore increased risk of the stock abundance falling to the LRP. At a minimum, the USR must be greater than the LRP and there should be a very low probability (< 5%) of the recruitment falling below the LRP when the stock at USR is exploited at the maximum removal rate.

DFO (2009b) indicated that the maximum removal rate in the healthy zone should not exceed the value corresponding to F_{MSY}. The maximum removal rate in the healthy zone could be calculated once the upper stock reference level is defined.

Considerations for changes in productivity

Changes in productivity in either the freshwater or marine phase of the life cycle can have consequences on the derivation of reference points. The effects of lower productivity, manifest in either phase, would reduce adult recruitment. Lower recruitment rates (recruits per spawner) result in lower reference point values. Reference points based on full life cycle models may not be robust to systematic and sustained changes in the density-independent dynamics occurring at sea. Density-dependent population regulation is considered to occur during the freshwater phase; if the average productivity in freshwater has not changed, limit reference points defined on the basis of maintaining a portion of the freshwater carrying capacity (R_{MAX}) would therefore be robust to temporal changes in average conditions during the marine phase. The proposed LRP ($S_{0.5Rmax}$) as well as S_{gen} have been shown by simulation in Pacific salmon to be robust to changes in productivity (Holt *et al*., 2009).

Estimation and transport of reference points

Stock and recruitment modelling is the favoured approach for examining population dynamics and developing reference points for Atlantic salmon. Bayesian approaches that provide a framework for incorporating multiple levels of uncertainty are well developed and can be applied to single-population stock and recruitment analyses. Hierarchical Bayesian modelling (HBM) provides a framework for incorporating information from multiple stock and recruitment series, and accounts for the additional uncertainties associated with multiple stock and recruitment time-series.

Results of HBM analyses of egg to smolt time-series from 14 rivers in eastern Canada show that the stock and recruitment dynamic of Atlantic salmon is highly variable and uncertain within and among stocks (Chaput *et al*., 2015). Since it is not possible to obtain stock and recruitment data from all the rivers with Atlantic salmon populations in eastern Canada,

consideration must be made to transferring reference values from monitored populations to rivers which lack such information. Scaling production and spawning stock on the basis of the amount of habitat area is the first scale of consideration for salmon. If reference points are defined in terms of rates, such as eggs or spawners per wetted fluvial area, these reference points can be transferred across a set of exchangeable rivers if the habitat areas are known. Examples of LRP values for rivers grouped by presence/absence of lacustrine habitat used for juvenile rearing, are shown in Figure 10.1.6.5. Options for transferring reference points among rivers based on exchangeability assumptions for habitat quantity, presence of lacustrine habitat, mean age of smolts, and proportions of eggs from multi-sea-winter (MSW) salmon are shown in Figure 10.1.6.5 (Chaput *et al*., 2015).

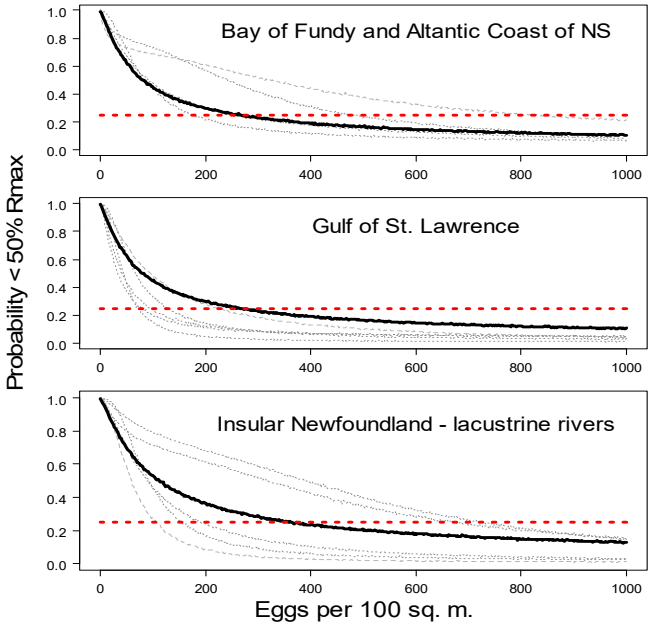


Figure 10.1.6.5 Example risk plots of recruitment being less than 50% R_{max} for different levels of egg depositions for the 14 rivers with egg to smolt data and the posterior predictions for rivers grouped by fluvial only and lacustrine habitat categories. The stock and recruitment model was Beverton–Holt with the presence/absence of lacustrine habitat modelled as a covariate of R_{max}. The light grey lines are the individual river profiles and the solid black lines are the predicted profile for rivers without lacustrine habitat (Bay of Fundy and Atlantic Coast of NS, upper panel; Gulf of St. Lawrence, middle panel) and with lacustrine habitat (insular Newfoundland, bottom panel). The dashed horizontal red line is the 25% probability risk level and the corresponding egg deposition would be SLRP.

The science advisory report on the development of reference points for Atlantic salmon (*Salmo salar*) that conform to the precautionary approach (DFO, 2015) is available on the Fisheries and Oceans Canada Canadian Science Advisory Secretariat website (www.dfo-mpo.gc.ca/csas-sccs/). Specific revisions and establishment of reference points for the PA are expected to take place in some regions over the next two years, based on regional priorities. The WGNAS will be informed of future progress on the development of the reference values that conform to the PA when they are developed.

Revised reference points for management of salmon fisheries in the province of Quebec

Conservation limits for managing Atlantic salmon fisheries in the province of Quebec (eastern Canada) were developed by Caron *et al*. (1999), based on a hierarchical analysis of adult-to-adult stock and recruitment relationships from six rivers in Quebec. In 2014, time-series of adult-to-adult stock and recruitment data from twelve rivers in Quebec, extending as far back as 1972 for some rivers were analyzed using a Ricker stock and recruitment function. The habitats of individual rivers were scaled to units of productive habitat (fluvial type, substrate, width of river, and temperature index). A full hierarchical model, with reference points transported to individual rivers based on estimated habitat within the model, was used to define reference points for 105 rivers in Quebec. The management plan for Atlantic salmon fisheries for the period 2016 to 2026 was published in March 2016 (www.mffp.gouv.qc.ca/faune/peche/plan-gestion-saumon.jsp).

The new management measures announced in the management plan are founded on the status of Atlantic populations in individual rivers, prescribed by three status zones:

- healthy zone that defines populations not put in peril by a sustainable exploitation rate;
- cautious zone for which abundance is less than optimal but not alarming, and the exploitation rate is adjusted to favour rebuilding; and
- critical zone for which populations are at low abundance and thus in peril, and the exploitation rate would be held at the lowest level possible.

Reference values to categorize the status of populations in each zone were defined as follows:

- genetic limit reference point: the objective is for a 90% chance of maintaining genetic diversity within 100 years. Any salmon population with adult abundance less than 200 fish is considered to be in peril (in the critical zone) and no exploitation is allowed on these rivers.
- demographic limit reference point: spawner abundance (egg deposition) that results in 75% or greater chance of achieving 50% R_{max} (as described in DFO, 2015).
- upper stock reference: defined as the egg deposition rate corresponding to the 95th percentile of the posterior distribution of S_{MSY}.
- management targets: at the discretion of the managers, for example to favour catch-and-release opportunities (R_{max}) rather than yield to harvests. By default these targets must be greater than the upper stock reference.

Revised reference points for 105 rivers were defined and reference points for four rivers in the northern portion of Quebec in Ungava Bay are under development. The previously defined conservation limits for Atlantic salmon for the province of Quebec generally correspond mid-range between the demographic limit reference point and the upper stock reference point (Figure 10.1.6.6).

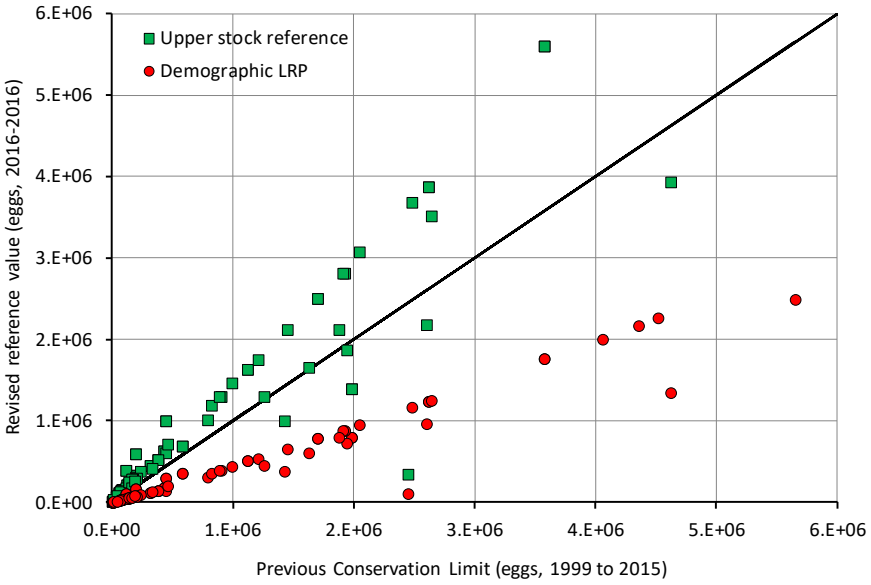


Figure 10.1.6.6 Correspondence between the previous river-specific conservation limits defined by Caron *et al.* (1999) and the new river-specific demographic limit reference points and the upper stock reference points for rivers of Quebec. Data were extracted from the table in Annex 1 of Ministère des Forêts, de la Faune et des Parcs (2016).

10.1.6.6 Review of proposed smolt-to-adult supplementation (SAS) activity in the Northwest Miramichi River, Canada

Increased marine mortality over the past two decades has contributed to declines of anadromous Atlantic salmon populations throughout the North Atlantic. Marine mortality is currently considered to be the most important threat to recovery of salmon populations in the southern regions of NAC (Section 10.3). For many populations at high risk of extinction, a number of recovery actions are undertaken, including live gene banking and adult captive-reared supplementation, to prevent extirpation and minimize loss of genetic diversity until conditions, primarily marine survival, become favorable to population persistence (DFO, 2008).

In response to particularly low returns of Atlantic salmon to the Northwest Miramichi River (New Brunswick, Canada) in 2012 to 2014, a group of non-government organizations in New Brunswick proposed a stock supplementation programme consisting of the capture of wild Atlantic salmon smolts, rearing these in captivity in freshwater to the adult stage, and subsequently releasing the adult captive-reared fish back to the river. This activity, smolt-to-adult supplementation (SAS), is intended to circumvent the low smolt-to-adult marine return rates of Atlantic salmon and to increase spawning escapement.

SAS activities consisting of the capture of wild juvenile salmon (parr, autumn pre-smolts, smolts) and rearing these in captivity with the intention of releasing the mature captive-reared adults to targeted rivers to spawn (Figure 10.1.6.7), has been undertaken by Fisheries and Oceans Canada (DFO) in the Scotia–Fundy region in support of populations of salmon at risk of extinction. However, it has not been done for the salmon populations in the Gulf region that are not considered at risk of extinction.

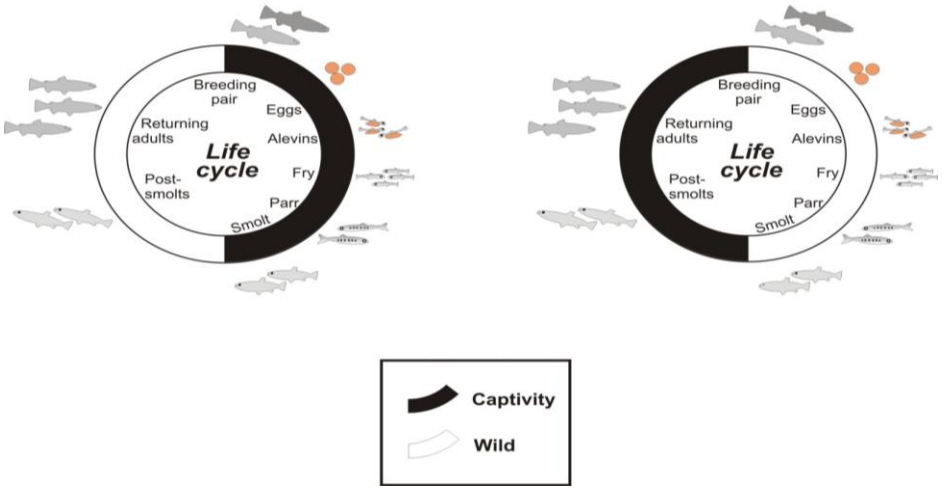


Figure 10.1.6.7 Contrasts between juvenile supplementation programmes (left panel) and juvenile/smolt-to-adult supplementation (SAS) programmes (right panel) in terms of life stages and processes which are impacted by captive rearing and those which occur in the wild. (Figure courtesy of P. O'Reilly, DFO.)

As a precedent-setting activity for supplementation of Atlantic salmon populations not considered to be at risk of extinction, a science peer review was conducted to support an assessment of risks and benefits of SAS activities to fitness of wild Atlantic salmon (DFO, 2016). The advice was provided to DFO Fisheries and Aquaculture Management, the sector responsible for issuing the permits for the collection of fish from and release to rivers. The science review addressed the following objectives:

- a review of the genetic risks of SAS to short- and long-term fitness of wild anadromous Atlantic salmon,
- the ecological risks of SAS,
- criteria and metrics for assessing risk of SAS,
- conditions under which SAS could be considered a negligible risk to wild Atlantic salmon fitness, and
- a specific assessment of risk to wild salmon of a proposed SAS activity of the Miramichi River, New Brunswick, Canada.

The science review was challenging due to the paucity of information available to assess the benefits and risks of SAS. The bulk of the scientific studies and literature regarding effects of captive-rearing and supplementation of Atlantic salmon have addressed the impacts of spawning in hatcheries and supplementation of various juvenile stages from eyed eggs to the smolt stage, though some research on SAS has been carried out on Atlantic and Pacific salmonids (Dempson *et al*., 1999; Fraser, 2008). Due to the recent development of SAS, much less empirical data are available to adequately describe the risks and benefits of SAS programmes to wild populations of Atlantic salmon. SAS is being used in areas where salmon populations are at high risk of extinction, and in cases where very low numbers of adult salmon are putting the population at risk of loss of genetic diversity which could affect long-term population viability.

Based on literature, it was concluded that adaptive genetic changes associated with captivity through unintentional selection, domestic selection, and relaxation of natural selection can occur rapidly, even within one generation. An immediate benefit resulting from an abundance

of breeding/spawning of SAS fish may be offset by the expectation that mean fitness of the captive-reared progeny will be reduced relative to wild fish, in particular if survival at sea of progeny inherited from the parents is lower than that of wild fish.

Considering the presently high marine mortality rates of Atlantic salmon in eastern Canada, the anadromous salmon that are returning are likely those with the combination of fitness traits best suited to the current environment. The review concluded that any dilution of these traits via SAS activities, and particularly via SAS/wild interbred progeny, may delay the recovery in abundance of the wild anadromous phenotype which is presently subjected to strong natural selection at sea. Even worse, it may increase the risk of further declines in abundance of the anadromous phenotype due to an increased proportion of progeny which are maladapted to surviving the current marine conditions.

In-depth research, evaluation, and modelling of existing or proposed SAS activities are required. Because of the large uncertainties on the benefits and risks of SAS activities to wild Atlantic salmon fitness, it was concluded that if a SAS activity is conducted, it should be at a geographic and demographic scale that allows and includes an adequate monitoring and assessment capability to address the vast knowledge gaps on benefits and risks to wild salmon population persistence and productivity from such activities. The compilation of these additional assessment results would facilitate proper decision-making on when, where, and how SAS might provide desired, net-demographic benefits to wild salmon populations.

The science advisory report (DFO, 2016) and supporting documents for the review (Chaput *et al*., 2016; Fraser, 2016; Pavey, 2016) are available on the internet site of Fisheries and Oceans Canada Canadian Science Advisory Secretariat (www.dfo-mpo.gc.ca/csas-sccs/).

10.1.6.7 Progress in stock assessment models – Embedding Atlantic salmon stock assessment within an integrated Bayesian life cycle modelling framework

As part of the inputs to the Atlantic salmon case study within the UE-FP7 ECOKNOWS project (http://www.ecoknows.eu/), Massiot-Granier *et al.* (2014) and Massiot-Granier (2014) developed a hierarchical Bayesian integrated life cycle model which is considered to be an improvement on the stock assessment approach currently used by ICES. The model was applied to the stock units considered by ICES for stock assessment in the Southern European stock complex: France, UK (England and Wales), Ireland, UK (Northern Ireland), UK (Scotland), and Southwest Iceland. In this new approach, the stock assessment is fully integrated in an age- and stage-based life cycle model that explicitly considers the variability of life histories (river and sea ages) and the demographic link between age classes. It makes explicit hypotheses about the demography and the migration routes that are easier to interpret and critically examine than in the currently used pre-fisheries abundance (PFA) modelling approach. In addition, this is an expandable framework which offers the possibility to use additional information through the Bayesian updating framework. Finally, the model estimates trends in marine productivity and proportion maturing for the first year at sea for all stock units in Southern Europe, which forms the basis for forecasting home-water returns based on catch options for at-sea fisheries.

As a new contribution, the working group reviewed an extension of the life cycle modelling framework to the six stock units considered in North America: Labrador, Newfoundland, Quebec, Scotia–Fundy, Gulf regions, and USA. This new model now considers the dynamics of both 1SW and 2SW fish, incorporating a time trend for the proportion of fish maturing as 1SW and differing from the current model used by ICES which considers only 2SW fish in the

PFA forecasting model (Figure 10.1.6.8). Partitioning the life cycle into the first and second year survivals at sea provide a model that aligns with the dynamics of the European stock units. This constitutes a critical step forward in the harmonization of the stock assessment models across stock units in the North Atlantic (Figure 10.1.6.8).

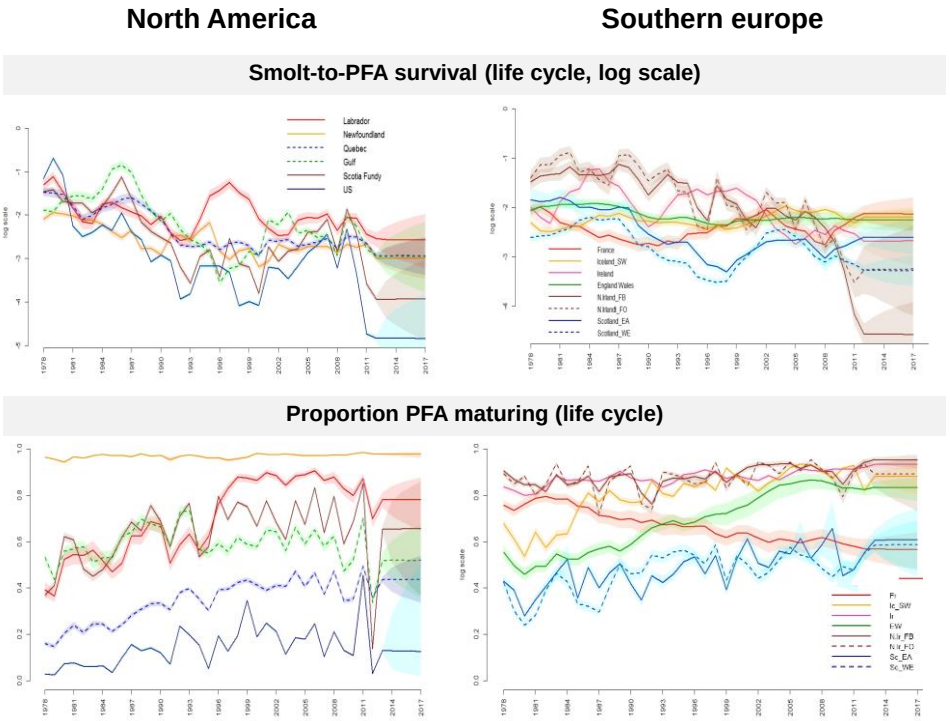


Figure 10.1.6.8 Estimates from the Bayesian life cycle models. Time-series of estimates of smolt to PFA survival (log scale; upper line) and proportion of maturing PFA (lower line) for stock units in North America (left column) and Southern Europe (right column). Lines: medians of Bayesian posterior distributions. Shaded areas: 50% BCI. Forecasting is presented for 3 years.

Cross-comparison with estimates of the PFA forecasting models show that the Bayesian life cycle approach can be applied to provide estimates and forecasts that are comparable with the PFA forecasting modelling approaches (Figure 10.1.6.9). Differences in trends in the productivity parameter for North America stock units arise from the contribution of 1SW to the total eggs deposition (more than 50% in some stock units in North America) that is considered in the life cycle approach, but not in the PFA forecasting model (only 2SW fish).

Also, by comparison with the model developed by Massiot-Granier (2014) for the Southern NEAC stock units, mathematical processes are simplified to speed up the analysis. The model can now run in a few hours (instead of several days for previous versions) and therefore has the potential to be used as a routine assessment tool by the working group.

Finally, the level of synchrony in trends in marine productivity and proportion maturing after the first year at sea can be quantified among all stock units of Southern NEAC and NAC. Taken together, the results provide a broad picture of Atlantic salmon population dynamics in the North Atlantic, providing evidence of a decline in the marine survival and an increase in the proportion of maturing PFA common to all stock units in NAC and Southern NEAC. The time-series of marine survival are negatively correlated with the AMO, a proxy of average SST in the North Atlantic. Taken together, results strongly suggest a common response to large-scale environmental changes impacting Atlantic salmon during the marine phase.

Ongoing developments include: (1) Further improvement of computational tractability of the model, including R-routines to easily pass results of the run-reconstruction as input to the life cycle model; (2) In depth comparisons of the results with those provided by the PFA forecasting models used by ICES; and (3) Extending the methodology to the stock assessment model for Northern NEAC stock units.

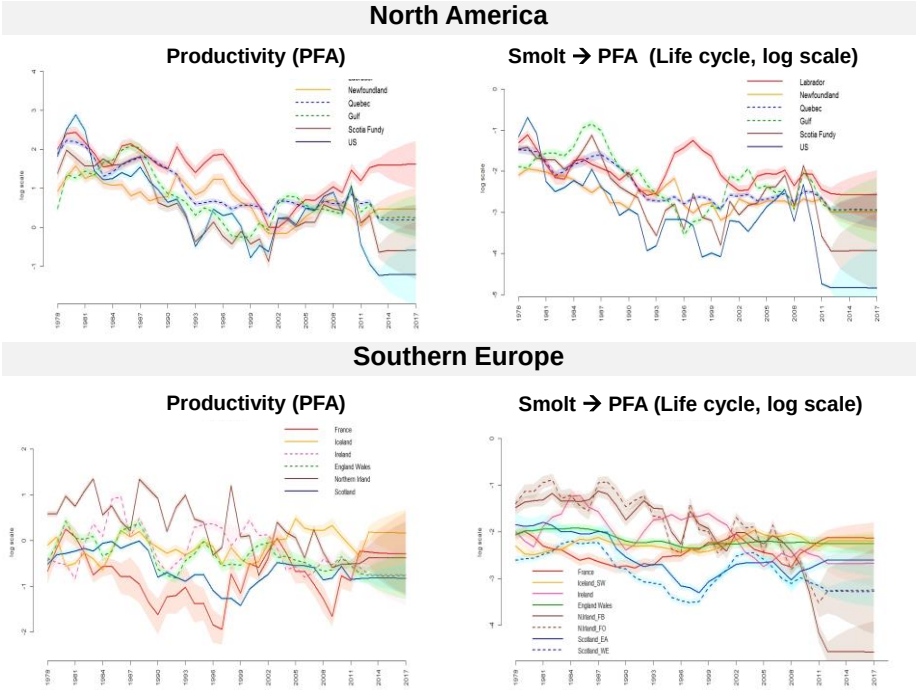


Figure 10.1.6.9 Comparison between the productivity parameter estimated from the PFA and the smolt-to-PFA survival estimated from the Bayesian life cycle model. Productivity parameter estimated from the PFA (left column) and smolt-to-PFA survival (log scale; right column) for North America (upper line) and Southern Europe (lower line). Lines: medians of Bayesian posterior distributions. Shaded areas: 50% BCI. Forecasting is presented for 3 years.

10.1.6.8 New opportunities for sampling salmon at sea

The International Ecosystem Summer Survey in 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 for improving our knowledge of salmon at sea. The time-series for abundance estimation using swept area from pelagic trawling goes back to 2007. The area surveyed (2.7 million km^2 in 2015) 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. In 2015 a total of 51 post-smolt and adult salmon were caught by the participating vessels in different regions of the North Atlantic (Figure 10.1.6.10). The working group has been liaising with the coordinator of the IESSNS surveys to clarify sampling protocols and a number of samples have been collected and frozen for subsequent analysis. Preparatory to conducting such analyses a plan for collecting samples from individual salmon caught in earlier years, in addition to those from last year's cruises, is currently under development at the Institute of Marine Research in Bergen, Norway.

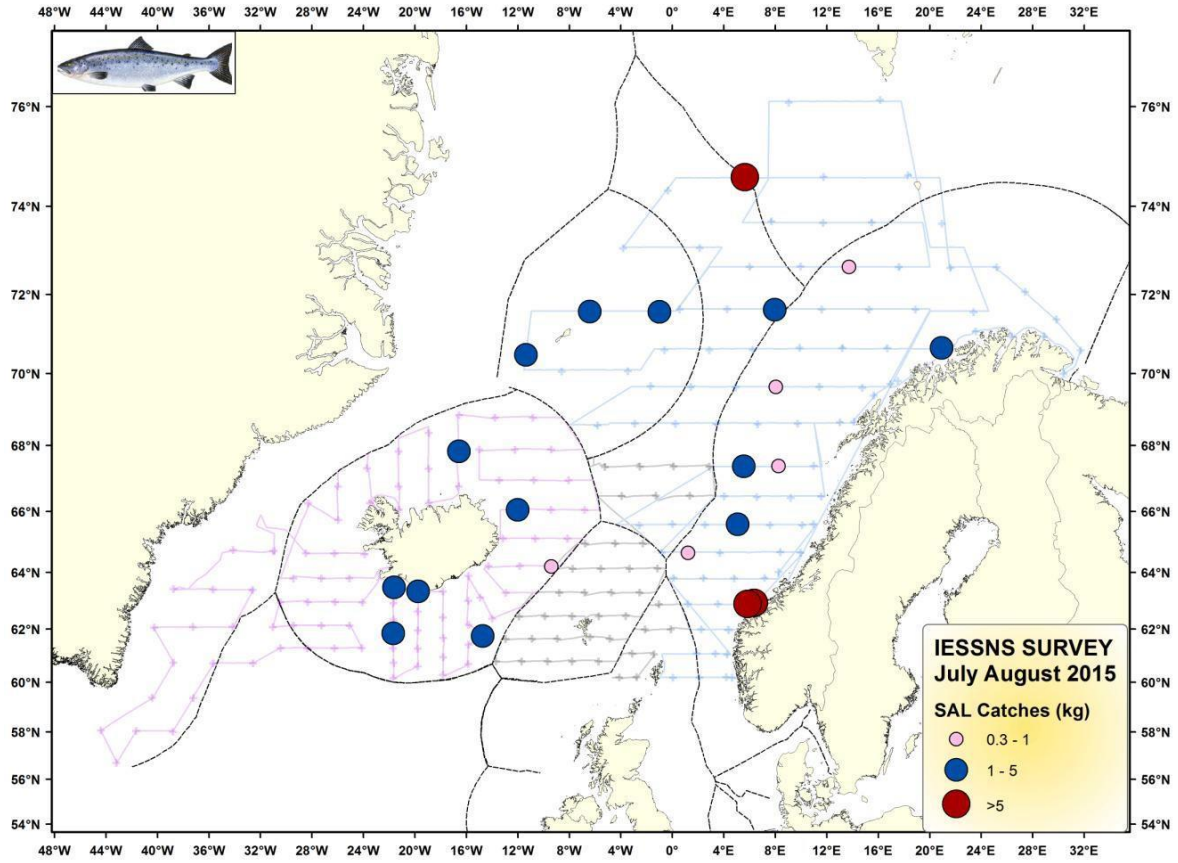


Figure 10.1.6.10 Distribution of salmon catches at surface trawl stations during the IESSNS survey in July and August 2015. (From Nøttestad *et al.*, 2015.)

The samples 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. The IESSNS survey data will also provide information on salmon distribution in relation to other pelagic species, hydrography, and plankton abundance. It has also been suggested that some of the IESSNS research effort could be focused more on surface trawling, potentially increasing the number of salmon samples obtained from these cruises.

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) met for a third and final time 10–12 November 2015 at ICES HQ in Copenhagen.

WGERAAS has completed analysis of both the case studies and the Database on Effectiveness of Recovery Actions for Atlantic Salmon (DBERAAS). A total of 15 case studies were received, together with a total of 568 individual river stocks entered in DBERAAS (Table 10.1.7.1). Analysis of case studies and DBERAAS is ongoing. Preliminary results were presented at WGNAS 2016.

Of the 15 case studies examined, five achieved their stated goals with regard to effective recovery while nine failed to do so. One case study reported a “partial” success.

Characteristics of the successful projects included:

- A limited number of stressors acting on the population.
- Successfully addressing all stressors acting on the population.
- A river stock with moderate to high marine survival estimates.
- Good project evaluation (pre-, mid-, and post project).

Based on the analysis of DBERAAS "Stressor" entries the following stressors were most often reported as having a ***high*** or ***very high*** impact:

1. Climate change.
2. Barriers to migration.
3. Freshwater habitat degradation.

Similarly, on the basis of the analysis of the DBERAAS "Action" entries the following recovery and restoration actions were most often reported as having a high or very high benefit:

1. Improvements in connectivity.
2. Improvements in freshwater water quality.
3. Freshwater habitat restoration.

It is noted that the successful projects in the WGERAAS report concerned river stocks with moderate to high marine survival estimates, while generally it is considered that marine survival is poor for most North Atlantic stocks (Sections 10.1.6.6 and 10.3).

A final report will be submitted in 2016 to ICES for the attention of NASCO. In 2017 WGERAAS will report again to WGNAS.

10.1.8 NASCO has asked ICES to 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

Advice Summary

ICES advises that there is substantial and growing evidence that salmon aquaculture activities can affect wild Atlantic salmon, through the impacts of sea lice as well as and farm escapees. Both factors can reduce the productivity of wild salmon populations and there is marked temporal and spatial variability in the magnitude of reported effects.

Effects of sea lice on wild Atlantic salmon

- The sea louse (*Lepeophtheirus salmonis*) is a parasite of salmonids that has widespread geographic distribution. Salmon farming has been shown to increase the abundance of lice in the marine environment and the risk of infection among wild salmon populations. There is considerable spatial and temporal variability in the extent of affected areas.
- Lice are also a serious problem for the Atlantic salmon farming industry and have been so since the 1970s.
- Laboratory studies show that 0.04–0.15 lice per gram fish weight can increase stress levels and that infections of 0.75 lice per gram fish weight can kill hatchery-reared smolts if all the lice develop into pre-adult and adult stages. This is the equivalent of 11 lice per smolt. This is also supported by field studies.

- Current marine mortality rates for salmon are often at or above 95%, the causes of which are largely unknown.
- There are differing perspectives on the impact of lice. In one perspective, the "additional" marine mortality attributable to lice is estimated at around 1%. In another perspective of the same data, losses are expressed at between 0.6% and 39% reduction in adult returns to rivers. The most important factor causing this variability is the level of total marine mortality. The greatest impact from lice is likely to occur on post smolts during the early period of marine migration.

Effects of escapees and genetic interactions on wild Atlantic salmon

- Farmed salmon are domesticated and display substantial differences to wild salmon in a wide range of fitness-related traits.
- Very large numbers of domesticated salmon escape from fish farms each year. Escapees are observed in rivers in all regions where farming occurs, although the number of escapees varies both spatially and temporally. The numbers of escapees have approached 50% or more of the spawning population in some rivers in some years. There is limited monitoring in rivers away from fish-farming regions.
- The spawning success of escaped farmed salmon is much lower than in wild salmon. Despite this, a large number of Norwegian wild salmon populations exhibit widespread introgression of farmed salmon genomes. Introgression has also been shown in other countries.
- The introgression of farmed salmon reduces the viability of the populations in rivers, caused by maladaptive changes in life history traits.
- The presence of farmed salmon and their offspring in a river has been shown to result in a decreased overall productivity of the wild population through competition for territory and food.
- The long-term consequences of introgression across river stocks can be expected to lead to erosion of genetic diversity and therefore to decreased resilience.

Request

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

…

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];

Notes:

…

[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.

The ICES Secretariat asked NASCO for further clarification via email and received the following from NASCO on 23 September 2015. These clarifications were consequently incorporated into the Terms of Reference for a Workshop to address the request for advice on possible effects of salmonid aquaculture on wild Atlantic salmon populations in the North Atlantic (WKCULEF; ICES, 2016a).

Clarification 1*: The request is referring to the most recent of the series of international symposia organised by NASCO and ICES in 2005. These symposia focused on both the scientific and management issues concerning interactions between aquaculture and wild salmon and other diadromous fish. The advice sought should focus on the effects of sea lice, genetic interactions and the impact on wild salmon production and not on the management approaches to addressing these. Furthermore, this request relates to impacts of salmonid farming and not other forms of aquaculture such as stocking. NASCO is holding a Theme-based Special Session on the topic of developments in relation to minimising the impacts of farmed salmon on wild salmon stocks and the advice will provide a very useful input to that process.*

Clarification 2*: Updating of the 2014 advice provided to OSPAR would be appreciated; there was no intention to request that ICES review its advice to OSPAR in the sense of assessing its quality but rather that ICES consider the advice already provided and update it as necessary in the light of new information. In the case of the advice to NASCO, the focus should be on the effects of sea lice, genetic interactions and impacts on wild salmon production whereas the advice to OSPAR also covered introduction of antibiotics and other pharmaceuticals; release of nutrients and other organic matter; effects on small cetaceans and introduction of non-indigenous species.*

Basis of the advice

Background

The farming of Atlantic salmon has expanded rapidly since the early 1980s. Production of farmed salmon in the North Atlantic is now approximately 1.5 million tonnes (over 2 million tonnes worldwide) and vastly exceeds the nominal catch of wild Atlantic salmon (FishstatJ; FAO, 2013). In 2014, it was estimated that farmed Atlantic salmon production exceeded the nominal wild catch in the North Atlantic by over 1900 times (ICES, 2015).

Interactions between salmon farming and wild stocks have raised concerns, in particular related to disease, parasite, genetic, and ecological interactions. Such issues have been subject to extensive research and dialogue as efforts have been made to balance current needs of industry with the need to safeguard wild stocks. The topic remains an area of continued intensive research interest.

This request for advice was addressed by a workshop, (Workshop to address the NASCO request for advice on possible effects of salmonid aquaculture on wild Atlantic salmon populations in the North Atlantic, WKCULEF). This enabled experts in aquaculture effects, wild Atlantic salmon, disease transmission, and genetic interactions to share and discuss relevant information and recent findings. WKCULEF was convened in Copenhagen, 1–3 March 2016, and was attended by 25 representatives from five ICES Member Countries.

Methods

The WKCULEF terms of reference were addressed though a comprehensive review of recent peer-reviewed literature, presentations from participants, reviews of working documents prepared ahead of the meeting, as well as the development of documents and text for the report during the meeting. It was particularly difficult to disentangle the issue of the possible impact of salmon aquaculture on wild salmon production from the sea lice and genetic interaction

questions. Information pertaining to population level effects was incorporated into the sections dealing with these main issues.

The published literature with respect to the effects of lice and genetic interactions on wild salmon populations from salmonid aquaculture is inevitably focused on countries that have established salmon farming industries. This is a consequence of the importance of both farmed salmon production and wild stocks to national interests. However, relatively little is known about the scale of possible effects of lice and genetic changes on wild salmon in areas without salmon farms in the immediate vicinity.

The terms of reference for WKCULEF focus on interactions between salmon farming and Atlantic salmon. However, salmon farming activities can impact on other salmonid species, in particular sea trout, Arctic char, and species of Pacific salmon, and selected references relating to these species have been included where considered relevant.

Elaboration on the advice

The effects of sea lice on Atlantic salmon

The sea louse (*Lepeophtheirus salmonis*) has a widespread geographic distribution, is a specific parasite of salmonids, and has been a serious problem for the Atlantic salmon farming industry since the 1970s (Thorstad *et al*., 2015). Lice have a greater economic impact on the industry than any other parasite (ICES, 2010b) and control of lice levels on farms is of key importance. In recent years, lice have also developed resistance to one or more of the chemicals commonly used to manage lice levels and resistant lice have been reported in all areas of Norway, except Finnmark County in northernmost Norway (Aaen *et al*., 2015; Besnier *et al*., 2014). The high density of salmon in cages has provided a high number of potential hosts and promoted the transmission and population growth of the parasite (Torrissen *et al*., 2013). As a result, salmon farming has been shown to increase the abundance of lice in the marine environment. However, knowledge of parasite infection rates and resulting effects in wild populations of fish is relatively poor.

Historically, naturally occurring lice levels on wild salmonids have typically been low – a few (0–10) adult lice per returning salmon and sea trout (Torrissen *et al*., 2013; Serra-Llinares *et al*., 2014). Elevated levels of lice on wild salmon collected from coastal areas in the vicinity of salmon farms have been regarded as evidence that mariculture is a main source of the infections and studies have demonstrated a link between fish farming activity and lice infestations on wild salmonids (Helland *et al*., 2012, 2015; Serra-Llinares *et al*., 2014). Thus, the risk of infection among wild salmon populations can be elevated in areas that support salmon mariculture, although louse management activities can reduce the prevalence and intensity of infection on wild fish (Penston and Davies, 2009; Serra-Llinares *et al*., 2014). There is considerable uncertainty about the extent of the zones of elevated risk of infection and this will be subject to both spatial and temporal variability, for example as a result of changes in local hydrological processes (Amundrud and Murray, 2009; Salama *et al*., 2013, 2015; Jones *et al*., 2015; Johnsen *et al*., 2016).

The extent to which elevated infections of lice pose a risk to the health of wild salmon populations has been the subject of extensive research. However, there are many difficulties in quantifying effects at the population level, particularly for fish stocks that are characterized by highly variable survival linked to environmental variables, such as Atlantic salmon (Vollset *et al*., 2015; Helland *et al*., 2015). The following sections aim to summarize the current state of

knowledge in relation to the impact of lice on Atlantic salmon. The literature reviewed includes some results from studies on Pacific salmon. This is considered to provide added insight, but needs interpreting with some caution since there are differences between the situation in the Pacific and the Atlantic, including in the genome of the lice themselves as well as the ecological context of the salmon. In the Pacific, salmonids are more diverse in their life-history traits, species composition, and abundance; the salmon farming industry is also smaller.

Physiological effects

Several laboratory studies have presented the effect of lice on the physiology of Atlantic salmon, sea trout, and Arctic charr smolts (reviewed in Finstad and Bjørn, 2011; Thorstad *et al*., 2015). Major primary (nervous, hormonal), secondary (blood parameters), and tertiary (whole body response) physiological effects (e.g. high levels of plasma cortisol and glucose, reduced osmoregulatory ability, and reduced non-specific immunity) occur when the lice develop from the sessile chalimus second stage to the mobile first pre-adult stage. Reduced growth, reproduction, swimming performance, and impaired immune defence have also been reported (Finstad and Bjørn, 2011). The susceptibility and response to louse infection varies among individuals, populations, and species of salmonid.

It has been shown in laboratory studies that 0.04–0.15 lice per gram fish weight can increase stress levels, reduce swimming ability, and affect the water and salt balance in Atlantic salmon (Finstad *et al*., 2000). In sea trout, the same authors found around 50 mobile lice are likely to give direct mortality, and 13 mobile lice, or approximately 0.35 lice per gram fish weight might cause physiological stress in sea trout (weight range 19–70 grams). Around 0.05–0.15 lice per gram fish weight were found to affect growth, condition, and reproductive output in sexually maturing Arctic charr (Tveiten *et al*., 2010).

Finstad *et al*. (2000) also found that infections of 0.75 lice per gram fish weight, or approximately 11 lice per fish, can kill a recently emigrated wild salmon smolt of about 15 gram if all the lice develop into pre-adult and adult stages. This is consistent with field studies on infections in salmon post-smolts in the Norwegian Sea where more than 3000 post-smolts have been examined for lice, but none observed carrying more than 10 adult lice (Holst *et al*., 2003). Fish with up to 10 mobile lice were observed to be in poor condition with a low haematocrit level and poor growth. These authors also conducted an experimental study of naturally infected migrating salmon smolts collected during a monitoring cruise. Half of the fish were deloused as a control, and the health of the two fish groups were monitored in the laboratory. Only fish carrying 11 mobile lice or less survived. The results have been further verified in the laboratory on wild-caught Atlantic salmon post-smolts infected with lice and showing the same level of tolerance for lice infections (Karlsen *et al*., in prep.).

These results have been used to provide estimates of death rates according to lice densities on migrating salmon smolts and have been adopted in the Norwegian risk assessment for fish farming (Taranger *et al*., 2015). The categories are: 100% mortality in the group > 0.3 lice per gram fish weight, 50% in the group 0.2–0.3 lice per gram fish weight, 20 % in the group 0.1–0.2 lice per gram fish weight and 0% in the group < 0.1 lice per gram fish weight. Wagner *et al*. (2008) discuss the wider factors that should be taken into account when estimating sea louse threshold levels detrimental to a host.

In practice, numerous biotic and abiotic stressors (e.g. pollutants) and ecological processes are likely to mediate the relationship between lice and the marine survival of Atlantic salmon. While laboratory estimates of lethal loads and physiological responses are attractive to predict

impacts on wild populations, this is likely an over-simplified view because natural ecological processes such as predation and competition will probably remove infected fish before lice kill the fish directly. Early marine growth is important for smolts to enable them to reduce the risk of predation and to allow access to more diverse prey fields, and reduced growth rates will affect fish under resource-limited or parasitized conditions. Furthermore, studies with Pacific salmon (Peacock *et al*., 2014) have demonstrated that sub-lethal effects seen in laboratory trials may increase or decrease observed mortality in the field. As such, laboratory results ideally need to be connected with behavioural changes (e.g. migration behaviour; Birkeland and Jakobsen, 1997) in the fish that alter predator–prey interactions between the smolts and their predators as well as the smolts and their prey.

Evidence from monitoring programmes

Monitoring programmes have been implemented in a number of countries to assess lice levels to inform management decisions. Given the difficulties of sampling outmigrating wild salmon smolts, sea trout are commonly sampled and may in some cases be used as a proxy for potential levels on salmon (Thorstad *et al*., 2014).

In Norway, lice infection on wild salmonid populations is estimated through a national monitoring programme (Serra-Llinares *et al*., 2014; Taranger *et al*., 2015). The aim of the lice monitoring programme is to evaluate the effectiveness and consequences of zone regulations in national salmon fjords (areas where salmon farming is prohibited), as well as the Norwegian strategy for an environmentally sustainable growth of aquaculture.

Monitoring is carried out during the salmon smolt migration and in summer to estimate lice levels on sea trout and Arctic charr. The fish are collected using traps, fishing nets, and surface trawling (Holm *et al*., 2000; Holst *et al*., 2003; Heuch *et al*., 2005; Bjørn *et al*., 2007). Sentinel cages have also been used to investigate infestation rates (Bjørn *et al*., 2011).

The results of monitoring indicate considerable variation in the risk of lice-related mortality (low: < 10%, moderate 10–30%, and high: > 30%) between years and sampling locations. The risk for sea trout (and also Arctic charr in the Northern regions) is higher compared with Atlantic salmon post-smolts and the results show moderate-to-high risk of lice-related mortality on sea trout in most counties with high salmon farming activity.

The estimated risk of lice-related mortality for Atlantic salmon varies between years and sites. It was low at most sites in Norway in 2010 and 2013, but moderate or high at several sites in 2011, 2012, and 2014.

In Scotland, analysis of wild sea trout monitored over five successive farm cycles found that lice burdens above critical levels were significantly higher in the second year of the production cycle (Middlemas *et al*., 2010). In Norway, preliminary analysis of data from fallowing zones indicate that lice levels in farming areas are also correlated with biomass. In years with high biomass, lice epidemics are present in some zones, but such epidemics are not seen in years with low biomass (Serra-Llinares *et al*., submitted).

As noted previously, research effort on interactions between farmed and wild salmon is concentrated in areas where salmon farming is most prevalent. The same applies to monitoring efforts and little, if any, monotoring is undertaken in many areas more remote from salmon farming areas, representing a potential gap in our knowledge.

Population effects

Population-level impacts of lice infestation have been estimated in Atlantic salmon post-smolts from a series of long-term studies and analyses in Ireland and Norway involving the paired release of treated and control groups of smolts (Jackson *et al*., 2011a, 2011b; Jackson *et al*., 2013; Gargan *et al*., 2012; Skilbrei *et al*., 2013; Krkošek *et al*., 2013; Vollset *et al*., 2014, 2015). These studies assumed that the louse treatments were efficacious and that released smolts were exposed to lice during the period of the outmigration in which the treatment was effective. Furthermore, the studies were not designed to discriminate between lice from farm and non-farm sources. In addition, the baseline marine survival from untreated groups, which is used as a comparator for treated groups, is itself likely to be affected by louse abundance, introducing an element of circularity that leaves the interactive effects between lice and other factors on salmon survival poorly characterized.

Survival estimates have been based on a statistical analysis of differential survival to adults among release groups (Gargan *et al*., 2012; Jackson *et al*., 2011a, 2011b, 2013), including odds ratios (Jackson *et al*., 2013; Skilbrei *et al*., 2013; Krkošek *et al*., 2013, 2014; Torrissen *et al*., 2013; Vollset *et al*., 2015). An odds ratio is a measure of association between an exposure and an outcome and represents the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure. Thus, in these studies, the odds ratio represented the probability of being recaptured in the treated group divided by the probability of being recaptured in the control group. All studies reported an improved return rate for treated versus control salmon, but all showed significant spatial and temporal variability.

Gargan *et al.* (2012) reported that the ratio of return rates of treated:control fish in individual trials ranged from 1:1 to 21.6:1, with a median ratio of 1.8:1. Similarly, odds ratios of 1.1:1 to 1.2:1 in favour of treated smolts were reported in Ireland and Norway, respectively (Torrissen *et al*., 2013). Krkošek *et al.* (2013) reported that treatment had a significant positive effect with an overall odds ratio of 1.29:1 (95% CI: 1.18–1.42). A recent meta-analysis of Norwegian data (Vollset *et al*., 2015) based on 118 release groups (3 989 recaptured out of 657 624 released), reported an odds ratio of 1.18:1 (95% CI: 1.07–1.30) in favour of treated fish. Untreated returning salmon were on average older and had a lower weight than treated fish (Vollset *et al*., 2014; Skilbrei *et al*., 2013).

The survival of Atlantic salmon during their marine phase has fallen in recent decades (Chaput, 2012; ICES, 2015). This downturn in survival is evident over a broad geographical area and is associated with large-scale oceanographic changes (Beaugrand and Reid, 2003; Friedland *et al*., 2000, 2005, 2009, 2014). For monitored stocks around the North Atlantic, current estimates of marine survival are at historically low levels, with typically fewer than 5% of outmigrating smolts returning to their home rivers for the majority of wild stocks and with even lower levels for hatchery-origin fish (ICES, 2015).

The scientific literature provides differing perspectives of the mortality attributable to lice (Jackson *et al*., 2013; Krkošek *et al*., 2013). In one view (Jackson *et al*., 2013), the emphasis is placed on the absolute difference in marine mortality between fish treated with parasiticides and those that are not. In this instance, viewed against marine mortality rates at or above 95% for fish in the wild, the mortality attributable to lice has been estimated at around 1% (i.e. mortality in treated groups is 95% compared to 96% in untreated groups). This "additional" mortality between groups is interpreted as a small number compared to the 95% mortality from the treatment groups.

The other perspective of this same example is in terms of the percent loss of recruitment, or abundance of returning adult salmon, due to exposure to sea lice. In this perspective, the same example corresponds to a 20% loss in adult salmon abundance due to sea lice; for every five fish that return as adults in the treated groups (95% mortality), four fish return as adults in the untreated group (96% mortality). In other words, one in five fish is lost to sea lice effects. These perspectives are solely differences in interpretation of the same data. Where impacts of lice have been estimated as losses of returns to rivers, these indicate marked variability, ranging from 0.6% to 39% (Gargan *et al*., 2012; Krkošek *et al*., 2013; Skilbrei *et al.*, 2013). These results suggest that a small incremental increase in marine mortality due to lice (or any other factor) can result in losses of Atlantic salmon that are relevant for fisheries and conservation management and which may influence the achievement of conservation requirements for affected stocks (Gargan *et al.*, 2012). Vollset *et al*. (2015) concluded that much of the heterogeneity among trials could be explained by the release location, time period, and baseline (i.e., marine) survival. Total marine survival was reported to be the most important predictor variable. When marine survival was low (few recaptures from the control group), the effect of treatment was relatively high (odds ratio of 1.7:1). However, when marine survival was high, the effect of treatment was undetectable (odds ratio of ~1:1). One explanation for this finding is that the detrimental effect of lice is exacerbated when the fish are subject to other stressors, and the findings of other studies support this hypothesis (Finstad *et al*., 2007; Connors *et al*., 2012; Jackson *et al*., 2013; Godwin *et al*., 2015). Potential interactive effects of multiple factors are likely to be important for explaining the result from meta-analysis where the effect of sea lice on salmon survival depends on the baseline survival of untreated fish (Vollset *et al*., 2015). In conclusion the authors cautioned that though their study supported the hypothesis that lice contribute to the mortality of salmon, the effect was not consistently present and strongly modulated by other risk factors, suggesting that population-level effects of lice on wild salmon stocks cannot be estimated independently of the other factors that affect marine survival.

Escapees, genetic interactions and effects on wild Atlantic salmon

Numbers of escapees and observations in rivers

Although aquaculture technology and fish-farm safety has significantly increased over the past decade or more, each year, large numbers of Atlantic salmon still escape from aquaculture installations into the wild. Although many of these are reported (e.g. http://www.fiskeridir.no/Akvakultur/Statistikk-akvakultur/Roemmingsstatistikk), in many circumstances, escapes go unnoticed. In Norway, the true numbers escaping from farms have been estimated to be 2–5 times higher than the official statistics (Skilbrei *et al*., 2015). The numbers of farmed escapees are also reported in Scotland (http://aquaculture.scotland.gov.uk/data/fish_escapes.aspx) and in eastern Canada and the United States (NASCO, 2015), but the degree of underreporting in these regions has not been estimated.

Farmed salmon may escape from both the freshwater (Clifford *et al*., 1998a; Carr and Whoriskey, 2006; Uglem *et al*., 2013) and the marine stages of production (Clifford *et al*., 1998b; Webb *et al*., 1991; Carr *et al*., 1997a). Most known escapes occur from sea cages (Jensen *et al.*, 2010). However, due to differences in rearing practices between countries and regions, the magnitude of freshwater escapes may differ. In some countries, such as Scotland, it is likely to be higher than, for example, in Norway. In Scotland, in the order of 20 million smolts are produced annually from freshwater pens (Franklin *et al.*, 2012). In Norway, most smolts are produced in land-based tanks from which escape is less likely. Although the probability of surviving to adulthood and maturing vary between the different life-history

stages at which the salmon escape, the great majority of salmon that escape from farms disappear, never to be seen again (Skilbrei, 2010a, 2010b; Hansen, 2006; Whoriskey *et al*., 2006). Nevertheless, some escapees enter rivers where native salmon populations exist and other fish escape direct to river systems. While not all escapees are sexually mature (Carr *et al*., 1997b; Madhun *et al*., 2015), some may attempt to spawn with wild salmon (this can include both precocious parr and adults). Farmed escaped salmon have been observed in rivers in all regions where Atlantic salmon farming occurs: Norway (Gausen and Moen, 1991; Fiske *et al*., 2006), United Kingdom (Youngson *et al*., 1997; Webb *et al*., 1991; Green *et al*., 2012), eastern Canada and the United States (Morris *et al*., 2008; Carr *et al*., 1997a), and Chile (Sepulveda *et al*., 2013). Furthermore, farmed salmon can migrate great distances post escape (Hansen and Jacobsen, 2003; Jensen *et al.*, 2013), and have been observed in rivers at a considerable distance from the main concentrations of salmon farming , for example in Iceland (Gudjonsson, 1991). Still, the incidence of farmed escaped salmon in rivers has been correlated with the volume of farming in Norway (Fiske *et al*., 2006), and in Scotland (where there are differences between the east and west coasts; Green *et al*., 2012). Relatively little is known about possible levels of spawning by escapees in river systems away from centres of aquaculture production. Numbers of escapees in such areas are typically assumed to be low (ICES, 2015), but can be subject to temporal variation (e.g. higher in rivers at spawning time than evidenced from in-season catches).

The incidence of farmed escaped salmon has been investigated in a number of rivers in Norway (Fiske *et al*., 2006). A new national monitoring programme for farmed escaped salmon was established in Norway in 2014 based upon data from angling catches, dedicated autumn angling, and diving surveys. The results for 30 of the 140 rivers surveyed exceeded a frequency of 10% escapees (see http://www.imr.no/publikasjoner/andre_publikasjoner/romt_oppdrettslaks_i_vassdrag/nb-no). These studies demonstrate that the number of escapees within rivers varies in time and space (Gausen and Moen, 1991; Fiske *et al*., 2006).

Farmed salmon escapees may attempt to spawn with wild salmon or among themselves. Observations of farmed salmon spawning with wild fish have been reported in rivers in Scotland (Webb *et al*., 1991, 1993; Butler *et al*., 2005), Norway (Lura and Saegrov, 1991; Saegrov *et al*., 1997), and Canada (Carr *et al*., 1997a). However, experiments demonstrate that the spawning success of farmed salmon is significantly reduced (Fleming *et al*., 1996; Fleming *et al*., 2000; Weir *et al*., 2004), perhaps just 1–3% and < 30% of the success of wild males and females, respectively (Fleming *et al*., 1996). However, the relative spawning success is likely to also vary with the life stage at which the fish escaped (Fleming *et al*., 1997; Weir *et al*., 2005). Therefore, if a river has, for example, 10% farmed escapees observed on the spawning grounds, the genetic contribution to the next generation is likely to be significantly lower than 10%. One explanation for the wide range of estimates of the relatively low spawning success of escapees is that they originate from aquaculture stocks that have been changed the most by domestication. If so, these interbreeding events likely have more serious consequences than interbreeding events of a similar magnitude involving less domesticated stocks. This would mean that simply focusing on the rate of interbreeding will not necessarily provide a full picture of the genetic consequences of escapees (Baskett and Waples, 2013).

The life stage of the escapees affects potential impact. Escapes of smolts are believed to assume a normal migration pattern, few immature adults return to rivers, maturing fish have a higher tendancy to return to nearby rivers (Skilbrei *et al*., 2015). This is also affected by the time of year relative to migration patterns in the wild. Thus smolts that escape when natural migration

is occurring in the spring have a greater tendancy to return than those escaping at other times of the year (Skilbrei *et al*., 2015).

The rate at which escapes occur may also have implications for the possible impact. Hindar *et al.* (2006) concluded that large pulses of escapes are more damaging than small amounts of gradual '"eakage". However, Baskett *et al.* (2013) reached the opposite conclusion; that constant, small-scale leakage created greater fitness losses to the wild population. The different conclusions can be largely explained by different time frames of reference: Hindar *et al.* (2006) focused on short-term effects, while Baskett *et al.* (2013) evaluated mean effects over long periods of time. However, this topic merits more detailed study. Baskett *et al.* also did not explicitly consider overlapping generations, and so more work is needed in order to evaluate results as a function of escapes across generations in Atlantic salmon. This is important to resolve, as it is convenient to ignore low-level leakage because it is very difficult to eliminate or even monitor, but some results, at least, suggest it can have extremely important effects on wild populations.

Identification of escapees

Farmed salmon escapees are typically identified using external morphological characteristics, including growth patterns on fish scales (Fiske *et al*., 2006; Lund and Hansen, 1991). In Norway, genetic methods to identify farmed escaped salmon back to their farm(s) of origin have been developed and are routinely implemented in cases of unreported escapes (Glover *et al*., 2008; Glover, 2010). By the start of 2016, the method has been used in ~20 cases of unreported escape and has resulted in initiation of legal investigations successfully resulting in fines for companies found in breach of regulations (Glover, 2010). Since 2003, all aquaculture salmon in Maine must be marked before placement into marine net pens, so that in the event of an escape the fish can be traced to the farm of origin (NMFS, 2005). Maine's marking programme utilizes a genetic pedigree-based approach to identify fish. In other countries, no formal active identification programmes are in place. There are ongoing efforts to develop other genetic and non-genetic tagging methods to permit the routine identification of escapees back to their farms of origin.

Intraspecific hybridization and introgression

Only few published studies have addressed genetic changes in wild populations following the invasion of escaped farmed Atlantic salmon. This may be due to the fact that such studies are often challenging. For example, they often require representative samples of the wild populations ideally before and after invasion, and access to representative farmed samples, as well as an informative set of molecular genetic markers (Besnier *et al*., 2011; Karlsson *et al*., 2011).

The first studies of introgression were conducted in Ireland (Clifford *et al*., 1998b, 1998a) and Northern Ireland (Crozier, 1993; Crozier, 2000), demonstrating introgression of farmed salmon in rivers as a response to escapes from local farms. These escapees originated from both cage escapes in salt water, as well as escapes from freshwater smolt rearing facilities located within rivers. The first studies in Norway demonstrated temporal genetic changes in three out of seven populations located on the west and middle parts of the country, and concluded that introgression of farmed salmon was the primary driver (Skaala *et al*., 2006). A more recent spatio-temporal investigation of 21 populations across Norway revealed significant temporal genetic changes in several rivers caused by introgression of farmed salmon, and importantly, observed an overall reduction in interpopulation genetic diversity (Glover *et al*., 2012). The

latter observation is consistent with predictions of population homogenization as a result of farmed salmon breeding with wild fish (Mork, 1991). Importantly, all rivers that displayed temporal genetic changes due to spawning of farmed escapees displayed an increase in genetic variation, revealed as the total number of alleles observed in the population. This is consistent with introgression from fish of a non-local source. The final published study in Norway used recently developed diagnostic genetic markers for identification of farmed and wild salmon (Karlsson *et al.*, 2011) to estimate cumulative introgression of farmed salmon escapees in 20 wild populations (Glover *et al.*, 2013). In this study, cumulative introgression over 2–3 decades ranged from 0% to 47% between rivers. Differences in introgression levels between populations were positively linked with the observed proportions of escapees in the rivers, but it was also suggested that the density of the wild population, and therefore level of competition on the spawning grounds and during juvenile stages, also influenced introgression (Glover *et al.*, 2013). A recent study conducted in the Magaguadavic River in eastern Canada has also demonstrated introgression of farmed escapees with the native population (Bourret *et al*., 2011).

The most recent and extensive investigations of introgression of farmed salmon were recently published as a report in Norwegian by researchers from NINA and IMR (http://www.nina.no/english/News/News-article/ArticleId/3984). A total of 125 Norwegian salmon populations were classified using a combination of the estimate of wild genome P(wild) (Karlsson *et al.*, 2014) and the introgression estimates from the study by Glover *et al*. (2013). The latter authors established four categories of introgression: green = no genetic changes observed; yellow = weak genetic changes indicated – i.e. less than 4% farmed salmon introgression; orange = moderate genetic changes documented – i.e. 4–10% farmed salmon introgression; red = large genetic changes demonstrated – i.e. >10% farmed salmon introgression. Based upon these analyses, 44, 41, 9, and 31 of the populations studied fell into categories green to red, respectively. There are no similar estimates in other countries.

Domestication and divergence from wild salmon

From the very start of the Atlantic salmon aquaculture industry in the early 1970s, breeding programmes to select salmon for higher performance in culture were initiated (Gjedrem *et al.*, 1991; Ferguson *et al.*, 2007; Gjoen and Bentsen, 1997). The largest and most significant of these programmes globally have been those initiated in Norway, based upon material originating from >40 Norwegian rivers (Gjedrem *et al*., 1991). Other programmes in Norway were also established from wild salmon, and in other countries salmon breeding programmes have also been established. Farmed salmon originating from the three main breeding companies in Norway: Marine Harvest – Mowi strain, Aqua Gen AS, and SalmoBreed AS, dominate global production although this varies from country to country. For example, in eastern Canada only the St John River domesticated strain (Friars *et al.*, 1995) is permitted for use in commercial aquaculture, and in Scotland some locally based strains, e.g. Landcatch (Powell *et al.*, 2008) are also being used.

Initially, salmon breeding programmes concentrated on increasing growth, but then expanded to include other traits that are also of commercial importance, such as flesh characteristics, age-at-maturation, and disease resistance (Gjedrem, 2000, 2010). Currently, breeding programmes have advanced to 12+ generations, and genome-assisted selection is being utilized in several of the breeding programmes. Quantitative Trait Loci (QTL)-selected sub-strains are now commercially available, displaying characteristics such as reduced sensitivity to specific diseases (Moen *et al.*, 2009) and increased growth. It is likely that full utilization of genomic selection will increase the number of traits that can be accurately targeted by selection for rapid

gains in breeding. For example, the recently identified strong influence of the vgll3 locus on age-at-maturation in salmon (Ayllon *et al.*, 2015; Barson *et al.*, 2015) could represent an effective target to inhibit grilsing (i.e. early maturation) in aquaculture.

As a result of: (1) directional selection for commercially important traits, (2) inadvertent domestication selection (the widespread genetic changes associated with adaptation to the human-controlled environment and its associated reduction in natural selection pressure), (3) non-local origin, and (4) random genetic changes (drift), farmed salmon display a range of genetic differences to wild salmon (Ferguson *et al.*, 2007). Examples of these differences include growth rate under controlled conditions (Glover *et al.*, 2006; Glover *et al.*, 2009; Solberg *et al.*, 2013a, 2013b; Thodesen *et al.*, 1999), gene transcription patterns (Bicskei *et al.*, 2014; Roberge *et al.*, 2006, 2008), stress tolerance (Solberg *et al.*, 2013a), and behavioural traits including predator avoidance and dominance (Einum and Fleming, 1997). In addition, farmed salmon strains typically display lower levels of allelic variation when compared to wild salmon strains (Norris *et al.*, 1999; Skaala *et al.*, 2004), although not all classes of genetic marker reveal the same trends (Karlsson *et al.*, 2010). Looking at the level of genetic variation coding for phenotypic traits such as growth, some data are emerging that suggest a possibly reduced variation in farmed strains (Solberg *et al.*, 2013a; Reed *et al.*, 2015). The latter observation is expected given the fact that farmed fish have been selected for this trait since the early 1970s.

Fitness studies

Thus far, only three published studies have addressed survival of farmed, hybrid, and wild salmon in the natural environment. Such studies are exceptionally demanding on logistics, and require unusually long and costly experimental periods.

The first study was conducted in the river Burrishoole in Ireland, and involved planting eggs of farmed, hybrid, and wild parentage into a natural river system (McGinnity *et al*., 1997). These fish were identified using DNA profiling and followed through a two-generation experiment. The authors concluded that the survival from fertilization to adult return (life-time success) of farmed fish was just 2% of wild fish (McGinnity *et al*., 2003). The relative life-time success increased along a gradient towards the offspring of F1 hybrid survivors spawning together with wild salmon (i.e. back crosses) that displayed life-time success of 89% compared to pure offspring of wild salmon. The authors concluded that repeated invasions of farmed salmon in a wild population may cause the fitness of the native population to seriously decline, and potentially enter an “extinction-vortex” in extreme cases.

In Norway, a slightly different but complimentary investigation was conducted in the River Imsa (Fleming *et al.*, 2000). Here, the authors permitted migrating adult salmon of farmed and wild native origin entry to the River Imsa, once they had been sampled in the upstream trap. They thereafter spawned naturally and their offspring were monitored until adulthood. This study reported a lifetime fitness of farmed salmon (i.e. escaped adult to adult) of 16% compared with wild salmon (Fleming *et al.*, 2000). Important additional data from this study was the fact that productivity of the wild salmon from the river decreased, following the permitted invasion of farmed salmon, both with respect to the total smolt production and when smolt production from native females was considered alone (Fleming *et al*., 2000). This is because the offspring of the farmed and hybrid salmon competed with wild salmon for both territory and resources, and the dynamics of this may vary across life-history stages (Sundt-Hansen *et al.*, 2015).

The most recently published study to address the relative fitness of farmed and wild Atlantic salmon in a natural environment was conducted in the River Guddal in Norway (Skaala *et al*., 2012). Here, these authors used a similar design to the Irish study, releasing large numbers of farmed, hybrid, and wild salmon eggs into a river that had no native Atlantic salmon population and following their survival. The study included planting out eggs across three cohorts, and permitted for the first time comparisons of family as well as group-fitness (farmed, hybrid, and wild) in freshwater. As there were no local wild fish, salmon from the Norwegian gene-bank were used as a wild-fish proxy. While these authors reported reduced genetic fitness of farmed salmon offspring compared to the non-local wild salmon, egg size was closely related to family survival in the river. Therefore, some farmed salmon families with large eggs displayed relatively high survival rates in freshwater (higher than some wild families). When these studies were controlled for egg size, farmed salmon offspring displayed significantly lower survival in freshwater compared to the wild salmon. To illustrate this, in 15 of 17 pair-wise comparisons of maternal half-sib groups, families sired with wild males performed better than families sired with farmed fish. The study also revealed that farmed and wild salmon overlapped in diet in the river, an observation also reported from an earlier small-scale release study (Einum and Fleming, 1997) and from the full-generation study in the river Imsa (Fleming *et al*., 2000).

Studies examining the underlying details, mechanisms, and genomics of the observed survival differences between farmed and wild salmon in natural habitats have also been published (Besnier *et al*., 2015; Reed *et al*., 2015), although the exact mechanisms still remain elusive. For example, attempts at quantifying predation in the wild (Skaala *et al*., 2014), and predation susceptibility in semi-natural contests (Solberg *et al*., 2015) have not revealed greater predation of farmed salmon offspring than wild salmon offspring, despite earlier studies suggesting reduced predation awareness caused by domestication (Einum and Fleming, 1997).

Collectively, the results of the whole-river studies outlined above are supported by the widespread literature demonstrating the reduced fitness of hatchery reared salmonids, including those fish used in stocking programmes (Araki *et al*., 2007, 2009; Christie *et al*., 2014).

Short-term (few generation) consequences of introgression for wild salmon populations

In natural habitats such as rivers, territory and food resources are typically limited, and survival is often controlled by density-dependent factors, and habitats have carrying capacities (Jonsson *et al*., 1998; Bacon *et al*., 2015). Studies have demonstrated that the offspring of farmed salmon compete with wild salmon for resources such as food and space (Skaala *et al*., 2012; Fleming *et al*., 2000). Therefore, when farmed salmon manage to spawn, and their offspring constitute a component of a given rivers´ juvenile population, the production of juveniles with a pure wild background will be depressed though competition for these resources. In addition, data from controlled studies have indicated that the total productivity of smolts in the river following introgression of farmed salmon can decrease (Fleming *et al*., 2000; McGinnity *et al*., 1997).

As discussed in the section above, farmed salmon display a range of genetic differences to wild populations, which includes various life-history and behavioural traits. In whole-river experiments with farmed and wild salmon (McGinnity *et al*., 1997, 2003; Fleming *et al*., 2000; Fraser *et al*., 2010a; Skaala *et al*., 2012) differences in freshwater growth and body shape, timing of smolt migration, age of smoltification, incidence of male parr maturation, sea-age at maturity, and growth in the marine environment have been observed, with some variation across farmed–wild comparisons (Fraser *et al*., 2010b). Therefore, where farmed salmon have

introgressed in natural populations, it is likely that recipient populations will display changes in life-history traits in the direction of the farmed strains. Given that life-history traits are likely to be associated with fitness in the wild and local adaptation (Garcia de Leaniz *et al*., 2007; Taylor, 1991; Fraser *et al*., 2011; Barson *et al.,* 2015), these changes in life-history characteristics are likely to be associated with a loss of fitness (which will also contribute to an overall reduction in productivity). These changes will be difficult to detect against the background of natural variability in stock abundance and require long-term studies to quantify accurately. At present, there is a lack of empirical data demonstrating such changes in affected wild populations.

The short-term consequences for wild populations is expected to be dependent on the magnitude and frequency of interbreeding events. For example, in rivers where density of wild spawners is low, spawning success of escapees should increase compared with locations where density of wild spawners is high. Similarly, low density of wild juveniles with reduced ability to compete should give farm offspring better survival opportunities than they will have in locations with a high density of wild juveniles. Thus, when populations are under stress and the density of individuals goes down, impact from escapees is expected to increase. These expectations are supported both by modelling (Hutchings, 1991; Hindar *et al*., 2006; Castellani *et al*., 2015) and by studies on observed introgression rates in salmon (Glover *et al*., 2012; Heino *et al*., 2015; Glover *et al*., 2013), and also by studies on brown trout supplemented by non-local hatchery fish (Hansen and Mensberg, 2009).

Atlantic salmon river stocks are characterized by widespread structuring into genetically distinct and differentiated populations (Ståhl, 1987; Verspoor *et al*., 2005). This is conditioned by the evolutionary relationships among populations (Dillane *et al*., 2008; Dionne *et al*., 2008; Perrier *et al*., 2011) and adaptive responses to historical and contemporary environmental differences (Taylor, 1991; Garcia de Leaniz *et al*., 2007). A spatio-temporal genetic study of 21 populations in Norway revealed an overall reduction in inter-population diversity caused by interbreeding of farmed escaped salmon (Glover *et al*., 2012). It is likely that further introgression of farmed salmon will continue to erode this diversity.

Long-term (more than a few generations) consequences of introgression for wild salmon populations

The conservation of genetic variation within and among populations (as outlined in the UN Convention on Biological Diversity, 1992) is important for the resilience of local stocks to human or natural disturbances (Ryman, 1991; Schindler *et al.,* 2010), and in the long term, reduced genetic variability will affect the species' ability to cope with a changing environment (Lande and Shannon, 1996; McGinnity *et al.,* 2009). Therefore, gene flow into wild populations caused by successful spawning of farmed escapees potentially represents a powerful evolutionary force. It erodes genetic variation among these populations (Glover *et al.,* 2012), and in the long run, may also erode the genetic variation within populations under certain situations (Tufto and Hindar, 2003) as the recipient wild populations become more similar to the less variable farmed populations.

Although evolutionary theory and modelling permits us to outline general trajectories, it remains difficult to predict and demonstrate the evolutionary fate of specific wild populations receiving farmed immigrants. The severity and nature of the effect depends on a number of factors. These include:

- the magnitude of the differences between wild and farmed populations (both historical and adaptive differences),
- the mechanisms underlying genetic differences between wild and farmed salmon,
- the frequency of intrusions of farmed fish, and
- the numbers of intruding farmed fish relative to wild spawning population sizes (Hutchings and Fraser, 2008).

Furthermore, wild populations that are already under evolutionary pressure from other challenges such as diseases, lice infection, overharvest, habitat destruction, and poor water quality, etc., are more likely to be sensitive to the potential negative effects of genetic introgression and loss of fitness. Therefore, genetic introgression has to be seen in the context of other challenges.

There have been a number of attempts to model the persistence of wild salmon populations interbreeding with farmed conspecifics. Early modelling work by Hutchings (1991) predicted that the extinction risk of native genomes is largest when interbreeding occurs and when farmed fish occur frequently and at high densities. The risk is largest in small, wild populations, which is related to both demographic and genetic effects. Hindar *et al.* (2006) refined this work by using life-stage specific fitness and narrowing the modelling to scenarios based on experimental data. They found that under high intrusion scenarios the recovery of the wild population is not likely under all circumstances, even when interbreeding has not occurred for many decades. Baskett *et al.* (2013) used a model with coupled demographic and genetic dynamics to evaluate how genetic consequences of aquaculture escapes depend on how divergent the captive and wild populations are. They found negative genetic consequences increased with divergence of the captive population, unless strong selection removes escapees before they reproduce. Recent modelling work by Castellani *et al.* (2015) has focused on using individual-based eco-genetic models, which are parameterized taking processes such as growth, mortality, and maturation as well environmental and genotypic variation into account. This should allow improved power for predicting the outcome of genetic and ecological interactions between wild and farmed salmon. Further field studies would be required to verify (or otherwise) these models.

Taken collectively, existing understanding makes it clear that the long-term consequences of introgression across river stocks can be expected to lead to reduced productivity and decreased resilience to future changes (i.e., less fish and more fragile stocks).

Knowledge gaps

This advice provides a review of the current evidence based on the latest available information in the peer-reviewed literature. While these recent findings have advanced our understanding of the interactions between salmonid aquaculture and wild salmon, substantial uncertainties remain and further investigations are recommended.

Knowledge gaps in relation to impacts of lice include:

- Natural mortality. In order to put mortality from lice into context, there is a need to better understand the causes underlying the current approximate 95% natural mortality of wild salmon and their interactions.
- Transfer of lice. In order to understand better the variation in infestation rates in wild salmon, there is a need to further explore the temporal and spatial variability in the mechanisms underlying the transfer of lice from farmed fish to wild salmonids.

- Long-term effects. There have been few studies of long-term effects of lice on wild salmon populations.
- Distance effects. Little is known on impacts in areas further away from salmon farming concentrations (applies also to escapees).

Knowledge gaps in relation to impacts of farm escapees include:

- Scale of introgression. Monitoring should continue in order to characterize changes in introgression through time. In addition, further characterization of aquaculture strains would better inform management decisions.
- Factors affecting introgression. There is uncertainty around the environmental and biological factors that influence levels of farmed salmon introgression.
- Consequences of introgression and escapees. There is limited knowledge of the ecological consequences of introgression and escapees. This particularly includes effects on the productivity of fish populations in rivers.
- Effects of escapes on the genetic structure of wild Atlantic salmon populations. There is a need for a better understanding of the underlying genetic differences between farmed and wild salmon and how these affect fitness.
- Timing and pace of escapes. There is conflicting evidence surrounding the long-term differences in impact between escapes resulting from major events and gradual leakage.

10.1.9 NASCO has asked ICES to provide a time-series of numbers of river stocks with established CLs and trends in numbers of stocks meeting their CLs by jurisdiction

In this section the attainment of CLs is assessed based on spawners, after fisheries.

In the NAC area, both Canada and the USA currently assess salmon stocks using river-specific CLs (Table 10.1.9.1 and Figure 10.1.9.1).

- In Canada, CLs were first established in 1991 for 74 rivers. Since then the number of rivers with defined CLs increased to 266 in 1997 to 476 since 2014. The number of rivers assessed annually has ranged from 61 to 91 and the annual percentages of these rivers achieving CL has ranged from 26% to 67% with no temporal trend.
- Conservation limits have been established for 33 river stocks in the USA since 1995. Sixteen of these are assessed against CL attainment annually with none meeting CL to date.

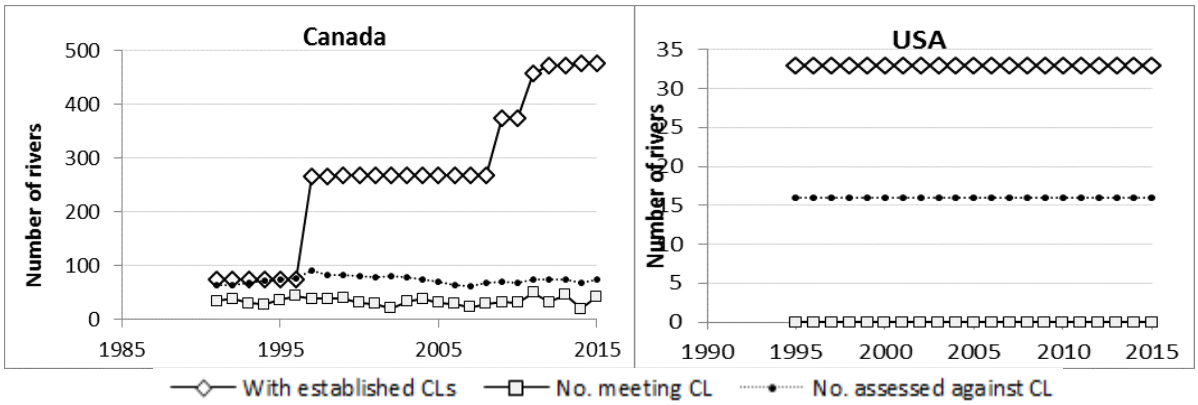


Figure 10.1.9.1 Time-series of NAC areas (Canada left; USA right) with established CLs and trends in the number of stocks meeting CLs (year on *x*-axis).

In the NEAC area, seven countries currently assess salmon stocks using river-specific CLs (Tables 10.1.9.2 and 10.1.9.3 and Figures 10.1.9.2 and 10.1.9.3).

- For the River Teno (Finland/Norway), the number of major tributary stocks with established CLs rose from 9 between 2007 and 2012 (with 5 annually assessed against CL) to 24 since 2013 (with 7 to 10 assessed against CL). None met CL prior to 2013 with 29%, 40%, and 20% meeting CLs in 2013, 2014, and 2015, respectively.
- Since 1999, CLs have been established for 85 river stocks in Russia (Murmansk region) with 8 of these annually assessed for CL attainment, 88% of which have consistently met their CL during the time-series.
- CLs were established for 439 Norwegian salmon rivers in 2009, but CL attainment was retrospectively assessed for 165–170 river stocks back to 2005. An average of 178 stocks are assessed since 2009. An overall increasing trend in CL attainment was evident from 39% in 2009 to provisionally 73% in 2015.
- In France, CLs were established for 28 river stocks in 2011, rising to 33 by 2015. The percentage of stocks meeting CL peaked in 2014 at 74%, dropping to 59% in 2015.
- Ireland established CLs for all 141 stocks in 2007, rising to 143 since 2013 to include catchments above hydro-dams. The mean percentage of stocks meeting CLs is 39% over the time-series, with the highest attainment of 43% achieved in 2014. This was followed by a drop to 38% in 2015.
- UK (England & Wales) established CLs in 1993 for 61 rivers, increasing to 64 from 1995 with a mean of 46% meeting CL. In recent years, a downward trend was observed from 66% attainment in 2011 to a minimum of 20% in 2014, followed by an increase to 38% in 2015.
- Data on UK (Northern Ireland) river-specific CLs are presented from 2002, when CLs were assigned to 10 river stocks. Currently, 16 stocks have established CLs and 5 to 10 rivers were assessed annually for CL attainment over the time-series. A mean of 41% have met their CLs over the presented time-series and an upward trend is evident from 2011, with 50% of assessed stocks attaining CL in 2015.

River stocks in UK (Scotland) are not currently assessed against CLs. As part of the regulations to control the killing of wild salmon in UK (Scotland), stocks will be assessed annually at the district scale from the 2016 season onwards (Section 3.2.3). Work is continuing to extend this analysis to the river scale. Iceland and Sweden are working towards developing river stock-specific CLs. No river-specific CLs have been established for Denmark, Germany, and Spain.

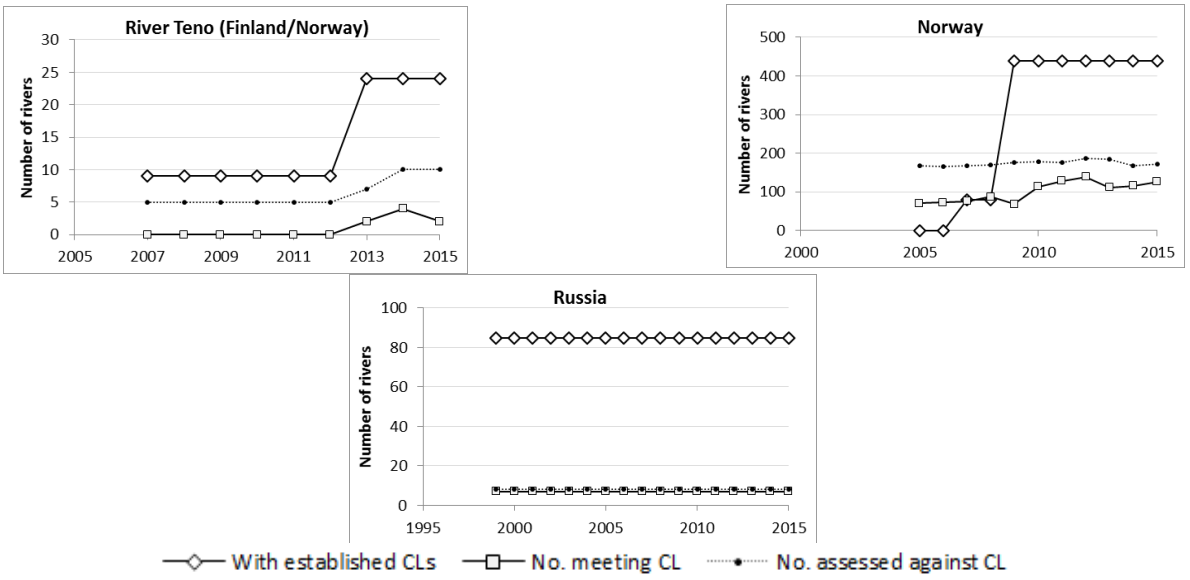


Figure 10.1.9.2 Time-series of northern NEAC area with established CLs and trends in the number of stocks meeting CLs (year on *x*-axis) (For Norway: CL attainment retrospectively assessed 2005–2008).

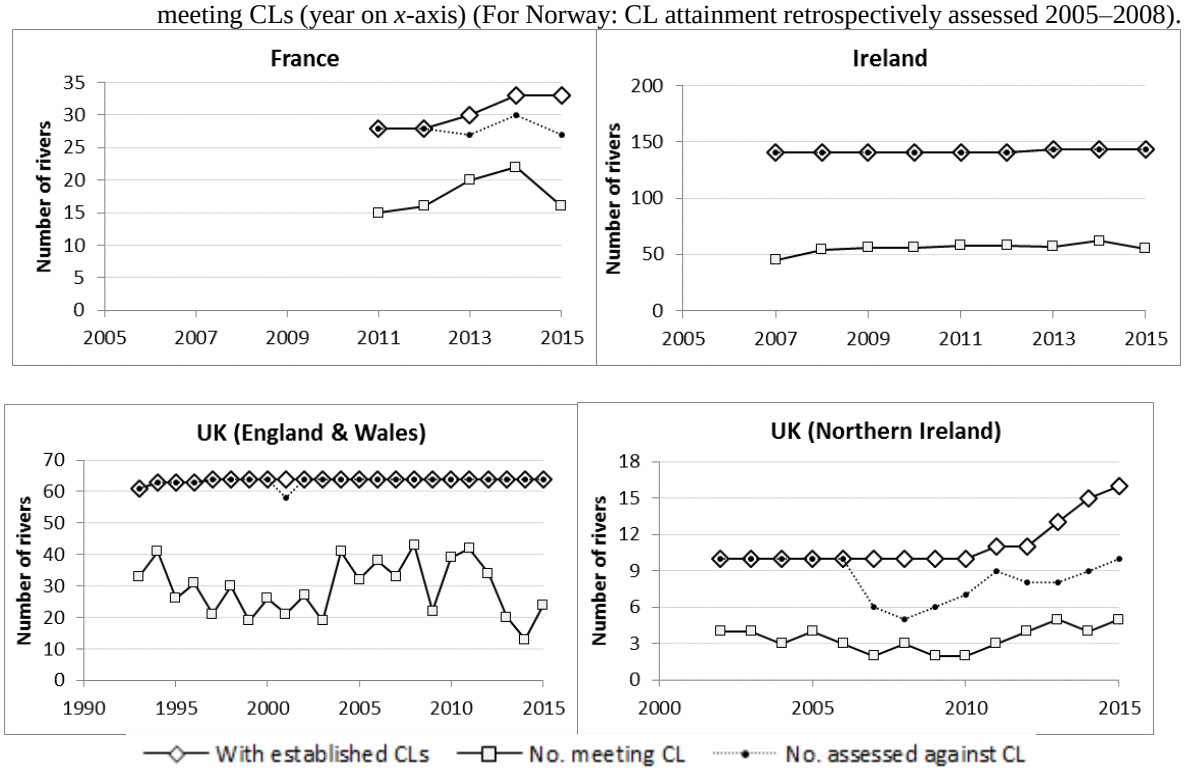


Figure 10.1.9.3 Time-series of southern NEAC area with established CLs and trends in the number of stocks meeting CLs (year on *x*-axis).

10.1.10 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 the coordination of work on diadromous species. The role of the Group is to coordinate work on diadromous species, organize expert groups, theme sessions, and symposia, and help to deliver the ICES Science Plan. WGRECORDS held an informal meeting in June 2015, during the NASCO Annual Meeting in Goose Bay, Canada. Discussions were held on the requirements for expert groups to address new and ongoing issues arising from the

NASCO Annual Meeting. The annual meeting of WGRECORDS was held in September 2015, during the ICES Annual Science Conference in Copenhagen, Denmark. Updates were received from expert groups of particular relevance to North Atlantic salmon which had been established by ICES following proposals by WGRECORDS.

WGERAAS

An update of the Working Group on Effectiveness of Recovery Actions for Atlantic Salmon (WGERAAS; convener Denis Ensing (UK, N.Ireland)) is provided in Section 10.1.7.

WGDAM

The Working Group on Data-Poor Diadromous Fish (WGDAM; conveners Karen Wilson (USA) and Lari Veneranta (Finland)) met in October 2015 and will report to WGRECORDS in May 2016.

WKTRUTTA2

The ICES Workshop on Sea Trout (WKTRUTTA2; conveners Ted Potter (UK, England and Wales) and Johan Höjesjö (Sweden)) was held in February 2016 to focus on the development of models to help address key management questions and to develop biological reference points (BRPs) for use in the management of sea trout stocks and fisheries.

The decline of sea trout stocks, for example in areas where marine mixed-stock fisheries prevail (e.g. the Baltic) and where there is salmon farming, have raised concerns about our lack of knowledge of the true status of stocks. Sea trout have historically taken second place to Atlantic salmon in national fishery assessment programmes and management priorities; as a result relatively few sea trout stocks have been studied for sufficient time to allow the development of population models. Initiating such studies now will be very expensive and will take many years to provide results that will be useful for modelling. There is therefore a need to consider alternative modelling approaches, for example based on catch data or juvenile surveys, to provide information on stock status to inform management.

The workshop reviewed current national monitoring and assessment programmes. Data collection for sea trout in many countries is poor. Catch reporting is often unreliable and in some countries is not required, although this is generally improving. There are few index river studies on sea trout, and although juvenile surveys are conducted in most countries, it is unclear how representative these are of total stocks.

Relatively little population modelling of sea trout has been undertaken to date, and very little work has been undertaken to develop BRPs. A range of modelling approaches were discussed by the group, although it was recognised that their application would generally be restricted by the lack of data. BRPs would ideally be established on the basis of stock–recruitment relationships for index river stocks, and some such work has been undertaken (e.g. River Burrishoole, Ireland). But the transport of BRPs from index sites to other rivers is constrained by the limited number of studies that have been undertaken and the complex and variable nature of trout populations. Two alternative approaches were considered for setting BRPs or alternative management standards. The first, based on the use of catch data to develop "pseudo-stock–recruitment relationships", showed promise, but its application is likely to be limited by the relatively small number of rivers throughout the northeast Atlantic for which good historical (and current) catch data are available. This work is expected to be developed further in England and Wales. The second approach was based on establishing Trout Habitat Scores for pristine/optimal juvenile trout populations. This approach is being applied in the Baltic, and the workshop recommended that a working group be established to further advance the

approach, test its application more widely outside the Baltic, and develop a clearer method setting reference levels.

The final report of the workshop is expected to be produced in the summer of 2016.

In addition, theme sessions and symposia may be developed and proposed by WGRECORDS.

A theme session for the ICES ASC in 2016 has been accepted by ICES entitled:

"Ecosystem changes and impacts on diadromous and marine species productivity." Conveners Katherine Mills (USA), Tim Sheehan (USA), and Mark Payne (Denmark)

Theme session proposals for 2017 and 2018 that are being considered and which are of relevance to NASCO:

From freshwater to marine and back again – population status, life histories, and ecology of least known migratory fishes. Conveners Karen Wilson (USA) and Lari Veneranta (Finland) in 2017.

Options for mitigating against poor marine survival and low stock levels of migratory fish stocks, including endangered fish species, without jeopardizing long-term fitness of wild populations. Conveners to be announced (2018).

ICES and the International Year of the Salmon

In 2002, NASCO, ICES, the North Pacific Anadromous Fish Commission (NPAFC), the North Pacific Marine Science Organization (PICES), and the International Baltic Sea Fishery Commission (IBSFC) cooperated in holding a workshop entitled "Causes of Marine Mortality of Salmon in the North Pacific and North Atlantic Oceans and in the Baltic Sea". The report of the meeting was published as an NPAFC Technical bulletin and is available on the NPAFC website (http://www.npafc.org/new/pub_technical4.html). The workshop demonstrated the benefits of, and the need to maintain and enhance cooperation and information exchange within and between the North Pacific and North Atlantic oceans and the Baltic Sea. Those attending the workshop supported holding an expanded international symposium on the marine survival of salmon. While symposia have been held in relation to the BASIS Programme in the North Pacific and the SALSEA Programme in the North Atlantic there has not, as yet, been a follow-up joint meeting or symposium.

NPAFC has now endorsed, in principle, the concept of an International Year of the Salmon (IYS) and has already held the first scoping meeting to further develop ideas for the IYS: a multi-year (2016–2022) programme centred on an "intensive burst of internationally coordinated, interdisciplinary, stimulating scientific research on salmon, and their relation to people". It considers that new technologies, new observations, and new 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. It considers that the current pace of research is too slow in the face of this change and that a burst of activity is needed to develop new tools, a coordinated approach to their development and application, and field observations to close information gaps.

This first scoping workshop was held in February 2015, and ICES was identified as a key potential partner. NPAFC notes that ICES shares alignment with the goals of the IYS. The NPAFC hosted a Second IYS Scoping Meeting 15–16 March 2016, in Vancouver, BC, and invited ICES to join this meeting to advise and support in planning this initiative.

ICES recognises this opportunity to raise awareness of the salmon globally, the issues facing these species, and the considerable efforts being made to conserve and restore stocks and that it endorses the concept of an IYS. Therefore ICES is currently considering their involvement in, and contribution to, such an initiative and the resources it wishes to make available to support the IYS, so that informed discussions can be held with NPAFC.

10.1.11 NASCO has asked ICES to provide a compilation of tag releases by country in 2015

Data on releases of tagged, fin-clipped, and otherwise marked salmon in 2015 were provided to the WGNAS and are compiled as a separate report (ICES, 2016b). A summary of tag releases is provided in Table 10.1.11.1.

10.1.12 NASCO has asked ICES to identify relevant data deficiencies, monitoring needs, and research requirements

ICES recommends that the WGNAS should meet in 2017 (Chair: Jonathan White, Ireland) to address questions posed by ICES, including those posed by NASCO. The working group intends to convene at the headquarters of ICES in Copenhagen, Denmark. The meeting will be held from 28 March to 6 April 2017.

The following relevant data deficiencies, monitoring needs, and research requirements were identified:

1) Sampling and supporting descriptions of the Labrador and Saint Pierre & Miquelon mixed-stock fisheries need to 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) Additional monitoring needs to be considered in Labrador to estimate stock status for that region. Furthermore, efforts should be undertaken to evaluate the utility of other available data sources (e.g. aboriginal and recreational catches and effort) to describe stock status in Labrador.
3) Further analysis of the resulting data and continuation of the phone survey programme in the Greenland fishery should be conducted. 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) Efforts to improve the Greenland catch reporting system should continue and detailed statistics related to catch and effort should be made available to WGNAS for analysis.
5) The broad geographic sampling programme at West Greenland (multiple NAFO divisions, including factory and non-factory landings) should be continued and potentially expanded to more accurately estimate continent and region of origin and biological characteristics of the mixed-stock fishery.

Table 10.1.5.1 Reported total nominal catches of salmon by country (in tonnes round fresh weight), 1960 to 2015 (2015 figures include provisional data).

	NAC Area			NEAC (N. Area)								NEAC (S. Area)						Faroes & Greenland				Total	Unreported catches	
Year	Canada	USA	St. P&M	Norway	Russia	Iceland		Sweden		Denmark	Finland	Ireland	UK (E & W)	UK (N.Irl.)	UK (Scotl.)	France	Spain	Faroes	East Grld.	West Grld.	Other	Reported Nominal Catch	NASCO Areas (13)	International waters (14)
	(1)			(2)	(3)	Wild	Ranch (4)	Wild	Ranch (15)			(5,6)		(6,7)		(8)	(9)	(10)		(11)	(12)			
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	-	2,155	700	-
2006	137	0	3	932	91	93	17	8	6	2	67	326	80	29	192	13	11	0	0	22	-	2,028	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	16	121	4	2	0	0.8	26	-	1,318	343	-
2010	153	0	3	642	88	147	42	9	13	13	49	99	109	12	180	10	2	0	1.7	38	-	1,610	393	-
2011	179	0	4	696	89	98	30	20	19	13	44	87	136	10	159	11	7	0	0.1	27	-	1,629	421	-
2012	126	0	3	696	82	50	20	21	9	12	64	88	58	9	124	10	7	0	0.5	33	-	1,412	403	-
2013	137	0	5	475	78	116	31	10	4	11	46	87	84	4	119	11	5	0	0.0	47	-	1,270	306	-
2014	118	0	4	490	81	51	20	24	6	9	58	57	54	2	84	12	7	0	0.1	58	-	1,134	287	-
2015	134	0	4	583	80	103	29	9	7	9	45	63	69	5	68	16	6	0	1.0	56	-	1,285	325	-
Average 2010-2014	143	0	4	600	84	92	29	17	10	11	52	84	88	8	133	11	5	0	0.5	41	-	1,411	362	-
2005-2014	139	0	3	699	80	104	33	12	9	9	54	141	80	19	153	10	7	0	0.3	32	-	1,582	444	-

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.

Country	Year	Coast		Estuary		River		Total
		Weight	%	Weight	%	Weight	%	weight
Canada	2000	2	2	29	19	117	79	148
	2001	3	2	28	20	112	78	143
	2002	4	2	30	20	114	77	148
	2003	5	3	36	27	96	70	137
	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	46	36	73	57	127
	2013	8	6	49	36	80	58	137
	2014	7	6	28	24	83	71	118
	2015	8	6	35	26	91	68	134
Finland	1996	0	0	0	0	44	100	44
	1997	0	0	0	0	45	100	45
	1998	0	0	0	0	48	100	48
	1999	0	0	0	0	63	100	63
	2000	0	0	0	0	96	100	96
	2001	0	0	0	0	126	100	126
	2002	0	0	0	0	94	100	94
	2003	0	0	0	0	75	100	75
	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
	2015	0	0	0	0	45	100	45
France	1996	0	0	4	31	9	69	13
	1997	0	0	3	38	5	63	8
	1998	1	13	2	25	5	63	8
	1999	0	0	4	35	7	65	11
	2000	0	4	4	35	7	61	11
	2001	0	4	5	44	6	53	11
	2002	2	14	4	30	6	56	12
	2003	0	0	6	44	7	56	13
	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
	2015	4	23	5	32	7	45	16
Iceland	1996	11	9	0	0	111	91	122
	1997	0	0	0	0	156	100	156
	1998	0	0	0	0	164	100	164
	1999	0	0	0	0	147	100	147
	2000	0	0	0	0	85	100	85
	2001	0	0	0	0	88	100	88
	2002	0	0	0	0	97	100	97
	2003	0	0	0	0	110	100	110

Country	Year	Coast		Estuary		River		Total
		Weight	%	Weight	%	Weight	%	weight
	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	70	100	70
	2015	0	0	0	0	132	100	132
Ireland	1996	440	64	134	20	110	16	684
	1997	380	67	100	18	91	16	571
	1998	433	69	92	15	99	16	624
	1999	335	65	83	16	97	19	515
	2000	440	71	79	13	102	16	621
	2001	551	75	109	15	70	10	730
	2002	514	75	89	13	79	12	682
	2003	403	73	92	17	56	10	551
	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	46	31	54	57
	2015	0	0	21	33	42	67	63
Norway	1996	520	66	0	0	267	34	787
	1997	394	63	0	0	235	37	629
	1998	410	55	0	0	331	45	741
	1999	483	60	0	0	327	40	810
	2000	619	53	0	0	557	47	1176
	2001	696	55	0	0	570	45	1266
	2002	596	58	0	0	423	42	1019
	2003	597	56	0	0	474	44	1071
	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
	2015	233	40	0	0	350	60	583
Russia	1996	64	49	21	16	46	35	131
	1997	63	57	17	15	32	28	111
	1998	55	42	2	2	74	56	131
	1999	48	47	2	2	52	51	102
	2000	64	52	15	12	45	36	124
	2001	70	61	0	0	44	39	114
	2002	60	51	0	0	58	49	118
	2003	57	53	0	0	50	47	107
	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

Country	Year	Coast		Estuary		River		Total
		Weight	%	Weight	%	Weight	%	weight
	2013	36	46	0	0	42	54	78
	2014	33	41	0	0	48	59	81
	2015	34	42	0	0	46	58	80
Spain	1996	0	0	0	0	7	100	7
	1997	0	0	0	0	4	100	4
	1998	0	0	0	0	4	100	4
	1999	0	0	0	0	6	100	6
	2000	0	0	0	0	7	100	7
	2001	0	0	0	0	13	100	13
	2002	0	0	0	0	9	100	9
	2003	0	0	0	0	7	100	7
	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	5	100	5
	2014	0	0	0	0	7	100	7
	2015	0	0	0	0	6	100	6
Sweden	1996	19	58	0	0	14	42	33
	1997	10	56	0	0	8	44	18
	1998	5	33	0	0	10	67	15
	1999	5	31	0	0	11	69	16
	2000	10	30	0	0	23	70	33
	2001	9	27	0	0	24	73	33
	2002	7	25	0	0	21	75	28
	2003	7	28	0	0	18	72	25
	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
	2015	0	0	0	0	16	100	16
UK	1996	83	45	42	23	58	31	183
England & Wales	1997	81	57	27	19	35	24	142
	1998	65	53	19	16	38	31	123
	1999	101	67	23	15	26	17	150
	2000	157	72	25	12	37	17	219
	2001	129	70	24	13	31	17	184
	2002	108	67	24	15	29	18	161
	2003	42	47	27	30	20	23	89
	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	36	13	20	30	44	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	41	76	4	8	9	16	54
	2015	55	79	5	7	10	14	69
UK	1999	44	83	9	17	-	-	53
N. Ireland	2000	63	82	14	18	-	-	77
	2001	41	77	12	23	-	-	53
	2002	40	49	24	29	18	22	81
	2003	25	45	20	35	11	20	56
	2004	23	48	11	22	14	29	48

Country	Year	Coast		Estuary		River		Total
		Weight	%	Weight	%	Weight	%	weight
	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	2	100	2
	2015	0	0	0	0	5	100	5
UK	1996	129	30	80	19	218	51	427
Scotland	1997	79	27	33	11	184	62	296
	1998	60	21	28	10	195	69	283
	1999	35	18	23	11	141	71	199
	2000	76	28	41	15	157	57	274
	2001	77	30	22	9	153	61	251
	2002	55	29	20	10	116	61	191
	2003	87	45	23	12	83	43	193
	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	124
	2013	50	42	26	22	43	36	119
	2014	41	49	17	20	26	31	84
	2015	31	46	9	14	27	40	68
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	0	0	0	12	100	12
	2013	0	0	0	0	11	100	11
	2014	0	0	0	0	9	100	9
	2015	0	0	0	0	9	100	9
Totals								
NEAC	2015	356	33	40	4	680	63	1076
NAC	2015	8	6	35	26	91	68	134

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, 2015.

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	39
NEAC	Finland	6	0.4	12
NEAC	Iceland	4	0.3	3
NEAC	Ireland	6	0.5	9
NEAC	Norway	250	17.9	30
NEAC	Sweden	3	0.2	14
NEAC	France	3	0.2	16
NEAC	UK (E & W)	13	0.9	16
NEAC	UK (N.Ireland)	0	0.0	6
NEAC	UK (Scotland)	7	0.5	9
NAC	USA	0	0.0	0
NAC	Canada	17	1.2	11
WGC	West Greenland	10	0.7	15
	Total Unreported Catch *	325	20.2	
	Total Reported Catch of North Atlantic salmon	1,284		

* No unreported catch estimate available for Russia in 2015.
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, 1991–2015. Figures for 2015 are provisional.

Year	Canada [4]		USA		Iceland		Russia [1]		UK (E&W)		UK (Scotland)		Ireland		UK (N Ireland) [2]		Denmark		Sweden		Norway [3]		Total catch & release
	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	Total	% of total rod catch	
1991	22 167	28	239	50.1			3 211	51															25 617
1992	37 803	29	407	66.7			10 120	73															48 330
1993	44 803	36	507	76.9			11 246	82	1 448	10													58 004
1994	52 887	43	249	95.0			12 056	83	3 227	13	6 595	8											75 014
1995	46 029	46	370	100.0			11 904	84	3 189	20	12 151	14											73 643
1996	52 166	41	542	100.0	669	2	10 745	73	3 428	20	10 413	15											77 963
1997	50 009	50	333	100.0	1 558	5	14 823	87	3 132	24	10 965	18											80 820
1998	56 289	53	273	100.0	2 826	7	12 776	81	4 378	30	13 464	18											90 006
1999	48 720	50	211	100.0	3 055	10	11 450	77	4 382	42	14 846	28											82 664
2000	64 482	56	0	-	2 918	11	12 914	74	7 470	42	21 072	32											108 856
2001	59 387	55	0	-	3 611	12	16 945	76	6 143	43	27 724	38											113 810
2002	50 924	52	0	-	5 985	18	25 248	80	7 658	50	24 058	42											113 873
2003	53 645	55	0	-	5 361	16	33 862	81	6 425	56	29 170	55											128 463
2004	62 316	57	0	-	7 362	16	24 679	76	13 211	48	46 279	50					255	19					154 102
2005	63 005	62	0	-	9 224	17	23 592	87	11 983	56	46 165	55	2 553	12			606	27					157 128
2006	60 486	62	1	100.0	8 735	19	33 380	82	10 959	56	47 669	55	5 409	22	302	18	794	65					167 735
2007	41 192	58	3	100.0	9 691	18	44 341	90	10 917	55	55 660	61	15 113	44	470	16	959	57					178 346
2008	54 887	53	61	100.0	17 178	20	41 881	86	13 035	55	53 347	62	13 563	38	648	20	2 033	71			5 512	5	202 145
2009	52 151	59	0	-	17 514	24			9 096	58	48 418	67	11 422	39	847	21	1 709	53			6 696	6	147 853
2010	55 895	53	0	-	21 476	29	14 585	56	15 012	60	78 357	70	15 142	40	823	25	2 512	60			15 041	12	218 843
2011	71 358	57	0	-	18 593	32			14 406	62	64 813	73	12 688	38	1 197	36	2 153	55			14 303	12	199 511
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	170 773
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	172 030
2014	41 613	54	0	-	13 616	41	8 479	52	7 992	78	37 270	82	6 537	37	1 065	50	1 918	61	445	15	20 281	19	139 216
2015	64 159	64	0		29 341	40	7 028	50	9 925	79	45 973	84	9 374	37	111	100	2 989	70	725	19	25 433	19	195 058
5-yr mean																							
2010-2014	52 557	56.1			17 314	32.6	7 885	47.5	11 964	66.9	59 563	75.7	11 388	37.4	1 921	46.8	2 134	57.6			16 838	14.3	180 075
% change on 5-year mean	22.1	14.1			69.5	21.2	-10.9	5.3	-17.0	18.1	-22.8	10.9	-17.7	-1.1	-94.2	113.7	40.1	21.5			51.0	34.8	8.3

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). Data for 2015 is for R. Bush only.

[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 10.1.7.1 Overview of the number of case studies examined and the data base on Effective Recovery Actions for Atlantic salmon (DBERAAS) river stock entries per nation.

Nation	Region	Number rivers DBERAAS	Number Case Studies
Iceland	N/S NEAC	84	0
Faroe Islands	N NEAC	0	0
Norway	N NEAC	0	1
Sweden	N NEAC/HELCOM	77	1
Russian Federation	N NEAC/HELCOM	0	1
Finland	N NEAC/HELCOM	69	1
Poland	HELCOM	0	0
Lithuania	HELCOM	0	0
Estonia	HELCOM	12	0
Denmark	N NEAC/HELCOM	9	0
Germany	S NEAC/HELCOM	4	1
France	S NEAC	0	2
Spain	S NEAC	10	0
Ireland	S NEAC	148	4
UK (England & Wales)	S NEAC	93	2
UK (Scotland)	S NEAC	0	0
UK (Northern Ireland)	S NEAC	19	0
Canada	NAC	0	1
USA	NAC	43	1
Greenland	WGC	0	0
Total		**568**	**15**

Table 10.1.9.1 Time-series of NAC area with established CLs and trends in the number of stocks meeting CLs.

	Canada				USA			
Year	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met
1991	74	64	34	53				
1992	74	64	38	59				
1993	74	69	30	43				
1994	74	72	28	39				
1995	74	74	36	49	33	16	0	0
1996	74	76	44	58	33	16	0	0
1997	266	91	38	42	33	16	0	0
1998	266	83	38	46	33	16	0	0
1999	269	82	40	49	33	16	0	0
2000	269	81	31	38	33	16	0	0
2001	269	78	29	37	33	16	0	0
2002	269	80	21	26	33	16	0	0
2003	269	79	33	42	33	16	0	0
2004	269	75	39	52	33	16	0	0
2005	269	70	31	44	33	16	0	0
2006	269	65	29	45	33	16	0	0
2007	269	61	23	38	33	16	0	0
2008	269	68	29	43	33	16	0	0
2009	375	70	32	46	33	16	0	0
2010	375	68	31	46	33	16	0	0
2011	458	75	50	67	33	16	0	0
2012	472	74	32	43	33	16	0	0
2013	473	75	46	61	33	16	0	0
2014	476	69	20	29	33	16	0	0
2015	476	74	43	58	33	16	0	0

Table 10.1.9.2 Time-series of northern NEAC area with established CLs and trends in the number of stocks meeting CLs.

Year	Teno River (Finland/Norway)				Norway				Russia			
	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met
1999									85	8	7	88
2000									85	8	7	88
2001									85	8	7	88
2002									85	8	7	88
2003									85	8	7	88
2004									85	8	7	88
2005					0	167*	70	42	85	8	7	88
2006					0	165*	73	44	85	8	7	88
2007	9	5	0	0	80	167*	76	46	85	8	7	88
2008	9	5	0	0	80	170*	87	51	85	8	7	88
2009	9	5	0	0	439	176	68	39	85	8	7	88
2010	9	5	0	0	439	179	114	64	85	8	7	88
2011	9	5	0	0	439	177	128	72	85	8	7	88
2012	9	5	0	0	439	187	139	74	85	8	7	88
2013	24	7	2	29	439	185	111	60	85	8	7	88
2014	24	10	4	40	439	167	116	69	85	8	7	88
2015	24	10	2	20	439	172	126	73	85	8	7	88

* CL attainment retrospectively assessed.

Table 10.1.9.3 Time-series of southern NEAC area with established CLs and trends in the number of stocks meeting CLs.

Year	France				Ireland				UK (England & Wales)				UK (Northern Ireland)			
	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met
1993									61	61	33	54				
1994									63	63	41	65				
1995									63	63	26	41				
1996									63	63	31	49				
1997									64	64	21	33				
1998									64	64	30	47				
1999									64	64	19	30				
2000									64	64	26	41				
2001									64	58	21	36				
2002									64	64	27	42	10	10	4	40
2003									64	64	19	30	10	10	4	40
2004									64	64	41	64	10	10	3	30
2005									64	64	32	50	10	10	4	40
2006									64	64	38	59	10	10	3	30
2007					141	141	45	32	64	64	33	52	10	6	2	33
2008					141	141	54	38	64	64	43	67	10	5	3	60
2009					141	141	56	40	64	64	22	34	10	6	2	33
2010					141	141	56	40	64	64	39	61	10	7	2	29
2011	28	28	15	54	141	141	58	41	64	64	42	66	11	9	3	33
2012	28	28	16	57	141	141	58	41	64	64	34	53	11	8	4	50
2013	30	27	20	74	143	143	57	40	64	64	20	31	13	8	5	63
2014	33	30	22	73	143	143	62	43	64	64	13	20	15	9	4	44
2015	33	27	16	59	143	143	55	38	64	64	24	38	16	10	5	50

Table 10.1.11.1 Summary of Atlantic salmon tagged and marked in 2015 – '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	1,904	315	1,476	**3,695**
	Hatchery Juvenile	0	38	212,180	0	**212,218**
	Wild Adult	0	4,234	0	238	**4,472**
	Wild Juvenile	0	19,390	9,303	1,061	**29,754**
	Total	**0**	**25,566**	**221,798**	**2,775**	**250,139**
Denmark	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	68,000		424,700	10,000	502,700
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	0	0
	Total	**68,000**	**0**	**424,700**	**10,000**	**502,700**
France	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile[3]	0	0	205,876	0	205,876
	Wild Adult[3]	29	0	0	0	29
	Wild Juvenile	860	0	0	0	860
	Total	**889**	**0**	**205,876**	**0**	**206,765**
Iceland	Hatchery Adult	0	102	0	0	102
	Hatchery Juvenile	32,209	0	0	0	32,209
	Wild Adult	0	92	0	0	92
	Wild Juvenile	2,406	0	0	0	2,406
	Total	**34,615**	**194**	**0**	**0**	**34,809**
Ireland	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	208,481	0	0	0	208,481
	Wild Adult	0	0	0	0	0
	Wild Juvenile	6,480	0	0	0	6,480
	Total	**214,961**	**0**	**0**	**0**	**214,961**
Norway	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	58,996	9,660	0	22,187	90,843
	Wild Adult	0	753	0	58	811
	Wild Juvenile	0	2,371	0	3,051	5,422
	Total	**58,996**	**12,784**	**0**	**25,296**	**97,076**
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	0	170,920	0	0	**170,920**
	Wild Adult	0	0	0	0	**0**
	Wild Juvenile	0	0	0	0	**0**
	Total	**0**	**170,920**	**0**	**0**	**170,920**
Sweden	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	3999	163,870	0	167,869
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	489	0	0	489
	Total	**0**	**4,488**	**163,870**	**0**	**168,358**
UK (England & Wales)	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	0	23,493	0	23,493
	Wild Adult	0	613	0	3	616
	Wild Juvenile	6,468	0	9,494	10	15,972
	Total	**6,468**	**613**	**32,987**	**13**	**40,081**
UK (N. Ireland)	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	12,147	0	39,776	0	51,923
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	0	0
	Total	**12,147**	**0**	**39,776**	**0**	**51,923**
UK (Scotland)	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	0	183,475	2,045	185,520
	Wild Adult	0	505	0	0	505
	Wild Juvenile	3,130	0	4,758	6,288	14,176
	Total	**3,130**	**505**	**188,233**	**8,333**	**200,201**
USA	Hatchery Adult	0	488	0	2,687	3,175
	Hatchery Juvenile	0	117,628	206,182	2,480	326,290
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	50	50
	Total	**0**	**118,116**	**206,182**	**5,217**	**329,515**
All Countries	Hatchery Adult	0	2,494	315	4,163	6,972
	Hatchery Juvenile	379,833	302,245	2,992,523	36,712	3,711,313
	Wild Adult	29	7,948	0	299	8,276
	Wild Juvenile	19,344	22,250	23,555	10,460	75,609
	Total	**399,206**	**334,937**	**3,016,393**	**51,634**	**3,802,170**

[1] Includes other internal tags (PIT, ultrasonic, radio, DST, etc.)
[2]Includes Carlin, spaghetti, streamers, VIE etc.
[3] Includes external dye mark.

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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 member country under the direction of an independent chair appointed by the Council.

AMO (*Atlantic Multidecadal Oscillation*). A mode of natural variability occurring in the North Atlantic Ocean and which has its principle expression in the sea surface temperature (SST) field.

BASIS (*Bering-Aleutian Salmon International Survey*). Project, commenced in 2001 in the North Pacific, designed to establish the biological responses of salmon to conditions resulting from climate change.

BC (*British Columbia*). Canadian province on the west (Pacific) coast.

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

BRP (*biological reference point*). The spawning stock level that produces maximum sustainable yield (Conservation Limit).

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 (or CLs), 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.

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.

DBERAAS (*Database on Effectiveness of Recovery Actions for Atlantic Salmon*). Database output from WGERAAS.

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.

EU (*European Union*)

FAO (*Food and Aquaculture Organisation of the United Nations*). Agency of the United Nations dealing with global food and aquaculture production.

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 multiannual management advice has occurred.

HBM (*Hierarchical Bayesian modelling*). Statistical model written in multiple levels that estimates the parameters of the posterior distribution using the Bayesian method.

HELCOM (*Baltic Marine Environment Protection Commission*). HELCOM is the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, known as the Helsinki Convention.

IASRB (*International Atlantic Salmon Research Board*). Platform established by NASCO in 2001 to encourage and facilitate cooperation and collaboration on research related to marine mortality in Atlantic salmon.

IBSFC (*International Baltic Sea Fishery Commission*). The IBSFC was established pursuant to Article V of the Convention on Fishing and Conservation of the Living Resources in the Baltic Sea and the Belts (the Gdańsk Convention) which was signed on the 13th of September 1973. The Contracting Parties undertook to cooperate closely with a view to preserving and increasing the living resources of the Baltic Sea and the Belts and obtaining the optimum yield, and, in particular to expanding and coordinating studies towards these ends. The IBSFC was closed down in 2007.

ICES (*International Council for the Exploration of the Sea*).

IESSNS (*International Ecosystem Summer Survey in the Nordic Seas*). A collaborative programme involving research vessels from Iceland, the Faroe Islands and Norway.

IYS (*International Year of the Salmon*). A concept proposal from NPAFC for a multiyear (2016–2022) programme centred on an intensive burst of internationally coordinated, interdisciplinary, stimulating scientific research on salmon, and their relation to people.

LRP (*limit reference point*). When using the Precautionary Approach in resource management the LRP represents the stock status below which serious harm is occurring to the stock. At this stock status level, there may also be resultant impacts to the ecosystem, associated species and a long-term loss of fishing opportunities. Several approaches for calculating the LRP are in use and may be refined over time. The units describing stock status will vary depending on the nature of the resource (groundfish, shellfish, salmonids or marine mammals). The LRP is based on biological criteria and established by Science through a peer reviewed process.

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.

NAFO (*Northwest Atlantic Fisheries Organisation*). NAFO is an intergovernmental fisheries science and management organization that ensures the long-term conservation and sustainable use of the fishery resources in the Northwest Atlantic.

NAC (*North American Commission*).

NASCO (*North Atlantic Salmon Conservation Organization*).

NEAC (*North East Atlantic Commission).*

NOAA (*National Oceanic and Atmospheric Administration*).

NPAFC (*North Pacific Anadromous Fish Commission*). An intergovernmental organization established by the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean. The Convention was signed on February 11, 1992, and took effect on February 16, 1993. The member countries are Canada, Japan, Republic of Korea, Russian Federation, and United States of America. As defined in the Convention, the primary objective of the NPAFC is to promote the conservation of anadromous stocks in the Convention Area. The Convention Area is the international waters of the North Pacific Ocean and its adjacent seas north of 33°North beyond the 200-mile zones (exclusive economic zones) of the coastal States.

OSPAR (*Convention for the Protection of the Marine Environment of the Northeast 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.

PA (*precautionary approach*). In resource management the PA is about being cautious when scientific information is uncertain, unreliable or inadequate and not using the absence of adequate scientific information as a reason to postpone or fail to take action to avoid serious harm to the resource.

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).

PICES (*North Pacific Marine Science Organization*). PICES, the North Pacific Marine Science Organization, is an intergovernmental scientific organization that was established and held its first meetings in 1992. Its present members are Canada, People's Republic of China, Japan, Republic of Korea, Russian Federation, and the United States of America. The purposes of the Organization are as follows: (1) Promote and coordinate marine research in the northern North Pacific and adjacent seas especially northward of 30 degrees North, (2) advance scientific knowledge of the ocean environment, global weather and climate change, living resources and their ecosystems, and the impacts of human activities, and (3) promote the collection and rapid exchange of scientific information on these issues.

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.

SAS (*smolt-to-adult supplementation*). Generally refers to intervention activities consisting of the capture of wild juvenile salmon (parr, fall presmolts, smolts) and rearing theses in captivity with the intention to release the mature captive reared adults to targeted rivers to spawn.

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.

S_{MSY} (*spawners for maximum sustainable yield*). The spawner abundance that generates recruitment at a level that provides a maximum exploitable yield (recruitment minus spawners).

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 subskin 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.

UDN (*Ulcerative Dermal Necrosis*). Disease mainly affecting wild Atlantic salmon, sea trout and sometimes other salmonids. It usually occurs in adult fish returning from the sea in the colder months of the year and starts as small lesions on the scale-less regions of the fish, mainly the snout, above the eye and near the gill cover. On entry to freshwater lesions ulcerate and may become infected with secondary pathogens like the fungus Saprolegnia spp. Major outbreaks of UDN occurred in the 1880s (UK) and 1960s–1970s (UK and Ireland), but the disease has also been reported from France, and in 2015 from the Baltic and Russia.

USR (*upper stock reference point*). When implementing the precautionary approach in resource management USR is the threshold point below which removals must be reduced to avoid serious harm.

WGDAM (*Working Group on Data=Poor Diadromous Fish*).

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 final meeting in Copenhagen in November 2015.

WGNAS (*Working Group on North Atlantic Salmon*).

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).

WKCULEF (*NASCO Request for Advice on Possible Effects of Salmonid Aquaculture on Wild Atlantic Salmon Populations*). Workshop on the possible effects of salmonid aquaculture on wild Atlantic salmon populations in the North Atlantic. Met in Copenhagen 1–3 of March 2016 and reported by the 11 March 2016 for the attention of the ICES Advisory Committee.

WKTRUTTA2 (*Workshop on sea trout*). A workshop was held in February 2016 to focus on the development of models to help address key management questions and to develop biological reference points for use in the management of sea trout stocks and fisheries.

Annex 11

CNL(16)10

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

Steigenberger Hotel, Bad Neuenahr-Ahrweiler, Germany

6 June 2016

1. Opening of the Meeting

1.1 The Chairman, Mr Rory Saunders (USA), opened the meeting and welcomed members of the Board, their scientific advisers and observers to Bad Neuenahr-Ahrweiler.

1.2 A list of participants is contained in Annex 1.

2. Adoption of the Agenda

2.1 The Board adopted its Agenda, ICR(16)6 (Annex 2).

3. Report of the Scientific Advisory Group

3.1 The Chairman of the Board's Scientific Advisory Group (SAG), Dr Niall Ó Maoiléidigh, presented a report on the Group's meeting, SAG(16)6 (Annex 3). During its meeting the SAG had:

- reviewed the updated inventory of marine research which will be uploaded to the website by the end of July. Three new projects, two involving the application of telemetry in Ireland and one which aims to acoustically tag smolts in Middle River, Cape Breton, Canada, have been included since last year. The Parties/jurisdictions were asked to take steps to increase awareness of the inventory;
- reviewed the metadatabase of salmon survey data and sample collections, which currently contains 11 entries. In 2015, the SAG had 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. The SAG had 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. The SAG considered that the Board could play a role in identifying such scale collections, raising their profile with a view to safeguarding them for future use. The Board agreed that information on these scale collections should, as a first step, be included in the metadatabase and asked that the Secretary contact Parties/jurisdictions in order to seek the relevant information;
- discussed the proposed International Year of the Salmon (see item 4 below);
- discussed developments in relation to SALSEA - Track (see item 5 below);
- noted that since last year's Annual Meeting, the United States had made a contribution to the IASRB to support an extension of the study undertaken in 2014/15 (see SAG(15)4) 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'. The study will proceed later in the year following completion of the necessary documentation;

- considered an application to the Board for partial funding by Professor Christopher Todd, Scottish Oceans Institute, St Andrews, Scotland, for a study entitled 'Effects of recent ocean warming on growth and migration of Southern NEAC 1SW salmon', ICR(16)4. The SAG endorsed the proposed research project but, given the limited funds available to it and the Board's current research priority, it did not recommend that the funds sought should be approved by the Board. The SAG noted that previous financial support from the Board had assisted in securing funding from other sources for projects such as the Greenland and Faroes GSI projects. These projects had generated valuable new information of relevance to management with limited financial support from the Board. The SAG highlighted the importance of the Board having resources available to support similar studies in future.

3.2 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, prior to it being uploaded to the IASRB website;
- to endorse the study entitled 'Effects of recent ocean warming on growth and migration of Southern NEAC 1SW salmon';
- to ask the Secretary to contact Parties/jurisdictions in order to seek relevant information about scale collections for inclusion in the IASRB metadatabase.

4. Update on the Proposed International Year of the Salmon

4.1 Last year, the IASRB had recognised that there are some synergies between NPAFC's proposed International Year of the Salmon (IYS) and SALSEA - Track. The Board noted that at its 2016 Annual Meeting the Council will be considering an Outline Proposal for the IYS (see CNL(16)7) with aims which include the following:

- improving scientific understanding of the factors driving salmon abundance;
- increasing public and political awareness of the challenges facing the resource and the measures being taken to conserve and restore salmon; and
- generating further support for strategies to conserve, restore and rationally manage salmon.

4.2 Mr Dan Morris (United States) made a presentation on the proposed International Year of the Salmon. He referred to Council document CNL(16)7 and indicated that he would be seeking support for the Outline Proposal contained in that document from the Council. Clarification was sought as to whether the SALSEA - Track Programme would fit within the research themes and it was confirmed that it was relevant to at least three themes – Status of Stocks; Salmon in a changing salmosphere; and New Frontiers. It was noted that the IYS is scalable, depending on the resources available. Reference was made to a new initiative in the United States, Species in the Spotlight, which had resulted in increased awareness and support for salmon conservation and research and the IYS might deliver the same benefit. In response to a question about goals for fundraising, it was noted that in the North Pacific, a figure of $50million was proposed. The North Pacific Anadromous Fish Commission had endorsed the IYS and made

budgetary provision of $65,000 in each of the next two years and the IYS had been incorporated into the North Pacific Science Plan. Reference was made to joint opportunities for co-operation. It was recognised that the SAG and IASRB could play valuable roles on issues in relation to closer co-operation and information exchange between scientists in the Pacific and Atlantic, including through the proposed international symposium.

4.3 While it is a matter for the Council to decide on NASCO's involvement in the IYS, the IASRB recognises that salmon face many challenges and uncertainties, not least those associated with climate change and that the IYS is a timely initiative. The Board has agreed that its research priority is studies to partition mortality of salmon along marine migration routes through telemetry projects (SALSEA - Track) and that this fits within the research themes identified in the Outline Proposal, particularly 'Status of Stocks' and 'Salmon in a Changing Salmosphere'. The Board recognised that the proposed IYS could be supportive of fund-raising initiatives under SALSEA - Track by increasing awareness of the proposed research and through IYS endorsements. The Board also welcomes the opportunity for closer co-operation and collaboration with scientists in the North Pacific and other parts of the salmosphere and the proposed international symposium.

5. Developments in relation to SALSEA - Track

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.

5.2 In 2015, through a Telemetry Workshop, 12 outline project proposals had been developed. 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.

5.3 Last year, the Board recognised that there were some clear synergies between NPAFC's proposed IYS and the Board's international telemetry programme. The Board recognised the high value of the SALSEA brand and the strong impact of NASCO as the international forum for consultation and co-operation 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. It was recognised that with relatively small sums, the Board had been able

to support research projects that had provided important information to support management.

5.4 The Chairman introduced document ICR(16)3 and indicated that a brochure on SALSEA - Track had now been prepared and progress reports had been requested on these projects. He highlighted a number of areas where the Board could play a role in taking the project forward, including supporting fund-raising, funding research, endorsements, providing a forum for information exchange and collaboration and co-ordination. It was noted that for the first phase of the SALSEA Programme, the Board had developed an outline programme and that the SALSEA-Merge project had then been developed for funding under the EUFP7 programme and SALSEA-North America had been implemented. Private funding had been secured from the TOTAL Foundation. The challenge now was to support the 12 outline projects. The Board confirmed that it had endorsed these projects but indicated that if outline project proposals included additional or different research, they should be referred to the SAG. It was recognised that there might be scope to combine some of these projects into large projects within the NAC and NEAC areas.

5.5 Mr David Meerburg (ASF Canada) made a presentation on the Atlantic Salmon Federation's tracking projects (CNL(16)63).

6. Finance and Administrative Issues

6.1 The Secretary introduced document ICR(16)2 presenting the Board's accounts for 2015. The decision had been taken not to have the 2015 accounts audited because of the limited funds held and the small number of transactions in the year. At the end of 2015, the balance of the International Atlantic Salmon Research Fund was £35,235. Since the last meeting of the Board, the USA had contributed £16,900 to support the project 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*' and Norway had contributed approximately £6,000. The Chairman thanked the representatives of the US and Norway for these generous contributions. The Board had asked that the Chairman contact the Parties with a view to seeing if additional funds could be contributed and this has been done. It was recognised that with relatively modest funding, the Board could support projects that could provide valuable management information, but implementation of SALSEA - Track would require more substantial funding.

6.2 The Board decided that it would not have its 2016 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.

6.3 The representative of the European Union indicated that the intention was to make a voluntary contribution to NASCO to support two projects, one relating to SALSEA - Track and the other aquaculture impacts. The funding would be for Euro 300,000 per project representing 80% of the costs with the balance of funding requiring to be found from third parties (Member States). There would be a need to consider how these funds would be managed and what the role of the IASRB might be. The representative of the European Union indicated that the role of the IASRB might evaluate the proposals. The arrangements would need to be finalised by the end of 2016.

7. Other Business

7.1 The Board was advised of a new research initiative in Canada that will allocate $40million to ocean science.

8. Report of the Meeting

8.1 The Board agreed a report of its meeting.

9. Date and Place of Next Meeting

9.1 The Board agreed to hold its next meeting in conjunction with the Thirty-Fourth Annual Meeting of NASCO during 6 - 10 June 2017.

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

Annex 1 of CNL(16)10

List of Participants

Canada

Bud Bird
Tony Blanchard
Gérald Chaput

Denmark (in respect of the Faroe Islands and Greenland)

Esben Ehlers

European Union

Jaakko Erkinaro
Cathal Gallagher
Michael Millane
Niall Ó Maoiléidigh
Julius Piercy
Ted Potter
Stamatis Varsamos

Norway

Raoul Bierach
Arne Eggereide
Peder Fiske

Russian Federation

Konstantin Drevetnyak
Alina Nikolaeva
Sergey Prusov

United States

Dan Morris
Rory Saunders (Chairman)
Tim Sheehan

International Council for the Exploration of the Sea

Jonathan White

North Pacific Anadromous Fish Commission

Mark Saunders

Non-Government Organisations

Dave Meerburg
Sue Scott
Ken Whelan

Secretariat

Peter Hutchinson

ICR(16)6

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Report of the Scientific Advisory Group
4. Update on the Proposed International Year of the Salmon
5. Developments in relation to SALSEA - Track
6. Finance and Administrative Issues
7. Other Business
8. Report of the Meeting
9. Date and Place of Next Meeting

SAG(16)6

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

Steigenberger Hotel, Bad Neuenahr-Ahrweiler, Germany

Monday 6 June 2016

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 Bad Neuenahr-Ahrweiler.

1.2 A list of participants is contained in Annex 1.

2. Adoption of the Agenda

2.1 The SAG adopted its Agenda, SAG(16)3 (Annex 2).

3. Election of Officers

3.1 The SAG re-elected Dr Niall Ó Maoiléidigh as its Chairman for a period of two years and thanked him for his excellent work to date.

4. Review of the Updated Inventory of Research and the Metadatabase of Salmon Survey Data and Sample Collections

Research Inventory

4.1 The Secretary presented an overview of the Updated Inventory of Research Relating to Salmon Mortality in the Sea, SAG(16)2. For 2016, the total annual expenditure on the 41 ongoing projects (2 of which are uncosted) is approximately £5.1million. More than half of the expenditure is associated with long-term monitoring programmes. He indicated that there are three new projects, two of which relate to telemetry projects in the Burrishoole River, Ireland and the third aims to acoustically tag up to 50 smolts in the Middle River, Cape Breton, Canada in 2016. These projects are as follows:

Canada

- Smolt monitoring on Middle River, Cape Breton, Nova Scotia, Canada.

European Union - Ireland

- Investigation of the early migration of salmon and brown trout from the Burrishoole National Index River using PIT tag telemetry technology in freshwater areas;

- Investigation of the causes of early migration mortality in salmon and sea trout from the Burrishoole National Index River using acoustic telemetry in estuarine, marine and coastal areas.

4.2 The SAG was advised that at the time of preparation of SAG(16)2, no update had been received for EU - Denmark. This had since been submitted and will be incorporated before the inventory is updated and uploaded to the IASRB website.

4.3 The SAG recognised that as 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 be conducted by a SAG Sub-Group every 3 or 4 years. The inventory was last reviewed in 2012 by the Sub-Group on the Future Direction of Research on Marine Survival of Salmon and, if this schedule was followed, then the next review of the inventory would be due in 2016 or 2017. However, the SAG noted that one of the purposes of the review was to identify research needs and recognised that the Board has agreed that its current priority is to partition mortality of salmon along their migration routes through telemetry studies (SALSEA - Track). The SAG therefore agreed to recommend to the Board that the need for a further review of the inventory should be reconsidered at its 2017 meeting. The SAG noted that it had previously encouraged Parties/jurisdictions to take steps to increase awareness of the inventory and asked that the Secretary highlight this when requesting updating of the inventory. It was noted that the proposed symposium to launch the International Year of the Salmon might also be a good opportunity to increase awareness of the inventory.

4.4 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 should be uploaded to the IASRB website.

Metadatabase

4.5 The Board had previously decided that it could play an important role with regard to marine salmon survey data and sample co-ordination by establishing a metadatabase of existing datasets and sample collections of relevance to mortality of salmon at sea. This metadatabase had been made available on the IASRB's website in 2014 and the Chairman indicated that it currently contains eleven entries as follows:

- 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);

- SALSEA-Merge marine feeding (data);
- SALSEA-Merge Genetics Database: Genetically-based Regional Assignment of Atlantic Salmon Protocol (GRAASP) (data).

4.6 The Chairman indicated that he had made enquiries about including an entry for the West Greenland Sampling Programme Biological Characteristics database, which is maintained by Fisheries and Oceans Canada, Newfoundland, and is updated annually. It contains information for more than 60,000 salmon (including age, length and weight and in some instances origin of the fish). Mr Tim Sheehan (USA) undertook to provide the entry for the metadatabase. It was noted that the IASRB metadatabase provides a useful tool to increase awareness of the availability and location of valuable datasets and sample collections, but it does not include actual data, only details of where it can be accessed.

4.7 In 2015, the SAG had 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 had 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. The SAG recognised that even if the scales themselves are not lost, the information accompanying them could be or they could be damaged while in storage. There were three main issues regarding scale collections outlined to the SAG. Firstly the need to have the scale archive described (metadatabase); secondly to ensure the security and safe storage of such archives; and thirdly to determine the best use of these scales for analyses including the potential requirement for destructive sampling for chemical analyses. The SAG considered that the Board could play a role in identifying such scale collections, raising their profile with a view to safeguarding them for future use. The SAG was advised that the Atlantic Salmon Trust had identified three scale collections from sea trout and that arrangements had been made for their safe storage by the Freshwater Biological Association. It was also noted that there were scale sample collections in Ireland dating back to the 1920s and that these had been stored in a secure facility. The SAG agreed that information on these scale collections should, as a first step, be included in the IASRB metadatabase and asked that the Secretary contact Parties/jurisdictions in order to seek the relevant information.

5. Update on the Proposed International Year of the Salmon

5.1 In 2015, the Board had recognised that there were some potential synergies between NPAFC's proposed IYS and SALSEA - Track. The SAG received an update on the International Year of the Salmon (IYS) from Mr Dan Morris, Head of the US Delegation to NASCO. He reported that the IYS had initially been conceived by the North Pacific Anadromous Fish Commission as an intensive burst of research on Pacific salmon in response to a changing environment and the need for scientific endeavours to understand the factors driving abundance and carrying capacity. While the situation facing salmon in the Atlantic is different, there are some common interests. He indicated that following inter-sessional consultations with NASCO Parties, it was confirmed that there was unanimous support for an IYS. NASCO Parties favour a clearly defined, one year initiative (consistent with the NPAFC 'call to action') to raise awareness of the challenges and opportunities facing salmon and in support of fund-raising for new research to better understand the factors driving salmon abundance throughout the 'salmosphere'. NASCO had been invited to join the IYS initiative and, together with the

NASCO Secretary, Mr Morris had attended an IYS Scoping Meeting and Workshop held in Vancouver, Canada, in March 2016 (see document CNL(16)7), at which an Outline Proposal had been developed that articulated a rationale, vision, themes and governance model for the IYS together with an initial budget. The proposed aims of the IYS include improving scientific understanding of the factors driving salmon abundance and public and political awareness of the environmental and anthropogenic challenges facing salmon and the measures being taken to mitigate these. Scientists and the SAG in particular had a lot to bring to the table in consultations and communications with their counterparts in NPAFC. A full report will be presented to the Council. It was noted that there is interest in including representation from the Baltic and Arctic regions. The Council document CNL(16)7 had proposed that the Secretary should liaise with the EU and the Russian Federation with regard to involvement from the Baltic. Dr Jaakko Erkinaro indicated that there was considerable interest among salmon scientists and managers in the Baltic in the IYS.

5.2 Mr Mark Saunders (NPAFC) indicated that NPAFC had very much appreciated the contribution made by NASCO at the Scoping and Working Group meetings, and particularly in developing the Outline Proposal. He advised the SAG that the Outline Proposal had been accepted by NPAFC without change and budgetary provision had been made. While acknowledging that some stocks in the Pacific, particularly pink and chum salmon, are very abundant there are concerns about other species, especially in southern parts of the range which have shown a 20 year decline and some populations are threatened with loss. He referred to a common interest in tracking salmon to better understand where mortality is occurring and to identify the actions that can be taken to counteract it and other synergies related to studies utilising scale reading and otolith microchemistry. He indicated that NPAFC had already been approached by representatives of Genome Canada as there is interest in studies across the northern hemisphere.

5.3 The Outline Proposal contained five broad scientific themes as follows:

- Status of Salmon: to understand the present status of salmon and their environment;
- 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;
- New Frontiers: to develop new technologies and analytical methods to advance salmon science and to explore the unchartered regions of the salmosphere;
- Human Dimension: to investigate the cultural, social and economic elements that depend upon sustainable salmon populations;
- Information Systems: to develop an integrated archive of accessible electronic data collected during the IYS and tools to support future research.

5.4 The SAG noted that the SALSEA - Track Programme fitted well within the first three of these research themes. Common problems with regard to persistent stock declines for Atlantic, Baltic and some Pacific salmon stocks were noted and efforts to understand where mortality was occurring in the marine environment were almost identical in both areas including efforts to co-ordinate studies involving large scale telemetry initiatives, scale growth, otoliths and microchemistry to understand mortality during migration. There was also support for the proposed international symposium as a means to improve exchanges between scientists working in the Pacific and Atlantic. Similarly, ICES had

committed to supporting the IYS and would play an active role. It was recognised that the SAG could play an important role in reviewing research programmes to understand marine mortality of Atlantic salmon and identifying research needs and priorities. Professor Ken Whelan (Atlantic Salmon Trust) made reference to a possible joint AST/ASF symposium being planned to mark the AST's 50th anniversary. He agreed to coordinate with the Secretariat as the planning proceeds, but if the IYS proceeds there might be interest in seeking endorsement for the symposium.

6. Developments in relation to SALSEA - Track

6.1 In 2014, the IASRB 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 there may be a role for the Board in co-ordinating efforts and supporting fund raising initiatives. In 2014, a Telemetry Workshop organised by the Board had developed 12 outline project proposals utilising telemetry. The Board had recognised that if the international telemetry programme is to proceed, it would be important to liaise with the project leaders with a view to following progress and, where appropriate, to provide support to assist with their implementation.

6.2 In 2015, the Board had recognised the high value of the SALSEA brand and the strong impact of NASCO as the international forum for consultation and co-operation on wild Atlantic salmon. The Board reaffirmed its commitment to an international telemetry project under the SALSEA brand, namely SALSEA - Track. Specifically, the Board agreed to support SALSEA - Track as a continuing commitment to understanding the factors affecting the 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. The Board had also agreed that it would be important to raise funds for the SALSEA - Track programme and that members of the Board should be consulted to see if funds could be made available.

6.3 The Chairman of the Board, Mr Rory Saunders (USA), indicated that, as requested, a brochure on SALSEA - Track had been printed and would be distributed at the meeting of the Board. The Secretariat had requested progress reports on the outline projects and these are contained in document ICR(16)3. Seven reports had been received. Additionally, a further, more recent update on one of the projects 'SeaMonitor' had been received, SAG(16)4. While it was clear there has been some progress on a number of the projects, some are awaiting confirmation of funding and a number of the responses indicated that a lack of resources, including financial, are hindering progress with the outline projects. The Secretary sought clarification as to whether the 12 outline project proposals could be considered to have been endorsed by the Board. The SAG agreed with this interpretation but indicated that if outline project proposals included additional or different research, they should be referred to the SAG. It was noted that the Resolution should support those seeking funding for telemetry projects. The SAG noted that three new projects had been included in the inventory since last year involving telemetry and were closely linked with the aims and objectives of SALSEA - Track.

6.4 The Chairman of the Board indicated that additional funding had been generously provided by the United States (see item 7 below) and Norway (approximately £6,000). The Chairman of the Board subsequently wrote to all Parties/jurisdictions to see if they would be willing to make a contribution to support the work of the Board over the coming few years, noting that such contributions can be made direct to the Board independently of the contributions to NASCO. The representative of the European Union indicated that it intended to make a voluntary contribution to NASCO to support two research projects i.e. a sea-lice model for the sustainable development of Atlantic salmon fisheries and aquaculture and Atlantic salmon mortality at sea.

6.5 Professor Whelan indicated that there were a number of small telemetry projects being planned including on the east coast of Scotland and that the AST was seeking funding to employ a coordinator. These were outside of Government funding and largely associated with private funding. Marine Scotland were involved to ensure that projects were realistic and practical. He looked forward to working with SALSEA - Track initiatives and offered to keep the SAG informed of progress.

6.6 Mr Dave Meerburg (ASF Canada) updated the SAG on its smolt and kelt tracking studies in the Gulf of St Lawrence, CNL(16)63.

7. Progress Reports on Projects funded by the IASRB

7.1 Following last year's Annual Meeting, the United States made a contribution of £16,900 ($26,000) to the IASRB to support an extension of the study undertaken in 2014/15 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' (see SAG(15)4). This support is very much appreciated by the SAG. The project leader is Dr Ian Bradbury, Fisheries and Oceans Canada, Newfoundland and the research will proceed later in the year following completion of the necessary documentation and a progress report will be presented at the next meeting of the SAG.

8. Review of Project Applications for potential funding by the Board

8.1 Under the Board's Guidelines for Submitting Proposals for Research, Workshops, Symposia and Other Activities for Support by the IASRB, ICR(09)10, applications seeking either only endorsement by the Board or funding support from the Board may be considered. Applications are reviewed by the SAG which makes its recommendations to the Board.

8.2 The Chairman referred to an application to the Board by Professor Christopher Todd, Scottish Oceans Institute, St Andrews, Scotland, for partial funding for a study entitled 'Effects of recent ocean warming on growth and migration of Southern NEAC 1SW salmon', ICR(16)4. A sum of £10,000 was sought from the Board with an in-kind contribution of approximately £17,100 from the University of St Andrews. The funding would support an experienced post-doctoral assistant for three months (August - October 2016) to complete analyses of growth throughout the marine phase, with a focus on the post-winter growth period as the key time at which final adult condition is determined, and to prepare and submit the results for publication.

8.3 The SAG endorsed the proposed research project but, given the limited funds available to it and the Board's current research priority, it would not recommend that funds sought should be approved by the Board. The SAG was advised that endorsement of a study to investigate the application of eDNA technology in the assessment of pelagic by-catch of Atlantic salmon had been very helpful to the Atlantic Salmon Trust in securing funding for the project. Members of the SAG were asked to advise the AST if they were aware of any similar ongoing studies utilising eDNA.

8.4 The SAG noted that previous financial support from the Board had assisted in securing funding from other sources for projects such as the Greenland and Faroes GSI projects. These projects had generated valuable new information of relevance to management with limited financial support from the Board. The SAG highlighted the importance of the Board having resources available to support similar studies in future.

9. Other Business

9.1 There was no other business.

10. Report of the Meeting

10.1 The SAG agreed a report of its meeting.

11. Date and Place of the Next Meeting

11.1 The SAG agreed to hold its next meeting in conjunction with the Thirty-Fourth Annual Meeting of NASCO during 6 - 9 June 2017.

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

List of Participants

Canada

Bud Bird
Tony Blanchard
Doug Bliss
Gérald Chaput

European Union

Jaakko Erkinaro
Cathal Gallagher
Michael Millane
Niall Ó Maoiléidigh (Chairman)
Julius Piercy
Ted Potter
Stamatis Varsamos

Norway

Peder Fiske

Russian Federation

Alina Nikolaeva
Sergey Prusov

United States

Dan Morris
Rory Saunders
Tim Sheehan

International Council for the Exploration of the Sea

Jonathan White

North Pacific Anadromous Fish Commission

Mark Saunders

Non-Government Organisations

Ken Whelan
Dave Meerburg

Secretariat

Peter Hutchinson

SAG(16)3

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Election of Officers
4. Review of the Updated Inventory of Research and the Metadatabase of Salmon Survey Data and Sample Collections
5. Update on the Proposed International Year of the Salmon
6. Developments in relation to SALSEA - Track
7. Progress Reports on Projects funded by the IASRB
8. Review of Project Applications for potential funding by the Board
9. Other Business
10. Report of the Meeting
11. Date and Place of Next Meeting

Annex 12

CNL(16)11

Report of the Working Group on Stock Classification

1. Background

1.1 The 2012 External Performance Review of NASCO's work, CNL(12)11, stated that '*A major advance in the protection and restoration of habitat has been the establishment by NASCO of the NASCO Atlantic Salmon Rivers Database, which provides information on river location and characteristics, stock status, and impact factors and allows information to be viewed interactively on maps and reports to be generated*'. However, the Review Panel had concluded that it is not easy to reconcile the information in the Rivers Database with the ICES advice. 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. It is noted in this Action Plan that the stock categories used in the NASCO Rivers Database are out-dated and that consideration should be given to reviewing these in the future.

1.2 The Council has recognised the value in developing a consistent and uniform approach to presenting information on stock status and, as a first step, had requested that ICES provide a review of the stock status categories currently used by the jurisdictions of NASCO, including within their Implementation Plans, and advise on common approaches that may be applicable throughout the NASCO area. The response from ICES was presented at NASCO's 2014 Annual Meeting, CNL(14)8. ICES had concluded 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. conservation limits (CLs), and had provided a tentative example. To take forward this work, the Council established a Working Group on Stock Classification in 2014, comprising experts in science and management (Raoul Bierach (Norway), Gérald Chaput (Canada), John McCartney (European Union), Sergey Prusov (Russian Federation) and Steve Gephard, Chairman (USA)). The Group worked mainly by correspondence but held a brief meeting during NASCO's Thirty-Second (2015) Annual Meeting in Happy Valley-Goose Bay and made a verbal report on progress at that meeting.

2. Terms of Reference

2.1 The Terms of Reference (TORs) for the Working Group are contained in document CNL(14)61 and are as follows:

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.

2.2 The Working Group discussed the interpretation of these TORs. With regard to the Rivers Database, the Council's Action Plan, CNL(13)38, states that '*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.'* This statement, together with the TORs above, suggested to the Group that its remit was to develop a more consistent and uniform stock classification system for use with the Rivers Database, not necessarily for use domestically by Parties/jurisdictions. The Group noted that it is clear that in some cases there are differences in the information on stock status currently included in the Rivers Database and that presented in the Implementation Plans. Since the Council seeks a more consistent and uniform approach to presenting information on stock status, the new classification might also be considered for use in reporting to NASCO under Implementation Plans/Annual Progress Reports. While that might result in more consistent reporting, this broader application would be a matter for the Council to decide.

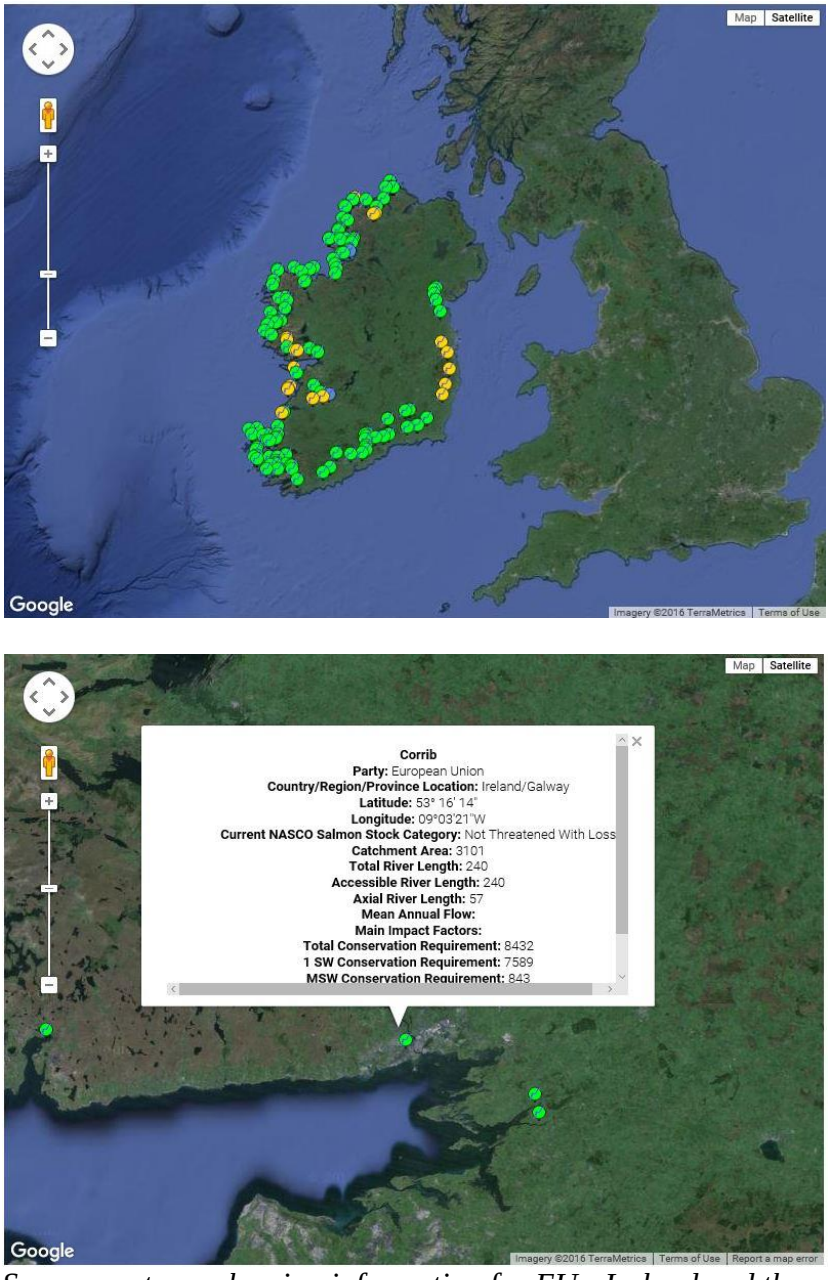
2.3 In the following sections, a brief overview of the Rivers Database (section 3) is provided by way of background and then sections 4 - 9 address each of the Working Group's TORs.

3. The NASCO Rivers Database

3.1 The Council first established a database of salmon rivers in 1989 and over the last 26 years it has undergone several changes. Initially, the Rivers Database comprised a listing of all salmon rivers flowing into the Convention area where stocks had been lost or were threatened with loss. In 1990, the Council agreed a system of categorising rivers (Lost, Maintained, Restored, Threatened with Loss, Not Threatened with Loss) together with definitions for each category. Parties were asked to contribute information but it was recognised that it would take some time to assemble the information and once that was done it should be updated every 5 to 10 years. By 1995, information had been provided by all Parties (approximately 1,800 rivers).

3.2 In 2001, following the adoption of NASCO's Plan of Action for Habitat Protection and Restoration, CNL(01)51, a major change was proposed to the Rivers Database. This plan required, *inter alia*, the establishment of inventories of salmon rivers and reporting on progress. In 2004, an expanded Rivers Database, developed by the US in consultation with the other Parties, and which reflected the information requirements detailed in the Plan of Action, was adopted and made available on the NASCO website. The new Rivers Database format allowed for inclusion of river data, salmon production data, and habitat impact data. Additionally, two new stock categories were added –

'Unknown' and 'Not Present but Potential'. Some progress was made over a number of years in populating the Rivers Database, but this was a substantial undertaking given the extensive information sought. However, given that reporting was still incomplete after several years, Parties/jurisdictions were reporting on habitat issues through their new Implementation Plans and Focus Area Reports (now Annual Progress Reports) and the Rivers Database was incomplete but publically available via the NASCO website, the Council decided to revert to the simpler listing which has been used since. The current Rivers Database fields, including the seven stock categories and their definitions, are shown in Annex 1.



Screen captures showing information for EU - Ireland and the detailed information held for the River Corrib

3.3 All Parties/jurisdictions (with the exception of Portugal) have contributed information and the Rivers Database now contains information for ~2,550 rivers. Complete information has been included for all rivers for river name, location and stock category. However, only partial information has been provided for catchment area, river length,

mean annual flow, main impact factors, special stock characteristics and conservation requirements (data has been provided for 13 - 59% of rivers, depending on the information concerned). The Working Group recognised that any new categories proposed would need to lend themselves to use for public relations purposes on the NASCO website and to the development of a status report, i.e. they should be clear and not too numerous.

4. A new classification system based on stock status relative to conservation limits or other indicators of abundance

4.1 The Working Group considered that there are a number of limitations in basing a stock classification system only on attainment of conservation limits (CL) and noted that its TORs specifically ask that the Group considers 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 Working Group noted that NASCO's objective, as stated in the Convention, is to conserve, restore, enhance and rationally manage Atlantic salmon through international cooperation taking account of the best available scientific information. Furthermore, under the Strategic Approach for NASCO's 'Next Steps', CNL(05)49, NASCO Parties have agreed the following vision: '*NASCO will pursue the restoration of abundant Atlantic salmon stocks throughout the species' range with the aim of providing the greatest possible benefits to society and individuals*'. The Agreement on Adoption of a Precautionary Approach and the Strategic Approach also recognise that a goal for NASCO's is to *promote the diversity and abundance of salmon stocks and to maintain all stocks above their conservation limits*. The Working Group considered that any system that is based only on attainment of CLs and that fails to take into account other considerations would not be consistent with these goals and visions (although such a system may potentially be an improvement on the current categories used in the Rivers Database). By way of examples, the Working Group noted that:

- a stock may only be achieving its CL because there have been reductions in fishing effort such that there is little or no harvestable surplus remaining. A stock that is clearly declining in abundance over time cannot be considered to be 'healthy' even if it is still achieving its CL;
- the current CL may not take account of historically available habitat that has been lost to salmon production, e.g. through construction of impassable dams;
- there may be qualitative concerns about a stock that are not obvious from a classification based on attainment of CL, e.g. genetic changes as a result of impacts of fish farm escapees, selective fishing etc.

4.2 While taking broader considerations into account increases the complexity of the classification system, the Working Group believes that doing so should provide a more accurate classification of stock status consistent with NASCO's objectives and vision. The Working Group recognises that the classification system for use in the Rivers Database should be relatively simple and amenable to display through the existing web-based maps, which are an important outreach tool for use by a broad target audience, and of value to NASCO delegates, researchers and others.

4.3 The Working Group discussed the existing categories used in the NASCO Rivers Database and recommends that while the '**Lost**' and '**Unknown**' categories should be retained, the '**Not present but potential**' category should be removed because the

Rivers Database should not relate to the potential introduction of salmon in rivers that have not previously supported wild Atlantic salmon populations. There are only two rivers listed under this category in the current Rivers Database. The Working Group also recommends that the '**Maintained**' category be renamed '**Artificially sustained**' to cover rivers that once supported a salmon stock but in which the current stock survives only due to regular stocking and it is likely that it would be lost if this stocking was discontinued. This category would include cases where the salmon stock was lost a long time ago and salmon from another river were introduced to recreate a run that is maintained by stocking and situations where fish from the salmon stock were taken for live gene banking, the remaining salmon stock in the river was then removed and the salmon were re-introduced and sustained through stocking. The Working Group notes that if the salmon stock is re-established such that stocking is no longer required, then the river would be re-assigned to another category based on risks to the stock.

4.4 For all other salmon rivers with an existing self-sustaining stock of salmon and where there is information on stock status, the Working Group proposes the use of four categories based upon the risks to the abundance and diversity of those stocks (High, Moderate, Low, Not at Risk). These four categories of risk to the existing stocks would be assigned by the use of two scores: a '**CL Attainment Score**' (CAS) and an '**Impacts Assessment Score**' (IAS). The use of an IAS is intended to address the issues associated with a classification based only on attainment of the CLs identified in paragraph 4.1 above.

CL Attainment Score (CAS)

4.5 The CAS would be assigned based on available information concerning the extent to which the conservation limit is being attained (see table below). The Working Group recognises that CLs are not available for many rivers and for such rivers the Party/jurisdiction would be asked to use the best available information to assign such rivers to an appropriate CAS category based on an assessment of the abundance of the stock (but see section 7 below), recognising that smaller stocks might be more vulnerable than larger stocks. If CLs are subsequently established for the rivers then these assignments, based on best professional judgement, would be changed as necessary when updating the Rivers Database. There is already a field in the existing Rivers Database that provides details of conservation requirements that could serve to identify the basis of the assignment of the CAS. The proposed categories for the CAS are as follows:

Range of CL attainment	Risk Description	Category Score
<50%	High	3
50 – 75%	Moderate	2
>75 – 100%	Low	1
>100%	None	0

Impacts Assessment Score (IAS)

4.6 The second step in assigning the stock classification requires that an assessment be made of the known impacts affecting the stock by referring to the table below.

Level of Impacts	Category Score
Heavily impacted	3
Moderately impacted	2
Lightly impacted	1
Not impacted	0

4.7 The IAS for a river could be assigned based on a range of factors including: habitat degradation e.g. deterioration in water quality or obstacles to migration; over-harvest or selective harvest; diseases and parasites, e.g. sea lice; *G. salaris*; impacts on genetic integrity e.g. due to aquaculture escapees; or a steadily declining stock trend where the causes are unknown. The IAS would be assigned by the Party/jurisdiction concerned based on the best available information. A river may be assigned a high IAS by having low to moderate impacts from more than one factor or having severe impacts from one factor. The procedure for assigning the IAS would be a matter for the Party/jurisdiction concerned. The Working Group does not suggest that there be any effort to standardise the scoring among Parties/jurisdictions and the rationale for each score would not be specified in the Rivers Database, although it is possible that a Party/jurisdiction may receive enquiries about this. The Working Group notes that naturally small stocks, by their nature, are more prone to impacts than larger stocks and this would need to be considered in assigning the IAS.

Stock Classification Score (SCS)

4.8 Once both a CAS and an IAS have been assigned to a river, they would be added together to assign a Stock Classification Score (SCS). In most cases it is assumed that each river would be assigned only one CAS and one IAS (but see paragraph 4.9 below). The SCS would assign the river to one of four categories as indicated by the different colours in the table below. The lowest three categories of SCS are defined by a single numerical score (0 (Green) = Not at Risk; 1 (Yellow) = Low Risk; 2 (Orange) = Moderate Risk) but the highest risk category (3 or higher (Red) = High Risk) would apply to all rivers with an SCS of 3 or greater.

CAS Score	**IAS Score**			
	0	**1**	**2**	**3**
3	**3**	**4**	**5**	**6**
2	**2**	**3**	**4**	**5**
1	**1**	**2**	**3**	**4**
0	**0**	**1**	**2**	**3**

4.9 These four categories would be used in the Rivers Database, together with categories for ‘Lost’, ‘Artificially Maintained’ and ‘Unknown’, resulting in a total of 7 categories as shown in the table below. This is the same number of stock categories as currently used in the Rivers Database and should not create any issues with the mapping facility. The Working Group recommends that if the stock status differs markedly in different parts of a single river, these rivers could be divided into segments and each segment would be classified according to status. For example, if a river has a healthy salmon stock below a dam but the dam has resulted in the loss of salmon upstream, the lower river could be classified in the ‘No risk’ category and the river above the dam could be

classified as 'Lost'. However, the more categories that are assigned to each river the more complex the mapping becomes.

Stock Classification Score	***Salmon Classification Category***	***Description***	***Map Colour***
0	Not at Risk	Rivers in which there are stocks of Atlantic salmon for which Stock Classification Scores of 0 have been assigned because there are no risks to the abundance and/or diversity of the stocks	Green
1	Low Risk	Rivers in which there are stocks of Atlantic salmon for which Stock Classification Scores of 1 have been assigned because risks to the abundance and/or diversity of the stocks are considered to be low	Yellow
2	Moderate Risk	Rivers in which there are stocks of Atlantic salmon for which Stock Classification Scores of 2 have been assigned because risks to the abundance and/or diversity of the stocks are considered to be moderate	Orange
3	High Risk	Rivers in which there are stocks of Atlantic salmon for which Stock Classification Scores of 3 have been assigned because risks to the abundance and/or diversity of the stocks are considered to be high	Red
N/A	Artificially Sustained	Rivers which are known to have had stocks of Atlantic salmon which have been lost and in which the current stocks are only sustained through hatchery stocking	Gray
N/A	Lost	Rivers which are known to have previously had stocks of Atlantic salmon that currently have none	Black
N/A	Unknown	Rivers in which there are known to be stocks of Atlantic salmon but for which there is no information on which to assess their abundance.	Blue

5. Time period for stock indicators

5.1 NASCO's *Guidelines on the Use of Stock Rebuilding Programmes in the Context of the Precautionary Management of Salmon Stocks*, CNL(04)55, recognise that assessing the status of the stock requires more than simply determining whether the escapement has fallen below the CL, and a range of other factors will influence management decisions on the nature and extent of the Stock Rebuilding Programme required. Both the duration and degree of the CL failure (e.g. failure by more than X% for more than Y years) are relevant to the assessment and the further that a stock falls below its CL and the more years for which it does this, the greater the probable risk.

5.2 A short-term failure to meet the CL may not be a basis for assigning the stock as at risk, for example, if the stock has been well above the CL in previous years. The Working Group recognised that it would be important to agree on a time period that provides a reliable guide to stock status rather than a system that could be influenced by either one anomalously high or low year of returns. The Working Group suggests basing the stock indicators on the average CL attainment over the previous five-year period, which is

the proposed frequency of updating of the information for the Rivers Database (see 6 below).

6. Frequency of updating

6.1 The Council's 2013 'Action Plan' states that '*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*'. However, it does not indicate at what frequency such a report should be prepared. The Public Relations Group had suggested that an annual State of the Salmon report be prepared but the Working Group considers that this would place a considerable additional reporting burden on the Parties/jurisdictions, would be a considerable undertaking for the Secretariat and there may be relatively small changes on an annual basis. When the Rivers Database was established, the Council's intention was that it would be updated every 5 - 10 years. The Working Group notes that the Implementation Plans have a duration of five years, with the current plans covering the period 2013 - 2018 and recommends that five years would be an appropriate frequency for updating the Rivers Database. It should be noted that the Annual Progress Reports request information on any significant changes in the status of stocks relative to the reference points described in the Implementation Plan and of any new factors which may significantly affect the abundance of salmon stocks. There is, therefore, a process by which Parties/jurisdictions could highlight any major changes in stock status on an annual basis and the factors responsible.

6.2 If the Council agrees that five-yearly updating would be appropriate, a 'State of the Salmon' report might be prepared in the first year of each Implementation Plan period, drawing on the updated stock status information and summarising new threats and challenges and the management actions planned to address them over the coming five-year period. The launch of the status report and the new Implementation Plans might be of considerable media interest. The next cycle of Implementation Plans is scheduled to commence in 2018/19 but the idea of a report summarising the status of stocks around the North Atlantic and the threats to them was first raised several years ago. The Working Group, therefore, recommends that if a new classification system is agreed by the Council at the Thirty-Third Annual Meeting, Parties/jurisdictions be asked to update the current information held in the Rivers Database by 31 December 2016. This is important because at present the information contained in the Rivers Database presents a very different picture of stock status to that contained in the Implementation Plans for some Parties/jurisdictions. There should be no need to update much of the information in the Rivers Database, but the stock categories would need to be revised and as noted in section 3 above, this would be a good opportunity to augment those fields where only partial information has been provided (catchment area, river length, mean annual flow, main impact factors, special stock characteristics and conservation requirements). There could then be a further updating of the Rivers Database in 2019 and the first status report could then be prepared. Thereafter, the Working Group recommends five yearly updates. Depending on the timing of the proposed International Year of the Salmon, the first State of the Salmon report could be timed to occur during that year.

7. Reporting where data is lacking

7.1 At present there are approximately 400 rivers in the Rivers Database for which the stock category is reported as 'Unknown'. As became clear at the 2014 Theme-based Special

Session, not all Parties/jurisdictions have established CLs or other reference points and in some cases closure of fisheries means that information on stock status is lacking. As noted above (see section 4), where no CL has been established a CAS might be assigned based on best available information, but it has to be recognised that there are rivers around the North Atlantic, particularly in remote areas, where little or no information on stock status is available and for this reason the Working Group recommends that the 'Unknown' category is retained when the Rivers Database categories are revised.

8. 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

8.1 The classification system proposed by the Working Group is based on both a CAS and IAS in order to address the need to take into account NASCO's goals for salmon management and the limitations identified in section 4.1 above relating to a system based only on attainment of conservation limits.

9. Changes to the NASCO Rivers Database

9.1 The Working Group recommends that if the Council agrees to the proposed new classification system, as outlined above, the information currently held in the Rivers Database should be updated as a matter of urgency given that this information is many years old and, as indicated above, may be very different from the information on stock status provided in the Implementation Plans. However, this should not be a major undertaking as most of the fields in the Rivers Database will remain unchanged. Given the nature of the report envisaged in the Council's Action Plan (describing the status of stocks and the threats to them), the Council may consider that both the 'Salmon Stock Category' and 'Main Impact Factors' fields be updated as a priority but it would also contribute to the completeness of the Rivers Database, and its utility, if all the fields where only partial information has been provided to date could also be completed/updated.

9.2 The Working Group recommends that once the classification system is agreed the Council asks that the current information in the Rivers Database be returned to the Parties/jurisdictions by the Secretary in Excel spreadsheet format (incorporating a choice field reflecting the new stock categories), together with updated guidance notes to reflect the changes. The Parties/jurisdictions should be asked to update the information and return it to the Secretariat no later than 31 December 2016.

10. Conclusions

10.1 The Council believes that NASCO should be the source of information on salmon stock status around the North Atlantic and has recognised the value in developing a consistent and uniform approach to presenting information on stock status. Once this is agreed, it has decided to develop a State of the Salmon report using the updated stock categories in the Rivers Database. The Rivers Database is an important public relations tool for the Organization. The Working Group has reviewed the existing categories used in the Rivers Database and has proposed a new system based on both attainment of conservation limits (or other indicators where CLs have not been established) and an assessment of known impacts. The Working Group recommends that once the Council has agreed a new classification of salmon rivers for use in the Rivers Database, the

Parties/jurisdictions be asked to update the data by 31 December 2016 and that a further update be undertaken in 2019 with a view to preparing a State of the Salmon report, based on this information, thereafter.

Current Guidance notes to assist in providing or updating information for the Rivers Database

Rivers' Database - file structure

The spreadsheet contains the following fields:-

Field Name	Data Type	Notes
RegionProvince	text	
RiverName	text	For the purposes of the simplified database the definition previously adopted by the Council is proposed, i.e., a river is named as the mainstem of the system of rivers and tributaries where it reaches the sea.
LocationLatitude	number	2 digits of degrees plus 2 digits of minutes, zero-padded where required e.g 0464, not 464
LocationLongitude	number	2 digits of degrees plus 2 digits of minutes, zero-padded where required
LocationEastOrWest	text	E or W
SalmonStockCategory	text	Select only from options listed below to categorise the status of the salmon stocks. See definitions appended.
Not threatened with loss		
Threatened with loss		
Lost		
Restored		
Maintained		
Unknown		
Not present but potential		
CatchmentArea	number	square kilometres (km^2)
TotalRiverLength	number	kilometres (km), maximum 1 decimal place
AxialRiverLength	number	kilometres (km), maximum 1 decimal place
AccessibleRiverLength	number	kilometres (km), maximum 1 decimal place
MeanAnnualFlow	number	Cumecs (m^3s^{-1}), maximum 1 decimal place
MainImpactFactors	text	255 characters maximum. A description of the main factors adversely affecting the salmon stock
TotalConservationRequirement	number	total number of salmon
1SWConservationRequirement	number	number of 1 sea-winter salmon (if available)
MSWConservationRequirement	number	number of multi-sea-winter salmon (if available)
SpecialStockCharacteristics	text	255 characters maximum. e.g. run timing
OtherInformation	text	255 characters maximum. e.g. details of any designations; protected areas

Current River Categories as Agreed by the Council of NASCO for use with the Original Non-Web Based Rivers Database

CATEGORY 1: LOST [Red]

Rivers in which there is no natural or maintained stock of salmon but which are known to have contained salmon in the past.

CATEGORY 2: MAINTAINED [Blue]

Rivers in which there is no natural stock of salmon, which are known to have contained salmon in the past, but in which a salmon stock is now only maintained through human intervention.

CATEGORY 3: RESTORED [Purple]

Rivers in which the natural stock of salmon is known to have been lost in the past but in which there is now a self-sustaining stock of salmon as a result of restoration efforts or natural recolonization.

CATEGORY 4: THREATENED WITH LOSS [Amber]

Rivers in which there is a threat to the natural stock of salmon which would lead to loss of the stock unless the factor(s) causing the threat is(are) removed.

CATEGORY 5: NOT THREATENED WITH LOSS [Green]

Rivers in which the natural salmon stocks are not considered to be threatened with loss (as defined in Category 4).

Note: Following adoption in 2002 of the NASCO Plan of Action for Habitat Protection and Restoration an expanded web-based database was developed by the US. In accordance with the Plan of Action two additional categories were proposed (but not defined) as follows and we have proposed definitions for these below:

CATEGORY 6: UNKNOWN [White/Grey]

Rivers in which there is no information available as to whether or not it contains a salmon stock.

CATEGORY 7: NOT PRESENT BUT POTENTIAL [Black]

Rivers in which it is believed there has never been a salmon stock but which it is believed could support salmon if, for example, natural barriers to migration were removed.

Annex 13

CNL(16)12

Request for Scientific Advice from ICES

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

1.1 provide an overview of salmon catches and landings by country, including unreported catches and catch and release, and production of farmed and ranched Atlantic salmon in 2016[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 provide a summary of the available diet data for marine life stages of Atlantic salmon and identify key prey species at different life stages (e.g. herring at post-smolt stages, capelin in West Greenland waters and the Barents Sea)[4];

1.5 quantify possible future impacts of climate change on salmon stock dynamics;

1.6 provide a compilation of tag releases by country in 2016; 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 2016 fisheries[5];

2.2 review and report on the development of age-specific stock conservation limits, including updating the time-series of the number of river stocks with established CLs by jurisdiction;

2.3 describe the status of the stocks, including updating the time-series of trends in the number of river stocks meeting CLs by jurisdiction;

2.4 provide information on the size, distribution and timing of the blue whiting fishery in the North-East Atlantic area and any official observer information relating to by-catch which may indicate possible impact of this fishery on wild salmon.

*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 2017/18-2019/20 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 2016 fisheries (including the fishery at St Pierre and Miquelon)[5];
3.2 update age-specific stock conservation limits based on new information as available, including updating the time-series of the number of river stocks with established CLs by jurisdiction;
3.3 describe the status of the stocks, including updating the time-series of trends in the number of river stocks meeting CLs by jurisdiction.

*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 2017-2020 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 2016 fisheries[5];
4.2 describe the status of the stocks[7].

*In the event that NASCO informs ICES that the Framework of Indicators (FWI) indicates that reassessment is required:**

4.3 provide catch options or alternative management advice for 2017-2020 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
4.4 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 comment on any significant changes in population dynamics (i.e. abundance, distribution, size structure and energy density) of key prey species which may be associated with changes in salmon abundance, distribution and marine ecology (e.g. the recently identified decreases in capelin energy density) and the consequences on marine productivity of Atlantic salmon while also providing information related to fisheries which catch significant numbers of the identified key prey species (i.e. direct harvest or by-catch).*
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 4.3, 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)

Esben Ehlers (WGC, manager representative)
Ted Potter (WGC, scientist representative)

Jonathan White (ICES representative, Observer)

Patrick Gargan (Coordinator)

New questions, originator:

- 1.4 USA
- 1.5 Norway
- 2.2, 2.3, 3.2, 3.3 European Union
- 2.4 NGOs

Annex 14

CNL(16)13

Report of the Meeting of the Implementation Plan/Annual Progress Report Review Group

Rydges Kensington Hotel, London, UK

20 and 21 April 2016

1. Opening of the Meeting

1.1 The Chairman of the Review Group, Mr Ted Potter (European Union), opened the meeting and welcomed members of the Review Group to London. He indicated that the purpose of the Implementation Plans (IPs) is to provide details of the measures to be taken by Parties/jurisdictions to implement NASCO's agreements and that the second cycle of plans sought information on the actions to be taken over a five year period (2013-2018) with clearly identifiable measurable outcomes. The main task before the Review Group was to evaluate the 2016 Annual Progress Reports (APRs) under these IPs to ensure that Parties/jurisdictions had provided a clear account of progress in implementing and evaluating the actions detailed in their IPs and of the other information requested in the APRs. The 2016 APRs are the third under the current IPs and, as such, we are now more than half way through the period covered by the Implementation Plans. It would be important, therefore, that the Review Group critically evaluate the progress made to date.

1.2 Katrine Kaergaard was not able to serve on the Review Group and her place was taken by Áki Johansen. Paddy Gargan, Paul Knight, Ted Potter (Chairman), Rory Saunders and Sue Scott also participated in the meeting. The NASCO Secretary coordinated the work of the Group.

2. Adoption of the Agenda

2.1 The Review Group adopted its Agenda, IP(16)2 (Annex 1).

3. Review of the Terms of Reference and Consideration of Working Methods

3.1 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.

3.2 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 in the APRs, 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 APRs, the Council had agreed that Parties/jurisdictions should provide written responses to the questions in advance of the 2015 Annual Meeting so that these could be distributed and discussed during a Special Session of the Council. This arrangement had worked well and the Council had asked that it be continued for the 2016 evaluations.

Working Methods

3.3 The Review Group adopted the same working methods as it had used at its meetings in 2013, 2014 and 2015. These are described in document CNL(15)12. In summary, the Review Group continued to adopt the following 'ground rules' in undertaking its 2016 evaluations:

(a) initial reviewers were appointed for each APR (mainly the same reviewers as for the IPs and previous 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 without disclosing which members of the Group expressed the dissenting views unless they wished to be identified;

(c) while the Group drew on information in the IPs, it only commented 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.

3.4 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.

3.5 When all evaluations were complete, a consistency check was undertaken of all the assessments. As with the 2015 review, the template used for the evaluations provided a general assessment of the APR in terms of whether it provided a clear account of progress in implementing and evaluating the actions in the IPs, 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

Overview of the IP evaluations

4.1 In its report to the Council's Thirty-Second (2015) Annual Meeting, the Review Group had noted that it had reviewed 18 IPs and, of these, 11 were considered to be satisfactory. The Review Group had considered that the following IPs contained clear omissions or inadequacies: Canada; Denmark (in respect of the Faroe Islands and Greenland) - Faroe Islands; EU - Spain (Asturias); EU - Spain (Cantabria); EU - Spain (Galicia); EU - UK (Scotland); and the Russian Federation.

4.2 For those jurisdictions that have salmon farming, the Review Group had recognised 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 made over the period of the IP towards the international goals for sea lice and containment rather than describing only the management measures in place. The Review Group had recommended that where this information had not been provided in the IPs, it should be reported through the APRs or, if that was not feasible, prior to the start of the next IP cycle.

4.3 The Group had emphasised that a score of '1' on an IP 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.

Evaluation of new IPs

4.4 Following the Review Group's 2015 meeting and prior to NASCO's Thirty-Second (2015) Annual Meeting, an Implementation Plan was received for EU - France, CNL(15)39rev. It had been submitted to the Secretariat as a partial plan to be further developed and it did not include identification of any threats/challenges in relation to aquaculture, introductions and transfers and transgenics and, as a consequence, any relevant actions. It had not, therefore, been reviewed but the Review Group welcomes this contribution. Although it has not conducted a formal review, the Review Group noted that the IP appeared to be generally satisfactory and encourages EU - France to complete its plan without further delay so that it can be fully evaluated by the Review Group. The Secretary was asked to write to the Head of the EU delegation to ask that the IP be completed and providing some initial feedback on areas where some clarification of the information provided would be helpful.

Changes to IPs since 2015 Review Group meeting

4.5 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. 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. Since the Council's 2015 Annual Meeting, revised IPs had been received from EU - Germany, CNL(15)58, EU - Spain (Galicia), CNL(15)59 and the USA, CNL(15)60. These revised IPs are available on the NASCO website at www.nasco.int/implementation_plans_cycle2.html The Review Group did not re-evaluate these IPs but it noted that the changes made to them were mainly of a minor editorial nature. In the case of the USA, some information that had previously been included in section 1.6 of an earlier version of the IP on the extent of salmonid aquaculture was reinstated and two additional rivers had been included under Action F4 in the IP for EU - Spain (Galicia).

4.6 At the time of the Review Group's meeting, an IP had still not been received for EU - Portugal and this is a concern to the Review Group given the significant challenges facing salmon managers in the southern part of the species' range. It is important that Portugal be encouraged to report on the measures being taken to safeguard the resource in accordance with NASCO agreements and guidelines.

4.7 The Review Group again highlighted that evaluating the progress made on actions was very difficult when the action in the IP was vague or imprecise and that this should be addressed in the next reporting cycle (see section 7 below). Notwithstanding this shortcoming in a number of IPs, the Review Group considered that there had been an overall improvement in the 2013 - 2018 IPs compared with the first cycle, not least because many 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.

5. Evaluation of the 2016 Annual Progress Reports and development of feedback to the Parties/jurisdictions

Overview of the 2015 Annual Progress Report Evaluations

5.1 Last year, the Review Group had noted that evaluating the progress made on actions in the APRs was very difficult when the descriptions of the planned actions in the IP were vague or imprecise. It had also indicated that Parties/jurisdictions should not rely on links to information on the internet in their APRs 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. The Council had, therefore, asked that all Parties/jurisdictions address this in future APRs.

2016 Annual Progress Report Evaluations

5.2 The 2016 APR template had been issued to all Parties/jurisdictions by the Secretariat on 15 January 2016. The Council had asked that the APRs be completed and returned to the Secretariat by 1 April 2016 for critical evaluation by the Review Group. As requested by the Council, the Secretariat had included the 'Description of Actions' and 'Expected Outcomes' in the APR template for each Party/jurisdiction using the text from the most recent versions of the IPs. Last year, the Review Group had noted that some Parties/jurisdictions had made changes to these fields in completing the APR template resulting in differences between the APR and the IP. To address this issue, the Secretariat had made these fields non-editable in the template before issuing the 2016 APR template to the Parties/jurisdictions for completion. Furthermore, as requested by the Council, the Secretary had provided some examples of good practice in completing the 2015 APR template as highlighted in the Review Group's 2015 report, CNL(15)12, in order to assist Parties/jurisdictions in completing their 2016 APR. The Council had also highlighted that timely reporting was essential if the evaluations were to be fair and balanced.

5.3 Eighteen APRs were submitted in 2016, 14 of which had been received by the deadline of 1 April. No proposals to amend the IPs in 2016 had been highlighted. The Review Group evaluated the following APRs:

Party/jurisdiction	**Document No.**	**Date APR received by Secretariat**	**Proposed amendments to IP in 2016?**
Canada	CNL(16)38	14 April 2016	No
Denmark (in respect of the Faroe Islands and Greenland) - Faroe Islands	CNL(16)34	1 April 2016	No
Denmark (in respect of the Faroe Islands and Greenland) - Greenland	CNL(16)21	18 March 2016	No
EU - Denmark	CNL(16)35	5 April 2016	No
EU - Finland	CNL(16)31	31 March 2016	No
EU - France			
EU - Germany	CNL(16)22	18 March 2016	No
EU - Ireland	CNL(16)36	8 April 2016	No
EU - Portugal			
EU - Spain (Asturias)	CNL(16)27	31 March 2016	No
EU - Spain (Cantabria)	CNL(16)28	31 March 2016	No
EU - Spain (Galicia)	CNL(16)29	31 March 2016	No
EU - Spain (Navarra)	CNL(16)30	31 March 2016	No
EU - Sweden	CNL(16)32	31 March 2016	No
EU - UK (England and Wales)	CNL(16)24	30 March 2016	No
EU - UK (Northern Ireland)	CNL(16)37	8 April 2016	No
EU - UK (Scotland)	CNL(16)26	31 March 2016	No
Norway	CNL(16)33	1 April 2016	No
Russian Federation	CNL(16)25	30 March 2016	No
United States	CNL(16)23	29 March 2016	No

5.4 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. In some instances, the Review Group also asked questions where it felt that further information on the action would be helpful. 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 be asked to respond in writing no later than 15 May so that their responses can be circulated prior to, and discussed at, the Special Session scheduled to be held during the 2016 Annual Meeting.

5.5 The Review Group's evaluations of the 2016 APRs are contained in document IP(16)3 (Annex 2). All the evaluations were agreed unanimously by the Review Group. The Review Group used the following format in presenting its evaluations:

- a paragraph (shown in bold italics) summarising its overall assessment of the APR in terms of whether it provided a clear account of progress and noting any shortcomings;
- a paragraph highlighting interesting developments or challenges related to implementation of NASCO's agreements and guidelines;
- paragraphs summarising the actions taken in relation to management of fisheries, habitat protection and restoration and aquaculture and related activities; and
- a list of questions where clarification is being sought from the Party/jurisdiction about the information (or lack of information) provided in the APR.

5.6 For some APRs, evaluating the progress made on actions was very difficult because the descriptions of the planned actions in the IP were vague or imprecise. The Review Group had previously highlighted such shortcomings and has noted this difficulty in some of its evaluations. The Review Group noted that the APRs for several Parties/jurisdictions continued to lack a clear account of progress in implementing and evaluating some, or all, of the actions detailed in their IPs, despite the further guidance provided on completing the template and the provision of examples of good practice. These reports either included:

- one or more gaps in the 'Progress on Action to Date';
- very little information or quantitative data to demonstrate progress; and/or
- comment(s) bearing no clear relationship to the proposed action(s).

5.7 The Review Group also noted that a number of the 2016 APRs had provided similar information to that provided in 2014 and 2015, even when the Review Group had previously sought clarification or further detail in its questions.

5.8 These shortcomings are of concern to the Review Group given that improving commitment to NASCO agreements was a key aspect of the 'Next Steps' and External Performance reviews and as the second reporting cycle is now 60% completed. When preparing future APRs, Parties/jurisdictions are again reminded to provide evidence of progress made to address the action in the current year or to indicate that no further progress was made, taking account of previous questions asked by the Review Group.

5.9 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 in 2016 (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.

5.10 The Review Group is concerned that, for some Parties/jurisdictions, actions have not yet started or where actions are ongoing there has either been no report of progress or the reporting is unclear. The Review Group also experienced considerable difficulties in interpreting the progress in some APRs because of the continuing use of links to websites and references to publications. As previously indicated, the APRs should be stand-alone documents that allow progress to be assessed and only provide links or references as a means to provide access to additional information for those wishing to learn more. Overall, the Review Group again considered that the most common fault with the information provided continues to be a lack of quantitative evidence on the extent of the progress made and/or what the results have been. All Parties/jurisdictions are asked to address this in future APRs.

5.11 If the evaluation process is to work effectively, and be fair and equitable, clearer and more detailed reporting will be required in the 2017 APRs for a number of EU Member States and jurisdictions. These are: EU - Finland, EU - Spain (Asturias), EU - Spain (Cantabria), EU - Spain (Galicia), EU - UK (Northern Ireland) and EU - UK (Scotland). The Review Group wishes to particularly commend EU - Sweden for the clarity of its APR on which it had no questions.

5.12 The Review Group noted that a number of Parties/jurisdictions reported some interesting and useful developments and challenges in addressing NASCO's Resolutions, Agreements and Guidelines, including:

- **Canada:** publication of the report of the Ministerial Advisory Committee on Atlantic Salmon which contains 61 recommendations including plans to update the Wild Atlantic Salmon Conservation Policy;
- **Denmark (in respect of the Faroe Islands and Greenland) - Greenland:** implementation of new monitoring and control measures and establishment of a quota for the entire fishery in 2015;
- **EU - Finland:** conclusion of negotiations with Norway on regulatory measures for the Tenojoki (Tana River) that will reduce fishing pressure by 30%;
- **EU - Spain (Navarra):** establishment of a TAC for MSW salmon. Funding has been obtained for a LIFE project that should result in improvements to river connectivity;
- **EU - Sweden:** as a result of a measure introduced in 2014 there was no coastal mixed-stock fishing in 2015;
- **EU - UK (England & Wales):** development of a five-point approach in England aimed at addressing pressures faced by salmon throughout their life-cycle;
- **EU - UK (Northern Ireland):** legislation to manage exploitation and prevent harvest of salmon from rivers in the DCAL area that are not meeting their management targets. Farm origin genetic signals were found in between 2.6% and 6.7% of juveniles sampled across ten rivers in Northern Ireland and there was

evidence of second generation back-crosses between farmed and wild salmon, albeit at a low level;

- **EU - UK (Scotland):** prohibition on killing of salmon beyond estuary limits for three years from 2016 and killing of Atlantic salmon in inland waters will be managed on an annual basis by categorising fishery districts by their conservation status. A requirement to develop a Conservation Plan for salmon stocks irrespective of their conservation status;
- **Norway:** salmon catches in rivers that are being limed have increased from about 10 tonnes in the 1980s to 40 – 50 tonnes today and account for 10 – 14% of the total catch in Norwegian rivers. Triploid salmon are being reared by several commercial salmon farmers;
- **Russian Federation:** a large kill (700 adult salmon; about 10% of the run) in the Kola River believed to be due to Ulcerative Dermal Necrosis (UDN);
- **USA:** a new initiative for endangered species including Atlantic salmon entitled 'Species in the Spotlight: Survive to Thrive' and a new action plan aimed at reducing threats and stabilising population declines in endangered Atlantic salmon populations.

Parties/jurisdictions not submitting APRs

5.13 No APRs had been received from EU - France or EU - Portugal by the time the Review Group met to undertake its evaluations. The lack of some APRs 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 2016 APRs might be expected to represent the completion of 60% of the proposed actions. Timely, complete and comprehensive reporting is important if the evaluation process is to be thorough and consistent.

Improvements to the APR template

5.14 The Review Group welcomed the improvements made to the 2016 reporting template but, as noted above, several APRs still contain links to websites or references to publications rather than a stand-alone, clear report on progress. While the guidance in the 2016 template at the start of each section dealing with the progress reports states that '*While referring to additional material (e.g. via links to websites) may assist those seeking more detailed information, this will not be evaluated by the Review Group'* this could be further clarified both in the template and the covering letter issued by the Secretariat to request completion of the APRs. The Review Group also recommends that the 'Current Status of Action' field in the template be made a choice field with only three options ('Not started', 'Ongoing', 'Completed for Current Year' and 'Completed') to avoid confusion about the use of this field.

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-Third (2016) 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 discussion at the meeting involving all Parties and NGOs.

7. Recommendations for the third round of Implementation Plans

7.1 At its 2015 meeting, the Review Group discussed changes that might be made to the next (third) cycle of IPs and APR s that will commence in 2019 so that these might be considered with a view to improving the effectiveness of future reporting. These were as follows:

- 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. In 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 are fully compliant with NASCO agreements and guidelines;
- 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;
- 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 (e.g. relating to sea lice levels and containment within marine salmon farms).

7.2 The Review Group noted that all the Members of the West Greenland Commission had agreed to apply the six tenets for effective management of an Atlantic salmon fishery in order to evaluate the monitoring and control measures applying to their salmon fisheries. These tenets have already been applied to the salmon fishery at West Greenland and led to the adoption of an Updated Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, progress on which has been reported in the 2016 APR for Greenland, CNL(16)21. There had been some discussions within the West Greenland Commission as to whether the six tenets might be applied more widely to include all NASCO Parties/jurisdictions. If that is done, consideration might be given to including a section in the new IPs dealing with the monitoring and control elements covered by the six tenets.

8. Membership of the Review Group

8.1 Under the Guidelines for the Preparation and Evaluation of NASCO Implementation Plans and for Reporting on Progress, CNL(12)44, the Review Group comprises one representative from Denmark (in respect of the Faroe Islands and Greenland), three representatives from the other Parties (preferably one from North America and two from Europe), two representatives of the NGOs (preferably one from Europe and one from North America) and one scientific representative from NASCO's Standing Scientific Committee (SSC). The Council had recognised that it would be desirable, wherever possible, that those appointed to serve on the Review Group do so for the entire reporting cycle covered by the Implementation Plans.

8.2 The Chairman indicated that he would be retiring after NASCO's 2016 Annual Meeting and would not, therefore, be able to participate in the future work of the Review Group. The Review Group noted that Ted Potter had been the SSC's representative but that the Chairman of the SSC, Paddy Gargan, also serves on the Review Group although appointed by a Party. The Council would, therefore, need to appoint a new member of the Review Group to replace Ted Potter, either as a representative of the Parties or the SSC (or possibly two new members if the Council decided to fill all the available places).

8.3 Sue Scott, one of the two NGO representatives on the Review Group, also indicated that she was retiring and would not be able to participate in the Group's work in the future. The Group noted that it would be a matter for the NGOs to nominate a replacement.

8.4 The Review Group thanked Ted Potter and Sue Scott for their contributions to the review process and Ted Potter for his chairmanship of the Group's 2015 and 2016 meetings.

8.5 The Review Group appointed Rory Saunders as its new Chairman.

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 Chairman 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, hopefully so the responses can be provided by mid-May.

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-NP	OG
F2	OG		OG	OG-NP	OG		OG	OG		OG-NP	NS	NS	OG	OG	OG	OG	OG-NP	OG-NP	OG	OG
F3	OG			OG-NP				OG			NS	OG-NP	OG	OG	OG	OG-NP	OG	OG-NP	OG	OG
F4	OG										NS	OG-NP	OG	CD	OG	OG-NP	OG-NP	OG	CD	
F5	OG										OG			OG	OG		OG-NP			
F6														OG						
F7														OG						
F8														OG						
F9														OG						
F10														OG						
F11														OG						
Actions Related to Habitat Protection and Restoration																				
H1	OG		OG	OG-NP	OG-NP		OG	OG-NP		OG-NP	OG-NP	NS	NS	OG	OG	OG	OG-NP	OG	OG	OG
H2	OG			OG-NP			OG	OG-NP		OG-NP	OG-NP	OG-NP	NS	CD	OG	OG-NP	OG	OG	OG	OG
H3	OG			OG-NP			OG	OG-NP		CD-NP	OG	OG		OG	OG	OG-NP	OG	OG		OG
H4								OG-NP			NS	OG-NP		CD	OG	OG	OG	OG		OG
H5														OG		OG				
H6																OG				
Actions Related to Aquaculture and Associated Activities																				
A1	OG-NP	OG-NP			OG		OG	OG-NP			NS			OG	OG	OG	OG-NP	OG-NP	OG-NP	OG
A2	OG-NP				OG-NP		OG	OG						OG	OG		OG-NP	OG	OG	OG
A3	OG							OG							OG		OG-NP	OG	OG	OG
A4	OG																	OG		OG

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 2015 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(16)2

Meeting of the
Implementation Plan/Annual Progress Report Review Group

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 2016 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. Membership of the Review Group
9. Report of the Meeting
10. Any other business
11. Close of the Meeting

IP(16)3

Evaluation of Annual Progress Reports and Questions from the Review Group to Parties/jurisdictions

Canada, CNL(16)38

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 generally clear and comprehensive reports to address the topic areas covered by each action, all of which are ongoing with some elements completed.

The final report of the Ministerial Advisory Committee on Atlantic Salmon was issued in 2015. It included 61 recommendations on issues ranging from conservation and enforcement to working internationally within NASCO and with other partners to address fisheries which target Atlantic salmon of Canadian origin. The APR states that many of the recommendations have been addressed already while others are targeted for implementation in 2016-17. One recommendation of note that will be undertaken in 2016 is a review and revision of Canada's Wild Atlantic Salmon Conservation Policy with the aim of updating the policy's existing goals, approach to resource management and overall framework for conservation of the resource. In Quebec, new upper and lower reference points have been set for each river stock. Catch limits have been reduced, release of large salmon will be mandatory on rivers that do not reach the upper reference points, and fishing will be closed in rivers below the lower reference points. Changes have also been made to the Newfoundland and Labrador baitfish fishery to reduce salmon bycatch. Canada has met with France (in respect of St Pierre and Miquelon) and raised the question of its membership of NASCO.

Actions related to management of salmon fisheries: DFO has initiated a process to update its Wild Atlantic Salmon Conservation Policy and expects to hold stakeholder consultations in 2016. A scientific review of stock reference points was published in 2015, and new harvest decision rules, are being implemented regionally. New management measures have been put in place in much of Canada (Action F1). New Aquatic Invasive Species Regulations came into force during 2015 (Action F2). The Nova Scotia Salmon Association liming project has continued, and the objective of increasing the pH (target pH of 5.5) and increasing production has been achieved; monitoring of juveniles and adult runs has continued and a full-time research scientist has been hired to expand the project (Action F3). Enforcement activities have been further enhanced in 2015 and over 6,000 fishers and 20,000 fishing sites have been checked (Action F4). Measures are in place to restrict the bycatch of salmon e.g. areas closed to use of gill nets and depth requirements for groundfish gill nets, and the implementation of these is continuing (Action F5).

Actions related to habitat protection and restoration: DFO has been working with its many partners to implement the Recovery Strategy for the Inner Bay of Fundy Atlantic salmon population; funding has been obtained from a range of sources and a number of projects initiated (Action H1). Work to enhance the protection of salmon from works, undertakings and activities that represent the greatest threats (Action H2) and to foster inter-jurisdictional discussions and collaborative activities (Action H3) are ongoing, but no new information for 2015 has been provided.

Actions related to aquaculture and associated activities: The new national Aquaculture Activities Regulations came into force during 2015 and require increased reporting by licence holders. Nova Scotia has released new Aquaculture Management Regulations, which *inter alia* allow for the establishment of Aquaculture Management Areas, increased reporting of elevated on-farm mortalities and use of treatment products. A review of the Integrated Pest Management Program for Sea Lice in New Brunswick has been completed; Performance Measures and sea lice management reports are released annually. Newfoundland and Labrador has adopted and implemented a Bay Management Area plan for salmon aquaculture in the Coast of Bays region (Action A1). Nova Scotia's new Aquaculture Management Regulations require finfish licence holders to include containment management in their Farm Management Plan and this must be audited annually by a third party and immediately following a reported breach. Marine cage site designs must also be approved by a qualified engineer before deployment. The Newfoundland and Labrador Code of Containment continues to be implemented as a condition of the aquaculture licence and the Province is currently evaluating a proposal to grow triploid (sterile) salmon as a means of growing European-strain fish in Newfoundland and Labrador without the potential for genetic interactions with wild stocks (Action A2). Canada's National Code on Introductions and Transfers of Aquatic Organisms was implemented at the end of 2015 to coincide with the full implementation of the National Aquatic Animal Health Program (Action A3). Canada has previously decided to permit the commercial production of transgenic Atlantic salmon in contained facilities and, in 2015, there were no known regulatory violations in relation to these activities (Action A4).

Questions for written response prior to the 2016 Annual Meeting:

1. *How many of the recommendations from the report of the Ministerial Advisory Committee on Atlantic Salmon were addressed in 2015 and what important developments have resulted?*
2. *What are the plans for identifying critical marine habitat within the Bay of Fundy (Action H1)?*
3. *What measures will be taken to ensure that the proposal to rear triploid European strain salmon in Newfoundland and Labrador is consistent with the Williamsburg Resolution and NAC Protocols on Introductions and Transfers and that the risk of any adverse ecological impacts on the wild salmon stocks is minimal (Action A2)?*
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 as a baseline for demonstrating progress towards meeting the international goals for sea lice and containment set out in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Summary data are requested to provide the baselines for Canadian salmon farming facilities (Actions A1 and A2).*

Denmark (in respect of the Faroe Islands and Greenland) - Faroe Islands, CNL(16)34

The Implementation Plan identifies only two proposed actions (there are no self-sustaining salmon populations in the Faroe Islands), and the APR provides a clear report on the progress made to address each action in 2015, both of which are ongoing.

There was no salmon fishery at Faroes in the 2015/16 season. There is continuing interest in conducting a research fishery.

Actions related to management of salmon fisheries: In 2015, NASCO's North-East Atlantic Commission agreed a Decision regarding the salmon fishery in Faroese waters in 2015/16, 2016/17 and 2017/18, NEA(15)10. In accordance with this decision, and consistent with the advice from ICES, no salmon fishery took place in Faroese water in the 2015/16 season (Action A1).

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 or fjords. 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 77 tonnes of salmon in 2012. During 2015, 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. A figure providing information on counts of sea lice on farmed salmon has been provided. Rearing of transgenic salmon farming is not allowed under the Veterinary Law (Action A1).

Questions for written response prior to the 2016 Annual Meeting:

1. *The figure provided under Action A1 appears to show increased lice levels in salmon farms in late 2015. What sea lice thresholds are applied on salmon farms to trigger action to control sea lice, how many instances were there of farms breaching lice limits in 2015 and what action was taken (Action A1)?*
2. *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 as a baseline for demonstrating progress towards meeting the international goals for sea lice and containment set out in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Summary data are requested to provide the baselines for containment levels at salmon farming facilities in the Faroe Islands.*

Denmark (in respect of the Faroe Islands and Greenland) - Greenland, CNL(16)21

The Implementation Plan identifies three proposed actions and the APR provides a clear report on the progress to address each of these actions, all of which are ongoing.

The Review Group notes that the same estimate of unreported catch has been provided by Greenland since the 1990s (through ICES including in the APR).

In accordance with the Multi-Annual Regulatory Measure for Fishing for Salmon at West Greenland for 2015, 2016 and 2017, WGC(15)21, and the Updated Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGC(15)20, the following measures and initiatives were implemented in Greenland during 2015:

- Only designated fish factories will be authorised to accept landings of salmon;
- It is now a condition in the license that fishermen should allow samplers to take samples of their catches upon request;
- The NASCO brochure on sampling was issued with all the licenses, distributed to the open air markets and provided to the samplers;
- The Government of Greenland decided to delay the opening date of the fishing season to 15. August;
- For the first time a quota was set for the entire salmon fishery (45 tonnes).

The plan is to implement the remaining measures in the spring of 2016 and for some measures and initiatives the implementation process has already begun.

Actions related to management of salmon fisheries: An extensive information campaign was undertaken to remind all fishermen of the need to report catches. A phone survey was conducted by the GFLK in an effort to improve the reporting for 2014 and 2015; this has increased awareness of the way to complete the reporting forms and provided additional information on catches (Action F1). A quota was set for the entire fishery (45 tonnes). The APR indicates that the provisional catch for 2015 was 58.4 tonnes (Action F2).

Actions related to habitat protection and restoration: Work in developing a protection plan for the Kapisillit River stock and the surrounding watershed ceased following the election in the Autumn of 2014 but the strategy to develop a biodiversity strategy for Greenland continues. A detailed report on biodiversity has been prepared and will be the basis for the strategy (Action H1).

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 2016 Annual Meeting:

1. *Given that the provisional catch statistics indicate that the quota for the 2015 fishery of 45 tonnes was exceeded by 13.4 tonnes, what actions will be taken to improve control of the harvest (Action F2)?*

European Union - Denmark, CNL(16)35

The Implementation Plan identifies six proposed actions, all of which were on-going in 2015. The APR provides very little information on the progress to address each of these actions in 2015 and so more information is sought in the questions below. No progress reports have been provided for actions F1, F2 and F3. For the evaluation process to work effectively and be fair and equitable, the Review Group will require more detailed reporting on progress against each action in the 2017 APR.

Actions related to management of salmon fisheries: Denmark has continued to apply a national cormorant plan to regulate recruitment of cormorants where predation on salmonids is perceived to be a problem (Action F1). The by-catch of salmon and sea trout in fisheries in the Ringkøbing Fjord is being assessed (Action F2). Work is also underway to develop more reliable reference points for four wild salmon stocks in Denmark (Action F3). These actions are said to be ongoing, but no details of progress have been provided.

Actions related to habitat protection and restoration: Several hundred obstructions to fish migration have been removed as part of a programme to improve access for salmon and sea trout (Action H1). Many habitat restoration projects are said to have been executed, but no further details have been provided (Action H2). Present and potential salmon production has been estimated for the Rivers Skjern and Ribe (in draft) as part of a study to identify and quantify potential salmon spawning and nursery habitats in newly accessible areas (Action H3). No further details of progress have been provided.

Actions related to aquaculture and associated activities: No actions were proposed in the Implementation Plan.

Questions for written response prior to the 2016 Annual Meeting:

1. *What action was taken in 2015 to reduce the mortality of salmonid smolts caused by cormorants (Action F1)?*
2. *What levels of by-catch of salmon and sea trout were observed in the Ringkøbing Fjord in 2015 (Action F2)?*
3. *What was the result of the assessment under the new management plan for 2013/2014 regarding whether reliable reference points can be established for Danish salmon rivers (Action F3)?*
4. *How much new habitat was made available to salmon by the removal of migratory obstructions in 2015 (Action H1)?*
5. *What activities were undertaken in 2015 to restore habitat in smaller streams from earlier canalisation, pipe-laying and dredging (Action H2)?*
6. *What action is planned to make use of the information on present and potential salmon production in the Rivers Skjern and Ribe (Action H3)?*

European Union - Finland, CNL(16)31

The Implementation Plan identifies only five proposed actions. The APR provides very little information on the progress to address the actions in 2015, all of which were ongoing, and so more information is sought in the questions below. This is particularly so for Action A2 where no report on progress has been provided and it would have been useful if quantitative information derived from the monitoring programme had been presented. For the evaluation process to work effectively and be fair and equitable, the Review Group will require more detailed reporting on progress against each action in the 2017 APR.

The APR does not identify any major new initiatives or achievements for salmon conservation. However, the Review Group notes that the APR states that Finland and Norway have reached a conclusion on regulatory measures for salmon fishing in the Tenojoki (Tana River) that will result in a reduction in fishing pressure of 30%. Furthermore, a new Fishing Act that will provide better tools for management, including in tributaries of the Tenojoki and Näätämöjoki not covered by the bilateral agreements, entered into force on 1 January 2016.

The APR indicates that catch and release not applicable although it has previously been reported to be at a low level. The Review Group had previously noted that it will be important to ensure that reporting procedures are in place if catch and release increases in the future under any new fishing agreement.

Actions related to management of salmon fisheries: The APR indicates that Finland and Norway have come to a conclusion on a new regulatory regime for the Tenojoki regulatory measures based on biological reference points and scientific assessments, including a reduction of fishing pressure of 30% (Action F1). Conservation limits have been established for nine tributary populations and the main stem of the Tenojoki; attainment has been assessed against these and bilateral cooperation with Norway is underway to define targets for more tributaries (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 to avoid the creation of barriers to migration and erosion and, in response to a previous question from the Review Group, Finland advised that no monitoring is undertaken or required to confirm that construction works have not harmed salmon habitat (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 in 2015 to prevent the spread of *Gyrodactylus salaris* (Action A1). No progress report was provided on the monitoring programme for escaped farm salmon in 2015 (Action A2).

Questions for written response prior to the 2016 Annual Meeting:

1. *In the absence of a new bilateral agreement, were the measures introduced by local fishing right owners on the Tenojoki in 2015 considered to be effective and will these measures continue to apply in 2016 (Action F1)?*
2. *The 2015 APR indicated that spawning targets had been set for 24 sites on the Tenojoki. The Review Group understands that attainment is now being assessed for nine*

tributaries and the main stem. What steps are being taken to assemble data to allow assessments for the remaining sites (Action F2)?

3. *What are the plans and timeframes for developing new salmon fishing agreements for the Näätämönjoki (Action F1)?*

4. *Given that recommendations have been given to road constructors, but that monitoring is not undertaken, have any works been approved since last year that were not consistent with these recommendations (Action H1)?*

5. *No progress was reported on Action A2. What are the results of the monitoring programme for escaped farmed salmon in the Tenojoki in 2015 (Action A2)?*

European Union - Germany, CNL(16)22

The Implementation Plan identifies seven proposed actions and the APR provides a clear and comprehensive report on the progress made to address them in 2015; all were ongoing with one action partially completed. Detailed supplementary information is provided in appendices to the APR.

The APR highlights a number of interesting new developments in 2015 including: evaluation of the effectiveness of fish protection devices that had been installed on two hydropower plants in 2014; installation of a Vaki counter in one tributary and evaluation of optical video monitors in two other tributaries); plans for new trials with calcein marking; planning for mapping of redds by local angling clubs; and genetic studies of salmon from the River Nette, a tributary of the Rhine, which indicate that most salmon were from British or Irish strains, but two fish originated from central Norway.

No estimate of unreported catch has been provided although it is recognised that bycatch and illegal catches occur. Catch and release is not practiced (salmon fisheries are prohibited in the Rhine).

Actions related to management of salmon fisheries: An annual exchange of information among experts on the implementation and effectiveness of measures to reduce by-catches and illegal fishing is ongoing. A Dutch report on fishing activities on the coast indicates that most salmonids are caught near the Haringvliet sluices, particularly when gillnets are used close to the shore. However, the requirement to use mesh nets for shrimp and the introduction of a closed season for eels are expected to result in reduced catches of salmonids (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. In 2015 stocking in this river ceased (Action F2).

Actions related to habitat protection and restoration: A programme is underway to maintain and restore good fish passage at 250 barrages on the rivers Rhine, Ems, Weser and Elbe. Of the 46 measures originally scheduled, only three had been constructed and so the strategy has been updated. The second phase commenced in 2016 and includes 77 projects of which 52 are already in the planning phase. Monitoring is ongoing at 12 fish passes (Action H1). The second Rhine River Basin Management Plan under the EU Water Framework Directive was published in 2015 and contains a description of measures for migrating fish and a list of obstacles to be modified by 2012. A new Federal programme was launched in 2015 to provide funding during 2016 - 2018 for ecological restoration including habitat restoration in the River Rhine. The first integrated LIFE project in Germany was launched in January 2016 with the aim of achieving 'good ecological status' in the River Lahn, a tributary of the Rhine (Action H2). There are plans to improve longitudinal connectivity at 134 sites on the river Elbe and its primary tributaries. Many of the measures to improve river connectivity under the first international management plan (2013 - 2015) have been fully implemented or initiated, but a new strategy has been developed for the second management period to 2021 drawing on experiences under the previous plan (Action H3).

Actions related to aquaculture and associated activities: The intention is to establish a separate locally adapted indigenous salmon populations in tributaries of the Rhine in North Rhine Westphalia and the successful trial operation of the Wild Salmon Centre Rhine-Sieg without the use of imported ova in 2014 continued in 2015. Kelt reconditioning at the LANUV NRW hatchery has been found to be ineffective and ceased in 2015 in favour of expansion of

the captive broodstock programme (Action A1). A harmonised genetic monitoring programme for salmon in the Rhine catchment has been agreed but its implementation requires clarification of funding and arrangements for storing samples (Action A2).

Questions for written response prior to the 2016 Annual Meeting:

1. *What is the estimated harvest of salmon in the Dutch fisheries and are there any proposals for measures to address these harvests in the gill net fisheries close to the shore near the Haringvliet sluices (Action F1)?*

European Union - Ireland, CNL(16)36

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 progress through the APRs. Nevertheless, the APR provides clear and comprehensive reports on progress to address some actions in 2015 with useful quantitative data to demonstrate progress on monitoring programmes etc. However, it is unclear what progress has been made in relation to the four actions on habitat protection and restoration.

Fisheries regulations and byelaws regulating recreational and commercial fisheries were updated for the 2015 fisheries. A new National Strategic Plan for Sustainable Aquaculture Development was published for consultation in 2015. It reviews the current status of farmed salmon production in Ireland and the potential for sectoral growth.

Actions related to management of salmon fisheries: Enforcement activities related to illegal fishing are well described for 2015 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. In recent years, all commercial salmon fishermen have made a catch return; the percentage of recreational fishermen that reported in 2015 was the same as in 2014. All anglers who do not return logbooks are written to and a proportion taken to court; an electronic licence application system is in place (Action F2). A national reporting mechanism for fish counter data and validation has been in place since 2014. Information from 32 counters (an increase of 11 since 2011) is used to inform the current assessment (Action F3).

Actions related to habitat protection and restoration: The APR indicates that there is an overall improvement of water quality due to improved agricultural practices and that seriously polluted river sites have been virtually eliminated, although it is noted that the 2015 target is unlikely to have been met (Action H1). The Forestry Act passed into law in October 2014 and a GIS-based management system is being used to ensure that forestry activities are approved only following detailed environmental consultation (Action H2). Efforts to improve waste water treatment are ongoing with upgrading focusing on those facilities where improvements are most needed. Inspections have shown an improvement from 52% compliance in the first year of the plan to 79% by February 2015 after the remedial works were undertaken (Action H3). The APR indicates that stringent action is being taken by the Irish authorities to enforce Treatment Trigger Levels for sea lice, including accelerated harvests and early fallowing of sites (Action H4). However, it is unclear from the APR what progress was made on actions H1, H2, H3 and H4 during 2015.

Actions related to aquaculture and associated activities: A pan-European study, 'Prevent Escapes', indicated that the level of escapes in Ireland is low in comparison to other countries assessed. The APR indicates that there were no recorded incidents of escapes in 2015 (Action A1). On-farm sea lice checks together with alternative approaches to complement husbandry and medicine treatments and rigorous regulatory oversight are reported to have led to improved sea lice levels throughout the Irish salmon farming industry. In 2015, for farmed salmon in the first year at sea, 97% of inspections were below the Treatment Trigger Level compared to 94% in 2014 and 100% in 2013. The corresponding figures for one-sea-winter salmon were 78%, 71% and 82%. (Action A2). Mortality due to Amoebic Gill Disease is reported to have decreased significantly in the last 12 months due to weekly monitoring and early intervention. Phytoplankton and zooplankton damage continues to be problematic in certain bays but early

intervention in relation to fish husbandry and management is reported to have helped (Action A3).

Questions for written response prior to the 2016 Annual Meeting:

1. *What quantitative information can be provided to demonstrate progress made in 2015 on the four actions relating to habitat protection and restoration (Actions H1, H2, H3 and H4)?*
2. *What data are available to support the statement that the level of escapes is low compared to other countries (Action A1)?*
3. *What action is taken when sea lice thresholds are exceeded over an extended period (Actions H4 and A2)?*
4. *What evidence can be provided to demonstrate that the incidence of diseases in salmon farming has declined and how has this been achieved (Action A3)?*
5. *Have there been further outbreaks of Pancreas Disease (PD) in 2015, following those reported in the 2015 APR and, if so, have mitigation measures been successful in minimizing losses (Action A3)?*

European Union - Spain (Asturias), CNL(16)27

The Implementation Plan identifies five proposed actions, and the APR indicates that all of these are on-going. The APR provides very little information on the progress made to address the actions in 2015 and so more information is sought in the questions below. For the evaluation process to work effectively and be fair and equitable, the Review Group will require more detailed reporting on progress against each action in the 2017 APR.

Fishing has been prohibited in estuaries and the sea since 2002. No catch and release data are provided, but the response to a question in 2014 indicated that all salmon caught from mid to end July are released. Unreported catch is thought to be negligible.

Actions related to management of salmon fisheries: Annual monitoring programmes have been conducted in reserves as part of an action to reduce poaching (Action F1), and 'broodstock' counts have been undertaken to estimate the impacts of fisheries (Action F2). No further information has been provided.

Actions related to habitat protection and restoration: An annual programme of cleaning and maintenance of the ladders in mini hydroelectric plants and removing obstacles impeding the upstream movement of salmon has been completed for 2015 (Action H1). Lectures have been given to heighten awareness of the fragility of salmon in the region (Action H2). An up-to-date inventory of river obstacles that impede passage in the river network has been completed (as was reported in 2015) (Action H3). No further information has been provided.

Actions related to aquaculture and associated activities: The IP indicates that there is no commercial salmon farming, but fry are reared for stocking using local wild broodstock. There are no actions relating to aquaculture in the IP.

Questions for written response prior to the 2016 Annual Meeting:

1. *What anti-poaching activities were conducted in 2015; what levels of poaching were recorded; and how many people were prosecuted (Action F1)?*
2. *What censuses were conducted in 2015; what are the current estimated impacts of the fisheries on stocks; and at what stock levels would action be taken to reduce exploitation (Action F2)?*
3. *What number and proportion of fishways in Asturias are included in the annual programme of cleaning (Action H1)?*
4. *How are the initiatives (e.g. lectures) to increase awareness of the fragility of salmon stocks at the edge of their range being used to improve salmon conservation (Action H2)?*
5. *Having completed the inventory of river obstacles that impede fish passage, what actions are now planned to achieve the expected outcome of increasing spawning habitats (Action H3)?*

European Union - Spain (Cantabria), CNL(16)28

The Implementation Plan identifies 10 proposed actions. The APR indicates that work has not yet started on seven of these but is ongoing on the other three (work was said to be ongoing on four actions in the 2014 APR and two in the 2015 APR). Despite being 60% of the way through the IP period, work has not started on seven of the actions, and the Review Group is concerned to know when work will begin on these. The APR provides very little information on the progress to address the ongoing actions in 2015 and so more information is sought in the questions below. For the evaluation process to work effectively and be fair and equitable, the Review Group will require more detailed reporting on progress against each action in the 2017 APR.

Actions related to management of salmon fisheries: The Implementation Plan includes actions to reduce exploitation of MSW salmon (Action F1), to develop conservation limits and management targets (Action A3), and to estimate exploitation levels (Action F4). The APR states that no work has started on these three actions, although the opening of the fishing season was again delayed in 2015. Action F2 seeks to promote catch and release among stakeholders, but in 2015 it was found that anglers were releasing fish in order to continue fishing for larger specimens without exceeding the catch limit of one fish/angler/day; catch and release of any fish above the legal size limits has, therefore, been banned in 2016. Sampling of smolts and juveniles is continuing in an index river but no estimates of marine survival have yet been obtained (Action F5).

Actions related to habitat protection and restoration: One fish pass has been modified to improve broodstock selection, but this has not increased accessibility to habitat upstream (Action H1). Four projects are underway to install gratings at the entrance and exits of hydropower facilities, but progress has been limited (Action H2). No work has started on two other actions to provide appropriate river flows by implementing sustainable abstraction programmes (Action H3) and to develop integrated catchment management plans to reduce land-use impacts (Action H4).

Actions related to aquaculture and associated activities: No work has started on the planned action to regulate salmonid stocking by implementing and enforcing existing and proposed new stocking programmes (Action A1).

Questions for written response prior to the 2016Annual Meeting:

1. *All the actions in the IP were scheduled to commence in 2014, but very little progress has been reported in the last three years. What will be done to ensure that work on actions F1, F2, F3, F4, H3, H4 and A1 is completed before 2018?*
2. *When are the first estimates of marine survival for Cantabrian salmon stocks expected to be obtained (Action F5)?*
3. *What work is planned to achieve the expected outcome of improving connectivity between freshwater habitats and the sea (Action H1)?*
4. *What work is underway or is planned to achieve the expected outcome of obtaining a betting understanding of the potential impacts of hydropower (Action H2)?*

European Union - Spain (Galicia), CNL(16)29

The Implementation Plan identifies eight proposed actions, and the APR indicates that work has not started on three of these but is ongoing on the remaining five. The Review Group is concerned that work has not started on three of the actions despite being 60% of the way through the IP period. The APR provides very little information on the progress to address the ongoing actions in 2015 and so more information is sought in the questions below. For the evaluation process to work effectively and be fair and equitable, the Review Group will require more detailed reporting on progress against each action in the 2016 APR.

The APR indicates that the stocking programme on the rivers Sor and Anllóns (A Coruña province) continued in 2015 and the first spring salmon returns are expected in 2016. The lower part of the river Anllóns has been declared 'Free Access Catch and Release waters'. There are no salmon fisheries in the sea; levels of unreported catches and catch and release are reported to be unknown.

Actions related to management of salmon fisheries: Action F1 aims to develop conservation limits for, at least, the Rivers Eo and Ulla, and Action F2 involves working with the central government of Spain to develop fishing rules and undertake research in the River Miño. Work has not begun on either of these planned actions. As part of an action to develop and implement specific fishing rules for trout and sea-trout in salmon rivers, compulsory catch and release has been introduced in the lower reaches of the river Anllóns (Action F3). Progress on the development of a Conservation/Restoration Plan for salmon rivers in the A Coruña province is ongoing, but the progress made in 2015 is unclear (Action F4).

Actions related to habitat protection and restoration: The implementation of guidelines for the management of riparian vegetation in order to control river temperatures has not yet started (Action H1). Implementation of the WFD requires all rivers to be raised to 'good ecological status'; the APR indicates that only the rivers Anllóns, Xubia and Miño rivers failed to meet this standard, but no details are provided of actions that are being taken to address the problems (Action H2). The new River Basin Plans (2015-2021) for salmon rivers in Galicia have been approved which include the definition of compensation flows for every water body (Action H3). Seven dams have been removed in the lower Ulla basin (under the Life+ Margal-Ulla project LIFE NAT/ES/000514) and the construction of some fishways in A Coruña province is under investigation (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 2016 Annual Meeting:

1. *All the actions in the IP were scheduled to commence in 2014, but very little progress has been reported in the last three years. What will be done to ensure that work on Actions F1, F2 and H1 is completed by the end of 2018?*
2. *What work was undertaken in 2015 on the development of management strategies for sea trout and trout in salmon rivers other than the River Anllóns to achieve the expected outcomes of minimizing impacts on salmon and reducing unreported catches of salmon (Action F3)?*
3. *What work is planned for the development of a Conservation/Restoration Plan for salmon rivers in the A Coruña province (Action F4)?*

4. *What plans are there to remove obstructions and build fishways in rivers other than the River Ulla (Action H4)?*

European Union - Spain (Navarra), CNL(16)30

The Implementation Plan identifies six proposed actions. Three actions were completed or partially completed for 2015, the objectives are reported to have been achieved and the APR provides quantitative information on the progress made. Despite being 60% of the way through the IP period, work has not started on the other three actions, although one is scheduled to begin in 2016. The Review Group is concerned to know when work will begin on the other two actions.

The APR indicates that a new salmon protection measure has established an overall TAC of 83 salmon and a TAC for MSW salmon of 28 for the entire angling season based on the size and age structure of the returning salmon population in the past five years. When 80% of the MSW TAC is reached (22 MSW salmon), the angling season is closed for a week. There are no fisheries in estuaries or the sea, there is said to be no unreported catch and catch and release is considered to be uncommon.

Actions related to management of salmon fisheries: Work has not yet started on the development of conservation limits due to lack of funding (Action F1). Biological sampling of rod caught salmon and monitoring of juveniles was completed for 2015 although smolt trapping was not possible due to flood damage (Action F2). A TAC of 83 salmon was set for the rod fishery in 2015, with a new TAC for MSW salmon alone of 28 (Action F3). Broodstock collection and fry and autumn parr stocking have been undertaken on the Bidasoa river and its tributaries in 2015 (Action F4).

Actions related to habitat protection and restoration: No work has begun to update salmonid mesohabitat maps (Action H1). An evaluation of the effectiveness of 10 fish-ways built in the last decade and the development of projects to improve river connectivity are due to start in 2016 under a LIFE project (LIFE14 NAT/ES/000186) (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 2016 Annual Meeting:

1. *All the actions in the IP were scheduled to commence in 2014, but work has yet to commence on Actions F1, H1 and H2 (although H2 is scheduled to commence in 2016). What will be done to ensure that work is completed on these actions by the end of 2018?*

European Union - Sweden, CNL(16)32

The Implementation Plan identifies eighteen proposed actions. The APR provides clear and comprehensive reports on the progress made to address each of the actions in 2015 and including quantitative information. Three actions have been completed and are reported to have achieved their objectives and the other fifteen actions are ongoing.

In 2015, a national plan for the future conservation and management of salmon and sea-running brown trout for stocks in both the Baltic sea and the Atlantic was completed but it has not yet resulted in any changes to the Implementation Plan. In 2014, a ban was imposed on gill net fishing for salmon on the coast at water depths >3m and this has resulted in no mixed stock fishing taking place on the coast in 2015. The proportion of the total number of salmon released after capture in rivers increased to 18%.

Actions related to management of salmon fisheries: There was no legal commercial fishing for salmon on the coast for the first time in 2015, and it is estimated that a bag limit of two salmonid fish will result in practically no fishing mortality for salmon in the marine sport fishery (Action F1). A ban on gill net fishing in coastal waters >3m was introduced from March 2014, but catch in the fishery did not decrease in 2014, and in 2015 the Swedish Agency for Marine and Water management filed a law suit for illegal fishing against the responsible fishermen. There is still a mixed fishery for reared and wild fish in the rivers Lagan and Göta älv, but reared fish can be distinguished by the presence of fin clips (Action F2). Between 2000 and 2015 an average of ~174,000 salmon smolts has been released annually (Action F3).

Sampling began in 2014 to establish a genetic baseline for Swedish salmon stocks; the base line was completed in 2015, and a report will be published in late 2016 (Action F4). The efficiency of the River Ätran index river trap was evaluated in 2015, and the results will be published in 2016 (Action F5). Considerable progress has been made in establishing conservation limits, and preliminary results suggest that these will be set at about 5.5 eggs per m^2 of wetted river. It should be possible to establish conservation limits for all rivers in 2017 (Actions F6). Data on in-river exploitation was successfully gathered for the index river in 2015 (Action F7).

Work is underway to reduce fishing effort and improve voluntary catch reporting by non-commercial fishermen, who mainly fish using gill nets on the coast (Action F8). There has been no progress on reducing over-exploitation of MSW fish in rivers through restrictions on landing large fish but voluntary restrictions are implemented by individuals on some rivers. During autumn 2015, a report was published on the effect on egg deposition in Swedish rivers of introducing maximum lengths or/and no catch of females. (Action F9). Juvenile recruitment surveys were conducted in three rivers in 2015 (Action F10). Fish management units have been established on many rivers but an inventory compiled in 2015 showed that there was a need for management units on smaller rivers and in parts of some larger rivers; information exchange and discussions with the different river managers and land owners are ongoing (Action F11).

Actions related to habitat protection and restoration: All 20 salmon rivers that require liming are included in a liming programme and a report published in 2015 concluded that this had achieved the goals for water chemistry and abundance of fry and parr (Action H1). A report produced in 2015 shows that there are 306 hectares of spawning and rearing habitat of salmon on the Swedish west coast; this has increased by16% since 1999, mainly due to new fishways, liming operations and habitat improvement (Action H2). A plan for continued

habitat restoration in salmon rivers started in 2015 with coordination of plans by the three regional counties and the Swedish University of Agricultural Sciences (Action H3). Criteria for best available technology (BAT) for hydropower generation were published in December 2015 (Action H4). Work in establishing criteria and a plan for the surveillance of hydropower plants according to Environmental Law and the BAT is ongoing (Action H5).

Actions related to aquaculture and associated activities: Annual monitoring of rivers for the presence of *G. salaris* was undertaken as planned and protective measures have been introduced to avoid spreading the parasite, including a ban on stocking salmonid fish in uninfected rivers. During 2015 a new river (River Rolfsån in the county Halland) was infected, the first river since 2005. Monitoring in infected rivers has shown that the number of Gyrodactylus per fish has decreased over time (Action A1). Genetic screening for escaped farmed salmon will be undertaken during 2016 (Action A2).

Questions for written response prior to the 2016 Annual Meeting:

The Review Group has no questions on this APR and commends Sweden on the clarity of its report.

European Union - UK (England and Wales), CNL(16)24

The Implementation Plan identifies 12 proposed actions, a number of which are divided into sub-headings. The APR provides clear and comprehensive reports to address the topic areas covered by each action, all of which are ongoing with some elements completed.

The Environment Agency hosted a "Salmon Summit" to raise awareness about the state of England's salmon stocks and to bring together influential leaders to discuss salmon protection and enhancement measures. The Environment Agency, Defra, its agencies and partner organizations are now developing a five-point approach with proposals for actions on: improving marine survival; further reducing exploitation by nets and rods; removing barriers to migration and enhancing habitat; safeguarding sufficient flows; and improving water quality. Statutory Instruments prohibiting fishing for salmon in the sea have been consolidated without change to make them clearer. New Net Limitation Orders were approved for a number of fisheries.

Actions related to management of salmon fisheries: An annual assessment of the status of salmon stocks was completed for 2015 (Action F1). Net limitation orders (NLOs) were reviewed for the fisheries in three estuaries: for the Teign estuary, the NLO was maintained at three seine nets; for the Dart estuary, a reducing NLO of zero was introduced for the seine net fishery and the remaining nets have now been bought out in perpetuity; and for the Dee estuary, the reducing NLO of zero was maintained for the seine and trammel net fisheries but there has been no fishing since 2009 because of a buy-off of all nets (Action F2). The reducing NLO for the Anglian Coastal fishery (NLO of zero) was maintained through a new regulatory measure and further progress was made on genetic stock assignment studies on catches in mixed-stock fisheries. An investigation into the possibility of capping catches in the North East coast net fishery has been completed and the APR indicates that further action in relation to management of the fishery will be taken forward under the five-point approach (Action A3). Efforts to promote catch and release fishing continue, including a voluntary carcass tagging scheme in the Rivers Ribble and Eden, and catch and release was estimated at 79% (9,925 salmon) in 2015 (Action F4). Efforts aimed at disrupting illegal fishing continued in 2015 with a number of net seizures and other prosecutions (Action F5).

Actions related to habitat protection and restoration: Approximately 55,000 trees have been planted and 27.5 km of fencing erected since last year's update on the Keeping Rivers Cool Project. Climate change is considered in RBMPs and the final plans were published in February 2016; a review of the impacts of thermal emissions on the marine environment has been published (Action H1). Progress in reconnecting salmon habitat continued in 2015 with improved access for salmon to 280km of river in England and improved access to about 700 km of river in Wales (Action H2). Actions have been taken to provide appropriate river flows under the Restoring Sustainable Abstraction Programme; under the 2014 Water Act new regulations for trickle irrigation and several other abstractions will enter into force from 2016 (Action H3). A number of actions have been taken concerning integrated catchment management including investigating the sources of sediment, stakeholder engagement, encouraging uptake of incentive schemes, pollution prevention campaigns and improving soil protection, making use of local partnerships and reviewing Good Agricultural and Environmental Condition (Action H4).

Actions related to aquaculture and associated activities: In England, the Environment Agency will no longer permit stocking of salmon into rivers that are Special Areas of Conservation (SACs) where salmon is a qualifying feature (Action A1). Natural Resources Wales has also decided to end the stocking of salmon (and sea trout) into Welsh rivers beginning in 2014; stocking is now being replaced by alternative means of delivering benefit for fish and fisheries, including work to resolve barriers to migration and sub-optimum habitats (Action A1). New live fish movement legislation came into force in January 2015 (Action A2). A desktop exercise, project 'Alpheus', was undertaken in 2015 to test Great Britain's response to a *G. salaris* outbreak (Action A2). A research project evaluating the impacts on freshwater fish populations of contaminants in effluents from fish farms has been completed and will be published shortly (Action A3).

Questions for written response prior to the 2016 Annual Meeting:

1. *How are erosion events measured and were there any penalties in 2015 (Action H4)?*
2. *Are any additional preventative measures planned in response to the findings of project 'Alpheus' described in Action A2?*

European Union - UK (Northern Ireland), CNL(16)37

The Implementation Plan identifies eleven proposed actions one of which has been completed and is reported to have achieved its objective. However, as previously reported by the Review Group, the precise activities that were planned are unclear (with some descriptions of actions reading like progress reports), making it difficult to evaluate the progress made. The APR provides a clear and comprehensive report on the progress made to address some of the actions. However, very little information has been provided on the progress to address a number of other actions in 2015 and no report on progress is made for action F3 so more information is sought in the questions below. For the evaluation process to work effectively and be fair and equitable, the Review Group will require more detailed reporting on progress against each action in the 2017 APR.

Legislation is now in place to manage salmon exploitation and prevent harvests of salmon from rivers not meeting their management targets in the DCAL area. The APR indicates that catch and release is N/A in the Loughs Agency Area but it is not clear if this means Not Applicable or signifies that statistics are not available.

Actions related to management of salmon fisheries: New legislation came into effect in 2014 that prohibits commercial netting or recreational angling for salmon in the DCAL area based on an assessment of individual stocks and compliance with management targets. Commercial fisheries in both the DCAL and Loughs Agency area are currently closed (Actions F1 and F2). No progress has been reported for 2015 on mandatory catch and release before 1 June in the DCAL area to protect MSW salmon (Action F3). Monitoring of compliance with legislation is carried out through planned patrols and response to reports of illegal activity, but no quantitative information has been provided on activities in 2015 (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; the existing guidance on run of the river hydros is being updated. Assessment of the impacts on fisheries of water abstraction works continued in 2015 (Action H1). Assessment of the impacts on fisheries of drainage and other works continued in 2015 (Action H2). Monitoring programs were undertaken in 2014 in relation to trade and sewage waste discharge; however, it is unclear if this continued in 2015 (Action H3). Work to identify barriers to migration has continued and a study of cumulative effects is being written up. A range of habitat improvement works were conducted in 2015. (Action H4). To reduce illegal alterations to salmon habitat, an advisory booklet has been published and distributed to the public; however, it is unclear if further progress was made in 2015 to reduce illegal alterations to habitat (Action H5). A salmon habitat survey was initiated on the Agivey River in 2015 (Action H6).

Actions related to aquaculture and associated activities: An investigation of sea lice levels on wild salmon and the level of genetic introgression in wild salmon from escaped farmed salmon has been completed. Details of sea lice levels are provided. Farm origin genetic signals were found in between 2.6% and 6.7% of juveniles sampled across ten rivers in Northern Ireland and evidence of second generation back-crosses between farmed and wild salmon were found, albeit at a low level (Action A1).

Questions for written response prior to the 2016 Annual Meeting:

1. *Has the mandatory catch and release of all rod caught salmon before 1 June in the DCAL area continued in 2015 (Action F3)?*
2. *What progress was made with enforcement activities in 2015 (e.g. numbers of patrols, numbers of nets seized and numbers of prosecutions taken in 2015 (Action F4)?*
3. *What progress was made in reducing the impacts of drainage works on salmon habitat (Action H2)?*
4. *What were the results of any monitoring undertaken in accordance with water pollution legislation in 2015 (Action H3)?*
5. *How many routine fishery enforcement patrols were conducted in 2015 (Action H5)?*
6. *Do the genetic results provide any indication as to the origin of the fish farm escapees (Action A1)?*

European Union - UK (Scotland), CNL(16)26

The Implementation Plan identifies 12 proposed actions, a number of which are divided into sub-headings. The APR describes some major developments in the management of salmon stocks and fisheries in 2015 consistent with NASCO guidelines. However, much of the APR is confused or unclear and provides very little information on the progress to address the actions in 2015 so more information is sought in the questions below. No report on progress has been provided for actions A1 and A2. For the evaluation process to work effectively and be fair and equitable, the Review Group will require more detailed reporting on progress against each action in the 2017 APR.

Scotland recently completed a review of the management of salmon and freshwater fisheries. The Scottish Government has taken action to limit killing of salmon beyond estuary limits for the next three years (from 2016) because of the mixed-stock nature of the fishery and limited data on the composition of the catch. Conservation limits have been developed, and there are also new measures to limit killing of salmon in inland waters according to their conservation status as well as the introduction of a carcass tagging program for net caught salmon for certain areas.

The APR does not provide catch data for calendar year 2015; the reasoning for this has previously been explained.

Actions related to management of salmon fisheries: An independent review of the management of salmon and freshwater fisheries has been completed. Draft provisions for a Wild Fisheries Bill and Wild Fisheries Strategy (following the recommendations from the Wild Fisheries Review) are reported to be currently undergoing consultation (Action F1a). Research has been commissioned into the economic and financial contribution of wild fisheries in Scotland and will be published in 2016 (Action F1b). The APR states that the proposed salmon conservation regulations will require the development of conservation plans for each district irrespective of conservation status but no clear progress has been reported (Action F2a). A paper summarizing the engineering requirements, options and costs involved in the deployment of a network of counters was recently published, although the link to the website provided an error message (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 was published in 2016, although the link to the website provided an error message (Action F3a), and a paper has been published as a contribution to better understanding coastal migrations of adult salmon (Action F3c). Action F4 is a general fisheries management action for which there is no clear progress reported but reference is made to a study on effects of electromagnetic fields on fish behavior which appears to relate to Action F5a. Action F5a suggests that a monitoring and research strategy for analyzing impacts to salmon from marine renewable energy projects should be developed. Although some progress on technical aspects of these interactions is ongoing, there is no clear progress reported in terms of the development of the overall strategy. Action F5b provides goal statements for the continued growth of the aquaculture industry in Scotland but no clear progress for 2015 (the research strategy was published in 2014). Action F5c relates to research funding for investigating sea lice impacts including reference to individual research projects and the Scottish Aquaculture Innovation Centre. Action F5d provides an update on the aquaculture industry's enhanced, voluntary quarterly publication of sea lice data. Although a link to the report is provided, no summary of progress is provided in the APR. Action F5e provides an update on a 3-year project to identify areas of opportunity and restriction for aquaculture including considerations of risks to wild salmon. Progress reports have recently been made available to various stakeholders and a final report is expected

in 2016. Action F5f provides an update on a particle tracking model (autoDEPOMOD) that is expected to be made available in 2016. Action F5g provides an update on the Scottish Shelf Modeling project that should inform sea lice dispersal projections. Actions F5h and F5i provide links to operational websites but no summaries of the progress in 2015.

Actions related to habitat protection and restoration: Action H1 describes a broad suite of activities under Scotland's Climate Change Adaptation Plans. In 2015, a temperature monitoring network was implemented including spatial modeling components. The work of the temperature monitoring network is described in a peer-reviewed paper and a link to a website is provided. This information appears relevant to actions H1a and H1b, but no clear progress on actions H1c-f is provided. A barrier assessment program is underway; the APR suggests that a prioritization process is complete but no progress toward barrier removal is provided (Action H2). There are plans to ensure appropriate provision of river flows and habitat modeling efforts are underway to support their implementation. River Basin Management Plans have prioritized 108 waterbodies for actions to improve flows (Action H3a-b). An integrated catchment management approach is proposed to reduce the impact of land use (Action H4) and 53 catchments were prioritised in 2015 for action to improve land use practices over the period from 2016 - 2021.

Actions related to aquaculture and associated activities: No progress reports have been provided for Actions A1 and A2. Technical Standards for Finfish Aquaculture were published in 2015 and require that site appropriate equipment to prevent escapes is in place at all fin fish farms by 2020 at the latest (Action A3).

Questions for written response prior to the 2016 Annual Meeting:

1. *Several progress reports for actions are unclear, do not appear to relate to 2015 or not to the specific action. Some responses refer to websites but provide no summary information (see instructions), and some links do not work. The Review Group requests clarification of the progress reports for the following actions: F4b, F5a, F5b, F5d F5h, F5i, H1c, H1d, H1e, H1f.*
2. *What actions were taken in 2015 with regard to regulating stocking of salmonids and freshwater fish (Action A1)?*
3. *What actions were taken in 2015 to implement EC Council Regulation 708/2007 concerning Use of Alien and Locally Absent Species in Aquaculture and to prevent G. Salaris and other parasites occurring in Scotland (Action A2)?*
4. *What key objectives of the Ministerial Group on Aquaculture have been delivered; and how is the structure of the Ministerial Group on Aquaculture likely to change (Action A3)?*
5. *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 as a baseline for demonstrating progress towards meeting the international goals for sea lice and containment set out in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Summary data are requested to provide the baselines for Scottish salmon farming facilities.*

Norway, CNL(16)33

The Implementation Plan identifies 12 planned actions and all are ongoing. Succinct reports have been provided on the progress made with all of the actions in 2015, but a number lack quantitative data where this is needed to gauge the extent of the progress; more information is sought on these in the questions below.

Actions related to management of salmon fisheries: New fishing regulations have been implemented and these will take effect from 2016 (Action F1). The APR indicates that an increasing number of rivers are subject to mandatory mid-season fishery assessments, and the way that local managers handle the mid-season assessment is being evaluated. Legislation is also being developed to introduce 'continuous reporting' of catches in the sea fisheries (Action F2). Work is continuing to improve conservation limits by collecting more stock-recruitment data series and additional information about mesohabitat distribution and juvenile salmon production (Action F3). A new agreement on a revised management regime for the River Tana is expected to be signed with Finland in June 2016 and enter into force before the fishing season in 2017 (Action F4).

Actions related to habitat protection and restoration: Twenty-two rivers are now included in the national liming program and in 2015 the program cost NOK47 million (approximately £4 million). These rivers now produce 10-14% of the total salmon catch in Norway (Action H1). New rules for the operation of hydropower plants have been set for the river Årdal and provide new minimum summer and winter flows. Forty other revisions are underway, some of which are in rivers with anadromous species (Actions H2). Regional plans, setting environmental objectives and prioritizing habitat improvements, were finalized in 2015. The road authorities have planned work to mitigate obstructions caused by roads in prioritized rivers and have already removed 15 such obstacles (Action H3). Two habitat restoration projects have been completed in northern Norway involving the removal of old erosion protection works in the river Kvalvik in Lyngen and in the Alta river (Action H4).

Actions related to aquaculture and associated activities: The national programme to monitor the sensitivity of sea lice to treatments is continuing and the Parliament has developed a new policy for determining how aquaculture will be allowed to grow based on its environmental footprint. Action is taken against farms that exceed lice limits, including a requirement to harvest and/or reduce site biomass (Action A1). Research is continuing on animal welfare considerations relating to the use of sterile fish in aquaculture, and several commercial salmon farmers have started using triploid fish as a 'green' rearing approach. The second report of the national programme for monitoring escaped salmon will be completed in April 2016, and will be continued on an annual basis (Action A2). The *G. salaris* treatment programme was completed in the Rana region, and the first rotenone treatment was undertaken on two infected rivers in the Skibotn region. A second treatment in this region will be implemented in 2016. All preparations for the building of a fish barrier in River Driva were completed, and construction was due to start in January 2016 (Action A3). A monitoring programme has been implemented to record the prevalence of pink salmon in Finnmark county. A programme has also been initiated to monitor the downstream spread of minnow to areas used by salmon in the river Namsen (Action A4).

Questions for written response prior to the 2016 Annual Meeting:

1. *What were the major changes in the fishery regulations that were introduced from 2016 (Action F1)?*
2. *How many rivers had mandatory mid-season assessments in 2015 compared with previous years (Action F2)?*
3. *How many rivers currently have reliable stock-recruitment data and what new information is being obtained on mesohabitat distribution and juvenile production (Action F3)?*
4. *How many fish farms exceeded the sea lice limit in 2015, and what action was taken? What growth in the salmon farming industry is anticipated based on the new policy decided by the Parliament (Action A1)?*
5. *What are the current estimates of pink salmon numbers in Finnmark and have the measures implemented been successful in reducing the breeding populations (Action A4)?*

Russian Federation, CNL(16)25

The Implementation Plan identifies nine proposed actions, and the APR provides a clear report on the progress made to address them in 2015. One action (Action F4) has been completed and is reported to have achieved its objective; the other eight actions are ongoing.

The APR provides only partial information on catch and release and no estimate of unreported catch has been provided.

In autumn 2015 the Russian Federation and Norway signed a Memorandum of Understanding (MoU) on cooperation in management of, and monitoring and research on, wild Atlantic salmon in Finnmark County (Norway) and the Murmansk region (the Russian Federation). The first meeting of a Working Group, comprising scientists and managers, established under the MoU has been held. In August 2015, the decision was taken to close recreational salmon fisheries in the Kola River (Murmansk region) after a large number (700 salmon; about 10% of the run) of dead adult salmon were recorded in the river; the mortality is believed to be due to Ulcerative Dermal Necrosis (UDN).

Actions related to management of salmon fisheries: Measures to reduce the level of unreported catches in the Varzuga River were developed in 2015. New rules restrict boat usage and prohibit rafting and other boat activities from 15 July until ice cover. Salmon recreational fisheries were closed in some remote fishing sites on the Varzuga River for the 2015 and 2016 seasons. Protection patrols were carried out on lakes and rivers by fisheries inspectors of the Regional Directorate of the Federal Agency for Fisheries and in coastal areas of the Barents and White Seas by fisheries inspectors of the Border Guard Department of the Russian Federal Security Service (Action F1). A comprehensive genetic baseline has been established through the Kolarctic Atlantic Salmon project (2011 – 2013), allowing for precise identification of wild salmon caught at sea to individual rivers/regions and providing opportunities for more adaptive and informed management of coastal salmon fisheries. The findings were used in developing quota allocations for coastal salmon fisheries in the White Sea on the basis of data on contributions of salmon stocks to the fisheries. No Atlantic salmon fisheries are allowed in the Russian Federation in the Barents Sea. (Action F2). Conservation limits have been set for some salmon stocks including all rivers in the Murmansk Region and for a number of those in the Murmansk region revised estimates were made in 2015 (Action F3). Clearer legislation has been put in place to manage the fisheries conducted by indigenous small nations of the North (Action F4).

Actions related to habitat protection and restoration: Estimates of the carrying capacity of some Barents Sea rivers in the Murmansk region were revised in 2015 on the basis of new data on spawning and nursery grounds. The reassessment of the carrying capacity of the White Sea rivers of the Murmansk and Archanglesk regions is underway (Action H1). A habitat inventory has been established for the Barents Sea rivers and the work in developing the inventory of salmon rivers of the White sea basin of Murmansk and Archangelsk regions is underway. General recommendations on habitat restoration were prepared for a number of salmon rivers in the Murmansk region (Action H2).

Actions related to aquaculture and associated activities: The Federal Law on Aquaculture came into force on 1 January 2014. A number of by-laws came into force in 2015 (Action A1). Monitoring is undertaken for *G. salaris* in a number of rivers, and the parasite is present in the Keret River in Karelia. The APR indicates that there is 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 freshwater aquaculture activities. Veterinary control is applied for aquaculture. New veterinary measures for aquaculture activities in the Murmansk region have been under development. Some recreational fishing companies in the Murmansk region started voluntary programmes for anglers to disinfect their fishing tackle and clothes but no obligatory measures to prevent the introduction or further spread of the parasite through recreational fisheries have been developed (Action A2). New rules relating to the introduction of aquatic species came into force in 2010. A comprehensive scientific evaluation is required prior to any introduction of aquatic species and no movements of reproductively viable non-indigenous anadromous salmonids or their gametes originating from outside the North-East Atlantic Commission area has occurred (Action A3).

Questions for written response prior to the 2016 Annual Meeting:

1. *The Review Group notes that some data are collected on unreported catches but no information is provided on unreported catches in section 2.2. Why were partial estimates of unreported catches not provided and when will these be reported to NASCO (Action F1)?*
2. *In answer to a question on Action A1 in its 2014 report, the Russian Federation indicated that they would provide more information on how sea lice are managed under the new Federal Law on aquaculture. Please provide this information (Action A1)?*
3. *The APR indicates that a number of by-laws introduced under the Federal Law on aquaculture came into force in 2015. What general measures did these bye-laws contain (Action A1)?*
4. *Why have obligatory measures not been introduced to prevent the spread of G.salaris in the wild (Action A2)?*
5. *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 as a baseline for demonstrating progress towards meeting the international goals for sea lice and containment set out in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Summary data are requested to provide the baselines for salmon farming facilities in the Russian Federation.*

United States of America, CNL(16)23

The Implementation Plan identifies eleven proposed actions. The APR provides a clear and comprehensive report on the progress made to address the planned actions in 2015.

In 2016, NOAA announced a new program to increase its efforts to protect some of the species that are currently among the most at risk of extinction. The Gulf of Maine (GOM) Distinct Population Segment (DPS) of Atlantic salmon was selected as one of eight 'Species in the Spotlight' nationally. At the regional level, the USA recently developed a 5-year action plan that details the focused efforts needed to reduce threats and stabilize population declines of the GOM DPS of Atlantic salmon. The plan highlights four key areas: reconnecting the Gulf of Maine with headwater habitats; increasing the number of fish successfully entering the marine environment; reducing international fishery mortality; and increasing understanding and ability to improve survival in the marine environment. Efforts are underway to engage public and private parties in support of this initiative.

There are no targeted fisheries for sea-run Atlantic salmon in the US and consequently zero catch is reported. However, small fisheries for domestic broodstock occur is some rivers outside the geographic range of the endangered populations. Unreported catch is estimated to be zero.

Actions related to management of salmon fisheries: In 2015, the United States continued to play an active role in the work of NASCO (Action F1). There are stringent regulations governing recreational fishing for other species in salmon habitats e.g. prohibition on retaining landlocked salmon and brown trout >25 inches in length in 30 waterbodies. Discussions are continuing to develop of a comprehensive conservation plan applicable to the entire freshwater range of endangered salmon (Action F2). Directed fisheries for sea-run salmon are all closed and there was no record of Atlantic salmon having been caught in commercial fisheries subject to federal jurisdiction in 2015. Surveillance in rivers for potential poaching activity was conducted routinely by conservation law officers throughout the salmon's freshwater range, (Action F3).

Actions related to habitat protection and restoration: In 2015, 21 additional aquatic connectivity projects were completed across the GOM DPS, and a total of over 77 km of stream habitat was made accessible as a result of these projects. A new downstream fishway was constructed in 2015 at the Holyoke Hydroelectric Project, the first dam on the Connecticut River. A bypass channel at the Howland Dam underwent initial testing and is expected to be fully operational for the spring migrations in 2016. This completes the Penobscot River restoration programme (Action H1). The Maine Department of Environmental Protection implements water quality programmes under the Clean Water Act and state law, and enforcement actions in Maine over the last five years have resulted in approximately US$400,000 in fines (Action H2). Consultations continued in 2015 among federal agencies concerning salmon Essential Fish Habitat (EFH) and 10 conservation recommendations were issued to address adverse effects on salmon habitat (Action H3). NOAA and the US Fish and Wildlife Service (USFWS) completed 12 consultations in 2015, each of which produced conservation recommendations to prevent degradation of designated critical habitat and reduce incidental mortality of salmon (Action H4).

Actions related to aquaculture and associated activities: Monitoring of active farm sites in Maine showed all sites were in full compliance with the required permit conditions and there were no reports of farmed fish being captured in Maine Rivers containing endangered Atlantic salmon in 2015. A survey of sea lice infestation rates of >6,000 wild fish (no Atlantic salmon) in Cobscook Bay showed only *Caligus elongatus* being present but no *Lepeophtheirus salmonis* (Action A1). Revisions to the existing fish health guidelines were completed 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 (Action A3). Many salmon rivers are no longer stocked with non-native salmonids (e.g. brown trout) but there is not yet a comprehensive conservation plan (Action A4).

Questions for written response prior to the 2016 Annual Meeting:

1. *What is being done to ensure recreational fisheries for other species do not result in a bycatch of Atlantic salmon (Action F2)?*

Annex 15

CNL(16)20

Written responses from the Parties/jurisdictions to the questions raised by the Implementation Plan/Annual Progress Report Review Group

Canada

1. *How many of the recommendations from the report of the Ministerial Advisory Committee on Atlantic Salmon were addressed in 2015 and what important developments have resulted?*

   Initial review of the report indicates that to a large extent, the recommendations reflect many of DFO's current activities in support of salmon conservation. As such, many of them are either already being advanced or will be during 2016 and subsequently on an on-going basis. Some notable highlights include:

   - Continuation of the catch and release strategy in the Gulf region
   - Review of the Wild Atlantic Salmon Conservation Policy
   - Creation of collaborative venues to coordinate and work collaboratively with university researchers, non-governmental organizations, private researchers, in an effort to identify, prioritize and promote collaboration and information sharing on wild Atlantic salmon research
   - Engagement with Provinces and First Nations on recommendations related to their interests or jurisdictions
   - Explore use of innovations in technologies and intelligence to improve and strengthen enforcement efforts
   - Use the Precautionary Approach framework and its elements to determine harvest levels
   - Continue to evaluate the annual and multi-year approaches to the management of stocks on a case by case and province by province basis through annual workshops and consultation processes.

2. *What are the plans for identifying critical marine habitat within the Bay of Fundy (Action H1)?*

   Two DFO Science processes were undertaken to assist in identifying marine critical habitat for Inner Bay of Fundy (iBoF) Salmon. In November 2012, a DFO Science peer review process was undertaken to review and evaluate available information to support the identification of important marine and estuarine habitat required for the successful completion of all iBoF Salmon life-history stages (DFO 2013). The Department, informed by this Science advice, is proceeding with identifying critical habitat for iBoF Salmon in three key areas: 1) tidal portion of priority rivers, 2) Minas Basin and Chignecto Bay, and 3) coastal southwest Nova Scotia: Port George to Hall's Harbour. A second DFO Science process was undertaken in 2014 to assist with the delineation of precise boundaries for iBoF Salmon critical habitat being considered within Chignecto Bay and Minas Basin (DFO 2015) in order to subsequently map these as critical habitat within an amended

Recovery Strategy for iBoF salmon. The work to amend the Recovery Strategy is underway and the Amended Recovery Strategy will be available on the Species at Risk Public Registry once completed.

Additional information on iBF Salmon can be found with the following links.
http://sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=672.
DFO. 2013. Important marine and estuarine habitat of inner Bay of Fundy Atlantic Salmon. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/054.
http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2013/2013_054-eng.html
DFO. 2015. Support for Delineation of Inner Bay of Fundy Salmon Marine Critical Habitat Boundaries in Minas Basin and Chignecto Bay. DFO Can. Sci. Advis. Sec. Sci. Resp. 2015/035.
http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ScR-RS/2015/2015_035-eng.html

3. *What measures will be taken to ensure that the proposal to rear triploid European strain salmon in Newfoundland and Labrador is consistent with the Williamsburg Resolution and NAC Protocols on Introductions and Transfers and that the risk of any adverse ecological impacts on the wild salmon stocks is minimal (Action A2)?*

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 as a baseline for demonstrating progress towards meeting the international goals for sea lice and containment set out in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Summary data are requested to provide the baselines for Canadian salmon farming facilities (Actions A1 and A2)*

Response to Questions 3 and 4:

Canada's Implementation Plan, developed in 2012 for the period 2013-2018, contains a commitment to implementing and improving sea lice and containment management tools which could include such elements as legislation, regulation, policy, standards, monitoring and reporting.

While 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)*, the commitment in the current Implementation Plan is to ensuring that participants, including industry and governments, act in a coordinated manner that, using a risk and evidence-based approach, addresses impacts to wild fish populations.

As is indicated in the 2015 Progress Report, a number of federal and provincial initiatives have been undertaken to strengthen federal and provincial regimes that will result in further information being reported on both sea lice and containment management in the 2016 Progress Report.

On the federal level, the *Aquaculture Activities Regulations* came into force on June 29, 2015. These new Regulations require licence holders to do the following:

– Notify DFO of their intent to deposit pest-control products, including the species to be treated, treatment reason, product type/name, amount to be deposited, and expected date of deposit.

– Should any morbidity/mortality event be observed within 96 hours of deposits of drugs or pest control products, licence holders must notify DFO immediately. If directed, licence holders must take water, sediment and tissue samples to be analyzed under laboratory conditions to determine the cause of the event.

– Licence holders must report annually on a variety of mitigation measures, as well as consideration of alternatives to use of drugs and pest control products. The annual report must also contain a wrap-up of all drugs and pest control products used during the year, including verification that drugs were administered under supervision of a licensed veterinarian and pest control products were used according to label specifications.

These data will provide DFO with baseline information on the use of treatments from which we will be able to extrapolate trends and further measures of improvement over time. The first public report on aquaculture activities will be released on the DFO web site in early 2017.

Provinces also play an important role in the day-to-day monitoring of sea lice:

– In October 2015, Nova Scotia released new Aquaculture Management Regulations setting out the requirements to operate aquaculture farms. The new Regulations establish Aquaculture Management Areas, and require farms to develop Farm Management Plans which must include procedures for managing sea lice.

– New Brunswick has reviewed and modified its Integrated Pest Management Program for Sea Lice. The aquaculture industry continues its weekly treatment report to stakeholders and development of its annual sea lice management report.

– In 2015, Newfoundland and Labrador announced an investment for oceanographic research to support further development of Bay Management Areas to enhance fish health management and biosecurity for marine aquaculture sites.

Fisheries and Oceans Canada is exploring the possibility of expanding the *Aquaculture Activities Regulations* to include containment. New elements could include national standards for design, installation and maintenance of net pens, training and response protocols, and a national Code of Containment.

Currently, companies must adhere to strict Codes of Containment, and implement pre-developed and approved response protocols. These vary by province.

Companies must report breaches to provincial authorities within a prescribed period of time; Fisheries and Oceans Canada is also notified so that recapture licences can be issued.

Provinces also play an important role in containment and reporting:

• New Brunswick has revised its Governance for Containment and is working on changes to its Aquaculture Act and General Regulations. These could be in place by the end of 2016 or early 2017. Discussions will continue on a pan-Atlantic approach to containment, where possible.

• The Government of Nova Scotia's new Aquaculture Management Regulations require finfish licence holders to include containment management in their Farm Management Plans. Plans must include information and procedures related to a variety of containment issues such as (amongst others) processes for installing and maintaining infrastructure to limit risk of a breach, responses to breaches, and inventory levels during production. The containment management sections of the Farm Management

Plans must be audited by a third party annually and immediately following a reported breach. Marine cage site designs must also be approved by a qualified engineer before deployment.

- The Newfoundland and Labrador Code of Containment continues to be implemented as a condition of the aquaculture licence. The Province is currently evaluating a proposal to grow triploid (sterile) salmon as a means of growing European-strain fish in Newfoundland and Labrador without the potential for genetic interactions between farmed and wild stocks.
- All provinces require that breaches be reported; reporting requirements differ from province to province.

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

1. *The figure provided under Action A1 appears to show increased lice levels in salmon farms in late 2015. What sea lice thresholds are applied on salmon farms to trigger action to control sea lice, how many instances were there of farms breaching lice limits in 2015 and what action was taken (Action A1)?*

   A) the sea lice threshold applied at Faroese salmon farms triggering action to control sea lice has been and is fortwith 2 adult female lice or 10 developing mobile lice
   B) there were 63 instances of farms breaching the threshold in 2015
   C) reach or breach of threshold triggers/triggered the following actions:

      - immediate mandatory notification of the Chief Veterinary Officer (CVO)
      - immediate mandatory treatment in all fish units in the farm to be concluded within a fortnight and, if the CVO so demands, in all farms and units on the same fjord and/or nearby fjords
      - mandatory evaluation and new counting immediately after each treatment
      - mandatory scrutiny of the cause of ineffective treatment (each farm must have an in- or external veterinary consultant)
      - mandatory reporting to the CVO of ineffective treatment, suspicion of immunity/resistance or other inconsistency with expected results

      The CVO may demand further/more frequent counting/counting of other species of lice.

      The CVO may demand coordinated fallowing of nearby fjords if found needful to impede lice infestation.

      In case of ineffective treatment, other agents/treatments are to be used.

      If such also prove ineffective, the CVO can order other action including imminent slaughter or destruction.

      In case of elevated infestation, disproportionally frequent or incomplete/defective treatments, the CVO may freeze or decrease the number of smolts put to sea at the following production cycle. In addition to owners realizing and following their own best interest, such limitations may be the most efficient tool to secure adherence to regulative requirements.

      The CVO may allow exception or postponement of treatment:

      - if the breach is diminutive and other effective action is likely to lower the infestation
      - if coordinated treatment with other farms is imminent or
      - in case of imminent slaughter

D) In addition to mandatory requirements, the following actions were taken by the CVO in 2015:

- Demanding imminent slaughter in 5 cases
- Reducing the allowed no of in smolts put to sea by 30 % in one case (comming into force early 2016)
- Reducing the allowed no of smolts put to sea by 10 % in 2 cses (1 put into force in 2015, 1 early 2016)
- Denial of 2 applications to increase stocking/no. of smolts put to sea (1 put in force in 2015, 1 in 2016)
- Exemption from treatment due to slaughter in one case
- Reevaluation of legislation and regulatory procedures (lacking efficiency and other facts indicate a high level of immunity and a need to rethink lice containment strategies)
- Preparation of legislative proposal to lower threshold and allow treatment of individual infested cages to limit immunity/resistance awaiting hearing and expected to come into force in 2016

2. *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 as a baseline for demonstrating progress towards meeting the international goals for sea lice and containment set out in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Summary data are requested to provide the baselines for containment levels at salmon farming facilities in the Faroe Islands.*

Production statistics

Faroese prodution statistics are available at Bureau of Statistics, Hagstova Føroya, Home page: hagstova.fo.

The weight of slaughtered Atlantic Salmon *Salmo salar* and Rainbow Trout *Oncorhychus mykiss* for 1997-2015 can be seen in the below chart.

Slaughtered weight in tonnes of Atlantic Salmon *Salmo salar* and Rainbow Trout *Oncorhynchus mykiss* from 1997-2015

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total	17947	16858	35149	28660	40545	46896	52269	38191	19593	15662	25173	38272	48622	39012	49588	62783	63338	70893	66090
Salmon	16651	15724	32187	27477	37731	36861	43071	33608	15549	10728	18290	31565	42134	37221	49588	62783	63266	70893	66090
R. Trout	1296	1134	2963	1184	2813	10034	9198	4583	4044	4934	6883	6707	6488	1791	-	-	72	-	-

Source: Hagstova Føroya (Statistical Bureau of Faroe Islands), www.Hagstova.fo

Due to the following reasons, the quantity of slaughtered tonnes does however not correlate well with number of smolts put to sea, with the stocking number of fish at sea and with stocking density.

- The weight of slaughtered Atlantic salmon was ~5 kg live weight in the late 1990-ies and 6.6 kg in 2015
- Annual mortality at sea, including escapees, was 12-28% in the late 1990-ies and 5-12 % in 2007-15

- In 2000-2002 ~20 mill. smolts were put to sea annually, while the number is now ~15 mio. annually
- The average size of smolts put to sea was ~50 gr in the late 1990-ies and ~170 gr in 2015
- The average production time at sea until 6 kg was 19 months in 2008 and 16 months in 2015
- The average no. of days with fish at each production site dropped from 714 in 2008 to 612 in 2015
- Average stocking density was up to and above 25 kg/m3 in late 1990ies and is now ~7-9 kg/m3

Courteousy of Avrik/Rúni Dam, Havbúnaðarfelagið & Fiskaaling. Further information may be found at:
file:///C:/Users/ln49275/Downloads/Alir%C3%A1%C3%B0stevnan2016_Framlei%C3%B0sluhagt%C3%B8l_R%C3%BAniDam.pdf

Escapees

Reporting of escaped aquaculture fish to the Chief Veterinary Officer (CVO) is mandatory, and farmers are obliged to attempt to catch escapees. Escape incidents mostly occur as incidents relating to stormy weather or to handling of nets in relation to delousing, transport to slaughter etc. In such cases, prevention of further escapes, mending of nets and alike logically becomes a priority.

From 2011 to 2014, the following incidents have been reported:

2011: 2 incidents, no information on number/quantity given. Average weight 1,9 kg. The incidents are reported to have occurred as perforation in relation to delousing and in relation to moving fish into a new net pen.

2012: 4 incidents, whereof 2.741 fish escaped in two incidents, while no numbers have been reported in the 2 other incidents. The average weight of escapees was 4,8 kg. The incidents are reported to have occurred in relation to moving fish to slaughter, sorting of fish into two net pens and stormy weather.

2013: 4 incidents, estimated at 25.000 fish averaging 2,8 kg. The incidents are reported to have occurred in relation to stormy weather during winther of 2013 and to moving fish into a new net pen.

2014: 2 incidents estimated at 40.000 fish averaging 4,8 kg. The incidents are reported to have occurred in relation to stormy weather and to moving fish into a net pen in relation to slaughter.

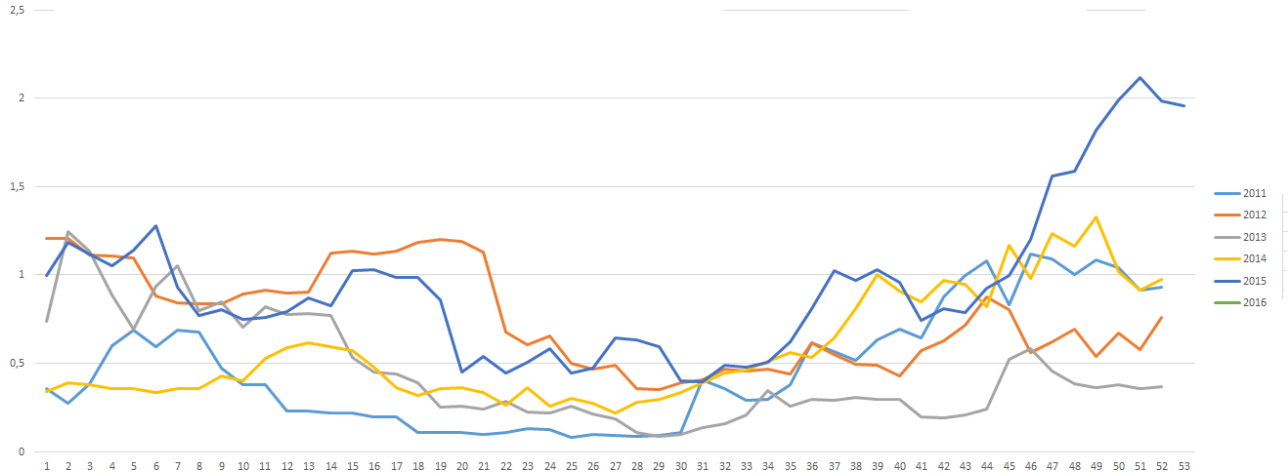
The numbers must be taken with some caution and are in most cases based on decreased fodder intake in net pens. More accurate numbers may be achieved when the net pens are slaughtered.

Lice

In general, it may be said that lice is the most serous veterinary challenge of Faroese aquaculture with:

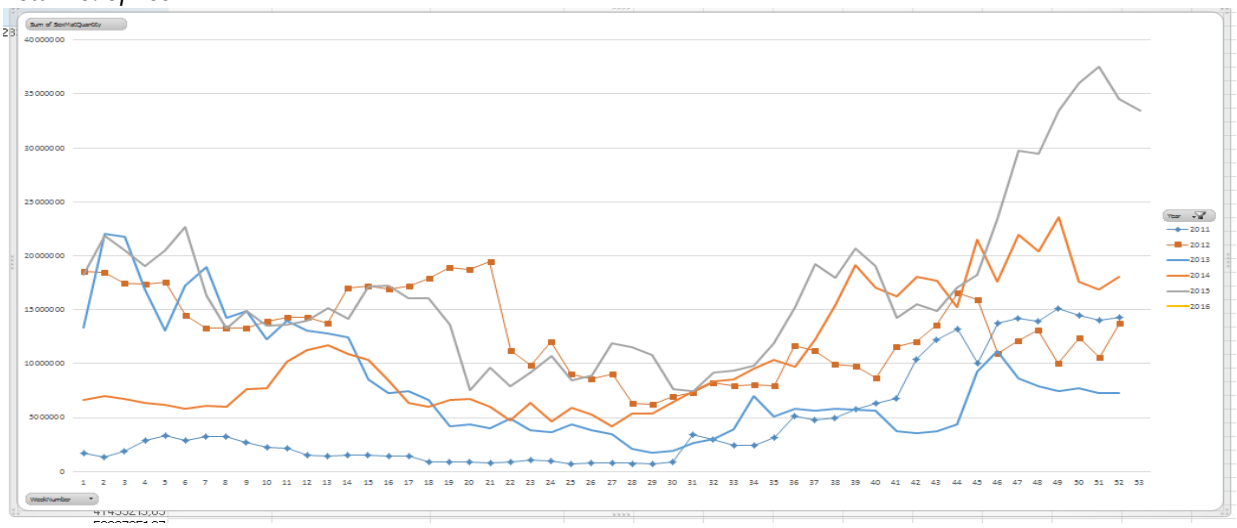
- Increasing immunity/resistance to treatment
- Relatively few therapeutic options
- Effective doses near toxic/lethal levels to salmon
- Recurrent treatment & treatment at high dose affect welfare and resilience of salmon
- Early life stage of lice spreads throughout islands within a fortnight (the total size of the islands is such as they may comfortably fit within a single fjord system of the neighbouring countries)
- The same specie/strain of lice is throughout the islands leading to lasting immunity

Average no. of lice pr. fish according to season (week by week) in 2011-2015
Average no. of lice pr. fish



Week no.

Total calculated no. of lice according to season (week by week) in 2011-2015
Total no. of lice



Week no.

As may be observed, the number of lice/fish tends to fall in the spring and summer and to increase in the fall. The unusual increase in late 2015 is mainly due to ineffective louse treatment at a single producer and acacerbated by lacking capacity for immediate slaughter of infested fish. In the spring of 2016, the average no. of lice/fish is within the level found at the same season during 2011-2014.

There have been increasing breaches of lice thresholds.

Year	Breaches	Countings
2009	0	2
2010	4	80
2011	16	183
2012	32	357
2013	23*	555
2014	45*	469
2015	63	470
2016	4	15

*In 2013 & 2014, treatments were coordinated, at first appearing to lower infestation, but also to lead to increased immunity/resistance towards therapeutics.

Research, treatment regimes, empiric results and beneficial regulatory instuments are taken into account as a new proposal for firmer legislative action has been prepared and is soon sent to hearing.

With caution of approval, it includes:

- Lowering of the treatment threshold to 1,5 sexually mature female louse pr. salmon
- Allowing treatment of cage by cage at this threshold (or voluntarily at lower thresholds)
- Making the threshold absolute, breaches automatically leading to immediate mandatory slaughter and restrictions in future stocking

Main elements of the current legislation:

(All farms must have an in- or external veterinary consultant and an effective plan for the impediment of lice infestation)

On each farm and in each unit, counting of sexually mature females, of moving and of adhering lice of the species *Lepeophtheirus salmonis* and *Caligus elongatus* by an external non-aligned party is mandatory fortnightly 1. May – 31. Dec. and monthly from 1. Jan. – 30. April

The data is to be available to the Chief Veterinary Officer (CVO) no later than the following day (in practice it is entered into a database available to/shared by the CVO)

The treatment thresholds are: a) 2 adult female lice or b) above 10 developing mobile lice

If thresholds are reached, the CVO must immediately be notified

Hitherto, reach or breach of the threshold triggers immediate mandatory treatment in all fish units in the farm and, if the CVO demands, in all farms and units on the same fjord and/or nearby fjords

The CVO may allow postponement if the breach is diminutive and other effective action may decrease the infestation, if coordinated treatment with other farms is imminent or in case of imminent slaughter

The CVO may demand coordinated fallowing of nearby fjords if found needful to impede lice infestation

Evaluation and new counting is mandatory immediately after each treatment

The cause of ineffective treatment must be analyzed

Ineffective treatment, suspicion of immunity or other inconsistency with expected results are to be must immediately reported to the CVO

The CVO may demand further counting and counting of other species of lice

In case of ineffective treatment, other therapeutics/agents/treatments are to be used

If such also prove ineffective, the CVO can order other action including imminent slaughter or destruction

In case of elevated infestation, disproportionally frequent or defective treatments, the CVO may freeze or decrease the number of smolts put to sea at the following production cycle

Other comments:

In addition to owners realizing and following their own best interest, limitations in no of smolts putt o sea may be among the most efficient tools to secure adherence to regulative requirements.

Voluntary coordinated treatments were jointly undertaken by the aquaculture industry in 2013/14 leading to a preliminary decline in the number of sea lice, however also building up immunity/resistance against the used drugs, which have likely contributed to recent increases.

Thus, new approaches are asked for

R&D is ongoing – much of it in collaboration with the Aquaculture Research Station of the Faroes, Fiskaaling
Aquaculture companies also try to adapt and test new approaches

Use of lumpfish, *Cyclopterus lumpus* in cages to combat lice, partly effective

Plans for breeding of better adapted *C. Lumpus* with a "better appetite for" salmon lice
Use of fresh water treatment

Increasing size of smolts put to sea up to ½ kg or more and thus shortening the life cycle at sea further

Denmark (in respect of the Faroe Islands and Greenland)

Greenland

1. *Given that the provisional catch statistics indicate that the quota for the 2015 fishery of 45 tonnes was exceeded by 13.4 tonnes, what actions will be taken to improve control of the harvest (Action F2)?*

   Following the implementation of the three year agreement running from 2015 to 2017 the private fishermen are for the first time met with restrictions. Naturally, this calls for an extensive information campaign which was also carried out in 2015 - especially during the fishery season. However it seems obvious that we need to continue this work and at the same time acknowledge that this is a learning process for all parties in the fishery. The Greenland authorities is aware of its obligations and commitments and will do its outmost to ensure that the quota for 2016 will not be exceeded. Again Greenland will carry out an extensive information campaign in order meet the expectations.

European Union

European Union - Denmark

1. *What action was taken in 2015 to reduce the mortality of salmonid smolts caused by cormorants (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. The Danish Nature Agency is in the process of revising the current management plan. Culling of eggs is still taking place, but there is no assessment of the effects yet. A two-year project is initiated in 2016 to assess the effect of egg-culling and planned cormorant-deterrent activities.

2. *What levels of by-catch of salmon and sea trout were observed in the Ringkøbing Fjord in 2015 (Action F2)?*

   The by-catch data of salmon and sea trout in fisheries in the Ringkøbing Fjord is being assessed and a report is planned published early 2017. At a first-hand glance salmon by-catches are low, and sea-trout by-catches are substantial.

3. *What was the result of the assessment under the new management plan for 2013/2014 regarding whether reliable reference points can be established for Danish salmon rivers (Action F3)?*

   The new management plan for salmon has not yet been published. Present and potential salmon production has been published for the River Ribe and is in draft for River Storaa. The investigations are expected to give reliable reference points.

   For River Skjern the investigation of present and potential salmon production has been delayed. This will be published in 2017.

4. *How much new habitat was made available to salmon by the removal of migratory obstructions in 2015 (Action H1)?*

   New habitat has been made available to salmon by the removal of migratory obstructions in 2015. At present the size of the new habitat is not available, but the new management plan will collate the data.

5. *What activities were undertaken in 2015 to restore habitat in smaller streams from earlier canalisation, pipe-laying and dredging (Action H2)?*

   The primarily information on these activities lies in the municipalities, however they are not obligated to report this information and hence it is not collated.

6. *What action is planned to make use of the information on present and potential salmon production in the Rivers Skjern and Ribe (Action H3)?*

   The information is used to ongoing revision of the management plan (see above).

European Union - Finland

1. *In the absence of a new bilateral agreement, were the measures introduced by local fishing right owners on the Tenojoki in 2015 considered to be effective and will these measures continue to apply in 2016 (Action F1)?*

   In the Teno main stem, no new management measures were introduced by local fishing right owners. The local fishing right owners have earlier placed special protective measures to some tributaries. These measures (temporal fishing restrictions, off-limit areas, total closure of certain tributaries for fishing) are considered effective and they continue to apply in 2016. Main focus has been on the negations for the new agreement with Norway that can give a more comprehensive solution to salmon management.

2. *The 2015 APR indicated that spawning targets had been set for 24 sites on the Tenojoki. The Review Group understands that attainment is now being assessed for nine tributaries and the main stem. What steps are being taken to assemble data to allow assessments for the remaining sites (Action F2)?*

   Increasing the number of assessed populations depends on the availability of relevant, stock-specific monitoring data. 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 assessing abundance, e.g. spawner counts or juvenile surveys, there are no realistic possibilities for assessing the CL attainment in many tributaries. Nonetheless, possibilities to include new populations in the annual assessment procedure of the Teno system are under consideration. A sonar counting system will be experimented in couple of tributaries in 2016-2017, and in one tributary, compilation of existing information is underway for potential assessment of CL attainment in 2016.

3. *What are the plans and timeframes for developing new salmon fishing agreements for the Näätämönjoki (Action F1)?*

   New fishing agreement for the river Teno has been prioritized and it is planned to be finalized within a short timeframe. The forthcoming Teno agreement can be used as a model of a flexible, science-based management in the River Näätämöjoki as well, but no timeframe for starting a process towards a new bilateral fishing agreement between Finland and Norway has been set so far. Monitoring data on the River Näätämöjoki salmon stock are available, including juvenile surveys, catch statistics, catch sampling (sea age composition) etc. Locally, co-operation among fishing right owners has resulted in voluntary reduction of their fishing effort in latest years.

4. *Given that recommendations have been given to road constructors, but that monitoring is not undertaken, have any works been approved since last year that were not consistent with these recommendations (Action H1)?*

   No information on such possible works exists. Road network in the catchment is very sparse; most of the area is wilderness or conservation area with no roads.

5. *No progress was reported on Action A2. What are the results of the monitoring programme for escaped farmed salmon in the Tenojoki in 2015 (Action A2)?*

   As indicated in the APR, the annual monitoring of the occurrence of aquaculture escapees in the River Teno (and Näätämöjoki) salmon catches is ongoing. The proportions of escaped farmed salmon in the Teno salmon catches has always been very low, being typically below 0.5% of the thousands of salmon sampled each year, and the figure in 2015 was 0.08% (three individuals out of the 3819 sampled), one of the lowest figure in the 31-year time series. No aquaculture escapees were detected in the catch samples of the River Näätämöjoki.

   A genetic study on the required methods for detecting possible hybrids of farmed x wild salmon and backcrosses, and first indications of their occurrence in the Teno system, is under preparation in collaboration with the University of Turku.

European Union - Germany

1. *What is the estimated harvest of salmon in the Dutch fisheries and are there any proposals for measures to address these harvests in the gill net fisheries close to the shore near the Haringvliet sluices (Action F1)?*

   A summary of the study to which the information about the Dutch fisheries refers in Action F1 can be provided in German. This study was commissioned by the Dutch Government (Rijkswaterstaat) and it is an examination of salmonid by-catches in Dutch coastal waters. The report does not mention salmon, but only salmonids. The best guess of the proportion salmon: sea trout is 1 : 10, based on catches from telemetry studies. The shore near the Haringsvliet sluices is the “Voordelta”.

European Union - Ireland

1. *What quantitative information can be provided to demonstrate progress made in 2015 on the four actions relating to habitat protection and restoration (Actions H1, H2, H3 and H4)?*

   To address the review group comments above, additional information has been appended by the Department of Communications Energy and Natural Resources and Inland Fisheries Ireland as the Competent Authorities for wild fish. This additional submitted in the section *Progress on Action to date* for H1, H2 and H3 (highlighted in red font):

Action H1:	Description of Action (*as submitted in the IP*):	**Agricultural enrichment** Following the implementation of the Water Framework Directive and the formation of River Basin District management structures, a collective approach to reducing all adverse impacts including agricultural enrichment and eutrophication on aquatic resources is now in place. Having characterised the risks posed to water-bodies nationally, Programmes of Measures are being developed to address habitat impacts / land use practices and to restore impaired water bodies to good status. The aim of the Water Framework Directive is to prevent any deterioration in the existing status of our waters, including the protection of good and high status where it exists, and to ensure that all waters are restored to at least good status by 2015. As a consequence of the implementation of the WFD and the Nitrates Directive, the impact of agricultural enrichment on salmon rivers is expected to reduce considerably over the coming decades. The CAP reform due in 2013 also provides an important opportunity for aligning agriculture objectives with habitat protection.
	Expected Outcome (*as submitted in the IP*):	Significant improvement in water quality due to improved agricultural practice
	Progress on Action to Date (*see note above*):	There is evidence of an overall improvement in water quality. However, Ireland faces major challenges to achieve water quality targets set for 2021 and 2027 as required by the WFD. The target for 2015 is unlikely to have been met. The latest published WFD assessments (2010-2012 period) show that approximately 53% of Irish river channels, 43% of Irish lakes, 45% of transitional waters and 93% of coastal water are unpolluted (good or high status). The main success story has been the virtual elimination of seriously polluted (bad ecological status) river sites. In addition, assessment, using the biological Q value scheme, showed that Irish rivers were in high or good condition along 73% of the monitored river channels. More recent quantitative information on the water quality status of Ireland's freshwaters is not currently available and thus cannot be provided in this year's submission to NASCO. Such information will be available in the third quarter of 2016 when the Irish Environmental Protection Agency (EPA) publishes their report *Water Quality in Ireland 2012-2015*. The second round of WFD River Basin Management Plans (RBMPs) covering the period 20015-2021 are currently in development and will be published in December 2016 / 2017. This will include a re-alignment of the main WFD target which is to ensure that all relevant waters are restored to at least good status. Following reviews of the first round of RBMPs (2010-2015), the Irish Government has recently established (in 2015/16) a new structure and assigned responsibility for various tasks in developing and implementing the next cycle of RBMPs. This includes a: 1) a Water Policy Advisory Committee, responsible for policy, legislation and resourcing; 2) the EPA, responsible for technical reporting and implementation; and 3) and Local Authorities Water and Communities Office (LAWCO), responsible for undertaking and enforcing programmes of measures and associated public consultations.

		Related catchment-focused initiatives include the set-up by the EPA of a *WFD Integration and Coordination Unit*. The main purpose of the unit is to protect and improve water resources, while ensuring that any water body remains productive for the communities that depend on it. The unit will work together with local authorities, other public authorities, government agencies, and local communities in establishing effective integrated catchment management in Ireland. One of the key milestones in designing the second cycle of the RBMPs is the identification of the significant water management issues in Ireland (SWMI). In June 2015, the SWMI public consultation document was published which provided an overview of the status of Irish waters (including the quantitative information presented above) and outlined the challenges ahead.
	Current Status of Action (e.g. '*Not started'; 'Ongoing'; 'Completed'*):	Ongoing
	If Completed, has the Action achieved its objective?	
Action H2:	Description of Action (*as submitted in the IP*):	**Forestry Related Impacts** Many Irish forests that are now mature, or approaching maturity, were planted in landscapes that were unsuited to economically viable forest production. The increasing recognition of the impacts from forestry on water resources has led to the development of a Code of Practice for forestry (Forest Service, 2000). Generally, forest management is based on the Code of Practice, although a new Forestry Bill, which will replace the out of date Forestry Act 1946, has been drafted with the opportunity to ensure that forestry management is better able to protect sensitive habitats.
	Expected Outcome (*as submitted in the IP*):	Improved water quality and protection of habitats
	Progress on Action to Date (*see note above*):	The Forest Service's IFORIS GIS-based management system for forestry grants 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. There was general compliance with the forestry codes of practice nationally. Many companies are also participating in additional independent forest certification schemes (e.g. FSC & PEFC). Many estates are being managed with biodiversity as the primary objective, e.g. when conifer trees are felled, there is now a greater percentage of broadleaved trees being planted in their place. The Forestry Act was passed into law in October 2014 (Number 31 of 2014). This confers responsibility on the Minister for Agriculture, Food and the Marine to promote and monitor the protection and enhancement of water quality in all aspects of forestry, including ensuring that forestry operations and forest-based activities regulated under this Act are compatible with the requirements of the EU Water Framework Directive. In 2015, Coillte (the state-sponsored forestry company) updated their Business Area Unit (BAU) strategic plans for their national estate which is comprised of eight forestry regions for the period (2016-2020). In addition to setting out how Coillte's policies and objectives will be implemented within each BAU, these plans re-enforce their commitment to sustainability and environmental protection including outlining measures to protect water quality during forestry management practices. Such measures (as in previous policies) include specifying aquatic buffer zones to minimise adverse impacts to aquatic species and habitats.

	Current Status of Action (e.g. *'Not started'; 'Ongoing'; 'Completed'*):	Ongoing
	If Completed, has the Action achieved its objective?	
Action H3:	Description of Action (*as submitted in the IP*):	**Poor water quality from Inadequate Sewage Treatment and Industrial Discharges** In Ireland, there has been considerable investment in upgrading of treatment facilities, primarily in larger towns, and this process will continue with the Programme of Measures under the Water Framework Directive. The Department of the Environment have invested many millions of Euro nationally over the recent years in new treatment facilities, and many of the smaller town and village schemes have been upgraded in this process. It is therefore anticipated that the impact on productive capacity of salmon rivers from inadequate sewage treatment will decrease considerably over the coming years with the requirements of the WFD being achieved. Significant upgrading of wastewater treatment plants has occurred in recent years to assist local authorities in complying with the Urban Wastewater Treatment Directive. The EPA regulates major industrial activities through the Integrated Pollution Prevention and Control (IIPC) regulations while the local authorities license small-scale industrial discharges to waters under the Water Pollution Acts. The Work of the EPA in enforcing the regulations and the implementation of the EU Water Framework Directive are likely to ensure that industrial discharges are adequately regulated to prevent impact on rivers nationally.
	Expected Outcome (*as submitted in the IP*):	Improved waste water treatment targeting upgrading of the most urgent facilities
	Progress on Action to Date (*see note above*):	Irish Water has been formed as an independent State-owned subsidiary within the Ervia group. Irish Water has taken over the water investment programmes of the 34 county and city councils, with the key aim of delivering water and sewerage schemes, and water conservation works aimed at finding additional water supply capacity. In recent years, 61 waste water projects have been completed in Ireland with 34 such projects currently in progress. Additional information released by Irish water for the period 2014 to 2015 state that: • 319 contracts signed have been signed for new projects to improve water supply and wastewater treatment; and • €320 million has been invested in new and upgraded wastewater infrastructure. The Water Services (Amendment) Act 2012 provides for the introduction of a registration and inspection system for domestic wastewater treatment systems, including septic tanks and similar systems. Owners of domestic waste water treatment systems are required to register their systems in accordance with these regulations to ensure protection of water quality. The EPA has developed a National Inspection Plan. All areas of the country are liable to inspection but priority is given to areas where water quality is most at risk from pollution from on-site waste water treatment systems. The aim of the plan is to protect water and human health by using a two-strand approach of education and awareness strategies linked with a risk-based inspection process. 987 inspections were undertaken in the first year of the plan (1st July 2013 – 30th June 2014), with an initial failure rate of 48%. However, by February 2015 79% of these were compliant after remediation works were undertaken. 1,000 inspections annually are planned in the period 2015-2017. This is the latest quantitative information available for submission to NASCO.

	Current Status of Action (e.g. '*Not started'; 'Ongoing'; 'Completed'*):	Ongoing
	If Completed, has the Action achieved its objective?	

The replies to questions 2 to 5 were provided by the Department of Agriculture Food and Marine (DAFM) as the Competent Authority for Aquaculture policy, development and regulation and by its Agency the Marine Institute.

2. *What data are available to support the statement that the level of escapes is low compared to other countries (Action A1)?*

   A recent pan-European review carried out as part of the FP7 project *Prevent Escape* of farm escape events shows that where mandatory reporting and sound regulation and licensing of aquaculture structures are implemented the incidence of escapes is lower. Reductions in the levels of escapes were recorded in Norway following on the introduction of equipment standards. The same study showed that the level of escapes in Ireland is low in comparison to the other countries assessed (Jackson *et al*., 2015). There were no recorded incidents of fish farm escapes in 2015 or in 2016 to date.

3. *What action is taken when sea lice thresholds are exceeded over an extended period (Actions H4 and A2)?*

   During the spring period Sea lice protocols are in place which set out ovigerous lice thresholds (0.3-0.5 ovigerous lice per fish March –May and 2.0 ovigerous lice per fish outside this period). When the threshold is breached a notice to treat is issued to the salmon farm to bring lice levels under control. In 2008, a new pest Management Strategy was developed that introduced detailed fallowing requirements and a new approach to monitoring to deal with situations where target lice levels were not being achieved. This approach among other approaches identifies 'breakout' site options for sites with persistent sea lice problems. When lice levels above the treatment trigger level are recorded at an offshore salmon farm a notice to treat is issued to the operator by the Marine Institute. If the initial treatment is not successful in reducing lice infestations to the required level a second notice to treat is issued, if the subsequent treatment does not result in reduction of lice infestation to the desired level the management cell process is invoked. The details of the process are set out in the Strategy for improved pest control on Irish salmon farms, May 2008 (DAFF).

   Management cell interventions can include mandatory treatments, accelerated harvests and extended fallowing periods. In spring 2012, non-compliance with lice thresholds at two salmon farms resulted in the Minister giving an order to harvest fish early, prior to wild smolt migration. Sea lice levels on one-sea-winter salmon decreased in 2015 compared to 2014. The greatest improvement in sea lice numbers in 2015 was on grower fish in the Northwest; in spring the number of inspections below TTLs increased from 61% in 2014 to 81%, and from 48% to 69% outside spring. Continuous on-farm sea lice checks have facilitated early intervention resulting in better sea lice control generally. The use of alternative approaches to complement husbandry and medicinal treatments, coupled with rigorous pro-active regulatory oversight, has led to improved sea lice levels over all in Ireland during 2015. Sea lice infestation levels on farmed salmon to date in 2016 have

been low. Notices to treat (NTT) have been issued at two sites, Portlea in Clew Bay and Froachoilean in Ballinakill Harbour. Both of these sites had elevated lice levels in February and corrective actions were initiated on foot of NTTs issued by the Marine Institute. In each case the Pest Management Protocols (as outlined in the first paragraph above) were followed, with full cooperation from the companies.

4. *What evidence can be provided to demonstrate that the incidence of diseases in salmon farming has declined and how has this been achieved (Action A3)?*

The Marine Institute carries out risk based health surveillance on all aquaculture sites in the country in accordance with Council Directive 2006/88/EC and SI No 261 of 2008(as amended). All finfish aquaculture sites must also retain a private veterinary practice to look after their routine health requirements in relation to disease investigation. It is mandatory to report suspicion or confirmation of the presence of a listed or emerging disease to the Marine Institute. It is also mandatory to investigate any increased unexplained mortality which may occur on farms from time to time.

These statutory provisions required under the Directive (surveillance visits plus reporting), and the regular investigations carried out by the private veterinary services, combine to ensure there is a strong national overview in relation to the incidence of disease on salmon farms in Ireland.

Data gathered in 2015 indicates that whilst pathogens such as Paramoeba perurans (the causative agent of AGD) and SAV (the causative agent of Pancreas Disease), were present in Ireland in 2015, the mortality levels associated with these pathogens, were low. Selective breeding, strategic vaccination programmes and increased biosecurity measures on farms have combined to ensure that disease related mortalities on Irish farms remained low last year.

Ireland continues to remain free (Category I) in relation to the listed salmonid diseases ISA, IHN, VHS, BKD and G.salaris.

5. *Have there been further outbreaks of Pancreas Disease (PD) in 2015, following those reported in the 2015 APR and, if so, have mitigation measures been successful in minimizing losses (Action A3)?*

As outlined above, whilst Pancreas Disease was diagnosed on a number of sites in Ireland in 2015, mortality levels were low. The mitigation measures mentioned above plus ongoing veterinary intervention and adherence to the best practice parameters set out in the Farmed Salmonid Health Handbook (2011) are considered to have been successful in this context.

European Union - Spain (Asturias)

1. *What anti-poaching activities were conducted in 2015; what levels of poaching were recorded; and how many people were prosecuted (Action F1)?*

   The number of records for poaching salmon is very low.

2. *What censuses were conducted in 2015; what are the current estimated impacts of the fisheries on stocks; and at what stock levels would action be taken to reduce exploitation (Action F2)?*

   The census was conducted through visual surveys in each salmon river and counts carried out in fish passages.

2015 RATIO SALMONS CENSUS/FISHERY	Nº SALMONS caught (Until July 2015)	Nº SALMONS counted (from September 2015)	Total
ESVA	32	366	**398**
NARCEA	404	549	**953**
SELLA	337	1.220	**1.557**
DEVA-CARES	233	763	**996**
	1.006	**2.898**	**3.904**

3. *What number and proportion of fishways in Asturias are included in the annual programme of cleaning (Action H1)?*

   There is no fixed number of cleanings on each scale. The number of cleanings of fishways depends on the needs of the service estimated for each.

4. *How are the initiatives (e.g. lectures) to increase awareness of the fragility of salmon stocks at the edge of their range being used to improve salmon conservation (Action H2)?*

   Every year talks are organised with fishermen associations.

5. *Having completed the inventory of river obstacles that impede fish passage, what actions are now planned to achieve the expected outcome of increasing spawning habitats (Action H3)?*

   The management focuses on cleaning and maintenance on each scale.

European Union - Spain (Cantabria)

1. *All the actions in the IP were scheduled to commence in 2014, but very little progress has been reported in the last three years. What will be done to ensure that work on actions F1, F2, F3, F4, H3, H4 and A1 is completed before 2018?*

   The objectives will be achieved before 2018. However, the lack of resources is complicating the implementation of these actions.

2. *When are the first estimates of marine survival for Cantabrian salmon stocks expected to be obtained (Action F5)?*

   Because of its complexity, it is unknown when the first estimation of survival for salmon stocks will be available.

3. *What work is planned to achieve the expected outcome of improving connectivity between freshwater habitats and the sea (Action H1)?*

   In the short term it is expected the installation of a fish pass in Miera river (Liérganes). However it should be noted that this action depends on other authorities and as such it might be delayed.

4. *What work is underway or is planned to achieve the expected outcome of obtaining a betting understanding of the potential impacts of hydropower (Action H2)?*

   To date, resources are not available to start new research on this matter.

European Union - Spain (Galicia)

1. *All the actions in the IP were scheduled to commence in 2014, but very little progress has been reported in the last three years. What will be done to ensure that work on Actions F1, F2 and H1 is completed by the end of 2018?*

   Despite slow progress so far, the target date for completion of these actions remains 2018. Action F1 (development of CLs) depends on data availability from surveys, fish traps/counting stations or catch records, that must be analyzed by our own team with no additional budgets. We stated that Action F2 (river Miño) had "not started" thus it is actually undergoing and each year new fishing rules are developed under the cooperation of representatives of the Central Governement and Xunta de Galicia. But unfortunately there is neither a definite system of cooperation nor an explicit document on salmon management in river Miño, so it is not feasible to clearly quantify progress made for this action . Action H1 (riparian vegetation guidelines) has not started yet.

2. *What work was undertaken in 2015 on the development of management strategies for sea trout and trout in salmon rivers other than the River Anllóns to achieve the expected outcomes of minimizing impacts on salmon and reducing unreported catches of salmon (Action F3)?*

   Action F3 (sea trout in salmon rivers) is in continuous development. Changes in a season remain for years (if effective) and we improve each year as far as we can the declaration of "salmon waters", where conflicts between sea trout and salmon are minimized, but little progress can be made due to fishermen opposition and there is a real problem to quantify this action.

3. *What work is planned for the development of a Conservation/Restoration Plan for salmon rivers in the A Coruña province (Action F4)?*

   Action F4 (Conservation Plan salmon rivers of A Coruña) was stated to be "Ongoing". We are expecting results from preliminary works (stocking in Anllóns and Sor) to look for modifications on the document if needed.

4. *What plans are there to remove obstructions and build fishways in rivers other than the River Ulla (Action H4)?*

   Action H4 (Improvement of accessibility) is "Ongoing" as it is a continuous process and depends on budget. The construction of a fish pass in river Sor is under study and so it is the removal of some obstacles in river Mandeo, in relation with the preliminary Conservation Plan for salmon rivers in A Coruña.

European Union - Spain (Navarra)

1. *All the actions in the IP were scheduled to commence in 2014, but work has yet to commence on Actions F1, H1 and H2 (although H2 is scheduled to commence in 2016). What will be done to ensure that work is completed on these actions by the end of 2018?*

   Action H2 is included in the framework of the mentioned LIFE project and therefore its completion is guaranteed.

   Regarding actions F1 and H1, it is expected that the Government of Navarre will devote funds to subcontract their implementation in 2017 and 2018. However, if by any reason funds were not available, a less ambitious work will be carried out by the experts working at present on salmon recovery in Bidasoa River, to ensure the implementation of the two actions before the end of 2018: the conservation limits foreseen in action F1 would be defined based on bibliographic reviews and the updating of salmonid mesohabitat maps (H1) would be done through the analysis of aerial photographs and other cartographic resources.

European Union - Sweden

No questions from the Review Group

European Union - UK (England and Wales)

1. *How are erosion events measured and were there any penalties in 2015 (Action H4)?*

Soils erosion events are measured through cross-compliance inspections by the RPA (Rural Protection Agency), which are undertaken at 1% of all Basic Payment Scheme and Rural Development Beneficiaries as required by Common Agricultural Policy (CAP) regulations and by the Environment Agency in its National Incident Recording System (NIRS). In Wales Natural Resources Wales (NRW) record and investigate reported polluted incidents using the Welsh Incident Reporting System and Welsh Government Rural Inspectorate Wales (RIW) assess compliance with the soil related cross compliance requirements.

In England under cross-compliance soil protection standard Good Agricultural and Environmental Condition (GAEC) 5 - minimising soil erosion, soil erosion that covers an area greater than 1 ha or is caused by livestock trampling along a continuous stretch of more than 20m long and 2m wide of a watercourse this is considered as non-compliance and is enforced by the Rural Payments Agency. In Wales GAEC 5 prohibit mechanical field operations (including harvesting, cultivation and spreading operations on water logged soil, over grazing resulting in poaching or soil run off site (field) or into watercourses and require farmers to complete an accurate rough surface assessment if fields are to left without a crop from harvest to 1st March.

In England and Wales under GAEC 4 – minimum soil cover, all reasonable steps must be taken to protect soil by having a minimum soil cover unless there is an agronomic justification for not doing so, or where establishing a cover would conflict with requirements under GAEC 5.

In recording incidents of erosion, the Environment Agency categorizes erosion events into one of four categories under their Common Incident Classification Scheme (CICS): Category 1 incident (major effect on water quality) where suspended solid concentrations are exceptionally high (>1000mg/l) compared to background levels upstream of incident; Category 2 (significant effect on water quality) >500mg/l; Category 3 (Minimal effect on water quality) >250mg/l and Category 4 (No impact). Nationally for farm related 'soil and clay' incidents in 2015 there were 0 Cat 1, 9 Cat 2, 43 Cat 3 and 5 Cat 4 across England recorded on the Environment Agency's National Incident Recording System (NIRS). In Wales, for 2015, 11 Cat 3 incidents were reported.

Response to date has focussed on gaining compliance through advice and guidance, working in partnership with Catch Sensitive Farming and other catchment-led initiatives. For example, an initiative called 'Farm Herefordshire', which involves the Bulmer Foundation, the Wye and Usk Foundation, Catchment Sensitive Farming, the Campaign for the Farmed Environment, Herefordshire Wildlife Trust, Herefordshire Rural Hub, the National Farmers Union, the Country Land and Business Association, Natural England, the Environment Agency and Herefordshire & Ludlow College, provides advice and guidance on managing nutrients, reducing runoff, soil structure and improving water quality. In Wales, similar liaison targeted work has been carried out with conjunction with Farming Connect, the Wildlife Trust's and the Welsh agricultural unions, NRW has worked with academic partners developing models that aid in identifying areas with high risk of erosion such that pre-emptive action can be taken.

Where non-compliance with GAEC 5 is reported in Herefordshire, farmers are invited to Soil Awareness Workshops and are asked to develop site improvement plans within an agreed timescale. If remedial measures aren't put in place and a serious breach of compliance conditions remain these are referred to the RPA.

A number of severe incidents have been referred to the RPA, though in 2015 only two of these were concluded and resulted in penalties under GAEC 4 and 5. In Wales, RIW have processed 4 of the referrals they have received for GAEC 5 and, upon inspection, only one was considered a breach.

2. *Are any additional preventative measures planned in response to the findings of project 'Alpheus' described in Action A2?*

We have over the years spent considerable effort investigating routes of Gs introduction. The key elements of national biosecurity are in place and well enforced. However, there are some actions resulting from the exercise that we will pursue this year. We will take opportunities to reinforce the "check-clean-dry" message directed at anglers returning from overseas trips, and make renewed efforts to get message highlighted in the angling press. The Fish Health Inspectorate has a Facebook page, and we will further develop our use of social media, to raise awareness with key groups.

Other work is focused on improving our response if Gs is detected. We have developed a non-lethal method for sampling fish which makes the process of surveillance quicker and easier (and more acceptable as wild salmon can be returned). The next phase is to validate this method in the field. Policies on live fish movements in the event of an outbreak are now well developed and embedded in the contingency plans. We will be working to refine our current strategy to demonstrate freedom on rivers that fall under suspicion.

This summer, Defra will publish a new Contingency Plan for Aquatic Animal Disease which was tested and improved during the exercise. Mechanisms for better cross-border and cross-agency response to disease have also been developed. The exercise indicated that overall, the UK governments have strong response capabilities when partnered with stakeholders and so subject to the knowledge gaps identified above being addressed, no further gaps were identified.

Update to compliance assessments for UK (England and Wales) for 2015

The final assessment of UK (England and Wales) river stocks for 2015 resulted in a small change to the compliance results listed in the response under 2.1 in the relevant APR document (CNL15.797EU-UK (England and Wales)), as follows:

The provisional annual review of stock status for 2015 showed the following river classifications:

- *0 rivers (0 %) 'not at risk' – i.e. p>95 % of meeting the management objective (MO);*
- *9 rivers (14 %) 'probably not at risk' – i.e. p>50% but <95% of meeting MO;*
- *32 rivers (50 %) 'probably at risk' – i.e. p>5% but <50% of meeting MO;*
- *23 rivers (36 %) 'at risk' – i.e. p<5% of meeting MO.*

European Union - UK (Northern Ireland)

1. *Has the mandatory catch and release of all rod caught salmon before 1 June in the DCAL area continued in 2015 (Action F3)?*

   Yes C&R is mandatory on all rivers in the DCAL for salmon caught before the 1st June with the exception of the L Melvin catchment. This is a transboundary water and its stocks are well above the CL and therefore harvesting is permitted. An annual tag quota has been established and is implemented for the area within the DCAL jurisdiction.

2. *What progress was made with enforcement activities in 2015 (e.g. numbers of patrols, numbers of nets seized and numbers of prosecutions taken in 2015 (Action F4)?*

   In 2015 - 2695 patrols were carried out in the DCAL area which included areas where salmon maybe. One case is currently being progressed to prosecution. In total 15 illegal nets were seized in the DCAL area which could have also have targeted salmon. In the Loughs Agency area 53 illegal nets were seized and 63 incidents are the subject of regulatory intervention.

3. *What progress was made in reducing the impacts of drainage works on salmon habitat (Action H2)?*

   Channel maintenance works on a regular basis have been and are undertaken on a number of drained rivers in NI (E.G. Bush, Main etc). Inland Fisheries and Loughs Agency provide advice to the drainage authority on how to carry out the works thereby reducing the impact and in recent years these have provided opportunities for habitat improvements or barrier removal to be carried out alongside the planned works. Angling clubs and fishery owners are consulted on the proposed works as part of the stakeholder engagement process.

4. *What were the results of any monitoring undertaken in accordance with water pollution legislation in 2015 (Action H3)?*

   Compliance results for 2014 are published in the Northern Ireland Environmental Statistics Report. (https://www.doeni.gov.uk/sites/default/files/publications/doe/ni-environmental-statistics-report-2016.pdf).

5. *How many routine fishery enforcement patrols were conducted in 2015 (Action H5)?*

   See 2 above.

6. *Do the genetic results provide any indication as to the origin of the fish farm escapees (Action A1)?*

   The study showed introgression of two commonly used Norwegian origin salmon aquaculture strains. As these two strains are widely used in salmon aquaculture in Ireland and the UK (including NI) it is not possible on the basis of this study to establish an exact origin of these escapes.

Re the review above for the following query:

"*The APR indicates that catch and release is N/A in the Loughs Agency Area but it is not clear if this means Not Applicable or signifies that statistics are not available"*.

C&R is only mandatory on the R Finn and Foyle, however it is practiced on other rivers in the Loughs Agency area but figs for 2015 are not available. Regulations to introduce C&R are in place and can be implemented in rivers in the Loughs Agency area which fall below the management targets.

European Union - UK (Scotland)

1. *Several progress reports for actions are unclear, do not appear to relate to 2015 or not to the specific action. Some responses refer to websites but provide no summary information (see instructions), and some links do not work. The Review Group requests clarification of the progress reports for the following actions: F4b, F5a, F5b, F5d F5h, F5i, H1c, H1d, H1e, H1f.*

   F4b - The Conservation of Salmon (Scotland) Regulations introduced carcass tagging for in estuary net-caught fish for areas in category 1 and 2. The costs for producing the tags will, in the first instance, be subsumed by Marine Scotland.

   F5a - The strategy was published in 2014 and is under on-going review and implementation. Studies advanced in 2015 (including planning and the publication of reports) included work on the hearing of salmon and responses to pile driving noise, the responses to Electro Magnetic Fields in relation to cables, the use of genetics to identify regions of origin of salmon, the movements of returning adult salmon, the installation of validation equipment at a salmon counter and design work towards the reinstallation of a different counter, planning work on migration routes of smolts in the Cromarty and Moray Firths, and trials of a video trawl net.

   F5b - The Ministerial Group for Sustainable Aquaculture (MGSA) last met in June 2016 where it was agreed that working groups which had delivered agreed priorities (Containment, Wellboats, Science & Research and fish health & welfare) would conclude. Interactions, Capacity and Shellfish working groups would continue to deliver on existing key priorities – Interactions pilots; the consenting review; and shellfish sustainable growth plan and proposals for a shellfish hatchery respectively. Proposals will be developed, following the 2016 Scottish Parliamentary elections, for a revised, streamlined MGSA Board whilst recognising new Government priorities.

   F5(d) - enhanced industry-led voluntary sea lice reporting over 30 river catchment areas. The Scottish Salmon Producer Organisation's quarterly reports on fish health management provide information for 30 regions of the north-west coast, western and northern isles. 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. The reports can be viewed at http://scottishsalmon.co.uk/category/science-behind-fish-farming/fish-health/

   F5h – Scotland's Aquaculture website has been fully operational since 2013.

   F5(i) - Marine Scotland's FHI have proactively published operational activity since October 2013. 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 the following information is published:

   - A list of all cases conducted.
   - A summary of case inspections and outcomes per region.
   - A list of all enhanced inspections conducted under the Aquaculture and Fisheries (Scotland) Act 2007.

- Individual case information, with each case referenced in the list of all cases conducted.

In addition to quarterly publications, the following reports are published annually.

- Annual summary of case inspections and outcomes per region.
- Annual report of operations and activities

H1c-f – this work is on-going and an important area there is not any progress reports available at this stage.

2. *What actions were taken in 2015 with regard to regulating stocking of salmonids and freshwater fish (Action A1)?*

In Scotland it is an offence for any person intentionally to stock any live fish or spawn into inland waters, or possess such with the intention of stocking, without previous written agreement of the appropriate authority:

Where a District Salmon Fishery Board (DSFB) operates and the fish to be stocked are Atlantic salmon or sea trout, then the relevant Board will consider applications to stock. The Board will issue written agreement or refusal to the applicant. Where a DSFB does not operate or where the fish being introduced are not salmon or sea trout (e.g. brown trout from hatcheries), then it is for Marine Scotland to consider applications and issue written agreement or refusal.

Under the Wildlife and Countryside Act 1981 it is also an offence to release fish out-with their native range and to keep certain species of invasive non-native fish species. Scottish Natural Heritage (SNH) are the licensing authority in this respect. If an application for consent to stock fish could also result in one or both of the above offences, Marine Scotland may forward that application to SNH for their consideration as licensing authority in this respect. There is no need to apply separately to SNH for a licence.

Marine Scotland assessed and processed 415 applications to introduce salmonids and other freshwater fish to Scottish inland waters during 2015.

409 licences were issued, 4 were applications were withdrawn after discussion, 1 was refused permission and 1 lapsed while awaiting further supporting information from the applicant.

The applications given permission can be broken down into the following: 261 applications involving brown trout; 219 for Rainbow trout; 7 for sea trout; 1 for Atlantic salmon; 29 for other freshwater fish.

A new policy on sea/brown and rainbow trout stocking was announced in 2015 and is being phased in over the period from January 2016 to January 2020, depending on the type of water and stocking history. These new arrangements seek to protect Scottish native brown trout populations from the potential negative impact on their genetic composition caused by breeding either with introduced wild origin fish or with farm reared stocks. In the case of rainbow trout, the policy aims to minimise potential risk to biodiversity. Exemptions to this policy may only be made on scientific or conservation grounds. England and Wales already have a similar stated policy on brown trout stocking.

The majority of trout stocking occurs in waters which have regularly been stocked, therefore the implementation timetable aims to provide time both for commercial suppliers and other producers to adjust stock production to meet requirements.

3. *What actions were taken in 2015 to implement EC Council Regulation 708/2007 concerning Use of Alien and Locally Absent Species in Aquaculture and to prevent G. Salaris and other parasites occurring in Scotland (Action A2)?*

   The Alien and Locally Absent Species in Aquaculture (Scotland) Regulations came into force on 3rd April 2015 implementing the EC Council Regulation 708/2007.

   Gs is a listed disease that must be reported under Schedule 1 of the Aquatic Animal Health (Scotland) Regulations 2009. The U.K. is currently recognised as being free from Gs. If introduced it may be impossible to eradicate Gs. We want to protect the health of our rivers and our fish stocks and so Scottish Government continue to promote the Home and Dry campaign. Scotland has a contingency plan outlining the steps which would be considered should Gs be identified in Scotland and the UK. The Scottish Government's response was tested in 2015 through a joint exercise involving UK government and a wide participation of internal and external stakeholders.

4. *What key objectives of the Ministerial Group on Aquaculture have been delivered; and how is the structure of the Ministerial Group on Aquaculture likely to change (Action A3)?*

   Key delivered priorities of MGSA are:

   An Assessment of the Benefits to Scotland of Aquaculture published 19 May 2014 www.gov.scot/Topics/marine/Publications/publicationslatest/farmedfish/AqBenefits which highlighted the contribution of Scotland's aquaculture industry to Scotland and estimated a potential turn-over value of well over £2 billion a year to the Scottish economy and support of 10,000 jobs by 2020.

   - Science & Research Working Group - published Scotland's first comprehensive aquaculture science and research strategy in July 2014 www.gov.scot/Publications/2014/07/4459
   - Containment Working Group – developed and published *A Technical Standard for Scottish Finfish Aquaculture* on 11 June 2015 http://www.gov.scot/Publications/2015/06/5747
   - Wellboats Working Group completed its reconsideration of the rules relating to wellboat behaviour in Scottish waters and agreed changes for inclusion in the industry Code of good practice.
   - Farmed Fish Health & Welfare Working Group produced standards for the use of cleaner fish and for mortality reporting and disposal.

   The structure of MGSA going forward will be considered in light of the 2016 Scottish Parliamentary elections and reflect revised Scottish Government priorities.

5. *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 as a baseline for demonstrating progress towards meeting the international goals for sea lice and containment set out in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Summary data are requested to provide the baselines for Scottish salmon farming facilities.*

Escapes

All confirmed reported fish farm escapes are published at http://aquaculture.scotland.gov.uk/data/fish_escapes.aspx a summary is attached below:

Number of fish (number of incidents)

Year	Atlantic salmon	Rainbow trout	Other	All Species
2005	877,883 (19)[1]	7,970 (3)	15,800 (1)	901,653 (23)
2006	155,653 (20)	36,866 (4)	12,230 (1)	204,749 (25)
2007	154,466 (12)	56,151 (7)	26 (2)	210,643 (21)
2008	58,641(8)	10,690 (7)	3,700 (1)	73,031 (16)
2009	131,971(9)	8,591 (6)	0(0)	140,562 (15)
2010	17,987(7)	19,976(3)	0(0)	37,963 (10)
2011	404,451 (10)[2]	12,820 (5)	0(0)	417,271 (15)
2012	37,523(4)	3,434(2)	0(0)	40,957(6)
2013	26,355(6)	7,442(2)	6,957(1)	40,754(9)
2014	184,614(11)[3]	~750 (3)	0 (0)	185,364(3)
2015	16,004 (4)[4]	2,091(1)	0	18,095(5)
2016	<10,000(1)	0(0)	0	<10,000(1)

Notes:
1. Major winter storm in January 2005. Five escapes alone accounted for 633,334 fish - many were expected to have died.
2. Major storm in Shetland in December 2011. Two escapes alone accounted for 370,225 fish - many were expected to have died.
3. Severe storms in Shetland in January 2014. One incident involved the loss of nearly 150,000 fish - many were expected to have died.
4. Including one escape of 16,000 fish in June 2015.

Sea lice

Industry annual and quarterly fish health management reports published by the Scottish Salmon Producers Organisation (SSPO) at
http://scottishsalmon.co.uk/category/industry-information/sspo-publications/

Norway

1. *What were the major changes in the fishery regulations that were introduced from 2016 (Action F1)?*

   The fishery regulations introduced from 2016 are mainly a continuation of earlier regulations, with some adjustments in rivers and at sea following advice from the scientific council. The main changes include a shorter season in the sea fisheries in central and north-eastern parts of Norway. Further restrictions in the northern sea fisheries will follow the enforcement of a new Tana agreement. River specific gear restrictions (type of lure etc.) have been omitted from the national regulations, and is now regulated by local management authorities. Length of fishing season and personal quotas have been adjusted in several rivers based on proposals from local management authorities and present knowledge of stock status.

2. *How many rivers had mandatory mid-season assessments in 2015 compared with previous years (Action F2)?*

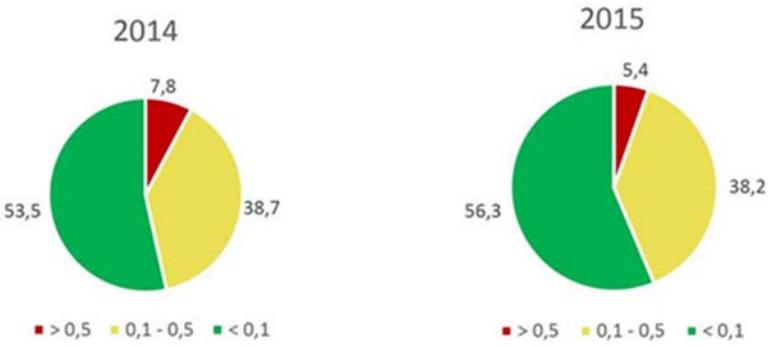
   Mandatory mid-season assessments have been kept on a fairly constant level in the period 2012-2015. In the new regulations from 2016, these assessments have been introduced in five new rivers and discontinued in two rivers.

3. *How many rivers currently have reliable stock-recruitment data and what new information is being obtained on mesohabitat distribution and juvenile production (Action F3)?*

   At present, twelve rivers have reliable stock-recruitment data. The next generation of spawning targets will be based on models using stock-recruitment parameters as a function of habitat and smolt age. Shelters near spawning areas seem to be a determining factor for production of juveniles, and the functional correlation between mesohabitat distribution and production of juvenile salmon is therefore a key factor in development of the next generation of spawning targets.

4. *How many fish farms exceeded the sea lice limit in 2015, and what action was taken? What growth in the salmon farming industry is anticipated based on the new policy decided by the Parliament (Action A1)?*

   It is required that fish farmers operate to ensure that the maximum sea lice count at the site does not exceed 0.5 adult female sea lice per fish (using standardized counting method). During the salmon migration period in the spring, the maximum limit is 0.1. The figure below shows the distribution of sea lice reports from Norwegian fish farms with less than 0.1 (green), from 0.1 to 0.5 (yellow) and more than 0.5 (red) adult females in 2014 and 2015. Reports are made weekly from each site, except when sea-temperature is below 4 deg C, when reporting is every 2. week.



According to the law, action taken must be proportional and relevant to the goal to be achieved. Consequently, the action taken varies from ordering of corrective actions to be taken within a certain timeframe, to enforced slaughtering. In 2015, The Norwegian Food Safety Authorities has prioritised the farms with the most severe sea lice problems. The strongest measure has been to reduce the maximum allowed biomass at the site in for the next production cycle with 50 %. This was done at 20 sites in 2015.

The growth in the Norwegian salmon farming industry should be 6 % every other year, provided that the sea lice indicator of all production areas signals green. How many production areas that will achieve this, and hence are allowed to increase their production capacity by 6 %, cannot be foreseen at this stage.

5. *What are the current estimates of pink salmon numbers in Finnmark and have the measures implemented been successful in reducing the breeding populations (Action A4)?*

It is not possible to specify the number of pink salmon that annually migrate up to the rivers in Finnmark other than say that the number seems to increase. In rivers in Eastern Finnmark (8 streams), we expect that pink salmon have self-reproducing populations. We believe that the implemented measures have reduced the number of pink salmon in both the rivers in the eastern part of the county, as well as further west where measures were implemented last year. Measures include fishing for pink salmon, harpooning and digging up spawning beds.

Russian Federation

1. *The Review Group notes that some data are collected on unreported catches but no information is provided on unreported catches in section 2.2. Why were partial estimates of unreported catches not provided and when will these be reported to NASCO (Action F1)?*

   The level of unreported catches was estimated for some areas and presented in the Annual Progress Report for the Calendar Year 2014. No new information is available for 2015.

2. *In answer to a question on Action A1 in its 2014 report, the Russian Federation indicated that they would provide more information on how sea lice are managed under the new Federal Law on aquaculture. Please provide this information (Action A1)?*

   No by-law regarding management of sea lice in aquaculture has been developed under the Federal Law on aquaculture. However in accordance with the current rules on veterinary control a regional veterinary authority inspects salmon farms quarterly to check salmon for diseases and parasites. Veterinary inspectors check fish for the level of sea lice infestation as well. In case of high level of infestation they recommend relative measures.

3. *The APR indicates that a number of by-laws introduced under the Federal Law on aquaculture came into force in 2015. What general measures did these bye-laws contain (Action A1)?*

   The information on by-laws introduced under the Federal Law on aquaculture in 2015 is partially presented in section 4.1. The general measure of the order of the Ministry of Agriculture No. 223 of 3 June 2015 contains methods for calculating aquaculture production which is required to conduct auctions for aquaculture sites in accordance with the order of the Government of the Russian Federation No. 450 of 15 May 2014. The order of the Ministry of Agriculture No. 129 of 6 April 2015 contains rules for water use at aquaculture sites.

4. *Why have obligatory measures not been introduced to prevent the spread of G.salaris in the wild (Action A2)?*

   Veterinary control is applied for aquaculture however no obligatory measures to prevent the introduction or further spread of parasite through recreational fisheries have been developed. Instead the regional Barents-Belomorskiy Directorate of the Federal Agency for Fisheries of the Russian Federation has developed basic recommendations for users of salmon fishing sites. It should be noted that salmon angling is allowed on designated fishing sites only. Some recreational fishing companies in Murmansk region have started voluntary programmes for angles to disinfect their tackle, clothes, etc. and others plan to do so. More effort in this area including introduction of obligatory measures is required.

5. *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 as a baseline for demonstrating progress towards meeting the international goals for sea lice and containment set out in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Summary data are requested to provide the baselines for salmon farming facilities in the Russian Federation.*

   No answer to the question is provided.

United States

1. *What is being done to ensure recreational fisheries for other species do not result in bycatch of Atlantic salmon (Action F2)?*

   Recently, discussions within the state of Maine have taken place regarding expanding the maximum length limit (25 inches) for landlocked salmon and brown trout throughout the entire state. The maximum length limit currently applies to over 20 specific rivers, streams, and ponds as well as all of Hancock and Washington Counties (with some exceptions for lakes with trophy landlocked salmon populations):
   http://www.eregulations.com/maine/15mefw/salmon-information/
   If this rule is expanded throughout the entire state, this would result in further protection of Atlantic salmon adults from potential bycatch in recreational fisheries.

Annex 16

CNL(16)59

Summary of discussions during the Special Session on the evaluation of Annual Progress Reports under the 2013 - 2018 Implementation Plans

Dr Hanna í Horni (Denmark (in respect of the Faroe Islands and Greenland)): thanked the Review Group for its important work and noted that while there have been developments and progress, it is clear from the evaluations that challenges remain. She indicated that although the Faroe Islands and Greenland have refrained from fishing for salmon or greatly reduced their fisheries, there has been no improvement in the status of stocks and the other Parties need to step up their actions in rivers and coastal waters to conserve and restore stocks. There is a need for full transparency in reporting on the actions taken.

Mr Dan Morris (United States): noted that much information had been provided through the Annual Progress Reports (APRs) and he thanked the Review Group for their work in evaluating this. He noted that the West Greenland Commission had agreed a process to apply the 'Six Tenets for Effective Management of an Atlantic Salmon Fishery' to all salmon fisheries conducted by West Greenland Commission Members. He hoped this would be brought forward for consideration by the Council for possible application by all NASCO Parties. He raised a question as to whether more time might be made available for consideration of this matter at the 2017 Annual Meeting.

Mr Ted Potter (European Union - UK (England and Wales), Review Group Chairman): indicated that the role of the Review Group is to evaluate the APRs against the actions in the Implementation Plans. The Group had, however, considered this issue and supported the inclusion of the six tenets into the next cycle of APRs. The Group suggested that the evaluation of fisheries against the six tenets should proceed as planned in the West Greenland Commission and then the outcome could be considered by the Council so that it could resolve if the six tenets should be incorporated into the next cycle of IPs for all Parties due to commence in 2018/19.

Ms Francesca Arena (European Union): thanked the Review Group for its detailed report and its suggestions for further improvement to the reporting process. She noted that not all EU jurisdictions had provided the same level of detail but responses had been provided to the Review Group's questions and these are contained in document CNL(16)20. She indicated that she would follow up with those jurisdictions where shortcomings had been highlighted by the Review Group and also with regard to the IPs and APRs for France and Portugal.

Mr Steinar Hermansen (President of NASCO): asked the Review Group if the answers provided by the Parties/jurisdictions to its questions, as contained in document CNL(16)20, had been helpful.

Mr Ted Potter (European Union – UK (England and Wales), Review Group Chairman): indicated that the answers were helpful but the Review Group did not evaluate the extent to which the concerns raised had been addressed. While the Parties had put effort into clarifying the information provided it will be important to ensure that this additional information is included in next year's APRs.

Mr Dan Morris (United States): noted the comment from Denmark (in respect of the Faroe Islands and Greenland) regarding transparency. He recognised that in the past, little quantitative information had been provided to demonstrate progress in implementing NASCO agreements but the current cycle of reporting through APRs was more complete, comprehensive and transparent.

Ms Sue Scott (Atlantic Salmon Federation/NGO Co-Chair): commended the Faroe Islands for the quantitative data provided at the Theme-based Special Session in order to demonstrate progress towards the international goals for sea lice and escapes. She asked Canada if more detailed information on sea lice could be provided in 2017 and if the more detailed information on escapes, provided at the Theme-based Special Session, could be provided in future APRs.

Ms Sylvie Lapointe (Canada): responded that a new regulation was coming into force that has improved reporting requirements for sea lice and that she would look at the information provided at the Theme-based Special Session with a view to ensuring the same level of detail is provided in the APRs.

Mr Andrew Graham-Stewart (Salmon and Trout Conservation Scotland): congratulated Scotland on the decision to close coastal mixed-stock fisheries for three years from 2016 and noted that this measure deserved recognition and credit. He noted NASCO's role in facilitating this. He highlighted the fact that the Review Group's questions included a request to provide quantitative data to demonstrate progress towards the international goals for sea lice and escapes. While the response provided by Scotland gave a link to the SSPO website, which contains a considerable amount of information, the response did not provide a clear summary of progress. He had carefully analysed the data and the percentage of farms above the threshold for treatment for sea lice under the industry's Code of Good Practice has shown an increasing trend. By March 2016, 66% of farms were above the threshold. He indicated that a graph showing this upward trend would have been helpful.

Mr Willie Cowan (European Union - UK (Scotland)): accepted the point made and reiterated that the ambition remains to have sea lice at the lowest possible level on all marine farms. He agreed to look into the comments made for next year's APR.

Mr Dan Morris (United States): commended Scotland for the closure of its coastal mixed-stock fishery and noted the comment made about the role of NASCO in this decision, including the discussions at the 2014 Theme-based Special Session. He indicated that this type of action is a tribute to the time and effort devoted to the IP and APR process and he appreciated the statement from the European Union that it would be working with all jurisdictions to further improve the APRs in 2017.

Mr Siegfried Darschnik (Der Atlantische Lachs): referred to the information provided in the APR for EU - Germany in which one state (North Rhine Westphalia) failed to refer to bird predation while another (Baden-Wüttermberg) indicated that 'competing protection concepts' prevent effective measures being introduced for Atlantic salmon. He asked the following questions:

- with regard to the returns in 2015 that are stated as being the highest during the last five years, the number (265) is almost the same as in 2002 (242), so can this be considered to represent progress over the last fifteen years?
- what monitoring investigations are undertaken of downstream migrating smolts referred to in reports of the ICPR and are the results published? If so, how do these compare to those

in 2008 and 2009 that showed that only 22% and 19% of the tagged smolts, respectively, reached the sea in these years and are these percentages the natural mortality rates that would be expected?

- could this high level of in-stream mortality be the reason for the failure to establish a self-sustaining population?
- given the predation by cormorants, should it be made clear that there is no alternative to a sound management programme for cormorants designed to reduce their number to a level that will permit self-sustaining fish populations because, if not, re-introduction efforts for salmon in central Europe will be a waste of money and effort?
- as a first step, will proposals be made to transport smolts downstream in vessels to protect them from predation to demonstrate the extent of the predation issue in fresh water?

Ms Francesca Arena (European Union): indicated that Germany had responded to a question relating to predation in 2015 but it would be challenging to respond to the very detailed questions raised by Der Atlantische Lachs at this meeting. She offered to provide written responses to these questions, to ensure full transparency, after the Annual Meeting.

Dr Craig MacIntyre (Association of Salmon Fishery Boards): indicated that he had just received a report that a major salmon farming company in North West Scotland had lost 300,000 salmon through an escape incident and he asked what actions would be taken to prevent further introgression of farmed salmon genes into wild salmon populations.

Mr Willie Cowan (European Union - UK (Scotland)): indicated that he had also just become aware of this escape incident. He advised that as with all such incidents, the Fish Health Inspectorate would investigate what had happened and take enforcement and remedial action. It is too early to anticipate what those actions will be.

Mr Noel Carr (Federation of Irish Salmon and Sea Trout Anglers): highlighted a number of issues relating to the reporting on aquaculture in the APR for Ireland, but as the relevant Ministry is not present he would not raise these. He indicated that after the Irish election he hoped there would be better consideration of recreational fisheries by the new government. These fisheries generate Euro836 million to the Irish economy compared to Euro50 million from aquaculture. He looked forward to a new era of wild fish management, noting that an application for a 150,000 tonne megafarm had been withdrawn.

Dr Hanna í Horni (Denmark (in respect of the Faroe Islands and Greenland)): thanked the NGOs and the United States for their comments. She indicated that in the Faroe Islands, sea lice counts are made by independent authorities and that estimates of losses allow mortality and escapes to be determined.

Mr Steinar Hermansen (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 closed the Special Session.

Annex 17

CNL(16)16

Report on 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 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). In 2014 and 2015, comprehensive progress reports on the recommendations contained in the Action Plan were presented to the Council (CNL(14)14 and CNL(15)15). The following tables present an update for 2016 which should be read in conjunction with these earlier reports. Where there is no new progress to report on a recommendation, or where a recommendation had been completed, the recommendations have not been included in this update.

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, in this report we have allocated numbers to the nine decisions contained in the Action Plan.

Section 3 contains actions to strengthen NASCO's work on the management of salmon fisheries.

Secretary
Edinburgh
31 May 2016

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

	2016 Update on Actions taken
EPRs 1, 2, 3, 46, 48, 50, 51, 52, 53, 57, 58 and NS 1, 4, 5, 8, 9, 12 and 13	In its 2016 report, the Review Group noted that an Implementation Plan had been received for EU - France but it did not include identification of any threats/challenges in relation to aquaculture, introductions and transfers and transgenics and, as a consequence, any relevant actions. It had not, therefore, been reviewed but the Review Group welcomed this contribution. An IP has still not been received for EU - Portugal and this is a concern to the Review Group given the significant challenges facing salmon managers in the southern part of the species' range. The Review Group noted that revised IPs had been received from EU - Germany, EU - Spain (Galicia) and the USA. The Review Group did not re-evaluate these IPs but it noted that the changes made to them were mainly of a minor editorial nature. The Review Group noted that evaluating the progress made on actions was very difficult when the action in the IP was vague or imprecise and that this should be addressed in the next reporting cycle. The Review Group has proposed some changes that could be made for the next reporting cycle. Overall, the Review Group considered that there had been an overall improvement in the 2013 - 2018 IPs compared with the first cycle, not least because many include measurable outcomes and the amount of information provided was more amenable to evaluation. For those jurisdictions that have salmon farming, the Review Group had recognised that providing quantitative data to demonstrate progress towards the international goals for sea lice and containment was challenging. The Review Group noted a number of issues with the 2016 APRs which it indicates are of concern given that improving commitment to NASCO agreements was a key aspect of the 'Next Steps' and External Performance reviews and as the second reporting cycle is now 60% completed. Overall, the Review Group again considered that the most common fault with the information provided continues to be a lack of quantitative evidence on the extent of the progress made and/or what the results have been. No APRs have been received from EU - France or EU - Portugal and this is a serious concern to the Group. 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 20 May. The Group's report will be presented at a Special Session during the Thirty-Third Annual Meeting to allow for 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, its Sub-Group reported to the Council in 2013 and 2014 and information has been included on the NASCO website. In 2015, the Council held a Theme-based Special Session on the topic of '*Maintaining and improving river connectivity with particular focus on impacts of hydropower'.* One of the objectives of this session was to evaluate the benefits and costs of removing dams and other obstructions.
EPR4, NS14 and NS15	A half-day Theme-based Special Session was held in 2015 on the topic of '*Maintaining and improving river connectivity with particular focus on impacts of hydropower*' and the report has been published and distributed. A full-day Theme-based Special Session will be held in 2016 on the topic of '*Addressing impacts of salmon farming on wild Atlantic salmon: challenges to, and developments supporting, achievement of NASCO's international goals*'. While no sessions devoted to cross-cutting issues such as climate change have yet been held, ICES is requested annually to provide advice on the potential implications of climate change for salmon management and the proposed International Year of the Salmon has '*Salmon in a Changing Salmosphere*' as one of its proposed themes and this would probably be one of the topics considered at the proposed international symposium.
EPR 33	At the 2015 Annual Meeting of the West Greenland Commission, a Multi-Annual Regulatory Measure for Fishing for Salmon at West Greenland for 2015, 2016 and 2017, WGC(15)21, was agreed. There will be an inter-sessional meeting of the West Greenland Commission immediately prior to the 2016 Annual

	Meeting to review this measure. Last year, the North-East Atlantic Commission adopted a Decision regarding the salmon fishery in Faroese waters in 2015/16, 2016/17 and 2017/18, NEA(15)10. There is an agenda item in 2016 to allow for an update on development a risk framework for the Faroese salmon fishery.
EPRs 41 and 43	At its 2014 Annual Meeting, the IASRB had adopted a Resolution encouraging telemetry projects and hosted a Telemetry Workshop at which 12 project proposals were developed. In 2015, the IASRB 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 the 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. A brochure describing SALSEA - Track and how it can be supported has been developed and printed and will be distributed at the Board's 2016 Annual Meeting. In 2015, donations to the Board were received from the US (£16,900 to support the project 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')* and from Norway (approximately £6,000). The EU has advised the Board that, after reviewing research priorities, the possibility of obtaining funds for two projects relating to marine survival of salmon was being explored. The Chairman of the Board has written to Board members seeking contributions to support the work of the Board.
EPR 42	In 2015, ICES was requested to provide a time series of numbers of river stocks with established CLs and trends in numbers of stocks meeting their CLs by jurisdiction (see CNL(16)9 for the advice from ICES). The Council seeks to develop a more consistent and uniform approach to presenting information on stock status. A Working Group has been established to recommend a classification system to indicate stock status relative to conservation limits and other information in relation to NASCO's goals and its report, CNL(16)11, will be considered at the 2016 Annual Meeting.
EPRs 47, 49 and 54	The Review Group has reported that fourteen APRs were submitted prior to the deadline of 1 April. Four further APRs were received after the deadline. No APRs were received for EU - France or EU - Portugal and the lack of some APRs is a serious concern to the Group. The 2016 APRs might be expected to represent the completion of 60% of the proposed actions and the Review Group stressed that timely, complete and comprehensive reporting is important if the evaluation process is to be thorough and consistent.
EPR 50	A Theme-based Special Session was held in 2015 on the topic of *'Maintaining and improving river connectivity with particular focus on impacts of hydropower'* with the objectives of reviewing and sharing best practice on the approaches taken by NASCO Parties and 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. The report has been published and distributed.
EPR 51	An item on '*Mixed-Stock Fisheries conducted by Members of the Commission*' has been included on each Commission agenda for their 2016 Annual Meetings to allow each Party/jurisdiction with MSFs to provide a brief description of any MSFs still operating, the most recent catch data, and any changes or developments in the management of MSFs to implement NASCO's agreements. In 2015, an evaluation of the salmon fishery at West Greenland, using six tenets for effective management, resulted in the adoption of an Updated Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGC(15)20. It had been recommended that the six tenets be applied by all Members of the West Greenland Commission to their fisheries consistent with the evaluation undertaken for the salmon fishery at West Greenland. An *Ad hoc* Working Group on the Application of the Six Tenets for Effective Management of an Atlantic Salmon Fishery met in Dublin, Ireland, during 16 and 17 February 2016 and developed a revised matrix for application of the six tenets to fisheries conducted by other Members of the Commission. The Group had recognised that, due to the number of jurisdictions involved in the broader application of the six tenets, it would be a substantial task for a group to conduct the assessments and recommended, therefore, that self-assessments be undertaken by the Members of the West Greenland Commission and then be subject to review. The Group's recommendations are contained in document WGCIS(16)3 and will be discussed by the Commission at its 2016 inter-sessional meeting. The 2016 APRs were evaluated by the Review Group and its findings are contained in document CNL(16)13.

EPR57 and NS 6	The NEAC has recognised the serious nature of the parasite *G. salaris* and the threat it poses to wild salmon stocks. It has developed a 'Road Map' with a large number of recommendations relating to monitoring, research, exchange of information and the need for revisions to international guidelines and other measures to prevent the further spread of the parasite. A Working Group was established in accordance with this Road Map but it has not met since 2007 and as a consequence no systematic exchange of information or review of progress on the elements in the 'Road Map' for almost ten years. While the NEAC has retained an item on its agenda entitled '*Risk of Transmission of Gyrodactylus salaris in the Commission Area'* there is little time available at the Annual Meetings of the Commission to give this important topic detailed consideration. There is a question related to *G. salaris* in the 2013 - 2018 IPs but only those Parties/jurisdictions that have included an action related to *G. salaris* in their IP would provide an Annual Progress Report on actions related to this parasite. The Commission will consider at its 2016 Annual Meeting whether or not to reconvene the *G. salaris* Working Group.
EPRs 59 and 61	The IP template seeks, for each action, details of the expected outcome and the approach to monitoring effectiveness and enforcement. The Review Group has again indicated that the most common fault with the information provided continues to be a lack of quantitative evidence on the extent of the progress made and/or what the results have been. The APR reporting template seeks estimates of unreported catch but not all Parties/jurisdictions provide such information (see CNL(16)14). At the 2015 Annual Meeting of the West Greenland Commission, an Updated Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGC(15)20, was adopted and consideration is now being given to application of the six tenets by all Members of the Commission (see EPR51 above). Consultations have continued with NEAFC and NAFO on IUU fishing by non-NASCO Parties (see 2.1 below).
EPR 73 NS 16	The Secretary has continued to keep the Icelandic authorities informed of NASCO's work.
EPR 74	At the 2015 Annual Meeting of the North American Commission, the representative of France (in respect of St Pierre and Miquelon) noted that there is an openness in Paris to join the Convention in the future, but that it would be contingent on guarantees that the fishery could continue. The Commission was advised that the Préfet would need to be consulted before acceding to the Convention and the Préfet would consult the fishermen. The representative of France (in respect of St Pierre and Miquelon) expressed the opinion that more time is necessary to educate and prepare the fishermen concerning the need to conserve Atlantic salmon. The representative of France (in respect of St Pierre and Miquelon) will again attend the 2016 Annual Meeting of NASCO and update the North American Commission and the Council on the management of the fishery and scientific sampling.
	The Chairman of EIFAAC attended the 2015 Annual Meeting of NASCO and will attend the 2016 Annual Meeting. NASCO supported an EIFAAC symposium on Recreational Fisheries held in Lillehammer, Norway, in June 2015. Consultations have been held with the OSPAR Commission on their Draft Recommendation relating to salmon and a revised Draft Recommendation will be considered by NASCO's Finance and Administration Committee at its Annual Meeting in 2016. A representative of the OSPAR Commission will attend the 2016 NASCO Annual Meeting. EIFAAC, ICES and the OSPAR Commission have been asked to contribute to preparations for the proposed International Year of the Salmon as two of NASCO's core partners.

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, EPR 64 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.

2016 Update: Liaison with both NEAFC and NAFO has continued. We have not been advised of any additions to the IUU lists maintained by NAFO and NEAFC and no information has been provided to suggest that there may be an issue of IUU fishing for salmon by non-NASCO Parties. NEAFC had indicated that any IUU fishing involving tuna vessels may have been reported to ICCAT so we have recently written to the Secretary of ICCAT seeking cooperation from that organisation on this issue. Information on the surveillance flights conducted by the Icelandic and Norwegian coastguards over the area of international waters where IUU fishing occurred in the past continues to be requested but is no longer received. However, there had been no sightings from these sources from the early 1990s until 2014 when information from the coastguards ceased to be provided.

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.

2016 Update: Estimates of unreported catch are contained in document CNL(16)14. Not all Parties/jurisdictions currently provide such information. At the 2015 Annual Meeting of the West Greenland Commission, following evaluation of the West Greenland fishery against six tenets for effective fishery management, an Updated Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGC(15)20, was adopted. A report on progress with its implementation, including progress on initiatives to improve catch reporting, is provided in document WGCIS(16)4. Recommendations on an approach to applying the six tenets to fisheries prosecuted by all Members of the West Greenland Commission are contained in document WGCIS(16)3 and will be discussed by the Commission at its 2016 inter-sessional meeting (see EPR 51 above).

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.

2016 Update: The Working Group has completed its work in reviewing the existing categories used in the Rivers Database and has proposed a new system based on both attainment of conservation limits (or other indicators where CLs have not been established) and an assessment of known impacts. The Group's recommendations are contained in document CNL(16)11 and will be considered at the Council's 2016 Annual Meeting. The production of a 'State of the Salmon' report, based on the updated information contained in the rivers database, could be a valuable contribution to the proposed International Year of the Salmon.

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.

2016 Update: In 2015, the IASRB 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 the 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. A brochure incorporating a call for funding for SALSEA - Track has been developed and published and will be distributed at the Annual Meeting. Funding (£16,900) has been received from the US to further support the project 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'.* A contribution to the work of the Board was also made by Norway (~ £6,000). The Board will consider how it can support the SALSEA - Track initiative. This is likely to require additional funding. Last year, the EU has advised the Board that, after reviewing research priorities, the possibility of obtaining funds for two projects relating to marine survival of salmon was being explored. The Chairman of the Board has written to Board members seeking contributions to support the work of the Board. It is worth noting that, with the limited sums available to it, the Board has in the past been able to support projects that have delivered important findings to support management.

ICES has again provided information on new opportunities for sampling salmon at sea through the annual (July – August) International Ecosystem Summer Survey in the Nordic Sea, a collaborative programme involving research vessels from Iceland, the Faroe Islands and Norway. The spatial coverage of the surveys is enormous (2.7 million km^2 in 2015) and overlaps the known distribution of post-smolts in the North-East Atlantic. The time-series for abundance estimation, using swept area from pelagic trawling, goes back to 2007 and, as these cruises target pelagic species such as herring and mackerel, by-catch of salmon post-smolts and adult salmon is not uncommon. In 2015, a total of 51 post-smolt and adult salmon were caught by the participating vessels in different regions of the North Atlantic. Samples have been collected and frozen for subsequent analysis. ICES has also provided new information on ocean migration and feeding areas derived from tagging Icelandic hatchery smolts with data storage tags and on changes in trophic structure and energy dynamics in the Northwest Atlantic. ICES has again made recommendations relating to sampling of the salmon fisheries at St Pierre and Miquelon and West Greenland and on any new sampling that would be required to improve assessments used to provide catch advice for the Faroes salmon fishery.

The Secretary of NEAFC has written to NEAFC Parties highlighting the existing obligation to ensure that their vessels record by-catch in their fishing logbooks and suggesting that reminders of the need to record salmon by-catch be issued to vessel operators and/or captains. The NASCO Secretary has been invited to make a presentation on NASCO's concern about by-catch of salmon in pelagic fisheries at the joint 2017 meeting under the collective arrangement. While this is currently a bilateral arrangement between NEAFC and the OSPAR Commission, the intention is that all authorities that have competence under international law to manage human activities in areas beyond national jurisdiction in the North-East Atlantic will be included in the arrangement.

Anecdotal information provided by a pelagic fisherman to Salmon Watch Ireland, one of NASCO's accredited NGOs, has been brought to the attention of the Secretariat. It suggests that there may be a by-catch of salmon in the blue whiting fishery in the North-East Atlantic, with the individual salmon caught ranging in weight from 0.5 - 2kg. While the report acknowledges that the fishery can be conducted at depths of up to 200m or more, salmon are known to dive to considerable depths and it is indicated that trawling may occur at shallower depths.

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.

2016 Update: The 2016 APRs have been made available on the NASCO website. NASCO made a further contribution (£10,000) to the film 'Atlantic Salmon – Lost at Sea', allowing work on the film to be completed. It is expected that the film will be released in July 2016. NASCO supported EIFAACs international symposium entitled 'Managing freshwater fisheries in an era of change in Lillehammer, Norway in June 2015. Presentations on the work of NASCO and the Board were made at a 'Salmon Summit' on the future of salmon in the Rhine held in Huningue, France in October 2015, at the IYS Scoping Meeting held in Vancouver, Canada in March 2016 and at the Board meeting of the Atlantic Salmon Trust in May 2016. Various groups visited NASCO during the year including representatives of the Atlantic Salmon Conservation Schools Network and we have assisted this initiative to broaden its network of schools around the North Atlantic. The reports of NASCO's 2014 and 2015 Theme-based Special Sessions have been distributed and copies lodged with libraries. A new brochure relating to the SALSEA - Track telemetry programme has been developed and will be made available at the Annual Meeting. The intention is to revise the stock classifications used in the Rivers Database, recognised by the Council as a valuable PR tool (see 2.4 above).

NASCO now has 37 accredited NGOs.

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.

2016 Update: A one day Theme-based Special Session entitled '*Addressing impacts of salmon farming on wild Atlantic salmon: challenges to, and developments supporting, achievement of NASCO's international goals'* will be held during the 2016 Annual Meeting.

The 2016 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, CNL(16)13, 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. For those jurisdictions that have salmon farming, the Review Group had previously recognised that providing quantitative data to demonstrate progress towards the international goals for sea lice and containment was challenging. 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 made over the period of the IP towards the international goals for sea lice and containment rather than describing only the management measures in place.

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.

2016 Update: A full-day Theme-based Special Session will be held at the 2016 Annual Meeting on the topic of *'Addressing impacts of salmon farming on wild Atlantic salmon: challenges to, and developments supporting, achievement of NASCO's international goals'*. The Programme for this session is contained in document CNL(16)15. The Council will be asked to consider if it wishes to hold a further Theme-based Special Session during its 2017 Annual Meeting, and, if so, to decide on a theme and appoint a Steering Committee.

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.* ***2016 Update:*** *As in 2015, an item on 'Mixed-Stock Fisheries conducted by Members of the Commission' has been included on each Commission Agenda for their 2016 Annual Meetings to allow each Party/jurisdiction with MSFs to provide a brief description of any MSFs still operating, the most recent catch data, and any changes or developments in the management of MSFs to implement NASCO's agreements.* *ICES has reported on progress on development of reference points for Atlantic salmon in Canada that conform to the precautionary approach and has provided provide a time-series of the numbers of river stocks with established CLs and trends in numbers of stocks meeting their CLs by jurisdiction.*
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. ***2016 Update:*** *The Review Group noted that for some 2016 APRs, evaluating the progress made on actions was very difficult because the descriptions of the planned actions in the IP were vague or imprecise. The Review Group had previously highlighted such shortcomings and has noted this difficulty in some of its evaluations. The Review Group noted that the APRs for several Parties/jurisdictions continued to lack a clear account of progress in implementing and evaluating some, or all, of the actions detailed in their IPs, despite the further guidance provided on completing the template and the provision of examples of good practice. The Review Group also noted that a number of the 2016 APRs had provided similar information to that provided in 2014 and 2015, even when the Review Group had previously sought clarification or further detail in its questions. These shortcomings are of concern to the Review Group given that improving commitment to NASCO agreements was a key aspect of the 'Next Steps' and External Performance reviews and as the second reporting cycle is now 60% completed. The Review Group is concerned that, for some Parties/jurisdictions, actions have not yet started or where actions are ongoing there has either been no report of progress or the reporting is unclear. The Review Group also experienced considerable difficulties in interpreting the progress in some APRs because of the continuing use of links to websites and references to publications. As previously indicated, the APRs should be stand-alone documents that allow progress to be assessed and only provide links or references as a means to provide access to additional information for those wishing to learn more. Overall, the Review Group again considered that the most common fault with the information provided continues to be a lack of quantitative evidence on the extent of the progress made and/or what the results have been. No APRs had been received from EU - France or EU - Portugal by the time the Review Group met to undertake its evaluations. The lack of some APRs 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 Group's report will be presented at a Special Session during the Thirty-Third 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.* ***2016 Update:*** *An item on 'Mixed-stock fisheries conducted by Members of the Commission' has again been included on the Agendas for each Commission for the 2016 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 and any changes or developments in the management of MSFs to implement NASCO's agreements.*
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.* ***2016 Update:*** *An MoU between the Ministry of Climate and Environment (Norway) and the Federal Agency for Fishery (the Russian Federation) on cooperation in management of, and monitoring and research on, wild Atlantic salmon in Finnmark County (Norway) and the Murmansk region (the Russian Federation) was signed in Oslo, Norway on 30 September. The MoU established a Working Group with a mandate that includes evaluating the management of salmon stocks in the light of relevant NASCO guidelines and which will report annually to the Ministry of Climate and Environment and the Federal Agency for Fishery. The Working Group held its first meeting on 24 November and an update on progress will be provided to the North-East Atlantic Commission at its 2016 Annual Meeting.* *At the 2015 Annual Meeting of the West Greenland Commission, an Updated Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGC(15)20, was adopted and consideration is now being given to application of the six tenets by all Members of the Commission (see EPR51 above).*

Annex 18

Agenda item 6.7
For information

Council

CNL(16)17

Management and Sampling of the St Pierre and Miquelon Salmon Fishery

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

PREMIER MINISTRE

Secrétariat
général de la mer

Le Secrétaire general adjoint

Paris, le 2 juin 2016

N° 75/SGMER

Affaire suivie par Marie-sophie DUFAU-RICHET
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marie-sophie.dufau-richet@pm.gouv.fr

The deputy secretary of the sea

To

Steinar Hermansen, Chairman of
The North Atlantic Salmon Conservation Organization (NASCO)

Subject: annual report of salmon's fisheries of Saint-Pierre-et-Miquelon

In view of the next annual meeting of NASCO in Bad-Neuenahr-Ahrweiler, the french authorities have the honour to send you the report for France in respect of Saint-Pierre-et-Miquelon prepared by the Direction of Territory, Agriculture and Sea in Saint-Pierre.

Scientific information is not fully available for the 2015 season, as the genetic analyses will be grouped with those for 2016, in a continuing cooperation between the French research Institute for the Exploration of the Sea representative in Saint-Pierre and the DFO Newfoundland and New Brunswick.

Patrick AUGIER

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PRÉFET DE SAINT-PIERRE-ET-MIQUELON

Direction des Territoires,
de l'Alimentation et de la Mer

Service des Affaires Maritimes

Saint-Pierre, 3 May 2016

L'adjointe au directeur, chef du service des affaires maritimes

to

Monsieur le directeur des pêches maritimes et de l'aquaculture

Tour Sequoia
92055 LA DEFENSE CEDEX

Reference: 106/MLQ/2016

Contact :Matthieu Le Quenven
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Tel: 05 08 41 15.30- **Fax:** 05 08 41 48 34

RE: Report on the 2015 salmon fishery

Annual Report on the Atlantic Salmon Fishery at St Pierre and Miquelon 2015 Season

CC: MOM/Délégué IFREMER SPM / Archives

Tel: 05 08 41 15 30-Fax: 05 08 41 48 34
BP 4206 1, rue Gloanec
97500 Saint-Pierre

1. Legislation

Salmon fishing at Saint Pierre and Miquelon is regulated by the Rural and Maritime Fishery Law, in particular Book IX, the Order of 20 March 1987 and the Order of 24 March 2015 revising 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

127 boat inspections were carried out by the Maritime Affairs Service in 2015, 98 of which were of recreational vessels and 29 were of professional vessels. The inspections were carried out over 11 days, both in the morning and in the evening. A report has been made.

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 the applicant's 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 2015, 8 professional and 70 recreational permits were issued. The total number of permits issued has remained stable over the last 3 years, while the number of actual fishers has remained constant since 2005 (an average of 50 fishers per year over the last 10 years).

3. Salmon catch

The total 2015 catch stands at:

Professional catch: 1,213kg (2,250kg in 2014). 442 salmon caught
Recreational catch: 2,300kg (1,561kg in 2014). 879 salmon caught

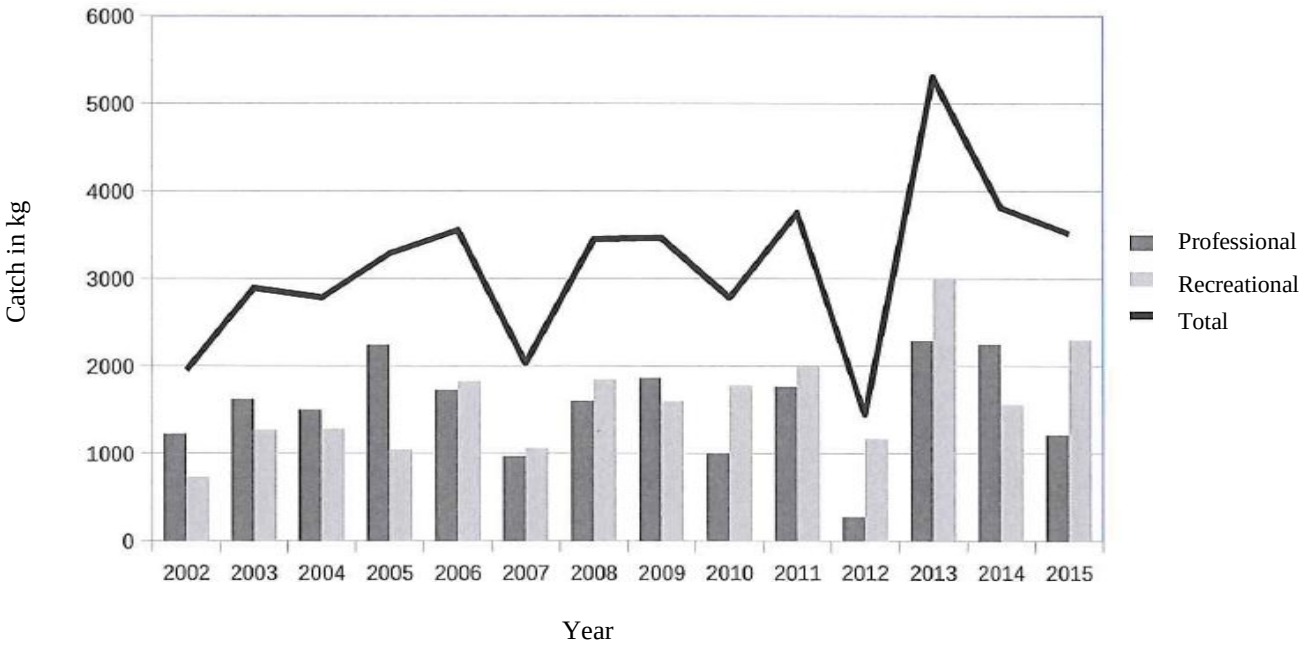
The total weight of the 2015 catch was therefore 3,513kg, compared to 3,811kg in 2014.

The 879 salmon caught by 60 recreational boats averages around 14 salmon per recreational fisher. However, the highest catch by a single recreational vessel was 43 salmon. It should also be noted that many people 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 442 salmon caught by 8 professional vessels averages around 55 salmon per professional fisher. The highest catch by a single professional vessel was 224 salmon. One professional license holder reported that he did not fish this season.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Professional Fishery														
No. of licenses	12	12	13	14	13	13	9	8	9	9	9	9	12	8
Catch volume	**1223**	**1620**	**1499**	**2243**	**1730**	**970**	**1604**	**1864**	**1002**	**1764**	**278**	**2291**	**2250**	**1213**
Recreational Fishery														
No. of licenses	42	42	42	52	52	53	55	50	57	58	60	64	70	70
Catch Volume	**729**	**1272**	**1285**	**1044**	**1825**	**1062**	**1846**	**1600**	**1780**	**1992**	**1168**	**3011**	**1561**	**2300**
Total catch	1952	2892	2784	3287	3855	2032	3450	3464	2782	3756	1446	5302	3811	3513

Salmon catch at St Pierre and Miquelon 2002 – 2015



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.

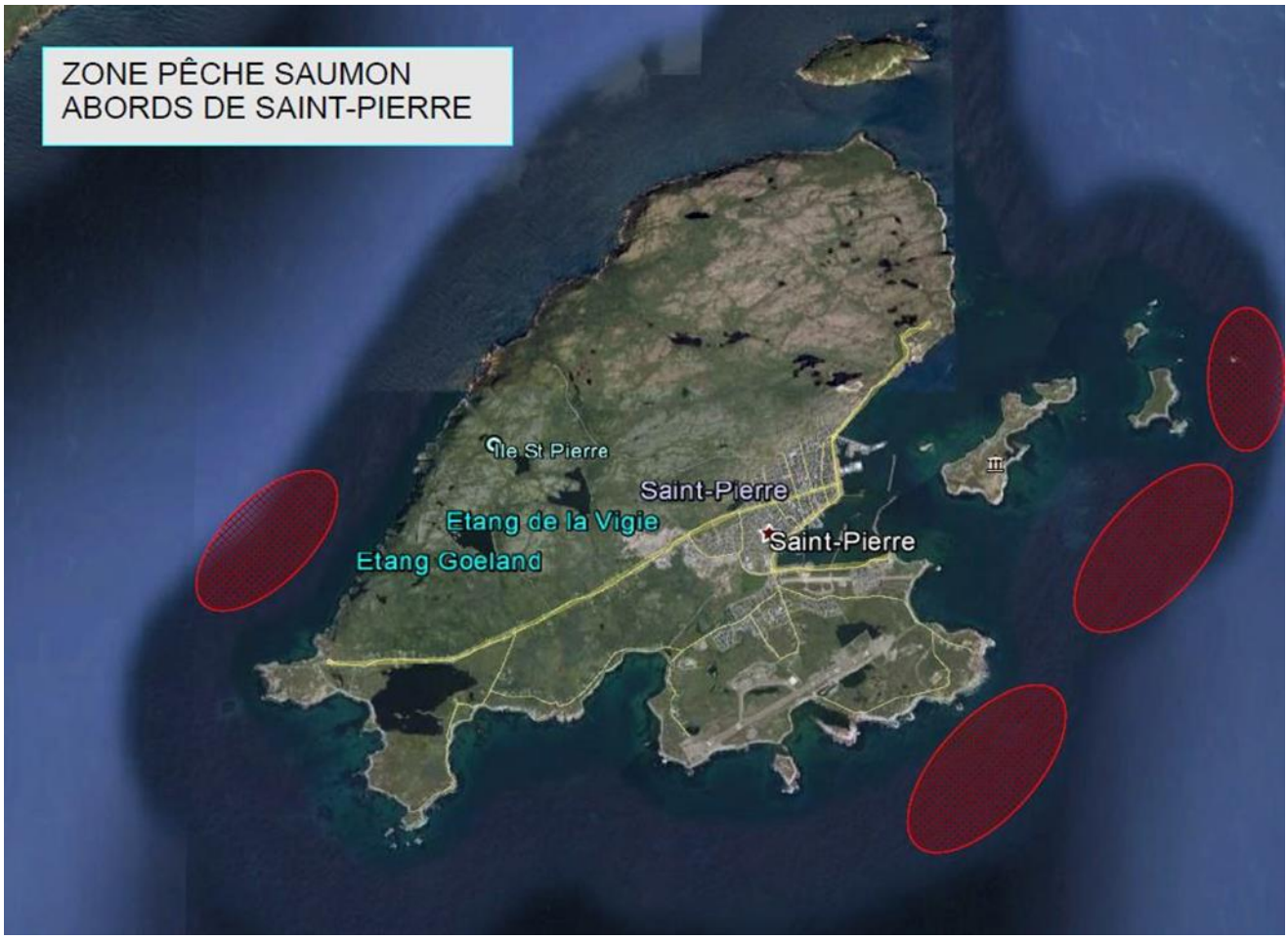
It should be noted that there is no salmon fishing in the archipelago's rivers and that the territory imports around 16 tonnes of farmed salmon from Canada. The annual consumption of salmon is approximately 3kg per inhabitant.

4. Profile of fishers/location of fishing sites

The average salmon fisher on the archipelago is male (no females fish), with an average age of 55 (the youngest being 38 and the oldest 77).

The Atlantic salmon 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
tang Goeland


ZONE PÊCHE SAUMON
ABORDS DE SAINT-PIERRE
Ile St Pierre
Saint-Pierre
Etang de la Vigie
Saint-Pierre
Etang Goeland

5. Results of the 2015 Projects

5.1 *Parr Study in the Belle river*

2014 Report: 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 in-river 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.

Results: The Belle river was not obstructed in 2015 and there was therefore no need to dredge the river. Electro-fishing was carried out to determine whether there were parr present in the river. The results are not yet known, but initial indications seem to show that some were found. These efforts will therefore continue in 2016.

5.2 *Seal count*

2014 Report: 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.

Results: A study is being carried out with the help of the French Institute for Marine Mammals, based in La Rochelle. A procedure to count the seals has been established and training on recognising the different species is scheduled for summer 2016. The initial stages of the study do not indicate an overpopulation of these marine mammals in the archipelago.

L'Administrateur de 1ere classe
des Affaires Maritimes
Julie Motyl-Nowski
Chef du service des Affaires Maritimes

Annex 19

Closing Statement submitted by the North Pacific Anadromous Fish Commission (NPAFC)

Mr President, Delegates, Ladies and Gentlemen,

At the risk of overstaying my welcome, I would like to say a few words. I thank NASCO for welcoming me as an observer for the North Pacific Anadromous Fish Commission for the second consecutive year. Thank you to Dr Peter Hutchinson and the Secretariat staff who did such an outstanding job of orchestrating this week of meetings. I take back to the NPAFC and Canada a wealth of new knowledge, ideas and connections to an impressive network of people.

Thank you to our German hosts who brought us to this remarkable valley that has, as we learned, provided outstanding culture and accommodation for several thousand years. The banquet and the reception were exceptional. I wish them well in their endeavours to return salmon to the Rhine and its tributaries.

Last year I arrived with a proposal from NPAFC for an International Year of the Salmon initiative to enhance our science and outreach efforts in a bid to meet the challenge that a rapidly changing environment poses to salmon and people. NASCO supported the concept and took the challenging step of developing a NASCO response inter-sessionally.

Dr Hutchinson and Mr Morris worked throughout the past year to develop the NASCO response and then actively participated in the Steering Committee for the IYS Scoping Meeting in Vancouver, Canada. I cannot over-emphasise enough the positive contribution that Peter and Dan have made in the form of leadership and ideas specifically regarding the governance model. We left Vancouver with a joint proposal to take to our respective organisations that was built in true collaborative fashion.

I know your deliberations on the IYS were a challenge this week. Regardless of the outcome of the week I was pleased that my role was truly that of an observer. NASCO took ownership of the IYS and has worked through issues related to timing and governance. The clarification that decision-making rests with the NASCO and NPAFC Steering Committees and not the Co-ordinating Committee is an excellent one.

I am more than pleased to be leaving here today with the news that the NASCO and NPAFC will move forward to implement the International Year of the Salmon. I would hope that the IYS is no longer referred to as an NPAFC proposal but rather a joint NASCO/NPAFC initiative.

Salmon are culturally iconic and, ecologically, a keystone species. The regional and municipal governments in the Cowichan Valley where I live have adopted the presence of salmon in the Cowichan as a key indicator of environmental and community health. The Rhine master plan for the re-introduction of Atlantic salmon does as well. I can envision through our IYS efforts that the presence of salmon across the entire salmosphere becomes a galvanising concept that inspires the advancement of science and cultural change.

Now our work begins and I look forward to what is going to be a very busy year with much to be done to meet aggressive timelines for a Symposium in 2018 and a focal year in 2019.

Thank you again to all of the participants for making me feel so welcome and I wish you well and safe travels.

Annex 20

CNL(16)67

Press Release

North Atlantic Salmon Conservation Organization (NASCO)
Thirty-Third Annual Meeting, Bad Neuenahr-Ahrweiler, Germany
7 - 10 June 2016

Salmon in a Changing World

Salmon face many challenges, not least those associated with a changing climate. A major new initiative, the International Year of the Salmon, was announced this week with the aim of improving scientific understanding of the factors driving salmon abundance and improve awareness of the challenges facing the species and the measures taken to mitigate these.

NASCO President Steinar Hermansen (Norway) said:

'We look forward to close collaboration with our colleagues working with salmon in the North Pacific Ocean, the Baltic Sea and the Arctic as we seek to join forces in a concerted effort to conserve and restore these highly valuable species.'

Working with the salmon farming industry in order to ensure wild salmon are protected from genetic and sea lice impacts from salmon farming was a primary focus during a session organised jointly with NASCO's NGOs. The information presented at the session will contribute to identification of best practice on measures to protect the wild Atlantic salmon.

In the North-East Atlantic, the parasite *Gyrodactylus salaris* poses a serious risk to wild salmon stocks and measures related to preventing its spread and its eradication from infected rivers will be reviewed by NASCO in order to strengthen protection to the wild salmon.

NASCO's Annual Meeting again took place against a background of continuing low, and in some areas, critically low abundance of salmon throughout the North Atlantic and the need for urgent action to understand the causal factors. Progress with an ambitious new research programme to track salmon from their rivers of birth out into the ocean was reported and the expansion of this programme will improve understanding of where salmon mortality is occurring and what is causing it. NASCO has agreed a new classification system for stock status to support the development of a 'State of the Salmon' report.

NASCO reviewed the implementation of its regulatory measure for the West Greenland fishery and commended Greenland for the steps it has taken to improve management control in its fishery. Other Members of the Commission have agreed to review the management of their fisheries.

The North American Commission continued to review events in the St Pierre and Miquelon salmon fishery.

The Thirty-Third Annual Meeting of NASCO was held during 7 - 10 June in Bad Neuenahr-Ahrweiler, Germany.

Notes for Editors:

NASCO is an intergovernmental organisation 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, the Russian Federation and the USA. There are 37 non-government observers accredited to the Organization.

The 2016 Annual Meeting included almost 115 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. The Thirty-Fourth Annual Meeting of NASCO will be held in Varberg, Sweden, during 6 - 9 June 2017.

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Annex 21

List of Papers

CNL(16)1	Provisional Agenda (English and French)
CNL(16)2	Draft Agenda (English and French)
CNL(16)3	Explanatory Memorandum on the Agenda
CNL(16)4	Draft Schedule of Meetings
CNL(16)5	Report of the Finance and Administration Committee
CNL(16)6	Secretary's Report
CNL(16)7	Progress Report on the Proposed International Year of the Salmon
CNL(16)8	Report on the Activities of the North Atlantic Salmon Conservation Organization in 2015
CNL(16)9	Report of the ICES Advisory Committee (ACOM)
CNL(16)10	Report of the Fifteenth Meeting of the International Atlantic Salmon Research Board
CNL(16)11	Report of the Working Group on Stock Classification
CNL(16)12	Request for Scientific Advice from ICES
CNL(16)13	Report of the Meeting of the Implementation Plan/Annual Progress Report Review Group
CNL(16)14	Summary of Annual Progress Reports under the 2013 - 2018 Implementation Plans
CNL(16)15	Programme for the Theme-Based Special Session: 'Addressing impacts of salmon farming on wild Atlantic salmon: challenges to, and developments supporting, achievement of NASCO's international goals'
CNL(16)16	Report on 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
CNL(16)17	Management and Sampling of the St Pierre and Miquelon Salmon Fishery
CNL(16)18	Summary of Council Decisions
CNL(16)19	Classification of Norwegian salmon populations according to the National Quality Norm for Wild Salmon
CNL(16)20	Written responses from the Parties/jurisdictions to the questions raised by the Implementation Plan/Annual Progress Report Review Group
CNL(16)21	Annual Progress Report: Denmark (in respect of the Faroe Islands and Greenland) - Greenland
CNL(16)22	Annual Progress Report: European Union - Germany
CNL(16)23	Annual Progress Report: United States
CNL(16)24	Annual Progress Report: European Union - UK (England and Wales)
CNL(16)25	Annual Progress Report: Russian Federation

CNL(16)26	Annual Progress Report: European Union - UK (Scotland)
CNL(16)27	Annual Progress Report: European Union - Spain (Asturias)
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CNL(16)34	Annual Progress Report: Denmark (in respect of the Faroe Islands and Greenland) - Faroe Islands
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CNL(16)38	Annual Progress Report: Canada
CNL(16)39	Revised Programme for the Theme-Based Special Session: 'Addressing impacts of salmon farming on wild Atlantic salmon: challenges to, and developments supporting, achievement of NASCO's international goals'
CNL(16)40	Update on enforcement activities in Canada in 2015 including information for Quebec
CNL(16)41	Measures introduced to meet NASCO goals of reducing impacts from sea lice and escapees on wild salmon (Tabled by Norway)
CNL(16)42	Drug resistance in sea lice and integrated lice management strategies (Tabled by Armin Sturm and James Bron)
CNL(16)43	Progress and challenges in achieving NASCO's international goals for aquaculture in the United States (Tabled by the US)
CNL(16)44	Aquaculture Management in Canada: Advancing NASCO's International Goals (Tabled by Canada)
CNL(16)45	The NGO Perspective (Tabled by the NGOs)
CNL(16)46	Advances in understanding the impacts of sea lice on wild Atlantic salmon (Tabled by Bengt Finstad)
CNL(16)47	Supporting sustainable aquaculture growth alongside a thriving recreational fisheries sector: Reducing the impacts from sea lice and escapes on wild fish in Scotland in parallel with NASCO's international goals (Tabled by EU - UK (Scotland))
CNL(16)48	Development of lice dispersal models and their utility in predicting impacts on wild Atlantic salmon (Tabled by Ørjan Karlsen)
CNL(16)49	Advances in understanding the impacts of escaped farmed salmon on the genetic integrity of wild Atlantic salmon (Tabled by Kjetil Hindar)
CNL(16)50	Progress and challenges in achieving NASCO's international goals (Tabled by EU - Ireland)

CNL(16)51	Progress and challenges in achieving NASCO's international goals (Tabled by the Faroe Islands)
CNL(16)52	Closed containment: recent developments - costs and benefits (Tabled by Ivar Warrer-Hansen)
CNL(16)53	Agenda
CNL(16)54	Salmon farming: the continuing damage and required solutions (Tabled by the NGOs)
CNL(16)55	The Atlantic Salmon in Germany (Presentation by Clemens Fieseler)
CNL(16)56	Atlantic salmon in the Rhine – from being extinct to the master plan migratory fish (Presentation by Laura Gangi)
CNL(16)57	Not issued
CNL(16)58	Not issued
CNL(16)59	Summary of discussions during the Special Session on the evaluation of Annual Progress Reports under the 2013 - 2018 Implementation Plans
CNL(16)60	Report of the Theme-based Special Session: 'Addressing impacts of salmon farming on wild Atlantic salmon: challenges to, and developments supporting, achievement of NASCO's international goals'
CNL(16)61	Draft Report of the Thirty-Third Annual Meeting of the Council of the North Atlantic Salmon Conservation Organization
CNL(16)62	North Atlantic Salmon Conservation Organization 2017 Budget, 2018 Forecast Budget and Five-Year (2017 - 2021) Budgeting Plan
CNL(16)63	Atlantic Salmon Federation's Salmon Tracking Programs: Investigating Low Marine Survival (presentation by Dave Meerburg)
CNL(16)64	Presentation of the ICES Advice to the Council
CNL(16)65	Draft Press Release
CNL(16)66	Not issued
CNL(16)67	Press Release
CNL(16)68	Report of the Thirty-Third Annual Meeting of the Council of the North Atlantic Salmon Conservation Organization