2017

REPORT OF THE THIRTY-FOURTH ANNUAL MEETINGS OF THE COMMISSIONS

VARBERG, SWEDEN

6 - 9 JUNE 2017

TABLE OF CONTENTS

REPORT OF THE

THIRTY-FOURTH ANNUAL MEETING

OF THE

NORTH AMERICAN COMMISSION

6 - 9 JUNE 2017
Varberg, Sweden

Chairman:	Mr Tony Blanchard (Canada)
Vice-Chairman:	Mr Patrick Keliher (USA)
Rapporteur:	Ms Kate Johnson (Canada)
Secretary:	Dr Peter Hutchinson

NAC(17)7

CONTENTS

Page No.

NAC(17)7

Report of the Thirty-Fourth Annual Meeting of the North American Commission of the North Atlantic Salmon Conservation Organization

Varbergs Kusthotell, Varberg, Sweden

6 - 9 June 2017

1. Opening of the Meeting

1.1 In the absence of both the Chairman and the Vice-Chairman of the Commission, Mr Stephen Gephard (USA) was appointed as Acting Chairman of the North American Commission for the duration of the Thirty-Fourth Annual Meeting. The Acting Chairman opened the Meeting and welcomed delegates to Varberg.

1.2 A written Opening Statement on behalf of the Non-Government Organisations (NGOs) attending the Annual Meeting was distributed (Annex 1).

1.3 A list of participants at the Thirty-Fourth Annual Meetings of the Council and Commissions of NASCO is included on page 347 of this document.

2. Adoption of the Agenda

2.1 The Commission adopted its Agenda, NAC(17)10 (Annex 2).

3. Nomination of a Rapporteur

3.1 Ms Kate Johnson (Canada) was appointed as Rapporteur.

4. Review of the 2016 Fishery and ACOM Report from ICES on Salmon Stocks in the Commission Area

4.1 The representative of ICES, Mr Gérald Chaput, presented the report from ICES on the status of salmon stocks in the Commission area. His presentation is available as document NAC(17)8. The ICES Advisory Committee (ACOM) report that contains the scientific advice relevant to all Commissions, CNL(17)8, is included on page 285 of this document.

4.2 The representative of the NGOs asked about the sampling undertaken in the Labrador Subsistence Fishery in 2016, with respect to the proportion of large fish sampled (17% of total) in comparison to the catch composition by size (50% large fish). He questioned whether the catch was being properly sampled and whether this would impact the results. The ICES representative clarified that the presentation distinguished between 1 and 2 Sea-Winter ages, as opposed to size. He noted that sampling representation is an important point to consider. Studies in previous years have indicated that size was not linked to the results of sampling in terms of fish origin. The NGO representative noted that ICES had once again recommended that more comprehensive sampling be conducted. The ICES representative responded that the current sampling efforts by fisheries officers and fishers are significant, but there is always room for improvement.

4.3 A representative of Canada congratulated the ICES representative on the comprehensive report. He inquired about the difference in stock status between northern and southern areas and links to warming waters due to climate change. The representative of ICES noted that there is a clear north/south association with stock status. This is more likely due to increased mortality at sea of southern stocks, as opposed to southern fish moving north in search of cooler waters. The sampling results in Labrador indicate that all fish are from Labrador. The representative of the NGOs noted that human influences, in addition to climate change, are also likely to play a role. For example, hydro-electric dams and aquaculture activities are more prevalent in southern areas.

5. Mixed-Stock Fisheries conducted by Members of the Commission

5.1 Under the Council's '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 was agreed that there should be agenda items in each of the Commissions to allow for a focus on mixed-stock fisheries.

5.2 The representative of Canada presented paper NAC(17)3 (Annex 3), which provided a description of the Labrador Subsistence Food Fishery, including information on the management, stock status, the most recent catch data and the sampling programme, as well as the origin and composition of the catches.

5.3 The representative of the United States expressed appreciation for the detailed and complete report. He recognised favourable trends including a reduction in total harvest, fishing closer to the shore to avoid possible interactions with non-Labrador stock and the sampling activities which have recently demonstrated the absence of United States origin fish among the sampled fish. He indicated that the United States appreciates Canada's efforts in these respects.

6. Sampling in the Labrador Fishery

6.1 The Acting Chairman noted that information on the sampling programme had been provided in both the ICES report and document NAC(17)3.

7. The St Pierre and Miquelon Salmon Fishery

7.1 The Acting Chairman referred the Commission to Council document CNL(17)17 (Annex 4) presenting information on the management and sampling of the St Pierre and Miquelon salmon fishery.

7.2 The representative of France (in respect of St Pierre and Miquelon) presented the report, noting that it had been submitted earlier to ICES, as was requested last year, in order to ensure that the data could be included in the ICES advice. She noted that there were reduced catches in the professional fishery and that one professional fisher is expected to retire in the next few years. There were however, increased catches in the recreational fishery due to favourable weather conditions. At last year's North American Commission Meeting, France (in respect of St Pierre and Miquelon) had committed to provide catch per unit of effort (CPUE) data in 2017, but has not yet been in a position to conduct this analysis.

7.3 The representative of the United States thanked the representative of France (in respect of St Pierre and Miquelon) for the report. The United States remains interested in the status of the fishery at St Pierre and Miquelon and in exploring ways to improve Atlantic salmon conservation. He sought clarity on whether, as one professional fisher leaves the fishery, that licence would be eliminated. The representative of France (in respect of St Pierre and Miquelon) stated that this was not the case, but that it was unlikely that there would be new interest on the professional front for new licences. She noted that on the recreational front, the number of licences issued has increased from 70 in 2016 to 80 in 2017 and has been permanently capped at that level. The season will be shortened by 10 days this year (ending on 21 July) and by two weeks in 2018 (ending on 15 July).

7.4 The representative of the United States asked if there had been any additional changes to the management regime for the fishery. He expressed the United States' concerns with the continued mixed-stock fishery at St Pierre and Miquelon. Instead of relying on weather conditions to regulate catches of Atlantic salmon, he wondered if consideration had been given to establishing regulatory measures to limit catches. The representative of France (in respect of St Pierre and Miquelon) stated that limiting the number of retained salmon per recreational licence was being considered.

7.5 The representative of Canada noted appreciation for the report and for the continued sampling efforts. She noted an understanding of the difficult conversations taking place with fishers in terms of limiting licenses, catches and the season duration. However, she expressed concern with the increase in catches in 2016, specifying that those catches were Atlantic salmon of Canadian origin, many from vulnerable populations. While establishing a limit on the total number of recreational licenses could be positive, Canada is very concerned that fixing this limit at 80 represents an increase from the 2014-16 yearly limit of 70 licences. The representative of Canada proposed that a letter from the President of NASCO to France (in respect of St Pierre and Miquelon) could be useful in order to express NASCO's concerns and encourage France to become a member of the Organisation. This had been done in the past, but not in recent years. The representative of the United States supported Canada's proposal of a letter stressing the importance of improved co-operation with France (in respect of St Pierre and Miquelon) in salmon conservation through effective management.

7.6 The North American Commission recommended to the Council that the President of NASCO submit a letter to the French Government in this respect.

8. Salmonid Introductions and Transfers

8.1 In 2010, the Commission had adopted recommendations arising from a Review of the NAC Database on Introductions and Transfers and the Scientific Working Group, NAC(10)6. The Parties agreed (1) that a detailed international database was no longer necessary; (2) that the Parties should provide focused annual reports to the Commission on issues of mutual concern including salmonid disease incidences, breaches of containment, introductions from outside the Commission area and transgenics; (3) that experts should be appointed who could work to identify priority mechanisms and requirements for information exchange on fish health issues; and (4) that minor revisions to the NAC Protocols on Introductions and Transfers of Salmonids should be made to reflect the new information exchange mechanism. In 2016, the Members of the Commission agreed to submit their Annual Reports in advance of the Annual Meeting in future so that they could be made available before the Meeting. However, this had not been possible in 2017 due to revisions being made to address comments and/or questions on the draft reports from one Member.

8.2 The representative of the United States presented its Annual Report, NAC(17)4 (Annex 5). He also thanked Canada for the preparatory discussions and the questions raised that brought some additional introduction activities to their attention.

8.3 The representative of Canada presented Canada's Annual Report, NAC(17)5 (Annex 6). She thanked the United States for their comments and expressed hope that the first section of Canada's report met their previous requests, as Canada had worked to strengthen the provision of direct information in that section. The representative of the United States thanked the Canadian Head of Delegation and staff for the thorough interactions that took place with respect to these reports. He appreciated the collegial interaction and transparent approach.

8.4 The representative of the NGOs noted that there were no escapes reported in New Brunswick in 2016. However, in Canada's Scotia-Fundy consultation process, it was indicated that an increase in escapes was observed in the Magaguadavic River that year. The representative of the NGOs noted that the origin of these escaped fish was uncertain.

8.5 The representative of Canada stated that in New Brunswick the industry must report and submit a containment plan which includes recapture activities on breach events greater than 100 fish. These event reports are shared with federal agencies. Smaller breach containment events can still occur as a result of human error, predators and natural climate events such as storms. Recognising this, in 2016 an Aquaculture Containment Liaison Committee comprised of both levels of government, NGOs and industry was established in New Brunswick. Co-chaired by the Atlantic Salmon Federation and the Atlantic Canada Fish Farmers Association, the Committee provides a forum to communicate and determine collaborative opportunities that are consistent with the objectives of the Containment Management of Marine Salmonid Farms in New Brunswick. This Committee was aware of the farmed salmon found in the Magaguadavic River and the Co-Chairs discussed the source.

8.6 The representative of the NGOs stated that there have been some more recent developments in the AquaBounty project since the time-period covered by this 2016 report. He asked the representative of Canada if there were any updates available on the status of the projects. The representative of Canada provided additional information NAC(17)9, (Annex 7).

8.7 The representative of the NGOs thanked the representative of Canada for the information. In response to the information provided in NAC(17)9, he noted that he had participated in the scientific risk assessment mentioned (Science Response

2013/23). That risk assessment was based on a much smaller number of eggs being produced (100,000 vs the 13 million eggs proposed) and all grow-out would occur from eggs exported to the Pacific drainage of Panama. The current AquaBounty proposal includes grow-out of 250 tonnes in PEI and potential sales of eggs for grow-out elsewhere. The risk assessment noted 'changes to the proposed use scenario or to the proposed containment measures may result in the entry or release of AAS into the environment in a quantity, manner or circumstances significantly different to the potential exposure of AAS assessed in the current risk assessment. Given the potential hazard of AAS to the environment and associated uncertainty, including potential invasiveness, any significant new activity may result in an altered exposure and consequently in a different risk assessment conclusion than provided in this report.'

9. Announcement of the Tag Return Incentive Scheme Prize

9.1 The Acting Chairman announced that the winner of the North American Commission £1,000 prize in the NASCO Tag Return Incentive Scheme was Mr Maurice LeBlanc, Saint Antoine, Canada. The winning tag was of Canadian origin. The tag was applied on 10 July 2016 to a small salmon at the 'Millerton' estuary trapnet as part of the assessment programme for Atlantic salmon in the Miramichi River. It was recaptured on 14 July 2016 at Quarryville Pool on the Southwest Miramichi River and subsequently released. The Commission offered its congratulations to the winner.

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

10.1 The request for scientific advice from ICES prepared by the Standing Scientific Committee in relation to the North American Commission area was agreed by the Council, CNL(17)10 (Annex 8).

11. Other Business

11.1 The representative of Canada provided information to the Commission on domestic updates that had taken place in the last year. The Ministerial Advisory Committee on Atlantic Salmon (MACAS), which was formed to investigate the low returns to southern Canadian rivers in 2014, completed its work, issuing its final report containing over 60 recommendations ranging from habitat improvements to science and enforcement. The Government of Canada reviewed the recommendations in detail, and subsequently a Forward Plan for Atlantic Salmon was developed outlining how the Department would advance the recommendations. The Forward Plan was posted on the internet in July 2016. Updates to the Forward Plan will be made in the coming months to capture the progress made over the past year.

11.2 The review of Canada's Wild Atlantic Salmon Conservation Policy was initiated in 2016, and was completed by a working group involving representation from 17 indigenous, watershed and conservation groups. One key highlight of the resulting draft policy is the plan to institute a process of 2-year, regionally based implementation plans for salmon conservation. Ministerial approval of the revised policy will be sought in the next few months.

11.3 In October 2016, Fisheries and Oceans Canada launched the Atlantic Salmon Research Joint Venture, the first ever collaborative research forum for Atlantic salmon. It brings together experts from Canada, the United States, Indigenous groups, provincial agencies, NGOs, academic institutions and other stakeholders to prioritise scientific research and data and information-sharing. This significant undertaking is already promising to show noteworthy benefits with respect to targeting research efforts to areas of concern and sharing information regularly so that collective efforts for salmon conservation remain aligned, as understanding of the various science-related issues is increased.

11.4 Finally, the Canadian representative noted that the House of Commons' Standing Committee on Fisheries and Oceans (SCOFO) issued its 'Report on Wild Atlantic Salmon in Eastern Canada', on 30 January 2017. This further helps place a high profile on Atlantic salmon not just within Government but in the public sphere as well. The report itself contains very pointed and specific recommendations that are currently being reviewed to assess their feasibility.

11.5 The representative of the United States congratulated Canada on the high level of prominence and visibility these activities have brought to Atlantic salmon. The United States appreciates the MACAS process and views it as an example of leadership. He noted that the United States participated in the first scoping session of the Joint Venture, and it got off to an excellent start. Finally, he noted that the SCOFO report is a great example of the kind of visibility and focus that NASCO is trying to achieve with the International Year of the Salmon.

12. Date and Place of the Next Meeting

12.1 The Commission agreed to hold its next Annual Meeting at the same time and place as the Thirty-Fifth Annual Meeting of NASCO.

13. Report of the Meeting

13.1 The Commission agreed a report of the Meeting.

14. Close of the Meeting

14.1 The Acting Chairman thanked the Parties and observers for their contributions and closed the Thirty-Fourth Annual Meeting of the North American Commission.

Note: The annexes mentioned above begin on page 19, following the French translation of the report of the meeting. A list of North American Commission papers is included in Annex 9.

NAC(17)7

Compte-rendu de la trente-quatrième session annuelle de la Commission Nord-Américaine de l'Organisation pour la conservation du saumon de l'Atlantique Nord

Varbergs Kusthotell, Varberg, Suède

6 - 9 juin 2017

1. Ouverture de la session

1.1 En l'absence du Président comme du Vice-président de la Commission, M. Stephen Gephard (Etats-Unis) a été nommé en tant que Président suppléant de la Commission nord-américaine pour la durée de la trente-quatrième session annuelle. Le Président suppléant a ouvert la session et a accueilli les délégués à Varberg.

1.2 Une déclaration d'ouverture écrite au nom des Organisations non gouvernementales (ONGs) présentes à la session annuelle a été distribuée (Annexe 1).

1.3 Une liste de participants aux trente-quatrièmes sessions annuelles du Conseil et des Commissions de l'OCSAN est incluse en page 347 de ce document.

2. Adoption de l'ordre du jour

2.1 La Commission a adopté l'ordre du jour, NAC(17)10 (Annexe 2).

3. Nomination d'un rapporteur

3.1 Ms Kate Johnson (Canada) a été nommée rapporteur.

4. Examen de la pêcherie de 2016 et du rapport du Comité Consultatif (ACOM) du CIEM sur les stocks de saumons dans la zone de la Commission

4.1 Le représentant du CIEM, M. Gérald Chaput, a présenté le compte-rendu du CIEM sur le statut des stocks de saumon dans la zone de la Commission. Sa présentation est disponible dans le document NAC(17)8. Le rapport du Comité consultatif (ACOM) du CIEM qui contient les conseils scientifiques pertinents pour toutes les Commissions, CNL(17)8, est inclus en page 285 de ce document.

4.2 Le représentant des ONGs a posé une question sur l'échantillonnage effectué dans la Pêcherie de subsistance du Labrador en 2016, et concernant la proportion des grands saumons échantillonnés (17% du total) par rapport à la composition des prises par taille (50% de grands saumons). Il a demandé si les prises étaient échantillonnées correctement et si cela aurait un impact sur les résultats. Le représentant du CIEM a clarifié que la présentation faisait une distinction entre la description de l'âge en fonction des hivers en mer 1 et 2, et la référence à la taille. Il a noté que la représentation de l'échantillonnage est un point important à considérer. Des études des années précédentes ont indiqué que la taille n'était pas liée aux résultats d'échantillonnage en termes d'origine des poissons. Le représentant des ONGs a noté que le CIEM avait à nouveau recommandé qu'un échantillonnage plus complet soit effectué. Le représentant du CIEM a répondu que les efforts actuels d'échantillonnage par les responsables de pêcheries et les pêcheurs sont significatifs mais qu'on peut toujours effectuer des améliorations.

4.3 Un représentant du Canada a félicité le représentant du CIEM sur le caractère complet du compte-rendu. Il a posé une question sur la différence de statut des stocks entre les zones Nord et Sud et les liens avec les eaux qui se réchauffent du fait du changement climatique. Le représentant du CIEM a noté qu'il est clair qu'il existe une association nord/Sud en ce qui concerne les statuts des stocks. Ceci est plus probablement dû à une augmentation de la mortalité en mer des stocks du Sud, plutôt qu'au déplacement des poissons du Sud vers le Nord à la recherche d'eaux plus fraîches. Les résultats d'échantillonnage dans le Labrador indiquent que tous les poissons viennent du Labrador. Le représentant des ONGs a dit qu'il est probable que les influences humaines, en dehors du changement climatique, jouent aussi un rôle. Par exemple, les barrages hydro-électriques et les activités d'aquaculture sont plus répandus dans les zones Sud.

5. Pêcheries de stocks mixtes menées par des Membres de la Commission

5.1 Selon le '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, il était convenu qu'il devrait y avoir des points d'ordre du jour dans chacune des Commissions pour permettre de se concentrer sur les pêcheries de stocks mixtes (MSFs).

5.2 La représentante du Canada a fourni le document NAC(17)3 (Annexe 3), qui présentait une description de la Pêcherie alimentaire de subsistance du Labrador, y compris des informations sur la gestion, le statut des stocks, les données relatives aux prises les plus récentes et le programme d'échantillonnage, ainsi que l'origine et la composition des prises.

5.3 Le représentant des Etats-Unis a dit apprécier le caractère détaillé et complet du rapport. Il a reconnu des tendances favorables y compris une réduction du total des prises, une pêche plus proche de la côte pour éviter les interactions possibles avec les stocks issus d'autres régions que le Labrador et les activités d'échantillonnage qui ont récemment révélé l'absence de poisson originaire des Etats-Unis parmi les échantillons de poisson. Il a indiqué que les Etats-Unis appréciaient les efforts du Canada à ce sujet.

6. Echantillonnage de la pêcherie du Labrador

6.1 Le Président suppléant a noté que les informations relatives au programme d'échantillonnage avaient été fournies aussi bien dans le rapport du CIEM que dans le document NAC(17)3.

7. Pêcherie de saumons à St Pierre et Miquelon

7.1 Le Président suppléant a renvoyé la Commission au document CNL(17)17 (Annex 4) qui présente des informations sur la gestion et l'échantillonnage de la pêcherie au saumon de St Pierre et Miquelon.

7.2 La représentante de la France (pour Saint Pierre et Miquelon) a présenté le rapport, soulignant qu'il avait été soumis plus tôt au CIEM, comme cela avait été demandé l'année dernière, afin de s'assurer que les données puissent être incluses dans les conseils du CIEM. Elle a noté que le nombre de prises avait baissé dans la pêcherie professionnelle et qu'il est prévu qu'un pêcheur professionnel prenne sa retraite au cours des quelques prochaines années. Le nombre des prises de la pêcherie récréative, a cependant augmenté du fait de conditions météorologiques favorables. Lors de la Session de la Commission nord-américaine de l'année dernière, la France (pour Saint Pierre et Miquelon) s'était engagée à fournir des données sur les prises par unité d'effort (CPUE) en 2017, mais n'a pas encore été en mesure d'effectuer cette analyse.

7.3 Le représentant des Etats-Unis a remercié la représentante de la France (pour Saint Pierre et Miquelon) pour le rapport. Les Etats-Unis s'intéressent encore au statut de la pêcherie et de St Pierre et Miquelon et à envisager des moyens pour améliorer la conservation du Saumon atlantique. Il a demandé à savoir si, lorsqu'un pêcheur professionnel quitte la pêcherie ce permis serait éliminé. La représentante de la France (pour Saint Pierre et Miquelon) a déclaré que ce n'était pas le cas, mais qu'il était peu probable qu'un intérêt pour de nouveaux permis se manifeste sur le front professionnel. Elle a noté que sur le front récréatif, le nombre de permis délivrés a augmenté pour passer de 70 en 2016 à 80 en 2017 et a été plafonné à ce niveau de façon permanente. La saison sera raccourcie de 10 jours cette année (elle prendra fin le 21 juillet) et de deux semaines en 2018 (elle prendra fin le 15 juillet).

7.4 Le représentant des Etats-Unis a demandé s'il y avait des changements supplémentaires au régime de gestion pour la pêcherie. Il a exprimé les préoccupations des Etats-Unis concernant la pêcherie de stocks mixtes à St Pierre et Miquelon. Il a demandé à la représentante de la France (pour Saint Pierre et Miquelon) si au lieu de s'appuyer sur les conditions météorologiques pour réguler les prises de saumon atlantique, il avait été envisagé de mettre en place des mesures réglementaires pour limiter les prises. La représentante de France (pour Saint Pierre et Miquelon) a déclaré que limiter le nombre de saumons retenus par permis récréatif était envisagé.

7.5 La représentante du Canada a dit apprécier le rapport et la poursuite des efforts d'échantillonnage. Elle a noté avoir compris la difficulté des conversations en cours avec les pêcheurs concernant la limitation des permis, des prises et de la durée de la saison. Cependant elle s'est dite préoccupée par l'augmentation des prises en 2016, spécifiant que ces prises étaient du Saumon atlantique d'origine canadienne, et nombre d'entre elles étaient issues de populations vulnérables. Si la mise en place d'une limite sur le nombre total de permis récréatifs pourrait être positive, le Canada s'inquiète fortement que le fait de fixer cette limite à 80 représente une augmentation par rapport à la limite annuelle de 70 permis de 2014-16. La représentante du Canada a proposé qu'une lettre du Président de l'OCSAN à la France (pour Saint Pierre et Miquelon) pourrait être utile pour exprimer les préoccupations de l'OCSAN et encourager la France à devenir membre de l'Organisation. Ceci avait été fait par le passé, mais pas ces dernières années. Le représentant des Etats-Unis a soutenu la proposition du Canada d'une lettre soulignant l'importance d'une amélioration de la coopération avec la France (pour Saint Pierre et Miquelon) pour la conservation du saumon à travers une gestion efficace.

7.6 La Commission Nord-américaine a suggéré au Conseil que le Président de l'OCSAN envoie une lettre au gouvernement français à ce sujet.

8. Introductions et transferts de salmonidés

8.1 En 2010, la Commission avait adopté des recommandations découlant de la 'Revue de la Base de données sur les Introductions et transferts de la CNA et le Groupe de travail scientifique', NAC(10)6. Les Parties ont convenu (1) qu'une base de données internationale détaillée n'était plus nécessaire; (2) que les Parties devraient fournir des rapports annuels ciblés à la Commission sur les questions qui les concernent mutuellement y compris les cas de maladies chez les salmonidés, les ruptures de confinement, les introductions venant de l'extérieur de la zone de la Commission et la transgénique ; (3) nomination d'experts qui pourraient travailler à l'identification de mécanismes de priorité et exigences en matière d'échange d'informations sur les questions de santé des poissons ; et (4) que des révisions mineures devraient être effectuées sur les Protocoles CNA relatifs aux Introductions et aux Transferts de Salmonidés pour refléter le nouveau mécanisme d'échange d'information. En 2016, les membres de la Commission ont convenu de soumettre leurs Rapports annuels préalablement à la session annuelle à l'avenir afin qu'ils puissent être rendus disponibles avant la session. Cependant, ceci n'a pas été possible en 2017 du fait des révisions effectuées pour traiter les commentaires et/ou les questions sur les rapports provisoires d'un Membre.

8.2 Le représentant des Etats-Unis a présenté leur rapport annuel, NAC(17)4 (Annexe 5). Il a aussi remercié le Canada pour les discussions préparatoires et les questions soulevées qui ont porté à leur attention des activités d'introduction supplémentaires.

8.3 La représentante du Canada a présenté le rapport annuel du Canada, NAC(17)5 (Annexe 6). Elle a remercié les Etats-Unis pour leurs commentaires et exprimé l'espoir que la première section du rapport du Canada répondait à leurs demandes, puisque le Canada s'est efforcé de renforcer la fourniture directe d'informations dans cette section. Le représentant des Etats-Unis a remercié le Chef de la délégation et le personnel canadiens pour les interactions approfondies qui ont eu lieu concernant ces rapports. Il a apprécié l'interaction collégiale et la transparence de l'approche.

8.4 Le représentant des ONGs a noté qu'aucune fuite n'avait été rapportée au Nouveau Brunswick en 2016. Cependant, dans le processus de consultation de la région de Scotia-Fundy du Canada, il a été indiqué qu'une augmentation des fuites a été observée dans la rivière Magaguadavic cette année-là. Le représentant des ONGs a noté que l'on n'était pas sûr de l'origine de ces échappées de poissons.

8.5 La représentante du Canada a déclaré que dans le Nouveau Brunswick l'industrie doit rapporter et soumettre un plan de confinement qui inclut les activités de recapture sur les événements de rupture concernant plus de 100 poissons. Les rapports concernant ces événements sont partagés avec des agences fédérales. Les événements de rupture de taille plus réduite peuvent encore avoir lieu du fait d'une erreur humaine, de prédateurs ou bien d'événements climatiques naturels tels que les orages. En reconnaissance de ceci, en 2016 un Comité de liaison de confinement aquacole comprenant les deux niveaux de gouvernement, les ONGs et l'industrie a été établi dans le Nouveau Brunswick. Co-présidé par la Fédération du saumon atlantique et l'Association des éleveurs de poisson du Canada Atlantique, le Comité fournit un forum pour communiquer et déterminer les opportunités de collaboration cohérentes avec les objectifs de la Gestion de confinement des élevages de salmonidés marins au Nouveau Brunswick. Ce comité est conscient que du saumon d'élevage a été trouvé dans la rivière Magaguadavic et les co-présidents ont discuté de la source.

8.6 Le représentant des ONGs a déclaré que des développements plus récents avaient eu lieu dans le projet de l'AquaBounty depuis la période couverte par ce rapport 2016. Il a demandé à la représentante du Canada si des mises à jour étaient disponibles sur le statut des projets. La représentante du Canada a fourni un supplément d'informations NAC(17)9 (Annexe 7).

8.7 Le représentant des ONGs a remercié la représentante du Canada pour les informations. Pour répondre aux informations fournies en NAC(17)9, il a noté qu'il avait participé à l'évaluation mentionnée des risques scientifiques (Réponse des Sciences 2013/23). L'évaluation de risque était fondée sur un nombre très réduit d'œufs produits (100 000 par rapport aux 13 millions proposés) et tout grossissement aurait lieu à partir d'œufs exportés vers le réseau hydraulique Pacifique du Panama. La proposition actuelle d'AquaBounty inclut un grossissement de 250 tonnes en IPE et la vente potentielle d'œufs pour un grossissement ailleurs. L'évaluation de risque a noté 'la modification du scénario d'utilisation proposé ou des mesures de confinement suggérées pourrait donner lieu à l'introduction ou à la libération de SAA dans l'environnement pour lesquels le risque d'exposition serait très différent de celui dans l'évaluation du risque actuelle. Cette variation est due aux différences quant au nombre de SAA, aux circonstances et à la façon dont ceux-ci se sont introduits ou ont été libérés. Étant donné le risque potentiel posé par le SAA sur l'environnement et l'incertitude qui s'y rattache, ce qui comprend le risque d'envahissement, toute nouvelle activité pourrait entraîner une modification de l'exposition et par conséquent donner lieu à une conclusion différente de celle tirée du présent rapport.'

9. Annonce du gagnant du prix du Programme incitatif au renvoi des étiquettes

9.1 Le Président suppléant a annoncé que le gagnant du prix de £1 000 de la Commission nord-américaine du Programme incitatif de l'OCSAN au renvoi des étiquettes était M. Maurice LeBlanc, Saint Antoine, Canada. L'étiquette gagnante était d'origine canadienne. L'étiquette avait été appliquée le 10 juillet 2016 à un petit saumon au filet trappe 'Millerton' dans le cadre du programme d'évaluation pour le Saumon atlantique dans la rivière Miramichi. Il a été repris le 14 juillet 2016 au Bassin de Quarryville dans la rivière Miramichi Sud-Ouest avant d'être relâché. La Commission a présenté ses félicitations au gagnant.

10. Recommandations au Conseil concernant la demande de conseils scientifiques auprès du CIEM

10.1 La demande de conseils scientifiques auprès du CIEM préparé par le Comité scientifique permanent concernant la zone de la Commission nord-américaine a été acceptée par le Conseil, CNL(17)10 (Annexe 8).

11. Divers

11.1 La représentante du Canada a fourni des informations à la Commission sur les mises à jour internes qui ont eu lieu au cours de l'année passée. Le Comité consultatif ministériel sur le saumon atlantique (CCMSA), formé pour enquêter sur les faibles retours vers les rivières du Sud du Canada en 2014, a achevé son travail, et produit son rapport final comprenant plus de 60 recommandations allant de l'amélioration de l'habitat à la recherche scientifique et à l'application. Le Gouvernement du Canada a passé en revue les recommandations en détail, et un Programme d'avancée pour le saumon atlantique a ensuite été développé soulignant comment le Département allait faire progresser les recommandations. Le Programme d'avancée a été posté sur Internet en juillet 2016. Des mises à jour du Programme d'avancée seront effectuées au cours des mois à venir pour saisir les progrès effectués au cours de l'année dernière.

11.2 La révision de la Politique de conservation du saumon sauvage atlantique du Canada a été initiée en 2016, et a été achevée par un groupe de travail impliquant une représentation de 17 groupes autochtones, de bassins et de conservation. Un point important ressortant du projet de politique qui en découle est le projet qui consiste à instituer un processus de 2 ans, des programmes d'application basés dans les régions pour la conservation du saumon. Il est prévu de rechercher l'accord ministériel au cours des prochains mois pour la politique révisée.

11.3 En octobre 2016, Pêches et Océans Canada a lancé le Partenariat de recherche sur le saumon atlantique, le tout premier forum de recherche collaborative pour le saumon atlantique. Il rassemble des experts du Canada, des Etats-Unis, des groupes autochtones, des agences provinciales, des ONGs, des institutions universitaires et autres parties prenantes pour donner la priorité à la recherche scientifique et le partage de données et d'informations. Cette entreprise significative promet déjà de montrer les bénéfices remarquables concernant le ciblage des efforts de recherche sur les régions qui soulèvent des inquiétudes et partager des informations régulièrement afin que des efforts collectifs pour la conservation du saumon restent alignés, tandis que la compréhension des différents problèmes liés à la science s'améliore.

11.4 Enfin, la représentante du Canada a noté que le Comité permanent des pêches et océans de la Chambre des communes (CPPO) a produit son 'Rapport sur le saumon atlantique sauvage dans l'Est du Canada', le 30 janvier 2017. Ceci aide encore davantage à relever le profil du saumon atlantique non seulement au sein du Gouvernement mais aussi dans la sphère publique. Le rapport lui-même contient des recommandations pointues et spécifiques qui sont actuellement passées en revue pour évaluer leur faisabilité.

11.5 Le représentant des Etats-Unis a félicité le Canada sur le niveau élevé de la proéminence et de la visibilité que ces activités avaient apporté au saumon atlantique. Les Etats-Unis apprécient le travail du CCMSA et le considèrent comme un exemple de leadership. Il a noté que les Etats-Unis ont participé à la première séance sur l'établissement de la portée du partenariat, et cela a constitué un excellent début. Enfin il a noté que le rapport du CPPO est un excellent exemple du type de visibilité et d'attention que l'OCSAN cherche à réaliser avec l'Année internationale du saumon.

12. Date et lieu de la prochaine session

12.1 La Commission a convenu de tenir sa prochaine session annuelle à la même période et lieu que la trente-cinquième session annuelle de l'OCSAN

13. Compte rendu de la session

13.1 La Commission a accepté un compte rendu de sa session.

14. Clôture de la session

14.1 Le Président suppléant a remercié les Parties et observateurs pour leurs contributions et a clôturé la trente-quatrième session annuelle de la Commission nord-américaine.

Note: Les annexes mentionnées ci-dessus commencent en page 19. Une liste des articles de la Commission nord-américaine est incluse en Annexe 9.

Annex 1

Opening Statement submitted by NASCO's accredited Non-Government Organizations to the North American Commission

The NGOs welcome the renewed focus on Atlantic salmon restoration by countries in the North American Commission. In the United States, the "Species in the Spotlight" initiative and funding dedicated by the federal government is a welcome and timely step towards restoring endangered populations. Likewise, the recently completed $65 million 16-year effort to restore native anadromous species access to a significant proportion of the Penobscot river is a major accomplishment that sets the standard for other recovery efforts in North America.

In Canada, the federal government's 2017 Standing Committee on Fisheries and Oceans Report on Wild Atlantic Salmon in Eastern Canada builds on the Ministerial Advisory Committee report (2015) and DFO's Forward Plan (2016) with a series of recommendations to help wild salmon. Of particular note is the recommendation *"That the Government of Canada, through Fisheries and Oceans Canada, develop and execute a recovery plan to rebuild wild Atlantic salmon stocks to, at minimum, 1975 levels. The plan must require annual reporting with precise and measurable objectives."* Likewise, Canada's forthcoming revision of their Wild Atlantic Salmon Policy also looks to set the stage for an increased focus on restoration. We believe it is time to move Canada's approach to conservation of threatened and endangered populations from maintenance to meaningful recovery, and we look to governments to commit to and appropriately fund these efforts.

Recovery plans must have a strong scientific basis with rigorous peer review and effective oversight to ensure efforts avoid doing more harm than good and that they are directed to where they are most needed. Stocking and supplementation should be limited to populations where human intervention is clearly necessary for recovery (i.e., endangered populations with very low natural production). Experimentation on relatively healthy populations is not acceptable, nor is supplementation of existing runs with hatchery raised fish for the purposes of increasing fishing opportunities. We welcome this year's special session on understanding the risks and benefits of stocking and hatcheries as a way to better understand where stocking and supplementation programs are appropriate, and where they are not.

The NGOs welcome the continued development of the Atlantic Salmon Research Joint Venture aimed at bolstering North American salmon science programs, and bringing science and conservation communities together, and we welcome Canada's initial contribution of $600,000 to research under the program. We look forward to seeing the results of this research being translated into meaningful conservation and restoration outcomes.

There has been no meaningful decrease in Canada's overall salmon harvest over the past 10 years, despite the imposition of live-release-only in all Maritime recreational salmon fisheries since 2015. It is important for Canada to continue to pursue precautionary management measures that will further decrease its harvest, especially of the large salmon that migrate to Greenland. ICES advises that no fishery should operate on mixed stocks or on stocks that are below their minimum conservation limits. Canada continues to allow harvest of salmon from mixed stocks where some components are not surpassing their conservation limits, such as those of the Miramichi and Restigouche rivers (where main stem fisheries intercept fish bound for numerous tributaries).

Any move to reopen Maritime recreational fisheries for grilse harvest should only occur on a river-by-river basis where populations are known to be surpassing conservation limits and where harvest can be limited to a sustainable level. We are encouraged by statements from the Minister of Fisheries and Oceans that such an approach is being considered. The new 10-year management plan developed and implemented by the Province of Quebec provides an excellent model from which to develop a more effective and robust recreational fisheries management system for the Maritimes.

We welcome the announcement of increased monitoring in northern Labrador with the planned assessment on the Kenamu river. However, we remain concerned about the status of stocks in southern Labrador where none of the three index rivers met their minimum spawning limits in 2016. We are particularly concerned that Canada continues to allow robust recreational harvest levels on some southern Labrador rivers as well as mixed stock salmon by-catch in the coastal trout net fishery.

Canada estimated an unreported catch of 27t in 2016, mostly due to poaching. We are encouraged that the Standing Committee on Fisheries and Oceans recognized that enforcement is underfunded and recommended that *"the federal government, through Fisheries and Oceans Canada, increase capacity for regulatory enforcement and data collection relating to Atlantic salmon, through increased funding and collaboration with stakeholder groups"* We call on the Canadian government to recognize that poorly resourced enforcement programs are a threat to wild Atlantic salmon, and to re-invest in enforcement.

The NGOs continue to be concerned about the impacts of sea cage salmon aquaculture industry on wild Atlantic salmon. A report by Gardner Pinfold Consultants revealed that the regulatory environments in all aquaculture producing provinces in eastern North America are significantly deficient in the protections afforded to wild salmon. New research demonstrating widespread introgression of genetic material from farmed salmon into threatened wild populations in southern Newfoundland is evidence of these deficiencies and the resulting impacts on wild salmon. It is particularly concerning that a major expansion of the sea cage industry in Newfoundland, using Icelandic strain salmon, has been approved by the provincial government without the requirement of a full environmental impact assessment. The NGOs believe this is unacceptable practice.

The NGOs are also concerned about a proposal to grow genetically modified salmon in land-based facilities on Prince Edward Island and, particularly, with the reluctance of both the federal and provincial governments to conduct a thorough and robust risk assessment of the proposed facility. We believe the elevated level of risk these organisms pose to wild salmon requires the highest level of risk assessment and the strongest possible containment measures. It is difficult to understand why governments are not willing to take appropriate steps to assure the public that these organisms will not impact the environment, especially in light of the findings in southern Newfoundland rivers. Again, the NGOs find it unacceptable that there is so little government commitment to wild fish protection.

And finally, we note the following recommendation from the Canadian governments' Standing Committee on Fisheries and Oceans Report on Wild Atlantic Salmon in Eastern Canada: *"That Fisheries and Oceans Canada revisit the feasibility of closed containment salmon aquaculture in areas with endangered or threatened wild Atlantic salmon populations."* Within that context, we urge Canada to highlight and support expansion of the fledgling land-based salmon farming industry that has already been established, and to develop a plan to transition the industry from open sea cage culture to closed containment facilities.

Annex 2

NAC(17)10

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. Review of the 2016 Fishery and ACOM Report from ICES on Salmon Stocks in the Commission Area
5. Mixed-Stock Fisheries conducted by Members of the Commission
6. Sampling in the Labrador Fishery
7. The St Pierre and Miquelon Salmon Fishery
8. Salmonid Introductions and Transfers
9. Announcement of the Tag Return Incentive Scheme Prize
10. Recommendations to the Council on the Request to ICES for Scientific Advice
11. Other Business
12. Date and Place of the Next Meeting
13. Report of the Meeting
14. Close of the Meeting

Annex 3

NAC(17)3

Labrador Subsistence Food Fisheries - Mixed-Stock Fisheries Context (Tabled by Canada)

EXECUTIVE SUMMARY

- The Atlantic salmon subsistence fisheries in Labrador take place in estuaries and coastal areas using gillnets and are considered to be mixed stock fisheries. The majority of the salmon harvests in these fisheries take place in fishing locations categorized as estuaries with a reduced potential to intercept salmon from non-local stocks.
- The management of these fisheries includes a number of conditions related to gear, seasons, weekly fishery closures, carcass tagging of harvested salmon, a logbook program for reporting catches, a limit on total harvest using tags, and a prohibition on sales of Atlantic salmon.
- Reported annual harvests of salmon have ranged from 15.6 t to 42.4 t during 2000 to 2016, representing between 4,800 to 11,100 small salmon and 1,400 to 6,400 large salmon annually. The reported harvests in any year have been less than the maximum tags available for these fisheries.
- Sampling of the fishery catches has taken place every year since 2006 by the members and officers of the aboriginal communities involved in the fisheries and the information and data shared with Fisheries and Oceans Canada.
- A recently developed genetic baseline of salmon populations in eastern North America can accurately resolve the origin of salmon to twelve regional groups, with most rivers in Labrador associated to a Labrador Central regional group. This group covers rivers in all Salmon Fishing Areas (1A, 1B, 2, 14B) of Labrador.
- Genetic analyses of the regional contributions of Atlantic salmon to the sampled catches in the Labrador subsistence fisheries for 2006 to 2016 indicate that the large majority (93% to 99%) of the samples assigned to the Labrador Central regional group. Resolution at a finer spatial scale and ultimately to individual river of origin is not possible at this time with the current genetic markers.
- Funding to support the analysis of 2017 and 2018 fishery samples has been secured and the results will be reported to ICES and NASCO as they become available.

INTRODUCTION

In support of the agenda item in the North American Commission agenda to address mixed stock fisheries in domestic waters of Commission member Parties, this document presents the following information:

- current management measures for the Labrador subsistence fisheries on Atlantic salmon
- summaries of annual harvests by location and size group of salmon
- summaries of the biological sampling program of this fishery,
- results from the determination of the origin of salmon sampled from these fisheries using genetic identification techniques

Fisheries for Atlantic salmon that occur at sea, along the coast, and in some cases in estuaries, have the potential to exploit salmon from multiple stock origins. The most important mixed-stock fisheries in Canada historically were the commercial fisheries which occurred in the marine coastal areas and in estuaries throughout eastern Canada. Since 2000, all commercial Atlantic salmon fisheries under Canadian jurisdiction have been closed and the sale of Canadian origin wild Atlantic salmon, regardless of fishery source, is prohibited.

Since the closure of the commercial fisheries for salmon in Canada, salmon are exploited by three user groups: aboriginal fisheries, Labrador resident food fisheries, and recreational fisheries. As reported to ICES and NASCO, the proportion of the Atlantic salmon harvest in Canada from all users (recreational, aboriginal, Labrador resident food) which takes place in rivers (on single stocks), in estuaries, and in coastal areas has varied annually (Figure 1). Coastal harvests have ranged from about 2 t to 9 t during 2000 to 2016, representing about 6% or less of the total annual harvests of Atlantic salmon. Harvests in recreational fisheries occur exclusively in rivers. Harvests in aboriginal food, social and ceremonial fisheries of Quebec and New Brunswick occur in rivers and estuaries whereas harvests in the subsistence food fisheries (aboriginal and resident) of Labrador occur in estuaries and coastal areas.

The aboriginal fisheries that occur in estuaries of Quebec and New Brunswick take place in the vicinity of single rivers, generally in tidal waters of rivers, and consequently are not considered to be mixed-stock fisheries. While the net fisheries for the Labrador subsistence food fisheries are authorized for coastal waters, current fishing activity occurs with gillnets very close to the communities which are located in deep bays along the coast away from the headlands where interception of non-local stocks of salmon historically was an issue. Despite this important change in the location of the current Labrador subsistence fisheries compared to the locations of the historical commercial marine fisheries, the Labrador subsistence fisheries are considered by NASCO as mixed stock fisheries.

GEOGRAPHIC LOCATION OF FISHERIES FOR ATLANTIC SALMON

The subsistence food fisheries in Labrador take place in estuaries and coastal areas. For the purposes of reporting the location of the harvests, the following definition of an estuary is used:

> "D.W. Pritchard (1967. What is an estuary: physical viewpoint. p. 3–5 in: G. H. Lauf (ed.) Estuaries, A.A.A.S. Publ. No. 83, Washington, D.C.) states that an estuary must (1) be partially enclosed, (2) have river(s) running into it, (3) have mix of fresh and sea water. An estuary

is thus a partly enclosed coastal body of water in which river water is mixed with seawater, defined by salinity rather than geography. As such Lake Melville in Labrador is considered to be an estuary" (D. Reddin DFO, unpubl. ICES working document).

Based on this definition and from interviews with guardian and fishery officers in Labrador, the fishing locations in Labrador were categorized as estuary or coastal and harvests attributed to these accordingly. Between 2000 and 2016, the percentage of the total Labrador subsistence harvests which were taken in coastal areas has ranged from 15.0% to 25.2% (Table 1). In 2016, 32.6 t, 82.4% of total subsistence fisheries harvests of Atlantic salmon, were harvested from areas classified as estuaries and 7.0 t (17.6%) were from locations classified as coastal. Approximately similar percentages of the harvests in SFA 1A and SFA 2 occur in coastal areas (Table 2).

MANAGEMENT OF THE LABRADOR SUBSISTENCE FOOD FISHERIES

There are two types of subsistence net fisheries in Labrador that authorize the harvest of Atlantic salmon:

- Resident subsistence Trout fishery that permits a by-catch of salmon, and
- Aboriginal Food Social and Ceremonial (FSC) Fisheries that direct for Atlantic salmon.

In recent years, the fishing season and mesh sizes in the various fisheries have been modified in an effort to reduce the capture of large salmon while at the same time providing an opportunity to harvest small salmon, trout and Arctic charr. Carcass tags are required for all harvested salmon in these fisheries and an allocation of tags is provided to each group which sets limits on the total harvest of salmon which can be taken. All sales of salmon are prohibited.

1) Resident Subsistence Trout Fishery

There is a long-standing tradition of trout net fishing in Labrador. Following the closure of the commercial salmon fishery in Labrador in 1998, there was an increased dependency on the trout fishery for subsistence purposes. A subsistence trout net licence is required and available to residents of Labrador to harvest trout for food purposes. There is a recognized by-catch of Atlantic salmon in the trout nets. Tags for salmon were issued on an individual fisher basis to attach to salmon so that legally caught salmon could be identified. There was a catch limit on charr and trout combined of 50 fish per designate or license holder and there is a limit of one designate or licence holder per household. A number of additional management measures are currently in place for this fishery.

- 148 licences issued for Cape Rouge to Fish Cove Point, including Lake Melville (Licence Cap 156) and approximately 140 licences issued for the coast of Labrador in 2016. Furthermore, there is a limit of one designate or licence holder per household.
- Target species are Speckled trout and Arctic charr with a seasonal limit of 50 trout / charr
- A maximum by-catch of 3 Atlantic salmon can be retained
- Fishing must cease when either 3 salmon or 50 trout and/or charr are taken
- All harvested salmon must be tagged
- Licence holders are permitted to use a single net with a maximum length of 15 fathoms
- Monofilament netting materials are not permitted
- Mesh size permitted is 4 inches

- The net must be set in a straight line
- Gear must be marked identifying licence holder
- Seasons in 2016 varied by location (refer to map in Figure 3):
    - Davis Inlet to Cape Chidley: June 24 to July 17
    - Cape Rouge to Davis Inlet: June 17 to July 15
    - Cape Rouge to Fish Cove Point (including Lake Melville): June 03 to July 03 and July 19 to August 03 (Kenamu River closes July 31)
    - Fish Cove Point to Cape Charles: July 12 to July 31
- No fishing (nets must be removed from the water) between the hours of 6:00 p.m. Sunday and 6:00 p.m. Monday.
- Completed logbooks of catch and effort must be submitted to Fisheries and Oceans Canada at the end of season.

2) Aboriginal Food Social and Ceremonial (FSC) fisheries

In response to the Supreme Court of Canada decision interpreting Section 35 of the Constitution Act of 1982, Fisheries and Oceans Canada (DFO) provided resource access to Aboriginal groups of Labrador for FSC purposes. Between 1999 and 2005, a FSC fishery was made available for members of the Labrador Inuit Association (LIA) in northern Labrador as well as the Lake Melville area, both located in SFA 1. In 2006, with the signing of the LIA Land Claims Agreement, a subsistence fishery with the Nunatsiavut Government which is the successor organization to the LIA was negotiated (Figure 2). The Innu Nation also fishes for salmon in Lake Melville from the community of Sheshatshiu and in northern Labrador from the community of Natuashish. In 2004, members of the NunatuKavut Community Council (NCC) on the south coast of Labrador negotiated a subsistence fishery with Fisheries and Oceans Canada in the area between Fish Cove Point and Cape St. Charles, located in SFA 2. In 2013, a subsistence fishery was negotiated with the NCC for access to upper Lake Melville.

The three Aboriginal groups with FSC fisheries in Labrador presently include:

- Nunatsiavut Government
    - 7,200 beneficiaries
    - 900 designated fishers
- Innu Nation
    - 2,200 members
    - 100 designated fishers
- NunatuKavut Community Council
    - 6,000 members
    - 1,050 designated fishers

All FSC fisheries are controlled through the issuance of a communal licence by Fisheries and Oceans Canada which includes carcass tags. Carcass tags are required for all harvested salmon in these fisheries and an allocation of tags is provided to each group which limits the harvest which can be taken. In 2016, the total number of carcass tags issued was 15,300 tags. The fishing gear used is gillnets.

There are a number of management measures implemented in all three of the licences. These include:

- Mono filament netting not permitted
- A maximum length of 25 fathoms of net per designated fisher

- Net must be set in a straight line
- No fishing (nets must be removed from the water) between the hours of 6:00 p.m. Sunday and 6:00 p.m. Monday.
- Gear must be tended every 24 hours
- All harvested salmon must be tagged
- Completed logbook of catch must be submitted to DFO at the end of season.

Specific measures for each group are described below.

Nunatsiavut Government

- For the Upper Lake Melville (ULM) area, the minimum mesh size is 3 inches and the maximum mesh size is 4 inches
- For the Labrador Inuit Settlement Area (LISA), there are various minimum mesh size requirements from 3 to 5 inches
- For the ULM area, the season extends from June 15 to July 8 and July 19 to August 31
- For LISA, the season extends from June 15 to August 31
- Fishing is allowed in tidal waters of the ULM and in various locations in tidal waters close to communities (Rigolet, Postville, Makkovik, Hopedale and Nain)
- 8,200 tags were issued; 4,200 (500*) for LISA and 4,000 for ULM
  *There is a reserve of 500 tags set aside for further allocation that was requested in 2016

Innu Nation

- Minimum mesh size of 3 inches and maximum mesh size of 4 inches
- For Sheshatshiu, the fishing season extends from May 15 to September 15
  - Fishing is permitted from Fish Cove Point, north to Cape Harrison, including Lake Melville and the inland waters of Little Lake and Grand Lake in Upper Lake Melville
  - Fishing activity in tidal waters does not occur outside the waters of Upper Lake Melville in the Kenamu River-Sheshatshiu areas
- For Natuashish, the fishing season extends from May 15 to August 31
  - Fishing is permitted in the tidal waters extending north and east from Cape Harrigan inclusive of Big Bay and south and east of Anaktalik Bay inclusive of Analtalik and Anktalik Bays including the inland waters of Sango Pond and Big Sango Lake
- 2,000 tags were issued: 1,500 for Sheshatshiu and 500 for Natuashish

NunatuKavut Community Council

- Minimum mesh size of 3.5 inches and maximum mesh size of 4 inches
- Fishing takes place in tidal waters from Fish Cove Point to Cape Charles
- Fishing season extends from July 6 to August 15
- For Upper Lake Melville, fishing takes place in tidal waters inside and west of the boundary line that marks the Labrador Inuit Marine Zone in Lake Melville
- Fishing season extends from June 15 to July 8 and July 19 to August 31
- 6,000 tags were issued: 5,700 for southern Labrador and 300 for Upper Lake Melville

HARVESTS IN THE LABRADOR SUBSISTENCE FISHERIES

FSC and resident subsistence fishers use logbooks to record catch and effort information. Data from returned logbooks are compiled by each user group and submitted to Fisheries and Oceans Canada at the end of the season. Total harvests are estimated by adjusting the reported catches proportionately to the total licenced/designated fishers (Reddin et al. 2005). The combined logbook return rate was 79% in 2016 and ranged from 55% to 87% from 2001 to 2015 (average 74%).

Details of the harvests of Atlantic salmon by size group (small salmon, large salmon) in terms of weight (kg) and number of fish overall and by Salmon Fishing Area are provided in Table 3 for the years 2000 to 2016. Harvests of Atlantic salmon in the Labrador subsistence fisheries ranged from 15.6 t in 2000 to 42.4 t in 2015 (Table 3; Figure 3). With the exception of 2013, 2015 and 2016, the small salmon size group comprises greater than 50% of the total harvest by weight, usually greater than 70% by number of salmon harvested (Table 3). In terms of number of salmon harvested, the subsistence food fisheries annually harvested 4,800 to 11,100 small salmon over the period 2000 to 2016 and large salmon harvests ranged from 1,400 to 6,400 fish, with the peak catches of small salmon in 2011 and large salmon in 2013 (Table 3; Figure 3).

There are annual variations in the harvest levels among the Salmon Fishing Areas in Labrador. On average over the period 2000 to 2016, the proportions of the total harvest, by number, of Atlantic salmon have been equally partitioned between SFA 1A and SFA 1B at 30% each and the remaining 40% from the southern Labrador area (Table 3). For small salmon, the average by number over the 2000 to 2016 period has been 28% and 30% of the total for SFA 1A and 1B, respectively, with the highest percentage, 42% from southern Labrador SFA 2 (Table 3; Figure 4). For large salmon numbers harvested, the percentages are more closely split among the three fishing areas, 37%, 32% and 31%, for SFA 1A, 1B and 2, respectively (Table 3; Figure 4).

Harvests are separated for the Labrador resident trout fishery (Table 4) and the aboriginal food, social and ceremonial (FSC) fisheries (Table 5).

The harvests of Atlantic salmon in the Labrador resident trout fisheries decreased after 2003 as some individuals fishing under the Labrador resident licence began fishing and reporting within the aboriginal communities. Since 2004, the harvests of Atlantic salmon in the resident trout fishery have varied between 1.6 t and 2.9 t, representing between 345 to 921 small salmon, 93 to 365 large salmon, in total (Table 4). The majority of the resident trout fishery harvests of Atlantic salmon are taken in the southern Labrador SFA 2; on average 58% by weight, 62% by number over the period 2004 to 2016 (Table 4). Harvests in Lake Melville (SFA 1B) have averaged 39% by weight, and 36% by number of the total harvest and harvests in northern Labrador SFA 1A have been approximately 2% of the total (Table 4).

The reported harvests in the aboriginal FSC fisheries in Labrador over the period 2004 to 2016 have ranged from 24.7 t to 40.4 t, with large salmon representing between 34% and 64% of the total harvest of salmon by weight and 21% to 47% of the total by number (Table 5). These harvests (2004 to 2016) have represented between 7,200 and 10,600 small salmon, 2,600 to 6,000 large salmon by number. As the aboriginal FSC fisheries comprise the majority of the Labrador subsistence fishery harvests (90% to 96% for small salmon by number; 91% to 96% for large salmon by number; 2004 to 2016), the distributions of the aboriginal FSC harvests among the Salmon Fishing Areas are the same as those for the overall harvests. For small salmon harvests by number, the average over the 2004 to 2016 period has been 24% and 32% of the total for SFA 1A and 1B, respectively, with the highest percentage, 44% from southern

Labrador SFA 2 (Table 5). For large salmon harvested by number, the percentages of the total were highest in SFA 1A at 35% and approximately similar for SFA1B and SFA 2 at 33% and 32%, respectively (Table 5).

SAMPLING PROGRAMME FOR LABRADOR ABORIGINAL FISHERIES

Sampling of the Labrador subsistence fisheries is very difficult as there is no common landing location. Sampling is conducted by personnel from the respective aboriginal groups. In southern Labrador, sampling was conducted by personnel hired by the Nunatukavut Community Council (NCC). In addition, Guardians hired as part of the DFO Aboriginal Fisheries Strategy program were requested to sample salmon. Conservation Officers of the Nunatsiavut Government (NG) also conducted sampling at each community in northern Labrador and in Lake Melville.

Sampling protocols generally consist of sampling landed salmon at random and where possible the total catch of a given boat is examined. Fish are measured (fork length to the nearest cm), weighed (gutted weight or whole weight if available to the nearest 1/10th of a kg) and sex determined. Scales are taken for age analysis and fish are examined for external tags, brands or elastomer marks, adipose clips and microtags. Since 2011, fin clip tissue samples have also been collected for genetic analysis leading to the identification of the origin the salmon.

Sampling program results have been reported annually at ICES since the 2006 fishery sampling program. The NCC and NG sampling programme of Labrador Aboriginal fisheries continued in 2015 and 2016. Landed fish were sampled opportunistically for length, weight, sex, scales (age analysis) and tissue (genetic analysis). Fish were also examined for the presence of external tags or marks.

In 2015, a total of 880 samples were collected from the Labrador subsistence fisheries, 212 from northern Labrador (SFA 1A), 204 from Lake Melville (SFA 1B) and 464 samples from southern Labrador (SFA 2) (Table 6). Based on the interpretation of the scale samples, 77% were 1SW salmon, 19% were 2SW, one sample was a 3SW salmon (<1%), and 4% were previously spawned salmon. The majority of salmon sampled were river ages 3 to 5 years (98%) (modal age 4).

In 2016, a total of 810 samples were collected from the Labrador FSC fisheries: 278 from northern Labrador (SFA 1A), 155 from Lake Melville (SFA 1B), and 377 samples from southern Labrador (SFA 2) (Table 6). Based on the interpretation of the scale samples (n=756), 69% were 1SW salmon, 26% were 2SW, and 5% were previously spawned salmon. The majority of salmon sampled were river ages 3 to 5 years (99%) (modal age 4).

In 2015 and 2016, there were no river age 1 and few river age 2 (0.5%) salmon sampled, suggesting, as in previous years (2006 to 2014), that very few salmon from the most southern stocks of North America (USA, Scotia-Fundy) were exploited in these fisheries.

The intensity of the sampling program (number of samples divided by reported harvests in number of fish from the aboriginal fishery) was 3.1%, 4.2%, 1.7% and 5.8% for the sampling years 2012 to 2015, respectively. In 2015 and 2016, the sampling intensity was 6% in both years.

LABRADOR FISHERY ORIGIN AND COMPOSITION OF THE CATCHES

As presented at the NASCO annual meeting in 2014 and reported to NASCO in 2015, the stock composition and variation in composition of salmon harvested in the Labrador subsistence food fisheries were determined based on a recently developed North American baseline for Atlantic salmon which allows assignment to regional reporting groups of eastern North America

(Bradbury et al. 2014, 2015; Moore et al. 2014). In total, twelve regional groups in eastern North America can be reliably identified using 15 microsatellite loci (Figure 5). The regional groups do not correspond directly to the six regions used by the ICES Working Group to characterize stock status and to provide catch advice. The overlap between the regional groups and the ICES areas in North America are shown in Table 7.

Characteristics of microsatellite markers of fishery samples from 2006 to 2016 were assessed relative to the twelve reporting groups. The estimated proportional contributions of the twelve groups (and associated standard errors) based on combined samples for 2006 to 2011 and annual samples for 2012 to 2016 are shown in Figure 6. The uncertainties in the estimated contributions are lowest (coefficient of variation, CV, of 1%) for the largest contributing group (Labrador Central).

The Labrador Central (LAB) regional group represents the majority (almost 93 to 99%) of the salmon in the Labrador subsistence fishery with minor contributions from a few other regions, primarily Ungava-Labrador North (Bradbury et al. 2015). No USA origin salmon were identified in the mixed stock analysis of samples from 2012 to 2016 and raised catches for those years are essentially zero. However, Bradbury et al. (2014) previously reported the presence of USA origin salmon in the samples from the fisheries in 2006 to 2011 with raised harvest estimates of 30 to 40 fish per year.

By Salmon Fishing Area, the samples from Lake Melville (SFA 1B) were essentially 100% from the Labrador Central regional group (Table 8). The Labrador Central regional group was also the dominant regional group in the samples from SFA 1A and SFA 2. Detectable contributions of salmon from the Ungava / Northern Labrador regional group of about 5% were identified in large salmon samples from 2016.

Funding to support the analysis of the 2017 and 2018 fishery samples has been secured and the results will be reported to ICES and NASCO as they become available.

REFERENCES CITED

Bradbury, I.R., Hamilton, L.C., Robertson, M.J., et al. 2014. Landscape structure and climatic variation determine Atlantic salmon genetic connectivity in the northwest Atlantic. Canadian Journal of Fisheries and Aquatic Sciences 71, 246-258.

Bradbury, I.R., Hamilton, L.C., Rafferty, S., et al. 2015. Genetic evidence of local exploitation of Atlantic salmon in a coastal subsistence fishery in the Northwest Atlantic. Can. J. Fish. Aquat. Sci. 72, 83–95.

Moore J-S, Bourret V, Dionne M*, et al.* 2014. Conservation genomics of anadromous Atlantic salmon across its North American range: outlier loci identify the same patterns of population structure as neutral loci. Molecular Ecology 23, 5680-5697.

Reddin, D.G., Poole, R.J., King, W., Oliver, S., Nuna, R., and Parr, T. 2005. Harvests in various fisheries for salmonids, Atlantic salmon returns to rivers and environmental conditions in Labrador, 2004. DFO Can. Sci. Adv. Secr. Res. Doc. 2005/006.

ACKNOWLEDGEMENTS

The information presented in this document was contributed by various people within Fisheries and Oceans Canada Newfoundland and Labrador Region: Rebecca Poole, Martha Robertson,

and Tony Blanchard. The information was summarized by Gérald Chaput and Martha Robertson, Fisheries and Oceans Canada.

Table 1. Labrador subsistence fisheries harvests (weight in t; aboriginal and resident food) by geographic location of harvests, 2000 to 2016.

	Harvest (t)			Percentage of harvest	
Year	Estuarine	Coastal	Total	Estuarine	Coastal
2000	13.28	2.34	15.61	85.0	15.0
2001	13.50	2.79	16.29	82.9	17.1
2002	13.99	3.59	17.57	79.6	20.4
2003	17.49	4.62	22.11	79.1	20.9
2004	24.86	6.79	31.65	78.6	21.4
2005	24.72	7.20	31.91	77.5	22.5
2006	25.00	7.77	32.72	76.3	23.7
2007	20.45	6.01	26.46	77.3	22.7
2008	27.04	9.09	36.13	74.8	25.2
2009	22.61	7.20	29.81	75.9	24.1
2010	29.57	6.23	35.80	82.6	17.4
2011	33.84	7.52	41.36	81.8	18.2
2012	28.69	7.87	36.56	78.5	21.5
2013	31.66	8.31	39.97	79.2	20.8
2014	25.72	7.06	32.77	78.5	21.5
2015	34.27	8.16	42.44	80.8	19.2
2016	32.63	6.96	39.59	82.4	17.6

Table 2. The percentages of the harvested weight of Atlantic salmon in the Labrador subsistence fisheries that are taken in coastal areas, 2009 to 2016. All other harvests in these fisheries are taken in estuaries. Salmon fishing areas are shown in Figure 3.

Year	SFA 1A (northern Labrador)	SFA 1B (Lake Melville)	SFA 1 total	SFA 2 (Southern Labrador)	SFA 1 & 2 Labrador
2009	33.0%	0%	16.9%	33.0%	24.1%
2010	33.0%	0%	9.5%	33.0%	17.4%
2011	32.0%	0%	10.0%	33.0%	18.2%
2012	31.0%	0%	16.5%	32.1%	21.5%
2013	29.0%	0%	13.4%	34.1%	20.8%
2014	35.0%	0%	16.3%	32.0%	21.5%
2015	29.0%	0%	13.3%	30.0%	19.2%
2016	31.0%	0%	12.0%	31.0%	17.6%

Table 3. Labrador subsistence food fisheries harvests (weight in kg, and number of fish) by size group and overall, and by Salmon Fishing Area and overall, 2000 to 2016. Data for 2016 are provisional.

	Weight (kg)			Number of fish			% Large	
Year	Small	Large	Total	Small	Large	Total	By weight	By number
Labrador overall								
2000	10,353	5,261	15,614	5,323	1,352	6,675	33.7%	20.2%
2001	9,789	6,499	16,288	4,789	1,721	6,510	39.9%	26.4%
2002	11,581	5,990	17,572	5,806	1,389	7,195	34.1%	19.3%
2003	13,196	8,912	22,108	6,477	2,175	8,653	40.3%	25.1%
2004	17,379	14,270	31,649	8,385	3,696	12,081	45.1%	30.6%
2005	21,038	10,876	31,914	10,436	2,817	13,253	34.1%	21.3%
2006	21,198	11,523	32,721	10,377	3,090	13,467	35.2%	22.9%
2007	17,070	9,386	26,456	9,208	2,652	11,860	35.5%	22.4%
2008	19,386	16,975	36,361	9,834	3,909	13,743	46.7%	28.4%
2009	16,130	13,681	29,810	7,988	3,344	11,332	45.9%	29.5%
2010	20,523	15,070	35,593	9,867	3,725	13,595	42.3%	27.4%
2011	23,123	18,235	41,358	11,138	4,451	15,589	44.1%	28.6%
2012	18,738	17,820	36,559	9,977	4,228	14,204	48.7%	29.8%
2013	14,674	25,299	39,973	7,164	6,375	13,539	63.3%	47.1%
2014	17,916	14,858	32,774	8,959	3,995	12,953	45.3%	30.8%
2015	17,500	24,935	42,435	8,923	6,146	15,069	58.8%	40.8%
2016 (prov.)	14,565	25,027	39,592	7,638	5,598	13,236	63.2%	42.3%
SFA 1A (northern Labrador)								
2000	4,184	2,359	6,543	2,111	599	2,709	36.0%	22.1%
2001	4,446	3,449	7,895	2,178	890	3,068	43.7%	29.0%
2002	4,997	2,769	7,766	2,431	661	3,092	35.7%	21.4%
2003	6,672	5,051	11,723	3,217	1,169	4,386	43.1%	26.7%
2004	6,722	4,729	11,451	3,261	1,167	4,427	41.3%	26.4%
2005	5,044	3,517	8,561	2,468	859	3,327	41.1%	25.8%
2006	4,958	4,081	9,039	2,366	1,062	3,427	45.1%	31.0%
2007	3,263	2,460	5,723	1,874	751	2,624	43.0%	28.6%
2008	5,106	7,809	12,916	2,537	1,776	4,313	60.5%	41.2%
2009	4,045	4,355	8,400	1,880	1,038	2,917	51.8%	35.6%
2010	3,255	3,635	6,890	1,479	823	2,302	52.8%	35.7%
2011	4,012	4,329	8,340	1,825	983	2,809	51.9%	35.0%
2012	5,096	8,097	13,193	2,849	1,752	4,601	61.4%	38.1%
2013	2,635	9,251	11,887	1,278	2,278	3,556	77.8%	64.1%
2014	3,918	6,316	10,234	1,907	1,713	3,621	61.7%	47.3%
2015	4,001	8,544	12,545	2,017	2,093	4,110	68.1%	50.9%
2016 (prov.)	2,701	8,140	10,841	1,392	1,834	3,226	75.1%	56.9%
SFA 1B (Lake Melville)								
2000	3,927	2,006	5,933	2,001	493	2,493	33.8%	19.8%
2001	2,550	1,672	4,222	1,215	409	1,624	39.6%	25.2%
2002	2,389	1,672	4,061	1,178	354	1,532	41.2%	23.1%
2003	2,422	1,975	4,397	1,165	470	1,635	44.9%	28.7%
2004	3,316	3,927	7,243	1,561	1,043	2,604	54.2%	40.1%
2005	5,072	3,414	8,485	2,490	828	3,318	40.2%	24.9%
2006	6,231	2,249	8,480	3,057	577	3,634	26.5%	15.9%
2007	5,043	2,854	7,896	2,827	809	3,636	36.1%	22.3%
2008	5,235	5,818	11,053	2,616	1,179	3,795	52.6%	31.1%
2009	4,128	3,877	8,005	2,084	870	2,954	48.4%	29.4%
2010	9,414	7,506	16,920	4,478	1,847	6,324	44.4%	29.2%
2011	9,826	8,498	18,323	4,648	1,967	6,615	46.4%	29.7%
2012	5,532	6,025	11,557	2,891	1,410	4,301	52.1%	32.8%
2013	5,119	8,684	13,803	2,476	2,084	4,560	62.9%	45.7%

Year	Weight (kg) Small	Large	Total	Number of fish Small	Large	Total	% Large By weight	By number
2014	6,863	4,822	11,685	3,390	1,251	4,642	41.3%	27.0%
2015	5,512	9,299	14,811	2,803	2,067	4,870	62.8%	42.4%
2016 (prov.)	5,191	11,953	17,144	2,722	2,409	5,131	69.7%	46.9%
SFA 2 (southern Labrador)								
2000	2,242	897	3,139	1,212	260	1,472	28.6%	17.7%
2001	2,793	1,378	4,172	1,396	422	1,818	33.0%	23.2%
2002	4,196	1,549	5,745	2,197	374	2,571	27.0%	14.6%
2003	4,102	1,885	5,987	2,095	536	2,632	31.5%	20.4%
2004	7,341	5,614	12,955	3,564	1,486	5,050	43.3%	29.4%
2005	10,922	3,946	14,868	5,479	1,130	6,609	26.5%	17.1%
2006	10,008	5,193	15,201	4,955	1,451	6,406	34.2%	22.7%
2007	8,764	4,073	12,837	4,507	1,092	5,599	31.7%	19.5%
2008	9,044	3,349	12,393	4,680	954	5,634	27.0%	16.9%
2009	7,956	5,449	13,405	4,024	1,437	5,461	40.6%	26.3%
2010	8,033	3,952	11,985	4,041	1,069	5,110	33.0%	20.9%
2011	9,285	5,409	14,694	4,665	1,501	6,165	36.8%	24.3%
2012	8,110	3,699	11,809	4,237	1,066	5,303	31.3%	20.1%
2013	6,920	7,364	14,284	3,410	2,012	5,422	51.6%	37.1%
2014	7,135	3,720	10,855	3,661	1,030	4,691	34.3%	22.0%
2015	7,988	7,093	15,081	4,103	1,987	6,030	47.0%	33.0%
2016 (prov.)	6,673	4,936	11,609	3,524	1,355	4,879	42.5%	27.8%

Table 4. Labrador resident trout fisheries harvests (weight in kg, and number of fish) of Atlantic salmon by size group and overall, and by Salmon Fishing Area and overall, 2000 to 2016. Data for 2016 are provisional.

	Weight (kg)			Number of fish			% Large	
Year	Small	Large	Total	Small	Large	Total	By weight	By number
Labrador overall								
2000	2,480	1,057	3,537	1,330	298	1,628	29.9%	18.3%
2001	3,082	1,501	4,583	1,530	449	1,979	32.8%	22.7%
2002	4,504	1,642	6,146	2,349	399	2,747	26.7%	14.5%
2003	4,502	2,157	6,659	2,294	608	2,902	32.4%	20.9%
2004	1,302	869	2,171	652	224	876	40.0%	25.6%
2005	1,817	871	2,688	921	228	1,150	32.4%	19.9%
2006	1,574	1,007	2,581	769	283	1,052	39.0%	26.9%
2007	1,294	388	1,682	640	93	734	23.1%	12.7%
2008	1,253	1,064	2,317	619	210	830	45.9%	25.3%
2009	1,644	1,212	2,856	806	313	1,119	42.4%	28.0%
2010	1,408	861	2,269	731	255	990	37.9%	25.7%
2011	1,027	1,059	2,085	501	290	791	50.8%	36.6%
2012	873	827	1,700	435	206	641	48.7%	32.2%
2013	714	1,342	2,057	345	365	710	65.3%	51.4%
2014	886	746	1,632	454	204	659	45.7%	31.0%
2015	932	1,084	2,016	471	293	764	53.8%	38.4%
2016 (prov.)	698	916	1,614	360	232	592	56.7%	39.1%
SFA 1A (northern Labrador)								
2000	0	0	0	0	0	0	na	na
2001	0	0	0	0	0	0	na	na
2002	0	0	0	0	0	0	na	na
2003	0	0	0	0	0	0	na	na
2004	13	9	22	6	2	8	39.2%	25.0%
2005	13	9	22	6	2	8	39.2%	25.0%
2006	13	9	22	6	2	8	39.2%	25.0%
2007	0	0	0	0	0	0	na	na
2008	20	247	267	4	24	28	92.5%	85.7%
2009	0	0	0	0	0	0	na	na
2010	14	6	20	7	1	8	30.0%	13.0%
2011	7	16	23	3	5	8	69.6%	62.5%
2012	18	70	88	9	15	24	79.5%	62.5%
2013	0	0	0	0	0	0	na	na
2014	11	17	29	6	4	10	59.8%	42.9%
2015	14	59	73	8	12	20	59.8%	42.9%
2016 (prov.)	26	48	74	17	11	28	59.8%	42.9%
SFA 1B (Lake Melville)								
2000	238	160	398	118	38	156	40.2%	24.4%
2001	288	123	411	135	27	161	29.9%	16.5%
2002	309	93	402	152	24	176	23.1%	13.9%
2003	400	272	672	199	71	270	40.5%	26.4%
2004	439	502	942	210	122	332	53.3%	36.7%
2005	711	607	1,318	336	154	490	46.0%	31.4%
2006	223	76	298	111	21	132	25.3%	16.0%
2007	397	57	454	186	15	201	12.6%	7.7%
2008	171	122	293	88	29	117	41.7%	24.8%
2009	243	213	456	122	56	178	46.7%	31.5%
2010	602	461	1,062	292	144	436	43.4%	33.0%
2011	401	656	1,057	190	170	360	62.1%	47.1%
2012	362	526	888	177	131	308	59.2%	42.5%

Year	Weight (kg) Small	Large	Total	Number of fish Small	Large	Total	% Large By weight	By number
2013	322	789	1111	153	213	366	71.0%	58.3%
2014	381	425	806	183	110	293	52.7%	37.6%
2015	349	621	970	171	159	330	64.0%	48.2%
2016 (prov.)	246	569	815	123	135	258	69.8%	52.3%
SFA 2 (southern Labrador)								
2000	2,242	897	3,139	1,212	260	1,472	28.6%	17.7%
2001	2,793	1,378	4,172	1,396	422	1,818	33.0%	23.2%
2002	4,196	1,549	5,745	2,197	374	2,571	27.0%	14.6%
2003	4,102	1,885	5,987	2,095	536	2,632	31.5%	20.4%
2004	849	358	1,207	436	100	536	29.6%	18.7%
2005	1,092	255	1,347	579	72	652	18.9%	11.1%
2006	1,338	922	2,260	652	260	912	40.8%	28.5%
2007	897	331	1,228	455	78	533	26.9%	14.6%
2008	1,062	695	1,757	528	157	685	39.6%	22.9%
2009	1,401	998	2,400	684	257	941	41.6%	27.3%
2010	808	376	1,184	441	105	546	31.8%	19.3%
2011	619	387	1,005	308	115	423	38.5%	27.3%
2012	493	232	725	249	60	309	32.0%	19.4%
2013	392	554	946	193	152	344	58.5%	44.0%
2014	493	304	797	265	90	355	38.2%	25.2%
2015	569	405	974	292	123	355	41.6%	34.6%
2016 (prov.)	426	300	726	221	86	307	41.3%	28.0%

Table 5. Labrador aboriginal food, social, and ceremonial fisheries harvests (weight in kg, and number of fish) for Atlantic salmon by size group and overall, and by Salmon Fishing Area and overall, 2000 to 2016. Data for 2016 are provisional.

	Weight (kg)			Number of fish			% Large	
Year	Small	Large	Total	Small	Large	Total	By weight	By number
Labrador overall								
2000	7,873	4,205	12,077	3,993	1,054	5,047	34.8%	20.9%
2001	6,707	4,998	11,705	3,259	1,272	4,531	42.7%	28.1%
2002	7,077	4,348	11,425	3,457	990	4,448	38.1%	22.3%
2003	8,695	6,754	15,449	4,183	1,568	5,751	43.7%	27.3%
2004	16,077	13,401	29,478	7,733	3,472	11,205	45.5%	31.0%
2005	19,221	10,005	29,226	9,515	2,588	12,103	34.2%	21.4%
2006	19,623	10,516	30,140	9,608	2,807	12,415	34.9%	22.6%
2007	15,775	8,999	24,774	8,567	2,559	11,126	36.3%	23.0%
2008	18,133	15,911	34,044	9,215	3,699	12,913	46.7%	28.6%
2009	14,485	12,469	26,955	7,182	3,031	10,213	46.3%	29.7%
2010	19,115	14,209	33,324	9,135	3,470	12,605	42.6%	27.5%
2011	22,096	17,176	39,272	10,637	4,161	14,798	43.7%	28.1%
2012	17,865	16,993	34,858	9,542	4,022	13,564	48.7%	29.7%
2013	13,959	23,957	37,916	6,819	6,010	12,828	63.2%	46.8%
2014	17,031	14,112	31,142	8,504	3,790	12,295	45.3%	30.8%
2015	16,569	23,851	40,419	8,452	5,853	14,305	59.0%	40.9%
2016 (prov.)	13,867	24,111	37,978	7,277	5,366	12,644	63.5%	42.4%
SFA 1A (northern Labrador)								
2000	4,184	2,359	6,543	2,111	599	2,709	36.0%	22.1%
2001	4,446	3,449	7,895	2,178	890	3,068	43.7%	29.0%
2002	4,997	2,769	7,766	2,431	661	3,092	35.7%	21.4%
2003	6,672	5,051	11,723	3,217	1,169	4,386	43.1%	26.7%
2004	6,709	4,720	11,429	3,255	1,165	4,419	41.3%	26.4%
2005	5,031	3,508	8,539	2,462	857	3,319	41.1%	25.8%
2006	4,945	4,072	9,017	2,360	1,060	3,419	45.2%	31.0%
2007	3,263	2,460	5,723	1,874	751	2,624	43.0%	28.6%
2008	5,086	7,562	12,649	2,533	1,752	4,285	59.8%	40.9%
2009	4,045	4,355	8,400	1,880	1,038	2,917	51.8%	35.6%
2010	3,241	3,629	6,870	1,472	822	2,294	52.8%	35.8%
2011	4,005	4,313	8,317	1,822	978	2,801	51.9%	34.9%
2012	5,078	8,027	13,105	2,840	1,737	4,577	61.3%	38.0%
2013	2,635	9,251	11,887	1,278	2,278	3,556	77.8%	64.1%
2014	3,906	6,299	10,205	1,901	1,709	3,611	61.8%	47.4%
2015	3,987	8,485	12,472	2,009	2,081	4,090	68.0%	50.9%
2016 (prov.)	2,675	8,092	10,767	1,375	1,823	3,198	75.2%	57.0%
SFA 1B (Lake Melville)								
2000	3,689	1,846	5,535	1,883	455	2,337	33.4%	19.5%
2001	2,261	1,549	3,810	1,081	382	1,463	40.7%	26.1%
2002	2,080	1,579	3,659	1,027	329	1,356	43.2%	24.3%
2003	2,023	1,703	3,725	966	399	1,365	45.7%	29.2%
2004	2,876	3,424	6,301	1,351	922	2,272	54.4%	40.6%
2005	4,361	2,807	7,167	2,154	674	2,828	39.2%	23.8%
2006	6,008	2,174	8,182	2,946	556	3,502	26.6%	15.9%
2007	4,646	2,796	7,442	2,641	794	3,435	37.6%	23.1%
2008	5,064	5,695	10,760	2,529	1,150	3,679	52.9%	31.3%
2009	3,885	3,663	7,549	1,962	814	2,776	48.5%	29.3%
2010	8,812	7,046	15,858	4,186	1,703	5,888	44.4%	28.9%
2011	9,425	7,841	17,266	4,457	1,798	6,255	45.4%	28.7%
2012	5,170	5,499	10,669	2,714	1,279	3,993	51.5%	32.0%

	Weight (kg)			Number of fish			% Large	
Year	Small	Large	Total	Small	Large	Total	By weight	By number
2013	4,796	7,895	12,691	2,323	1,871	4,194	62.2%	44.6%
2014	6,482	4,397	10,879	3,207	1,141	4,348	40.4%	26.2%
2015	5,163	8,678	13,841	2,632	1,908	4,540	62.7%	42.0%
2016 (prov.)	4,945	11,384	16,329	2,599	2,274	4,873	69.7%	46.7%
SFA 2 (southern Labrador)								
2000	0	0	0	0	0	0	na	na
2001	0	0	0	0	0	0	na	na
2002	0	0	0	0	0	0	na	na
2003	0	0	0	0	0	0	na	na
2004	6,492	5,256	11,748	3,128	1,386	4,514	44.7%	30.7%
2005	9,830	3,691	13,520	4,899	1,058	5,957	27.3%	17.8%
2006	8,670	4,270	12,941	4,303	1,191	5,494	33.0%	21.7%
2007	7,867	3,742	11,609	4,052	1,014	5,066	32.2%	20.0%
2008	7,982	2,654	10,636	4,153	797	4,949	24.9%	16.1%
2009	6,555	4,451	11,006	3,340	1,180	4,520	40.4%	26.1%
2010	7,225	3,576	10,801	3,600	964	4,564	33.1%	21.1%
2011	8,667	5,022	13,689	4,357	1,385	5,742	36.7%	24.1%
2012	7,617	3,467	11,084	3,988	1,006	4,994	31.3%	20.1%
2013	6,528	6,810	13,338	3,217	1,860	5,078	51.1%	36.6%
2014	6,642	3,415	10,058	3,396	940	4,336	34.0%	21.7%
2015	7419	6688	14,107	3811	1864	5,675	47.4%	32.8%
2016 (prov.)	6247	4636	10,883	3303	1269	4,572	42.6%	27.8%

Table 6. Number of samples collected and percentages of samples by river age within the sampling areas from the aboriginal food fisheries in Labrador for 2015 and 2016.

Area	Number of Samples	River Age						
		1	2	3	4	5	6	7
PERCENTAGE OF SAMPLES BY RIVER AGE WITHIN THE THREE SAMPLED AREAS IN 2015								
Northern Labrador (SFA 1A)	212	0.0	0.0	17.5	59.9	20.8	0.9	0.9
Lake Melville (SFA 1B)	204	0.0	1.0	30.4	53.9	14.7	0.0	0.0
Southern Labrador (SFA 2)	464	0.0	0.4	14.4	55.2	27.6	2.4	0.0
All areas	880	0.0	0.5	18.9	56.0	23.0	1.5	0.2
PERCENTAGE OF SAMPLES BY RIVER AGE WITHIN THE THREE SAMPLED AREAS IN 2016								
Northern Labrador (SFA 1A)	234	0.0	0.0	20.0	60.0	20.0	0.0	0.0
Lake Melville (SFA 1B)	153	0.0	0.7	21.6	70.6	7.2	0.0	0.0
Southern Labrador (SFA 2)	369	0.0	0.5	24.9	57.5	15.7	1.4	0.0
All areas	756	0.0	0.5	22.1	62.0	14.7	0.7	0.0

Table 7. Correspondence between ICES areas used for the assessment of status of North American salmon stocks and the regional groups (Figure 5) defined from the North American genetic baseline.

ICES region	Regional group	Group acronym
Quebec / Labrador	Ungava / Northern Labrador	UNG
Labrador	Labrador Central	LAB
Labrador / Quebec	Quebec / Labrador South	QLS
Quebec	Quebec	QUE
Quebec	Anticosti	ANT
Quebec / Gulf	Gaspe	GAS
Gulf / Scotia-Fundy	Gulf of St. Lawrence	GUL
Scotia-Fundy	Nova Scotia	NOS
Scotia-Fundy	Inner Bay of Fundy	FUN
USA	USA	US
Newfoundland	Newfoundland	NFL
Newfoundland	Avalon	AVA

Table 8. Estimated percent contributions (mean and standard error) by regional group of North American origin salmon in the Labrador FSC fisheries, 2015 and 2016. Regional groups are shown in Figure 5. Note: values in shaded cells are not significantly different from 0.

Regional Groups	Salmon All size groups Mean (S.E.)		Small Salmon < 63 cm Mean (S.E.)		Large Salmon ≥ 63 cm Mean (S.E.)		Northern Labrador SFA 1A Mean (S.E.)		Lake Melville SFA 1B Mean (S.E.)		Southern Labrador SFA 2 Mean (S.E.)	
Year	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
ANT	0.03 (0.06)	0.03 (0.06)	0.07 (0.15)	0.05 (0.11)	0.06 (0.16)	0.08 (0.23)	0.07 (0.19)	0.08 (0.20)	0.05 (0.12)	0.06 (0.15)	0.05 (0.12)	0.07 (0.18)
AVA	0.03 (0.07)	0.03 (0.06)	0.06 (0.15)	0.04 (0.07)	0.05 (0.14)	0.10 (0.27)	0.08 (0.23)	0.07 (0.16)	0.05 (0.13)	0.06 (0.18)	0.06 (0.18)	0.07 (0.19)
FUN	0.03 (0.07)	0.03 (0.07)	0.05 (0.11)	0.04 (0.10)	0.06 (0.18)	0.07 (0.20)	0.08 (0.20)	0.08 (0.21)	0.05 (0.14)	0.05 (0.14)	0.07 (0.17)	0.06 (0.17)
GAS	0.05 (0.13)	0.03 (0.08)	0.27 (0.58)	0.04 (0.11)	0.08 (0.23)	0.10 (0.28)	0.17 (0.43)	0.10 (0.30)	0.06 (0.15)	0.06 (0.15)	0.17 (0.44)	0.09 (0.25)
GUL	0.04 (0.10)	0.04 (0.07)	0.34 (0.59)	0.04 (0.10)	0.10 (0.26)	0.11 (0.31)	0.15 (0.38)	0.10 (0.27)	0.06 (0.16)	0.05 (0.14)	0.11 (0.29)	0.07 (0.19)
LAB	98.54 (0.68)	99.26 (0.55)	91.05 (2.92)	99.02 (0.66)	96.09 (2.38)	92.24 (2.74)	94.20 (2.67)	97.19 (1.64)	98.84 (1.10)	99.28 (0.63)	95.98 (2.35)	97.84 (1.29)
NFL	0.03 (0.07)	0.05 (0.12)	0.46 (0.82)	0.12 (0.30)	0.07 (0.19)	0.25 (0.65)	0.14 (0.39)	0.31 (0.69)	0.07 (0.17)	0.07 (0.17)	0.09 (0.27)	0.16 (0.43)
NOS	0.03 (0.07)	0.03 (0.06)	0.06 (0.15)	0.05 (0.12)	0.07 (0.19)	0.09 (0.29)	0.07 (0.19)	0.07 (0.19)	0.05 (0.13)	0.07 (0.19)	0.08 (0.24)	0.08 (0.21)
QLS	0.13 (0.22)	0.05 (0.11)	4.00 (2.32)	0.07 (0.18)	2.29 (2.11)	1.96 (1.88)	0.42 (0.81)	0.09 (0.26)	0.09 (0.25)	0.08 (0.26)	2.11 (2.16)	0.27 (0.68)
QUE	0.05 (0.12)	0.03 (0.07)	1.13 (1.35)	0.04 (0.10)	0.06 (0.16)	0.19 (0.54)	0.15 (0.40)	0.08 (0.26)	0.08 (0.22)	0.07 (0.21)	0.08 (0.23)	0.06 (0.18)
UNG	0.99 (0.60)	0.37 (0.47)	2.46 (1.26)	0.45 (0.47)	0.96 (1.23)	4.74 (1.87)	4.40 (2.49)	1.77 (1.30)	0.55 (0.97)	0.10 (0.25)	1.02 (0.96)	1.14 (0.81)
USA	0.03 (0.06)	0.03 (0.07)	0.07 (0.21)	0.04 (0.08)	0.1 (0.26)	0.06 (0.18)	0.07 (0.21)	0.07 (0.20)	0.06 (0.16)	0.06 (0.18)	0.17 (0.37)	0.07 (0.22)

Figure 1. Summary of harvests, in weight (t), of Atlantic salmon by geographic origin of the fisheries for eastern Canada, 2000 to 2016. Data for 2016 are provisional.

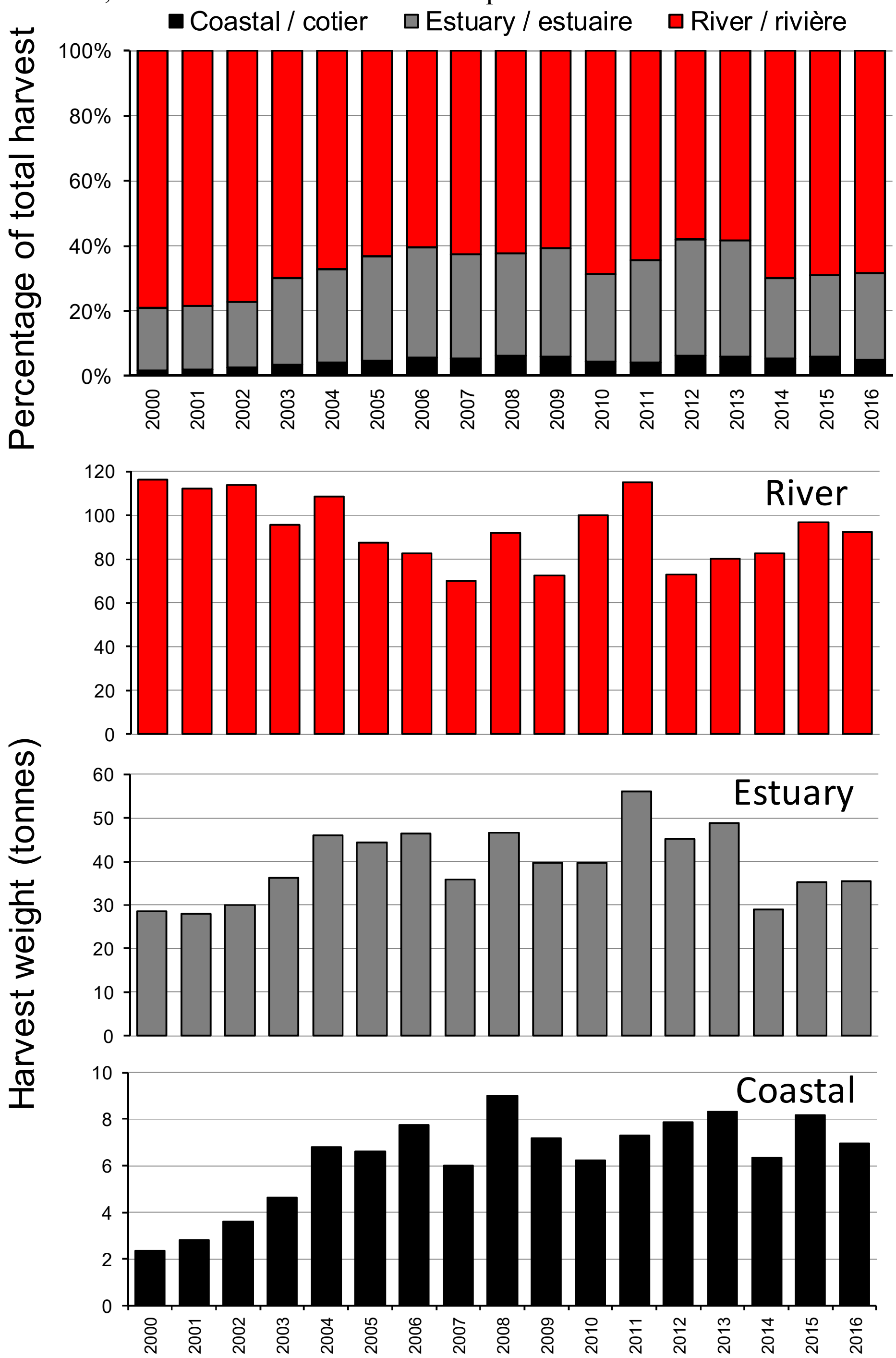


Figure 2. Map of Labrador showing the area represented by the Labrador Inuit Lands and the Labrador Inuit Settlement Area.

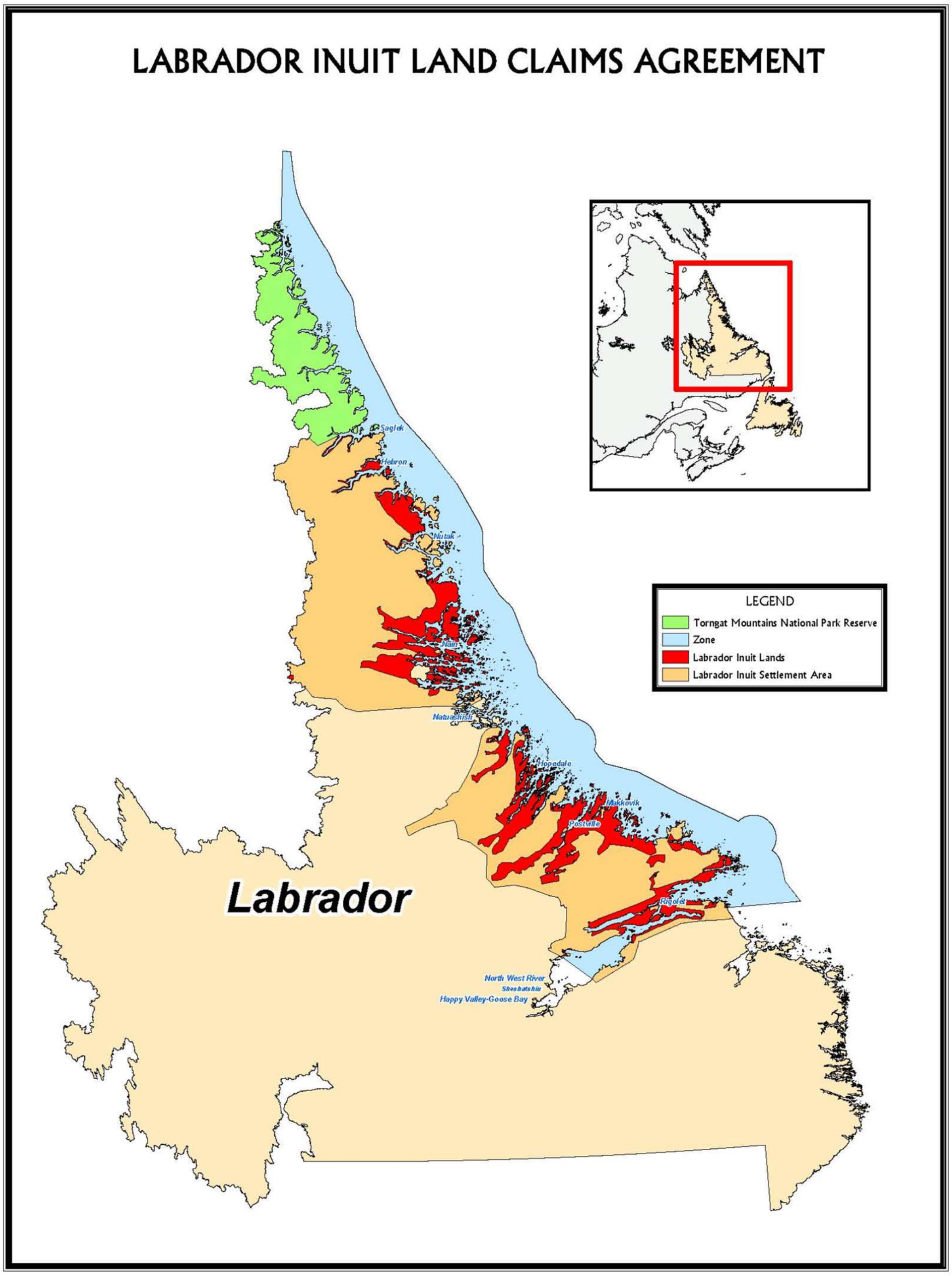


Figure 3. Total harvests (by number and weight) by size group of Atlantic salmon in the Labrador subsistence fisheries by Salmon Fishing Area, 2000 to 2016. Data for 2016 are provisional. Place names referred to in the text are also shown for reference.

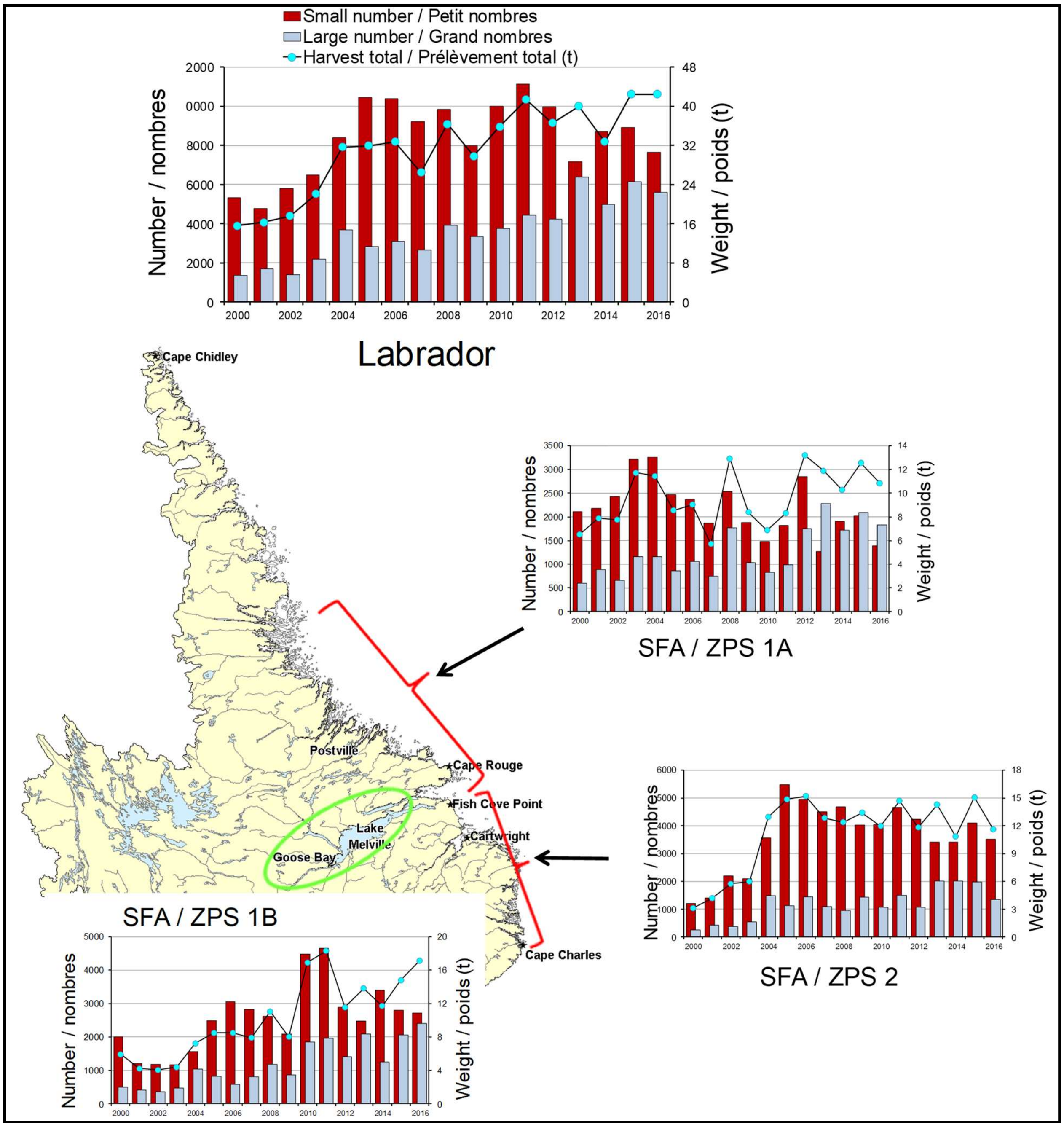


Figure 4. Distribution (percentages) of the Labrador subsistence fisheries harvests (by number) of small salmon (upper panel) and large salmon (lower panel) among the three Salmon Fishing Areas, 2000 to 2016.

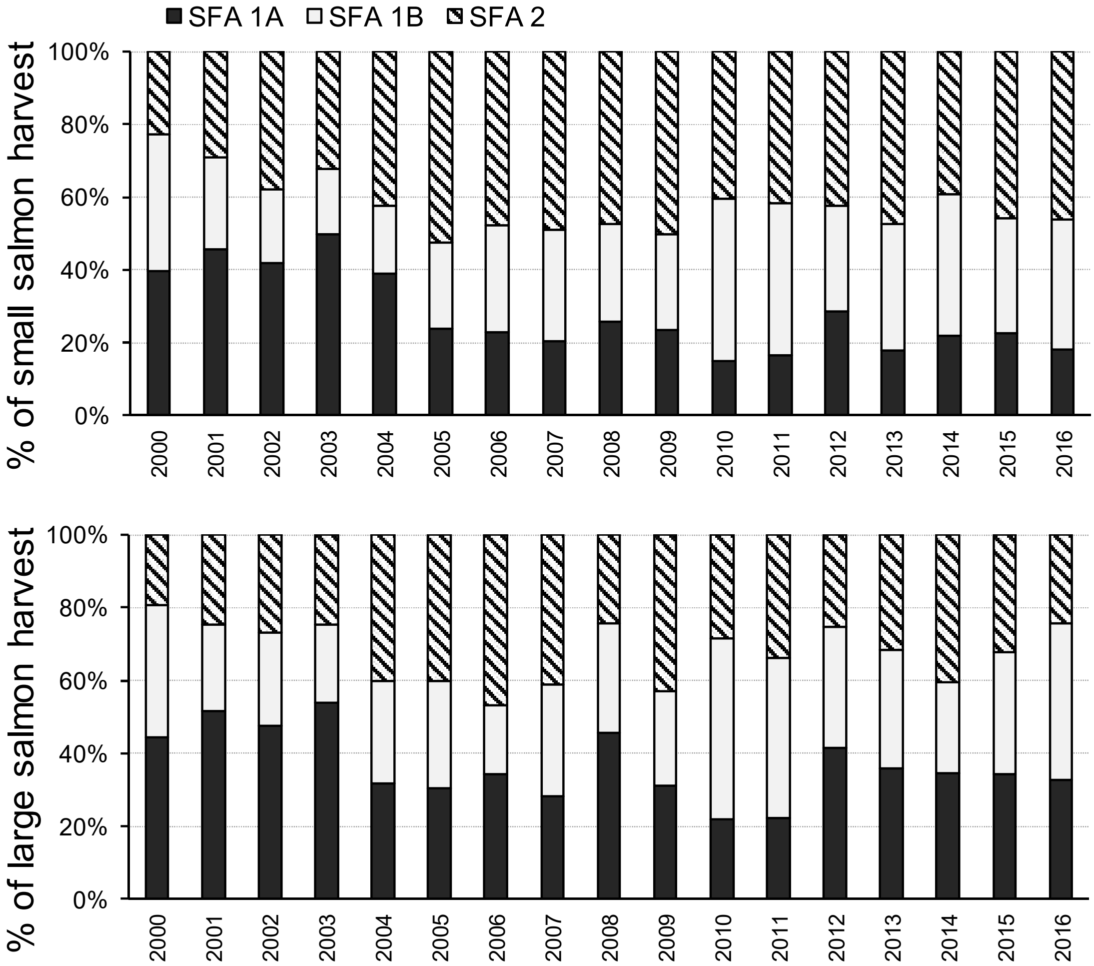


Figure 5. Map of sample locations used in the microsatellite baseline development for Atlantic salmon in North America and the regional groups resolved from the baseline. See Bradbury et al. (2015) for details and Table 7 for location abbreviations.

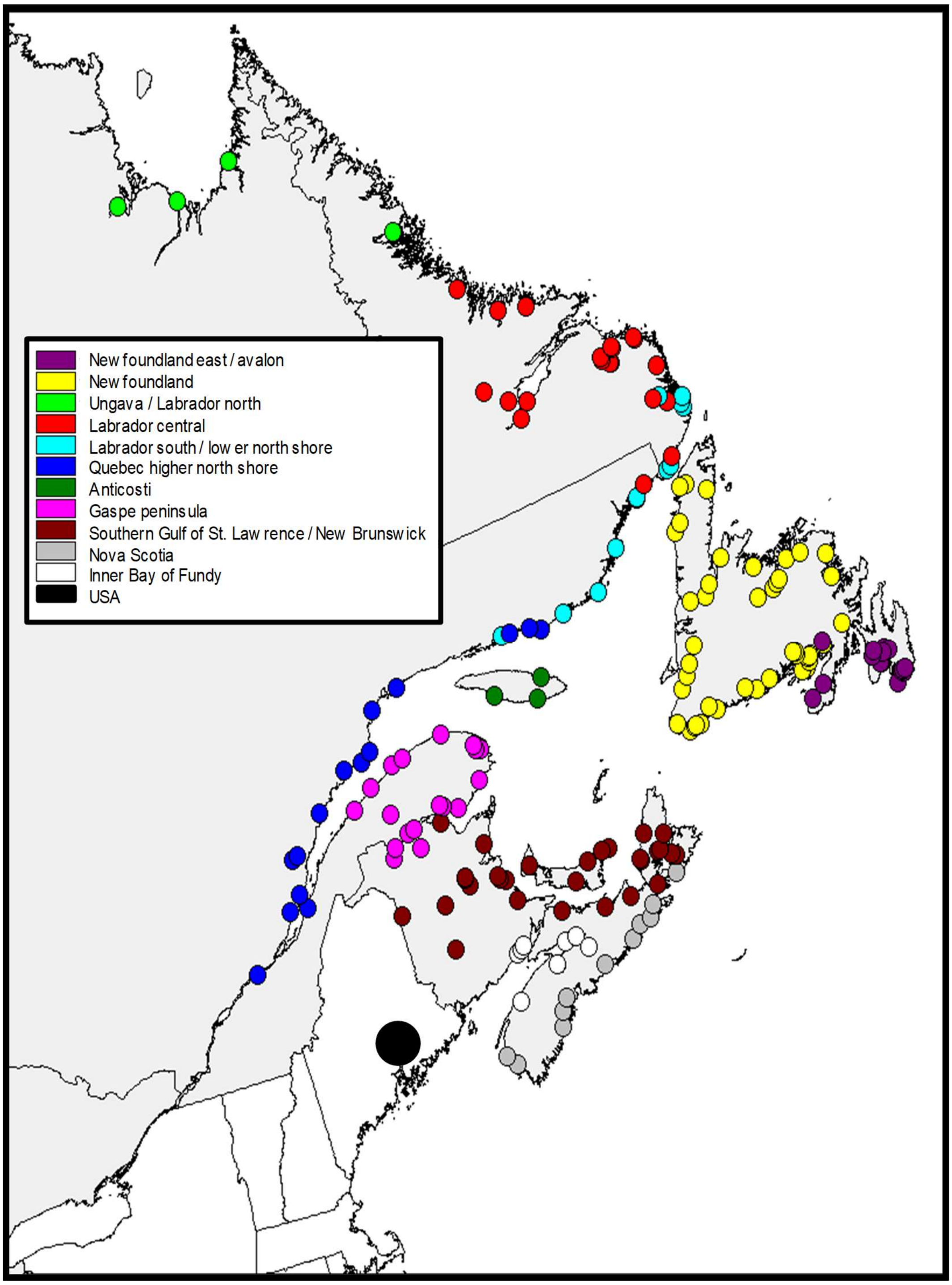
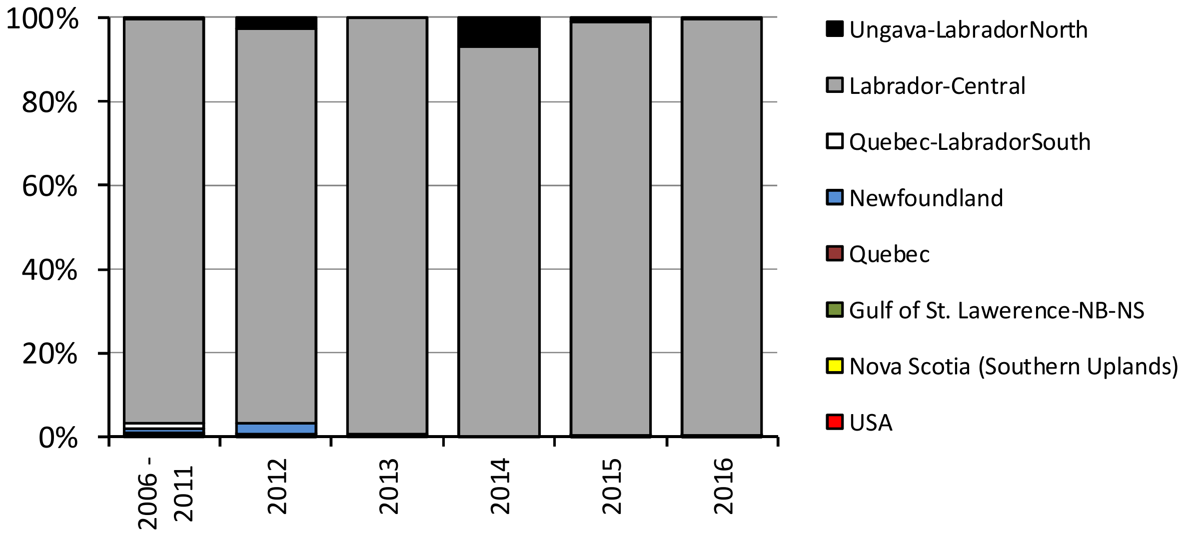


Figure 6. Bayesian estimates of mixture composition of samples from the Labrador Atlantic Salmon aboriginal fisheries from the combined samples for 2006 to 2011, and for each year 2012 to 2016. The groups, other than the first three Labrador groups, refer approximately to the regions used by ICES for assessment (Table 7 and Figure 5).



Annex 4

Council

CNL(17)17

Management and Sampling of the St Pierre and Miquelon Salmon Fishery

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

MINISTÈRE DES OUTRE-MER

DIRECTION GÉNÉRALE DES OUTRE-MER

SOUS-DIRECTION DES POLITIQUES PUBLIQUES

BUREAU DES POLITIQUES AGRICOLES,
RURALES ET MARITIMES

Affaire suivie par : ***Christiane LAURENT-MONPETIT***
Tél. : 01.53.69 24 66
Fax : 01.53.69.29.11
christiane.laurent-monpetit@outre-mer.gouv.fr

RÉF : 17-014755-D

Paris, le 15 MAI 2017

La Ministre des outre-mer

à

M. Steinar Hermansen,
Président de l'Organisation de conservation du saumon de l'Atlantique nord (OCSAN)

Objet : Rapport annuel sur la pêcherie du saumon à Saint-Pierre-et-Miquelon

En prévision de la trente-quatrième réunion annuelle de l'OCSAN à Varberg, Suède, du 6 au 9 juin 2017, les autorités françaises ont l'honneur de vous faire parvenir le rapport de la France au titre de Saint-Pierre-et-Miquelon préparé par la Direction des Territoires, de l'Agriculture et de la Mer à Saint-Pierre.

En 2016 la coopération entre l'Ifremer et Pêches et Océans Canada s'est poursuivie, permettant de disposer aussi d'informations scientifiques.

Le sous-directeur
des politiques publiques

Stanislas CAZELLES

27, rue Oudinot - 75358 PARIS 07 SP - Tél. 01 53 69 20 00
Internet : www.outre-mer.gouv.fr

PRÉFET DE SAINT-PIERRE-ET-MIQUELON

Direction des Territoires,
de l'Alimentation et de la Mer

Saint-Pierre, 22 March 2017

Service des Affaires Maritimes et Portuaires

L'adjointe au directeur, chef du service
des affaires maritimes et portuaires

to

Monsieur le directeur des pêches maritimes et de l'aquaculture

Reference:

Tour Sequoia
92055 LA DEFENSE CEDEX

Contact: Julie Matanowski
julie.matanowski@equipement-agriculture.gouv.fr
Tel: 05 08 41 15.30- **Fax:** 05 08 41 48 34

RE: Report on the 2016 salmon fishery

Annual Report on the Atlantic Salmon Fishery at St Pierre and Miquelon 2016 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

436 boat inspections were carried out by the Maritime and Port Affairs Service between 9 May and 7 July. These were carried out at random on 48 occasions, in the morning and/or the evening, on both recreational and professional vessels.

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 and Port 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 2016, 8 professional and 70 recreational permits were issued. The total number of permits issued has remained stable over the last 4 years, while the number of actual fishers has remained constant since 2005 (an average of 50 fishers per year over the last 11 years).

3. Salmon catch

The total 2016 catch stands at:

Professional catch: 978.58kg (1,213kg in 2015). 436 salmon caught
Recreational catch: 3,749kg (2,300kg in 2015). 1,246 salmon caught

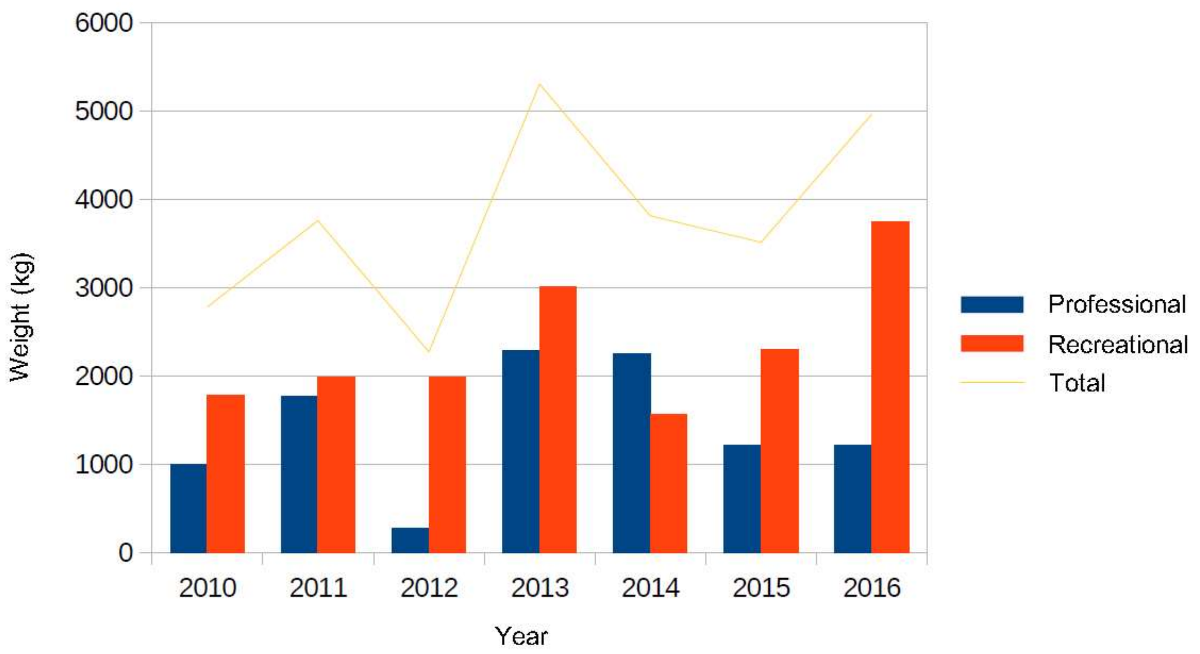
The total weight of the 2016 catch was therefore 4,727kg, compared to 3,513kg in 2015.

The 1,246 salmon caught by 65 recreational boats averages around 19 salmon per recreational fisher. However, the highest catch by a single recreational vessel was 49 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 436 salmon caught by 8 professional vessels averages around 54 salmon per professional fisher. The highest catch by a single professional vessel was 247 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	2016
Professional Fishery															
No. of licenses	12	12	13	14	13	13	9	8	9	9	9	9	12	8	8
Catch volume	**1223**	**1620**	**1499**	**2243**	**1730**	**970**	**1604**	**1864**	**1002**	**1764**	**278**	**2291**	**2250**	**1213**	**978**
Recreational Fishery															
No. of licenses	42	42	42	52	52	53	55	50	57	58	60	64	70	70	70
Catch Volume	**729**	**1272**	**1285**	**1044**	**1825**	**1062**	**1846**	**1600**	**1780**	**1992**	**1168**	**3011**	**1561**	**2300**	**3749**
Total catch	1952	2892	2784	3287	3855	2032	3450	3464	2782	3756	1446	5302	3811	3513	4727

Salmon catch at St Pierre and Miquelon 2010 - 2016



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.

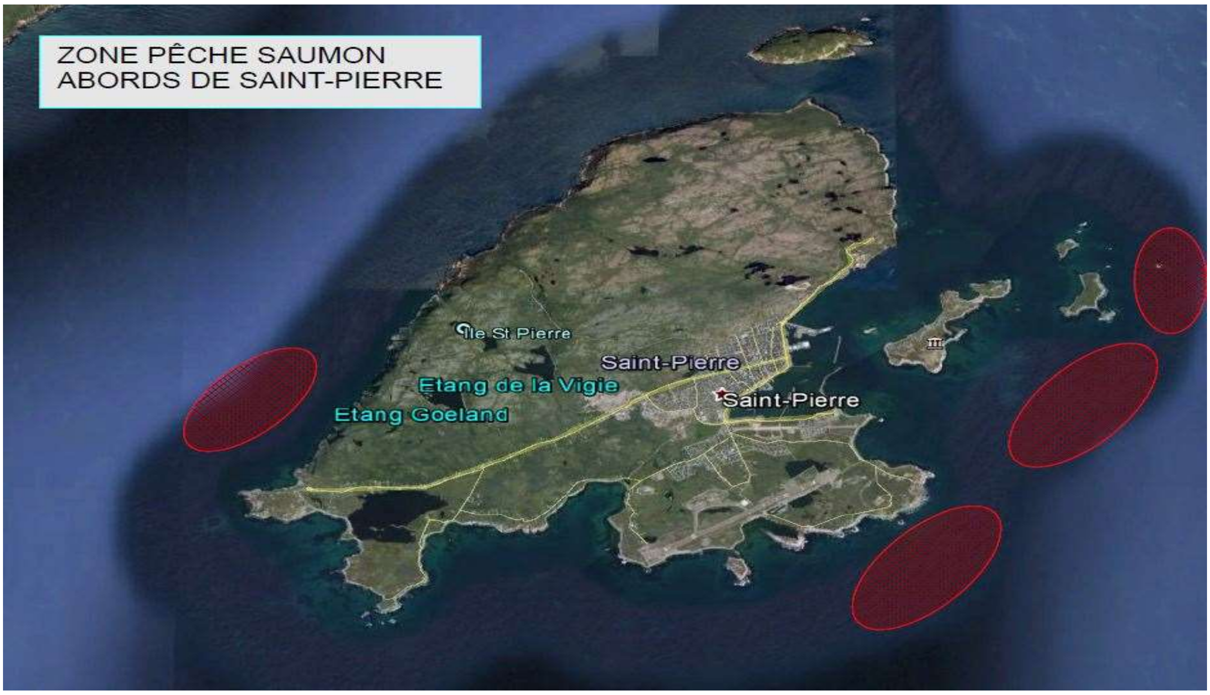
It should be noted that there is no salmon fishing in the archipelago's rivers and that the territory imports around 16 tonnes of farmed salmon from Canada. The annual consumption of salmon is approximately 3kg per inhabitant.

4. Profile of fishers/location of fishing sites

The average salmon fisher on the archipelago is male (no females fish), aged approximately 55 years old (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
Etang Goeland


ZONE PÊCHE SAUMON
ABORDS DE SAINT-PIERRE
Ile St Pierre
Saint-Pierre
Etang de la Vigie
Saint-Pierre
Etang Goeland

5. 2016 Project Reports

5.1 *Parr Study in the Belle river*

The situation in 2015: 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.

2016 Update: The Belle river was not obstructed in 2016 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 2017.

5.2 *Seal counts*

The situation in 2015: The November 2015 report on the current status of, and recommendations for monitoring, the seal population at St Pierre and Miquelon does not indicate an overpopulation of these marine mammals in the archipelago. However, the report establishes a procedure for monitoring seal populations, recognising the different species. The report also recommends studying the seals' diet and interactions between seals and fishing activity.

2016 Update: It has not been established that the seal population is increasing. However, the impact of these mammals on fishery resources, particularly salmon, is under serious consideration. Two studies, one involving telemetric tracking of seals (the BEST project) and another involving an analysis of their diet, are currently seeking funding. Two seal counts were carried out in July and November 2016 and four more are planned for April, July, September and November 2017.

NAC(17)4

NAC Annual Report (Tabled by the United States)

United States, 2016
Submitted by: National Marine Fisheries Service
Date: 6/4/17

1. Summary of Salmonid disease incidences

In 2016, there have been several reports of disease outbreaks among commercial salmon farming sites in Maine. Routine monitoring results for sites in Maine indicated a low level presence of the pathogen *Renibacterium salmoninarum* at several sites. Some of these sites also experienced low dissolved oxygen levels this summer which may have led to outbreaks of Bacterial Kidney Disease in some of the cages on those sites.

Given the recent detections of Infectious Salmon Anemia Virus at Canadian sites in close proximity to some Maine sites in Cobscook Bay, the Maine Department of Marine Resources (MDMR) required increased surveillance for some U.S. sites along with strict biosecurity protocols for vessels moving between these areas (complete disinfection of harvest vessels) to minimize transfer of pathogens. No U.S. sites have detected ISAV in 2016.

U.S. Point of Contact on Disease:
David Bean
Fisheries Biologist
NOAA's National Marine Fisheries Service
Maine Field Station
17 Godfrey Drive
Orono, Maine 04473USA
Phone: 207-866-4172
Fax: 207-866-7342
Email: David.Bean@noaa.gov

2. Summary of breaches of containment of salmonids from net cages

While there were not any reportable breaches of containment during the 2016 calendar year, there were three farm-origin salmon captured in salmon rivers in Maine.

The Maine Department of Marine Resources (MDMR) led several field investigations to capture putative aquaculture origin fish after receiving reports of many large fish observed in the Dennys River, Maine. On Wednesday, August 31, regional DMR staff checked six locations between river kilometer (rkm) 1.33 and 5.81. About 36 fish were observed in an area known as Charlies Rips (rkm 2.24) and a second school of 12 fish was observed above Route 86 (rkm 5.12). After several attempts, the MDMR biologists were able to capture two fish from the river on September 2, 2016. The fish were initially determined to be farm-origin by overall appearance and scale analyses. Another putative farm-origin salmon was captured in the Penobscot River, Maine on September 29, 2016.

Tissue samples were collected from each of these fish. The samples were analyzed to 1) verify the origin of the fish (e.g., from U.S. salmon farms or outside of the United States); 2) verify the Continent of Origin (North American or European); and 3) screen for pathogens of concern. Since all farm-origin salmon raised in the United States are genetically marked, we were able to determine that these three individuals were from active U.S. farm sites. Pathogen screening conducted by the United States Fish and Wildlife Service revealed no pathogens of concern.

Species (Strain, if applicable)	**Number[1]**	**Average size of fish[2]**	**Location[3]**	**Result[4]**	**Cause of the breach**	**Date**

There were no reported escapes, and as such, this table has intentionally been left blank.

1. This should be the best estimate possible, though it is recognized that exact numbers may be difficult to obtain.
2. Based on the codes of containment, it was agreed that average size is a more accurate measurement than lifestage.
3. The more specific the information the better, however Bay level is considered sufficient.
4. This refers to using recapture methods as detailed in the relevant code of containment and summarizing the results of the recapture attempt.

Notes:
Federal permits for U.S. commercial aquaculture operations in Maine require reporting any escapes of 50 fish or greater, and specifically for marine sites; only fish larger than 2 kg or a loss of greater than 25% of cage biomass for fish smaller than 2 kg are reported (i.e., reportable escape).

3. Summary of Salmonid introductions from outside the Commission Area

Species (strain, if applicable)	**Number**	**Life Stage**	**Origin [1]**	**Destination [2]**	**Purpose [3]**	**Date**
Salmo trutta (Iijoki River strain)	35,000	Eyed egg (to support culture and release of 2-year smolts)	Taivalkoski Hatchery, Finland	Two small streams that flow directly into Long Island Sound.	Promote a sea-run trout fishery with minimal impact to wild salmon conservation efforts.	January 2016
Oncorhynchus mykiss	45,000	Eyed eggs	Washington State (Trout Lodge Inc.)	Maine: these fish will all be stocked in inland (mainly	Recreational fisheries and for stocking in private ponds	various

				private) ponds with little or no potential to impact wild salmon recovery efforts.		
Oncorhynchus mykiss	25,000	Eyed eggs	Washington State (Trout Lodge Inc.)	New Hampshire: 24,000 will go to inland waters with little to no impact to wild salmon conservation. 1,000 will be transferred to net pens off the coast of New Hampshire with negligible impact to wild salmon conservation.	The 1,000 fish being transferred to marine cages are involved in a project examining how multi-trophic aquaculture may reduce environmental impacts associated with rearing finfish.	various

1. This would be the province or state for introductions from the west coast; or country for international introductions. It was decided that introductions between Canada and the US that are within the Commission Area (between Maine and NB, for example) would not be included here as those introductions would be captured in other avenues (ICES WGITMO, for example) and because these are not as relevant.
2. The more specific the information the better, however Bay level is considered sufficient.
3. This refers to the intention for the introduction – aquaculture, research, stock enhancement, etc.

4. Summary of Transgenic activities within the Country Annex 1 of NAC(10)6

We have no further updates beyond what we provided in 2016.

NAC(17)5

NAC Annual Report (Tabled by Canada)

Submitted by: Fisheries and Oceans Canada
Date: June 2, 2017 for calendar year 2016

1. Summary of salmonid disease incidents

The Canadian Food Inspection Agency (CFIA) is Canada's Competent Authority for aquatic animal health and lead Agency with respect to meeting Canada's international reporting obligations under the World Trade Organization (WTO) Sanitary and Phytosanitary (SPS) Agreement.

The CFIA updates the health status of Canada's aquatic animals monthly as mandatory notifications of aquatic animal diseases are confirmed. Information on all confirmed findings of regulated diseases is publicly available on the CFIA's website (see http://www.inspection.gc.ca/animals/aquatic-animals/diseases/reportable/2017/eng/1339174937153/1339175227861). The CFIA also maintains information on the status in Canada of reportable diseases and immediately notifiable diseases (see http://www.inspection.gc.ca/animals/aquatic-animals/eng/1299155892122/1320536294234).

For more information, please consult the CFIA website or contact:

- Disease Status in Canada: Dr. Debbie Barr, Director, Animal Health, Welfare and Biosecurity Division, Programs and Policy Branch, CFIA. Debbie.barr@inspection.gc.ca

- International Trade: Dr. Mohit Baxi, Director, Animal Import/Export Division, Programs and Policy Branch, CFIA. Mohit.Baxi@inspection.gc.ca

2016 Summary of federally reportable diseases of finfish

(Note: this information is current as of the day of publication of this report. For the most current information please see http://www.inspection.gc.ca/animals/aquatic-animals/diseases/eng/1299156296625/1320599059508

Federally reportable aquatic animal diseases - Finfish

Disease	Total
Ceratomyxosis (*Ceratomyxa shasta*)	
Epizootic haematopoietic necrosis	
Infectious haematopoietic necrosis	1 (details)
Infectious pancreatic necrosis	1 (details)

Federally reportable aquatic animal diseases - Finfish

Disease	Total
Infectious salmon anaemia	14 (details)
Koi herpesvirus disease	
Spring viraemia of carp	
Viral haemorrhagic septicaemia	1 (details)
Whirling disease (*Myxobolus cerebralis*)	16 (details)
White sturgeon iridoviral disease	

2016 Confirmed cases of federally reportable diseases that affected salmonids in the Atlantic Region

1. Infectious salmon anaemia is a federally reportable disease. This means that anyone who owns or works with aquatic animals has the legal obligation to notify the CFIA when they suspect or detect an aquatic animal disease that is of concern to Canada.

Current as of: 2016-12-31

Locations infected with infectious salmon anaemia

Date confirmed	Location	Animal type infected	Scientific Name
December 9[Table note *]	Newfoundland	Atlantic salmon	*Salmo salar*
December 9[Table note *]	Newfoundland	Atlantic salmon	*Salmo salar*
November 28[Table note *]	Newfoundland	Atlantic salmon	*Salmo salar*
November 22[Table note *]	New Brunswick	Atlantic salmon	*Salmo salar*
September 20	New Brunswick	Atlantic salmon	*Salmo salar*
July 14	New Brunswick	Atlantic salmon	*Salmo salar*
April 21	New Brunswick	Atlantic salmon	*Salmo salar*
March 21	New Brunswick	Atlantic salmon	*Salmo salar*
March 14[Table note *]	New Brunswick	Atlantic salmon	*Salmo salar*
March 14[Table note *]	New Brunswick	Atlantic salmon	*Salmo salar*
February 1[Table note *]	New Brunswick	Atlantic salmon	*Salmo salar*
February 1[Table note *]	New Brunswick	Atlantic salmon	*Salmo salar*
January 18[Table note *]	New Brunswick	Atlantic salmon	*Salmo salar*
January 6[Table note *]	New Brunswick	Atlantic salmon	*Salmo salar*

Table Note * This virus strain is not known to cause disease.

2. Infectious pancreatic necrosis is a federally reportable disease. This means that anyone who owns or works with aquatic animals has the legal obligation to notify the CFIA when they suspect or detect an aquatic animal disease that is of concern to Canada.

Current as of: 2016-12-31

Locations infected with infectious pancreatic necrosis

Date confirmed	Location	Animal type infected	Scientific Name
January 6	Nova Scotia	Rainbow trout	*Oncorhynchus mykiss*

2. Summary of breaches of containment of salmonids from net cages

Species (Strain, if applicable)	Number[1]	Average size of fish[2]	Location[3]	Result[4]	Cause of the breach	Date of breach
Rainbow trout	Unknown (suspected breach)		Shelburne Harbour, NS		Unknown (trout found outside cage in Shelburne Harbour)	April 2016
Atlantic salmon	No change in biomass reported		Brier Island, NS		Tear in net	August 2016
	No escapes were reported in Quebec, Prince Edward Island, New Brunswick, or Newfoundland Labrador for 2016.					

Notes:

1. This should be the best estimate possible, though it is recognized that exact numbers may be difficult to obtain. Also note that methodologies for determining and numbers differ between provinces and are presently not directly comparable. Efforts are underway to resolve these differences.
2. Based on the codes of containment, it was agreed that average size is a more accurate measurement than life stage.
3. The more specific the information the better, however Bay level is considered sufficient.
4. This refers to using recapture methods as detailed in the relevant code of containment and summarizing the results of the recapture attempt.

3. Summary of Salmonid introductions from outside the Commission Area

Species (strain, if applicable)	Number	Life Stage	Origin [1]	Destination [2]	Purpose [3]
Atlantic salmon	50,000	eggs	Stofnfiskur Ltd., Iceland	Victoria, PE (Elanco) land-based facility	research
Atlantic salmon	40,000	Eggs	Stofnfiskur Ltd., Iceland	Victoria, PE (Elanco) land-based facility	research
Rainbow trout	2,000	Eggs	Troutlodge, Hoodsport, WA, USA	Victoria, PE (Elanco) land-based facility	research
Rainbow trout	2.15 million	Eggs (all female)	Troutlodge, Sumnar, WA	Brookvale, PE, land-based facility	culture
	140,000	Eggs		Sustainable Fish Farming	culture

Atlantic salmon (Saga strain)			Stofnfiskur Ltd., Iceland	Canada Ltd., Center Burlington, NS (land-based facility)	
Rainbow trout	955,000	Eggs (all female)	Troutlodge, Sumner WA, US	North River Fish Farms, Truro, NS (land-based facility)	culture
Rainbow trout	420,000	Eggs (all female)	Troutlodge, Sumner WA, US	Dartek, Merigomish, NS (land-based facility)	culture
Rainbow trout	110,000	Eggs (all female)	Troutlodge, Sumner WA, US	Fraser Mills Hatchery, St. Andrews, NS (land-based facility)	enhancement/stocking
Atlantic salmon	10,000	Eggs	Stofnfiskur Ltd., Iceland	Ocean Sciences Centre, St. John's, NL	research

Notes:

1. This would be the province or state for introductions from the west coast; or country for international introductions. It was decided that introductions between Canada and the US that are within the NASCO Commission Area (between Maine and New Brunswick, for example) would not be included here as those introductions would be captured in other avenues (ICES WGITMO, for example) and because these are not as relevant.
2. The more specific the information the better, however Bay level is considered sufficient.
3. This refers to the intention for the introduction – aquaculture, research, stock enhancement, etc.

4. Summary of Transgenic activities within the Country Annex 1 of NAC (10)6

In May 2016, Health Canada and the Canadian Food Inspection Agency (CFIA) approved the transgenic AquaAdvantage™ Atlantic Salmon for human food and animal feed use, respectively.

In 2016, there were no known violations of the *New Substances Regulations* (Organisms) in respect of Atlantic salmon, and there were no known violations of the Significant New Activity Notice16528.

In 2016, there were no regulatory submissions under the *Canadian Environmental Protection Act*, 1999 for a transgenic salmonid, or any other novel aquatic organism that is a fish product of biotechnology.

Annex 7

NAC(17)9

Information on the rearing of transgenic salmon (Tabled by Canada)

1. AquaBounty is seeking provincial approval to expand their hatchery facility for grow-out of AquAdvantage® salmon in Rollo Bay, Prince Edward Island. The facility would be required to adhere to standards of physical and operational containment to ensure these transgenic salmon do not enter the environment.

2. Environment and Climate Change Canada (ECCC) approved the production of AquAdvantage® salmon in Canada in 2013. Fisheries and Oceans Canada assisted ECCC in the regulatory process by conducting the environmental and indirect human health risk assessment for AquAdvantage® salmon in 2013 and by providing science advice at the time to ECCC to appropriately manage risks. The risk assessment examined a range of scenarios including extreme weather events. Under the well-defined physical and operational containment conditions proposed by AquaBounty, Fisheries and Oceans Canada determined that the AquAdvantage® salmon poses a low risk to the Canadian environment and indirect human health from environmental exposure.

3. AquaBounty submitted an Environmental Impact Assessment to seek Prince Edward Island provincial approval to expand their hatchery operation for grow-out of transgenic, sterile Atlantic salmon in Prince Edward Island. The province has provided an information session and accepted public comments on the proposal until 15 May 2017.

4. The Significant New Activity Notice (No. 16528) issued by ECCC under the Significant New Activity Regulations in 2013 outlines the containment requirements to produce Aqua Advantage salmon. In accordance with ECCC's Significant New Activity Notice, the facility will be required to follow the strict standards of physical and operational containment as required under the previous regulatory process to ensure these salmon do not enter the Canadian environment. If Fisheries and Oceans Canada receives an application to transfer these salmon, the physical containment requirements of the receiving facility (i.e. Rollo Bay facility) will reflect the requirements of this Notice.

5. Whereas ECCC is responsible for compliance and enforcement under the Canadian Environmental Protection Act, Fisheries and Oceans Canada staff are currently assessing whether an Introductions and Transfer licence issued under Section 56 of the Fishery (General) Regulations would be required to move the eggs/fish between facilities. If so, an inspection of the physical containment of the new facility may be performed as a condition of licence.

Annex 8

CNL(17)10

Request for Scientific Advice from ICES

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

1.1 provide an overview of salmon catches and landings by country, including unreported catches and catch and release, and production of farmed and ranched Atlantic salmon in 2017[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 compilation of tag releases by country in 2017; and
1.5 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 2017 fisheries[4];
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 catch options or alternative management advice for the 2018/19-2020/21 fishing seasons, with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[5]; and
2.5 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 2017 fisheries (including the fishery at St Pierre and Miquelon)[4];
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;
3.4 provide catch options or alternative management advice for 2018-2021 with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[5]; 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 2017 fisheries[4];
4.2 describe the status of the stocks[6];
4.3 provide catch options or alternative management advice for 2018-2020 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[5];
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 respect to question 1.3, NASCO is aware that the WGERAAS final report is being prepared and will be submitted to ICES in 2017

4. 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.

5. In response to questions 2.4, 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.

6. 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.

Attendees:

Sergey Prusov (NEAC, manager representative)
Peder Fiske (NEAC, scientist representative)
Annette Rumbolt (NAC, manager representative)
Tim Sheehan (NAC, scientist representative)
Esben Ehlers (WGC, manager representative)
Niall Ó Maoiléidigh (WGC, scientist representative)
Gérald Chaput (ICES representative, Observer)
Patrick Gargan (Coordinator)

Annex 9

List of North American Commission Papers

NAC(17)1	Provisional Agenda
NAC(17)2	Draft Agenda
NAC(17)3	Labrador Subsistence Food Fisheries - Mixed-Stock Fisheries Context (Tabled by Canada)
NAC(17)4	Annual Report (Tabled by the United States)
NAC(17)5	Annual Report (Tabled by Canada)
NAC(17)6	Draft Report
NAC(17)7	Report
NAC(17)8	ICES Presentation
NAC(17)9	Transgenic Information
NAC(17)10	Agenda

REPORT OF THE

THIRTY-FOURTH ANNUAL MEETING

OF THE

NORTH-EAST ATLANTIC COMMISSION

6 - 9 JUNE 2017
Varberg, Sweden

Chairman:	Dr Ciaran Byrne (European Union)
Vice-Chairman:	Mr Victor Rozhnov (Russian Federation)
Rapporteur:	Mr Helge Lorentzen (Norway)
Secretary:	Dr Peter Hutchinson

NEA(17)11

CONTENTS

Page No.

NEA(17)11

Report of the Thirty-Fourth Annual Meeting of the North-East Atlantic Commission of the North Atlantic Salmon Conservation Organization

Varbergs Kusthotell, Varberg, Sweden

6 - 9 June 2017

1. Opening of the Meeting

1.1 The Chairman, Dr Ciaran Byrne (European Union), opened the Meeting and welcomed participants to the Thirty-Fourth Annual Meeting of the Commission. He noted that last year, in view of the very serious threat posed by the parasite *Gyrodactylus salaris*, the Commission decided to reconvene its Working Group. The Working Group had met in 2017 and had reviewed monitoring and eradication programmes for the parasite and developed recommendations for enhanced co-operation to prevent its spread. Given the risks to the wild stocks from this parasite, the Chairman indicated that he hoped the Commission would adopt the new 'Road Map' in order to enhance information exchange and co-operation on monitoring, research and measures to prevent the spread of *G. salaris* and eradicate it if introduced. He noted that in 2015, the Commission had adopted a multi-annual decision relating to the salmon fishery at the Faroe Islands. He recognised this continuing commitment to salmon conservation by the Faroe Islands in refraining from fishing for salmon in accordance with the scientific advice. The continuation of that decision was conditional on the application of a Framework of Indicators and the results for 2017 confirmed that no re-assessment of the existing management advice for the Faroes fishery was required from ICES in 2017. The decision would, therefore, continue to apply in 2017/18 but there were other important items on the Agenda, not least consideration of the scientific advice and the report of the Working Group on *Gyrodactylus salaris* and progressing towards the development and adoption of a risk framework for the Faroese salmon fishery.

1.2 A written Opening Statement on behalf of the Non-Government Organisations (NGOs) attending the Annual Meeting was distributed (Annex 1).

1.3 A list of participants at the Thirty-Fourth Annual Meetings of the Council and Commissions of NASCO is included on page 347 of this document.

2. Adoption of the Agenda

2.1 The Commission adopted its Agenda, NEA(17)8 (Annex 2).

3. Nomination of a Rapporteur

3.1 Mr Helge Lorentzen (Norway) was appointed as Rapporteur.

4. Review of the 2016 Fishery and ACOM Report from ICES on Salmon Stocks in the Commission Area

4.1 The representative of ICES, Mr Gérald Chaput, presented the report from ICES on the status of salmon stocks in the Commission area. His presentation is available as document NEA(17)10. The ICES Advisory Committee (ACOM) report that contains the scientific advice relevant to all Commissions, CNL(17)8, is included on page 285 of this document.

5. Mixed-Stock Fisheries conducted by Members of the Commission

5.1 In autumn 2015, the Russian Federation and Norway signed a Memorandum of Understanding (MoU) between the Ministry of Climate and Environment (Norway) and the Federal Agency for Fishery (the Russian Federation) on co-operation, on management and monitoring of, and research on, wild Atlantic salmon in Finnmark County (Norway) and the Murmansk region (the Russian Federation). A joint Working Group has been established under the MoU consisting of managers and scientists from each country as appointed by the Parties. The Group will meet and report annually to the Ministry of Climate and Environment (Norway) and to the Federal Agency for Fishery (the Russian Federation). An organisational meeting was held in November 2015 in Oslo and the Group held its first meeting in April 2016 in Trondheim, Norway. At that meeting the Group discussed a range of issues, including the scientific foundation for conservation limits and catch advice in Norway, status of relevant salmon populations in Finnmark, trends in fisheries, the management system, policies and processes in Norway with emphasis on Finnmark County, salmon fisheries management in Russia and development of fisheries and conservation limits for salmon populations in the Murmansk region. The Group agreed that the first report should focus on the mandate of the Group, the salmon stocks and the fisheries. Later reports will consider other topics such as fish farming. The Group has not yet produced a report and the next meeting is scheduled for the second half of 2017.

5.2 The representative of the European Union indicated that the Teno/Tana River is the border river between Finland and Norway, is one of the largest salmon rivers in the world and is very important for the indigenous Sami people. The new fisheries agreement for the Teno/Tana was accepted by the Finnish and Norwegian parliaments earlier this year and it came into force on 1 May 2017. The new agreement is target- and science-based and flexible and socio-economic factors have been taken into consideration. This means that the use of traditional gears can continue with reduced effort and the tourist fishery continues with a new license sales system. Fishing pressure will be substantially reduced, particularly for the weakest stocks.

5.3 The representative of Norway indicated that under the new agreement there will be close co-operation between the authorities managing the fisheries in Norway and Finland. A joint science group will co-ordinate monitoring and research and local knowledge will also be involved in all aspects of the group's work. The new agreement will soon be translated into English and distributed to NASCO Parties.

5.4 Under the Council's '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 was agreed that there should be agenda items in each of the Commissions to allow for a focus on mixed-stock fisheries (MSFs).

5.5 The European Union, NEA(17)7 (Annex 3), Norway, NEA(17)5 (Annex 4), and the Russian Federation, NEA(17)6 (Annex 5), tabled papers providing updates on the information on MSFs contained in the 2013 - 2018 Implementation Plans, including a 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.

5.6 The representative of Denmark (in respect of the Faroe Islands and Greenland) thanked the European Union for its comprehensive review and noted that there had been substantial progress in some areas. He reminded the Commission that the salmon fishery at the Faroe Islands was on mixed stocks and the fishery had been closed. He indicated that all MSFs should be sustainable and he encouraged the European Union to take further action.

5.7 The representative of the European Union thanked Norway for its report and asked for additional details because it was mentioned that new regulations would be introduced now the Teno/Tana River agreement is in place. He asked in which areas the new regulations would apply; would it only be the Tanafjord or the northern coastal region referred to in Norway's 2016 report on MSFs. He asked for details of the sort of restrictions that would be introduced and when they would come into force.

5.8 The representative of Norway indicated that a decision had been taken in the 2016 regulations for further restrictions on MSFs in Finnmark in the Tanafjord and coastal region, including the Varangerfjord, in order to offer additional protection to Tana River stocks. At that time, it was intended that these additional restrictions would come into force when a new agreement for the Tana River was reached. However, decisions on the new agreement were taken later than anticipated. The status of stocks suggests that these regulations had been beneficial, but given the delay in reaching agreement, the decision was made not to bring the regulations into force in 2017 but to do so in 2018 unless unforeseen circumstances occur or the scientific advice changes.

5.9 The representative of the NGOs commended Denmark (in respect of the Faroe Islands and Greenland) for continuing the moratorium on the salmon fishery since 2000. He recognised that this had been a difficult political decision for a country that relies heavily on marine resources. He noted that there are considerable MSFs in the North-East Atlantic Commission area and urged other Parties to take further action and could see no reason why this should not be possible if the Faroe Islands could close its salmon fishery. There was a need for fairness and balance.

6. Development of a Risk Framework for the Faroese Fishery

6.1 The Chairman noted that since 2010, the Commission has discussed the possible development and adoption of a Risk Framework for the Faroese fishery. The elements that would need to be developed and adopted to allow establishing a formal mechanism for the provision of the scientific advice as in other NASCO Commissions could, *inter alia,* include:

- agreement on appropriate management units (MU);
- the management objectives for these units;

- a sharing agreement;
- the season to which any TAC should apply (January to December or October to May).

6.2 Last year, Denmark (in respect of the Faroe Islands and Greenland) had indicated that it was not in a position to consider the development and adoption of a risk framework but agreed that there be more substantive discussion at the 2017 Annual Meeting. The representative of Denmark (in respect of the Faroe Islands and Greenland) advised the Commission that the Faroe Islands had been considering how to handle this matter for many years. There had been some further consultations in the Faroe Islands over the past year and he indicated that Denmark (in respect of the Faroe Islands and Greenland) intended to prepare a discussion document examining both scientific (e.g. the data to be used and appropriate Management Units) and management (components to be included in the framework) aspects. He referred to a Working Group on allocation criteria that had been set up by the North-East Atlantic Fisheries Commission (NEAFC). Issues considered included zonal attachment, historical fisheries, biomass conversion and socio-economic factors. These might be factors for inclusion in a risk framework for the Faroes salmon fishery. He suggested that the discussion document could be considered by correspondence and the Parties could then decide if a meeting was required.

6.3 The representative of the European Union thanked Denmark (in respect of the Faroe Islands and Greenland) for considering this issue and agreed that it would be useful to move forward on this over the coming year.

6.4 The representative of Norway indicated that he welcomed the commitment to move forward with the risk framework, but indicated that Norway would need to see what was being proposed before proceeding.

6.5 The representative of Denmark (in respect of Faroes Islands and Greenland) advised the Commission that, as he had been elected President of NASCO, the head of the Faroese delegation would in future be Ms Margretha Nónklett.

7. Regulatory Measures

7.1 At its Thirty-Second (2015) Annual Meeting, the Commission adopted a Decision regarding the salmon fishery in Faroese waters in 2015/16, 2016/17 and 2017/18 (NEA(15)10). Under this Decision, the Commission decided not to set a quota for the salmon fishery in the Faroese Fisheries Zone for 2015/16, acknowledging that Faroese management decisions will be made with due consideration to the ICES advice concerning the biological situation and the status of the stocks contributing to the fishery. The decision would also apply in 2016/17 and 2017/18 unless the application of the Framework of Indicators (FWI) showed that a re-assessment was warranted. The Commission had agreed that the procedure for applying the FWI that was used previously should continue under the new Decision.

7.2 The report of FWI Working Group, NEA(17)3, was presented by its Co-ordinator, Mr Ian Russell (European Union). The Working Group had concluded that the results of the NEAC FWI assessment in 2017 (based on indicator values for 2016) do not suggest that the PFA forecast for 2016 has been under-estimated. Therefore, the FWI Working

Group concluded that no re-assessment of the existing management advice for the Faroes fishery was required from ICES in 2017. The Decision adopted in 2015 will, therefore, continue to apply to the fishery in 2017/18.

8. Report of the Working Group on *Gyrodactylus salaris*

8.1 In 2004, the Commission had agreed a 'Road Map' for taking forward recommendations relating to the parasite *G. salaris*. In accordance with this 'Road Map', Working Group meetings had been held in 2006 and 2007. There had been no meetings of the Working Group since 2007, but an item had been included on the North-East Atlantic Commission's Agenda since then to allow for progress reports from the Parties and, in addition, information is sought in the Implementation Plan template on measures taken to prevent the introduction or further spread of the parasite. In 2016, in view of the serious threat posed by the parasite, the Commission agreed to reconvene its Working Group, under the Chairmanship of Mr Stian Johnsen (Norway), to undertake the following tasks:

- provide a forum for exchange of information among the Parties/jurisdictions on research on, and monitoring and control programmes for, the parasite *G. salaris*;
- review progress in relation to the Commission's 'Road Map' and advise of any changes required;
- develop recommendations for enhanced co-operation on measures to prevent the further spread of the parasite and for its eradication in areas where it has been introduced; and
- develop recommendations for future research.

8.2 The Commission Chairman introduced the Report of the Meeting of the Working Group on *Gyrodactylus salaris* in the North-East Atlantic Commission Area (NEA(17)4) (Annex 6). The Working Group had met in London during March 2017. The Working Group stressed the importance of ensuring that adequate measures are in place to prevent the introduction of the parasite and it was recommended that publicity material highlighting the risks posed by the parasite be disseminated by the competent authorities and made available on the NASCO website. The Working Group noted that legislation should recognise different strains and their pathogenicity. In the event that *G. salaris* and *G. thymalli* were synonymised, there could be serious consequences for the protection afforded by Additional Guarantees. The Group noted that emerging risk factors for the spread of *G. salaris* include a changing climate, which could result in reduced salinities, and changes in migration patterns with smolts entering the sea but then migrating into other rivers. In this regard, the Working Group had noted with concern the continuing spread of *G. salaris* along the west coast of Sweden and it was suggested that salinity levels in the Skagerrak may not always be at levels that would prevent the further spread of the parasite.

8.3 The Working Group further recommended that the North-East Atlantic Commission retain an item on its agenda to allow for an exchange of information on *G. salaris*. To facilitate this, there should be a further meeting of the Working Group in 2018 but, thereafter, only every three years. The importance of developing and testing contingency plans was highlighted and it was noted that these are at different stages of development in different countries. The Working Group recommended that the North-East Atlantic Commission request that contingency plans be made available through the Secretariat in advance of the Working Group meeting in 2018 and that those countries without plans be encouraged to develop them as a matter of urgency.

8.4 The Working Group recommended that, given the potentially devastating impacts of the parasite, the Commission adopt a revised 'Road Map' as contained in Annex 12 of its report. This revised 'Road Map' had been considerably simplified to remove duplication and reflect changes in EC fish health legislation and it had been re-formatted without reference to the original source of the recommendations, responsibilities and timeframe for action which should be clear from the text.

8.5 The representative of the European Union thanked the members of the Working Group for a very informative report which provides a good overview of monitoring programmes, distribution of the parasite, measures to prevent spread of the parasite and to eradicate it where introduced and research undertaken. While the European Union could support the Working Group continuing its work, it had difficulty in adopting the recommendations in Annex 12 (the revised 'Road Map') because there had been inadequate time to consult and it was not clear if some recommendations were consistent with EU Animal Health regulations. He also indicated that the recommendations concerning research should have been reviewed by the International Atlantic Salmon Research Board's Scientific Advisory Group (SAG). He also considered it strange that there would be a recommendation that required the EU to follow its own legislation. While he indicated that the new 'Road Map' is an improvement of the current version, he was not able to adopt the recommendations at this time.

8.6 The representative of Denmark (in respect of the Faroe Islands and Greenland) thanked the Working Group for its report and recommendations on this important issue.

8.7 The representative of Norway indicated that *G. salaris* was an important issue for Norway, as it should be for all Parties, given the damage the parasite can cause. Norway considers that the recommendations make sense and while understanding that the European Union needs more time to consider these, sometimes one should be open to changing a regulation based on a recommendation.

8.8 The representative of the European Union indicated that it was necessary to verify that the recommendations were consistent with EU legislation since EU Animal Health law was developed through a science-based, complex and participatory process and currently provides a comprehensive framework.

8.9 The Commission agreed that it would retain this item on the agenda for its Annual Meetings, and the Working Group should meet every three years starting in 2018 with the following Terms of Reference:

- provide a forum for exchange of information among the Parties/jurisdictions on research on, and monitoring, control and eradication programmes for, the parasite *G. salaris*;
- consider the need for revisions to the recommendations in Annex 12 of NEA(17)4 to ensure consistency with NASCO Parties' Animal Health Legislation;

- develop recommendations for enhanced co-operation on measures to prevent the further spread of the parasite and for its eradication in areas where it has been introduced.

8.10 The representative of the European Union proposed to provide comments to the Working Group in relation to Annex 12 of NEA(17)4 ahead of the next meeting of the Working Group.

8.11 The representative of Norway advised the Commission that efforts to eradicate *G. salaris* in Norway have given good results in recent years. By 1 January 2017, *G. salaris* had been successfully eradicated from 22 rivers and a further 21 rivers have been treated and are being monitored. After eradicating the parasite, the local salmon stocks are re-built from the gene bank. He reported that in 2017 work will continue in accordance with the National Action Plan. It is expected that two new regions will be declared free of the parasite later this year. The treatment in Skibotn region in 2015 and 2016 seems to have been successful and efforts to re-build the stocks will commence this year. It will be a further five years before the result of the chemical treatment will be confirmed. There will then be two regions infected with the parasite. In the Driva region, a fish barrier is now operative and prevents salmon from migrating upstream, thereby reducing the infected area in preparation for chemical treatment. The expert group assessing options for treating the Drammen River will deliver its final report in 2018.

9. Announcement of the Tag Return Incentive Scheme Prize

9.1 The Chairman announced that the winner of the Commission's £1,000 prize in the NASCO Tag Return Incentive Scheme was Mr Eugeny Danilov, Murmansk, Russian Federation. The winning tag had been applied to an autumn-run salmon on 10 September 2015 at the Falls Creek beat of the Ponoi River about 60km from the river outlet. It was recaptured on 23 September 2016 at the Gold Beach beat about 13km upstream from the place of tagging. The Commission offered its congratulations to the winner.

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

10.1 The request for scientific advice from ICES prepared by the Standing Scientific Committee in relation to the North-East Atlantic Commission area was agreed by the Council, CNL(17)10 (Annex 7).

11. Other Business

11.1 There was no other business.

12. Date and Place of the Next Meeting

12.1 The Commission agreed to hold its next Annual Meeting at the same time and place as the Thirty-Fifth Annual Meeting of NASCO.

13. Report of the Meeting

13.1 The Commission agreed a report of the meeting.

14. Close of the Meeting

14.1 The Chairman thanked the Parties and observers for their contributions and closed the Thirty-Fourth Annual Meeting of the North-East Atlantic Commission.

Note: The annexes mentioned above begin on page 95, following the French translation of the report of the Meeting. A list of North-East Atlantic Commission papers is included in Annex 8.

NEA(17)11

Compte-rendu de la trente-quatrième session annuelle de la Commission de l'Atlantique du Nord-Est de l'Organisation pour la conservation du saumon de l'Atlantique Nord

Varbergs Kusthotell, Varberg, Suède

6 - 9 juin 2017

1. Ouverture de la session

1.1 Le Président, le Dr Ciaran Byrne (Union européenne), a ouvert la session et accueilli les participants à la trente-quatrième session de la Commission. Il a noté que l'année dernière, compte tenu de la menace très sérieuse que présente le parasite *Gyrodactylus salaris*, la Commission a décidé de re-convoquer son Groupe de travail. Le Groupe de travail s'était réuni en 2017 et avait révisé les programmes de suivi et d'éradication pour le parasite et développé des recommandations pour améliorer la coopération pour prévenir sa propagation. Etant donnés les risques pour les stocks sauvages pour ce parasite, le Président a indiqué qu'il espérait que la Commission adopte la nouvelle 'Feuille de route' afin d'améliorer les échanges d'informations et la coopération sur le suivi, la recherche et les mesures pour prévenir la propagation du *G. salaris* et l'éradiquer s'il est introduit. Il a noté qu'en 2015, la Commission avait adopté une décision multiannuelle concernant la pêcherie de saumon aux Iles Féroé. Il a reconnu la poursuite de cet engagement pour la conservation du saumon par les Iles Féroé en s'abstenant de pêcher le saumon conformément aux conseils scientifiques reçus. La poursuite de cette décision est conditionnelle à l'application d'un Cadre d'indicateurs et les résultats pour 2017 ont confirmé qu'aucune réévaluation des conseils de gestion existants pour la pêcherie aux Iles Féroé n'était nécessaire de la part du CIEM en 2017. L'application de la décision se poursuivrait par conséquent en 2017/18 mais il y avait d'autres objets importants à l'Ordre du jour, l'étude des conseils scientifiques et le rapport du Groupe de travail sur le *Gyrodactylus salaris* n'en étant pas des moindres et le progrès vers le développement et l'adoption d'un cadre des risques pour la pêcherie au saumon Féroïenne.

1.2 Une déclaration d'ouverture écrite a été présentée au nom des Organisations non gouvernementales (ONGs) qui ont participé à la session annuelle (Annexe 1).

1.3 Une liste des participants aux trente-quatrièmes sessions annuelles du Conseil et des Commissions de l'OCSAN est incluse en page 347 de ce document.

2. Adoption de l'ordre du jour

2.1 La Commission a adopté l'ordre du jour, NEA(17)8 (Annexe 2).

3. Nomination d'un rapporteur

3.1 M. Helge Lorentzen (Norvège) a été nommé rapporteur.

4. Examen de la pêcherie de 2016 et du rapport du Comité Consultatif (ACOM) du CIEM sur les stocks de saumons dans la zone de la Commission

4.1 Le représentant du CIEM, M. Gérald Chaput, a présenté le rapport du CIEM sur le statut des stocks de saumon dans la zone de la Commission. La présentation est disponible dans le document NEA(17)10. Le rapport du Comité consultatif (ACOM) du CIEM, qui contient les conseils scientifiques pertinents pour toutes les Commissions, CNL(17)8, est inclus en page 285 du présent document.

5. Pêcheries de stocks mixtes menées par des Membres de la Commission

5.1 En automne 2015, la Fédération de Russie et la Norvège ont signé un Protocole d'entente (MoU) entre le Ministère du Climat et de l'Environnement (Norvège) et l'Agence fédérale pour la pêcherie (Fédération de Russie) sur la coopération pour la gestion et le suivi de, et la recherche sur, le Saumon atlantique sauvage dans le Comté du Finnmark (Norvège) et la région de Murmansk (Fédération de Russie). Un Groupe de travail conjoint a été établi en vertu du MoU consistant en des gestionnaires et des scientifiques de chaque pays et nommés par les Parties. Le Groupe va se réunir et effectuer un rapport chaque année auprès du Ministère du Climat et de l'Environnement (Norvège) et de l'Agence fédérale pour la pêcherie (Fédération de Russie). Une réunion organisationnelle a été tenue en novembre 2015 à Oslo et le Groupe a tenu sa première réunion en avril 2016 à Trondheim, en Norvège. Lors de cette réunion le Groupe a discuté un ensemble de questions, y compris les fondements scientifiques des limites de conservation et les conseils relatifs aux prises en Norvège, le statut des populations de saumon concernées dans le Finnmark, les tendances dans les pêcheries, le système de gestion, les politiques et processus en Norvège, l'accent étant mis sur le Comté du Finnmark, la gestion des pêcheries de saumon en Russie et le développement de pêcheries et de limites de conservation pour les populations de saumon dans la région de Murmansk. Le Groupe a convenu que le premier rapport devrait se concentrer sur le mandat du Groupe, les stocks de saumon et les pêcheries. Des rapports étudieront plus tard d'autres sujets tels que l'élevage de poisson. Le Groupe n'a pas encore produit de rapport et la prochaine réunion est prévue pour la seconde moitié de 2017.

5.2 Le représentant de l'Union européenne a indiqué que la rivière Teno/Tana est la rivière limitrophe entre la Finlande et la Norvège, et l'une des plus grandes rivières à saumons du monde et est très importante pour la population autochtone Sami. Le nouvel accord de pêcheries pour le Teno/Tana a été accepté par les parlements finnois et norvégien au début de cette année et il est entré en vigueur en mai 2017. Le nouvel accord est fondé sur les objectifs et la science, il est flexible et les facteurs socio-économiques ont été pris en compte. Ceci signifie que l'utilisation d'équipements traditionnels peut se poursuivre sans réduire les efforts et la pêcherie touristique se poursuit avec un nouveau système de vente des permis. La pression de pêche sera considérablement réduite, en particulier sur les stocks les plus faibles.

5.3 Le représentant de la Norvège a indiqué qu'en vertu du nouvel accord une coopération étroite aura lieu entre les autorités gérant les pêcheries en Norvège et en Finlande. Un groupe scientifique conjoint coordonnera le suivi et la recherche et les connaissances locales seront aussi employées dans tous les aspects du travail du groupe. Le nouvel accord sera bientôt traduit en anglais et distribué aux Parties de l'OCSAN.

5.4 Selon le '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, il était convenu qu'il devrait y avoir des points d'ordre du jour dans chacune des Commissions pour permettre de se concentrer sur les pêcheries de stocks mixtes (MSFs).

5.5 L'Union européenne, NEA(17)7 (Annexe 3), la Norvège, NEA(17)5 (Annexe 4), et la Fédération de Russie, NEA(17)6 (Annexe 5), ont enregistré des articles apportant des mises à jour sur les informations relatives aux MSFs contenues dans les Plans d'application de 2013 - 2018, y compris une description de toutes MSFs encore en opération, les données les plus récentes relatives aux prises, et tous changements ou développements dans la gestion des MSFs pour mettre en œuvre les accords de l'OCSAN.

5.6 Le représentant du Danemark (pour les Iles Féroé et le Groenland) a remercié l'Union européenne pour son rapport complet et a noté qu'il y avait eu un progrès considérable dans certains domaines. Il a rappelé à la Commission que la pêcherie de saumon aux Iles Féroé était sur des stocks mixtes et que la pêcherie avait été fermée. Il a indiqué que tous les MSFs devraient être durables et il a encouragé l'Union européenne a poursuivre l'action.

5.7 Le représentant de l'Union européenne a remercié la Norvège pour son rapport et a demandé des informations supplémentaires parce qu'il était mentionné que les nouvelles règlementations seraient introduites maintenant que l'accord sur la rivière Teno/Tana est en place. Il a demandé dans quelles zones les nouveaux règlements seraient en vigueur; s'agirait-t-il seulement du Tanafjord ou de la région côtière du Nord dont il avait été question dans le rapport de la Norvège pour 2016 sur les MSFs. Il a demandé des informations sur le type de restrictions qui seraient introduites et sur la date à laquelle elles entreraient en vigueur.

5.8 Le représentant de la Norvège a indiqué qu'une décision avait été prise dans les règlements de 2016 pour restreindre davantage les MSFs au Finnmark dans la région du Tanafjord et dans la région côtière, y compris le Varangerfjord, afin de mieux protéger les stocks de la rivière Tana. A l'époque, il était prévu que ces restrictions supplémentaires entreraient en vigueur lorsqu'un nouvel accord pour la rivière Tana serait atteint. Cependant, les décisions sur le nouvel accord ont été prises plus tard que prévu. Le statut des stocks suggère que ces règlements ont été bénéfiques, mais compte tenu du délai pour atteindre cet accord, il a été décidé de ne pas mettre les règlements en vigueur en 2017 mais de les y mettre en 2018 sauf circonstances imprévues ou changements des conseils scientifiques.

5.9 Le représentant des ONG a félicité le Danemark (pour les Iles Féroé et le Groenland) pour sa poursuite moratorium sur la pêcherie de saumon depuis 2000. Il a reconnu que ceci avait été une décision politique difficile pour un pays qui dépend fortement des ressources marines. Il a noté qu'il y avait des MSFs considérables dans la zone de la Commission de l'Atlantique du Nord-Est et a exhorté les autres Parties à poursuivre l'action et ne voyait aucune raison pour que cela ne soit pas possible si les Iles Féroé pouvaient fermer leur pêcherie de saumon. Justice et équilibre étaient nécessaires.

6. Elaboration d’un cadre des risques pour la pêcherie féringienne

6.1 Le Président a noté que depuis 2010, la Commission avait discuté auparavant de l’éventuel développement d’un Cadre des risques pour la pêcherie féroïenne. Les éléments qui devraient être développés et adoptés pour permettre d’établir un mécanisme formel de fourniture des conseils scientifiques comme dans d’autres Commissions de l’OCSAN pourraient, *inter alia,* inclure :

- accord sur des unités de gestion appropriées (MU) ;
- les objectifs de gestion pour ces unités ;
- un accord de partage ;
- la saison à laquelle tout TAC devrait s’appliquer (janvier à décembre ou octobre à mai).

6.2 L’année dernière, le Danemark (pour les Iles Féroé et le Groenland) avait indiqué qu’il n’était pas en position d’envisager le développement et l’adoption d’un cadre des risques mais a convenu qu’une discussion plus substantielle ait lieu lors de la session annuelle de 2017. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a informé la Commission que cela faisait de nombreuses années que les Iles Féroé envisagent comment traiter cette question. Davantage de consultations avaient eu lieu dans les Iles Féroé au cours de l’année dernière et il a indiqué que le Danemark (pour les Iles Féroé et le Groenland) prévoyait de préparer un document de discussion examinant aussi bien les aspects scientifique (e.g. les données à utiliser les Unités de gestion appropriées) et de gestion (composantes à inclure dans le cadre). Il a fait référence à un Groupe de travail sur un critère d’allocation qui avait été fixé par la Commission des pêcheries de l’Atlantique du Nord Est (CPANE). Les problèmes étudiés incluaient l’attachement régional, les pêcheries historiques, la conversion de la biomasse et les facteurs socio-économiques. Il pouvait s’agir de facteurs à inclure dans un cadre des risques pour la pêcherie du saumon des Féroé. Il a suggéré que le document de discussion pourrait être étudié par correspondance et les Parties pourraient ensuite décider si une réunion était nécessaire.

6.3 Le représentant de l’Union européenne a remercié le Danemark (pour les Iles Féroé et le Groenland) d’avoir étudié cette question et a convenu qu’il serait utile d’avancer à ce sujet pendant l’année qui vient.

6.4 Le représentant de la Norvège a indiqué qu’il accueillait cet engagement pour avancer avec le cadre des risques, mais a indiqué que la Norvège devrait voir ce qui était proposé avant de poursuivre.

6.5 Le représentant du Danemark (pour les Iles Féroé et le Groenland) a informé la Commission que, comme il avait élu Président de l’OCSAN, la directrice de la délégation Féroïenne serait désormais Ms Margretha Nónklett.

7. Mesures de réglementation

7.1 Lors de sa Trente-deuxième session annuelle (2015), la Commission a adopté une Décision relative à la pêcherie de saumon dans les eaux féringiennes en 2015/16, 2016/17 et 2017/18 (NEA(15)10). Conformément à cette Décision, la Commission a décidé de ne pas fixer de quotas pour la pêcherie de saumon dans la Zone de pêcheries féroïenne pour 2015/16, reconnaissant que les décisions de gestion féroïennes seront prises en tenant bien compte des conseils du CIEM concernant la situation biologique et l'état des stocks contribuant à la pêcherie. La décision s'appliquerait aussi en 2016/17 et en 2017/18 à moins que l'application du Cadre d'Indicateurs (FWI) ne montre qu'une réévaluation était nécessaire. La Commission avait convenu que la procédure d'application du FWI qui était utilisée auparavant se poursuive en vertu de la nouvelle Décision.

7.2 Le compte-rendu du Groupe de travail du FWI, NEA(17)3, a été présenté par son coordinateur, M. Ian Russell (Union européenne). Le Groupe de travail avait conclu que les résultats de l'évaluation du FWI pour la CANE en 2017 (sur la base de valeurs indicatives pour 2016) ne suggéraient pas que la prévision de l'AaP pour 2016 a été sous-estimée. Par conséquent le Groupe de travail du FWI a conclu qu'aucune réévaluation du conseil de gestion actuel pour la pêcherie des Féroé n'était requise auprès du CIEM en 2017. La Décision adoptée en 2015 continuera donc à s'appliquer dans la pêcherie en 2017/18.

8. Compte rendu du groupe de travail sur le *Gyrodactylus salaris*

8.1 En 2004, la Commission a accepté une 'Feuille de route' pour donner suite aux recommandations relatives au parasite *G. salaris*. Conformément à cette 'Feuille de route', les réunions de Groupe de travail avaient eu lieu en 2006 et 2007. Le Groupe de travail ne s'est pas réuni depuis 2007, mais un article a été inclus à l'Ordre du jour de la Commission de l'Atlantique du Nord-Est depuis pour permettre des compte-rendus du progrès des Parties et, de plus, des informations sont rassemblées pour le modèle des Programmes d'application sur les mesures prises pour prévenir l'introduction ou la prolifération du parasite. En 2016, compte tenu de la menace grave que représente le parasite, la Commission a convenu de re-convoquer son Groupe de travail, sous la Présidence de M. Stian Johnsen (Norvège), pour entreprendre les tâches suivantes :

- Permettre un forum d'échange d'informations entre les Parties/juridictions en recherche sur le parasite *G. salaris*, et programmes de suivi et de contrôle de ce parasite;
- Passer en revue le progrès relatif à la 'Feuille de route' de la Commission et informer de tout changement requis;
- Développer des conseils pour une coopération plus étroite sur les mesures de prévention contre une prolifération du parasite et pour son éradication dans les régions où il a été introduit; et
- Développer des recommandations pour la recherche future.

8.2 Le Président de la Commission a introduit le Rapport de la réunion du Groupe de travail sur le *Gyrodactylus salaris* dans la zone de la Commission de l'Atlantique du Nord-Est (NEA(17)4) (Annexe 6). Le Groupe de travail s'était rencontré à Londres courant mars 2017. Le Groupe de travail a souligné l'importance de s'assurer que des mesures adéquates sont en place pour prévenir l'introduction du parasite et il a été recommandé que des matériaux publicitaires soulignant les risques que présente le parasite soient disséminée par les autorités compétentes et rendu disponibles sur le site web de l'OCSAN. Le Groupe de travail a noté que la législation devrait reconnaître différentes souches et leur pathogénicité. Dans le cas où le *G. salaris* et le *G. thymalli* n'étaient plus classifiés différemment il pourrait y avoir de graves conséquences pour la protection apportée par des garanties supplémentaires de l'UE. Le Groupe a noté que des facteurs de risque émergeants pour la propagation du *G. salaris* incluent un climat changeant, qui pourrait entraîner une salinité réduite, et des changements dans les modèles de migration pour les saumoneaux qui entreraient dans la mer mais migreraient ensuite vers d'autres rivières. A cet égard, le Groupe de travail avait noté avec inquiétude la propagation qui se poursuivait du *G. salaris* le long de la côte ouest de la Suède et il a été suggéré que les niveaux de salinité dans le Skagerrak ne correspondent pas toujours aux niveaux qui empêcheraient une propagation plus importante du parasite.

8.3 Le Groupe de travail a encore recommandé que la Commission de l'Atlantique du Nord Est conserve un élément sur son ordre du jour pour permettre un échange d'informations sur le *G. salaris*. Pour faciliter ceci, le Groupe de travail devra se réunir en 2018 mais par la suite, seulement tous les trois ans. L'importance de développer et tester les plans d'urgence a été soulignée et il a été noté que ceux-ci se trouvent à différents stades de développement dans différents pays. Le Groupe de travail a recommandé que la Commission de l'Atlantique du Nord-Est demande que les plans d'urgence soient rendus disponibles à travers le Secrétariat avant que le Groupe de travail ne se réunisse en 2018 et que ces pays sans plans soient encouragés à les développer de toute urgence.

8.4 Le Groupe de travail a recommandé que, étant donnés les impacts potentiellement dévastateurs du parasite, la Commission adopte une 'Feuille de route' révisée telle qu'elle est contenue en Annexe 12 de son rapport. Cette 'feuille de route' révisée avait été considérablement simplifiée pour enlever les doublons et refléter les changements de la législation sur la santé des poissons de l'UE et il avait été reformaté sans référence à la source originale des recommandations, responsabilités et cadre temporel pour l'action qui devrait clairement ressortir du texte.

8.5 Le représentant de l'Union européenne a remercié les membres du Groupe de travail pour leur rapport très instructif qui présente un bon aperçu des programmes de suivi, de la répartition du parasite, les mesures pour prévenir la propagation du parasite et l'éradiquer lorsqu'il est introduit et la recherche entreprise. Tandis que l'Union européenne pourrait soutenir le Groupe de travail dans la poursuite de son travail, elle a eu des difficultés pour adopter les recommandations en Annexe 12 (la révision de la 'feuille de route') parce qu'il n'y avait pas eu assez de temps pour se consulter et que la conformité de certaines recommandations avec les règlements sur la santé animale de l'UE n'était pas claire. Il a aussi indiqué que les recommandations concernant la recherche auraient dûes être révisées par le Groupe scientifique consultatif de la Commission internationale de la recherche sur le Saumon atlantique. Il a aussi trouvé étrange qu'une recommandation requière que l'UE suive sa propre règlementation. Bien qu'il ait indiqué que la nouvelle 'Feuille de route' correspond à une amélioration par rapport à la version actuelle, il n'a pas été à même d'adopter les recommandations à ce stade.

8.6 Le représentant du Danemark (pour les Iles Féroé et le Groenland) a remercié le Groupe de travail pour son rapport et ses recommandations sur cette question importante.

8.7 Le représentant de la Norvège a indiqué que le *G. salaris* était une question importante pour la Norvège, et que ce devrait être le cas pour toutes les Parties, étant donné les dommages que le parasite peut entraîner. La Norvège considère que les recommandations ont du sens et bien que l'on comprenne que l'Union européenne a besoin de plus de temps pour les étudier, il est parfois nécessaire d'être ouvert au changement d'une règlementation sur la base d'une recommandation.

8.8 Le représentant de l'Union européenne a indiqué qu'il était nécessaire de vérifier que les recommandations étaient conformes à la règlementation de l'UE puisque la loi sur la santé animale de l'UE a été développée à travers un processus fondé sur la science, complexe et participatif et apporte actuellement un cadre complet.

8.9 La Commission a accepté de retenir cet élément sur son ordre du jour pour ses sessions annuelles, et le Groupe de travail devrait se réunir tous les trois ans à compter de 2018 avec les Termes de référence suivants :

- Permettre un forum d'échange d'informations entre les Parties/juridictions en recherche sur le parasite *G. salaris*, et programmes de suivi, contrôle et éradication de ce parasite;
- Étudier le besoin de révisions des recommandations dans l'Annexe 12 de NEA(17)4 pour assurer la cohérence avec la Législation de la santé animale des Parties de l'OCSAN ;
- Développer des conseils pour une coopération plus étroite sur les mesures de prévention contre une prolifération du parasite et pour son éradication dans les régions où il a été introduit.

8.10 Le représentant de l'Union européenne a proposé de fournir des commentaires au Groupe de travail concernant l'Annexe 12 de NEA(17)4 avant la prochaine réunion du Groupe de travail.

8.11 Le représentant de la Norvège a informé la Commission que les efforts pour éradiquer le *G. salaris* en Norvège a donné de bons résultats ces dernières années. Le 1er janvier 2017, le *G. salaris* avait été éradiqué avec succès de 22 rivières et 21 rivières supplémentaires ont été traitées et font l'objet d'un suivi. Après l'éradication du parasite, les stocks de saumon local sont reconstruits à partir de la banque de gênes. Il a rapporté qu'en 2017 le travail se poursuivra conformément au Programme d'action national. Il est prévu que deux nouvelles régions seront déclarées sans parasites plus tard cette année. Le traitement dans la région de Skibotn en 2015 et 2016 semble avoir fonctionné et les efforts pour reconstruire les stocks démarreront cette année. Les résultats du traitement chimique ne seront confirmés que cinq ans plus tard. Il ne restera alors que deux régions infestées par le parasite. Dans la région de Driva, une barrière à poissons fonctionne actuellement et empêche le saumon de migrer vers l'amont, réduisant ainsi la région infestée pour préparer le traitement chimique. Le groupe d'experts évaluant les options pour traiter le Drammen présentera son rapport final en 2018.

9. Annonce du gagnant du prix du Programme incitatif au renvoi des étiquettes

9.1 Le Président a annoncé que le gagnant du prix de £1,000 de la Commission du Programme incitatif de l'OCSAN au renvoi des étiquettes était M. Eugeny Danilov, Murmansk, Fédération de Russie. L'étiquette gagnante avait été appliquée à un saumon entré à l'automne, le 10 septembre 2015 dans la chute de Falls Creek de la rivière de

Ponoi, à 60km environ de l'embouchure. Il a été repris le 23 septembre 2016 dans la chute de Gold Beach 13km environ en amont du lieu d'étiquetage. La Commission a adressé ses félicitations au gagnant.

10. Recommandations au Conseil concernant la demande de conseils scientifiques auprès du CIEM

10.1 La demande de conseils scientifiques auprès du CIEM préparés par le Comité scientifique permanent et relatifs à la zone de la Commission de l'Atlantique du Nord-Est a été acceptée par le Conseil, CNL(17)10 (Annexe 7).

11. Divers

11.1 Aucune autre question n'a été soulevée.

12. Date et lieu de la prochaine session

12.1 La Commission a convenu de tenir sa prochaine session annuelle à la même période et lieu que la trente-cinquième session annuelle du Conseil.

13. Compte rendu de la session

13.1 La Commission a accepté un compte rendu de sa session.

14. Clôture de la session

14.1 Le Président a remercié les Parties et les observateurs pour leurs contributions et a fermé la trente-quatrième session annuelle de la Commission de l'Atlantique du Nord-Est.

Note: Les annexes mentionnées ci-dessus commencent à la page 95. Une liste des articles de la Commission de l'Atlantique du Nord-Est est inclue en Annexe 8.

Annex 1

Opening Statement submitted by NASCO's accredited Non-Government Organisations to the North-East Atlantic Commission

The NGOs welcome this opportunity to address the North-East Atlantic Commission at this 34th Annual Meeting of NASCO in Varberg, Sweden.

Depressingly, the NGOs could issue exactly the same statement this year as we did in 2016, so little has changed in the worlds of Atlantic salmon management and conservation. The ICES report shows that, once again, wild salmon stocks show little sign of any recovery in the NEAC region, with the southern stock being especially concerning. It is extremely frustrating that this situation fails to improve with each passing NASCO meeting.

As the NGOs do every year, we remind NEAC Parties that this forum is concerned with the protection of wild Atlantic salmon and not the interests of those who exploit them or adversely impact upon their survival. While salmon are obviously facing challenging natural conditions in their oceanic phase, the NGOs believe that the Parties should be even more rigorous in the way in which they control those activities that are within their regulatory powers, particularly home water mixed stock fisheries and aquaculture. Some NASCO Parties are still failing to abide by internationally agreed management responsibilities, and we are increasingly frustrated at the lack of political commitment in many areas towards the protection of wild Atlantic salmon.

The NGOs commend Scotland and Northern Ireland for their continued moratorium on coastal mixed stock netting, the Faroe Islands for keeping their commercial salmon fishery closed and Greenland for much tighter control over both their factory and subsistence fisheries. These were hard political decisions to make and the NGOs believe that those countries with continuing MSFs, particularly Norway and England, should follow these examples and close their coastal fisheries as soon as possible. We acknowledge some progress in planning for closures, but we said the same last year and we are now looking for delivery of actions, not more planning.

The NGOs suggested last year that the Parties paid more attention to the potential for by-catches of salmon in the course of conducting other fisheries in the North Atlantic. A question was asked on behalf of the NGOs to ICES and their response is included in this year's ICES Report. However, we would draw your attention to a paper distributed by Salmon Watch Ireland (SWIRL) at this meeting, arguing that further research, rather than a desktop study, be undertaken into what NGOs believe could still be a significant impact on migrating adult salmon.

As to marine salmon aquaculture, the NGOs can only repeat our statement from last year – and many years before – that the impact of the industry on wild salmon and sea trout continues to be a major concern, with Norway, Scotland and Ireland being the main focus of our scrutiny within NEAC. The NGOs continue to be utterly frustrated that the aquaculture industry is heavily supported by home Governments desperate for economic growth, despite overwhelming evidence of the failure of regulations to adequately protect wild salmonids from the harmful impacts of sea lice and disease transfer, while allowing escapees to dilute wild gene pools. We believe that it is totally unacceptable, for instance, that Parties are so complacent as to allow 30% of migrating wild smolts to be killed by sea lice emanating from salmon farms, or that a build-up of 8 adult female parasites can be allowed on farmed fish before regulatory action is taken - as was announced by one country at last year's Special Session on salmon farming. The introgression of farmed fish genes within wild salmon populations in Norwegian rivers is equally concerning, and a salutary lesson to other Parties as to what can happen if containment control is lax.

The NGOs commend the Faroe Islands for their strong regulation of aquaculture, whereby farms that persistently fail to control sea lice are forced to harvest early and reduce biomass in the following growing season – and this from a country without its own wild salmon stock, but with a responsibility towards other Parties' fish in Faroese waters. We cannot understand why other Parties cannot be equally committed to ensuring minimum impact from aquaculture on wild salmon.

The ultimate answer is to move the industry into closed containment units, either on land or in sea-based enclosures that provide a biological barrier between farmed and wild fish. The NGOs commend Norway for at least encouraging research into closed containment, but urge that this must be taken much more seriously by all Parties with aquaculture industries. The economics of closed containment are now very similar to open-net culture, and the greater production control, including better food conversions, waste disposal and removing the need for expensive chemical treatments to combat sea lice, surely make this the obvious way forward for an efficient, modern salmon farming industry.

We welcome the Hardangerfjord Conference (May 2017) developments as announced by Norske Industri and we look forward to their implementation by Marine Harvest and hope the rest of the industry will follow in due course.

Mr Chairman, we can only repeat what the NGOs said in the statement to NEAC last year – that in view of the continuing crisis in survival of wild Atlantic salmon throughout the North Atlantic, we urge all Parties to develop and to fully and urgently implement genuine action plans that strictly follow the NASCO fisheries management and aquaculture guidelines to which all Parties here have agreed. We say yet again that NASCO works for the protection of wild Atlantic salmon, and that it is totally unacceptable for economic or any other considerations to result in a significant barrier to achieving that underlying objective.

Part of the problem appears to be that political short termism of home governments feeds off lack of wide public awareness of, or interest in, the fate of salmon. But as iconic sentinel indictors of aquatic health in seas, estuaries and rivers, salmon serve as signals of environmental quality, which are being ignored. The Year of the Salmon is an opportunity to stimulate meaningful action by governments and their regulating agencies, and to lobby hard for shifts in public opinion. The NGOs hope that NASCO gives this high priority and look forward to contributing to its success.

<u>Annex 2</u>

NEA(17)8

Agenda

1. Opening of the Meeting

2. Adoption of the Agenda

3. Nomination of a Rapporteur

4. Review of the 2016 Fishery and ACOM Report from ICES on Salmon Stocks in the Commission Area

5. Mixed-Stock Fisheries conducted by Members of the Commission

6. Development of a Risk Framework for the Faroese Fishery

7. Regulatory Measures

8. Report of the Working Group on *Gyrodactylus salaris*

9. Announcement of the Tag Return Incentive Scheme Prize

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

11. Other Business

12. Date and Place of the Next Meeting

13. Report of the Meeting

14. Close of the Meeting

Annex 3

NEA(17)7

Mixed-Stock Fisheries
(Tabled by the European Union)

1) Brief description of existing MSFs

EU-Finland

Salmon fishery in the main stem of the large River Teno, including both various netting methods and angling, is exploiting c. 30 genetically different salmon populations from different tributaries and areas of the main stem.

CLs are established for 24 populations of the Teno stock complex. Target attainment evaluations are currently available for ten tributaries (partly including and combining lower order tributaries), the main stem, and for the Teno system as a whole.

EU-France

The only estuary where salmon is fished by professional fishermen in France is the one of the river Adour. 25-30 professional fishermen capture around 1000 to 1200 salmon every year (exploitation rate estimated at 40%). Fishing is authorised from May to July, but forbidden for 25% of the week.

		Pêcheurs professionnels			
		Marins pêcheurs côtiers	**Marins pêcheurs de l'estuaire**	**Pêcheurs professionnels en eau douce**	**Pêcheurs de loisir aux filets**
		Pêche interdite en mer	Zone maritime de l'estuaire	Lots Adour 23 et Gaves réunis	Estran landais
Effectifs de pêcheurs	période 2010-2013	méconnu	env. 12	env. 15	env. 6
	période 2000-2007	*méconnu*	*30*	*10*	*méconnu*
Niveau de capture annuel (en nombre de saumons)	période 2010-2013	captures accidentelles quelques dizaines à centaines	env. 1000	env. 200	anecdotique
	période 2000-2007	*méconnu*	*800 à 1000 avant 2002 1800 à 2000 depuis 2003*	*env. 80 avant 2001 env. 200 depuis 2002*	*anecdotique*

The Bay of Saint Michel is a vast area with exceptional biodiversity, which receives 3 rivers estuaries (Selune, See and Couesnon). Salmons swim upstream at low tide in very small streams. Although there is no professional fisherman, there is recreational fishing.

EU-Ireland

There are currently two managed mixed-stock fisheries in Ireland, Killary Harbour and Castlemaine Harbour. A third mixed-stock fishery, Tullaghan Bay, operated until 2013.

Killary Harbour
In the case of the Killary Harbour fishery, there are two contributing river stocks (Bundorragha (Delphi) and Erriff) both of which are meeting and exceeding their conservation limits (CL). The Standing Scientific Committee on Salmon (SSCS) undertake a risk assessment for the common estuary which results in a higher requirement for spawners in both rivers than simply combining the CLs for the rivers to ensure simultaneous attainment of CL in both rivers.
Castlemaine Harbour
The mixed-stock fishery in Castlemaine Harbour, Co. Kerry was closed over the 2007 to 2010 period as the fishery was perceived to exploit salmon from a range of rivers entering Castlemaine Harbour. A pilot fishery was conducted in the mixed-stock area of Castlemaine in 2010 to provide genetic samples for analysis of the rivers contributing to the fishery. Results revealed that the Castlemaine fishery almost exclusively exploited salmon from three rivers entering Castlemaine Harbour, the Laune, Caragh and Maine, all of which were meeting and exceeding CL. The Castlemaine fishery has operated since 2011 from the total available surplus of the three contributing rivers. For the mixed-stock Castlemaine fishery to operate, the total available surplus for the three rivers combined was reduced in a common estuary analysis to ensure that each river would meet CL simultaneously. The mixed-stock Castlemaine fishery and the draft net and rod angling fishery on the three rivers all exploit salmon from this reduced surplus calculation.

Tullaghan Bay
A draft net fishery operated in Tullaghan Bay up to 2013 predominantly exploiting stocks from the Owenmore, Carrowmore and the Owenduff rivers which were exceeding their CLs. A common estuary risk assessment was also undertaken for Tullaghan Bay, resulting in a higher requirement for spawners than simply combining the CLs for the rivers to ensure simultaneous attainment of CLs.

The SSCS reviewed the operation of Tullaghan Bay draft net fishery in 2012 and noted that the fisheries are mostly confined to the immediate vicinity of the Owenmore/Carrowmore and Owenduff river mouths and there was only a relatively small mixed-stock fishery in the bay. The SSCS advised that it was therefore not appropriate to apply risk analysis for a mixed-stock fishery in Tullaghan Bay. In its advice provided for the 2013 & 2014 seasons, the SSCS therefore did not advise a common estuary surplus for Tullaghan Bay. With regard to the SSCS 2015 scientific advice, the Owenmore River was only meeting 90% of CL (209 salmon deficit) and management advised that no commercial fishery should take place in the upper part of Tullaghan Bay in the vicinity of the Owenmore River. The Owenmore River has not exceeded CL over the period 2016-2017 based on scientific advice and therefore no mixed-stock commercial fishery took place in Tullaghan Bay in 2016 or will proceed in 2017 as one of the contributing stocks (Owenmore) failed to meet its CL.

EU-Sweden

Mixed stock fisheries is existing in the two rivers (River Lagan and Göta älv) with releases of reared salmon in the main watercourse and natural smolt production in tributaries. New fishing rules is planned to be implemented in 2018 or 2019.

EU-UK (England and Wales)

Fishery	Method	No. nets in 2016	Status
Anglian Coast:	Drift and non-drift nets	18	Being phased out
Severn Estuary	Putchers	5 [a]	Historic rights apply
	Lave nets	25 [a]	Being reduced to 15 nets
	Draft net	1 [a]	Being phased out
North East Coast:	Drift nets	11 [b]	Being phased out; due for closure in 2022
	T&J nets	48 [b]	Being phased out

[a] Subject to catch limits in 2016
[b] 2 joint licences included in both categories

EU-UK (Scotland)

Last year a prohibition on coastal netting was put in place.

2) Recent catch data

EU-Finland

Salmon catch in the River Teno in 2016: Total catch 84 t (Finland 48 t, Norway 36 t), c. 75% caught in the main stem (MSF), 25% in tributaries (little or no MSF).

EU-France

Provisional nominal catch (which may be subject to revision) for 2016 (tonnes)	Adour Estuarine 0,81T
Confirmed nominal catch of salmon for 2015 (tonnes)	0,88T

EU-Ireland

- Killary Harbour mixed-stock fishery (Erriff and Bundorragha rivers)
    - mean 5 year catch = 328 salmon (0.9t)
- Castlemaine Harbour mixed-stock fishery (Laune, Caragh and Maine rivers)
    - mean 5 year catch = 815 salmon (2.2t)
- Tullaghan Bay mixed-stock fishery (Owenmore, Carrowmore and Owenduff rivers)
    - mean 5 year catch = 136 salmon (0.4t)

EU-Sweden

	In-river	Estuarine	Coastal	Total
(a) provisional nominal catch (which may be subject to revision) for 2016 (tonnes)	9.03	0	0	9.03
(b) confirmed nominal catch of salmon for 2015 (tonnes)	17.688	0	0	17.688
(c) estimated unreported catch for 2016 (tonnes)	0.5	0	0.5	1

EU-UK (England and Wales)

(provisional declared catch of salmon in 2016)

- Anglian Coast: 0
- Severn Estuary: 155
- North East Coast: 18,767

EU-UK (Scotland)

In 2016, both catch and effort in the fixed engine and net and coble fisheries were the lowest since records began in 1952.

	In-river	Estuarine	Coastal	Total
(a) provisional nominal catch (which may be subject to revision) for 2016 (tonnes)	16.8	9.8	0.2	26.8
(b) confirmed nominal catch of salmon for 2015 (tonnes)	27.7	9.4	30.9	68.0
(c) estimated unreported catch for 2016 (tonnes)				3

3) Updates to the Implementation Plan (IP) related to MSF

EU-Finland

Parliaments in Finland and Norway have accepted the new bilateral fishery agreement, which will come into force for the fishing season 2017. The agreement concerns river fisheries, including MSF in the main stem, but the coastal MSF is the responsibility of Norwegian national management.

Conservation limits are established for 24 populations of the Teno stock complex, and attainment has been assessed for 11 individual populations. Exploitation of these populations in MSF of the Teno main stem can be assessed through genetic stock identification. Annual monitoring programme will also be updated in the near future as a part of the implementation work of the new agreement.

EU-France

N/U

EU-Ireland

The Irish Implementation Plan was updated in May 2014.

EU-Sweden

N/U

EU-UK (England and Wales)

The Implementation Plan (IP) for UK (England and Wales) was updated in 2013/14 to clarify the management of fisheries within estuaries. The updated IP states that all fisheries, including MSFs, operating within estuary limits are assumed to exploit predominantly fish that originated from waters upstream of the fishery. These fisheries are carefully managed at a local level to protect the weakest of the exploited stocks, guided by a decision structure and taking into account socio-economic factors and European Conservation status where applicable. This includes the fisheries in the Tamar/Tavy/Lynher and the Taw/Torridge estuaries and the Solway Firth.

EU-UK (Scotland)

N/U

4) Changes or developments in the management of MSFs in this IP period to implement NASCO's agreements

EU-Finland

New regulation regime for salmon fishing is based on biological reference points and scientific assessments of their attainment, including a reduction of fishing pressure by c. 30%. The reduction of fishing pressure is especially focusing on salmon stocks with the weakest status in the Teno stock complex by tailored fishery regulations in time and space, and on specific fishing methods. According to the new agreement, a recovery plan will be made to ensure the recovery of the weakest stocks in a time-frame of 2-3 salmon generations.

EU France

In Normandy (Mont Saint Michel area) salmons are captured both in rivers and estuaries. The regulation applying to the maritime domain allows for the capture of one salmon per day and per fisherman, but there is currently no TAC.

EU-Ireland

Closure of the Tullaghan Bay mixed-stock fishery due to one contributing stock failing to meet CL.

EU-Sweden

Sweden has taken following management measures to phase out mixed stock fisheries on wild salmon stocks.

- Sport fishing at sea is mainly targeting sea trout. The fishing mortality for salmon was estimated to be very low in this fishery even before a bag limit was introduced in 2014. It is estimated that the bag limit will result in nearly no fishing mortality for salmon in sport fishing at sea.

- There have been commercial trap net fisheries at the Swedish coast until 2011, situated near or in the estuary of a river with compensatory (hydropower stations) releases of fin-clipped smolt. Only catches of fin-clipped salmon is since 2013 allowed in trap net fisheries and all wild salmon shall be released alive. This was earlier partly a MSF but is not expected to be a MSF as only catches of fin-clipped salmon are allowed. Since 2012 there has been no trap net fisheries operating.

- Gill net fishing in the sea at depths <3 m is not expected to be a MSF. Since 2013 it is strictly regulated with respect to effort, period and mesh size. Marine protected areas are located nearby wild salmon rivers. In these areas, no gill net fishery is allowed irrespective of the depth.

- A ban on gill net fishing for salmon in remaining coastal waters with a depth >3m has been implemented from 2014 to phase out mixed stock fisheries targeting salmon stocks. There has not been any reported MSF or illegal gill net fisheries during 2016 in coastal waters with a depth > 3m.

EU-UK (England and Wales)

Anglian Coast: a new Net Limitation Order (NLO) was introduced in 2016 continuing the phase-out of this fishery.

Severn Estuary: new NLOs for the draft and lave nets were approved in May 2014. For both fisheries, the number of instruments was capped at 2013 levels. The draft net fishery is now subject to a phase-out (zero nets) and the lave net fishery is subject to a reducing order to 15. Catch limits are applied to all nets and putchers.

North East Coast: the NLO was updated in 2012; both drift nets and beach (T&J) nets are being phased out, and the drift net fishery will be closed in 2022. An investigation into the possibility of capping catches in the fishery (drift nets and T&J nets) to prevent exceptionally high landings has been completed and is under consideration. The Environment Agency will be conducting a mid-term review of the NLO in 2017; this will include an evaluation of the potential to maintain a limited T&J net fishery after 2022 that complies with NASCO guidelines and the need to safeguard the weakest stocks. Consideration of other possible management actions will be taken forward as part of the Environment Agency's new five-point approach to deliver a better future for salmon by addressing the pressures that they face through their life-cycle (see 2017 APR).

National measures: further action in relation to the management of net and fixed engine fisheries is under consideration in both England and Wales (see 2017 APR).

EU-UK (Scotland)

There were no recorded changes in the gears used to fish for salmon in the 2016 season. However, statutory conservation measures are in place to regulate both the killing of salmon in the early months of the fishing season (http://www.gov.scot/Topics/marine/Salmon-Trout-Coarse/fishreform/licence/spring), in coastal waters and on stocks with poor conservation status (http://www.gov.scot/Topics/marine/Salmon-Trout-Coarse/fishreform/licence/status).

These regulations will have an impact on the catch and effort data reported by Scottish salmon fisheries. In particular, the retained catch of salmon in coastal nets for 2016 was restricted to reports from a single haaf net fishery which was licenced as part of a science programme studying geographic variation in fecundity in relation to run-timing.

Annex 4

NEA(17)5

Mixed-Stock Fisheries
(Tabled by Norway)

In several fjords and coastal regions, mixed-stock fisheries have not been permitted for many years due to low target attainment. However, restricted mixed-stock fisheries are still in operation in most fjords and along the coast.

The regulation of these fisheries is based upon estimates of spawning target attainment of the stocks most likely to be exploited in the actual fjord or coastal region. In general, only bag nets and rod and line are allowed. In Finnmark County, however, bend nets are also permitted. In addition to restrictions on fishing gear, the main regulatory measures are length of fishing season and the number of fishing days per week.

As part of the revision of regulations for 2016 and onwards, the mixed-stock fisheries were further restricted in specific areas in western, central and northern Norway through a reduction of fishing days for bag nets. In addition, the number of fishing days for bend nets in coastal regions of Finnmark County were reduced, and new regulations for bag- and bend nets in the Tana fjord were given and will come into force as a result of the new agreement for the river Tana. The fishing season was extended in two minor fjord areas in western Norway, due to improvement of stock status in these areas.

The total salmon catch in coastal net fisheries in 2016 was 269 tonnes, an increase of 16 percent from 2015. Mixed-stock fisheries are still most extensive in Finnmark County where the catches increased by 50% (total catch = 134 tonnes) compared to 2015. As in 2015, no in-season measures were considered necessary in 2016.

As a new tool in fisheries management, rules for mandatory continuous reporting of catches in the sea fisheries are in progress. These rules will not be in place for the 2017 fishing season but an interactive solution for voluntary continuous reporting is supposed to be ready for use in the 2017 fishing season.

Annex 5

NEA(17)6

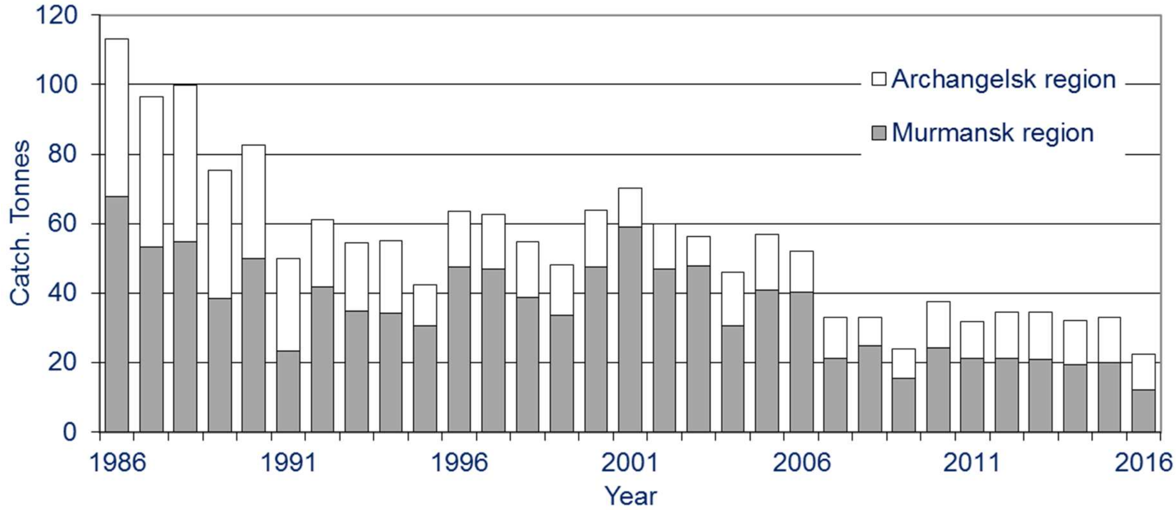
Mixed-Stock Fisheries
(Tabled by the Russian Federation)

In the Russian Federation, mixed-stock salmon fisheries are conducted in the Murmansk and Archangelsk regions in the White Sea only. Coastal salmon fisheries in the Barents Sea are prohibited by the Fishing Regulations for the Northern Fisheries basin (order of the Ministry of Agriculture No. 414, 30.10.2014).

Commercial, recreational and indigenous salmon fisheries are allowed at fishing sites only. A catch limit for anadromous fish is established annually on a region-by-region basis by the Federal Agency for Fisheries. A regional catch limit is allocated to commercial, recreational and indigenous fisheries by the Regional Commissions on Regulation of Harvesting the Anadromous Fish.

A Regional Directorate of the Federal Agency for Fisheries is responsible for issuing licenses for users of fishing sites in accordance with a catch limit allocated by a Regional Commission on Regulation of Harvesting the Anadromous Fish. Users of fishing sites are obliged to report catches to a Regional Directorate of the Federal Agency for Fisheries twice a month. Once the allocated catch limit has been reached the fishery must be closed.

Over past three decades, the effort in coastal fisheries in the White Sea has been noticeably reduced. The coastal catches decreased from over 100 tonnes in the 1980s to around 50 tonnes in the 1990s. Over the past 10 years, the total declared coastal catch in the White Sea has fluctuated around 30 tonnes (see Figure below).



Commercial coastal catches of Atlantic salmon in the White Sea in 1986-2016 by region (in tonnes round fresh weight).

In 2016, the total declared commercial catch of Atlantic salmon taken in coastal areas of the White Sea was 22.5 t (see Table below), the lowest in the time series with 12.1 t reported for the Murmansk region and 10.4 t reported for the Archangelsk region.

Provisional nominal catch (which may be subject to revision) for 2016	In-river	Estuarine	Coastal	Total
	32.3	0.0	23.5	55.8
Confirmed nominal catch of salmon for 2015	46.3	0.0	33.9	80.2

Nominal catches of Atlantic salmon in Russia in 2015-2016 (in tonnes round fresh weight).

Today, the commercial coastal salmon fishery in Russia is viewed more as a social measure - a traditional way of fishing by local people from Pomor villages along the White Sea coast.

The results of the Kolarctic salmon project have shown that no adult salmon sampled in the White Sea were assigned to the rivers outside the area. Salmon caught in the White Sea originated from 25 rivers and the vast majority of the fish were from 17 rivers in the Murmansk region (Vähä *et al*., 2014). Along the White Sea coast of the Murmansk region, 48% of sampled salmon originated from the Varzuga River and 23% of samples were assigned to the Strelna River. The occurrence of Varzuga salmon was highest (89%) in the coastal catches taken in the western part of the fishing area, closest to the Varzuga River estuary. The proportion of Varzuga salmon decreased towards the east and was lowest (27%) in the autumn catches taken in the most eastern areas. The number of salmon populations (15 stocks) was higher in catches taken in June-July than in the autumn (6 stocks) (Prusov *et al*., 2014).

References

Prusov, S., Ustyuzhinsky, G., Wennevik, V., Vähä J.-P., Ozerov, M., Fernandez R.D., Niemelä, E., Svenning, M-A., Falkegård, M., Kalske, T., Christiansen, B., Samoylova, E., Chernov, V., Potutkin, A., Tkachenko, A. 2014. Summary results from coastal salmon fisheries in the White Sea: timing and origin of salmon catches. Kolarctic report. 38 pp.

Vähä, J.-P., Wennevik, V., Ozerov, M., Fernandez, R.D., Unneland, L., Haapanen, K., Lyzhov, I., Rysakova, K., Falkegård, M., Svenning, M-A., Prusov, S. 2014. Genetic structure of Atlantic salmon in the Barents region and genetic stock identification of coastal fishery catches from Norway and Russia. Kolarctic report. 95 pp.

Annex 6

NEA(17)4

Report of the Meeting of the Working Group on Gyrodactylus salaris in the North-East Atlantic Commission Area

1. In 2004, NASCO's North-East Atlantic Commission organised a Workshop to discuss the need to minimise the threat posed by *Gyrodactylus salaris* to Atlantic salmon. The Workshop developed many recommendations and, following further work, these were collated into a 'Road Map' (amended in 2006) outlining responsibilities and a timeframe for action. The 'Road Map' includes recommendations on:
   - opportunities to enhance co-operation on monitoring, research and exchange of information;
   - the need for revisions to international guidelines and other measures to prevent the further spread of the parasite; and
   - strengthening of national and regional legislation and measures to prevent the spread of the parasite.

2. In view of the serious threat posed by this parasite, the North-East Atlantic Commission established a Working Group on *G. salaris* and meetings were held in both 2006 and 2007. In 2008, the North-East Atlantic Commission decided not to convene further meetings of the Working Group but to retain an item on its Annual Meeting agenda to allow developments in relation to the parasite to be monitored. While this provided an opportunity to report to the Commission on any new information relating to *G. salaris,* there was limited time available, few Parties/jurisdictions provided reports and those that were tabled were not comprehensive in terms of the elements in the 'Road Map'. There have, of course, been significant developments over the last ten years or so, not least in relation to international guidelines and other measures to prevent the spread of the parasite and in its eradication.

3. Last year, the North-East Atlantic Commission agreed to reconvene the Working Group and asked that it undertake the following tasks:
   - provide a forum for exchange of information among the Parties/jurisdictions on research on, and monitoring and control programmes for, the parasite *G. salaris*;
   - review progress in relation to the Commission's 'Road Map' and advise of any changes required;
   - develop recommendations for enhanced co-operation on measures to prevent the further spread of the parasite and for its eradication in areas where it has been introduced; and
   - develop recommendations for future research.

4. The Working Group met in London during 7 and 8 March under the Chairmanship of Mr Stian Johnsen (OIE). Its report is attached. Annex 12 contains a revised 'Road Map' which the Working Group recommends is adopted by the North-East Atlantic

Commission given the potentially devastating impacts of this parasite on wild salmon stocks. This revised 'Road Map' has been considerably simplified to remove duplication and reflect changes in EC fish health legislation and it has been re-formatted without reference to the original source of the recommendations, responsibilities and timeframe for action which should be clear from the text.

5. The Working Group stressed the importance of ensuring that adequate measures are in place to prevent the introduction of the parasite and it was recommended that publicity material highlighting the risks posed by the parasite be disseminated by the competent authorities and made available on the NASCO website. The Secretariat might be asked to develop standard text for use in such publicity material. The Working Group noted that legislation should recognise different strains and their pathogenicity. In the event that *G. salaris* and *G. thymalli* were synonymised there could be serious consequences for the protection afforded by Additional Guarantees. Emerging risk factors for the spread of *G. salaris* include a changing climate, which could result in reduced salinities, and changes in migration patterns with smolts entering the sea but then migrating into other rivers. In this regard, the Working Group noted with concern the continuing spread of *G. salaris* along the west coast of Sweden and it was suggested that salinity levels in the Skagerrak may not always be at levels that would prevent the further spread of the parasite.

6. The Working Group has recommended that the North-East Atlantic Commission retain an item on its agenda to allow for an exchange of information on *G. salaris* and that to facilitate this there be a further meeting of the Working Group in 2018 but, thereafter, only every three years. The importance of developing and testing contingency plans was highlighted and it was noted that these are at different stages of development in different countries. The Working Group recommends that the North-East Atlantic Commission request that contingency plans be made available through the Secretariat in advance of the Working Group meeting in 2018 and that those countries without plans be encouraged to develop them as a matter of urgency.

7. The North-East Atlantic Commission is asked to consider the recommendations in the attached report and decide on appropriate actions. If it agrees to proceed with a further meeting of the Working Group in 2018, the Terms of Reference might be as follows:

- provide a forum for exchange of information among the Parties/jurisdictions on research on, and monitoring, control and eradication programmes for, the parasite *G. salaris*;
- review progress in relation to the recommendations contained in the Commission's 'Road Map' including progress with the development and testing of contingency plans;
- develop recommendations for enhanced co-operation on measures to prevent the further spread of the parasite and for its eradication in areas where it has been introduced.

Stian Johnsen	Peter Hutchinson
Working Group Chairman	Secretary
Edinburgh	
7 April 2017	

GSWG(17)15

Report of the Meeting of the Working Group on Gyrodactylus salaris in the North-East Atlantic Commission Area

Rydges Kensington Hotel, London, UK

7 and 8 March 2017

1. Opening of the Meeting

1.1 The Chairman, Mr Stian Johnsen (OIE), opened the meeting and welcomed participants to London. He noted that in 2004, NASCO's North-East Atlantic Commission had organised a Workshop to discuss the need to: minimise the threat posed by *Gyrodactylus salaris* to Atlantic salmon; enhance cooperation on monitoring, research and dissemination of information on the parasite; strengthen national and regional legislation to prevent further spread of the parasite; and consider revisions to the international guidelines relevant to preventing its spread. He indicated that the Workshop had developed many recommendations and, following further work, these were collated into a 'Road Map' outlining responsibilities and a timeframe for action. The 'Road Map' includes recommendations for enhanced cooperation on monitoring, research and exchange of information and revisions to national, regional and international guidelines and other measures to prevent the further spread of the parasite. He recalled that the North-East Atlantic Commission had established a Working Group on *G. salaris* and that meetings of this Working Group were held in both 2006 and 2007. However, the North-East-Atlantic Commission had decided not to convene meetings of the Working Group since 2007 although it had retained an item on its agenda to allow developments in relation to the parasite to be monitored. Limited time is, however, available at these meetings and there had been limited exchange of information on the parasite and consideration of progress with the recommendations in the 'Road Map' or their continuing relevance. He noted that under NASCO's Strategic Approach, the parasite *G. salaris* is identified as one of six primary challenges facing the conservation and management of wild Atlantic salmon and, at its 2016 Annual Meeting, the Commission had agreed to reconvene its Working Group with the intention of providing a forum for a more detailed exchange of information and development of recommendations on measures needed to prevent the spread of the parasite, for its eradication where introduced and for future research. He wished participants a successful meeting and an enjoyable stay in London.

1.2 A list of participants is contained in Annex 1. There were no representatives at the meeting from Sweden (although a paper on monitoring and management of *G. salaris* in Sweden has been provided), Denmark, France, Spain, Germany or Portugal.

2. Adoption of the Agenda

2.1 The Working Group adopted its Agenda, GSWG(17)12 (Annex 2), but decided that item 6 of the Draft Agenda entitled 'Development of recommendations for future research on *G. salaris*' would be covered under item 5 'Development of recommendations for updating the 'Road Map''.

3. Consideration of the Terms of Reference

3.1 The Working Group considered its Terms of Reference (ToRs) as agreed by the North-East Atlantic Commission, GSWG(17)2. These request that the Working Group undertake the following tasks:

- provide a forum for exchange of information among the Parties/jurisdictions on research on, and monitoring and control programmes for, the parasite *G. salaris*;
- review progress in relation to the Commission's 'Road Map' and advise of any changes required;
- develop recommendations for enhanced co-operation on measures to prevent the further spread of the parasite and for its eradication in areas where it has been introduced; and
- develop recommendations for future research.

3.2 The Working Group agreed that after presentation of reports by each Party/jurisdiction (see paragraph 4.2 below) it would review each element of the 'Road Map' and propose changes where required. The Chairman advised the Working Group that its recommendations will be considered by the North-East Atlantic Commission of NASCO at its Thirty-Fourth (2017) Annual Meeting in Varberg, Sweden, in June. The importance of preventing the further spread of the parasite and to be able to respond rapidly with mitigation measures in the event of its introduction were highlighted.

4. Review of progress in implementing the Commission's *G. salaris* 'Road Map', NEA(06)9

4.1 The 'Road Map', NEA(06)9, contains recommendations concerning the following:

- opportunities to enhance co-operation on monitoring research and exchange of information;
- the need for revisions to international guidelines and other measures to prevent the further spread of *G. salaris; and*
- strengthened national and regional legislation and measures to prevent the further spread of *G. salaris.*

4.2 In preparation for the meeting, each Party/jurisdiction had been asked to prepare a brief paper updating the reports that were made at the Working Group's last meeting in 2007, including details on:

- monitoring and control programmes for, and distribution of, the parasite;
- on-going and planned research; and
- measures being taken to prevent the spread of the parasite and eradicate it where it has been introduced.

4.3 The following reports had been received and distributed to all participants:

- Eradication measures in Norwegian Rivers, GSWG(17)3, (Annex 3);
- *Gyrodactylus salaris* in Sweden; management and monitoring, GSWG(17)4, (Annex 4);
- Monitoring and control programmes and measures being taken to prevent the spread of the parasite and eradicate it where it has been introduced (Tabled by Norway), GSWG(17)5, (Annex 5);
- *Gyrodactylus salaris* monitoring in Northern Ireland (Update February 2017), GSWG(17)6, (Annex 6);
- *Gyrodactylus salaris* update paper - contribution from Marine Scotland, GSWG(17)7, (Annex 7);
- Briefing Paper on *Gyrodactylus salaris* (Tabled by EU Ireland), GSWG(17)8, (Annex 8);
- *Gyrodactylus salaris* update paper - contribution from Finland, GSWG(17)9, (Annex 9);
- *Gyrodactylus salaris* monitoring programme in the Russian Federation. Status of index salmon rivers, GSWG(17)10, (Annex 10);
- Briefing Paper on *Gyrodactylus salaris* (Tabled by EU England and Wales), GSWG(17)11, (Annex 11).

Sweden

4.4 *G. salaris* was first detected on the west coast of Sweden in 1989 and at present only 7 of the 23 salmon rivers are uninfected. The majority of uninfected rivers are in the north i.e. in the Skagerrak Sea where saline ocean water occurs. In Sweden, although mortality of individual fish attributable to the parasite has been recorded, there is no significant evidence of large-scale effects on salmon production in infected rivers. In 2001, an annual *G. salaris* monitoring programme was implemented with identification of species and clades carried out by Norwegian scientists. The Swedish authorities consider *G. salaris* to be a serious threat to remaining uninfected salmon stocks, and also to neighbouring stocks in Norway. Protective measures have been introduced to avoid spreading the parasite including a ban on stocking or rearing salmonid fish in the catchments of uninfected rivers. Eradication programmes have not been undertaken and the intensity of infection has been found to decrease over time even in the absence of treatment. An information leaflet has been produced describing the problem and containing recommendations for anglers to avoid accidental spread of the parasite with fishing gear and there is a good level of awareness of the risks among the angling community in Sweden. There is also good co-operation and data exchange with Norway and the data have been used in developing risk analyses regarding the possible spread of the parasite from Sweden to Norway.

Ireland

4.5 *G. salaris* is listed as a notifiable disease in Ireland and legislation is in place to prevent the transfer of live fish capable of carrying the parasite to or within Irish waters. The parasite is not listed in Council Directive 2006/88/EC but Ireland retained Additional

Guarantees under Decision 2004/453/EC in respect of *G. salaris* and can continue to control imports and suspected or confirmed outbreaks. Since 2005, wild salmon parr from selected river systems in Ireland have been examined annually for the presence of *G. salaris* by the Fish Health Unit of the Marine Institute. This monitoring is undertaken in conjunction with the catchment-wide electrofishing programme managed by Inland Fisheries Ireland. In a more general context, the Marine Institute is responsible for investigating unexplained abnormal or significant fish mortalities encountered in Ireland which may be a result of fish disease, while Inland Fisheries Ireland have statutory responsibility for the management of wild salmonid fisheries in Ireland. The Marine Institute is the Competent Authority for the Fish Health Directive. *G. salaris* has not been recorded on the island of Ireland to date. There is presently no on-going or planned research on *G. salaris* in Ireland. A detailed contingency plan for dealing with any outbreak of *G. salaris* in Ireland has been drafted by the Marine Institute, in consultation with relevant stakeholders including Inland Fisheries Ireland, and is likely to be published in advance of the Thirty-Fourth Annual Meeting of NASCO in June 2017. The plan will set out in detail the operational responsibilities and actions to be taken in the event of a suspected outbreak. In addition to the contingency plan, literature to highlight the issue of *Gyrodactylus* and advise on biosecurity measures that can be taken to minimise the risk of introduction of the parasite to Ireland has been developed and widely circulated among stakeholders. It includes a *Guide to Protecting Freshwater Fish Stocks in Ireland from the Parasite Gyrodactylus salaris* (https://goo.gl/NRgVY0) and, in addition, both state agencies host information about *G. salaris* on their websites.

Russian Federation

4.6 In Russia, *G. salaris* was first recorded in the Keret River (Republic of Karelia, White Sea basin) in 1992, probably following introduction into the river through aquaculture activities. Parasitological surveys to monitor for *G. salaris* have been carried out since 1993 in five index rivers of the Murmansk region (Pecha, Pack, Kola, Kovda and Kanda) and in the Keret River of the Republic of Karelia. To date, the parasite has not been found in the salmon rivers of the Murmansk region (either the Barents Sea or the White Sea basins). The infestation of juvenile Atlantic salmon with *G. salaris* was studied in the Keret River in 2016. The parasite was found on all fish sampled (n = 12) with the number of parasites per fish varying from 17 to 1,083 and an abundance rate of 164 parasite per fish. Salmon catches in the Keret River in the early 1980s varied from 2 to 3 tonnes and annual adult returns never fell below 2,700 salmon until the early 1990s. The maximum number of salmon counted at the barrier fence in the Keret River was 4,660 salmon in 1983, but in the period 2008 - 2015 the wild salmon count varied from 43 - 223 fish. In the light of recent aquaculture developments in the Murmansk region and Karelia, transfers of rainbow trout from areas with *G. salaris* (e.g. the Leningrad region and parts of Karelia) represent a high risk of further spreading the parasite into Atlantic salmon rivers. The parasite may also be transferred with fishing equipment in recreational fishing widely practiced in the Kola Peninsula.

Finland

4.7 The results of monitoring in the catchments of rivers in Finland draining into the Barents Sea have been negative for *G. salaris*. The rivers Tenojoki and Näätämöjoki both have free status for *G. salaris*. There were two fish farms in the River Paatsjoki catchment area in 2006 but only one from 2011 onwards. There has been no fish farming activity in other catchments during the monitoring period, although in some years, local brown trout eggs have been incubated in a miniature hatchery in the River Näätämöjoki catchment during winter and spring. In recent years, scientific research on *G. salaris* at the University of Oulu has focused on the molecular ecology and evolution of the parasite but it is expected that the amount of research on this parasite will now decline following retirement of the lead researcher. In Finland, the goal is to prevent the spread of *G. salaris* to the rivers of the Barents Sea catchment area but the parasite is widely distributed in rivers and fish farms in other catchment areas in Finland and eradication of the parasite from its natural distribution areas has been considered to be impossible in Finland. Measures to prevent spread of *G. salaris* to Barents Sea catchment areas include restrictions of fish movements, prohibition of the use of baitfish, requirements concerning drying or disinfection of fishing equipment, boats *etc*. and these have not changed since 2007. During the period 2006 - 2016, publicity material related to preventing the spread of the parasite has been developed with stakeholders and disseminated mainly through the internet. Leaflets on preventing the spread of the parasite were updated in 2014 and published in Finnish, Swedish, Samish, English and Russian. The leaflet is issued to every fisherman purchasing a fishing license for the River Tenojoki. *G. salaris* has also been on the agenda of the Finnish-Norwegian Transboundary Water Commission and in the negotiations of the new agreement for the Tenojoki between Finland and Norway during the last few years. In the event of a *G. salaris* outbreak in the River Tenojoki, there will not be possibilities to totally eradicate it. The preliminary work in developing a contingency plan for the rivers Tenojoki and Näätämöjoki was published in 2013. Measures to be considered in the event of the parasite being introduced include live gene banking and maintaining some areas free of the parasite. Contingency planning with Norway was proposed in the report of the preliminary study.

United Kingdom

4.8 The consequences of *G. salaris* introduction into the United Kingdom would be severe for salmonid stocks with potential for riverine stock losses of up to 98%. The economic consequences of such losses would also be severe. Three main categories and respective introduction pathways have been identified and analysed for the level of risk they pose. These are with live fish and gametes (e.g. imports of live fish and rainbow trout eggs); fish carcasses; and mechanical transmission (in ships' ballast water, in well boats and fishing gear and with lumber imports). The UK is one of the few areas within the EU that is recognised free from the parasite, along with the Republic of Ireland and two river catchments in Finland, and is able to restrict imports of live salmonids to countries that have an equivalent health status, i.e. demonstrated freedom from *G. salaris* and are approved as such by that country's competent authority.

4.9 To satisfy Article 43 of Directive 2006/88/EC, sampling of species susceptible to *G. salaris* is required as part of the criteria to maintain national control measures for the freedom of the parasite in England and Wales. Due to the low number of salmon farms in England and Wales, samples are obtained from wild salmonid populations. Monitoring for *G. salaris* in England and Wales is conducted through a rolling programme of sampling covering all river catchments which contain salmon. Within England and Wales, there are seventy-eight rivers that support salmon, although not all currently host large populations. Each of the catchments is sampled approximately every five years where possible. Since 2007, fifty-four sites on forty-three catchments have been sampled. In this time, *G. salaris* has not been found in any of the samples. However, several other gyrodactylid species native to the UK have been identified: *G. derjavininoides* (host is brown trout but also found on rainbow trout); *G. thymalli (h*ost is grayling) and *G. truttae* (host is brown trout and Atlantic salmon). In 2016, a novel non-destructive method for sampling wild salmonids was introduced and a request will be made that is included in the OIE manual of diagnostic tests for aquatic animals.

4.10 Yearly (2007 to 2016) sampling data for gyrodactylid parasites in Scotland was presented. In summary, the surveillance undertaken continues to support Scotland's disease free status with respect to *G. salaris*. No evidence of the parasite has been detected over the sampling period from 1 January 2007 to 31 December 2016. Targeted surveillance on fish farms and within wild fisheries was undertaken up until 2010. However, the introduction of Council Directive 2006/88/EC instigated a change from targeted surveillance towards risk based surveillance (both active and passive initiatives) with the aim of increasing the frequency of surveillance in areas which presented a greater risk of contracting and spreading disease. Across all freshwater fish farm sites in Scotland, which hold susceptible species and life stages, active surveillance for *G. salaris* remains in place. Fisheries, including wild and put and take, are covered through a passive surveillance programme. Passive surveillance involves communicating and informing relevant stakeholders about various listed disease and associated clinical signs and ensuring notification systems are in place for any case of suspicion together with the appropriate response by the competent authority. Following the reduction in sample throughput after 2010/2011, and with the development of the Q-PCR method, morphological assessment is now not routinely undertaken and diagnosis relies solely upon molecular methods.

4.11 At present Marine Scotland Science is not actively involved in any scientific research work concerning *G. salaris* but since the last meeting of the Working Group it has carried out research to improve approaches to screening for, and identification of, the parasite. Scotland (as part of the GB health zone), has recognised disease freedom with respect to *Gs*; as a consequence, imports are permitted only where they are accompanied by a health certificate confirming that the animals: originate from an area free from *G. salaris*; or they have been held immediately prior to dispatch in salt water for a designated period; or in the case of eggs they have been disinfected prior to dispatch. In 2007, the 'Home and Dry' campaign was launched in order to raise awareness of the potential risks to Scotland from *G. salaris* being introduced on fishing tackle and with associated water sports. Preventive treatment including disinfection of equipment are advocated. Many wild fishery stakeholders have taken measures at the local level to help prevent the introduction of *G. salaris* including ensuring equipment is disinfected, educating anglers, developing catchment contingency plans and mapping catchments to facilitate eradication. Marine Scotland maintains contingency plans (currently in their fourth edition) to deal with an outbreak of *G. salaris* which include an MoU with Norway for assistance in the event of an outbreak. Exercises to test Scotland's response to an outbreak of *G. salaris* (including Exercise Alpheus) have been conducted on a GB-wide basis.

4.12 In Northern Ireland, a rolling regime of testing for *G. salaris* has taken place since 2007 on both operational fin fish farms and in wild catchment areas (by electrofishing) with 10 - 12 sites each for both farmed and wild stock areas being monitored each year and, subject to confirmation, this monitoring is expected to continue in 2017/18. Northern

Ireland has continued freedom from *G. salaris*. There is no research currently ongoing or planned into *G. salaris*. Both published information leaflets and the internet are used to inform anglers and stakeholders of the risks associated with the parasite and disinfection of fishing gear is recommended where anglers have been fishing in other areas. With the re-organisation and reduction in the number of Government Departments in 2016 there is a need to review and update the current Northern Ireland and cross-border contingency plans. It is hoped that this work will be taken forward in 2017/18. There has been no testing of the plan to date.

Norway

4.13 Monitoring for *G. salaris* has been conducted in Norwegian rivers since the late 1970s. In 2015, 106 farms (3,651 fish) and 69 rivers (2,320 fish) were sampled with a similar programme in 2016. To ensure adequate sampling, a risk-based programme has been developed and involves sampling: rivers declared free after treatment; the 30 rivers with the largest salmon stocks; rivers with a high risk of infection from migrating fish; and other rivers at risk e.g. because of proximity to infected rivers. Moreover, Norway has an epidemiological surveillance programme in newly infected rivers and a post-treatment control programme. The use of eDNA and electrofishing can provide information on the presence of rainbow trout which can be vectors spreading the parasite. Project Gyrofri seeks to assess the risk of *G. salaris* from rivers in the Drammen area infecting other rivers draining into the Oslofjord given increased freshwater runoff and declining salinity. The findings have been used in decisions concerning stocking. This project will start investigating the migration patterns of salmon in the Oslofjord using an acoustic method.

4.14 In Norway, control and eradication has used chemical treatment and fish barriers (e.g. closed fish ladders or specially constructed barriers) to reduce the scale and complexity of the treatments and the amount of chemical and resources required. Juvenile salmon in the area above the barrier will either die or migrate to sea and, if migrants are excluded, the parasite will eventually disappear from the area if there are other long-term susceptible hosts e.g. brown trout. Rotenone, first used to eradicate *G. salaris* in 1981, has been the most important chemical treatment but more recently acid aluminium has also been used. Acid aluminium targets the parasite not the host so, with the exception of acid-sensitive species, it does not kill fish and other aquatic life. It is used to treat free-flowing areas whereas rotenone is used in backwater areas. Changes to the treatment methods have been implemented since 2003 which have improved the success rate. They include increasing the concentration of rotenone and use of heavy rotenone in upwelling areas, improved planning, timing of treatment with regard to water temperature and discharge, and double treatments. By 1 January 2017, *G. salaris* had been successfully eradicated from 22 rivers and a further 21 rivers have been treated and are being monitored (there must be a period of 5 years following treatment without detection of the parasite before the treatment is considered to be successful). If these treatments are successful, the number of infected rivers will have been reduced from 50 to 7. Treatment has commenced in the Driva region, including construction of a barrier in the River Driva, and a Working Group has been established to assess options for treating the Drammen River. There are currently no infected fish farms in Norway. It was noted that it is difficult to obtain funding for research on *G. salaris* in Norway although some research has been funded by the management agencies including studies on Arctic char. Work has also been undertaken on the development of an eDNA probe for *G. salaris* but this has not yet proved successful as it is difficult to prove absence rather than presence of the parasite. New treatment methods are also being considered including the use of chloride but as this is toxic to fish the concentration used needs to be very carefully controlled. Levels lower than chloride levels in drinking water are toxic to *G. salaris.*

Working Group Recommendations

4.15 The Working Group noted with concern the continuing spread of *G. salaris* along the west coast of Sweden and it was suggested that salinity levels in the Skagerrak may not always be at levels that would prevent the further spread of the parasite.

4.16 The Working Group noted that very little research is currently ongoing with regard to *G. salaris* and that availability of funding was a major factor. The 'Road Map' contains recommendations for research. These remain valid but in addition the Working Group noted the need for research on differentiating pathogenic and non-pathogenic forms of the parasite and on the effects of environmental factors on pathogenicity. The Working Group recognised that it could play an important role in providing a forum for exchange of information on on-going and planned research, measures to prevent the spread of the parasite and techniques to contain and eradicate it if introduced. The Working Group recommends that, in future, it should meet every 3 years commencing in 2018. The Working Group noted that Implementation Plans currently seek information on measures to prevent the introduction and further spread of *G. salaris* and that some Parties/jurisdictions had identified the parasite as a threat/challenge to management and had included an action related to this. However, not all NEAC Parties/jurisdictions had done so and it considered that, given the threat posed, an exchange of information and consideration of best practice would be best facilitated through periodic meetings of the Working Group.

4.17 The Working Group discussed changes to approaches to monitoring. Under EC Directive 2006/88, where a country is free of the parasite, it can adopt a passive approach to monitoring wild fish. While many countries still undertake targeted surveillance, which has the benefit of maintaining skill levels which would be important in the event of an outbreak of the parasite, it was recognised that such sampling is very demanding of resources, and would require escalation in some situations, if it was to be at a level that would give confidence of early detection. The importance of ensuring that adequate measures are in place to prevent the introduction of the parasite was stressed.

4.18 The importance of developing and testing contingency plans was highlighted and it was noted that these are at different stages of development in different countries. The Working Group recommends that the North-East Atlantic Commission should request that contingency plans be made available through the Secretariat and that those countries without plans be encouraged to develop them as a matter of urgency. The Working Group had previously developed guidelines on the elements to be included in contingency plans which are as follows:

Legal aspects

1. There should be a legal basis which describes what powers the authorities have or do not have to deal with an outbreak of *G. salaris*. A clear statement should be prepared

in advance of the policy that will be followed concerning eradication or containment of the parasite.

Publicity

2. As a precautionary measure the public should be advised in advance of what actions they should take in the event of an outbreak of the parasite.

Movement restrictions

3. In the case of a suspected outbreak, movements of live fish and equipment from the suspect area should immediately be regulated.

Strategy Groups

4. Each Party or relevant jurisdiction should establish a Disease Strategy Group to manage the response to the outbreak. The contingency plan should contain a list of factors to be considered by this group in deciding upon an eradication or containment policy. If necessary, local disease control centres could also be established.
5. An expert scientific group should be established to ensure that up-to-date scientific knowledge is available to the Disease Strategy Group.
6. The role of these groups should be clearly established in advance, together with contact details.

Review

7. The plan should be reviewed annually in January and updated in the light of new information. A test run of these arrangements should be conducted periodically.

Investigations

8. Epidemiological and other appropriate investigations should start immediately an outbreak is suspected.

4.19 The Working Group noted the importance of developing publicity material related to the risks posed to wild salmon stocks by *G. salaris* and noted that this had been done in a number of countries. The need to increase public awareness was noted and it is recommended that such publicity material be widely disseminated by the competent authorities and made available on the NASCO website. The Working Group recommends that the NASCO Secretariat develop standard text as a basis for publicity material.

4.20 The Working Group discussed the risks of transfer of the parasite on fishing gear and on boats and canoes. It was noted that there was only one known case where spread of the parasite was believed to have occurred on fishing gear and that involved a poaching incident in an infected river in Norway in which the net was subsequently used in an uninfected river. Concern was expressed that canoeists may inadvertently transfer the parasite on their canoes. At its last meeting, the findings of a risk assessment conducted in Norway had been presented. This study suggested that such transmission was unlikely because even during an epidemic there is less than one parasite per ten cubic meters of water and they are distributed close to the river bottom. Nonetheless, the Working Group recognised that although the risk of transmission with movements of canoes may be low, as with the risk of transmission on fishing equipment, the consequences could be very severe. It would be consistent with the requirements on anglers if efforts were made to ensure that canoeists and other boat users are aware of the need to take precautions to prevent the spread of the parasite. This may also offer broader biosecurity benefits.

4.21 The Working Group recognised that emerging risk factors for the spread of *G. salaris* include a changing climate which could result in reduced salinities and changes in migration patterns with smolts entering the sea but then migrating into other rivers.

4.22 The Working Group was advised that in Norway, in response to an outbreak of the parasite, the immediate response is to close the river given that planning for an eradication programme is a long process. The Working Group recognised the enormous progress made by Norway in eradicating the parasite from infected rivers and the increased success of the methods used following development of procedures in the light of experience. This expertise would be invaluable to other countries in the event of an outbreak.

5. Development of recommendations for updating of the 'Road Map'

5.1 The Working Group noted that when the 'Road Map' was developed in 2004 and updated in 2006, there was considerable uncertainty about new EU fish health legislation which was under review at that time. Many of the recommendations for revisions to international guidelines contained in the 'Road Map' related to the replacement of EC Directive 91/67 which was subsequently replaced by a new Directive, 2006/88/EC. This will be replaced shortly by a new Commission regulation (2016/429) that will cover both terrestrial and aquatic animal health but the provisions relating to aquatic animals remain unchanged. The Working Group agreed that the 'Road Map' could be simplified considerably to remove duplication and reflect changes in the EC fish health legislation and re-formatted without reference to the original source of the recommendations, responsibilities and timeframe for action.

5.2 A revised 'Road Map', GSWG(17)13, is contained in Annex 12 and the Working Group recommends that the North-East Atlantic Commission consider adopting this document given the potentially devastating impacts of this parasite on wild salmon stocks if introduced.

6. Other Business

6.1 At its last meeting in 2007, the Working Group had discussed the implications of the so-called EU 'Biocides Directive' for the continuing use of rotenone. The representative of Norway indicated that the process for registering rotenone is ongoing and is being led by the UK. He indicated that this process is now not expected to be concluded before 2023 and that in the meantime continuing use of rotenone is permitted. This use will continue to be permitted if the registration is successful but if not an application for use would need to be made and this could delay the initiation of treatment in the case of an outbreak. The Working Group had also previously noted that in the event of a major demand for rotenone there could be a delay depending on the existing demand for the product. The Working Group welcomed the efforts to develop new, environmentally-friendly treatment methods.

6.2 At the Working Group's last meeting the findings of a number of cost-benefit analyses were presented. A new study has commenced in Norway and is expected to report in two or three years' time. The project is being coordinated by NINA. To date, approximately NOK1 billion has been spent on the Norwegian *G. salaris* programme. The value of recreational fishing in Ireland has been estimated to be Euro836 million annually, of which about Euro210 million is associated with salmonid fisheries.

6.3 The Working Group noted that legislation should recognise different strains and their pathogenicity. In the event that *G. salaris* and *G. thymalli* were synonymised there could be serious consequences for the protection afforded by Additional Guarantees.

7. Report of the Meeting

7.1 The Working Group agreed a report of its meeting.

8. Close of the Meeting

8.1 The Chairman thanked all participants for their contributions, wished them a safe journey home and closed the meeting.

Meeting of the Working Group on Gyrodactylus salaris in the North-East Atlantic Commission Area

Participants

Ciaran Byrne, Inland Fisheries Ireland, Ireland

Seamus Connor, Department of Agriculture, Environment and Rural Affairs, UK

Peter Hutchinson, NASCO Secretariat

Geir Jakobsen, Norwegian Food Safety Authority, Norway

Stian Johnsen (Chair), OIE, France

Paul Knight, NGO Co-Chair

Perttu Koski, Finnish Food Safety Authority EVIRA, Finland

Michael Millane, Inland Fisheries Ireland, Ireland

Tor Atle Mo, NINA, Norway

Edward Peeler, Cefas, UK

Sergey Prusov, PINRO, Russian Federation

Neil Purves, Marine Scotland, UK

Jarle Skeinkjer, Directorate for Nature Management, Norway

David Stone, Cefas, UK

GSWG(17)12

Meeting of the Working Group on Gyrodactylus salaris in the North-East Atlantic Commission Area

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Consideration of the Terms of Reference
4. Review of progress in implementing the Commission's *G. salaris* 'Road Map', NEA(06)9
   - (a) Monitoring and control programmes for, and update on the distribution of, *G. salaris;*
   - (b) On-going and planned research concerning *G. salaris* and future research requirements;
   - (c) Measures to prevent the spread of the parasite and to eradicate it where it has been introduced:
     - (i) international initiatives;
     - (ii) national and regional initiatives, including progress in developing contingency plans
5. Development of recommendations for updating of the 'Road Map'
6. Other Business
7. Report of the Meeting
8. Close of the Meeting

GSWG(17)3

Eradication measures in Norwegian rivers

In recent years, control and eradication efforts have focused on a combination of fish barriers and chemical treatments.

1. Fish barriers

1.1. Long term barriers

Artificial barriers (fig.1) prevent Atlantic salmon from migrating upstream, which can reduce the amount of infested drainage. Barrier construction thus reduces the size and complexity of the treatments and the amount of chemical and other resources needed while increasing the chance of success. The young Atlantic salmon already present in the newly excluded area will either die or migrate out to sea, and the parasite will eventually disappear from the area if migrants are excluded for 4 to 6 years and there are no non-migratory hosts. The presence of non-migratory hosts such as rainbow trout (*Oncorhynchus mykiss*) and arctic char (*Salvelinus*

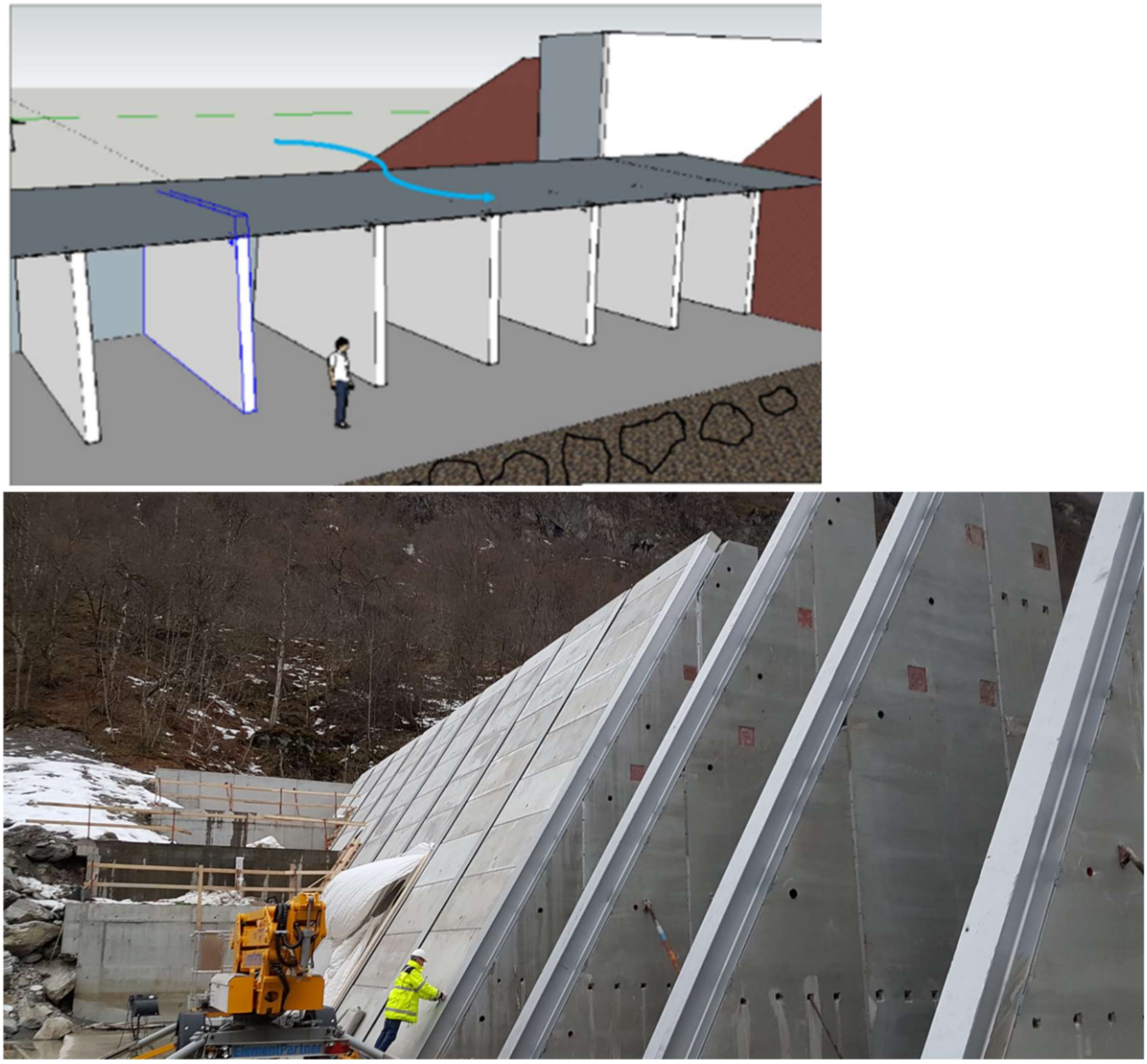


Fig.1 *A big long term barrier is now under construction in the river Driva. The barrier should be completed by spring 2017.*

alpinus) are contradictive to excluding migratory hosts. Closed fish ladders on the Vefsna River and the Rana River significantly reduced the required treatment area from 126 to 28 km and from 66 to 13 km, respectively. Closed fish ladders are the most common form of permanent barriers, but barriers have been constructed exclusively for eradication and control efforts.

1.2 Short term barriers

Temporary barriers (fig. 2) have been constructed for the purpose of optimizing a chemical treatment by isolating a tributary and allowing for its treatment independent of the main watercourse thus, dividing the drainage into smaller segments that reduces treatment complexity and opportunities for human error and increases the likelihood of success.

Fig. 2 *Temporary barrier in a tributary of the River Ogna*

2. Chemical treatments

There has been significant activity in combating the parasite since last meeting in NASCOs Working Group on *G. salaris* in the North-East Atlantic Commission Area in October 2007 (tab. 1).

2.1 Rotenone

Rotenone has been the most important tool for combating *G. salaris* by killing the host. Rotenone is a phosphorylation inhibitor. Rotenone was first used to eradicate *G. salaris* in 1981. Since then, a number of eradication projects have been completed in Norwegian rivers.

2.2 Acid aluminum

Use of acidic aluminum is a newly developed method. It is used in a manner similar to rotenone except that the parasite, not the host, is targeted. The method was developed through laboratory experiments and then refined during field trials. If correctly applied, the aluminum cations kill the parasite while fish and other animal life, with the exception of acid-sensitive species, are not significantly affected. Aluminum sulfate ($Al_2(SO_4)_3$) is dissolved in sulfuric acid (10–30%

H_2SO_4). Low pH (<5.5) must be maintained for aluminum to exist as cations in the water. In neutral waters (pH 6.5–7.5), the concentration of cations is low. The parasite must be exposed continuously for 7–12 days for the treatment to be effective. Acid-aluminum has been used in combination with rotenone in *G. salaris* eradication attempts. Acid-aluminum is applied to the free-flowing portion of the waterway where the majority of the fish reside, and rotenone is used in the backwater areas where aluminum hardly can be used effectively.

Tab 1. *Chemical treatment of infected rivers to eradicate* G. salaris *during the period 2009-2016*

Region	River	Year	Method used	Current status
Steinkjer	Steinkjervassdraget	2008/2009	Rotenone	Declared parasite free
	Figga	2008/2009	Rotenone	Declared parasite free
	Lundselva	2008/2009	Rotenone	Declared parasite free
Vefsna	Vefsna	2011/2012	Rotenone	Monitored for 4 years
	Fusta	2011/2012	Rotenone	Monitored for 4 years
	Drevja	2011/2012	Rotenone	Monitored for 4 years
	Hundåla	2011/2012	Rotenone	Monitored for 4 years
	Leirelva	2011/2012	Rotenone	Monitored for 4 years
	Ranelva	2011/2012	Rotenone	Monitored for 4 years
	Dagsvikelva	2011/2012	Rotenone	Monitored for 4 years
	Nylandselva	2011/2012	Rotenone	Monitored for 4 years
	Halsanelva	2010/2011	Rotenone	Monitored for 4 years
	Hestdalselva	2010/2011	Rotenone	Monitored for 4 years
Lærdal	Lærdalselva	2011/2012	Acid aluminum	Monitored for 4 years
Rauma	Rauma	2013/2014	Rotenone	Monitored for 2 years
	Hensvassdraget	2013/2014	Rotenone	Monitored for 2 years
	Breidvikelva	2013/2014	Rotenone	Monitored for 2 years
	Skorga	2013/2014	Rotenone	Monitored for 2 years
	Innfjordelva	2013/2014	Rotenone	Monitored for 2 years
	Måna	2013/2014	Rotenone	Monitored for 2 years
Rana	Rana	2014/2015	Rotenone	Monitored for 1 years
Skibotn	Skibotnelva	2015/2016	Rotenone	Monitoring starts in 2017
	Signaldalselva	2015/2016	Rotenone	Monitoring starts in 2017
	Kitdalselva	2015/2016	Rotenone	Monitoring starts in 2017

3. Assessment of the total eradication project

From 1975 to today, *G. salaris* have been detected on Atlantic salmon in 50 rivers. By January 1, 2017, it has been successfully eradicated from 22 rivers, and eradication programs are completed but still not confirmed in 21 rivers (fig 3). There must be 5 consecutive years after eradication where the parasite is not detected before a river is considered parasite-free. Presently, if all the eradication measures implemented are successful, the number of infected rivers are reduced from 50 to 7.

In the nineties, we experienced that many rotenone treatments were unsuccessful. Significant changes in the way to conduct treatments was completed. The main changes were:

(1) Sufficiently high concentration of rotenone
(2) Improving mapping and planning, including simulated treatments
(3) Increased focus on seeps and upwelling water
(4) Timing of treatment in relation to water temperature and discharge
(5) Double treatments (one treatment the first year, a new treatment the next year)
(6) Increased expertise due more experience with major treatments and international cooperation
(7) New methods for treating upwelling water and other complicated areas
The results from these changes, which were implemented for the first time in 2003, shows that we are now conducting treatments with great success. We are able to eradicate the parasite from big and complicated rivers, and hopefully from the whole country.

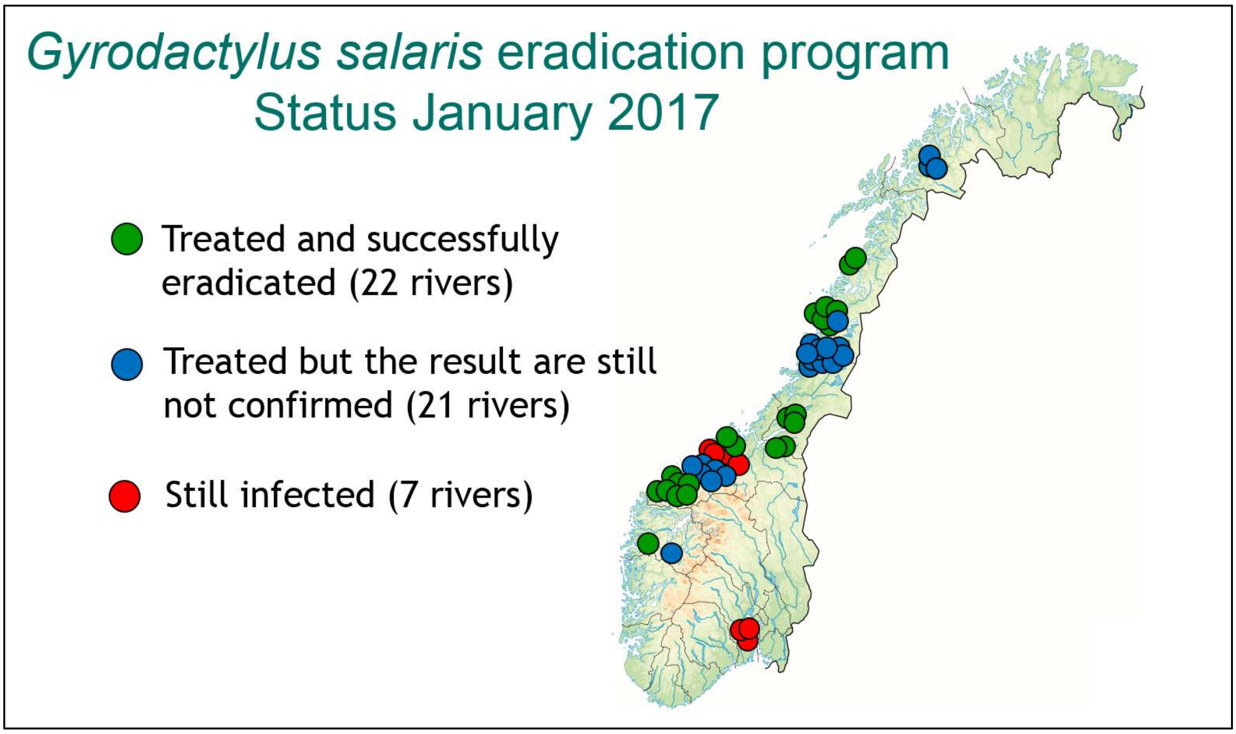


Fig 3. *Result from the eradication program*

GSWG(17)4

Gyrodactylus salaris in Sweden; management and monitoring

Summary

- *Gyrodactylus salaris* is considered endemic to the Baltic Sea area. It was first detected on the Swedish west coast (salmon stocks migrating to the Atlantic Ocean) in 1989. At present only seven out of 23 salmon rivers on the Swedish west coast are uninfected. The majority of uninfected rivers are in the northern part of the Swedish west coast, i.e. in the Skagerrak Sea with saline ocean water.
- The effect of *Gyrodactylus salaris* on salmon stocks has not been significant as compared to uninfected rivers. Mortality of individual fish has been registered, but there is no significant evidence of large scale effects on salmon production in infected rivers.
- Sweden in 2001 implemented an annual monitoring programme of *Gyrodactylus salaris* in salmon rivers on the west coast.
- Screening of salmon fry and parr is done in Sweden but microscopic and molecular methods of identification of species and clads are carried out by Norwegian expertise.
- The Swedish authorities consider G. salaris to be a serious threat to remaining uninfected stocks, and also to nearby Norwegian stocks. The monitoring programme has been run annually since 2001.
- Protective measures have been undertaken to avoid spreading the parasite, e.g. ban on stocking or rearing salmonid fish in the whole catchment of not infected rivers with salmonid fish.
- Eradication of GS in recently infected rivers has not been an issue as infected stocks have not decreased and the intensity of infection has decreased over time. Further, measures as treatment with rotenone is not carried out in Sweden.
- An information leaflet has been produced describing the problem with recommendations for anglers to avoid accidental spread via fishing gear. There is a good general awareness in anglers of the risks.
- Cooperation and exchange of data with Norwegian colleagues is encouraged and Swedish data has been part of different Norwegian risk analyses regarding spread to Norway via waterways.

Background

The ectoparasite Gyrodactylus salaris (GS) was first identified by Dr Göran Malmberg in 1952 in a fish hatchery at Swedish River Indalsälven (Baltic Sea basin). GS is naturally distributed throughout the Baltic Sea and has no drastic effect on survival of Baltic salmon, but infected salmon can show increased mortality (Bakke et al. 1990, 2004, Rintamaeki-Kinnunen & Valtonen 1996, Cable et al. 2000, Dalgaard et al. 2003, Dalgaard et al. 2004, Anttila et al. 2008). The Baltic Sea has a salinity range from 1 to 15 PSU. GS can tolerate up to 5-10 PSU for an extended time (e.g. Johnsen et al. 2008, Peeler et al. 2006). Baltic salmon normally do not migrate outside of the Baltic Sea, and has only rarely been found on the Swedish west coast.

The parasite was observed in Norway in 1975, probably transported with reared salmon from Sweden (the Baltic Sea area). GS has since had devastating effects on several Norwegian wild salmon stocks.

In 1989 the parasite was first discovered on the Swedish west coast (Degerman et al. 2012a), an area with Atlantic salmon (i.e. migrating to the Atlantic Ocean). This is in the Kattegat area, southern part of the Swedish west coast, with salinities of 10-20 PSU. In the Skagerrak area, northern coast with salinities above 20 PSU, no parasites have been detected on salmon parr in spite of investigations for 17 years. In this area no stocking of salmon parr has been conducted, at least since 1970 (Degerman et al. 1999). This means that the parasite has to be transferred with live fish entering from the sea. This scenario seems less probable (Peeler et al. 2006), due to the long distance between salmon rivers and the higher salinity in the sea. But *Gyrodactylus derjavini*, with brown trout (*Salmo trutta*) as primary host, may occasionally be found on salmon parr in this area.

The spread of GS from the Baltic Sea to the Kattegatt area may have been natural with migrating salmon, but also transport of salmon between different hatcheries has been suggested as the cause.

At present only seven out of 23 salmon rivers on the Swedish west coast are uninfected. The majority of uninfected rivers are in the northern part of the Swedish west coast, i.e. in the Skagerrak Sea close to Norway (Figure 1). It is suggested that northern stocks may be more sensitive to GS as they are isolated from southern stocks (and the Baltic) by high saline ocean waters (Degerman et al. 2012a), but tolerance test are generally lacking.

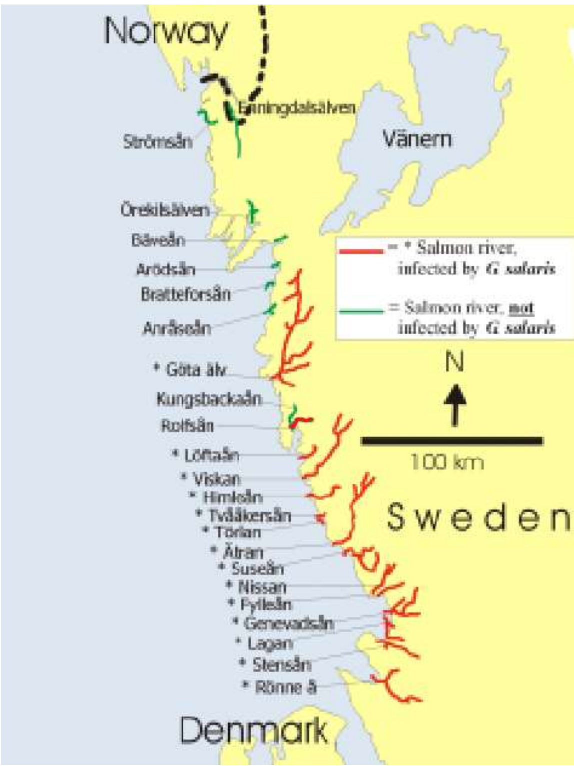


Figure 1. Map of salmon rivers on the Swedish west coast. Infected rivers in red. Green rivers are uninfected.

Different clades of GS

By analysing mitochondrial DNA sequences, GS has been divided into different clades or haplotypes (Hansen *et al*. 2003, 2004, Meinilä *et al*. 2004). Some are considered more harmful than others, but the results vary.

Haplotype A is the most common found in Norwegian rivers and has caused the decline of several salmon populations. In Sweden it has been found in River Ätran-Högvadsån and Surtan (tributary to River Viskan).
Haplotype B has been found in River Torneälven and R. Vindelälven.
Haplotype C is found in most infected rivers on the Swedish west coast.
Haplotype E was found in Säveån, which is a tributary to the large River Göta älv. It has also been found in the salmon hatchery in Laholm at the river Lagan (Malmberg & Malmberg 1991, Karlsson *et al*. 2003b).
*Haplotype F i*s common in rainbow trout farms in Sweden and neighbouring countries.

The effect of GS on stocks of the Swedish west coast

There has been much debate of the actual effect of GS on salmon populations on the west coast. The first years after infection the prevalence and number of GS per individual fish may be high. Mortality of individual fish has been registered, but there is no significant evidence of large scale effects on salmon production in infected rivers (Degerman et al. 2012a). Lowered abundance of the salmon population in River Ätran coincided with the first detection of the parasite in the river system (Alenäs et al. 1998), but there has been a general decline of salmon along the Swedish west coast (e.g. Degerman et al. 2015).

The Gyro-monitoring programme (see below) initiated in 2001 was evaluated in 2012. The results showed that although individual parr with many parasites will have impaired growth and eventually die; no effects can be seen at the population level according to our large scale electrofishing surveys (Degerman et al. 2012a). Comparing the parr abundance before infection with *G. salaris* with after and comparing with the abundance of reference sites in uninfected rivers showed no significant differences. The trend (Pearson r) in parr abundance over time was compared with Meta-analysis between infected rivers and reference rivers, again without differences.

After initial high infection rates the first years after *G. salaris* has been established in a river, the infection rate generally declines (example in Figure 2). The previous evaluation has shown that the infection rates theoretically would be at low levels after approximately 40 years after the establishment of G. salaris (op. cit.).

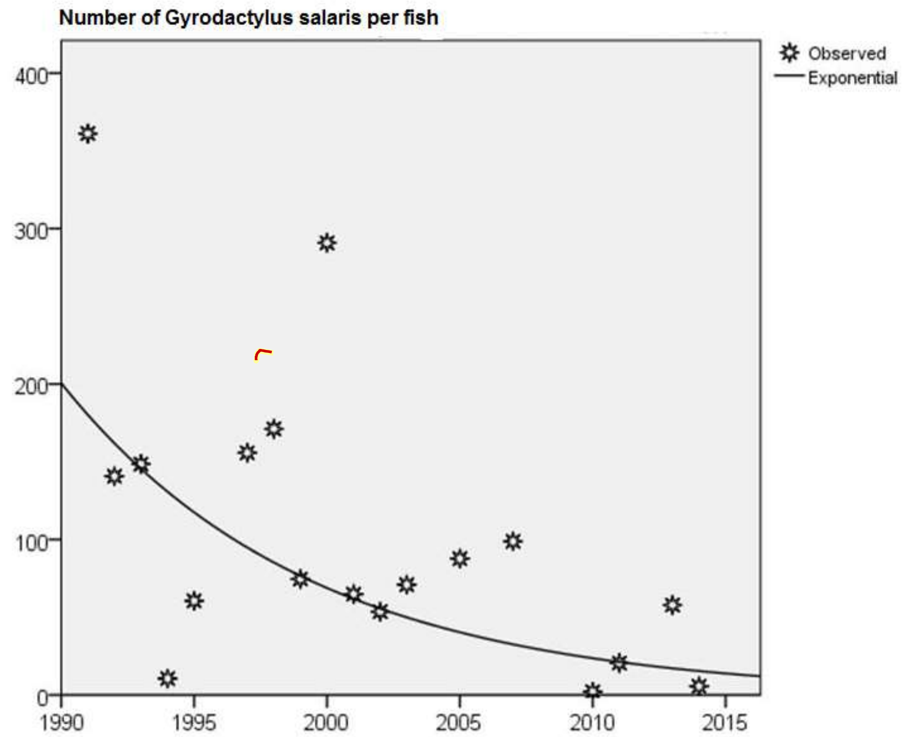


Figure 2. Ätran average number of Gyrodactylus salaris per examined salmon fry & parr (0+ and 1+) in the River Ätran system.

As an example of the effects of GS on a salmon population the monitoring of fry and parr in River Himleån is shown. The river was infected with GS in 2005. The mean density of young salmon (0+ & 1+) was 44 per 100 m^2 in 1990-2004 and 55 in 2005 to 2016 (Figure 3). The difference was not significant (Anova, p=0.3).

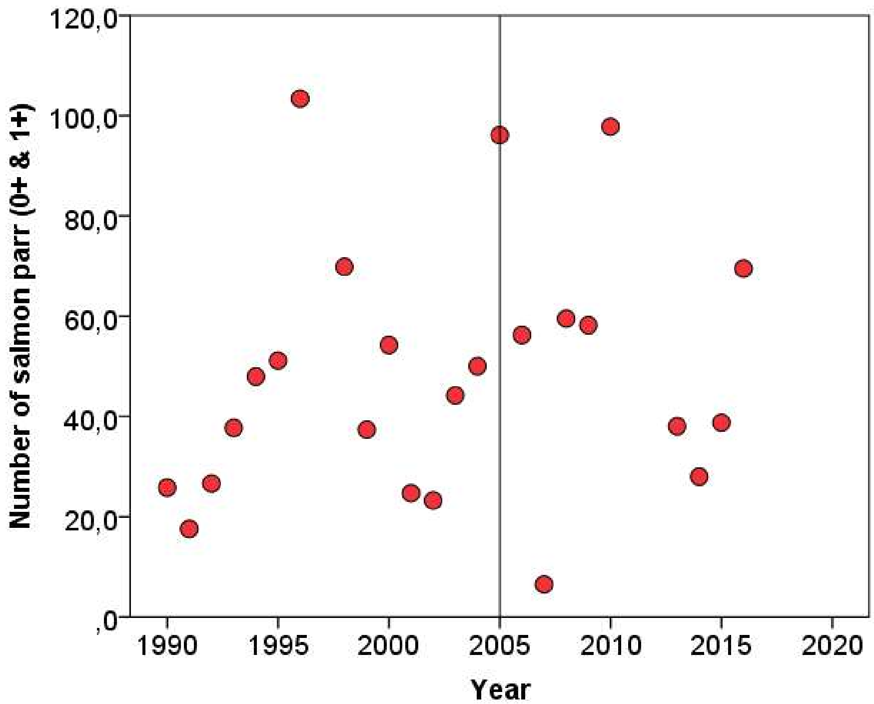


Figure 3. Mean density of fry and parr (0+ and 1+) young salmon per 100 m^2 in River Himleån. Gyrodactylus salaris was detected in the river in 2005.

Monitoring program

In 2001 a monitoring program was established for the Swedish west coast (Degerman et al. 2012b), although screening for GS had been going on since 1989. Today monitoring is done in selected infected rivers to follow the development of GS and in all uninfected salmon rivers annually.

Salmon parr are caught with electrofishing. The fish may either be screened in situ and put back alive or preserved in ethanol (96%). The direct screening can be done in water or in air (sedated fish). For preserved fish the ethanol content of the sample must not fall below 70% as the skin of the fish may wrinkle causing the parasites to fall off.

The number of GS is counted using a stereo microscope at 20 times enlargement. Fiber optic (Euromex EK-1) is generally used as light source.

During 1991-2000 *Gyrodactylus* spp. were counted separately on the body, the head, and all fins (pectoral, pelvic, dorsal, anal, caudal and adipose). From 2001 only the dorsal fin and both the pectoral fins are screened. There is a good correlation between the total number of GS on the fish and the number of the selected fins (Figure 4).

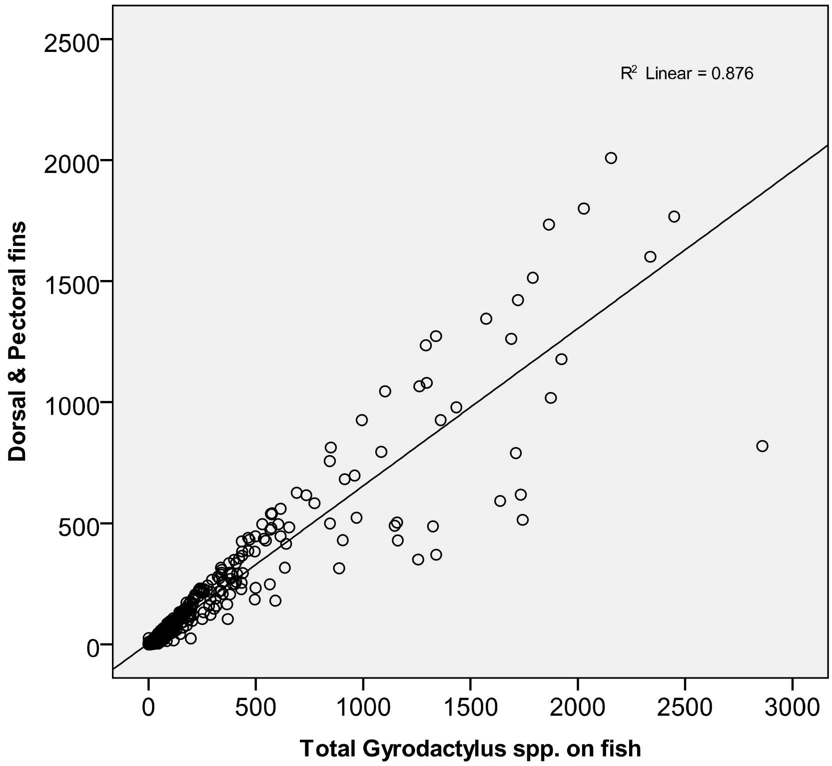


Figure 4. Scatterplot between number of Gyrodactylus spp. on the whole fish versus the number found on dorsal and pectoral fins. R^2=0.876. (Degerman et al. 2012b).

This screening in-situ takes on average 3 minutes per uninfected fish and the double time for infected fish, depending on the number of parasites found.

Studies in infected rivers showed that the prevalence (number of infected fish) was higher in spring (April-May; 85%±SD23, n=20), with water temperatures of 10-13 ºC at sampling, than in summer (June-July; 64%±SD28, n=15) with 14-18 ºC at sampling). In late summer – autumn (August-October) the prevalence was again higher; 71%±SD28, n=41), when the water temperature was 9-13 ºC. At temperatures above 14 ºC the prevalence tended to be lower (Figure 5). Sampling is therefore carried out at water temperatures of approximately 10 ºC in April/May and October.

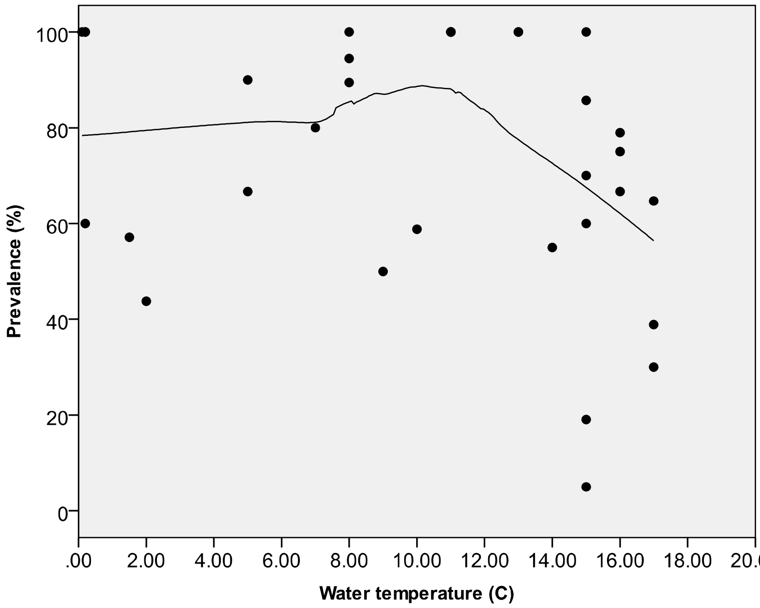


Figure 5. Prevalence (%) of GS in infected rivers versus water temperature (°C) at sampling. Loess Gaussian regression shown. (Degerman et al. 2012b).

The prevalence in the Swedish data in 1999-2001 was high, average 74% when infected fish was present. What is the risk of missing the occurrence of *Gyrodactylus spp.* in an infected population? If the prevalence is 74% (0.74) the number of uninfected fish is 26% (0.26). Sampling one fish the probability (risk) of not detecting the parasite is $(0.26)^1=0.26$. For a sample of five fish the risk would be $(0.26)^5=0.002$, i.e. insignificant. At a prevalence of 10% at least 30 fishes would be necessary to screen in order to have a probability <0.05 of not detecting the parasite (Table 1). From earlier experience it is quite probable that fish will have high prevalence when they first encounter *Gyrodactylus salaris*, this indicates that less than 30 fishes in a sample is normally required for a screening programme. In the Swedish programme we aim at 20 fishes in order to be able to follow changes in prevalence with sufficient accuracy.

Table 1. Probability/risk (p) of not detecting Gyrodactylus spp. at different prevalence (%) depending on sample size.

Sample size	Prevalence 1%	5%	10%	25%	50%
5	0,95	0,77	0,59	0,24	0,03
10	0,90	0,60	0,35	0,06	0,001
15	0,86	0,46	0,21	0,01	0,000
20	0,82	0,36	0,12	0,003	0,000
30	0,74	0,21	0,04	0,000	0,000
50	0,61	0,08	0,01	0,000	0,000

Generally all Gyrodactylus specimens found in infected rivers are considered as and counted as *Gyrodactylus salaris*, whereas all found *Gyrodactylus spp.* in uninfected rivers are sent to the Norwegian National Veterinary Institute for species identification and genetic characterization (e.g. Hansen et al. 2003, 2006). The samples are mainly sent as whole fish preserved in ethanol.

Data from the monitoring programme is quality controlled and stored in a database at the Swedish University of Agricultural sciences. The status of stocks with respect to GS is reported to ICES (WGNAS, Working group on Atlantic Salmon) (e.g. Degerman et al. 2013, 2015, 2016).

Management

The Swedish authorities consider *G. salaris* to be a serious threat to remaining uninfected stocks, and also to nearby Norwegian stocks. The monitoring programme has been run annually since 2001.

Protective measures have been undertaken to avoid spreading the parasite, e.g. ban on stocking or rearing salmonid fish in the whole catchment of not infected rivers with salmonid fish.

There is no culture of salmonid fish in cages in the Swedish part of the Skagerrak area.

Eradication of GS in recently infected rivers has not been an issue as infected stocks have not decreased (Figure 3) and the intensity of infection has decreased (Figure 2). Further, measures as treatment with rotenone is not carried out in Sweden.

An information leaflet has been produced describing the problem with recommendations for anglers to avoid accidental spread via fishing gear. There is a good general awareness in anglers of the risks.

Cooperation and exchange of data with Norwegian colleagues is encouraged and Swedish data has been part of different Norwegian risk analyses regarding spread to Norway via waterways.

References

Alenäs, I., Malmberg, G. & H. Carlstrand, 1998. Investigations on Gyrodactylus salaris on salmon in River Ätran during five years, 1991-1995. Miljö- och hälsoskyddskontoret rapport 1998:1, in Swedish.

Anttila, P., Romakkaniemi, A., Kuusela, J., Koski, P., 2008. Epidemiology of *Gyrodactylus salaris* (Monogenea) in the River Tornionjoki, a Baltic wild salmon river. Journal of Fish Diseases 31(5):373-382.

Bakke, T.A., Harris, P.D., Hansen, H., Cable, J., Hansen, L.P., 2004. Susceptibility of Baltic and East Atlantic salmon *Salmo salar* stocks to *Gyrodactylus salaris* (Monogenea). Diseases of Aquatic Organisms 58(2-3): 171-177.

Bakke, T.A., Jansen, P.A., Hansen, L.P., 1990. Differences in the host resistance of Atlantic salmon, *Salmo sala*r L., stocks to the monogenean *Gyrodactylus salaris* Malmberg, 1957. Journal of Fish Biology 37(4):577-587.

Cable, J., Harris, P.D., Bakke, T.A., 2000. Population growth of *Gyrodactylus salaris* (Monogenea) on Norwegian and Baltic Atlantic salmon (*Salmo salar*) stocks. Parasitology 121(6):621-629.

Dalgaard, M.B., Nielsen, C.V., Buchmann, K., 2003. Comparative susceptibility of two races of *Salmo salar* (Baltic Lule river and Atlantic Conon river strains) to infection with *Gyrodactylus salaris*. Diseases of Aquatic Organisms 53(2):173-176.

Dalgaard, M.B., Larsen, T.B., Joerndrup, S., Buchmann, K., 2004. Differing resistance of Atlantic salmon strains and rainbow trout to *Gyrodactylus salaris* infection. Journal of Aquatic Animal Health 16(3):109-115.

Degerman, E., Almer, B. & K. Höglind, 1999. Västkustens laxåar. (Salmon rivers on the Swedish west coast). Fiskeriverket Information 1999:9, 156 s. (In Swedish.)

Degerman, E., Petersson, E., Jacobsen, P.-E., Karlsson, L., Lettevall, E. & F. Nordwall, 2012a. Laxparasiten *Gyrodactylus salaris* i västkustens laxåar. (*Gyrodactylus salaris* in Swedish west coast salmon rivers.) Aqua reports 2012:8. (In Swedish.)

Degerman, E., Jacobsen, P.-E., Karlsson, L. & E. Lettevall, 2012b. Gyrodactylus salaris monitoring – experiences from Sweden. Working Group on North Atlantic Salmon. Working paper 2012/29, 10 s.

Degerman, E., Jens Persson, Berit Sers & Johan Östergren, 2013. Fisheries, management and status of Atlantic salmon stocks in Sweden: National report for 2012. Working Group on North Atlantic Salmon. Working paper 2013/23, 25 s.

Degerman, E., Spjut, D. & B. Sers, 2015. Fisheries, status and management of Atlantic salmon stocks in Sweden: national report for 2014. Working Group on North Atlantic Salmon. Working paper 2015/3, 19 s.

Degerman, E., Törnblom, J. & B. Sers, 2016. Fisheries, status and management of Atlantic salmon stocks in Sweden: national report for 2015. Working Group on North Atlantic Salmon. Working paper 2016/22, 19 s.

Hansen, H., Bachmann, L. & T.A. Bakke, 2003. Mitrochondrial DNA variation of *Gyrodactylus* spp. (Monogenea, Gyrodactylidae) populations infecting Atlantic salmon, grayling and rainbow trout in Norway and Sweden. Parasitology 33:1471-1478.

Hansen, H., Martinsen, L., Bakke, T.A. & L. Bachmann, 2006. The incongruence of nuclear and mitochondrial DNA variation supports conspecificity of the monogean parasites *Gyrodactylus salaris* and *G. thymalli*. Parasitology 133:639-650.

Johnsen, B.O., Brabrand, Å., Jansen, P.A., Teien, H.-C. & G. Bremset, 2008. Evaluering av bekjempelsesmetoder for *Gyrodactylus salaris.* Rapport fra ekspertgruppe. Utredning for DN 2008-7.

Malmberg, G. & M. Malmberg, M. 1991. Undersökningar angående *Gyrodactylus* på laxfisk i fria vatten och odlingar under åren 1951-72 och 1986-Maj 1991. – Information från Sötvattenslaboratoriet, Drottningholm 2: 1- 30.

Meinilä, M, Kuusela, J., Zietara, M.S. & J. Lumme, 2004. Initial steps of speciation by geographic isolation and host switch in salmonid pathogen *Gyrodactylus salaris* (Monogenea: Gyrodactylidae - International Journal for Parasitology, 2004 Mar 29, 34(4):515 - 526.

Peeler, E., Thrush, M., Paisley, L. & C. Rodgers,2006. An assessment of the risk of spreading the fish parasite *Gyrodactylus salaris* to uninfected territories in the European Union with the movement of live Atlantic salmon (*Salmo salar*) from coastal waters. Aquaculture 258:187-197.
Rintamaeki-Kinnunen, P. & E.T. Valtonen, 1996. Finnish salmon resistant to *Gyrodactylus salaris*: A long-term study at fish farms. International Journal for Parasitology 26(7):723-732.

Annex 5 of NEA(17)4

GSWG(17)5

Monitoring and control programmes and measures being taken to prevent the spread of the parasite and eradicate it where it has been introduced (Tabled by Norway)

The Norwegian National surveillance program for *Gyrodactylus salaris* in Atlantic salmon

Surveillance of *G. salaris* has been performed in Norwegian salmon rivers since late 1970s.

The Norwegian Veterinary Institute (NVI) coordinates the surveillance program and publishes the overall results in monthly and annual reports. Surveillance is not performed in infected rivers or farms.

Farms:
The Norwegian Food Safety Authority is responsible for the sampling in hatcheries/fish farms. Our inspectors visit the farms every second year.

Rivers:
NVI is responsible for the sampling in the rivers but County Environmental Departments and other institutions/companies are commissioned to do the actual sampling. We regard the whole Norwegian territory except those defined areas which are positive, as free of the *G.salaris*. There are appr. 400 rivers with salmon stocks and 1135 rivers with stocks of carrier species throughout the country. To ensure adequate surveillance NVI has designed a risk based program founded on experience and scientific knowledge. The following rivers are part of the program:

1) Rivers declared free after treatment
2) The 30 rivers with largest stocks of Atlantic salmon
3) Rivers that have high risk of being infected by migrating fish
4) Rivers of other risk values with geographical proximity to infested rivers and/or rivers where there are activities that have the potential to spread the parasite, i.e. rafting.

NVI is responsible for examination of all the fish samples and the species identification of the parasites if *Gyrodactylusspp.* is detected.

The surveillance program aims to document the freedom of *G. salaris* in Norwegian farms and rivers, and to detect and trace any spread of the parasite to new river systems or fish farms (or to rivers and farms declared free from infection).

In 2015 the surveillance program for *G.salaris* examined

- 69 rivers and 2.320 fishes
- 106 farms and 3.651 fishes

In 2016 we examined almost the same number of rivers, farms and fishes.

The post-treatment control program to ascertain freedom from infection with *Gyrodactylus salaris* in Atlantic salmon

Surveillance of *G. salaris* aiming to declare freedom from the parasite in treated rivers has been performed in Norway since early 1980s. NVI coordinates the surveillance program and publishes the overall results in monthly and annual reports.

An adequate surveillance, in space and time, is required to ascertain freedom from infection with *G. salaris* in the treated rivers. Declaring freedom from the parasite requires examination of salmon juveniles sampled over a time period of a minimum of five years after an eradication measure is completed. This time frame is based on a smolt age of four years, adding one year safety margin. In rivers with higher smolt age, the time to ascertain freedom from infection is increased proportionally.

NVI is responsible for the sampling in the rivers, but County Environmental Departments and other institutions/companies are commissioned to carry out the actual sampling. NVI is responsible for both examination of the fish and subsequent species identification of the parasites if *Gyrodactylus* spp. is detected.

The post-treatment control program to ascertain freedom from infection with *G. salaris*, aims to document freedom of the parasite in previously infested rivers after implementation of eradication measures. The documentation provides the basis for declaring the salmon populations free from infection. Freedom from infection is declared by the Norwegian Food Safety Authority.

Epidemiological survey

When a river is infected, we start an epidemiological survey program in order to find out more about how the river could have been infected and what to do with the situation.

The project Gyrofri

The Norwegian Food Safety Authority contributes to this **project.**

They are monitoring salinity different places in the Oslofjord. They will also start working with telemetry surveillance to find out more about how the fish swim and disperse in the Oslofjord.

Both salinity and wandering patterns are important for how and how much *G. salaris* can be spread in this fjord system.

Data from Gyrofri was used in the last risk analysis from NVI. They concluded that there is higher risk for spreading of *G. salaris* in the Oslofjord than earlier estimated.

The Norwegian Food Safety Authority recently used the information from Gyrofri and NVI when making legal decisions on how to regulate stock enhancement.

Monitoring environmental DNA and electric fishing in Begna, part of the river Drammenselva

Monitoring of E-DNA and electric fishing can give indications of the presence of rainbow trout, which can be infection spreaders.

There are some rainbow trout-farms on the shores of Begna. The important aspect of this monitoring is to find out if some of the fish from the farms have escaped.

Distribution of the parasite

22 rivers are declared free from *G. salaris* after treatment.

21 rivers are treated, but still not declared free from *G. salaris.*

- These rivers have been treated and are now undergoing the post treatment control program:
    - The Skibotn region. Consists of the rivers Skibotnelva, Signaldalselva and Kitdalselva. They were treated in 2015 and 2016.
    - The following rivers were treated earlier than 2016. All samples in the post-treatment control program were negative for *G. salaris.*
        - The river Lærdalselva. Treated in 2011 and 2012.
        - The Vefsna region. Consists of 10 rivers and 3 lakes. Treated in 2011 and 2012.
        - The Rauma region. Consists of 6 rivers. Treated in 2013 and 2014.
    - The region of Rana was treated in 2004, and declared free for *G. salaris* in 2009. Unfortunately, the river was reinfected in 2014. An epidemiological survey program was started and the river was treated the same year.
    - If the surveillance samples during 2017 are all negative for *G. salaris*, The Norwegian Food Safety Authority will probably declare the river Lærdalselva and 9 of the rivers of the Vefsna region free from infection with *G. salaris.*

7 rivers are infected, but not treated

- The Driva region (with the rivers Driva, Litledalselva, Usma and Batnfjordselva)
- The Drammen region (with the rivers Drammenselva, Sandeelva and Lierelva)

GSWG(17)6

Gyrodactylus salaris monitoring in Northern Ireland (Update February 2017)

GS monitoring is carried out as part of DAERA Fish Health's disease testing regime. A rolling regime of testing takes place across both operational fin fish farms and wild catchment areas (by electrofishing). This equates to between 10 – 12 sites each for both farmed and wild stock areas being monitored each year. The testing work is carried out by AFBI on our behalf as a part of their Annual Work Program and the SLA with the Fish Health section.

We have continued freedom from GS - the records go back to 2007 for GS monitoring and all results have been negative since then.

Subject to confirmation of the 2017/18 AWP and the DAERA Fish Health unit/AFBI SLA, monitoring will continue at previous levels for the next year (2017/18).

There is no research currently or planned into GS by DAERA.

Anglers / Stakeholders are educated on the potential harm should using both published information on leaflets etc and digital information on the Internet to avoid the spread by taking effective disinfectant procedures if fishing in others areas or importing fish from elsewhere.

With the reorganisation and reduction in the number of Government Departments in 2016 there is a need to review and update the current NI and the Cross Border GS contingency Plans. This work will hopefully be taken forward in 2017_18 year.

GSWG(17)7

Gyrodactylus salaris update paper - contribution from Marine Scotland

1. Monitoring and distribution of gyrodactylids

1.1 Annex 1 provides yearly sampling data from 2007 to 2016 (years inclusive) on activity undertaken by the Competent Authority[1] in relation to sampling for and confirming the presence of gyrodactylid parasites in Scotland. For each year an overview is provided, together with a breakdown of sampling at the farm and fishery[2] level where appropriate. The structure of these reports is based upon previous contributions made from Scotland.

1.2 In summary, the surveillance undertaken continues to support Scotland's disease free status with respect to *Gyrodactylus salaris* (Gs). No evidence of the parasite has been detected over the sampling period from 01 January 2007 to 31 December 2016.

Changes to surveillance activity

1.3 Targeted surveillance on fish farms and within wild fisheries was undertaken up until 2010 to screen for the presence of Gs in addition to other listed and notifiable diseases. Samples were taken from 50% of Scottish freshwater fish farms, holding susceptible species on an annual basis. Sampling was also conducted from 20% of Scotland's District Salmon Fishery Board (DSFB) areas (generally one sample water was chosen per location area, with the 54 areas being covered over a 5 year period).

1.4 The introduction of Council Directive 2006/88/EC, implemented in Scotland through The Aquatic Animal (Health) Scotland Regulations 2009, instigated a change in general health surveillance within aquatic animals with a move from targeted surveillance towards risk based surveillance inclusive of both active and passive surveillance initiatives. The aim behind this new strategy was to increase the frequency of surveillance in areas which presented a greater risk of contracting and spreading disease.

1.5 As a component of this risk based approach additional resource has been invested into promoting passive surveillance. Passive surveillance involves communicating and informing relevant stakeholders about various listed disease and associated clinical signs and ensuring notification systems are in place for any case of suspicion together with the appropriate response undertaken by the Competent Authority. Intelligence led initiatives also feed into the surveillance activity, all of which is undertaken by Marine Scotland's Fish Health Inspectorate (FHI).

1.6 With the introduction of new regulations, no legislative basis remained for a targeted sampling programme aimed at detecting diseases for which disease freedom had been

[1] The role of Scotland's Competent Authority in this regard was fulfilled by Fisheries Research Services prior to 1st April 2010 and after this date by Marine Scotland Science

[2] Fishery in this context refers to both wild fish populations and put-and-take / sport fisheries and these are differentiated where required

granted. This was the case for viral haemorrhagic septicaemia (VHS), infectious haematopoietic necrosis (IHN) as well as Gs. As a result, from 2010 / 2011 onwards, targeted surveillance for Gs ceased. However, across all freshwater fish farm sites in Scotland which hold susceptible species and life stages, active surveillance for Gs remains in place. Fisheries are covered through a passive surveillance programme. Sampling is still undertaken to detect the presence of Gs in accordance with the FHIs standard diagnostic practices.

1.7 Before the cessation of targeted surveillance, careful consideration was given to continuing the programme and indeed modifying the same to include a risk based initiative in line with other disease surveillance. Several conclusions were drawn surrounding the existing surveillance programme for Gs and any future proposed programme. These conclusions were based upon scientific and epidemiological expertise within Marine Scotland Science, and included:

- the sampling level being applied to sites, where rainbow trout populations were the target species, meant it was unlikely to detect Gs through existing targeted surveillance

- despite targeted surveillance for Gs appearing more effective at the river level (sampling wild salmonids) it was concluded that the level being applied was insufficient to provide a meaningful output and chance of early detection if the parasite was present

- the benefit of targeted surveillance for Gs was considered to be marginal and to make this more effective in terms of detection it would require a significant level of additional resource and activity

- it was considered that the detection of an outbreak of Gs would most likely result through some form of third party notification

1.8 At the time of this consideration and through the points identified above, targeted sampling for Gs did not qualify as a sufficiently high priority given a) the other legislative requirements facing Marine Scotland and b) the level of funding available with respect to Marine Scotland's operations.

Population surveys

1.9 One of the harbingers of the potential presence of Gs in any given river system may be the lack of juvenile salmon populations in areas where they were previously plentiful. In addition to the disease surveillance conducted by Marine Scotland's Fish Health Inspectorate, population surveys are undertaken across Scotland by fishery boards and fishery trusts as well as the Marine Scotland Science freshwater laboratory. These surveys vary locally from ad hoc to regular structured repeat site visits to assess stock strength. Hence, only in some cases would such surveys provide a reliable indicator of a problem.

1.10 Whilst this activity is not actively searching for the presence of Gs, it does make an assessment to some extent of the ecological health of wild salmonid populations in any given area. Identifying declines or absences in certain populations acts as an indicator for further investigations conducted by Marine Scotland's FHI to determine the potential presence of Gs and other diseases.

1.11 New structures are being developed for coordinated local sampling of fish to support the salmon conservation regulations[3]. This programme may provide more generally structured and robust warning system with respect to the presence of Gs.

Diagnostic capability and activity

1.12 The diagnostic methodology, as detailed within the 2007 report and as relevant to Scotland remains in place and has been modified in relation to both the molecular and morphological components.

1.13 A Q-PCR multiplex assay has been developed to detect Gs, *Gyrodactylus derjavinoides* (Gd) & *Gyrodactylus truttae* (Gt). This originates from research work[4] undertaken by Marine Scotland Science (MSS). The process is then followed by sequencing. This represents the standard diagnostic practice in relation to the diagnosis of gyrodactylids by MSS.

1.14 Since 2007 FRS / MSS has increased its morphological capability, with respect to the diagnosis of gyrodactylids, through collaboration with other scientific institutions and national reference laboratories. Following the reduction in sample throughput after 2010 / 2011, and with the development of the Q-PCR method, morphological assessment is now not routinely undertaken. Diagnosis relies solely upon molecular methods. All gyrodactylid parasites are removed from the samples taken and analysed by Q-PCR and sequenced where necessary.

1.15 Despite this change in diagnostic procedure, morphological capability has been maintained and can be reintroduced at a future point should the need arise.

1.16 With regards to the detection of Gs, the diagnostic methods employed by MSS satisfies the recommended methodology detailed within the OiE Manual of Diagnostic Tests for Aquatic Animals (2016).

2. On-going, planned and completed research

2.1 At present MSS is not actively involved in any scientific research work concerning Gs. Despite this, the organisation maintains knowledge of developments in this area through national and international discussions and contact with other research parties.

2.2 Since the last NEAC workshop in 2007, MSS has carried out research to improve approaches for Gs screening and identification, and has incorporated the outcomes for *Gyrodactylus* species identification in its laboratory procedures.

[3] http://www.gov.scot/Topics/marine/Salmon-Trout-Coarse/fishreform/licence

[4] Collins, C.M., Kerr, R., McIntosh, R., Snow, M. (2010). Development of a real-time PCR assay for the identification of *Gyrodactylus* parasites infecting salmonids in northern Europe. Diseases of Aquatic Organisms, Vol. 90: 135–142, 2010

2.3 A multi-centre comparison of the most commonly employed methods (morphological, morphometric and molecular) available for *Gyrodactylus* screening and identification was performed, led by the University of Stirling. The aim was to determine best practice for processing samples and decision-making to allow maximal throughput and accuracy of identification. The approaches tested related to analysis of individual parasites. After accounting for potential risk of specimen loss, the probabilities of a specimen being accurately identified were 95%, 87% and 92% for visual, morphometric and molecular techniques, respectively, and the probabilities of correctly identifying a specimen of Gs by each method were 81%, 58% and 92%. Staff resources and time required for identification for each method were also taken into consideration. The results indicated that during routine surveillance/low numbers of specimens, RFLP (restriction fragment length polymorphism) analysis of the ITS rDNA, followed by sequencing of the COI mitochondrial DNA was most appropriate. During suspected outbreaks with high volume of samples, then initial visual identification, followed by molecular-based techniques of Gs like specimens, would offer greatest processing capacity (Shinn et al., 2010[5]).

2.4 If a pooling approach to analysing specimens was adopted, then molecular based techniques may be suitable, assuming can confirm presence of Gs at low numbers if required.

2.5 A multiplex TaqMan real-time PCR for identification of Gd and Gt, most commonly found on salmonids in the UK, and Gs was developed at MSS. The real-time PCR assay proved to be much faster than ITS rDNA PCR amplification followed by RFLP as an initial screening method. However, as with ITS RFLP, the real-time method does not distinguish between Gs and the non-pathogenic Gt, and further sequencing of COI mtDNA is required. The assay was validated against specimens used in the multi-method comparison above, and achieved a 100% agreement with previous ITS rDNA RFLP results. In relation to limits of detection, the real-time PCR assay was also found to be able to detect 10 to 100 fold less Gs DNA that traditional ITS PCR. This may prove useful if pooled samples to be analysed (Collins et al., 2010[4]).

2.6 MSS have collaborated on the modelling of disease transmission pathways in the UK. This work is not specific to Gs but relevant to a number of aquatic animal pathogens and diseases. A high degree of connectivity has been identified through transmission pathways across Great Britain. Although there is some separation between trout and salmon aquaculture sectors. This work helps to demonstrate the likely rapid spread of some pathogens following introduction, and is evidence which supports the decisions made with respect to changes in surveillance for Gs. It also emphasises the need to

[5] Shinn, A,P., Collins, C., García-Vásquez, A., Snow, M., Mateˇjusová, I., Paladini, G., Longshaw, M., Lindenstrøm, T., Stone, D.M., Turnbull, J.F., Picon-Camacho, S.M., Vázquez Rivera, C., Duguid, R.A., Mo, T.A., Hansen, H., Olstad, K., Cable, J., Harris, P.D., Kerr, R., Graham, D., Monaghan, S.J., Yoon, G.H., Buchmann, K., Taylor, N.G.H., Bakke, T.A., Raynard, R., Irving, S., Bron, J.E.(2010). Multi-centre testing and validation of current protocols for the identification of *Gyrodactylus salaris* (Monogenea). International Journal for Parasitology, Vol. 40: 1455–1467, 2010

prevent the introduction of pathogens in first place, through risk assessment, best practice and complying with legal requirements[6,7].

3. Measures taken to prevent spread and to eradicate

Trade restrictions

3.1 Scotland (as part of the GB health zone), has recognised disease freedom with respect to Gs. As a result, trade restrictions, granted through EU Commission Decision 2010/221, are in place and assist in preventing the import of Gs through commercial activity involving the trade in live aquatic animals. With respect to Gs, imports are permitted only where they are accompanied by a health certificate confirming that the animals:

a) originate from an area free from Gs, or

b) they have been held immediately prior to dispatch in saltwater for a designated period[8],
or
c) in the case eggs they have been disinfected prior to dispatch

3.2 These measures assist in protecting Scotland from the introduction of the parasite through commercial activity associated with live aquatic animal trade.

'Home and Dry' campaign

3.3 In 2007 Scottish Government introduced the 'Home & Dry' campaign. This was focused on raising the profile of Gs and its potential risk to Scotland by raising awareness around the risks of introduction through the use of fishing tackle and equipment associated with water sports and leisure pursuits. Preventative measures including the treatment and disinfection of equipment are advocated. This campaign continues to help disseminate the message concerning the potential risks posed by Gs and the actions which can be taken to mitigate those risks. This includes annual advertisement in Fish in Scotland magazine, which included an article on Gs in 2017.

3.4 Gs is also recognised through the GB non-native species secretariat and the check-clean-dry campaign aimed at preventing the spread of invasive non-native species.

Actions taken by wild fishery stakeholders

3.5 Many wild fishery stakeholders including riparian owners, fishery boards and trusts as well as angling associations and clubs have taken measures at the local level to help prevent the introduction of Gs. These measures can include:

---

[6] Green, D.M., Werkman, M., Munro, L.A. (2011). The potential for targeted surveillance of live fish movements in Scotland. 2011. Journal of Fish Diseases, Vol. 35: 29-37, 2011

[7] Munro, L.A., Wallace, I.S. (2012). Analysis of farmed fish movements between catchments identifies a simple compartmentalised management strategy for bacterial kidney disease in Scottish aquaculture. Aquaculture, Vol. 338-341: 300-303, 2012

[8] The certificate requires a minimum of 25ppt saltwater for at least 14 days

- ensuring disinfection of fishing equipment by action or certificate prior to use
- providing equipment to visiting anglers, to avoid potentially infected equipment being used
- educating anglers in best practice in relation to the risks of aquatic animal disease
- developing catchment and river contingency plans in the event of an outbreak of Gs
- mapping and surveying of catchments to facilitate with eradication if required

Contingency Planning

3.6 Marine Scotland maintains contingency plans to deal with an outbreak of Gs in Scotland. These plans are currently in their 4th edition (last revised March 2011) and are currently subject to further review. The bulk of the contingency procedures have been detailed within the 2007 report. These contingency procedures include a memorandum of understanding with Norway for assistance in dealing with an outbreak in particular with respect to any attempts to eradicate the parasite. Officials within Scotland maintain links with colleagues in Norway through regular communications concerning Gs.

3.7 Exercises to test Scotland's response to an outbreak of Gs have been conducted in 2010 and 2015 – Exercise Alpheus. The exercise in 2010 was an internal table top event involving Marine Scotland staff from scientific, operational and policy disciplines. This was primarily undertaken to emphasise the roles and responsibilities of policy colleagues following some recent staff changes at that time, but also served as a useful training exercise for all staff involved.

3.8 Exercise Alpheus was conducted on a GB wide basis and was developed in partnership between Defra, Cefas and Marine Scotland. This was a table top exercise involving policy and operational aspects of UK and Scottish Governments, government agencies and involved participation from external stakeholders. The aim of the exercise was to test and improve the Government's Contingency Plans, procedures and established policy for the control of a cross border outbreak of Gs in the UK.

Annex 1 of GSWG(17)7

Yearly sampling data from 2007 to 2016 conducted by MSS

With reference to this section the following codes apply:

G. species:	*Gyrodactylus* species (confirmed as not being *Gyrodactylus salaris*)
Gd:	*Gyrodactylus derjavinoides*
Gt:	*Gyrodactylus truttae*
Ga:	*Gyrodactylus arcuatus*

Gyrodactylid sampling in Scotland 2007

Overview

No *G. salaris* were identified. Positive results below are for species of gyrodactylids which are confirmed as not being *G. salaris*.

Total no. of cases: 106
No. of farm cases: 88
No. wild cases: 18
Total No. of fisheries[9] sampled: 0 sites

Total No. of fish examined: 2729
Total No. of farmed fish examined: 2380
Total No. of wild fish examined: 349
Total No. of fishery fish examined: 0

No. of +ve farm cases: 14
No. of +ve wild fish cases: 3
No. of +ve fisheries: 0

Breakdown of sampling for gyrodactylids

Farmed fish samples (≥30 fish per case):

Species	Cases	No. fish examined	Results (cases)	Species
Rainbow trout	28	840	7 Positive	Gd & G. species
Atlantic salmon	45	1350	4 Positive	Gd
Brown / sea trout	2	60	1 Positive	Gd
Total	75	2250	12 Positive	Gd & G. species

[9] Fishery / fisheries within this section refers to put-and-take / sport fisheries and excludes wild fisheries

Farmed fish sampling (<30 fish per case):

Species	**Cases**	**No. sampled per case**	**Results**	**Species**
Rainbow trout	7	10	-ve	
		1	-ve	
		5	-ve	
		1	-ve	
		25	Positive	Gd & G. species
		5	-ve	
		5	-ve	
Atlantic salmon	6	2	-ve	
		10	-ve	
		25	Positive	Gd
		4	-ve	
		20	-ve	
		2	-ve	
Brown / sea trout	2	5	-ve	
		5	-ve	
Arctic charr	1	5	-ve	
Total	16	130	2 Positive	Gd & G. species

N.B. one case may represent more than one species

Wild fish sampling

Species	**Cases**	**No. sampled**	**Results (cases)**	**Species**
A. salmon	15	248	3 Positive	Gd & Gt
Trout	5	100	-ve	
Minnow	1	1	-ve	
Total	21	349	3 Positive	Gd & G species

N.B. one case may represent more than one species

Regional breakdown farmed fish (≥30 fish per case):

Region	Cases	Results (cases)	Species
Borders	1	-ve	
Central	3	1 Positive	Gd
Dumfries and Galloway	5	1 Positive	Gd
Grampian	2	-ve	
Highland	20	3 Positive	Gd
Lothian	1	-ve	
Shetland	3	1 Positive	Gd
Strathclyde	22	4 Positive	Gd & G. species
Tayside	7	2 Positive	Gd & G. species
Western Isles	11	-ve	

Regional breakdown farmed fish (<30 fish per case):

Region	Cases	Results (cases)	Species
Borders	1	-ve	
Central	1	-ve	
Dumfries and Galloway	2	1 Positive	Gd & G. species
Fife	1	-ve	
Highland	4	-ve	
Orkney	1	1 Positive	Gd
Strathclyde	1	-ve	
Tayside	2	-ve	

Regional breakdown wild fish

Region	Cases	Results (cases)	Species
Borders	1	1 Positive	Gd
Grampian	6	1 Positive	Gd & Gt
Highland	7	1 Positive	Gd
Orkney	1	-ve	
Shetland	1	-ve	
Strathclyde	1	-ve	
Tayside	1	-ve	

Gyrodactylid sampling in Scotland 2008

Overview

No *G. salaris* were identified. Positive results below are for species of gyrodactylids which are confirmed as not being *G. salaris*

Total no. of cases: 93
No. of farm cases: 75
No. wild cases: 16
Total No. of fisheries[10] sampled: 2 fisheries

Total No. of fish examined: 2435
Total No. of farmed fish examined: 2033
Total No. of wild fish examined: 394
Total No. of fishery / estuary fish examined: 8

No. of +ve farm cases: 13
No. of +ve wild fish cases: 5
No. of +ve fishery cases: 0

Breakdown of sampling for gyrodactylids

Farmed fish samples (≥30 fish per case):

Fish species	Cases	No fish examined	Result (cases)	Parasite species
Rainbow trout	15	450	4 Positive	Gd & G. species
Atlantic salmon	45	1350	4 Positive	Gd & G. species
Brown / sea trout	4	120	1 Positive	Gd
Arctic charr	1	30	1 Positive	G. species
Total	65	1950	10 Positive	Gd & G. species

10 Fishery / fisheries within this section refers to put-and-take / sport fisheries and excludes wild fisheries

Farmed fish samples (<30 fish per case):

Fish species	Cases	No. sampled per case	Result	Parasite species
Rainbow trout	8	5	-ve	
		1	-ve	
		2	-ve	
		1	-ve	
		1	-ve	
		2	-ve	
		1	Positive	Gd & G. species
		5	-ve	
Atlantic salmon	1	10	-ve	
Brown / sea trout	3	25	Positive	G. species, Gd & Gt
		20	-ve	
		10	Positive	Gd & G. species
Total	12	83	3 Positive	Gd, Gt & G. species

N.B. one case may include more than one fish species

Wild fish sampling:

Fish Species	Cases	No sampled (total)	Result (cases)	Parasite species
Atlantic salmon	13	325	4 Positive	Gd & Gt
Brown / sea trout	6	69	2 Positive	Gd & Gt
Total	19	394	6 Positive	Gd, Gt & G. species

N.B. one case may represent more than one species

Fishery sampling:

Fish species	Cases	No sampled (total)	Result (cases)	Parasite species
Rainbow trout	2[11]	8	-ve	
Total	2	8	-ve	

Regional breakdown farmed fish sampling ($\geq$30 fish per case):

Region	Cases	Result (cases)	Parasite species
Borders	2	1 Positive	Gd & G. species
Central	5	1 Positive	Gd
Dumfries and Galloway	7	1 Positive	Gd
Highland	18	2 Positive	Gd & G. species
Orkney	3	1 Positive	G. species
Shetland	6	1 Positive	Gd
Strathclyde	10	2 Positive	Gd
Tayside	4	1 Positive	Gd
Western Isles	10	-ve	

Regional breakdown farmed fish sampling (<30 fish per case):

Region	Cases	Results (cases)	Species
Central	2	1 Positive	Gd, Gt & G. species
Dumfries and Galloway	4	-ve	
Highland	2	1 Positive	Gd & G. species
Strathclyde	2	1 Positive	Gd & G. species

Regional breakdown wild fish sampling:

Region	Cases	Results (cases)	Species
Dumfries and Galloway	1	-ve	
Grampian	6	2 Positive	Gd & Gt
Highland	5	2 Positive	Gd
Strathclyde	3	1 Positive	Gd & Gt
Tayside	1	-ve	

[11] Regions are Strathclyde and Grampian

Gyrodactylid sampling in Scotland 2009

Overview

No G. salaris were identified. Positive results below are for species of Gyrodactylids confirmed as not being *G. salaris*.

Total No. of cases: 108
No. of farm cases: 88
No. of wild cases: 19
Total No. of fisheries[12] sampled: 1

Total No. of fish examined: 2778
Total No. of farmed fish examined: 2421
Total No. of wild fish examined: 356
Total No. of fishery / estuary fish examined: 1

No. of +ve farm cases: 8
No. of +ve wild cases: 4
No. of +ve fishery cases: 0

Breakdown of sampling for gyrodactylids

Farmed fish samples ($\geq$30 fish per case):

Fish species	Cases	No. fish examined	Result (cases)	Parasite species
Rainbow trout	25	750	4 Positive	Gd & G. species
Atlantic salmon	46	1380	1 Positive	Gd
Brown / sea trout	4	120	1 Positive	Gd & G. species
Arctic charr	1	30	1 Positive	G. species
Total	76	2280	7 Positive	Gd & G. species

12 Fishery / fisheries within this section refers to put-and-take / sport fisheries and excludes wild fisheries

Farmed fish samples (<30 fish per case):

Fish species	Cases	No. sampled per case	Result	Parasite species
Rainbow trout	9	28	-ve	
		6	-ve	
		10	Positive	Gd
		10	-ve	
		20	-ve	
		4	-ve	
		5	-ve	
		1	-ve	
		3	-ve	
Atlantic salmon	2	25	-ve	
		5	-ve	
Brown / sea trout	5	5	-ve	
		1	-ve	
		1	-ve	
		10	-ve	
		7	-ve	
Total	16	141	1 Positive	Gd

N.B. one case may represent more than one species

Wild fish sampling

Fish species	Cases	No. sampled	Result (cases)	Parasite species
Atlantic salmon	18	319	4 Positive	Gd
Trout	4	37	2 Positive	Gd
Total	22	356	6 Positive	Gd

N.B. One case may represent more than one species

Fishery sampling

Fish species	Cases	No. sampled	Result (cases)	Parasite species
Rainbow trout	1[13]	1	-ve	
Trout	1	1	-ve	

Regional breakdown farmed fish sampling (≥30 fish per case):

Region	Cases	Results (cases)	Parasite species
Borders	1	-ve	
Central	2	-ve	
Dumfries and Galloway	7	1 Positive	Gd & G. species
Grampian	2	-ve	
Highland	28	-ve	
Lothian	1	-ve	
Orkney	1	1 Positive	G. species
Shetland	4	1 Positive	Gd & G. species
Strathclyde	12	3 Positive	Gd & G. species
Tayside	4	1 Positive	Gd & G. species
Western Isles	14	-ve	

Regional breakdown farmed fish sampling (<30 fish per case):

Region	Cases	Results (cases)	Parasite species
Borders	1	-ve	
Central	1	-ve	
Dumfries and Galloway	2	-ve	
Lothian	1	-ve	
Shetland	1	-ve	
Strathclyde	6	1 Positive	Gd

Regional breakdown wild fish sampling:

Region	Cases	Results	Parasite species
Dumfries and Galloway	4	1 Positive	Gd
Grampian	10	1 Positive	Gd
Highland	2	-ve	
Shetland	1	1 Positive	Gd
Strathclyde	2	1 Positive	Gd

[13] Fishery region - Grampian

Gyrodactylid sampling in Scotland 2010

Overview

No *G. salaris* were identified. Positive results below are for species of gyrodactylids which are confirmed as not being *G. salaris*.

Total No. of cases: 81
No. of farm cases: 68
No. of wild cases: 13
Total No. of fisheries[14] sampled: 0

Total No. of fish examined: 2189
Total No. of farmed fish examined: 1851
Total No. of wild fish examined: 338
Total No. of fishery fish examined: 0

No. of +ve farm cases: 9
No. of +ve wild cases: 0
No. of +ve fisheries: 0

Breakdown of sampling for gyrodactylids

Farmed fish samples (≥30 fish per case):

Fish species	Cases	No. fish examined	Result (cases)	Parasite species
Rainbow trout	13	390	5 Positive	Gd & G. species
Atlantic salmon	43	1290	3 Positive	1 Gd & G. species
Brown / sea trout	3	90	-ve	
Total	59	1770	8 Positive	Gd & G. species

[14] Fishery / fisheries within this section refers to put-and-take / sport fisheries and excludes wild fisheries

Farmed fish sampling (<30 fish per case):

Species	Cases	No. sampled per case	Result	Species
Rainbow trout	5	5	-ve	
		5	-ve	
		5	-ve	
		20	Positive	Gd
		1	-ve	
Atlantic salmon	4	5	-ve	
		5	-ve	
		25	-ve	
		5	-ve	
Brown / sea trout	1	5	-ve	
Total	10	81	1 Positive	Gd

N.B. One case may represent more than one species

Wild fish sampling

Species	Cases	No. sampled	Result (cases)	Species
A. salmon	11	260	-ve	
Trout	5	78	-ve	
Total	16	338	-ve	

N.B. One case may represent more than one species

Regional breakdown farmed fish sampling (≥30 fish per case):

Region	Cases	Results (cases)	Species
Borders	2	-ve	
Central	6	1 Positive	Gd & G. species
Dumfries and Galloway	5	2 Positive	Gd & G. species
Highland	15	1 Positive	Gd
Lothian	1	-ve	
Orkney	1	-ve	
Shetland	4	-ve	
Strathclyde	11	2 Positive	Gd & G. species
Tayside	4	1 Positive	G. species
Western Isles	10	1 Positive	Gd

Regional breakdown farmed fish (<30 fish per case):

Region	Cases	Results (cases)	Species
Central	1	-ve	
Highland	3	-ve	
Lothian	1	-ve	
Strathclyde	1	-ve	
Tayside	2	1 Positive	Gd
Western Isles	1	-ve	

Regional breakdown wild fish sampling

Region	Cases	Results (cases)	Species
Dumfries and Galloway	1	-ve	
Grampian	2	-ve	
Highland	7	-ve	
Strathclyde	1	-ve	
Tayside	1	-ve	
Western Isles	1	-ve	

Gyrodactylid sampling in Scotland 2011

Overview

No *G. salaris* were identified. Positive results below are for species of gyrodactylids which are confirmed as not being *G. salaris*.

Total No. of cases: 17
No. of farm cases: 5
No. of wild cases: 12
Total No. of fisheries[15] sampled: 0

Total No. of fish examined: 124
Total No. of farmed fish examined: 17
Total No. of wild fish examined: 107
Total No. of fishery fish examined: 0

No. of +ve farm cases: 0
No. of +ve wild cases: 1
No. of +ve fisheries: 0

Breakdown of sampling for gyrodactylids

Farmed fish sampling

Species	Cases	No. sampled per case	Region	Result	Species
Atlantic salmon	2	3	Highland	-ve	
		3	Highland	-ve	
Rainbow trout	3	5	Dumfries & Galloway	-ve	
		5	Dumfries & Galloway	-ve	
		1	Tayside	-ve	

Wild fish sampling

Species	Cases	No. sampled per case	Region	Result	Species
Atlantic salmon	12	2	Highland	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	
		35	Dumfries & Galloway	Positive	Gd
		1	Grampian	-ve	
		30	Grampian	-ve	
		2	Grampian	-ve	
		31	Highland	-ve	

15 Fishery / fisheries within this section refers to put-and-take / sport fisheries and excludes wild fisheries

Gyrodactylid sampling in Scotland 2012

Overview

No *G. salaris* were identified. Positive results below are for species of gyrodactylids which are confirmed as not being *G. salaris*.

Total No. of cases: 11
No. of farm cases: 4
No. of wild cases: 6
Total No. of fisheries[16] sampled: 1

Total No. of fish examined: 23
Total No. of farmed fish examined: 15
Total No. of wild fish examined: 7
Total No. of fishery fish examined: 1

No. of +ve farm cases: 0
No. of +ve fisheries: 1
No. of +ve wild cases: 0

Breakdown of sampling for gyrodactylids

Farmed fish sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Atlantic salmon	2	5	Strathclyde	-ve	
		3	Strathclyde	-ve	
Rainbow trout	2	2	Central	-ve	
		5	Tayside	-ve	

Fishery sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Common carp	1	1	Strathclyde	Positive	G. species

Wild fish sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Atlantic salmon	6	2	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	

16 Fishery / fisheries within this section refers to put-and-take / sport fisheries and excludes wild fisheries

Gyrodactylid sampling in Scotland 2013

Overview

No *G. salaris* were identified. Positive results below are for species of gyrodactylids which are confirmed as not being *G. salaris*.

Total No. of cases: 8
No. of farm cases: 6
No. of wild cases: 1
Total No. of fisheries[17] sampled: 1

Total No. of fish examined: 31
Total No. of farmed fish examined: 26
Total No. of wild fish examined: 4
Total No. of fishery fish examined: 1

No. of +ve farm cases: 1
No. of +ve wild cases: 0
No. of +ve fisheries: 0

Breakdown of sampling for gyrodactylids

Farmed fish sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Atlantic salmon	3	5	Western Isles	-ve	
		5	Highland	-ve	
		1	Shetland	-ve	
Rainbow trout	3	5	Tayside	-ve	
		5	Strathclyde	Positive	Gd
		5	Strathclyde	-ve	

Fishery sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Rainbow trout	1	1	Dumfries & Galloway	-ve	

Wild fish sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Trout	1	4	Highland	-ve	

[17] Fishery / fisheries within this section refers to put-and-take / sport fisheries and excludes wild fisheries

Gyrodactylid sampling in Scotland 2014

Overview

No *G. salaris* were identified. Positive results below are for species of gyrodactylids which are confirmed as not being *G. salaris*.

Total No. of cases: 22
No. of farm cases: 17
No. of wild cases: 4
Total No. of fisheries[18] sampled: 1

Total No. of fish examined: 79
Total No. of farmed fish examined: 62
Total No. of wild fish examined: 12
Total No. of fishery fish examined: 5

No. of +ve farm cases: 1
No. of +ve wild cases: 0
No. of +ve fishery cases: 1

Breakdown of sampling for gyrodactylids

Farmed fish sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Atlantic salmon	9	2	Strathclyde	-ve	
		5	Dumfries & Galloway	-ve	
		9	Shetland	-ve	
		5	Shetland	-ve	
		5	Shetland	-ve	
		4	Strathclyde	-ve	
		1	Highland	-ve	
		1	Highland	-ve	
		1	Highland	-ve	
Rainbow trout	8	4	Borders	-ve	
		1	Dumfries & Galloway	-ve	
		5	Tayside	-ve	
		5	Tayside	-ve	
		3	Tayside	-ve	
		1	Tayside	-ve	
		5	Tayside	-ve	
		5	Tayside	Positive	Gd

[18] Fishery / fisheries within this section refers to put-and-take / sport fisheries and excludes wild fisheries

Fishery sampling

Species	Cases	No. sampled per case	Region	Result	Species
Stickleback	1	5	Dumfries & Galloway	Positive	Ga

Wild fish sampling

Species	Cases	No. sampled per case	Region	Result	Species
Atlantic salmon	3	1	Grampian	-ve	
		3	Strathclyde	-ve	
		1	Borders	-ve	
Trout	1	7	Strathclyde	-ve	

Gyrodactylid sampling in Scotland 2015

Overview

No *G. salaris* were identified. Positive results below are for species of gyrodactylids which are confirmed as not being *G. salaris*.

Total No. of cases: 24
No. of farm cases: 8
No. of wild cases: 13
Total No. of fisheries[19] sampled: 3

Total No. of fish examined: 60
Total No. of farmed fish examined: 29
Total No. of wild fish examined: 26
Total No. of fishery fish examined: 5

No. of +ve farm cases: 0
No. of +ve wild cases: 0
No. of +ve fisheries: 0

Breakdown of sampling for gyrodactylids

Farmed fish sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Atlantic salmon	3	5	Highland	-ve	
		1	Shetland	-ve	
		5	Highland	-ve	
Rainbow trout	4	1	Dumfries & Galloway	-ve	
		5	Tayside	-ve	
		3	Dumfries & Galloway	-ve	
		4	Lothian	-ve	
Trout	1	5	Western Isles	-ve	

Fishery sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Rainbow trout	2	2	Dumfries & Galloway	-ve	
		2	Shetland	-ve	
Tench	1	1	Strathclyde	-ve	

[19] Fishery / fisheries within this section refers to put-and-take / sport fisheries and excludes wild fisheries

Wild fish sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Atlantic salmon	3	5	Strathclyde	-ve	
		1	Central	-ve	
		5	Highland	-ve	
Trout	1	4	Grampian	-ve	
Eel	9	1	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	
		2	Grampian	-ve	
		1	Grampian	-ve	
		2	Grampian	-ve	
		1	Grampian	-ve	
		1	Grampian	-ve	

Gyrodactylid sampling in Scotland 2016

Overview

No *G. salaris* were identified. Positive results below are for species of gyrodactylids which are confirmed as not being *G. salaris*.

Total No. of cases: 7
No. of farm cases: 2
No. of wild cases: 4
Total No. of fisheries[20] sampled: 1

Total No. of fish examined: 17
Total No. of farmed fish examined: 2
Total No. of wild fish examined: 14
Total No. of fishery fish examined: 1

No. of +ve farm cases: 1
No. of +ve wild cases: 0
No. of +ve fisheries: 0

Breakdown of sampling for gyrodactylids

Farmed fish sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Atlantic salmon	1	1	Central	-ve	
Rainbow trout	1	1	Dumfries & Galloway	Positive	Gt and Gd

Fishery sampling

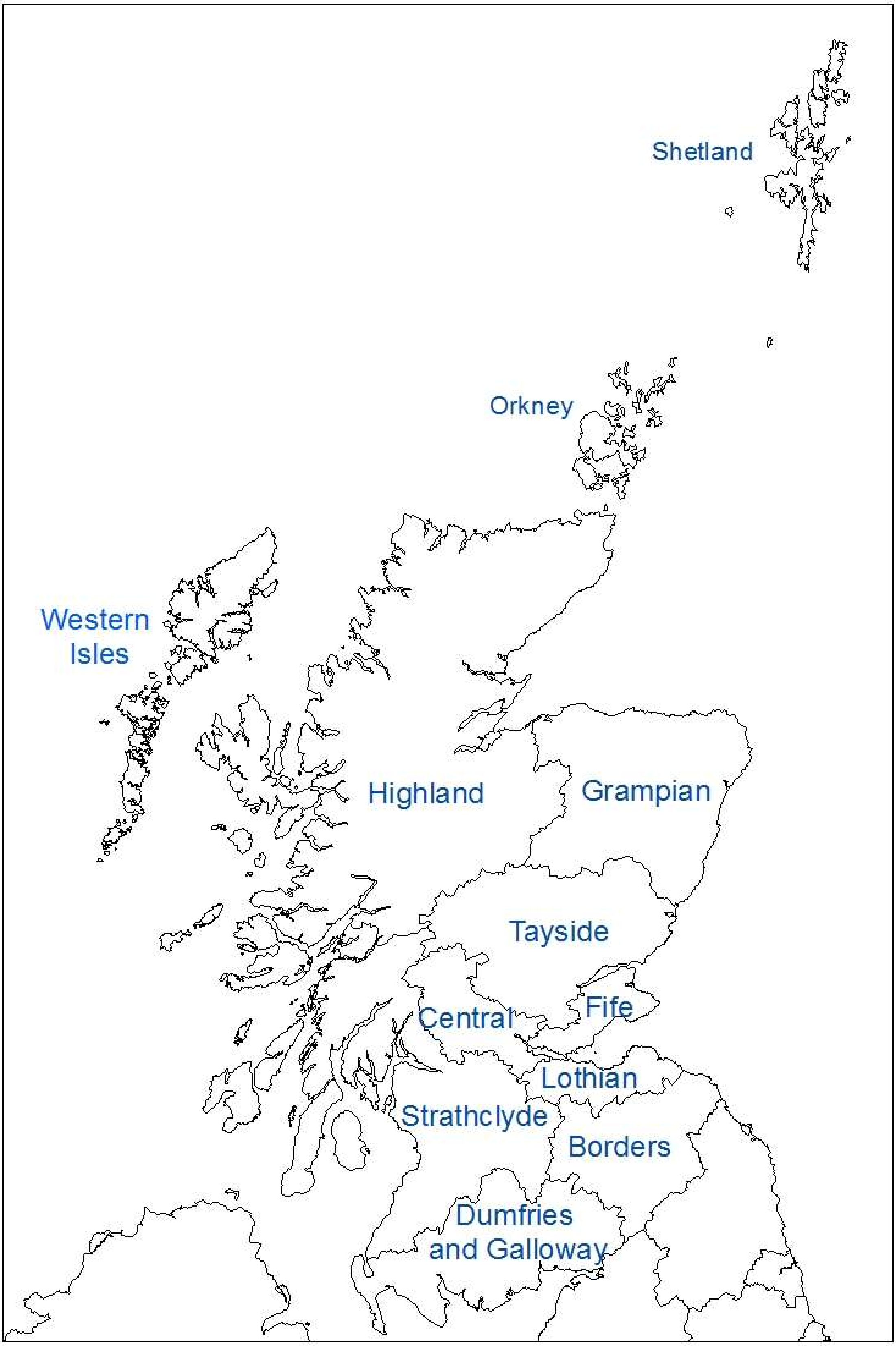
Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Rainbow trout	1	1	Grampian	-ve	

[20] Fishery / fisheries within this section refers to put-and-take / sport fisheries and excludes wild fisheries

Wild fish sampling

Fish species	Cases	No. sampled per case	Region	Result	Parasite species
Atlantic salmon	3	10	Tayside	-ve	
		1	Tayside	-ve	
		1	Highland	-ve	
Eel	1	2	Grampian	-ve	

Map identifying the regions of Scotland



GSWG(17)8

Briefing Paper on Gyrodactylus salaris (Tabled by EU Ireland)

Scope

NASCO have requested that Ireland provide a briefing paper for the 2017 meeting of the Working Group on *Gyrodactylus salaris* in the North-East Atlantic Commission Area. The paper should provide country-specific details of the following: *monitoring and control programmes and distribution of the parasite; ongoing and planned research; and measures being taken to prevent the spread of the parasite and eradicate it where it has been introduced*.

1. Background

Gyrodactylus salaris is listed as a notifiable disease in Ireland and legislation is in place preventing the transfer of live fish capable of carrying the parasite to or within Irish waters. The parasite is not listed in Council Directive 2006/88/EC, which has been applied since 1 August 2008, and replaces the previous fish health regime under Directive 91/67/EEC. However, Ireland retained additional guarantees under Decision 2004/453/EC in respect of *G. salaris* and can continue to control imports and suspected or confirmed outbreaks under the European Communities (Health of Aquaculture Animals and Products Regulations) 2008. These additional guarantees have been recognised as "national measures" under Article 43 of Council Directive 2006/88/EC. This has been reflected in Commission Decision 2010/221/EU, which replaces Commission Decision 2004/453/EC.

2. Distribution of *Gyrodactylus salaris* in Ireland

Gyrodactylus salaris has not been recorded on the island of Ireland to date.

3. Monitoring and control programmes *Gyrodactylus salaris* in Ireland

Since 2005, wild salmon parr from selected river systems in Ireland are examined annually for the presence of *G. salaris* (Appendix 1, Table 1). This monitoring is undertaken in conjunction with the catchment-wide electrofishing programme managed by Inland Fisheries Ireland (IFI) with sample analyses undertaken by the Fish Health Unit (FHU) of the Marine Institute (MI). In a more general context, the MI are responsible for investigating unexplained abnormal or significant fish mortalities encountered in Ireland which may be a result of fish disease, while IFI have statutory responsibility for wild salmonid fisheries in Ireland.

4. Ongoing and planned research

There is no ongoing or presently planned research on *G. salaris* in Ireland, with the exception of the ongoing annual monitoring programme.

5 Measures being taken to prevent the spread of the parasite and eradicate it where it has been introduced.

A detailed contingency plan for dealing with any outbreak of *G. salaris* in Ireland has been drafted by the FHU with input from IFI and other stakeholders with statutory interests in salmonids. The plan is currently in final revision (February 2017) and is likely to be published in advance of the Thirty-Fourth Annual Meeting of NASCO in June 2017.

The plan will set out in detail the operational responsibilities and actions to be taken in the event of a suspected outbreak of gyrodactylosis. It is envisaged that these will include the following:

- The convening of the National Disease Strategy Group (NDSG) to activate and oversee the implementation of the contingency plan. The group will comprise senior representatives from relevant Government Departments and State Bodies including IFI and MI as well as expert national and international veterinary scientists;

- The establishment of National Control Centre (NCC) overseen by the NDSG for the purposes of co-ordinating control / eradication measures. The NCC will include representatives of the FHU, IFI, Departmental veterinary inspectors, the cross-border Loughs Agency and relevant representation from Northern Ireland.

- A communications strategy.

- Detailed actions to be implemented on the suspicion or confirmation of a gyrodactylosis outbreak.

- Sampling, testing and fish disposal protocols.

- Containment, eradication and treatment options.

The *G. salaris* Working Group and the NASCO Secretariat will be notified when the contingency plan has been finalised and issued.

In addition to the contingency plan, IFI and MI have co-produced and widely circulated awareness literature to highlight the issue of *Gyrodactylus* among stakeholders and advise on biosecurity measures that can be taken to minimise the risk of introduction of the parasite to Ireland (e.g. *A Guide to Protecting Freshwater Fish Stocks in Ireland from the Parasite Gyrodactylus salaris* https://goo.gl/NRgVY0). In addition, both state agencies host information in this regard on their respective websites.

Appendix 1 of GSWG (17)8

Table 1 Irish river systems sampled for the presence of *G. salaris* (2005 – 2016).

Catchment	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Abbert, Corrib						X		X				
Aherlow	X											
Araglin								X				
Aughnacliffe				X								
Aughrim/Avoca										x		
Bilboa					X							
Boyne trib.									x			
Bride						X						
Brosna			X						x*			
Bunnoe			X									
Burrin			X									
Carrigahorig		X								x		
Cork Blackwater										x	x	x
Derry	X											
Dunkellin						X						
Eanymore						X						
Emlagh							X					
Erne										x		
Erne, Swanlinbar			X									
Erriff						X	X					
Feale					X				x			
Finnow								X				x
Garavogue						X						
Glen							x					
Greese					X							
Laune										x		
Leannon							X				x	
Lee		X										
Little Brosna			X									
Maine											x	
Moy								X				
Owenboliska						X						
Owenmore												
Owenwee							X					
Poulmounty			X							x		
Screebe		X	X					X				
Suir											x	
Tullaghobegley									x			

Annex 9 of NEA(17)4

GSWG(17)9

Gyrodactylus salaris update paper - contribution from Finland

European Union, Finland
Perttu Koski, Finnish Food Safety Authority Evira, Animal Disease Bacteriology and Pathology

1. Monitoring and control programmes for, and update on the distribution of *Gyrodactylus salaris* in Finland in 2006-2016

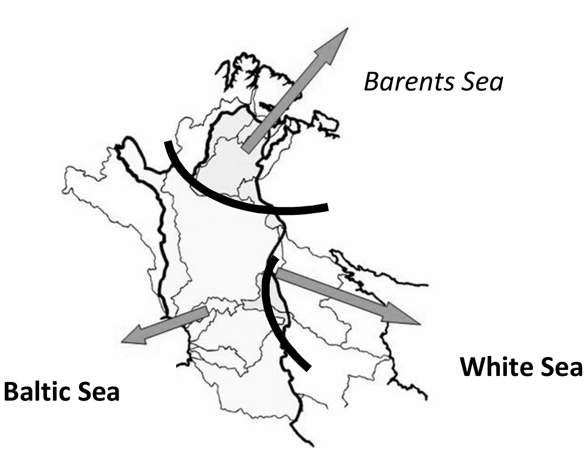


Figure 1: Three main water catchment areas in northern Finland.

The watersheds between the water catchment areas of the Barents Sea, the White Sea and the Baltic Sea are partly situated in the territory of Finland (see Fig. 1).

There is official monitoring and control programme only in the water catchment areas running into the Barents Sea in Finland.

2. Number of examined fish in the monitoring of the catchment areas running into the Barents Sea

Water catchment area	Tenojoki[1)] (Tana)	Näätämöjoki[1)] (Neiden)	Paatsjoki[1)] (Påsvik)	Paatsjoki, farmed fish		Tuulomajoki[1)]
Year	Salmon	Salmon	Grayling	Salmon	Char	Grayling
2006	163	155	8	150	60	25
2007	197	161	14	150	60	
2008	100	120	15	150	60	30
2009	100	122	15	150	60	53
2010	102	173	15		120	30
2011	65	156	15		120	30
2012	100	120	15		100	
2013	100	120	15		120	30
2014	100	120	15		120	30
2015	100	120	15		120	
2016	101	120	15		120	10

1) Samples from wild fish

All the examinations have been negative for the presence of *Gyrodactylus salaris* on the examined fish.

There were two fish farms in the River Paatsjoki catchment area in 2006, but only one from 2011 onwards. In other water catchments running into the Barents Sea there has not been fish farming activity during the monitoring period. During some years, there has, however, been incubation of local brown trout eggs in a miniature hatchery in the River Näätämöjoki (Neiden in Norwegian) catchment area during the winter and spring months.

3. Monitoring of the catchment areas running into the Baltic and White Seas

There is no regular official monitoring of *G. salaris* in these areas. On wild salmon, *G. salaris* is common in the river Tornionjoki water catchment area, which situates on the territories of both Finland and Sweden. The epidemiology of the infection in the best wild salmon river of the Baltic Sea has been studied by Anttila *et* al (2008), Kuusela *et* al (2009) and Lumme *et* al (2016).

Rainbow trout farms are considered to be quite often infected with *G. salaris* in both these catchment areas. Only a few farms have, however, been examined for the presence of *G. salaris* in recent years. The information on the present-day situation at the fish farms of Finland is thus poor. The examinations of farmed rainbow trout have been performed in connection with research or live fish export certification. In addition to *G. salaris* also *G. lavareti* has been found at some farms.

4. On-going and planned research concerning G. salaris and future research requirements

Scientific research on *G. salaris* during the recent years has mainly been performed at the University of Oulu, Department of Biology, by a group led by Professor Jaakko Lumme. Their interest has been on the molecular ecology and evolution of the parasite. Much of the work has been done in collaboration with the fish parasitologists in the Russian Karelia and Finnish Food Safety Authority Evira and the University of Turku, Finland. Professor Lumme has retired and the volume of new research on *G. salaris* in Finland might be expected to decline.

5. The publications in peer-reviewed journals by Finnish authors in 2006-2016

Anttila, P., Romakkaniemi, A. Kuusela, J. & Koski, P. (2008): Epidemiology of *Gyrodactylus salaris* (Monogenea) in the River Tornionjoki, a Baltic wild salmon river. Journal of Fish Diseases 31, 373-382.

Ieshko, E., Barskaya, Yu., Parshukov, A., Lumme, J. Khlunov, O. (2016) Occurrence and morphogenetic characteristics of *Gyrodactylus* (Monogenea: Gyrodactylidae) from a rainbow trout farm (Lake Ladoga, Russia). Acta Parasitologica 61: 151-157

Koski, P., Anttila, P., Kuusela, J. (2016): Killing of *Gyrodactylus salaris* by heat and chemical disinfection. Acta Veterinaria Scandinavica, 58, 21, doi 10.1186/s13028-016-0202-y.

Kuusela J, Holopainen R, Meinilä M, Anttila P, Koski P, Ziętara MS, Veselov AJe, Primmer CR, Lumme J (2009) Clonal structure of salmon parasite *Gyrodactylus salaris* on a coevolutionary gradient on Fennoscandian salmon (*Salmo salar*). Ann. Zool. Fenn. 46: 21-33.

Kuusela J, Ziętara MS, Lumme J (2007). Hybrid origin of Baltic salmon-specific parasite *Gyrodactylus salaris*: a model for speciation by host switch for hemiclonal organisms. Molecular Ecology 16: 5234-5245.

Lumme, J., Anttila, P., Rintamäki, P., Koski, P. Romakkaniemi, A. (2016) Genetic gradient of a host-parasite pair persisted ten years against physical mobility: Baltic *Salmo salar* vs. *Gyrodactylus salaris*. Infection, Genetics and Evolution, 45: 33-39. http://www.sciencedirect.com/science/article/pii/S1567134816303434#MMCvFirst

Ozerov M.Yu., Lumme J., Päkk P., Rintamäki P., Ziętara M.S., Barskaya Y., Lebedeva D., Saadre E. Gross R., Primmer C.R., Vasemägi A, (2010) High *Gyrodactylus salaris* infection rate in triploid Atlantic salmon (*Salmo salar* L.). Diseases of Aquatic Organisms 91: 129-136

Rokicka M, Lumme J, Ziętara MS (2007). Identification of *Gyrodactylus* ectoparasites in Polish salmonid farms by PCR-RFLP of the nuclear ITS segment of ribosomal DNA (Monogenea: Gyrodactylidae). Acta Parasitologica 52: 185-195.

Ziętara MS, Kuusela J, Lumme J (2006). Escape from an evolutionary dead-end: a triploid clone of *Gyrodactylus salaris* is able to revert to sex and switch host (Platyhelminthes, Monogenea, Gyrodactylidae). Hereditas 143, 86-92.

Ziętara MS, Rokicka M, Stojanovski S, Lumme J (2010) Introgression of distant mitochondria into the genome of *Gyrodactylus salaris*: Nuclear and mitochondrial markers are necessary to identify parasite strains. Acta Parasitologica 55: 20-28.

There are also other publications on *G. salaris* and other *Gyrodactylus* species of salmon, some of the most interesting for the prevention work of *G. salaris* might be:

Ieshko, E., Lebedeva, D., Lumme, J. (2015) A new *Gyrodactylus* strain on brown trout (*Salmo trutta*) in Jänisjärvi, Russian Karelia, and a literature revision of salmonid parasites of the genus *Gyrodactylus* in North-Western Russia and adjacent areas. Acta Parasitologica 60: 75-84

Ziętara MS, Johnsen, BO, Lumme J (2008) Genetisk analyse av opprinnelsen til *Gyrodactylus salaris*-infeksjonen på laksunger i Laerdalselva. NINA Rapport 371.

Ziętara MS, Kuusela J, Veselov AJe, Lumme J (2008). Molecular faunistics of accidental infections of *Gyrodactylus* Nordmann, 1832 (Monogenea) parasitic on salmon *Salmo salar* L. and brown trout *Salmo trutta* L. in NW Russia. Systematic Parasitology 69: 123-135.

6. Measures to prevent the spread of the parasite and to eradicate it where it has been introduced

In Finland, the purpose is to keep *G. salaris* outside the rivers of the Barents Sea catchment area. The parasite has a wide distribution in the rivers and fish farms in other catchment areas in Finland, there is a common occurrence of potential wild carrier fish in the wild and there are great difficulties in demarcating the possible eradication areas. This is why the eradication of the parasite from its natural distribution areas has considered to be impossible in the territory of Finland. Considering the prevention of *G. salaris* in the Barents Sea catchment area, the restrictions of fish movements, prohibition of the use of baitfish, requirements concerning drying or disinfection of fishing equipment, boats etc. are basically the same as they were in 2007.

During the period 2006-2016 much of the publicity material of the prevention has gone into internet. A large number of players from the local fishing license sellers to central government authorities and scientific research has participated in this prevention work. The leaflets of the prevention of the spread were updated in 2014 in Evira and published in Finnish, Swedish, Samish, English and Russian. Every fisherman gets an information leaflet made by the Centre for Economic Development, Transport and the Environment of Lapland while buying a fishing license to River Tenojoki (Tana in Norwegian).

The international cooperation between veterinary authorities has been lesser than previously in 2006-2016, but information of the national contingency planning concerning the Rivers Tenojoki and Näätämöjoki has been changed with Norway. The prevention work has also been in the agenda of the Finnish-Norwegian Transboundary Water Commission and in the negotiations of the agreement of Tenojoki between Finland and Norway during the last few years.

In the event of a *G. salaris* infection in the River Tenojoki, there will not be possibilities to the total eradication of the disease. This conclusion was based on the evaluation reports of the treatments of the Norwegian Atlantic salmon rivers and the conditions of the river and biology of River Tenojoki salmon. The preliminary study of a contingency plan for the rivers Tenojoki and Näätämöjoki was published in 2013 (Koski, P. (2013) Teno- ja Näätämöjokien suojelu *Gyrodactylus salaris* -loiselta, https://www.evira.fi/globalassets/tietoa-evirasta/julkaisut/julkaisusarjat/elaimet/eviran_julkaisuja_1_2013.pdf, in Finnish with a summary in Swedish, Samish and English). An attempt to conserve the genetic material to live gene banks would probably be the option of choice in such case. In a contingency plan the possibility of keeping certain parts of the water system free of the infection and compensatory restocking programs should be analyzed. This kind of work could perhaps serve as artificial respiration for the salmon in the river system. In the long run, a more resistant stock of the River Tenojoki salmon would presumably be needed for the restoration of the salmon population and fishing.

The desolate sight of the *G. salaris* infection in River Tenojoki or Näätämöjoki underlines the importance of the prevention work. There is a need to prepare also against the catastrophe scenario, too. The commencement of contingency planning with Norway is, however, hopeful. The contingency planning addressing the infection of *G. salaris* is an extraordinary and extensive task of preparation against an animal disease.

Annex 10 of NEA(17)4

GSWG(17)10

Gyrodactylus salaris monitoring programme in the Russian Federation Status of index salmon rivers

In Atlantic salmon rivers of the Russian Federation the parasite *Gyrodactylus salaris* was for the first time found in 1992 in the Keret River (Republic of Karelia, the White Sea basin). It's believed that the parasite was introduced into the river through aquaculture activities. Therefore, in the light of recent aquaculture developments in the Murmansk region and Karelia transfers of rainbow trout from the Leningrad region and those parts of Karelia, where *Gyrodactylus salaris* is a native species, to these two regions represent a high risk of further spread of *Gyrodactylus salaris* into Atlantic salmon rivers. The parasite may also be transferred with fishing equipment in recreational fishing widely practiced in the Kola Peninsula.

Parasitological surveys to monitor *Gyrodactylus salaris* have been carried out since 1993 in five index rivers of the Murmansk region (Pecha, Pack, Kola, Kovda and Kanda) and in the Keret River of the Republic of Karelia. Until now the parasite has not been found in salmon rivers of the Murmansk region in both the Barents Sea and White Sea basins.

The infestation of juvenile Atlantic salmon with *Gyrodactylus salaris* was studied in 2016. The parasite was found on 100% of the analyzed fish (12 individuals). The number of parasites per fish varied from 17 to 1083 and the abundance rate was 164 parasite per fish (Table).

Salmon catches in the Keret River in the first half of the 1980s varied from 2 to 3 tonnes and annual adult return never fell below 2700 salmon until early 1990s. The maximum number of salmon counted at the barrier fence in the Keret River was 4660 salmon in 1983.

According to counts at the barrier fence the abundance of wild salmon in the Keret River varied from 43 to 223 individuals in 2008-2015, the majority of spawning migrants were of hatchery origin (Figure), their numbers varied from 115 to 507.

Table. Indicators of Atlantic salmon juveniles infestation (n=12 individuals) with *Gyrodactylus salaris* in the Keret River in 2016.

Proportion of infested fish, %	Number of parasite per fish (min – max)	Parasite abundance rate
100.0	17 - 1083	164.1

Parr surveys carried out in 2012-2015 showed that salmon juvenile densities were extremely low and varied from 4.7 individuals/100 m^2 in 2012 to 0.5 individuals/100 m^2 in 2014. In 2016 juveniles occurred in the upper parts of the river only.

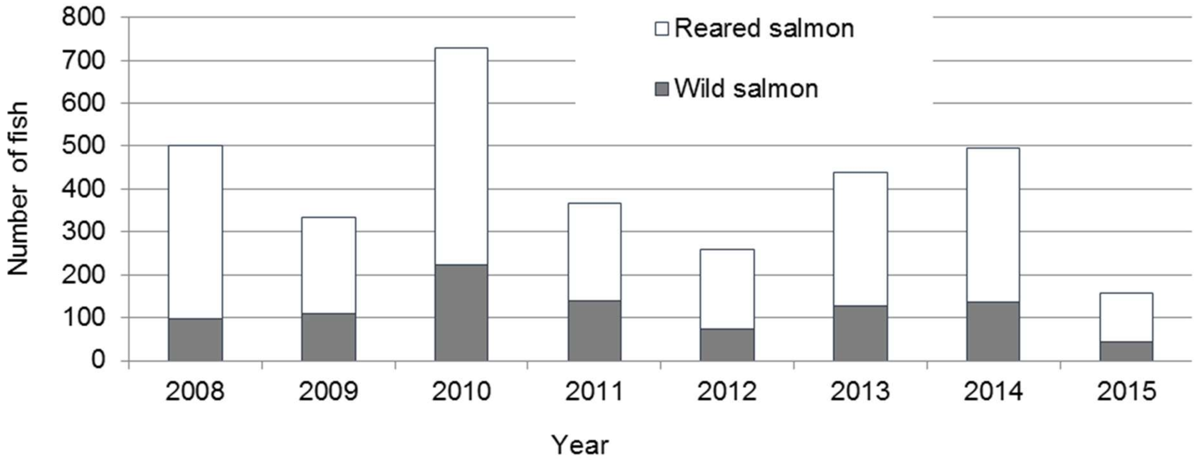


Figure. Adult salmon counts and origin of fish according to data from the barrier fence in the Keret River in 2008-2015.

GSWG(17)11

Briefing Paper on Gyrodactylus salaris (Tabled by EU England and Wales)

Scope

NASCO have requested that England and Wales provide a briefing paper for the 2017 meeting of the Working Group on *Gyrodactylus salaris* in the North-East Atlantic Commission Area. The paper should provide country-specific details of the following: *monitoring and control programmes and distribution of the parasite; ongoing and planned research; and measures being taken to prevent the spread of the parasite and eradicate it where it has been introduced*.

1. Gyrodactylus salaris and the United Kingdom

The consequences of *G. salaris* introduction into the United Kingdom would be severe for salmonid stocks with potential for riverine stock losses of up to 98%. The economic consequences of such losses would also be severe, with an Environment Agency study in 2001 estimating that the market value of fishing rights for salmon rod fisheries in England and Wales to be £128 million.

2. Routes of Introduction

There is the potential for *G. salaris* to be introduced into the UK by several different pathways. Three main categories and respective introduction pathways have been identified and analysed for the level of risk they pose (Table 1)[1].

3. Legislative controls

At present, the UK is recognised as being free from *G. salaris* and as such the parasite is considered exotic to the country. The UK is one of the few areas within the EU that is recognised free from the parasite along with the Republic of Ireland and two river catchments in Finland [25].

Due to recognised freedom from *G.salaris*, under Council Directive 2006/88/EC, Article 43, the United Kingdom is able to restrict imports of live salmonids to countries that have an equivalent health status i.e. demonstrated freedom from *G. salaris* and are approved as such by that countries competent authority. The National controls implemented under the Aquatic Animal Health (England and Wales) Regulations 2009 mean that any suspicion of infection or mortality resulting from infection must be reported to the Fish Health Inspectorate. Failure to inform the FHI of any suspicion of *G. salaris* is an offence under the regulations.

Table 1: Pathways of *Gyrodactylus salaris* introduction [(1)]

Category	Pathway
Live fish and gametes	Importation of live salmonids Importation of eels Importation of non-salmonid fish Importation of rainbow trout eggs
Fish carcasses	Fresh or chilled Atlantic salmon from Norway/ Finland/Sweden Fresh or chilled rainbow trout from freshwater production in mainland Europe
Mechanical transmission	Lorries moving live fish Ships' ballast water Well-boats travelling from Norway Freshwater tanks of leisure craft Canoes and angling equipment (especially keep nets) Importation of lumber from Baltic countries Importation of aquatic plants from Baltic Countries

Monitoring Programme

To satisfy Article 43 of the Directive, the Cefas fish health inspectorate (FHI) are required to carry out sampling of species susceptible to *G. salaris* as part of the criteria to maintain national control measures for the freedom of the parasite in England and Wales.

Due to the low number of salmon farms in England and Wales, samples are obtained from wild salmonid populations. This work is carried out in conjunction with the Environment Agency's area fisheries teams during their annual wild fish population surveys.

The Cefas FHI carries out monitoring for *G. salaris* in England and Wales through a rolling programme of sampling covering all river catchment's which contain salmon. Within England and Wales, there are seventy-eight rivers that support salmon, although not all currently host large populations. Each of the catchments is sampled approximately every five years where possible. The fish sampled are usually approximately 15 cm in length and a total of 30 fish are sampled where possible. Generally, a sample of 30 salmon are required although where the numbers of salmon are too low to obtain this sample size, trout and grayling may be taken as a substitute.

Diagnostic methods

Once collected the fish are euthanized and placed into ethanol before being returned to the Weymouth Cefas laboratory for examination. Handling of the fish during the field sampling is kept to a minimum, to minimise the risk of removing any gyrodactylids that may be present on the fish. The sample, on return to the laboratory, is examined under a light microscope and any gyrodactylid species found are recorded and identified. All sampling carried out in the field and in the laboratory, is undertaken in accordance with the Cefas quality management system and accredited under the international standard ISO17025.

Since 2007, fifty-four sites on forty-three catchments have been sampled. In this time, *G. salaris* has not been found in any of the samples (Table 2). However, several other gyrodactylid species native to the UK have been identified.

- *Gyrodactylus derjavininoides*: Host is brown trout but also found on rainbow trout. Parasitises fins and skin surfaces.
- *Gyrodactylus thymalli:* Host is grayling. Parasitises fins and body surfaces
- *Gyrodactylus truttae*: Host is brown trout and Atlantic salmon. Observed on fins and skin surfaces

In 2016 the Cefas FHI introduced the use of a novel non-destructive method, developed at Cefas Weymouth laboratory, for sampling wild salmonids (Figure 1). This method involves the immersion of fish in a weak hydrogen peroxide solution (560ppm for 3 minutes) which removes the gyrodactylids whilst leaving the fish unharmed. The parasites can then be recovered for analysis whilst the live fish are returned to the river. This technique has increased the number of fish sampled from each river catchment, and increased the harvest of gyrodactylids, which improves the statistical confidence in the sampling programme. This method represents an important step forward in surveillance for gyrodactylids in both wild and farmed fish populations as it removes the need for destructive testing of juvenile Atlantic salmon, a species subject to national and international conservation measures. This new technique has been incorporated into Defra's (England and Wales) national aquatic animal disease contingency plans. Cefas will publish the methodology and will then request that it is considered for inclusion in the OIE manual for diagnostic tests for aquatic animals.

Figure 1. Equipment used in a novel non-destructive method for sampling wild salmonids for gyrodactylids

Table 2 Species of Gyrodactylids found during FHI sampling 2007-2016

Year	Catchment	Species sampled			Gyrodactylids identified
		Atlantic salmon	grayling	brown trout	
2007	Avon		17		*G. thymalli*
	Test		12		*G. thymalli*
	Tavy	30			*-ve*
	Plym	30			*G. derjavinoides*
	Inny	30			*-ve*
	Frome	30			*G.. Sp*
	Tawe	30			*-ve*
	Nadder	20			*G. derjavinoides*
	Avon	15			*-ve*
2008	Coquet	30			*-ve*
	Aln			17	*-ve*
	Tyne	30			*-ve*
	Wear	30			*-ve*
	Test		2	1	*-ve*
	Itchen		30		*-ve*
2009	Nidd		21	71	*G. truttae/G. derjavinoides*
	Piddle	30			*G. derjavinoides*
	Usk	30			*G. derjavinoides*
	Wye	30			*G. derjavinoides*
	Severn	30			*G. derjavinoides*
	Tees	30			*-ve*
	Esk	30			*-ve*
2010	Exe	30			*G. derjavinoides/G. sp*
	Torridge	30			*G. derjavinoides*
	Tywi	30			*-ve*
	Afan	20		10	*G. derjavinoides*
	Lugho	28		1	*-ve*
	Lynher	30			*G. derjavinoides*
2011	Camel	30			*-ve*
	Fowey	30			*-ve*
	Teign			30	*-ve*
	Teifi	30			*G. derjavinoides*
	Nevern	30			*G. derjavinoides*
	Gwaun	30			*G. derjavinoides*
	Dee	30			*G. derjavinoides*
	Conwy	30			*G. derjavinoides*
	Lune	30			*-ve*
	Duddon	30			*-ve*
	Esk	30			*G. derjavinoides*
2012	Thames			30	*G. derjavinoides/G.Sp*
	Thames			29	*G. derjavinoides/G.Truttae*
	Avon			30	*G. derjavinoides*
	Stour			30	*G. derjavinoides*
	Taw	15		15	*-ve*
	Tavy	30			*-ve*
	Wey			30	*G. derjavinoides*

2013	Coquet	29		1	*-ve*
	Aln	4		26	*-ve*
	Piddle	1		12	*-ve*
	Tamar	30			*-ve*
	Frome	30			*-ve*
	Ouse			30	*-ve*
	Tyne	30			*-ve*
	Wear	30			*-ve*
2014	Ouse			30	*G. derjavinoides*
	Inny	30			*-ve*
	Plym	30			*G. derjavinoides*
	Usk	30			*G. derjavinoides*
	Wye	33			*G. derjavinoides*
	Severn	30			*G. derjavinoides*
	Test	30			*-ve*
2015	Itchen	30			*G. derjavinoides*
	Esk (Yorkshire)			30	*G. derjavinoides*
	Tees	30			*G. derjavinoides*
	Exe	25		5	*G. derjavinoides*
	Torridge	30			*G. derjavinoides*
	Lynher	30			*G. derjavinoides*
	Tywi	9		21	*G. derjavinoides*
	Afan	23		7	*G. derjavinoides*
	Lughor	6		24	*G. derjavinoides*
	Tawe	10		20	*G. derjavinoides*
	Tamar	6			*-ve*
2016	Ogmore	30			*G. derjavinoides*
	Cleddau	30			*G. derjavinoides*
	Dee	30			*G. derjavinoides*
	Mawddach	30			*G. derjavinoides*
	Fowey	30			*G. derjavinoides*
	Camel	30			*G. derjavinoides*
	Teign	30			*G. derjavinoides*
	Ellen	4		26	*G. derjavinoides/G.Truttae*
	Eden	30			*G. derjavinoides*
	Bela River Kent	5		25	*G. derjavinoides*
	Frome	30			*G. derjavinoides*
	Usk	81		5	*G. derjavinoides/G.Truttae*
	Cynrig Hatchery	170			*-ve*

References

Peeler, E.J., Thrush, M.A., 2004. Qualitative analysis of the risk of introducing *Gyrodactylus salaris* into the United Kingdom. Diseases of Aquatic Organisms. 62, 103-113

GSWG(17)13

'Road Map' to enhance information exchange and co-operation on monitoring, research and measures to prevent the spread of G. salaris and eradicate it if introduced

Recommendation	Proposed Action
1. Preventive measures and contingency planning	a) Appropriate steps should be taken to prevent the spread of *G. salaris* on fishing equipment, boats, *etc*. by use of approved disinfection methods. b) All movements of live fish should be recorded so that movements can be traced in the event of an outbreak of *G. salaris.* c) The risk of *G. salaris* introduction through the processing of fish carcasses should be assessed and, where appropriate, mitigated through control of processing. d) Physical barriers to fish migration should be considered as a measure to prevent the spread of *G. salaris* within a catchment and to uninfected catchments. e) Where possible, routine breaks in production and disinfection on rainbow trout and salmon freshwater aquaculture sites should be implemented as part of a control programme in infected areas. f) Permission to stock fish into infected river catchments should be based on an assessment of the increased risk of transmission of the parasite to non-infected rivers (e.g. through migration and other routes). g) NEAC Parties and their relevant jurisdictions should have contingency plans in place for treatment, containment or eradication. These plans should be developed in consultation with stakeholders. A legal base for the use of rotenone and other treatments, containment and eradication measures should be put in place. Contingency plans should be tested periodically and updated as required. h) NEAC Parties and their relevant jurisdictions should ensure that adequate resources are available for the implementation of measures to contain and eradicate *G. salaris*.
2. Cooperation on management	a) The North-East Atlantic Commission (NEAC) should retain an item on *G. salaris* on the agendas for its Annual Meetings. This would facilitate reports by its Parties and their relevant jurisdictions and by the Working Group on measures to prevent the further spread of the parasite and to eradicate it in areas where it has been introduced and on other aspects of this 'Road Map'. b) The Working Group on *G. salaris* in the North-East Atlantic Commission Area should meet again in 2018 and then every 3 years thereafter, or more frequently if circumstances require, to provide a forum for more detailed information exchange and review of progress in implementing this 'Road Map'.

	c) Contingency plans developed by NEAC Parties and their relevant jurisdictions should be made available to the Working Group at its next meeting with the view to sharing information on approaches and challenges. The plans should be made available on the websites of the Competent Authorities with links to them from the NASCO website.
3. Monitoring methods for use in watercourses, lakes and in aquaculture	The Working Group should review new developments with regard to monitoring for, and detection of, *G. salaris* and develop recommendations for their inclusion in international guidelines.
4. Distribution of *G. salaris* in the NEAC area and adjacent areas	a) Existing monitoring programmes on salmonids in the wild and in aquaculture environments undertaken by NEAC Parties and their relevant jurisdictions should be retained and expanded as necessary. They should provide genetic data for all *Gyrodactylus* species isolated during monitoring. Reports on these programmes should be provided to the Working Group at their next meeting. b) Information should be requested from all NEAC Parties and their relevant jurisdictions which have wild Atlantic salmon but which have not participated in the Working Group to date. c) NEAC Parties and their relevant jurisdictions should identify *G. salaris* as an impact factor in the NASCO Rivers Database for those rivers infected by the parasite. d) The NASCO Secretariat should make a request to the OIE reference laboratory for *G. salaris* seeking information on the distribution of *G. salaris* in countries that have wild and/or farmed susceptible species, but which do not have wild Atlantic salmon.
5. Research to inform the effective management of *G. salaris*	a) The NEAC Parties and their relevant jurisdictions should conduct applied research to inform the effective management of *G. salaris*, particularly the following: - the distribution and genetics of *G. salaris*; - the effects of salmon genetics on susceptibility to *G. salaris*; - the effect of environmental factors on pathogenicity; - to clarify the classification of *G. salaris* and *G. thymalli* and then develop a reliable method to distinguish between pathogenic and non-pathogenic strains; - general biology and mechanisms of spread of the parasite; - effect of environmental parameters and ecology on the distribution of *G. salaris*; - detection and diagnostic methods for *G. salaris;* - new environmental friendly treatment methods in rivers and lakes, e.g. acid aluminum and chloride. b) The Working Group should keep research requirements and monitoring needs under review and report regularly to the NEAC.

6. Classification of *Gyrodactylus* species	NEAC Parties and their relevant jurisdictions should only support any future proposal to synonomise *G. salaris* and *G. thymalli* if, in parallel, OIE standards and national legislation recognise the different pathogenicity and host predilection of these two species.
7. Publicity, education, and awareness	a) NEAC Parties and their relevant jurisdictions should develop publicity material on the threat of the parasite to wild Atlantic salmon and specify measures to prevent its spread; strategies for the effective dissemination of this material should be developed particularly with regard to targeting high risk groups. Existing material should be reviewed and updated as appropriate in the light of current knowledge. The NASCO Secretariat should develop standard text as a basis for such publicity material. b) This material should be made available on the web sites and promoted on the social media platforms of the Competent Authorities and NASCO with a view to highlighting the serious risks posed by the spread of the parasite.
8. Continuity of current measures in the EU Animal Health Law	Relevant NEAC Parties and their relevant jurisdictions should seek to ensure continuity in the provisions related to *G. salaris* in current EU animal health legislation (Regulation 2016/429) which should be retained, in particular with regard to Additional Guarantees.
9. Criteria for diagnosis and establishing *G. salaris*-free zones	NEAC Parties and their relevant jurisdictions should implement the diagnostic standards in the OIE Manual of Diagnostic Tests for Aquatic Animals.
10. Trade in live susceptible fish species	a) Trade in disinfected eggs is preferable to trade in live susceptible fish species. However, where movements of live susceptible fish species are approved, NEAC Parties and their relevant jurisdictions should ensure that trade in live susceptible fish species only takes place between areas of equal *G. salaris* status or from a higher to lower status area. b) NEAC Parties and their relevant jurisdictions should ensure the health status of the traded live susceptible fish species and/or their eggs, and the competence of the certifying Authority.
11. Shared catchments	NEAC Parties and their relevant jurisdictions with shared catchments or having catchments in close proximity should implement appropriate mechanisms for co-operation, including the establishment and strengthening of inter-country Working Groups and the development of common contingency plans to control and eradicate *G. salaris*.

Annex 7

CNL(17)10

Request for Scientific Advice from ICES

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

1.1 provide an overview of salmon catches and landings by country, including unreported catches and catch and release, and production of farmed and ranched Atlantic salmon in 2017[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 compilation of tag releases by country in 2017; and
1.5 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 2017 fisheries[4];
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 catch options or alternative management advice for the 2018/19-2020/21 fishing seasons, with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[5]; and
2.5 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 2017 fisheries (including the fishery at St Pierre and Miquelon)[4];
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;
3.4 provide catch options or alternative management advice for 2018-2021 with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[5]; 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 2017 fisheries[4];
4.2 describe the status of the stocks[6];
4.3 provide catch options or alternative management advice for 2018-2020 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[5];
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 respect to question 1.3, NASCO is aware that the WGERAAS final report is being prepared and will be submitted to ICES in 2017*
4. *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.*
5. *In response to questions 2.4, 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.*
6. *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.*

Attendees:

Sergey Prusov (NEAC, manager representative)
Peder Fiske (NEAC, scientist representative)
Annette Rumbolt (NAC, manager representative)
Tim Sheehan (NAC, scientist representative)
Esben Ehlers (WGC, manager representative)
Niall Ó Maoiléidigh (WGC, scientist representative)
Gérald Chaput (ICES representative, Observer)
Patrick Gargan (Coordinator)

<u>Annex 8</u>

List of North-East Atlantic Commission Papers

NEA(17)1	Provisional Agenda
NEA(17)2	Draft Agenda
NEA(17)3	Report on the Use of the Framework of Indicators in 2017
NEA(17)4	Report of the Meeting of the Working Group on *Gyrodactylus salaris* in the North-East Atlantic Commission Area
NEA(17)5	Mixed-Stock Fisheries (Tabled by Norway)
NEA(17)6	Mixed-Stock Fisheries (Tabled by the Russian Federation)
NEA(17)7	Mixed-stock Fisheries (Tabled by the European Union)
NEA(17)8	Agenda
NEA(17)9	Draft Report of the North-East Atlantic Commission Meeting
NEA(17)10	ICES Presentation
NEA(17)11	Report of the North-East Atlantic Commission Meeting

REPORT OF THE

THIRTY-FOURTH ANNUAL MEETING OF

THE

WEST GREENLAND COMMISSION

6 - 9 JUNE 2017
Varberg, Sweden

Chairman:	Mr Carl McLean (Canada)
Vice-Chairman:	Ms Kimberly Damon-Randall (USA)
Rapporteur:	Dr Michael Millane (European Union)
Secretary:	Dr Peter Hutchinson

WGC(17)9

CONTENTS

Page No.

WGC(17)9

Report of the Thirty-Fourth Annual Meeting of the West Greenland Commission of the North Atlantic Salmon Conservation Organization

Varbergs Kusthotell, Varberg, Sweden

6 - 9 June 2017

1. Opening of the Meeting

1.1 The Chairman, Mr Carl McLean (Canada), opened the Meeting and welcomed delegates to Varberg.

1.2 A written Opening Statement on behalf of the Non-Government Organisations (NGOs) attending the Annual Meeting was distributed (Annex 1).

1.3 A list of participants at the Thirty-Fourth Annual Meetings of the Council and Commissions of NASCO is included on page 347 of this document.

2. Adoption of the Agenda

2.1 The Commission adopted its Agenda, WGC(17)6 (Annex 2).

3. Nomination of a Rapporteur

3.1 Dr Michael Millane (European Union) was appointed as Rapporteur.

4. ACOM Report from ICES on Salmon Stocks in the Commission Area

4.1 The representative of ICES, Mr Gérald Chaput, presented a report on the scientific advice on salmon stocks in the West Greenland Commission area, CNL(17)8. His presentation to the Commission is available as document WGC(17)7. The ICES Advisory Committee (ACOM) report, which contains the scientific advice relevant to all Commissions, is included on page 285 of this document. The Chairman and the representatives of the Parties and NGOs thanked the representative of ICES for the presentation. The Chairman noted that the representative of Denmark (in respect of the Faroe Islands and Greenland) had outlined a report on the 2016 fishery at the Inter-Sessional Meeting of the Commission. As such, the Parties agreed that it was not necessary to repeat this presentation at the current meeting.

4.2 The representative of the United States asked if there are methods, in addition to or instead of the phone surveys, that might produce more reliably robust catch information. The representative of ICES indicated that no such formal discussions have taken place. Phone surveys are more widely used in fisheries where there is information on the pool of participants. In the absence of a known pool of participants, it is a difficult and challenging issue to adequately resolve. Alternative approaches have been discussed previously, for example, the use of internet-based applications to gather catch data. Direct engagement with communities may also be useful given that locals may know who goes fishing and how much they catch in the absence of other reporting mechanisms.

4.3 The representative of the NGOs noted that the unknown level of unreported catches in the Greenland salmon fishery is concerning as a significant proportion of the population in Greenland may be involved in salmon fishing. For example, if 1% of the population caught an average of 50 kg of salmon, such landings could comprise *c*. 25 tonnes per year. While recognising that it is a difficult challenge to accurately establish such catches with the disparate character of communities in Greenland, he asked the representative of ICES if he considered the accounted unreported catch estimates as accurate. The representative of ICES suggested that the representative of Denmark (in respect of the Faroe Islands and Greenland) may be best placed to answer that question. The representative of Denmark (in respect of the Faroe Islands and Greenland) acknowledged the uncertainties that exist as the pool of participants is unknown. He suggested that unreported catches may be low as salmon is perceived to be a delicacy and to some extent, it may be a relatively small fishery in comparison to inshore fisheries for Greenland halibut, cod and red fish. The Parties discussed the possibility of considering other forms of reporting to improve compliance and data, such as reporting by community, and discussed the possible pros and cons of such an approach.

4.4 The representative of the NGOs highlighted the issue, previously raised at the Inter-Sessional Meeting, that there is a paucity of catch information available from non-licensed private fishermen in order to quantify their contribution to the catch figures. He asked the representative of Denmark (in respect of the Faroe Islands and Greenland) whether a statistically-informed random sampling approach of the Greenlandic population could be considered to better address this knowledge deficit. For example, this could involve sending out questionnaires with a question such as 'Are you a private salmon fisher, and if so, what did you catch?'.

4.5 The representative of Denmark (in respect of the Faroe Islands and Greenland) thanked the representative of the NGOs for this worthwhile suggestion. He considered that direct engagement with communities, as alluded to by the representative of ICES, may provide the most reliable source to quantify unreported catch by private fishermen.

5. Report of the Inter-Sessional Meeting of the Commission to review the Multi-Annual Regulatory Measure for Fishing for Salmon at West Greenland for 2015, 2016 and 2017, WGC(15)21

5.1 The Chairman introduced the report of the 2017 Inter-Sessional Meeting of the West Greenland Commission, (WGCIS(17)14) (Annex 3). He presented a brief summary of the information and issues considered at that meeting.

6. Mixed-Stock Fisheries conducted by Members of the Commission

6.1 Under the Council's '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 was agreed that there should be agenda items in each of the Commissions to allow for a focus on mixed-stock fisheries (MSFs).

6.2 The European Union, NEA(17)7 (Annex 4), and Canada, NAC(17)3 (Annex 5), tabled papers providing a description of any MSFs still operating, the most recent catch data, any updates to the Implementation Plans (IPs) relating to MSFs and any changes or developments in the management of MSFs in the IP period to implement NASCO's agreements.

6.3 The representative of the NGOs noted that there should be fairness in the focus and pressure placed on all mixed-stock fisheries, not just the fishery at West Greenland, particularly given MSFs still operate in other jurisdictions. In particular, he urged the European Union to influence constituent countries with MSFs to close them.

6.4 The representative of the European Union thanked the representative of the NGOs for their comments and emphasised that tremendous efforts have been made over many years by EU Member States to address a wide range of ecological and environmental issues in view of ensuring very high environmental standards across the EU. This notably includes the implementation of the EU Water Framework Directive and the Habitats Directive where the achievements and progress made to date are significant and have direct and indirect positive effects on Atlantic salmon conservation. Although many challenges remain, the outlook is positive with a commitment to continual improvement.

7. Regulatory Measures

7.1 At its Thirty-Second Annual Meeting, the Commission adopted a Multi-Annual Regulatory Measure for Fishing for Salmon at West Greenland for 2015, 2016 and 2017, WGC(15)21. This measure had applied to the 2015 fishery, and, subject to the result of running the Framework of Indicators (FWI), would also apply to the 2016 and 2017 fisheries at West Greenland. The Commission had agreed that the procedure for applying the FWI that was used previously should continue under the new Regulatory Measure. The Report on the Use of the Framework of Indicators in 2017, WGC(17)3, was presented by the Group's Chairman, Mr Gérald Chaput (Canada). The Group had concluded that 'the FWI does not show that there has been a significant change in the indicators used, and therefore a re-assessment of the ICES management advice for the 2017 fishery is not required'.

7.2 The Chairman noted that the Multi-Annual Regulatory Measure adopted in 2015 would continue to apply to the 2017 fishery.

7.3 The NGOs requested information on how Greenland planned to manage its salmon fishery in 2017. The representative of Denmark (in respect of the Faroe Islands and Greenland) responded that they would implement the measure WGC(15)21 in 2017 and committed that the following would also apply:

- the quota for the 2017 fishery will be set at 45 tonnes;
- there will be no factory landings;
- the season will remain the same as 2016;
- the awareness campaign on reporting catches will continue; and
- validation of catches through phone surveys will continue.

8. Sampling in the West Greenland Fishery

8.1 The West Greenland Fishery Sampling Programme provides valuable biological data to the stock assessments conducted by ICES that inform science-based management decisions for this fishery. The Parties to the West Greenland Commission have worked co-operatively over the past three decades to collect these biological data.

8.2 The representative of the United States appreciated the continuance of the sampling programme, noting the contributions made by the European Union, Canada, USA and Greenland. He noted that it was a co-operative effort providing guidance for regulatory decisions in the coming years. Of particular note, was that Canada has agreed to conduct the analyses of tissue samples for Atlantic salmon.

8.3 The representative of the United States sought clarification from the representative of Denmark (in respect of the Faroe Islands and Greenland) that external staff inputs are available from the Government of Greenland, in co-operation with the Greenland Institute of Natural Resources, to undertake the sampling of fish in Nuuk as stated in the Draft West Greenland Fishery Sampling Agreement for 2017, WGC(17)4. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that he was aware of issues in this regard and committed to follow-up on them. The representative of the United States thanked the representative of Denmark (in respect of the Faroe Islands and Greenland) for this commitment. The representative of the United States noted that it has been suggested that the Greenland Institute of Natural Resources will undertake fish sampling during the season in Nuuk. The representative of Denmark (in respect of the Faroe Islands and Greenland) indicated that he required time to further clarify this matter with the Greenlandic authorities. The representative of the United States responded that they were content to await clarification of this matter by correspondence in the period after the Annual Meeting. The representative of Canada stressed that it was important to note the ICES advice on this matter.

8.4 The representative of the NGOs supported the recommendation that sampling should occur at Nuuk. He indicated that whole season sampling could be very valuable and would not incur significant time resources, and that this could be explored further with the Sampling Co-ordinator. The representative of Denmark (in respect of the Faroe Islands and Greenland) indicated that further consultation with the Greenland Institute of Natural Resources would be necessary and that international samplers may be better placed to do this work.

8.5 The Commission adopted a West Greenland Fishery Sampling Agreement for 2017, WGC(17)8 (Annex 6).

9. Announcement of the Tag Return Incentive Scheme Prize

9.1 The Chairman announced that the winner of the West Greenland Commission £1,000 prize in the NASCO Tag Return Incentive Scheme was Mr Per Nukaaraq Hansen, Nuussuaq, Greenland. The winning tag was applied on 30 April 1973 to a hatchery smolt released below the Mactaquac Dam in the St John River, Canada. It is likely to have been recaptured in 1974 in NAFO division 1B in West Greenland. The Commission offered its congratulations to the winner.

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

10.1 The request for scientific advice from ICES, prepared by the Standing Scientific Committee in relation to the West Greenland Commission area, was agreed by the Council, CNL(17)10 (Annex 7).

11. Other Business

11.1 There was no other business.

12. Date and Place of Next Meeting

12.1 The Chair proposed that an Inter-Sessional Meeting would be required some time in advance of the Annual Meeting of the West Greenland Commission in order to facilitate the consideration of a possible new regulatory measure to be adopted in 2018. An earlier Inter-Sessional Meeting will allow the Parties to have a productive discussion on the regulatory measure and enable the Parties to consider the report of the 2017 Greenland fishery prior to the next regular Commission meeting. The Parties agreed to the proposal. The representative of Denmark (in respect of the Faroe Islands and Greenland) confirmed that the report on the 2017 Greenland salmon fishery would be ready by mid-February 2018 to facilitate a productive meeting. The Commission asked the Secretariat to liaise with the Parties to agree a suitable date and venue.

12.2 The Commission agreed to hold its next Annual Meeting at the same time and place as the Thirty-Fifth Annual Meeting of NASCO.

13. Report of the Meeting

13.1 The Commission agreed a report of its Meeting.

14. Close of the Meeting

14.1 The Chairman thanked the Parties and observers for their contributions and closed the Thirty-Fourth Annual Meeting of the West Greenland Commission.

Note: The annexes mentioned above begin on page 221, following the French translation of the report of the meeting. A list of West Greenland Commission papers is included in Annex 8.

WGC(17)9

Compte-rendu de la trente-quatrième session annuelle de la Commission du Groenland Occidental de l'Organisation pour la conservation du saumon de l'Atlantique Nord

Varbergs Kusthotell, Varberg, Suède

6 - 9 juin 2017

1. Ouverture de la session

1.1 Le Président, M. Carl McLean (Canada), a ouvert la session et accueilli les délégués à Varberg.

1.2 Une déclaration d'ouverture écrite au nom des ONGs présentes à la session annuelle a été distribuée (Annexe 1).

1.3 Une liste des participants aux trente-quatrièmes sessions annuelles du Conseil et des Commissions de l'OCSAN est incluse en page 347 de ce document.

2. Adoption de l'ordre du jour

2.1 La Commission a adopté son ordre du jour, WGC(17)6 (Annexe 2).

3. Nomination d'un rapporteur

3.1 Le Dr Michael Millane (Union européenne) a été nommé rapporteur.

4. Rapport du Comité Consultatif (ACOM) du CIEM sur les stocks de saumons dans la zone de la Commission

4.1 Le représentant du CIEM, M. Gérald Chaput, a présenté un rapport sur les conseils scientifiques sur les stocks de saumon dans la zone de la Commission du Groenland occidental, CNL(17)8. Sa présentation à la Commission est disponible dans le document WGC(17)7. Le rapport du Comité consultatif (ACOM) du CIEM, qui contient les conseils scientifiques relatifs à toutes les Commissions, est inclus en page 285 de ce document. Le Président et les représentants des Parties et des ONGs ont remercié le représentant du CIEM pour la présentation. Le Président a noté que le représentant du Danemark (pour les Iles Féroé et le Groenland) avait présenté un rapport sur la pêcherie de 2016 lors de la réunion d'inter-session de la Commission. Ainsi, les Parties ont convenu qu'il n'était pas nécessaire de répéter cette présentation au cours de la session actuelle.

4.2 Le représentant des Etats-Unis a demandé s'il existait des méthodes hormis les ou au lieu des enquêtes téléphoniques, qui pourraient apporter des informations plus fiables et efficaces sur les prises. Le représentant du CIEM a indiqué qu'aucunes discussions formelles n'avaient eu lieu. Les enquêtes téléphoniques sont plus largement utilisées dans les pêcheries où des informations existent sur les participants des pêcheries. Sans savoir qui sont les participants, ceci est un problème difficile à résoudre de façon adéquate et représente un défi. Des approches alternatives ont été discutées précédemment, par exemple, l'utilisation d'applications internet pour collecter des données sur les prises. Un engagement direct avec les communautés peut aussi s'avérer utile en l'absence d'autres mécanismes de reporting, étant donné qu'il est possible que la population sache qui va pêcher et quelle quantité ils prennent.

4.3 Le représentant des ONGs a noté que le fait que l'on ne connaissait pas le niveau des prises non rapportées dans la pêcherie de saumon du Groenland est préoccupant alors qu'il se peut qu'une part importante de la population du Groenland soit impliquée dans la pêche au saumon. Par exemple si 1% de la population attrapait en moyenne 50 kg de saumon, de tels débarquements pourraient comprendre c. 25 tonnes par an. Il est évident qu'établir de telles prises de façon précise représente un défi difficile compte-tenu du caractère disparate des communautés du Groenland, mais il a demandé au représentant du CIEM s'il considérait que les estimations des prises non rapportées fournies étaient précises. Le représentant du CIEM a suggéré que le représentant du Danemark (pour les Iles Féroé et le Groenland) pourrait être le mieux placé pour répondre à cette question. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a reconnu que des incertitudes existent compte tenu que l'ensemble des participants est inconnu. Il a suggéré que les prises non rapportées peuvent être faibles puisque le saumon est perçu comme un mets fin et dans une certaine mesure, il peut s'agir d'une pêcherie de taille relativement petite par rapport aux pêcheries côtières pour le flétan, le cabillaud et la morue du Groenland. Les Parties ont discuté la possibilité d'envisager d'autres formes de reporting pour améliorer la conformité et les données, telles qu'un reporting par la communauté, et ont discuté des éventuels pour et contre d'une telle approche.

4.4 Le représentant des ONGs a souligné le problème soulevé auparavant lors de la réunion d'inter-session que les informations disponibles sur les prises étaient insuffisantes sur les pêcheurs privés ne disposant pas d'un permis afin de quantifier leur contribution aux chiffres relatifs aux prises. Il a demandé au représentant du Danemark (pour les Iles Féroé et le Groenland) si une approche d'échantillonnage aléatoire informée statistiquement de la population du Groenland pouvait être envisagée pour mieux traiter ce déficit de connaissance. Cela par exemple sous la forme d'un envoi de questionnaires posant une question telle que 'Etes-vous un pêcheur de saumon privé, et si oui, qu'avez-vous pêché?'.

4.5 Le représentant du Danemark (pour les Iles Féroé et le Groenland) a remercié le représentant des ONGs pour cette suggestion intéressante. Il a considéré que l'engagement direct avec les communautés, suggéré par le représentant du CIEM, pourrait apporter la source la plus fiable pour quantifier les prises non déclarées par les pêcheurs privés.

5. Rapport de la réunion d'inter-session de la Commission pour passer en revue la mesure pluri-annuelle pour la pêche au saumon au Groenland occidental pour 2015, 2016 et 2017, WGC(15)21

5.1 Le Président a présenté le rapport de la réunion d'inter-session de 2017 de la Commission du Groenland occidental, (WGCIS(17)14) (Annexe 3). Il a présenté un bref résumé des informations et questions étudiées lors de cette réunion.

6. Pêcheries de stocks mixtes menées par des Membres de la Commission

6.1 Selon le '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, il était convenu qu'il devrait y avoir des points d'ordre du jour dans chacune des Commissions pour permettre de se concentrer sur les pêcheries de stocks mixtes (MSFs).

6.2 L'Union européenne, NEA(17)7 (Annexe 4), et le Canada, NAC(17)3 (Annexe 5), ont présenté des articles fournissant une description de toute MSFs encore en opération, les données les plus récentes relatives aux prises, toutes mises à jour sur les Plans d'application (IPs) relatives aux MSFs et tous changements ou développements dans la gestion des MSFs au cours de la période de l'IP pour mettre en œuvre les accords de l'OCSAN.

6.3 Le représentant des ONGs a noté qu'il devrait y avoir une justice dans l'attention accordée à et la pression qui pèse sur toutes les pêcheries de stocks mixtes, et pas seulement sur la pêcherie du Groenland occidental, en particulier compte tenu que des MSFs fonctionnent encore dans d'autres juridictions. Il a notamment exhorté l'Union européenne à influencer les pays constitutifs disposant de MSFs à les fermer.

6.4 Le représentant de l'Union européenne a remercié le représentant des ONGs pour leurs commentaires et a souligné les efforts considérables effectués pendant de nombreuses années par les Etats membres de l'UE pour traiter tout un ensemble de problèmes écologiques et environnementaux pour s'assurer que les normes environnementales restent strictes dans l'ensemble de l'UE. Ceci inclut notamment la mise en œuvre de la Directive Cadre sur l'eau de l'UE et la Directive 'Habitats' où les réalisations et le progrès accomplis à ce jour sont significatifs et produisent des effets positifs directs et indirects sur la conservation du saumon atlantique. De nombreux défis subsistent, mais la perspective est positive et un engagement pour poursuivre l'amélioration existe.

7. Mesures de réglementation

7.1 Lors de sa trente-deuxième session annuelle, la Commission a adopté une mesure de réglementation pluri-annuelle pour la pêche au saumon au Groenland occidental pour 2015, 2016 et 2017, WGC(15)21. Cette mesure avait été en vigueur pour la pêcherie de 2015 et, sous réserve du résultat de l'application du Cadre d'Indicateurs (FWI), serait aussi appliquée aux pêcheries de 2016 et 2017 au Groenland occidental. La Commission avait accepté que la procédure d'application du FWI utilisée auparavant devrait se poursuivre en vertu de la nouvelle mesure de réglementation. Le Rapport sur l'utilisation du Cadre d'indicateurs en 2017, WGC(17)3, a été présenté par le Président du Groupe, M. Gérald Chaput (Canada). Le Groupe avait conclu que 'le FWI ne montre pas de changement significatif des indicateurs utilisés et, donc, qu'une réévaluation des conseils de gestion du CIEM pour la pêcherie de 2017 n'est pas nécessaire'.

7.2 Le Président a noté que la mesure de règlementation pluri-annuelle adoptée en 2015 resterait en vigueur dans la pêcherie de 2017.

7.3 Les ONGs ont demandé des informations sur la façon dont le Groenland comptait gérer sa pêcherie de saumon en 2017. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a répondu qu'ils mettraient en œuvre la mesure WGC(15)21 en 2017 et s'est engagé à ce que les choses suivantes soient aussi appliquées :

- Le quota pour la pêcherie de 2017 sera fixé à 45 tonnes ;
- Aucuns débarquements d'usine n'auront lieu ;
- La saison restera la même qu'en 2016 ;
- La campagne de sensibilisation sur le reporting des prises se poursuivra; et
- La validation des prises à travers des enquêtes téléphoniques continuera.

8. Echantillonnage dans la pêcherie du Groenland occidental

8.1 Le Programme d'échantillonnage de la pêcherie du Groenland occidental fournit des données biologiques importantes pour les évaluations de stocks menées par le CIEM qui informent les décisions de gestion fondées sur la science pour cette pêcherie. Les Parties membres de la Commission du Groenland occidental ont coopéré au cours des trente dernières années pour rassembler ces données biologiques.

8.2 Le représentant des Etats-Unis a apprécié la poursuite du programme d'échantillonnage, notant les contributions effectuées par l'Union européenne, le Canada, les Etats-Unis et le Groenland. Il a noté qu'un effort coopératif apportait des directions pour les décisions règlementaires dans l'année à venir. Il a noté en particulier que le Canada avait convenu de mener des analyses d'échantillons de tissus pour le saumon atlantique.

8.3 Le représentant des Etats-Unis a demandé des clarifications auprès du représentant du Danemark (pour les Iles Féroé et le Groenland) que des apports hors personnel soient disponibles auprès du Gouvernement du Groenland, en coopération avec l'Institut des ressources naturelles du Groenland, pour effectuer l'échantillonnage du poisson à Nuuk tel que cela a été déclaré dans le projet d'Accord d'échantillonnage de la pêcherie du Groenland occidental pour 2017, WGC(17)4. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a noté qu'il était conscient des problèmes à ce sujet et s'est engagé à les suivre. Le représentant des Etats-Unis a remercié le représentant du Danemark (pour les Iles Féroé et le Groenland) pour cet engagement. Le représentant des Etats-Unis a noté qu'une suggestion avait été faite que l'Institut des ressources naturelles du Groenland se chargera d'un échantillonnage de poisson pendant la saison à Nuuk. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a indiqué qu'il avait besoin de temps pour mieux clarifier cette question avec les autorités du Groenland. Le représentant des Etats-Unis a répondu qu'ils étaient prêts à attendre qu'une clarification sur cette question leur soit communiquée par correspondance durant la période qui suit la session annuelle. La représentante du Canada a souligné qu'il était important de prendre note du conseil du CIEM sur cette question.

8.4 Le représentant des ONGs a soutenu l'idée que l'échantillonnage devrait avoir lieu à Nuuk. Il a indiqué qu'un échantillonnage pour toute la saison serait très utile et n'entraînerait pas de ressources en temps considérables, et que ceci pourrait être discuté plus avant avec le Coordinateur de l'échantillonnage. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a indiqué qu'une consultation ultérieure avec L'Institut des ressources naturelles du Groenland serait nécessaire et que les échantillonneurs internationaux pourraient être les mieux placés pour effectuer ce travail.

8.5 La Commission a adopté un Accord d'échantillonnage de la pêcherie du Groenland occidental pour 2017, WGC(17)8 (Annexe 6).

9. Annonce du gagnant du prix du Programme incitatif au renvoi des étiquettes

9.1 Le Président a annoncé que le gagnant du prix de £1,000 du Programme incitatif au renvoi des étiquettes de l'OCSAN était M. Per Nukaaraq Hansen, Nuussuaq, Groenland. L'étiquette gagnante avait été appliquée le 30 Avril 1973 sur un saumoneau d'élevage relâché sous le barrage de Mactaquac sur le fleuve St John au Canada. Il est probable qu'il a été recapturé en 1974 dans la division 1B de l'OPANO au Groenland occidental. La Commission a présenté ses félicitations au gagnant.

10. Recommandations au Conseil concernant la demande de conseils scientifiques auprès du CIEM

10.1 La demande de conseils scientifiques auprès du CIEM, préparée par le Comité scientifique permanent concernant la zone de de Commission du Groenland occidental, a été acceptée par le Conseil, CNL(17)10 (Annexe 7).

11. Divers

11.1 Aucun autre question n'a été soulevée.

12. Date et lieu de la prochaine session

12.1 Le Président a proposé qu'une réunion d'inter-session serait requise quelque temps avant la session annuelle de la Commission du Groenland occidental afin de faciliter l'étude d'une nouvelle mesure règlementaire éventuelle qui serait adoptée en 2018. Une réunion inter-sessionelle préalable permettra aux Parties d'avoir une discussion productive sur la mesure règlementaire et permettre aux Parties d'étudier le rapport sur la pêcherie du Groenland de 2017 avant la prochaine session régulière de la Commission. Les Parties ont accepté la proposition. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a confirmé que le rapport sur la pêcherie de saumon du Groenland de 2017 serait prêt d'ici à la mi-février 2018 pour faciliter une réunion productive. La Commission a demandé au Secrétariat de se mettre en liaison avec les Parties pour convenir d'une date et d'un lieu adéquats.

12.2 La Commission a convenu de tenir sa prochaine session annuelle à la même période et lieu que la trente-cinquième session annuelle de l'OCSAN.

13. Compte rendu de la session

13.1 La Commission a accepté un compte rendu de la session.

14. Clôture de la session

14.1 Le Président a remercié les Parties et observateurs pour leurs contributions et a clôturé la trente-quatrième session annuelle de la Commission du Groenland occidental.

Note : Les annexes mentionnées ci-dessus commencent en page 221. Une liste des articles de la Commission du Groenland occidental est incluse en Annexe 8.

Annex 1

Opening Statement submitted by NASCO's accredited Non-Government Organisations to the West Greenland Commission

The International Council for the Exploration of the Sea (ICES) indicates that there is no surplus of large North American salmon and advises NASCO that no fisheries should be operating on mixed stocks. Greenland's fishery is entirely mixed-stock and cannot differentiate between the harvest of salmon from healthy populations and those from endangered populations located in their southern range in North America and Europe.

The NGOs do recognise that Greenland decided to cap its salmon fishery (factory and subsistence) at 45 tonnes for 2015, 2016 and 2017, despite strong opposition within Greenland and this was not an easy decision. However, the hard truth is that this fishery harvests salmon that are needed to seed North American and European rivers.

The NGOS are aware that Greenland plans to allow a fishery in 2017 of 45 tonnes, a large increase from the 27 tonnes reported caught in 2016 and that the fishery will commence August 15 and no factory landings will be allowed. Eliminating the factory landings and having a delayed season are supported by the NGOs however the magnitude of the proposed fishery is of concern. There is certainly no scientific rationale for any fishery at Greenland, however the NGOs could accept a subsistence fishery of no more than 20t.

The NGOs commend Greenland for the advances that they are making in catch reporting and in managing catches. We are following the development of Greenland's monitoring and control procedures with interest, and feel that its goals are worthy of emulation by other Parties as well. The NGOS are however concerned with the lack of progress in the licensing of the private fishermen. Although there were approximately 70 private fishermen reporting a catch of about 8 tonnes or 111 kg on average per fisherman in 2016, there have been suggestions from Greenland that there are many more private fishermen that are not reporting their catch. Until the total numbers of private fishermen and their catch is known, NGOs will continue to have little faith in the estimates of catch provided by Greenland.

Annex 2

WGC(17)6

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. ACOM Report from ICES on Salmon Stocks in the Commission Area
5. Report of the Inter-Sessional Meeting of the Commission to review the Multi-Annual Regulatory Measure for Fishing for Salmon at West Greenland for 2015, 2016 and 2017, WGC(15)21
6. Mixed-Stock Fisheries conducted by Members of the Commission
7. Regulatory Measures
8. Sampling in the West Greenland Fishery
9. Announcement of the Tag Return Incentive Scheme Prize
10. Recommendations to the Council on the Request to ICES for Scientific Advice
11. Other Business
12. Date and Place of Next Meeting
13. Report of the Meeting
14. Close of the Meeting

Annex 3

WGCIS(17)14

Report of the Inter-Sessional Meeting of the West Greenland Commission of the North Atlantic Salmon Conservation Organization

Varbergs Kusthotell, Varberg, Sweden

4 June 2017

1. Opening of the Meeting

1.1 The Chairman of the West Greenland Commission, Mr Carl McLean (Canada), opened the meeting and welcomed participants to Varberg. He referred to extreme events, particularly in the high Arctic, where climate change effects are most noticeable. He referred to the importance of food security issues facing indigenous peoples and the importance of both aquatic and terrestrial resources including salmon. He noted that the Commission's work would involve: reviewing events in the fishery at Greenland in 2016, for which a quota of 32 tonnes was set following exceedance of the agreed 45 tonne quota in 2015; reviewing progress in implementing monitoring and control measures in the salmon fishery at Greenland; reviewing the results of the self-assessments using the six tenets for effective management of an Atlantic salmon fishery; and considering other elements of the regulatory measure. He commended Greenland for its efforts since the 2016 Annual Meeting and for the transparent way in which the Commission has been kept advised. He noted that the Commission's work takes place against a background of continuing low abundance of salmon stocks, but he anticipated that the excellent spirit of co-operation that characterises the work of the West Greenland Commission would stand the Commission in good stead and enable it to build upon the progress that has been made over the last two years.

1.2 A written Opening Statement was tabled by the United States (Annex 1).

1.3 A list of participants is attached as Annex 2.

2. Adoption of the Agenda

2.1 The Commission adopted its Agenda, WGCIS(17)13 (Annex 3).

3. Nomination of a Rapporteur

3.1 Dr Michael Millane (European Union) was appointed Rapporteur for the meeting.

4. Review of the Multi-Annual Regulatory Measure for Fishing for Salmon at West Greenland for 2015, 2016 and 2017, WGC(15)21

In 2015, the Commission adopted a Multi-Annual Regulatory Measure for Fishing for Salmon at West Greenland for 2015, 2016 and 2017, WGC(15)21, (Annex 4). Last year, the Commission had agreed to convene an Inter-sessional Meeting at which it would review implementation of that measure. Details of the proposed management measures for the 2016 fishery were issued to all Members of the Commission on 19 August 2016. The report on the fishery contained in WGCIS(17)7 (Annex 5) was provided to the Secretariat on 6 April 2017.

4.1 Report on the West Greenland Salmon Fishery in 2016 *(sub-paragraphs 1 and 2 of WGC(15)21*)

4.1.1 The representative of Denmark (in respect of the Faroe Islands and Greenland) provided a brief overview of the Greenland salmon fishery in 2016. He indicated that the management measures implemented before the 2015 fishery had continued in the 2016 fishery. Following overfishing in 2015, the quota was set at 32 tonnes for the 2016 fishery. The quota uptake, based on received reports, was approximately 27 tonnes, which represented around half of the reported landings in 2015. The Executive Order setting a shorter fishing season continued and, as in 2015, the 2016 salmon fishery ran from 15 August - 31 October. Factory landings were not permitted in the 2016 salmon fishery. This likely represented an important element in the reduction in fishery catches. The export ban remained in force.

4.1.2 The respective representatives of each Party thanked and acknowledged Greenland for their efforts in managing the 2016 salmon fishery. The representative of the United States noted with pleasure that the quota was not exceeded and that additional steps had been taken to better control and monitor the fishery. The representative of the European Union was encouraged by the reduction in the fishing season and offered assistance to Greenland to address areas where there may be difficulties in enforcing regulatory measures. The representative of Canada was encouraged that there were no factory landings in 2016 and indicated that she looked forward to hearing about Greenland's plans for the coming year.

4.1.3 The Chairman informed the Commission that following distribution of document WGCIS(17)7, a short list of questions from the Parties had been sent to Denmark (in respect of the Faroe Islands and Greenland). These questions (in italics) and the responses provided are shown below:

Canada

1. *Why has the measure related to failure to provide a catch report (even when zero) not been implemented? Any additional information on this and plans for implementation in future years would be appreciated.*

4.1.4 The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that the management and regulatory issues raised must be perceived from a political and cultural perspective, further noting that the salmon fishery is an intrinsic part of life in Greenland for coastal communities and a relatively small component of all inshore fisheries that occur there. Therefore, the focus of the authorities is to place high importance on ensuring that inshore fishermen are reasonably facilitated and not subject to strict consequences for the non-reporting of catches. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that work is underway to revise relevant fisheries legislation in order to introduce a more efficient licensing process for fishermen. This has notably included a proposal to decentralise the licensing process from central government to the respective municipalities if related legal and administrative complexities can be adequately addressed. At the present time, parts of the licensing system have already been introduced and implementation is ongoing. However, no set timeframe is currently in place for the full introduction and implementation of this new licensing system. In addition, corrections during the implementation process may be expected as well as legal adjustments. It was noted that although the municipalities would administer the proposed new licensing system, licences would still be issued by the central authority. It is intended that licence applications made through the new system will be validated to ensure that licence criteria set out in the relevant legislation are fulfilled. It was suggested that the proposed changes to the licensing process may reduce the work currently undertaken to validate catches and could negate the necessity for the phone surveys as the new system could have the potential to more readily record catch information.

4.1.5 The representative of the NGOs asked for clarification as to why issuing of licences by the municipalities would negate the need for phone surveys. The representative of Denmark (in respect of the Faroe Islands and Greenland) responded that if there was a regulation that failure to report catches would result in no licence being issued for the following year, there would be no need for a phone survey. He indicated that the transfer of licensing to the municipalities was to provide better service to fishers.

4.1.6 The representative of the United States commended Greenland's efforts to work on catch accountability and acknowledged the wider challenges faced in this regard for many fisheries. He reiterated the importance of providing incentives such as the denial of licence renewals for the non-reporting of catches, the ultimate aim of which is to better manage and conserve the fishery resource.

2. *The report indicates that efforts to ensure proper reporting from open air markets continued. A bit more information on the successes and challenges of this effort would be helpful.*

4.1.7 The representative of Denmark (in respect of the Faroe Islands and Greenland) indicated that significant efforts of GFLK to inform municipalities, market administrators and fishermen of their reporting obligations have continued in 2016. This has resulted in an increase in the reporting of catches. However, there have been instances where the same catch has been concurrently reported from different sources (fishermen, open-air markets and municipalities) and this has required further validation to ensure that catch figures are correct.

United States

The United States appreciates the efforts undertaken again this year by Greenland to better monitor and control its Atlantic salmon fishery. We are encouraged that reported landings (27 mt) were below the 32 mt quota established for the 2016 fishery. We also note that landings to factories were not allowed in 2016, which we view as a positive step. With regard to the fishery, we have the following questions:

1. *Greenland notes in its report that it continues to seek improvements to the catch reporting process. Can Greenland provide additional information on the approaches it has implemented and is considering implementing to improve reporting? As part of your response, we would appreciate additional information on the current status of, and considerations regarding, implementation of a provision stating that failure to submit catch*

reports, including for zero catches, will result in no license being issued in the following year(s).

4.1.8 The representative of Denmark (in respect of the Faroe Islands and Greenland) addressed this question in his response to question 1 raised by Canada. In addition, he indicated that information collated by the new licensing system could facilitate the non-renewal of licences in the case of non-reporting if this regulation was ever adopted.

4.1.9 The representative of Denmark (in respect of the Faroe Islands and Greenland) responded that the principal focus is on resolving administrative and legal issues with the development of the new licensing process, as well as on efforts to communicate the reporting requirements to the fishing community. He reiterated that substantial efforts have been made in implementing the existing regulatory measures adopted. He confirmed that there has been no licence renewals denied to date due to a failure to report catches.

2. *It is not clear from the report if a phone survey was conducted again this year. As such, we would appreciate any information on how Greenland has confirmed that the reporting provided represents full reporting and accounting of harvest.*

4.1.10 The representative of Denmark (in respect of the Faroe Islands and Greenland) confirmed that a phone survey was undertaken in 2016 to validate catches. The representative of the United States noted that ICES recommended that a more standardised approach to the validation of catches through the phone survey should be implemented to better ensure scientifically robust reporting and offer to support and assist Greenland in this regard was extended by the United States.

3. *When does Greenland expect the licensing of private fishermen to begin? If the task of issuing licenses to private fishermen is delegated to municipalities as indicated in the report, what structural arrangement will be implemented to allow the Government of Greenland to know how many such licenses are issued each year and ensure catch reports from these licensed private fishermen are provided as required?*

4.1.11 The representative of Denmark (in respect of the Faroe Islands and Greenland) highlighted the difficulties in systemically licensing private fishermen. Such fishing is typically small-scale, commonplace throughout communities in Greenland with a high proportion of the population potentially involved. Therefore, it is not easy to clearly define the pool of participants in the West Greenland fishery. He noted that it is more practical to focus efforts on how to reduce the overall catch, for example through the cessation of factory landings. It was further noted that the significant reduction in total catch in 2016 from 2015 may, in part, be a result of a shift in focus to other fish species, notably cod and Greenland halibut, particularly in the northern parts of the country. The representative of Denmark (in respect of the Faroe Islands and Greenland) considered that this changing trend may further reduce fishing pressure on salmon stocks over the short to medium term and is likely dependent on continuation of the recent increase in the cod inshore fishery and increased market price for Greenland halibut.

4.1.12 The representative of the United States and the representative of the NGOs highlighted the importance of accurately establishing the pool of participants involved in the private non-licensed fishery in order to generate more reliable catch information. In addition, the representative of the United States noted that information provided on awareness initiatives and the effectiveness and prevalence of enforcement measures are essential to effectively monitor and manage the salmon fishery in Greenland and achieve full catch accountability. It was further noted that these are important components to consider for the six tenets assessment. In response, the representative of Denmark (in respect of the Faroe Islands and Greenland) reiterated the challenges faced regarding reporting of catches by this group of fishermen where consideration must be given to the cultural context the fishery operates in. He also noted that some considerations were being given in Greenland to developing an internet application to assist with reporting. However, he stressed that, although desirable, there are logistical and technical difficulties in reporting catches using such an approach, including where internet access is often limited, prohibitively expensive or non-existent, particularly in isolated communities.

4.1.13 The representative of the European Union observed that when comparing the number of reports submitted for the 2015 and 2016 fishing seasons there was a reduction in the total number from approx. 1100 to 500 which seemed consistent with the reduction of the total catch. However, the number of reports from unlicensed fisherman remained stable at around 200. The representative of the European Union asked whether the representative of Denmark (in respect of the Faroe Islands and Greenland) had any information about how volatile this particular component of the pool of participants could be. The representative of Denmark (in respect of the Faroe Islands and Greenland) indicated that it was possible to check this but at this stage the information was not available.

4.1.14 The representative of the NGOs noted that landings by non-licensed private fishermen may make up a significant proportion of the total catch in Greenland with catches in the region of 8 tonnes per year. He enquired as to whether hunters are licensed in Greenland and, if so, why private salmon fishermen are not licensed. The representative of Denmark (in respect of the Faroe Islands and Greenland) confirmed that hunting for muskox and reindeer is licensed in Greenland. However, this is administered by a different government division and is not applicable to salmon.

4.1.15 The representative of Denmark (in respect of the Faroe Islands and Greenland) indicated that it was very likely that the two-hundred fishermen who respectively registered catches in 2015 and 2016 were from the same pool of participants. However, this would have to be confirmed with reference to the relevant database.

4.1.16 The representative of the European Union asked the representative of Denmark (in respect of the Faroe Islands and Greenland) whether any progress was achieved in relation to one of the provisions of WGC(20)15 which is embedded in the current regulatory measure for the Atlantic salmon fishery in Greenland, according to which the Ministry of Fisheries, Hunting and Agriculture would "evaluate and report on the costs and benefits of conducting a pilot carcass tagging project". The representative of the European Union also indicated that it remained available for offering expertise and assistance on this issue. The representative of Denmark (in respect of the Faroe Islands and Greenland) indicated that they would further examine this provision.

4.2 Progress in Implementing the Updated Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland *(sub-paragraph 5 of WGC(15)21*)

4.2.1 Further to the relevant items reported under Section 4.1, the representative of Denmark (in respect of the Faroe Islands and Greenland) stated that the 2017 fishery will maintain the existing measures that are implemented, notably:

- the quota for the 2017 fishery will be set at 45 tonnes;
- there will be no factory landings;
- the season will remain the same as 2016;
- the awareness campaign on reporting catches will continue;
- validation of catches through phone surveys will continue.

4.2.2 The representative of Denmark (in respect of the Faroe Islands and Greenland) indicated that no deliberations have taken place as to whether the methodology for the phone survey will be made more standardised as recommended by ICES.

4.2.3 The representative of Denmark (in respect of the Faroe Islands and Greenland) thanked the representative of Canada for offering assistance if required for the awareness campaign to improve catch reporting and will consider this offer further when he returns to Greenland. In addition, he expressed a willingness to consider the ICES recommendation.

4.2.4 In response to the representative of Canada, the representative of Denmark (in respect of the Faroe Islands and Greenland) confirmed that there have been no discussions on limiting catches below the unilateral quota of 45 tonnes. Greenlandic authorities are focused on complying with the current three-year regulatory measure as agreed by the Parties.

4.3 Review of the Self-assessments using the Six Tenets for Effective Management of an Atlantic Salmon Fishery *(sub-paragraph 6 of WGC(15)21)*

4.3.1 The *Ad Hoc* Working Group on Monitoring and Control, which met in Nuuk, Greenland in October 2014, had developed a matrix for applying the six tenets for effective management of an Atlantic salmon fishery and used this to evaluate the monitoring and control of the salmon fishery at West Greenland. This evaluation resulted in the agreement of enhancements in the form of the Updated Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGC(15)20. The Working Group had recommended that the six tenets be applied by all Members of the West Greenland Commission and had recognised that the evaluation of these fisheries should be consistent with that undertaken for the salmon fishery at West Greenland. At its Thirty-Second Annual Meeting, the West Greenland Commission agreed Terms of Reference for an *Ad hoc* Working Group on the Application of the Six Tenets for Effective Management of an Atlantic Salmon Fishery, WGC(15)23.

4.3.2 The Working Group had developed a revised matrix but 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. The Working Group had, therefore, recommended that self-assessments be undertaken using the revised matrix, and proposed that it would be more consistent with the review of the Greenland salmon fishery if these self-assessments were then subject to review. At its 2016 Inter-sessional Meeting, the Commission had agreed the revised matrix for the application of the six tenets for effective management of an Atlantic salmon fishery, WGCST(16)16. It was agreed that self-assessments should be conducted by each Party/jurisdiction of the West Greenland Commission (excluding Finland and Sweden).

4.3.3 Self-assessments have been submitted by Canada, European Union (Denmark, France, Germany, Ireland, Spain and UK) and the United States. The Commission had noted that as the application of the six tenets is part of the Regulatory Measure, it would be appropriate to review the self-assessments as part of that process during the 2017 Inter-sessional Meeting. In preparation for this, as agreed by the Commission, the self-assessments were issued to members of the Commission and the NGOs as documents WGCIS(17)3, WGCIS(17)4, WGCIS(17)5 and WGCIS(17)8. Questions on the self-assessments were provided to the Secretariat and issued to Parties/jurisdictions and NGOs as documents WGCIS(17)6rev and WGCIS(17)10. The responses to these questions are contained in document WGCIS(17)11rev.

4.3.4 The representative of the NGOs highlighted that Canada had not undertaken the assessment on a provincial basis, although acknowledged that Canada had provided a rationale for not doing so. The NGOs considered that reporting by province would increase transparency, notably in cases where the assignment of a single score may not be common and appropriate to each province within a particular category. In response the representative of Canada noted that there were difficulties in conducting assessments by individual province but committed to examine whether amendments can be made to better address this. The representative of the NGOs indicated that he considered that the challenge would be greater if the assessments were combined.

4.3.5 The representative of the European Union provided an update on the recently highlighted enforcement discrepancy in the Irish fisheries protection legislation which was first noted on 9 February 2017. He stated that significant progress has been made to address this since that time. The Irish Government has prioritised the relevant amendments to the legislation which has now successfully passed all five stages in the lower House of Parliament. The upper House of Parliament is scheduled to debate the legislation on 20 and 27 June 2017. Thereafter it is intended to have it signed into law by the President of Ireland. As there exists a six month time period to initiate prosecutions for breaches of fisheries law after an offence has been committed, it is intended that there will be no period when offences will be committed with impunity.

4.3.6 The representative of the European Union noted that the 6 tenets process had been useful but at the same time it was challenging to complete the report. He indicated it would be more helpful to have more measurable parameters and asked if it would be possible to integrate the process into the next cycle of Implementation Plans. The representative of Canada agreed with the European Union. The need to find a way to streamline the process was recognised and it was suggested that the process should apply to all NASCO Parties.

4.3.7 The representative of the United States found the process to be informative but felt that the grades given (red, green, amber) by a Party to itself were not assigned consistently across all Parties. The NASCO Secretary suggested that a possible option for looking at ways to improve/streamline the process would be through the Implementation Plan Review Group who will be making a report this year. The representative of the United States agreed that this could be useful but indicated that the United States will persist in considering the six tenets when reviewing the success of the Regulatory Measure and the West Greenland fishery. The representative of the European Union indicated that WGC(15)20 which is embedded in WGC(15)21 includes all the elements of the six tenets. The representative of the NGOs indicated there is still more work to be done by all jurisdictions on catch accountability and we cannot lose sight of that fact. The WGC should ensure that the six tenets continue to be taken into account when considering implementation of the 2015-2017 regulatory measure at its next Inter-sessional Meeting by including a reference to the tenets in that agenda item.

4.4 **Other Elements of the Regulatory Measure *(sub-paragraphs 4 and 8 of WGC(15)21*)**

4.4.1 Sub-paragraph 4 of the Multi-Annual Regulatory Measure states that efforts will be made to identify and implement temporal or spatial harvest restrictions that would provide increased protection for weaker stocks taking into account information provided by ICES. In 2016, the representative of ICES indicated that the analyses presented in the ACOM advice, CNL(16)9, did not provide clear evidence of temporal and/or spatial management options for the fishery at West Greenland that would provide increased protection for weaker stocks. Although sample sizes may not be optimal, the best available information suggested that the contributing North American and European stocks mix along the coast of West Greenland and across the fishing season. The contributions to the harvest by the regional stock groupings closely mirrors the modeled estimates of MSW stock abundance, further supporting the suggestion that the stocks are well mixed within the fished complex. Although some weak relationships were identified (e.g. a higher contribution of North American river-age 1 fish in week 31, a greater number of European river-age 1 fish in the north), these relationships were preliminary and further analysis of these data, increased genetic sampling of the fishery, and further refinement in the genetic baselines used for regional assignments may be needed to investigate these patterns further.

4.4.2 The representative of ICES indicated that no further spatial or temporal analyses of the salmon stocks at West Greenland have been conducted to ascertain whether these factors may protect vulnerable stocks present there. In 2016, ICES conducted an assessment of the consequences for harvest levels and exploitation rates of delaying the opening of the season in Greenland to 15 September. This assessment indicated that there would be a reduction in the exploitation rate of all contributing stocks, including vulnerable stocks, with a reduction in the number of fish harvested per tonne. However, the tonnage landed would not significantly change as larger fish would be present in the catch later in the season. The results of this assessment were reported to NASCO by ICES in the 2016 ACOM advice. The representative of Denmark (in respect of the Faroe Islands and Greenland) acknowledged this and indicated that no consideration has been given at present to further delaying the commencement of the fishing season beyond 15 August.

5. Other Business

5.1 There was no other business.

6. Report of the Meeting

6.1 The Commission agreed a report of the Inter-sessional Meeting.

7. Close of the Meeting

7.1 The Chairman thanked the participants for their contributions to the Inter-sessional Meeting and closed the meeting.

Annex 1 of WGCIS(17)14

Opening Statement by the US to the Intersessional Meeting of the West Greenland Commission

Mr. Chairman, Mr. Secretary, Fellow Delegates, Ladies and Gentlemen:

The United States appreciates the opportunity to once again work with our partners during this important intersessional meeting of the West Greenland Commission (WGC) to review progress in implementing the WGC regulatory measure adopted in 2015. The discussions we have today will position us well for the work that the Commission will undertake when it meets this week during the NASCO annual meeting.

We thank Greenland for continuing their efforts to better control and monitor the fishery at West Greenland and for providing information to the WGC that will help to facilitate its work this week. We note that reported catch from West Greenland was below the adjusted autonomous quota of 32 t in 2016. We are pleased to see that the quota was not exceeded and that additional steps have been taken to better control and monitor the fishery in West Greenland. We wish to thank Greenland for its transparency and openness in providing timely updates on the steps it has taken and intends to take to improve monitoring and control of its mixed stock fishery. The information and updates that we have received to date have provided us with a greater appreciation for some of the domestic pressures and workload issues that our Greenlandic colleagues are facing as we work together to improve the conservation of Atlantic salmon.

These intersessional meetings represent an important opportunity to better understand the significant efforts Greenland is investing in improving the monitoring and control of the fishery. Given the scientific advice that there should be no fishery at West Greenland, the status of U.S. origin salmon in particular, and NASCO's agreement on the implementation of the precautionary approach, it is difficult for the United States to support a fishery at West Greenland. We recognize, however, that there is value in continuing the dialogue on this matter. If Greenland intends to pursue a fishery at West Greenland after this regulatory measure expires, we believe it will be important to begin discussions early in 2018. In order to do so effectively, it will be important for us to discuss and agree on an approach before the annual meeting ends this week.

We look forward to the collaborative discussions we will have today and during this week's annual meeting focused on the 2016 fishery and ways to continue to make improvements to the management control and catch accountability in the West Greenland fishery and enhance Atlantic salmon conservation.

List of Participants

Canada

Ms Sylvie Lapointe
Mr Bud Bird
Mr Carl McLean
Ms Kate Johnson
Dr Martha Robertson
Ms Annette Rumbolt
Ms Shelley Denny

Denmark (in respect of the Faroe Islands and Greenland)

Mr Esben Ehlers
Mr John Biilmann

European Union

Dr Stamatis Varsamos
Dr Ciaran Byrne
Mr Håkan Carlstrand
Mr Simon Dryden
Ms Delyth Dyne
Dr Cathal Gallagher
Mr Denis Maher
Mr John McCartney
Dr Michael Millane
Dr Niall Ó Maoiléidigh
Mr Ian Russell
Mr Lawrence Talks

USA

Mr Daniel Morris
Ms Kimberley Blankenbeker
Ms Rebecca Dorsey
Mr Rory Saunders
Mr Tim Sheehan
Ms Julie Williams

IGO

Mr Gèrald Cahaput (ICES)
Mr Mark Saunders (NPAFC)

NGO

Mr Dave Meerburg

Secretariat

Dr Peter Hutchinson

Annex 3 of WGCIS(17)14

WGCIS(17)13

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. Review of the Multi-Annual Regulatory Measure for Fishing for Salmon at West Greenland for 2015, 2016 and 2017, WGC(15)21
   - 4.1 Report on the West Greenland Salmon Fishery in 2016 *(sub-paragraphs 1 and 2 of WGC(15)21)*
   - 4.2 Progress in Implementing the Updated Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland *(sub-paragraph 5 of WGC(15)21)*
   - 4.3 Review of the Self-assessments using the Six Tenets for Effective Management of an Atlantic Salmon Fishery *(sub-paragraph 6 of WGC(15)21)*
   - 4.4 Other Elements of the Regulatory Measure *(sub-paragraphs 4 and 8 of WGC(15)21)*
5. Other Business
6. Report of the Meeting
7. Close of the Meeting

WGC(15)21

Multi-Annual Regulatory Measure for Fishing for Salmon at West Greenland for 2015, 2016 and 2017

RECOGNISING that in exercising its functions the West Greenland Commission shall take into account the factors detailed in Article 9 of the Convention;

NOTING that at its 2006, 2009 and 2012 Annual Meetings, the West Greenland Commission adopted multi-annual regulatory measures that provided for a fishery that was "restricted to that amount used for internal consumption in Greenland, which in the past has been estimated at 20t annually," and applied for three year periods, subject to the result of application of the Framework of Indicators;

FURTHER NOTING that the reported catches in the West Greenland fishery since implementation of the restriction to internal consumption only may provide an indication of the subsistence needs of Greenland;

TAKING INTO ACCOUNT the comprehensive information presented to the inter-sessional meetings of the Commission in 2014 and 2015 concerning the critical status of many of the Multi-Sea-Winter salmon stocks contributing to the West Greenland fishery and the conservation initiatives taken by both Greenland and States of origin;

NOTING that some stocks harvested at West Greenland are endangered and at risk of extinction in some States of origin;

CONSIDERING that ICES has assessed the stocks from the seven regions contributing to the fishery at West Greenland to be below conservation limits and thus suffering reduced reproductive capacity and has advised that there are no catch options for the mixed-stock fishery at West Greenland that would satisfy the NASCO management objectives in 2015, 2016 or 2017;

FURTHER CONSIDERING that an updated Framework of Indicators has been provided by ICES and will be applied in 2016 and 2017 to evaluate if a significant change is signalled by the indicators and, therefore, a reassessment of the ICES advice is warranted;

RECOGNISING the work that Denmark (in respect of the Faroe Islands and Greenland) has done to obtain additional information on fishing effort in the salmon fishery and their commitment to further improve the monitoring, control and catch reporting for the fishery;

COMMITTING to continue to cooperate in the design and implementation of a sampling programme for the salmon fishery at West Greenland;

NOTING that at the 2015 Annual Meeting, Denmark (in respect of the Faroe Islands and Greenland) proposed a total catch limit of 45t to which not all members of the Commission could agree. Nevertheless, Denmark (in respect of the Faroe Islands and Greenland) unilaterally committed to limit the total annual catch for all components of its fishery to take no more than 45t in 2015, 2016 and 2017;

Thus, the Members of the Commission agree as follows:

(1) There will be no export of wild Atlantic salmon or its products from Greenland;

(2) The fishery will open no earlier than 1 August and close no later than 31 October each year;

(3) For the unilateral catch limit to be established by Denmark (in respect of the Faroe Islands and Greenland), any overharvest in a particular year will result in an equal reduction in the catch limit in the following year; there will be no carry forward into a future year of any under-harvest;

(4) Efforts will be made to identify and implement temporal or spatial harvest restrictions that would provide increased protection for weaker stocks taking into account information provided by ICES;

(5) Denmark (in respect of the Faroe Islands and Greenland) will further improve the monitoring, management control and surveillance of its salmon fishery during the period covered by this measure, at a minimum, in accordance with the Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGC(15)20 with the objective of achieving full catch accountability;

(6) All Members of the Commission will implement the six tenets in accordance with WGC(15)23;

(7) Denmark (in respect of the Faroe Islands and Greenland) will inform NASCO and, as appropriate, ICES in a timely manner of any modifications to the management of the West Greenland salmon fishery, of the outcome of the 2015, 2016 and 2017 fisheries and of progress with the implementation and effectiveness of its Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGC(15)20 , for annual review by the Commission;

(8) States of origin will explore opportunities to share experiences with Greenland on monitoring, management control and surveillance in the salmon fishery, including on carcass tagging, through knowledge-sharing exchange programmes;

(9) This regulatory measure will apply to the fishery at West Greenland in 2015. This measure will also apply in 2016 and 2017 unless any Member of the Commission requests review.

WGCIS(17)7

Report on the Greenland Salmon Fishery in 2016

05-04-2017
Sags nr. 2017-2510
Dok. nr. 4867408

Postboks 269
3900 Nuuk
Tlf. (+299) 34 50 00
Fax (+299) 34 63 55
E-mail: apnn@nanoq.gl
www.naalakkersuisut.gl

Members of West Greenland Commission
NASCO

Status on the Salmon fishery in Greenland 2016

According to the Multi-Annual Regulatory Measure for fishing for salmon at West Greenland in 2015, 2016 and 2017 (WGC(15)21) Greenland should report on its fisheries and changes to its management regime to the West Greenland Commission. Hence the Ministry of Fisheries and Hunting is forwarding this status report concerning the fishery in 2016 and the initiatives implemented from the Plan for implementation of monitoring and control measures in the salmon fishery in Greenland (WGCIS(15)5).

The management measures implemented before the 2015 fishery continued in the 2016 fishery.

Following overfishing in 2015, the quota was set at 32 tonnes for the entire fishery in 2016, all segments included.

The Executive Order to include a shorter fishing season still stands. Thus, as in 2015, the fishing season ran from 15 August – 31 October with the exemption that the quota would be exhausted earlier. This wasn't the case and the salmon fishery in Greenland (both East and West) was closed on 31 October. The quota uptake, based on received reports, ended at 27088 kg, of which roughly 95% was taken in West Greenland.

As during the previous regulatory measures the export ban on salmon continued.
A new executive order on catch reporting was in force before the start of the season, which required salmon catches to be reported by count (number of fish) as well as weight. No factory landings were allowed in the fishery in 2016.

Reporting from fishermen

It is compulsory for all salmon fishers to report daily or every time the nets are mended, which they can do directly to The Greenland Fisheries License Control Authority (GFLK) or indirectly through municipalities. GFLK continued the increased focus on the control of the salmon fishery in 2016. The wild life officers and landing officers all brought reporting templates with them to hand out to fishermen during their patrols and landing controls – thus, reminding people to report daily or every time they had mended their nets.

As in 2015 the Ministry and GFLK ran an extensive information campaign, with infomercials in the newspapers, on TV and in the radio up to three times a week during the season reminding people to report and that everyone needs to report – including private fishermen. Furthermore, the Ministry published a report every week stating how much of the quota had been fished and how much was left.

This effort has sustained the relatively high number of reports received. GFLK received approximately 500 catch reports of which around 200 are from private, unlicensed fishermen. The problem of late reporting from one municipality in 2015 was not repeated in 2016.

Status on the implementation of the Multi-Annual Regulatory Measures and the Plan for implementation of monitoring and control measures in the salmon fishery in Greenland.

The measures agreed to during the meetings in the West Greenland Commission in 2015 are very extensive and require great efforts from the Government and the people of Greenland to implement. Thus, the Government of Greenland had put a lot of efforts in implementing as many of the measures and initiatives as possible before the fishery season in 2015 as well as in 2016.

While not all the remaining initiatives and measures were implemented in 2016, the effort to ensure proper reporting was sustained and work on the remaining issues is ongoing, and the Government of Greenland is committed to continue this work.

Below is given a short status/overview of the implementation process.

The Multi-Annual Regulatory Measures entails that Greenland should implement the following measures:

- One quota for all segments of the fishery, which includes professional and private fishermen.
    - ➢ One quota for all fishermen was introduced in 2015 – a quota of 45 tonnes was set. Again in 2016 one quota covering all segments was set.

- Unilateral catch limit, which ensures that any overharvest in one year is deduced in the following year.
    - ✓ A unilateral catch limit of 32 tonnes was decided in 2016 due to the overharvest in 2015 as a consequence of late incoming reports from one municipality.

- All salmon fishermen will require a license and will be categorized as either licensed professional fisherman or licensed non-professional/private fishermen; only licensed professional fishermen will be authorized to sell salmon.
    - ➢ Licensing of private/non-professional fishermen is not yet implemented. In 2016 a process of transferring the general task of issuing licenses to the inshore fishermen from

the Government of Greenland to the municipalities commenced. This was due to a political demand and took a lot of effort which can be considered as one of the reasons why licenses for private salmon fishermen weren't implemented.

- Only designated fish factories will be authorized to accept landings of salmon, and fishermen should be advised that landing of salmon at non-authorized factories is not permitted. Fish factories will report landings no less frequently than on a weekly basis;
  - ➢ Factory landings were not allowed in 2016.

- Supervisors at the large open air markets will report all salmon offered for sale on a weekly basis;
  - ➢ The effort to ensure proper reporting from open air markets continued, and a dialogue with responsible municipalities was maintained in 2016.

- In the 2015 status report it was announced that the Ministry of Fisheries and Hunting will work on better opportunities to report and along with that increasing information about the new reporting regime to the municipalities
  - ➢ GFLK has had a close dialogue with municipalities; however the standards of reporting from 2015 were carried over in 2016 and are now under evaluation.

- Reports of all catches, including zero catch reports, will be required within 1 month of the end of the salmon fishing season at which time fishermen may apply for a license for the following season;
  - ✓ Most reports were received within the season.

- Failure to report catches will result in no license being issued for the following year(s), even in the case of zero catch;
  - ➢ This measure has not been implemented.

- It will be a condition of the license that fishermen should allow samplers to take samples of their catches upon request;
  - ➢ The license requirement was implemented before the 2015 season and remained in force in 2016.

- Information will be provided to fishermen and supervisors at open air markets about the sampling programme and the findings of the programme to date through the members' magazine of the Fishermen and Hunters Organization (KNAPK) and press releases.
  - ➢ The NASCO brochure was issued with each license and forwarded to open air markets.

The Government of Greenland is pleased to present this report to our colleagues in the West Greenland Commission.

The Ministry of Fisheries and Hunting and GFLK will continue the focus on salmon in 2017, and will work with municipalities to ensure that reporting is done in a timely manner.

Please do not hesitate to contact me or my staff for additional information.

Best regards,

Esben Ehlers
Acting Head of Delegation

Annex 4

NEA(17)7

Mixed-Stock Fisheries
(Tabled by the European Union)

1) Brief description of existing MSFs

EU-Finland

Salmon fishery in the main stem of the large River Teno, including both various netting methods and angling, is exploiting c. 30 genetically different salmon populations from different tributaries and areas of the main stem.

CLs are established for 24 populations of the Teno stock complex. Target attainment evaluations are currently available for ten tributaries (partly including and combining lower order tributaries), the main stem, and for the Teno system as a whole.

EU-France

The only estuary where salmon is fished by professional fishermen in France is the one of the river Adour. 25-30 professional fishermen capture around 1000 to 1200 salmon every year (exploitation rate estimated at 40%). Fishing is authorised from May to July, but forbidden for 25% of the week.

		Pêcheurs professionnels			
		Marins pêcheurs côtiers	Marins pêcheurs de l'estuaire	Pêcheurs professionnels en eau douce	Pêcheurs de loisir aux filets
		Pêche interdite en mer	Zone maritime de l'estuaire	Lots Adour 23 et Gaves réunis	Estran landais
Effectifs de pêcheurs	période 2010-2013	méconnu	env. 12	env. 15	env. 6
	période 2000-2007	*méconnu*	*30*	*10*	*méconnu*
Niveau de capture annuel (en nombre de saumons)	période 2010-2013	captures accidentelles quelques dizaines à centaines	env. 1000	env. 200	anecdotique
	période 2000-2007	*méconnu*	*800 à 1000 avant 2002 1800 à 2000 depuis 2003*	*env. 80 avant 2001 env. 200 depuis 2002*	*anecdotique*

The Bay of Saint Michel is a vast area with exceptional biodiversity, which receives 3 rivers estuaries (Selune, See and Couesnon). Salmons swim upstream at low tide in very small streams. Although there is no professional fisherman, there is recreational fishing.

EU-Ireland

There are currently two managed mixed-stock fisheries in Ireland, Killary Harbour and Castlemaine Harbour. A third mixed-stock fishery, Tullaghan Bay, operated until 2013.

Killary Harbour
In the case of the Killary Harbour fishery, there are two contributing river stocks (Bundorragha (Delphi) and Erriff) both of which are meeting and exceeding their conservation limits (CL). The Standing Scientific Committee on Salmon (SSCS) undertake a risk assessment for the common estuary which results in a higher requirement for spawners in both rivers than simply combining the CLs for the rivers to ensure simultaneous attainment of CL in both rivers.

Castlemaine Harbour
The mixed-stock fishery in Castlemaine Harbour, Co. Kerry was closed over the 2007 to 2010 period as the fishery was perceived to exploit salmon from a range of rivers entering Castlemaine Harbour. A pilot fishery was conducted in the mixed-stock area of Castlemaine in 2010 to provide genetic samples for analysis of the rivers contributing to the fishery. Results revealed that the Castlemaine fishery almost exclusively exploited salmon from three rivers entering Castlemaine Harbour, the Laune, Caragh and Maine, all of which were meeting and exceeding CL. The Castlemaine fishery has operated since 2011 from the total available surplus of the three contributing rivers. For the mixed-stock Castlemaine fishery to operate, the total available surplus for the three rivers combined was reduced in a common estuary analysis to ensure that each river would meet CL simultaneously. The mixed-stock Castlemaine fishery and the draft net and rod angling fishery on the three rivers all exploit salmon from this reduced surplus calculation.

Tullaghan Bay
A draft net fishery operated in Tullaghan Bay up to 2013 predominantly exploiting stocks from the Owenmore, Carrowmore and the Owenduff rivers which were exceeding their CLs. A common estuary risk assessment was also undertaken for Tullaghan Bay, resulting in a higher requirement for spawners than simply combining the CLs for the rivers to ensure simultaneous attainment of CLs.

The SSCS reviewed the operation of Tullaghan Bay draft net fishery in 2012 and noted that the fisheries are mostly confined to the immediate vicinity of the Owenmore/Carrowmore and Owenduff river mouths and there was only a relatively small mixed-stock fishery in the bay. The SSCS advised that it was therefore not appropriate to apply risk analysis for a mixed-stock fishery in Tullaghan Bay. In its advice provided for the 2013 & 2014 seasons, the SSCS therefore did not advise a common estuary surplus for Tullaghan Bay. With regard to the SSCS 2015 scientific advice, the Owenmore River was only meeting 90% of CL (209 salmon deficit) and management advised that no commercial fishery should take place in the upper part of Tullaghan Bay in the vicinity of the Owenmore River. The Owenmore River has not exceeded CL over the period 2016-2017 based on scientific advice and therefore no mixed-stock commercial fishery took place in Tullaghan Bay in 2016 or will proceed in 2017 as one of the contributing stocks (Owenmore) failed to meet its CL.

EU-Sweden

Mixed stock fisheries is existing in the two rivers (River Lagan and Göta älv) with releases of reared salmon in the main watercourse and natural smolt production in tributaries. New fishing rules is planned to be implemented in 2018 or 2019.

EU-UK (England and Wales)

Fishery	Method	No. nets in 2016	Status
Anglian Coast:	Drift and non-drift nets	18	Being phased out
Severn Estuary	Putchers	5 [a]	Historic rights apply
	Lave nets	25 [a]	Being reduced to 15 nets
	Draft net	1 [a]	Being phased out
North East Coast:	Drift nets	11 [b]	Being phased out; due for closure in 2022
	T&J nets	48 [b]	Being phased out

[a] Subject to catch limits in 2016
[b] 2 joint licences included in both categories

EU-UK (Scotland)

Last year a prohibition on coastal netting was put in place.

2) Recent catch data

EU-Finland

Salmon catch in the River Teno in 2016: Total catch 84 t (Finland 48 t, Norway 36 t), c. 75% caught in the main stem (MSF), 25% in tributaries (little or no MSF).

EU-France

Provisional nominal catch (which may be subject to revision) for 2016 (tonnes)	Adour Estuarine
	0,81T
Confirmed nominal catch of salmon for 2015 (tonnes)	0,88T

EU-Ireland

- Killary Harbour mixed-stock fishery (Erriff and Bundorragha rivers)
    - mean 5 year catch = 328 salmon (0.9t)
- Castlemaine Harbour mixed-stock fishery (Laune, Caragh and Maine rivers)
    - mean 5 year catch = 815 salmon (2.2t)
- Tullaghan Bay mixed-stock fishery (Owenmore, Carrowmore and Owenduff rivers)
    - mean 5 year catch = 136 salmon (0.4t)

EU-Sweden

(a) provisional nominal catch (which may be subject to revision) for 2016 (tonnes)	In-river	Estuarine	Coastal	Total
	9.03	0	0	9.03
(b) confirmed nominal catch of salmon for 2015 (tonnes)	17.688	0	0	17.688
(c) estimated unreported catch for 2016 (tonnes)	0.5	0	0.5	1

EU-UK (England and Wales)

(provisional declared catch of salmon in 2016)

- Anglian Coast: 0
- Severn Estuary: 155
- North East Coast: 18,767

EU-UK (Scotland)

In 2016, both catch and effort in the fixed engine and net and coble fisheries were the lowest since records began in 1952.

(a) provisional nominal catch (which may be subject to revision) for 2016 (tonnes)	In-river	Estuarine	Coastal	Total
	16.8	9.8	0.2	26.8
(b) confirmed nominal catch of salmon for 2015 (tonnes)	27.7	9.4	30.9	68.0
(c) estimated unreported catch for 2016 (tonnes)				3

3) Updates to the Implementation Plan (IP) related to MSF

EU-Finland

Parliaments in Finland and Norway have accepted the new bilateral fishery agreement, which will come into force for the fishing season 2017. The agreement concerns river fisheries, including MSF in the main stem, but the coastal MSF is the responsibility of Norwegian national management.

Conservation limits are established for 24 populations of the Teno stock complex, and attainment has been assessed for 11 individual populations. Exploitation of these populations in MSF of the Teno main stem can be assessed through genetic stock identification. Annual monitoring programme will also be updated in the near future as a part of the implementation work of the new agreement.

EU-France

N/U

EU-Ireland

The Irish Implementation Plan was updated in May 2014.

EU-Sweden

N/U

EU-UK (England and Wales)

The Implementation Plan (IP) for UK (England and Wales) was updated in 2013/14 to clarify the management of fisheries within estuaries. The updated IP states that all fisheries, including MSFs, operating within estuary limits are assumed to exploit predominantly fish that originated from waters upstream of the fishery. These fisheries are carefully managed at a local level to protect the weakest of the exploited stocks, guided by a decision structure and taking into account socio-economic factors and European Conservation status where applicable. This includes the fisheries in the Tamar/Tavy/Lynher and the Taw/Torridge estuaries and the Solway Firth.

EU-UK (Scotland)

N/U

4) Changes or developments in the management of MSFs in this IP period to implement NASCO's agreements

EU-Finland

New regulation regime for salmon fishing is based on biological reference points and scientific assessments of their attainment, including a reduction of fishing pressure by c. 30%. The reduction of fishing pressure is especially focusing on salmon stocks with the weakest status in the Teno stock complex by tailored fishery regulations in time and space, and on specific fishing methods. According to the new agreement, a recovery plan will be made to ensure the recovery of the weakest stocks in a time-frame of 2-3 salmon generations.

EU France

In Normandy (Mont Saint Michel area) salmons are captured both in rivers and estuaries. The regulation applying to the maritime domain allows for the capture of one salmon per day and per fisherman, but there is currently no TAC.

EU-Ireland

Closure of the Tullaghan Bay mixed-stock fishery due to one contributing stock failing to meet CL.

EU-Sweden

Sweden has taken following management measures to phase out mixed stock fisheries on wild salmon stocks.

- Sport fishing at sea is mainly targeting sea trout. The fishing mortality for salmon was estimated to be very low in this fishery even before a bag limit was introduced in 2014. It is estimated that the bag limit will result in nearly no fishing mortality for salmon in sport fishing at sea.
- There have been commercial trap net fisheries at the Swedish coast until 2011, situated near or in the estuary of a river with compensatory (hydropower stations) releases of fin-clipped smolt. Only catches of fin-clipped salmon is since 2013 allowed in trap net fisheries and all wild salmon shall be released alive. This was earlier partly a MSF but is not expected to be a MSF as only catches of fin-clipped salmon are allowed. Since 2012 there has been no trap net fisheries operating.

- Gill net fishing in the sea at depths <3 m is not expected to be a MSF. Since 2013 it is strictly regulated with respect to effort, period and mesh size. Marine protected areas are located nearby wild salmon rivers. In these areas, no gill net fishery is allowed irrespective of the depth.

- A ban on gill net fishing for salmon in remaining coastal waters with a depth >3m has been implemented from 2014 to phase out mixed stock fisheries targeting salmon stocks. There has not been any reported MSF or illegal gill net fisheries during 2016 in coastal waters with a depth > 3m.

EU-UK (England and Wales)

Anglian Coast: a new Net Limitation Order (NLO) was introduced in 2016 continuing the phase-out of this fishery.

Severn Estuary: new NLOs for the draft and lave nets were approved in May 2014. For both fisheries, the number of instruments was capped at 2013 levels. The draft net fishery is now subject to a phase-out (zero nets) and the lave net fishery is subject to a reducing order to 15. Catch limits are applied to all nets and putchers.

North East Coast: the NLO was updated in 2012; both drift nets and beach (T&J) nets are being phased out, and the drift net fishery will be closed in 2022. An investigation into the possibility of capping catches in the fishery (drift nets and T&J nets) to prevent exceptionally high landings has been completed and is under consideration. The Environment Agency will be conducting a mid-term review of the NLO in 2017; this will include an evaluation of the potential to maintain a limited T&J net fishery after 2022 that complies with NASCO guidelines and the need to safeguard the weakest stocks. Consideration of other possible management actions will be taken forward as part of the Environment Agency's new five-point approach to deliver a better future for salmon by addressing the pressures that they face through their life-cycle (see 2017 APR).

National measures: further action in relation to the management of net and fixed engine fisheries is under consideration in both England and Wales (see 2017 APR).

EU-UK (Scotland)

There were no recorded changes in the gears used to fish for salmon in the 2016 season. However, statutory conservation measures are in place to regulate both the killing of salmon in the early months of the fishing season (http://www.gov.scot/Topics/marine/Salmon-Trout-Coarse/fishreform/licence/spring), in coastal waters and on stocks with poor conservation status (http://www.gov.scot/Topics/marine/Salmon-Trout-Coarse/fishreform/licence/status).

These regulations will have an impact on the catch and effort data reported by Scottish salmon fisheries. In particular, the retained catch of salmon in coastal nets for 2016 was restricted to reports from a single haaf net fishery which was licenced as part of a science programme studying geographic variation in fecundity in relation to run-timing.

Annex 5

NAC(17)3

Labrador Subsistence Food Fisheries - Mixed-Stock Fisheries Context (Tabled by Canada)

EXECUTIVE SUMMARY

- The Atlantic salmon subsistence fisheries in Labrador take place in estuaries and coastal areas using gillnets and are considered to be mixed stock fisheries. The majority of the salmon harvests in these fisheries take place in fishing locations categorized as estuaries with a reduced potential to intercept salmon from non-local stocks.
- The management of these fisheries includes a number of conditions related to gear, seasons, weekly fishery closures, carcass tagging of harvested salmon, a logbook program for reporting catches, a limit on total harvest using tags, and a prohibition on sales of Atlantic salmon.
- Reported annual harvests of salmon have ranged from 15.6 t to 42.4 t during 2000 to 2016, representing between 4,800 to 11,100 small salmon and 1,400 to 6,400 large salmon annually. The reported harvests in any year have been less than the maximum tags available for these fisheries.
- Sampling of the fishery catches has taken place every year since 2006 by the members and officers of the aboriginal communities involved in the fisheries and the information and data shared with Fisheries and Oceans Canada.
- A recently developed genetic baseline of salmon populations in eastern North America can accurately resolve the origin of salmon to twelve regional groups, with most rivers in Labrador associated to a Labrador Central regional group. This group covers rivers in all Salmon Fishing Areas (1A, 1B, 2, 14B) of Labrador.
- Genetic analyses of the regional contributions of Atlantic salmon to the sampled catches in the Labrador subsistence fisheries for 2006 to 2016 indicate that the large majority (93% to 99%) of the samples assigned to the Labrador Central regional group. Resolution at a finer spatial scale and ultimately to individual river of origin is not possible at this time with the current genetic markers.
- Funding to support the analysis of 2017 and 2018 fishery samples has been secured and the results will be reported to ICES and NASCO as they become available.

INTRODUCTION

In support of the agenda item in the North American Commission agenda to address mixed stock fisheries in domestic waters of Commission member Parties, this document presents the following information:

- current management measures for the Labrador subsistence fisheries on Atlantic salmon
- summaries of annual harvests by location and size group of salmon
- summaries of the biological sampling program of this fishery,
- results from the determination of the origin of salmon sampled from these fisheries using genetic identification techniques

Fisheries for Atlantic salmon that occur at sea, along the coast, and in some cases in estuaries, have the potential to exploit salmon from multiple stock origins. The most important mixed-stock fisheries in Canada historically were the commercial fisheries which occurred in the marine coastal areas and in estuaries throughout eastern Canada. Since 2000, all commercial Atlantic salmon fisheries under Canadian jurisdiction have been closed and the sale of Canadian origin wild Atlantic salmon, regardless of fishery source, is prohibited.

Since the closure of the commercial fisheries for salmon in Canada, salmon are exploited by three user groups: aboriginal fisheries, Labrador resident food fisheries, and recreational fisheries. As reported to ICES and NASCO, the proportion of the Atlantic salmon harvest in Canada from all users (recreational, aboriginal, Labrador resident food) which takes place in rivers (on single stocks), in estuaries, and in coastal areas has varied annually (Figure 1). Coastal harvests have ranged from about 2 t to 9 t during 2000 to 2016, representing about 6% or less of the total annual harvests of Atlantic salmon. Harvests in recreational fisheries occur exclusively in rivers. Harvests in aboriginal food, social and ceremonial fisheries of Quebec and New Brunswick occur in rivers and estuaries whereas harvests in the subsistence food fisheries (aboriginal and resident) of Labrador occur in estuaries and coastal areas.

The aboriginal fisheries that occur in estuaries of Quebec and New Brunswick take place in the vicinity of single rivers, generally in tidal waters of rivers, and consequently are not considered to be mixed-stock fisheries. While the net fisheries for the Labrador subsistence food fisheries are authorized for coastal waters, current fishing activity occurs with gillnets very close to the communities which are located in deep bays along the coast away from the headlands where interception of non-local stocks of salmon historically was an issue. Despite this important change in the location of the current Labrador subsistence fisheries compared to the locations of the historical commercial marine fisheries, the Labrador subsistence fisheries are considered by NASCO as mixed stock fisheries.

GEOGRAPHIC LOCATION OF FISHERIES FOR ATLANTIC SALMON

The subsistence food fisheries in Labrador take place in estuaries and coastal areas. For the purposes of reporting the location of the harvests, the following definition of an estuary is used:

> "D.W. Pritchard (1967. What is an estuary: physical viewpoint. p. 3–5 in: G. H. Lauf (ed.) Estuaries, A.A.A.S. Publ. No. 83, Washington, D.C.) states that an estuary must (1) be partially enclosed, (2) have river(s) running into it, (3) have mix of fresh and sea water. An estuary is thus a partly enclosed coastal body of water in which river water is mixed with seawater, defined by salinity rather

> than geography. As such Lake Melville in Labrador is considered to be an estuary" (D. Reddin DFO, unpubl. ICES working document).

Based on this definition and from interviews with guardian and fishery officers in Labrador, the fishing locations in Labrador were categorized as estuary or coastal and harvests attributed to these accordingly. Between 2000 and 2016, the percentage of the total Labrador subsistence harvests which were taken in coastal areas has ranged from 15.0% to 25.2% (Table 1). In 2016, 32.6 t, 82.4% of total subsistence fisheries harvests of Atlantic salmon, were harvested from areas classified as estuaries and 7.0 t (17.6%) were from locations classified as coastal. Approximately similar percentages of the harvests in SFA 1A and SFA 2 occur in coastal areas (Table 2).

MANAGEMENT OF THE LABRADOR SUBSISTENCE FOOD FISHERIES

There are two types of subsistence net fisheries in Labrador that authorize the harvest of Atlantic salmon:

- Resident subsistence Trout fishery that permits a by-catch of salmon, and
- Aboriginal Food Social and Ceremonial (FSC) Fisheries that direct for Atlantic salmon.

In recent years, the fishing season and mesh sizes in the various fisheries have been modified in an effort to reduce the capture of large salmon while at the same time providing an opportunity to harvest small salmon, trout and Arctic charr. Carcass tags are required for all harvested salmon in these fisheries and an allocation of tags is provided to each group which sets limits on the total harvest of salmon which can be taken. All sales of salmon are prohibited.

1) Resident Subsistence Trout Fishery

There is a long-standing tradition of trout net fishing in Labrador. Following the closure of the commercial salmon fishery in Labrador in 1998, there was an increased dependency on the trout fishery for subsistence purposes. A subsistence trout net licence is required and available to residents of Labrador to harvest trout for food purposes. There is a recognized by-catch of Atlantic salmon in the trout nets. Tags for salmon were issued on an individual fisher basis to attach to salmon so that legally caught salmon could be identified. There was a catch limit on charr and trout combined of 50 fish per designate or license holder and there is a limit of one designate or licence holder per household. A number of additional management measures are currently in place for this fishery.

- 148 licences issued for Cape Rouge to Fish Cove Point, including Lake Melville (Licence Cap 156) and approximately 140 licences issued for the coast of Labrador in 2016. Furthermore, there is a limit of one designate or licence holder per household.
- Target species are Speckled trout and Arctic charr with a seasonal limit of 50 trout / charr
- A maximum by-catch of 3 Atlantic salmon can be retained
- Fishing must cease when either 3 salmon or 50 trout and/or charr are taken
- All harvested salmon must be tagged
- Licence holders are permitted to use a single net with a maximum length of 15 fathoms
- Monofilament netting materials are not permitted
- Mesh size permitted is 4 inches
- The net must be set in a straight line
- Gear must be marked identifying licence holder
- Seasons in 2016 varied by location (refer to map in Figure 3):
    - Davis Inlet to Cape Chidley: June 24 to July 17

- Cape Rouge to Davis Inlet: June 17 to July 15
- Cape Rouge to Fish Cove Point (including Lake Melville): June 03 to July 03 and July 19 to August 03 (Kenamu River closes July 31)
- Fish Cove Point to Cape Charles: July 12 to July 31

- No fishing (nets must be removed from the water) between the hours of 6:00 p.m. Sunday and 6:00 p.m. Monday.
- Completed logbooks of catch and effort must be submitted to Fisheries and Oceans Canada at the end of season.

2) Aboriginal Food Social and Ceremonial (FSC) fisheries

In response to the Supreme Court of Canada decision interpreting Section 35 of the Constitution Act of 1982, Fisheries and Oceans Canada (DFO) provided resource access to Aboriginal groups of Labrador for FSC purposes. Between 1999 and 2005, a FSC fishery was made available for members of the Labrador Inuit Association (LIA) in northern Labrador as well as the Lake Melville area, both located in SFA 1. In 2006, with the signing of the LIA Land Claims Agreement, a subsistence fishery with the Nunatsiavut Government which is the successor organization to the LIA was negotiated (Figure 2). The Innu Nation also fishes for salmon in Lake Melville from the community of Sheshatshiu and in northern Labrador from the community of Natuashish. In 2004, members of the NunatuKavut Community Council (NCC) on the south coast of Labrador negotiated a subsistence fishery with Fisheries and Oceans Canada in the area between Fish Cove Point and Cape St. Charles, located in SFA 2. In 2013, a subsistence fishery was negotiated with the NCC for access to upper Lake Melville.

The three Aboriginal groups with FSC fisheries in Labrador presently include:

- Nunatsiavut Government
  - 7,200 beneficiaries
  - 900 designated fishers
- Innu Nation
  - 2,200 members
  - 100 designated fishers
- NunatuKavut Community Council
  - 6,000 members
  - 1,050 designated fishers

All FSC fisheries are controlled through the issuance of a communal licence by Fisheries and Oceans Canada which includes carcass tags. Carcass tags are required for all harvested salmon in these fisheries and an allocation of tags is provided to each group which limits the harvest which can be taken. In 2016, the total number of carcass tags issued was 15,300 tags. The fishing gear used is gillnets.

There are a number of management measures implemented in all three of the licences. These include:

- Mono filament netting not permitted
- A maximum length of 25 fathoms of net per designated fisher
- Net must be set in a straight line
- No fishing (nets must be removed from the water) between the hours of 6:00 p.m. Sunday and 6:00 p.m. Monday.
- Gear must be tended every 24 hours

- All harvested salmon must be tagged
- Completed logbook of catch must be submitted to DFO at the end of season.

Specific measures for each group are described below.

Nunatsiavut Government

- For the Upper Lake Melville (ULM) area, the minimum mesh size is 3 inches and the maximum mesh size is 4 inches
- For the Labrador Inuit Settlement Area (LISA), there are various minimum mesh size requirements from 3 to 5 inches
- For the ULM area, the season extends from June 15 to July 8 and July 19 to August 31
- For LISA, the season extends from June 15 to August 31
- Fishing is allowed in tidal waters of the ULM and in various locations in tidal waters close to communities (Rigolet, Postville, Makkovik, Hopedale and Nain)
- 8,200 tags were issued; 4,200 (500*) for LISA and 4,000 for ULM
  *There is a reserve of 500 tags set aside for further allocation that was requested in 2016

Innu Nation

- Minimum mesh size of 3 inches and maximum mesh size of 4 inches
- For Sheshatshiu, the fishing season extends from May 15 to September 15
  - Fishing is permitted from Fish Cove Point, north to Cape Harrison, including Lake Melville and the inland waters of Little Lake and Grand Lake in Upper Lake Melville
  - Fishing activity in tidal waters does not occur outside the waters of Upper Lake Melville in the Kenamu River-Sheshatshiu areas
- For Natuashish, the fishing season extends from May 15 to August 31
  - Fishing is permitted in the tidal waters extending north and east from Cape Harrigan inclusive of Big Bay and south and east of Anaktalik Bay inclusive of Analtalik and Anktalik Bays including the inland waters of Sango Pond and Big Sango Lake
- 2,000 tags were issued: 1,500 for Sheshatshiu and 500 for Natuashish

NunatuKavut Community Council

- Minimum mesh size of 3.5 inches and maximum mesh size of 4 inches
- Fishing takes place in tidal waters from Fish Cove Point to Cape Charles
- Fishing season extends from July 6 to August 15
- For Upper Lake Melville, fishing takes place in tidal waters inside and west of the boundary line that marks the Labrador Inuit Marine Zone in Lake Melville
- Fishing season extends from June 15 to July 8 and July 19 to August 31
- 6,000 tags were issued: 5,700 for southern Labrador and 300 for Upper Lake Melville

HARVESTS IN THE LABRADOR SUBSISTENCE FISHERIES

FSC and resident subsistence fishers use logbooks to record catch and effort information. Data from returned logbooks are compiled by each user group and submitted to Fisheries and Oceans Canada at the end of the season. Total harvests are estimated by adjusting the reported catches proportionately to the total licenced/designated fishers (Reddin et al. 2005). The combined logbook return rate was 79% in 2016 and ranged from 55% to 87% from 2001 to 2015 (average 74%).

Details of the harvests of Atlantic salmon by size group (small salmon, large salmon) in terms of weight (kg) and number of fish overall and by Salmon Fishing Area are provided in Table 3 for the years 2000 to 2016. Harvests of Atlantic salmon in the Labrador subsistence fisheries ranged from 15.6 t in 2000 to 42.4 t in 2015 (Table 3; Figure 3). With the exception of 2013, 2015 and 2016, the small salmon size group comprises greater than 50% of the total harvest by weight, usually greater than 70% by number of salmon harvested (Table 3). In terms of number of salmon harvested, the subsistence food fisheries annually harvested 4,800 to 11,100 small salmon over the period 2000 to 2016 and large salmon harvests ranged from 1,400 to 6,400 fish, with the peak catches of small salmon in 2011 and large salmon in 2013 (Table 3; Figure 3).

There are annual variations in the harvest levels among the Salmon Fishing Areas in Labrador. On average over the period 2000 to 2016, the proportions of the total harvest, by number, of Atlantic salmon have been equally partitioned between SFA 1A and SFA 1B at 30% each and the remaining 40% from the southern Labrador area (Table 3). For small salmon, the average by number over the 2000 to 2016 period has been 28% and 30% of the total for SFA 1A and 1B, respectively, with the highest percentage, 42% from southern Labrador SFA 2 (Table 3; Figure 4). For large salmon numbers harvested, the percentages are more closely split among the three fishing areas, 37%, 32% and 31%, for SFA 1A, 1B and 2, respectively (Table 3; Figure 4).

Harvests are separated for the Labrador resident trout fishery (Table 4) and the aboriginal food, social and ceremonial (FSC) fisheries (Table 5).

The harvests of Atlantic salmon in the Labrador resident trout fisheries decreased after 2003 as some individuals fishing under the Labrador resident licence began fishing and reporting within the aboriginal communities. Since 2004, the harvests of Atlantic salmon in the resident trout fishery have varied between 1.6 t and 2.9 t, representing between 345 to 921 small salmon, 93 to 365 large salmon, in total (Table 4). The majority of the resident trout fishery harvests of Atlantic salmon are taken in the southern Labrador SFA 2; on average 58% by weight, 62% by number over the period 2004 to 2016 (Table 4). Harvests in Lake Melville (SFA 1B) have averaged 39% by weight, and 36% by number of the total harvest and harvests in northern Labrador SFA 1A have been approximately 2% of the total (Table 4).

The reported harvests in the aboriginal FSC fisheries in Labrador over the period 2004 to 2016 have ranged from 24.7 t to 40.4 t, with large salmon representing between 34% and 64% of the total harvest of salmon by weight and 21% to 47% of the total by number (Table 5). These harvests (2004 to 2016) have represented between 7,200 and 10,600 small salmon, 2,600 to 6,000 large salmon by number. As the aboriginal FSC fisheries comprise the majority of the Labrador subsistence fishery harvests (90% to 96% for small salmon by number; 91% to 96% for large salmon by number; 2004 to 2016), the distributions of the aboriginal FSC harvests among the Salmon Fishing Areas are the same as those for the overall harvests. For small salmon harvests by number, the average over the 2004 to 2016 period has been 24% and 32% of the total for SFA 1A and 1B, respectively, with the highest percentage, 44% from southern Labrador SFA 2 (Table 5). For large salmon harvested by number, the percentages of the total were highest in SFA 1A at 35% and approximately similar for SFA1B and SFA 2 at 33% and 32%, respectively (Table 5).

SAMPLING PROGRAMME FOR LABRADOR ABORIGINAL FISHERIES

Sampling of the Labrador subsistence fisheries is very difficult as there is no common landing location. Sampling is conducted by personnel from the respective aboriginal groups. In southern Labrador, sampling was conducted by personnel hired by the Nunatukavut Community Council (NCC). In addition, Guardians hired as part of the DFO Aboriginal Fisheries Strategy program were requested to sample salmon. Conservation Officers of the Nunatsiavut Government (NG) also conducted sampling at each community in northern Labrador and in Lake Melville.

Sampling protocols generally consist of sampling landed salmon at random and where possible the total catch of a given boat is examined. Fish are measured (fork length to the nearest cm), weighed (gutted weight or whole weight if available to the nearest 1/10th of a kg) and sex determined. Scales are taken for age analysis and fish are examined for external tags, brands or elastomer marks, adipose clips and microtags. Since 2011, fin clip tissue samples have also been collected for genetic analysis leading to the identification of the origin the salmon.

Sampling program results have been reported annually at ICES since the 2006 fishery sampling program. The NCC and NG sampling programme of Labrador Aboriginal fisheries continued in 2015 and 2016. Landed fish were sampled opportunistically for length, weight, sex, scales (age analysis) and tissue (genetic analysis). Fish were also examined for the presence of external tags or marks.

In 2015, a total of 880 samples were collected from the Labrador subsistence fisheries, 212 from northern Labrador (SFA 1A), 204 from Lake Melville (SFA 1B) and 464 samples from southern Labrador (SFA 2) (Table 6). Based on the interpretation of the scale samples, 77% were 1SW salmon, 19% were 2SW, one sample was a 3SW salmon (<1%), and 4% were previously spawned salmon. The majority of salmon sampled were river ages 3 to 5 years (98%) (modal age 4).

In 2016, a total of 810 samples were collected from the Labrador FSC fisheries: 278 from northern Labrador (SFA 1A), 155 from Lake Melville (SFA 1B), and 377 samples from southern Labrador (SFA 2) (Table 6). Based on the interpretation of the scale samples (n=756), 69% were 1SW salmon, 26% were 2SW, and 5% were previously spawned salmon. The majority of salmon sampled were river ages 3 to 5 years (99%) (modal age 4).

In 2015 and 2016, there were no river age 1 and few river age 2 (0.5%) salmon sampled, suggesting, as in previous years (2006 to 2014), that very few salmon from the most southern stocks of North America (USA, Scotia-Fundy) were exploited in these fisheries.

The intensity of the sampling program (number of samples divided by reported harvests in number of fish from the aboriginal fishery) was 3.1%, 4.2%, 1.7% and 5.8% for the sampling years 2012 to 2015, respectively. In 2015 and 2016, the sampling intensity was 6% in both years.

LABRADOR FISHERY ORIGIN AND COMPOSITION OF THE CATCHES

As presented at the NASCO annual meeting in 2014 and reported to NASCO in 2015, the stock composition and variation in composition of salmon harvested in the Labrador subsistence food fisheries were determined based on a recently developed North American baseline for Atlantic salmon which allows assignment to regional reporting groups of eastern North America (Bradbury et al. 2014, 2015; Moore et al. 2014). In total, twelve regional groups in eastern North America can be reliably identified using 15 microsatellite loci (Figure 5). The regional groups do not correspond directly to the six regions used by the ICES Working Group to characterize stock status and to provide catch advice. The overlap between the regional groups and the ICES areas in North America are shown in Table 7.

Characteristics of microsatellite markers of fishery samples from 2006 to 2016 were assessed relative to the twelve reporting groups. The estimated proportional contributions of the twelve groups (and associated standard errors) based on combined samples for 2006 to 2011 and annual samples for 2012 to 2016 are shown in Figure 6. The uncertainties in the estimated contributions are lowest (coefficient of variation, CV, of 1%) for the largest contributing group (Labrador Central).

The Labrador Central (LAB) regional group represents the majority (almost 93 to 99%) of the salmon in the Labrador subsistence fishery with minor contributions from a few other regions, primarily Ungava-Labrador North (Bradbury et al. 2015). No USA origin salmon were identified in the mixed stock analysis of samples from 2012 to 2016 and raised catches for those years are essentially zero. However, Bradbury et al. (2014) previously reported the presence of USA origin salmon in the samples from the fisheries in 2006 to 2011 with raised harvest estimates of 30 to 40 fish per year.

By Salmon Fishing Area, the samples from Lake Melville (SFA 1B) were essentially 100% from the Labrador Central regional group (Table 8). The Labrador Central regional group was also the dominant regional group in the samples from SFA 1A and SFA 2. Detectable contributions of salmon from the Ungava / Northern Labrador regional group of about 5% were identified in large salmon samples from 2016.

Funding to support the analysis of the 2017 and 2018 fishery samples has been secured and the results will be reported to ICES and NASCO as they become available.

REFERENCES CITED

Bradbury, I.R., Hamilton, L.C., Robertson, M.J., et al. 2014. Landscape structure and climatic variation determine Atlantic salmon genetic connectivity in the northwest Atlantic. Canadian Journal of Fisheries and Aquatic Sciences 71, 246-258.

Bradbury, I.R., Hamilton, L.C., Rafferty, S., et al. 2015. Genetic evidence of local exploitation of Atlantic salmon in a coastal subsistence fishery in the Northwest Atlantic. Can. J. Fish. Aquat. Sci. 72, 83–95.

Moore J-S, Bourret V, Dionne M*, et al.* 2014. Conservation genomics of anadromous Atlantic salmon across its North American range: outlier loci identify the same patterns of population structure as neutral loci. Molecular Ecology 23, 5680-5697.

Reddin, D.G., Poole, R.J., King, W., Oliver, S., Nuna, R., and Parr, T. 2005. Harvests in various fisheries for salmonids, Atlantic salmon returns to rivers and environmental conditions in Labrador, 2004. DFO Can. Sci. Adv. Secr. Res. Doc. 2005/006.

ACKNOWLEDGEMENTS

The information presented in this document was contributed by various people within Fisheries and Oceans Canada Newfoundland and Labrador Region: Rebecca Poole, Martha Robertson, and Tony Blanchard. The information was summarized by Gérald Chaput and Martha Robertson, Fisheries and Oceans Canada.

Table 1. Labrador subsistence fisheries harvests (weight in t; aboriginal and resident food) by geographic location of harvests, 2000 to 2016.

	Harvest (t)			Percentage of harvest	
Year	Estuarine	Coastal	Total	Estuarine	Coastal
2000	13.28	2.34	15.61	85.0	15.0
2001	13.50	2.79	16.29	82.9	17.1
2002	13.99	3.59	17.57	79.6	20.4
2003	17.49	4.62	22.11	79.1	20.9
2004	24.86	6.79	31.65	78.6	21.4
2005	24.72	7.20	31.91	77.5	22.5
2006	25.00	7.77	32.72	76.3	23.7
2007	20.45	6.01	26.46	77.3	22.7
2008	27.04	9.09	36.13	74.8	25.2
2009	22.61	7.20	29.81	75.9	24.1
2010	29.57	6.23	35.80	82.6	17.4
2011	33.84	7.52	41.36	81.8	18.2
2012	28.69	7.87	36.56	78.5	21.5
2013	31.66	8.31	39.97	79.2	20.8
2014	25.72	7.06	32.77	78.5	21.5
2015	34.27	8.16	42.44	80.8	19.2
2016	32.63	6.96	39.59	82.4	17.6

Table 2. The percentages of the harvested weight of Atlantic salmon in the Labrador subsistence fisheries that are taken in coastal areas, 2009 to 2016. All other harvests in these fisheries are taken in estuaries. Salmon fishing areas are shown in Figure 3.

Year	SFA 1A (northern Labrador)	SFA 1B (Lake Melville)	SFA 1 total	SFA 2 (Southern Labrador)	SFA 1 & 2 Labrador
2009	33.0%	0%	16.9%	33.0%	24.1%
2010	33.0%	0%	9.5%	33.0%	17.4%
2011	32.0%	0%	10.0%	33.0%	18.2%
2012	31.0%	0%	16.5%	32.1%	21.5%
2013	29.0%	0%	13.4%	34.1%	20.8%
2014	35.0%	0%	16.3%	32.0%	21.5%
2015	29.0%	0%	13.3%	30.0%	19.2%
2016	31.0%	0%	12.0%	31.0%	17.6%

Table 3. Labrador subsistence food fisheries harvests (weight in kg, and number of fish) by size group and overall, and by Salmon Fishing Area and overall, 2000 to 2016. Data for 2016 are provisional.

	Weight (kg)			Number of fish			% Large	
Year	Small	Large	Total	Small	Large	Total	By weight	By number
Labrador overall								
2000	10,353	5,261	15,614	5,323	1,352	6,675	33.7%	20.2%
2001	9,789	6,499	16,288	4,789	1,721	6,510	39.9%	26.4%
2002	11,581	5,990	17,572	5,806	1,389	7,195	34.1%	19.3%
2003	13,196	8,912	22,108	6,477	2,175	8,653	40.3%	25.1%
2004	17,379	14,270	31,649	8,385	3,696	12,081	45.1%	30.6%
2005	21,038	10,876	31,914	10,436	2,817	13,253	34.1%	21.3%
2006	21,198	11,523	32,721	10,377	3,090	13,467	35.2%	22.9%
2007	17,070	9,386	26,456	9,208	2,652	11,860	35.5%	22.4%
2008	19,386	16,975	36,361	9,834	3,909	13,743	46.7%	28.4%
2009	16,130	13,681	29,810	7,988	3,344	11,332	45.9%	29.5%
2010	20,523	15,070	35,593	9,867	3,725	13,595	42.3%	27.4%
2011	23,123	18,235	41,358	11,138	4,451	15,589	44.1%	28.6%
2012	18,738	17,820	36,559	9,977	4,228	14,204	48.7%	29.8%
2013	14,674	25,299	39,973	7,164	6,375	13,539	63.3%	47.1%
2014	17,916	14,858	32,774	8,959	3,995	12,953	45.3%	30.8%
2015	17,500	24,935	42,435	8,923	6,146	15,069	58.8%	40.8%
2016 (prov.)	14,565	25,027	39,592	7,638	5,598	13,236	63.2%	42.3%
SFA 1A (northern Labrador)								
2000	4,184	2,359	6,543	2,111	599	2,709	36.0%	22.1%
2001	4,446	3,449	7,895	2,178	890	3,068	43.7%	29.0%
2002	4,997	2,769	7,766	2,431	661	3,092	35.7%	21.4%
2003	6,672	5,051	11,723	3,217	1,169	4,386	43.1%	26.7%
2004	6,722	4,729	11,451	3,261	1,167	4,427	41.3%	26.4%
2005	5,044	3,517	8,561	2,468	859	3,327	41.1%	25.8%
2006	4,958	4,081	9,039	2,366	1,062	3,427	45.1%	31.0%
2007	3,263	2,460	5,723	1,874	751	2,624	43.0%	28.6%
2008	5,106	7,809	12,916	2,537	1,776	4,313	60.5%	41.2%
2009	4,045	4,355	8,400	1,880	1,038	2,917	51.8%	35.6%
2010	3,255	3,635	6,890	1,479	823	2,302	52.8%	35.7%
2011	4,012	4,329	8,340	1,825	983	2,809	51.9%	35.0%
2012	5,096	8,097	13,193	2,849	1,752	4,601	61.4%	38.1%
2013	2,635	9,251	11,887	1,278	2,278	3,556	77.8%	64.1%
2014	3,918	6,316	10,234	1,907	1,713	3,621	61.7%	47.3%
2015	4,001	8,544	12,545	2,017	2,093	4,110	68.1%	50.9%
2016 (prov.)	2,701	8,140	10,841	1,392	1,834	3,226	75.1%	56.9%
SFA 1B (Lake Melville)								
2000	3,927	2,006	5,933	2,001	493	2,493	33.8%	19.8%
2001	2,550	1,672	4,222	1,215	409	1,624	39.6%	25.2%
2002	2,389	1,672	4,061	1,178	354	1,532	41.2%	23.1%
2003	2,422	1,975	4,397	1,165	470	1,635	44.9%	28.7%
2004	3,316	3,927	7,243	1,561	1,043	2,604	54.2%	40.1%
2005	5,072	3,414	8,485	2,490	828	3,318	40.2%	24.9%
2006	6,231	2,249	8,480	3,057	577	3,634	26.5%	15.9%
2007	5,043	2,854	7,896	2,827	809	3,636	36.1%	22.3%
2008	5,235	5,818	11,053	2,616	1,179	3,795	52.6%	31.1%
2009	4,128	3,877	8,005	2,084	870	2,954	48.4%	29.4%
2010	9,414	7,506	16,920	4,478	1,847	6,324	44.4%	29.2%
2011	9,826	8,498	18,323	4,648	1,967	6,615	46.4%	29.7%
2012	5,532	6,025	11,557	2,891	1,410	4,301	52.1%	32.8%

Year	Weight (kg) Small	Large	Total	Number of fish Small	Large	Total	% Large By weight	By number
2013	5,119	8,684	13,803	2,476	2,084	4,560	62.9%	45.7%
2014	6,863	4,822	11,685	3,390	1,251	4,642	41.3%	27.0%
2015	5,512	9,299	14,811	2,803	2,067	4,870	62.8%	42.4%
2016 (prov.)	5,191	11,953	17,144	2,722	2,409	5,131	69.7%	46.9%
SFA 2 (southern Labrador)								
2000	2,242	897	3,139	1,212	260	1,472	28.6%	17.7%
2001	2,793	1,378	4,172	1,396	422	1,818	33.0%	23.2%
2002	4,196	1,549	5,745	2,197	374	2,571	27.0%	14.6%
2003	4,102	1,885	5,987	2,095	536	2,632	31.5%	20.4%
2004	7,341	5,614	12,955	3,564	1,486	5,050	43.3%	29.4%
2005	10,922	3,946	14,868	5,479	1,130	6,609	26.5%	17.1%
2006	10,008	5,193	15,201	4,955	1,451	6,406	34.2%	22.7%
2007	8,764	4,073	12,837	4,507	1,092	5,599	31.7%	19.5%
2008	9,044	3,349	12,393	4,680	954	5,634	27.0%	16.9%
2009	7,956	5,449	13,405	4,024	1,437	5,461	40.6%	26.3%
2010	8,033	3,952	11,985	4,041	1,069	5,110	33.0%	20.9%
2011	9,285	5,409	14,694	4,665	1,501	6,165	36.8%	24.3%
2012	8,110	3,699	11,809	4,237	1,066	5,303	31.3%	20.1%
2013	6,920	7,364	14,284	3,410	2,012	5,422	51.6%	37.1%
2014	7,135	3,720	10,855	3,661	1,030	4,691	34.3%	22.0%
2015	7,988	7,093	15,081	4,103	1,987	6,030	47.0%	33.0%
2016 (prov.)	6,673	4,936	11,609	3,524	1,355	4,879	42.5%	27.8%

Table 4. Labrador resident trout fisheries harvests (weight in kg, and number of fish) of Atlantic salmon by size group and overall, and by Salmon Fishing Area and overall, 2000 to 2016. Data for 2016 are provisional.

	Weight (kg)			Number of fish			% Large	
Year	Small	Large	Total	Small	Large	Total	By weight	By number
Labrador overall								
2000	2,480	1,057	3,537	1,330	298	1,628	29.9%	18.3%
2001	3,082	1,501	4,583	1,530	449	1,979	32.8%	22.7%
2002	4,504	1,642	6,146	2,349	399	2,747	26.7%	14.5%
2003	4,502	2,157	6,659	2,294	608	2,902	32.4%	20.9%
2004	1,302	869	2,171	652	224	876	40.0%	25.6%
2005	1,817	871	2,688	921	228	1,150	32.4%	19.9%
2006	1,574	1,007	2,581	769	283	1,052	39.0%	26.9%
2007	1,294	388	1,682	640	93	734	23.1%	12.7%
2008	1,253	1,064	2,317	619	210	830	45.9%	25.3%
2009	1,644	1,212	2,856	806	313	1,119	42.4%	28.0%
2010	1,408	861	2,269	731	255	990	37.9%	25.7%
2011	1,027	1,059	2,085	501	290	791	50.8%	36.6%
2012	873	827	1,700	435	206	641	48.7%	32.2%
2013	714	1,342	2,057	345	365	710	65.3%	51.4%
2014	886	746	1,632	454	204	659	45.7%	31.0%
2015	932	1,084	2,016	471	293	764	53.8%	38.4%
2016 (prov.)	698	916	1,614	360	232	592	56.7%	39.1%
SFA 1A (northern Labrador)								
2000	0	0	0	0	0	0	na	na
2001	0	0	0	0	0	0	na	na
2002	0	0	0	0	0	0	na	na
2003	0	0	0	0	0	0	na	na
2004	13	9	22	6	2	8	39.2%	25.0%
2005	13	9	22	6	2	8	39.2%	25.0%
2006	13	9	22	6	2	8	39.2%	25.0%
2007	0	0	0	0	0	0	na	na
2008	20	247	267	4	24	28	92.5%	85.7%
2009	0	0	0	0	0	0	na	na
2010	14	6	20	7	1	8	30.0%	13.0%
2011	7	16	23	3	5	8	69.6%	62.5%
2012	18	70	88	9	15	24	79.5%	62.5%
2013	0	0	0	0	0	0	na	na
2014	11	17	29	6	4	10	59.8%	42.9%
2015	14	59	73	8	12	20	59.8%	42.9%
2016 (prov.)	26	48	74	17	11	28	59.8%	42.9%
SFA 1B (Lake Melville)								
2000	238	160	398	118	38	156	40.2%	24.4%
2001	288	123	411	135	27	161	29.9%	16.5%
2002	309	93	402	152	24	176	23.1%	13.9%
2003	400	272	672	199	71	270	40.5%	26.4%
2004	439	502	942	210	122	332	53.3%	36.7%
2005	711	607	1,318	336	154	490	46.0%	31.4%
2006	223	76	298	111	21	132	25.3%	16.0%
2007	397	57	454	186	15	201	12.6%	7.7%
2008	171	122	293	88	29	117	41.7%	24.8%
2009	243	213	456	122	56	178	46.7%	31.5%
2010	602	461	1,062	292	144	436	43.4%	33.0%
2011	401	656	1,057	190	170	360	62.1%	47.1%
2012	362	526	888	177	131	308	59.2%	42.5%

	Weight (kg)			Number of fish			% Large	
Year	Small	Large	Total	Small	Large	Total	By weight	By number
2013	322	789	1111	153	213	366	71.0%	58.3%
2014	381	425	806	183	110	293	52.7%	37.6%
2015	349	621	970	171	159	330	64.0%	48.2%
2016 (prov.)	246	569	815	123	135	258	69.8%	52.3%
SFA 2 (southern Labrador)								
2000	2,242	897	3,139	1,212	260	1,472	28.6%	17.7%
2001	2,793	1,378	4,172	1,396	422	1,818	33.0%	23.2%
2002	4,196	1,549	5,745	2,197	374	2,571	27.0%	14.6%
2003	4,102	1,885	5,987	2,095	536	2,632	31.5%	20.4%
2004	849	358	1,207	436	100	536	29.6%	18.7%
2005	1,092	255	1,347	579	72	652	18.9%	11.1%
2006	1,338	922	2,260	652	260	912	40.8%	28.5%
2007	897	331	1,228	455	78	533	26.9%	14.6%
2008	1,062	695	1,757	528	157	685	39.6%	22.9%
2009	1,401	998	2,400	684	257	941	41.6%	27.3%
2010	808	376	1,184	441	105	546	31.8%	19.3%
2011	619	387	1,005	308	115	423	38.5%	27.3%
2012	493	232	725	249	60	309	32.0%	19.4%
2013	392	554	946	193	152	344	58.5%	44.0%
2014	493	304	797	265	90	355	38.2%	25.2%
2015	569	405	974	292	123	355	41.6%	34.6%
2016 (prov.)	426	300	726	221	86	307	41.3%	28.0%

Table 5. Labrador aboriginal food, social, and ceremonial fisheries harvests (weight in kg, and number of fish) for Atlantic salmon by size group and overall, and by Salmon Fishing Area and overall, 2000 to 2016. Data for 2016 are provisional.

	Weight (kg)			Number of fish			% Large	
Year	Small	Large	Total	Small	Large	Total	By weight	By number
Labrador overall								
2000	7,873	4,205	12,077	3,993	1,054	5,047	34.8%	20.9%
2001	6,707	4,998	11,705	3,259	1,272	4,531	42.7%	28.1%
2002	7,077	4,348	11,425	3,457	990	4,448	38.1%	22.3%
2003	8,695	6,754	15,449	4,183	1,568	5,751	43.7%	27.3%
2004	16,077	13,401	29,478	7,733	3,472	11,205	45.5%	31.0%
2005	19,221	10,005	29,226	9,515	2,588	12,103	34.2%	21.4%
2006	19,623	10,516	30,140	9,608	2,807	12,415	34.9%	22.6%
2007	15,775	8,999	24,774	8,567	2,559	11,126	36.3%	23.0%
2008	18,133	15,911	34,044	9,215	3,699	12,913	46.7%	28.6%
2009	14,485	12,469	26,955	7,182	3,031	10,213	46.3%	29.7%
2010	19,115	14,209	33,324	9,135	3,470	12,605	42.6%	27.5%
2011	22,096	17,176	39,272	10,637	4,161	14,798	43.7%	28.1%
2012	17,865	16,993	34,858	9,542	4,022	13,564	48.7%	29.7%
2013	13,959	23,957	37,916	6,819	6,010	12,828	63.2%	46.8%
2014	17,031	14,112	31,142	8,504	3,790	12,295	45.3%	30.8%
2015	16,569	23,851	40,419	8,452	5,853	14,305	59.0%	40.9%
2016 (prov.)	13,867	24,111	37,978	7,277	5,366	12,644	63.5%	42.4%
SFA 1A (northern Labrador)								
2000	4,184	2,359	6,543	2,111	599	2,709	36.0%	22.1%
2001	4,446	3,449	7,895	2,178	890	3,068	43.7%	29.0%
2002	4,997	2,769	7,766	2,431	661	3,092	35.7%	21.4%
2003	6,672	5,051	11,723	3,217	1,169	4,386	43.1%	26.7%
2004	6,709	4,720	11,429	3,255	1,165	4,419	41.3%	26.4%
2005	5,031	3,508	8,539	2,462	857	3,319	41.1%	25.8%
2006	4,945	4,072	9,017	2,360	1,060	3,419	45.2%	31.0%
2007	3,263	2,460	5,723	1,874	751	2,624	43.0%	28.6%
2008	5,086	7,562	12,649	2,533	1,752	4,285	59.8%	40.9%
2009	4,045	4,355	8,400	1,880	1,038	2,917	51.8%	35.6%
2010	3,241	3,629	6,870	1,472	822	2,294	52.8%	35.8%
2011	4,005	4,313	8,317	1,822	978	2,801	51.9%	34.9%
2012	5,078	8,027	13,105	2,840	1,737	4,577	61.3%	38.0%
2013	2,635	9,251	11,887	1,278	2,278	3,556	77.8%	64.1%
2014	3,906	6,299	10,205	1,901	1,709	3,611	61.8%	47.4%
2015	3,987	8,485	12,472	2,009	2,081	4,090	68.0%	50.9%
2016 (prov.)	2,675	8,092	10,767	1,375	1,823	3,198	75.2%	57.0%
SFA 1B (Lake Melville)								
2000	3,689	1,846	5,535	1,883	455	2,337	33.4%	19.5%
2001	2,261	1,549	3,810	1,081	382	1,463	40.7%	26.1%
2002	2,080	1,579	3,659	1,027	329	1,356	43.2%	24.3%
2003	2,023	1,703	3,725	966	399	1,365	45.7%	29.2%
2004	2,876	3,424	6,301	1,351	922	2,272	54.4%	40.6%
2005	4,361	2,807	7,167	2,154	674	2,828	39.2%	23.8%
2006	6,008	2,174	8,182	2,946	556	3,502	26.6%	15.9%
2007	4,646	2,796	7,442	2,641	794	3,435	37.6%	23.1%
2008	5,064	5,695	10,760	2,529	1,150	3,679	52.9%	31.3%
2009	3,885	3,663	7,549	1,962	814	2,776	48.5%	29.3%
2010	8,812	7,046	15,858	4,186	1,703	5,888	44.4%	28.9%

	Weight (kg)			Number of fish			% Large	
Year	Small	Large	Total	Small	Large	Total	By weight	By number
2011	9,425	7,841	17,266	4,457	1,798	6,255	45.4%	28.7%
2012	5,170	5,499	10,669	2,714	1,279	3,993	51.5%	32.0%
2013	4,796	7,895	12,691	2,323	1,871	4,194	62.2%	44.6%
2014	6,482	4,397	10,879	3,207	1,141	4,348	40.4%	26.2%
2015	5,163	8,678	13,841	2,632	1,908	4,540	62.7%	42.0%
2016 (prov.)	4,945	11,384	16,329	2,599	2,274	4,873	69.7%	46.7%
SFA 2 (southern Labrador)								
2000	0	0	0	0	0	0	na	na
2001	0	0	0	0	0	0	na	na
2002	0	0	0	0	0	0	na	na
2003	0	0	0	0	0	0	na	na
2004	6,492	5,256	11,748	3,128	1,386	4,514	44.7%	30.7%
2005	9,830	3,691	13,520	4,899	1,058	5,957	27.3%	17.8%
2006	8,670	4,270	12,941	4,303	1,191	5,494	33.0%	21.7%
2007	7,867	3,742	11,609	4,052	1,014	5,066	32.2%	20.0%
2008	7,982	2,654	10,636	4,153	797	4,949	24.9%	16.1%
2009	6,555	4,451	11,006	3,340	1,180	4,520	40.4%	26.1%
2010	7,225	3,576	10,801	3,600	964	4,564	33.1%	21.1%
2011	8,667	5,022	13,689	4,357	1,385	5,742	36.7%	24.1%
2012	7,617	3,467	11,084	3,988	1,006	4,994	31.3%	20.1%
2013	6,528	6,810	13,338	3,217	1,860	5,078	51.1%	36.6%
2014	6,642	3,415	10,058	3,396	940	4,336	34.0%	21.7%
2015	7419	6688	14,107	3811	1864	5,675	47.4%	32.8%
2016 (prov.)	6247	4636	10,883	3303	1269	4,572	42.6%	27.8%

Table 6. Number of samples collected and percentages of samples by river age within the sampling areas from the aboriginal food fisheries in Labrador for 2015 and 2016.

Area	Number of Samples	River Age						
		1	2	3	4	5	6	7
PERCENTAGE OF SAMPLES BY RIVER AGE WITHIN THE THREE SAMPLED AREAS IN 2015								
Northern Labrador (SFA 1A)	212	0.0	0.0	17.5	59.9	20.8	0.9	0.9
Lake Melville (SFA 1B)	204	0.0	1.0	30.4	53.9	14.7	0.0	0.0
Southern Labrador (SFA 2)	464	0.0	0.4	14.4	55.2	27.6	2.4	0.0
All areas	880	0.0	0.5	18.9	56.0	23.0	1.5	0.2
PERCENTAGE OF SAMPLES BY RIVER AGE WITHIN THE THREE SAMPLED AREAS IN 2016								
Northern Labrador (SFA 1A)	234	0.0	0.0	20.0	60.0	20.0	0.0	0.0
Lake Melville (SFA 1B)	153	0.0	0.7	21.6	70.6	7.2	0.0	0.0
Southern Labrador (SFA 2)	369	0.0	0.5	24.9	57.5	15.7	1.4	0.0
All areas	756	0.0	0.5	22.1	62.0	14.7	0.7	0.0

Table 7. Correspondence between ICES areas used for the assessment of status of North American salmon stocks and the regional groups (Figure 5) defined from the North American genetic baseline.

<table>
<tr><th>ICES region</th><th>Regional group</th><th>Group acronym</th></tr>
<tr><td>Quebec</td><td rowspan="2">Ungava / Northern Labrador</td><td rowspan="2">UNG</td></tr>
<tr><td rowspan="3">Labrador</td></tr>
<tr><td>Labrador Central</td><td>LAB</td></tr>
<tr><td rowspan="2">Quebec / Labrador South</td><td rowspan="2">QLS</td></tr>
<tr><td rowspan="4">Quebec</td></tr>
<tr><td>Quebec</td><td>QUE</td></tr>
<tr><td>Anticosti</td><td>ANT</td></tr>
<tr><td rowspan="2">Gaspe</td><td rowspan="2">GAS</td></tr>
<tr><td rowspan="2">Gulf</td></tr>
<tr><td rowspan="2">Gulf of St. Lawrence</td><td rowspan="2">GUL</td></tr>
<tr><td rowspan="3">Scotia-Fundy</td></tr>
<tr><td>Nova Scotia</td><td>NOS</td></tr>
<tr><td>Inner Bay of Fundy</td><td>FUN</td></tr>
<tr><td>USA</td><td>USA</td><td>US</td></tr>
<tr><td rowspan="2">Newfoundland</td><td>Newfoundland</td><td>NFL</td></tr>
<tr><td>Avalon</td><td>AVA</td></tr>
</table>

Table 8. Estimated percent contributions (mean and standard error) by regional group of North American origin salmon in the Labrador FSC fisheries, 2015 and 2016. Regional groups are shown in Figure 5. Note: values in shaded cells are not significantly different from 0.

Regional Groups	Salmon All size groups Mean (S.E.)		Small Salmon < 63 cm Mean (S.E.)		Large Salmon ≥ 63 cm Mean (S.E.)		Northern Labrador SFA 1A Mean (S.E.)		Lake Melville SFA 1B Mean (S.E.)		Southern Labrador SFA 2 Mean (S.E.)	
Year	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
ANT	0.03 (0.06)	0.03 (0.06)	0.07 (0.15)	0.05 (0.11)	0.06 (0.16)	0.08 (0.23)	0.07 (0.19)	0.08 (0.20)	0.05 (0.12)	0.06 (0.15)	0.05 (0.12)	0.07 (0.18)
AVA	0.03 (0.07)	0.03 (0.06)	0.06 (0.15)	0.04 (0.07)	0.05 (0.14)	0.10 (0.27)	0.08 (0.23)	0.07 (0.16)	0.05 (0.13)	0.06 (0.18)	0.06 (0.18)	0.07 (0.19)
FUN	0.03 (0.07)	0.03 (0.07)	0.05 (0.11)	0.04 (0.10)	0.06 (0.18)	0.07 (0.20)	0.08 (0.20)	0.08 (0.21)	0.05 (0.14)	0.05 (0.14)	0.07 (0.17)	0.06 (0.17)
GAS	0.05 (0.13)	0.03 (0.08)	0.27 (0.58)	0.04 (0.11)	0.08 (0.23)	0.10 (0.28)	0.17 (0.43)	0.10 (0.30)	0.06 (0.15)	0.06 (0.15)	0.17 (0.44)	0.09 (0.25)
GUL	0.04 (0.10)	0.04 (0.07)	0.34 (0.59)	0.04 (0.10)	0.10 (0.26)	0.11 (0.31)	0.15 (0.38)	0.10 (0.27)	0.06 (0.16)	0.05 (0.14)	0.11 (0.29)	0.07 (0.19)
LAB	98.54 (0.68)	99.26 (0.55)	91.05 (2.92)	99.02 (0.66)	96.09 (2.38)	92.24 (2.74)	94.20 (2.67)	97.19 (1.64)	98.84 (1.10)	99.28 (0.63)	95.98 (2.35)	97.84 (1.29)
NFL	0.03 (0.07)	0.05 (0.12)	0.46 (0.82)	0.12 (0.30)	0.07 (0.19)	0.25 (0.65)	0.14 (0.39)	0.31 (0.69)	0.07 (0.17)	0.07 (0.17)	0.09 (0.27)	0.16 (0.43)
NOS	0.03 (0.07)	0.03 (0.06)	0.06 (0.15)	0.05 (0.12)	0.07 (0.19)	0.09 (0.29)	0.07 (0.19)	0.07 (0.19)	0.05 (0.13)	0.07 (0.19)	0.08 (0.24)	0.08 (0.21)
QLS	0.13 (0.22)	0.05 (0.11)	4.00 (2.32)	0.07 (0.18)	2.29 (2.11)	1.96 (1.88)	0.42 (0.81)	0.09 (0.26)	0.09 (0.25)	0.08 (0.26)	2.11 (2.16)	0.27 (0.68)
QUE	0.05 (0.12)	0.03 (0.07)	1.13 (1.35)	0.04 (0.10)	0.06 (0.16)	0.19 (0.54)	0.15 (0.40)	0.08 (0.26)	0.08 (0.22)	0.07 (0.21)	0.08 (0.23)	0.06 (0.18)
UNG	0.99 (0.60)	0.37 (0.47)	2.46 (1.26)	0.45 (0.47)	0.96 (1.23)	4.74 (1.87)	4.40 (2.49)	1.77 (1.30)	0.55 (0.97)	0.10 (0.25)	1.02 (0.96)	1.14 (0.81)
USA	0.03 (0.06)	0.03 (0.07)	0.07 (0.21)	0.04 (0.08)	0.1 (0.26)	0.06 (0.18)	0.07 (0.21)	0.07 (0.20)	0.06 (0.16)	0.06 (0.18)	0.17 (0.37)	0.07 (0.22)

Figure 1. Summary of harvests, in weight (t), of Atlantic salmon by geographic origin of the fisheries for eastern Canada, 2000 to 2016. Data for 2016 are provisional.

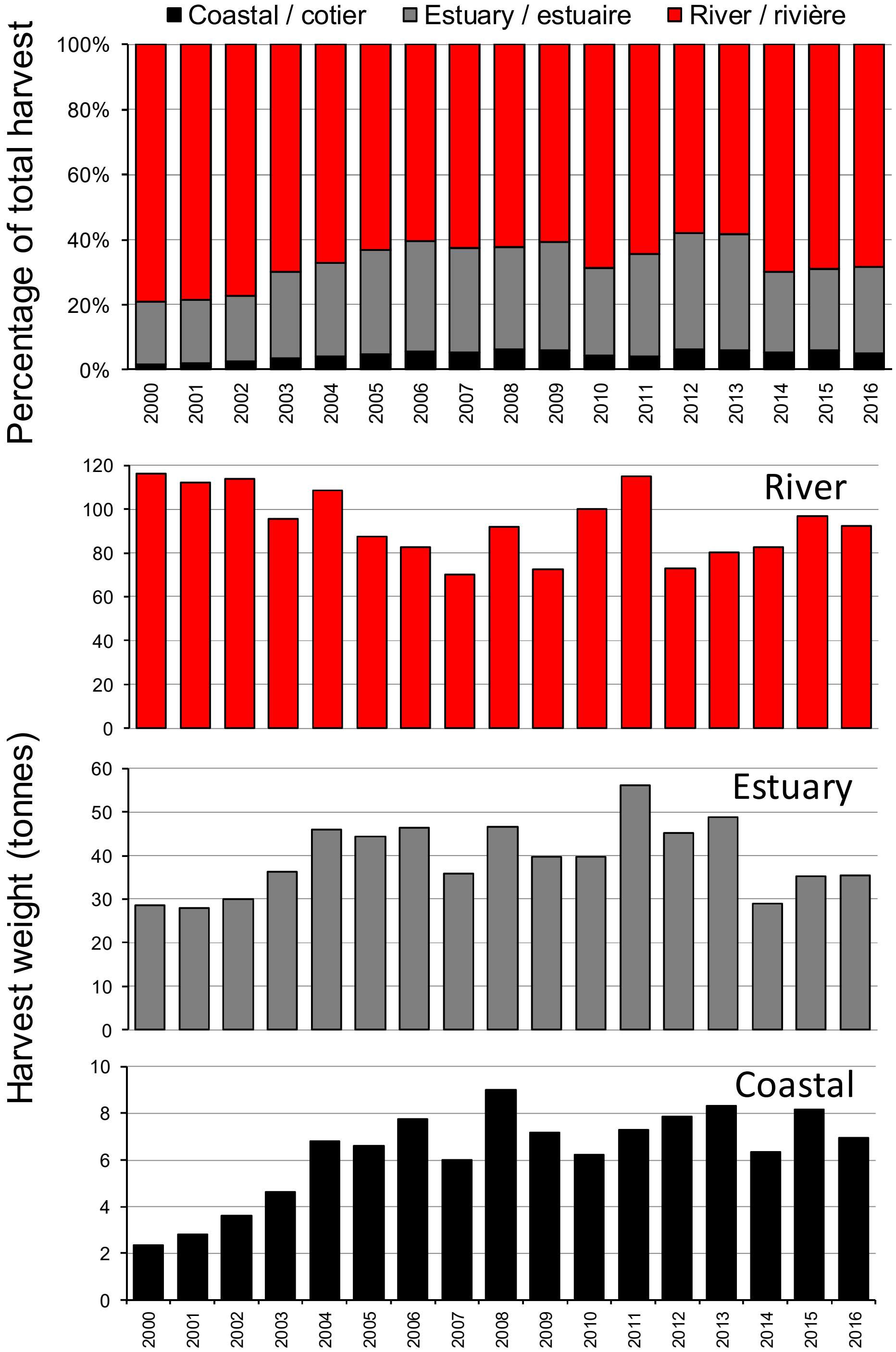


Figure 2. Map of Labrador showing the area represented by the Labrador Inuit Lands and the Labrador Inuit Settlement Area.

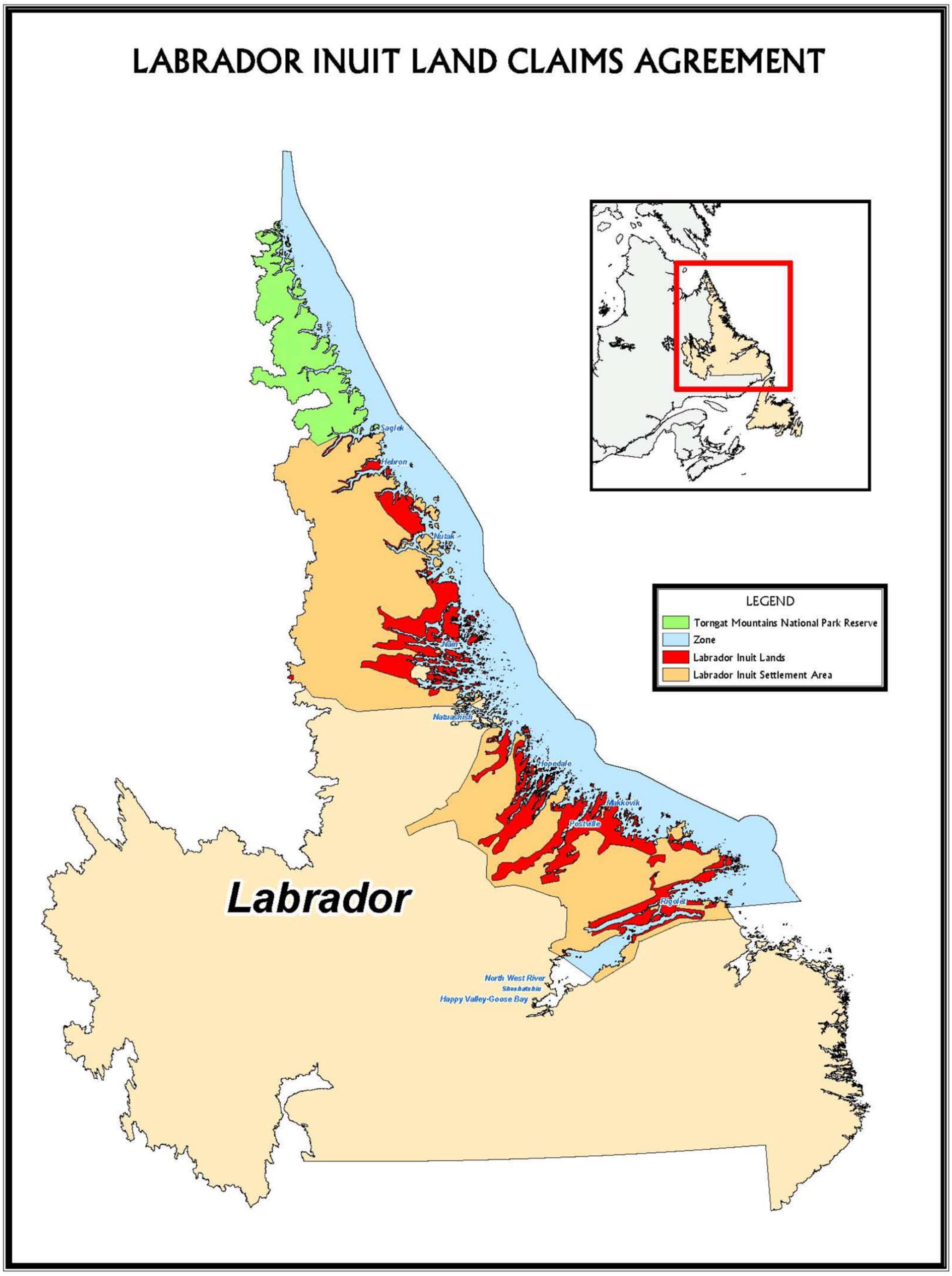


Figure 3. Total harvests (by number and weight) by size group of Atlantic salmon in the Labrador subsistence fisheries by Salmon Fishing Area, 2000 to 2016. Data for 2016 are provisional. Place names referred to in the text are also shown for reference.

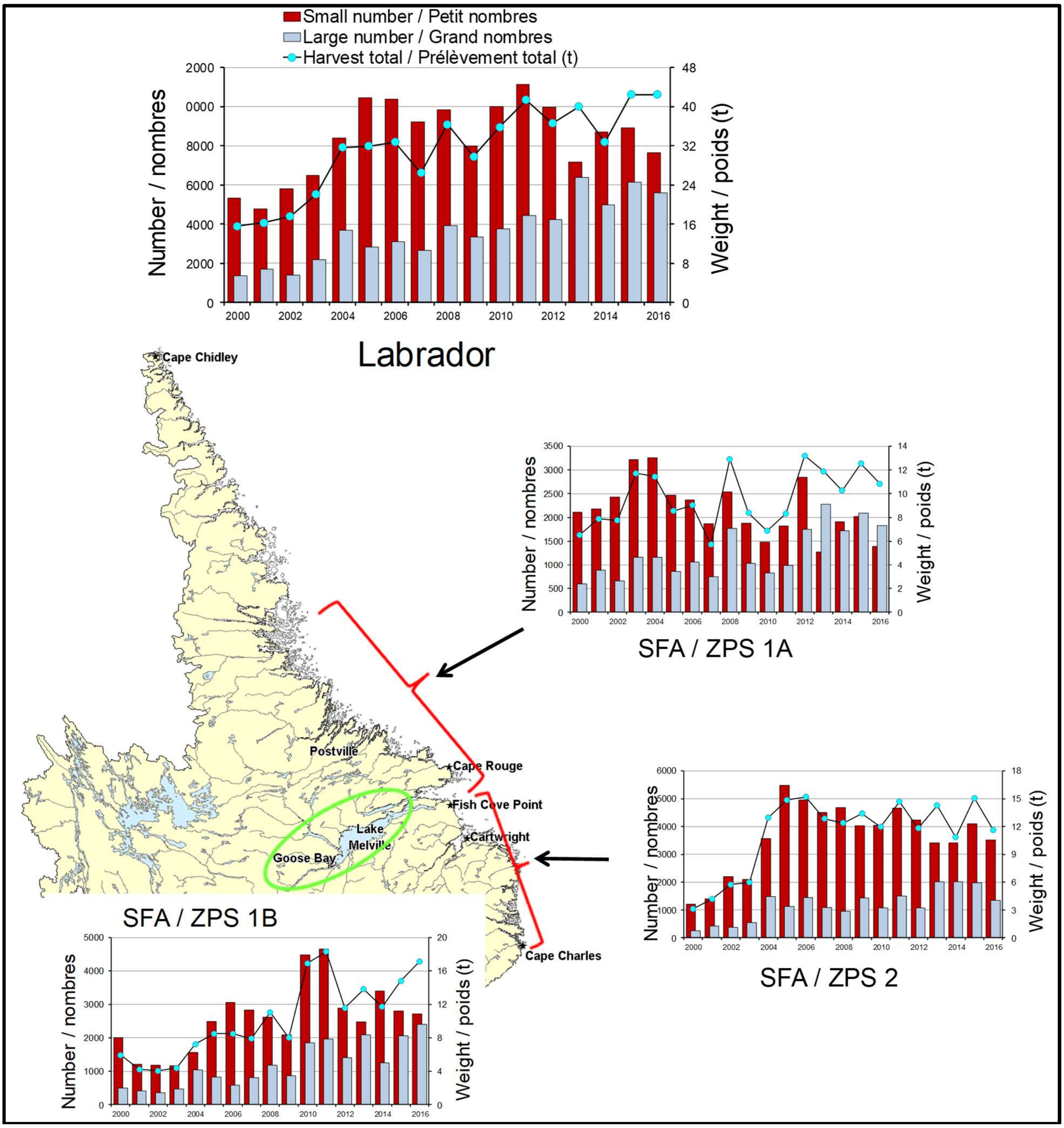


Figure 4. Distribution (percentages) of the Labrador subsistence fisheries harvests (by number) of small salmon (upper panel) and large salmon (lower panel) among the three Salmon Fishing Areas, 2000 to 2016.

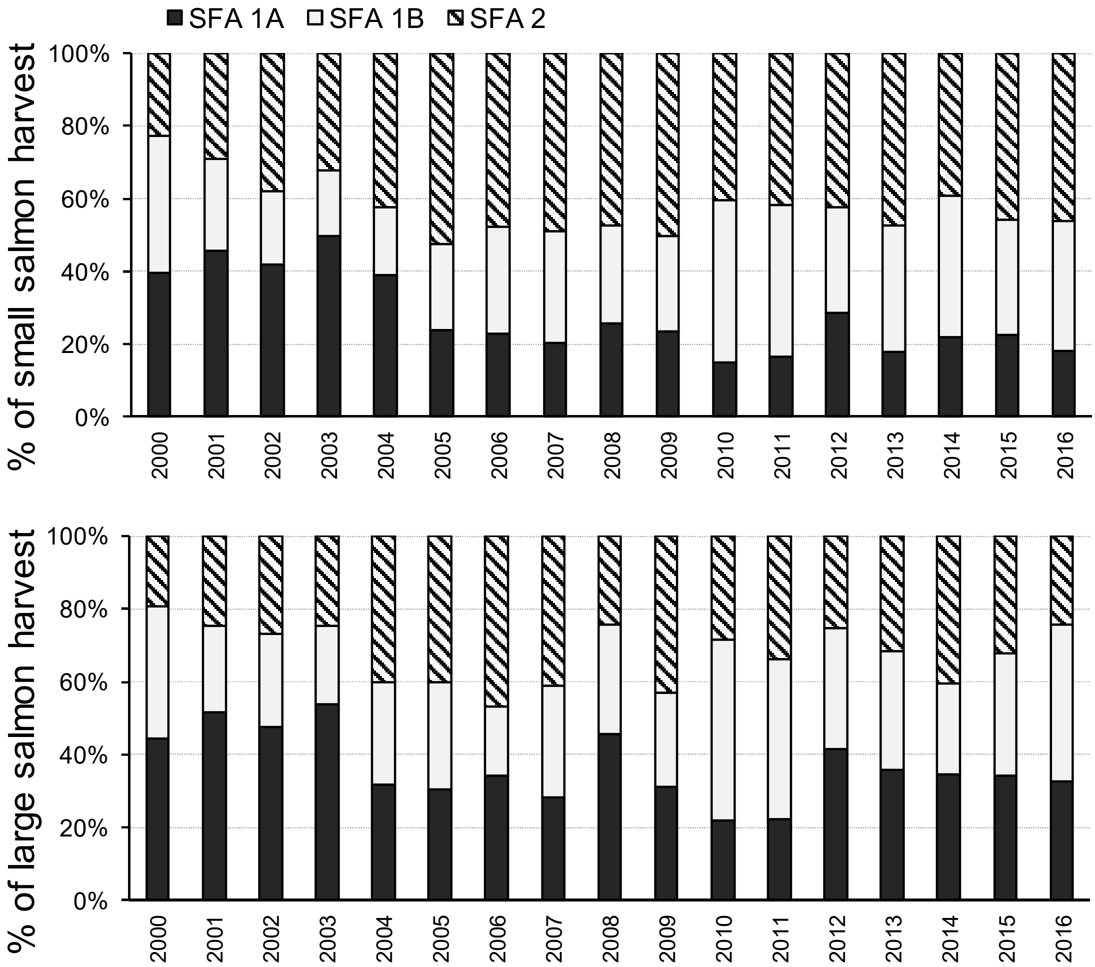


Figure 5. Map of sample locations used in the microsatellite baseline development for Atlantic salmon in North America and the regional groups resolved from the baseline. See Bradbury et al. (2015) for details and Table 7 for location abbreviations.

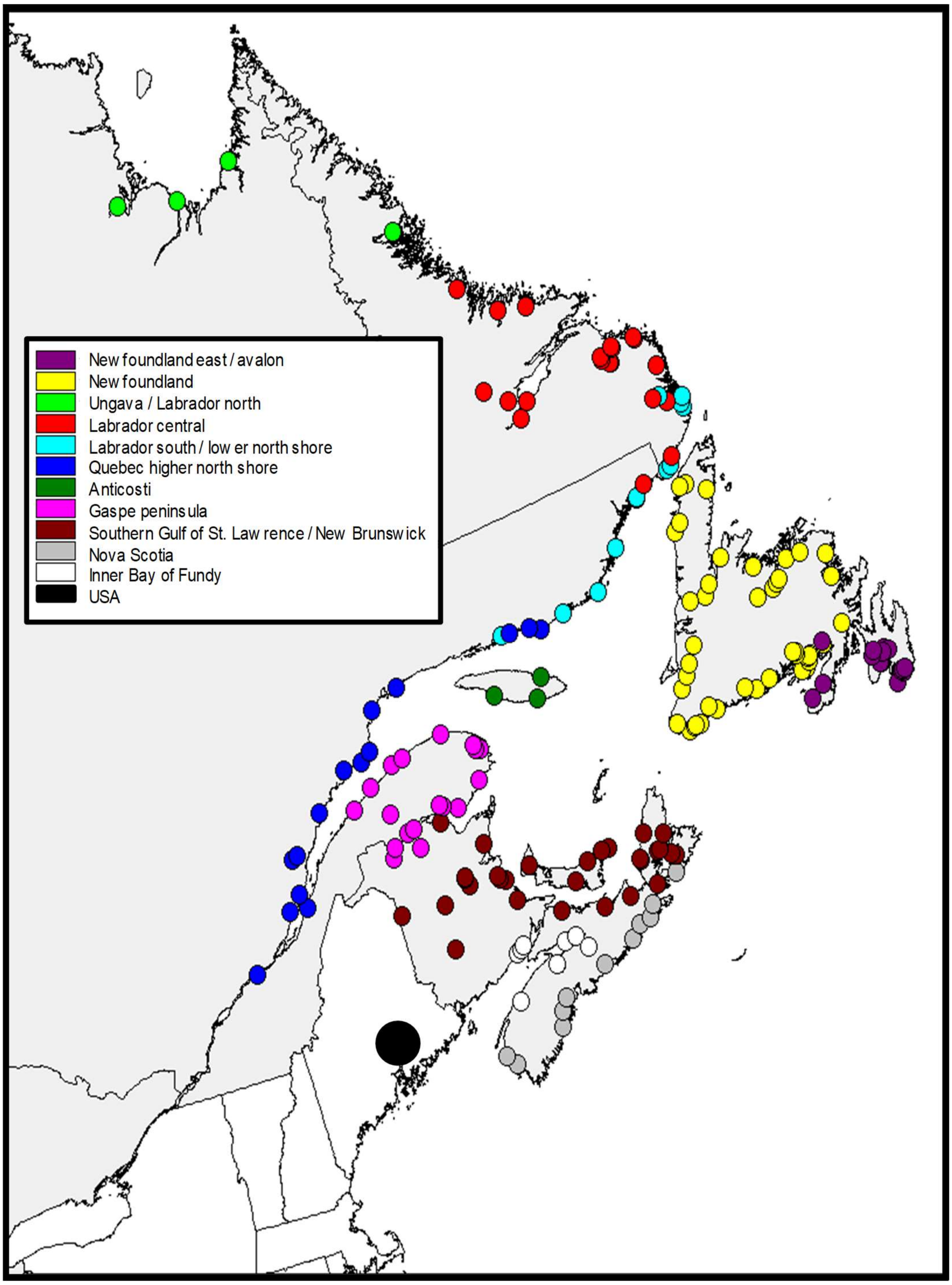
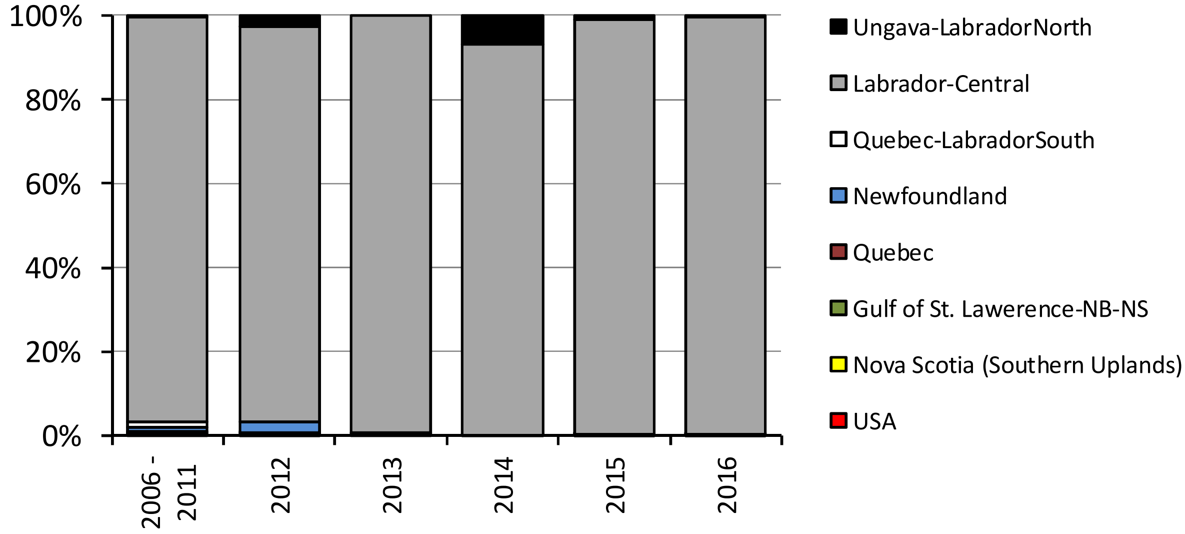


Figure 6. Bayesian estimates of mixture composition of samples from the Labrador Atlantic Salmon aboriginal fisheries from the combined samples for 2006 to 2011, and for each year 2012 to 2016. The groups, other than the first three Labrador groups, refer approximately to the regions used by ICES for assessment (Table 7 and Figure 5).



Annex 6

WGC(17)8

West Greenland Fishery Sampling Agreement, 2017

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

The objectives of the sampling program in 2017 are to:

- Continue the time series of data (1969-2016) on continent of origin and biological characteristics of the Atlantic salmon in the West Greenland fishery

- Provide data on mean weight, length, age, and continent of origin for use in the North American and European Atlantic salmon run-reconstruction models

- Collect information on the recovery of internal and external tags

To this end, the sampling program in 2017 will collect:

- Biological characteristics data including lengths and weights of landed fish
- Information on tags, fin clips, and other marks
- Scale samples to be used for age and growth analyses
- Tissue samples to be used for genetic analyses
- Other biological data requested by the ICES scientists and NASCO cooperators

<u>External Staffing Inputs</u>:

Parties external to Greenland with interests in the mixed stock fishery at West Greenland, including Canada, the European Union, and the United States, have historically provided personnel and analytical inputs into the cooperative sampling programs. The NASCO Parties agree to provide the following inputs to the cooperative sampling program at West Greenland during the 2017 fishing season:

- The European Union[21] agrees to provide a minimum of 8 person weeks[22] to sample Atlantic salmon at West Greenland during the 2017 fishing season;
- Canada agrees to provide a minimum of 2 person weeks[2] to sample Atlantic salmon at West Greenland during the 2017 fishing season;
- The United States agrees to provide a minimum of 2 person weeks[2] to sample Atlantic salmon at West Greenland during the 2017 fishing season;

---

[21] Ireland (2 samplers) and the United Kingdom (2 samplers).
[22] For the purposes of this agreement, a person week of sampling is defined as a trained individual who works on site in West Greenland to collect samples of Atlantic salmon for a period of 7 days.

- The Government of Greenland, in cooperation with the Greenland Institute of Natural Resources, will sample Atlantic salmon from the city of Nuuk on a weekly basis during the 2017 fishing season;
- The United States agrees to co-ordinate the sampling program for 2017; and
- The Government of Greenland, in cooperation with the Greenland Institute of Natural Resources, agrees to provide support for the sampling program by facilitating the sampling of Atlantic salmon by the samplers identified above.

In addition, NASCO Parties agree to provide the following technical support for sample analysis and data collected at West Greenland:

- The Government of Greenland, in cooperation with the Greenland Institute of Natural Resources and the Sampling Program Coordinator, will work with any factories receiving harvested salmon to collect biological characteristics data and samples from a proportion of the landed fish via factory staff;

- The United States agrees to provide oversight for the processing of all collected biological samples;

- The United States agrees to report the sampling program results to the ICES North Atlantic Salmon Working Group in support of the stock assessment completed by this group;

- The United States agrees to coordinate the publishing of a report that details the preliminary results of the sampling program. The report will be compiled in cooperation with institutes participating in the sampling program and will be published via a participating institution's official report series;

- Canada agrees to provide microsatellite DNA analysis of tissue samples collected from Atlantic salmon harvested at West Greenland;

- Canada agrees to provide ageing of scale samples collected from Atlantic salmon harvested at West Greenland;

- Canada agrees to maintain the historical West Greenland sampling database; and

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

<u>Government of Greenland Coordination Efforts</u>:

The Government of Greenland agrees to identify a mechanism to provide sampling access to landed Atlantic salmon before grading/culling and before fish are subject to health regulations that would restrict or prohibit activities associated with sampling.

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

The allocation of available scientific sampling personnel will be determined annually by the Program Coordinator to provide spatial and temporal coverage to characterize both the fishery and the Atlantic salmon populations along the West Greenland coast. Parties participating in the cooperative sampling program will share access to resulting data and work cooperatively in the publication of information.

Annex 7

CNL(17)10

Request for Scientific Advice from ICES

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

1.1 provide an overview of salmon catches and landings by country, including unreported catches and catch and release, and production of farmed and ranched Atlantic salmon in 2017[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 compilation of tag releases by country in 2017; and
1.5 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 2017 fisheries[4];
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 catch options or alternative management advice for the 2018/19-2020/21 fishing seasons, with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[5]; and
2.5 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 2017 fisheries (including the fishery at St Pierre and Miquelon)[4];
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;
3.4 provide catch options or alternative management advice for 2018-2021 with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[5]; 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 2017 fisheries[4];
4.2 describe the status of the stocks[6];
4.3 provide catch options or alternative management advice for 2018-2020 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[5];
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 respect to question 1.3, NASCO is aware that the WGERAAS final report is being prepared and will be submitted to ICES in 2017*
4. *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.*
5. *In response to questions 2.4, 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.*
6. *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.*

Attendees:

Sergey Prusov (NEAC, manager representative)
Peder Fiske (NEAC, scientist representative)
Annette Rumbolt (NAC, manager representative)
Tim Sheehan (NAC, scientist representative)
Esben Ehlers (WGC, manager representative)
Niall Ó Maoiléidigh (WGC, scientist representative)
Gérald Chaput (ICES representative, Observer)
Patrick Gargan (Coordinator)

Annex 8

List of West Greenland Commission Papers

WGC(17)1	Provisional Agenda
WGC(17)2	Draft Agenda
WGC(17)3	Report on the Use of the Framework of Indicators in 2017
WGC(17)4	Draft West Greenland Fishery Sampling Agreement 2017
WGC(17)5	Draft Report of the West Greenland Commission
WGC(17)6	Agenda
WGC(17)7	ICES Presentation
WGC(17)8	West Greenland Fishery Sampling Agreement 2017
WGC(17)9	Report of the West Greenland Commission

Report of the
ICES Advisory Committee
(Sections 2 to 4 only)

2. Atlantic salmon from the Northeast Atlantic

Summary of advice for fishing seasons 2017/2018 to 2018/2019

In 2015, ICES advised that there were no mixed-stock fisheries options (i.e. no catch > 0) on the NEAC stock complexes at the Faroes for the fishing seasons 2015/2016 to 2017/2018 (ICES, 2015). After an assessment in 2016, ICES continued to advise that there were no mixed-stock fisheries catch options on the NEAC complexes at the Faroes for the fishing seasons 2016/2017 to 2018/2019 (ICES, 2016a). This was consistent with the earlier advice. NASCO subsequently agreed that the Decision adopted in 2015 (NASCO, 2015) would continue to apply to the fishery in 2016/17, and that it would also apply in 2017/2018 unless the application of the Framework of Indicators (FWI) shows that a re-assessment is warranted.

The NASCO Framework of Indicators of Northeast Atlantic stocks for 2016 did not indicate the need for a revised analysis of catch options for 2017 and no new management advice for 2017 is provided. The assessment was updated to 2016 and the stock status is consistent with the previous years' assessments and catch advice.

2.1 NASCO asked ICES to describe the key events of the 2016 fisheries, including details of catch, gear, effort, composition and origin of the catch, rates of exploitation, and location of the catch as in river, estuarine, and coastal

Reports from the NEAC area in 2016 showed no significant changes in the gear types used.

No fishery for salmon has been prosecuted at the Faroes since 2000.

Reported nominal catch in the NEAC area in 2016 is 1043 t, with 187 t reported in the Southern NEAC and 856 t in the Northern NEAC subareas. Estimates of unreported catches in the NEAC area were 298 t in total. In 2016, the location of catches differed between Southern NEAC and Northern NEAC (Table 1). In-river fisheries accounted for 42% of the catches in Southern NEAC, 20% for estuarine fisheries, and 38% from coastal fisheries. In Northern NEAC, coastal fisheries accounted for 34% of the catches, with the remaining 66% of the catches coming from in-river fisheries.

Table 1 Salmon catches and catch locations in the NEAC area in 2016.

Catches and locations	Southern NEAC	Northern NEAC	Faroes	Total NEAC
2016 reported nominal catch (t)	187	856	0	1043
% of NEAC total	18	82	0	100
Unreported catch (t)	28	270	-	298
Location of catches				
% in-river	42.0	65.8	-	61.6
% in estuaries	19.9	0	-	3.6
% coastal	38.1	34.2	-	34.9

The NEAC area has seen a general reduction in catches since the 1980s (Figure 1; Table 2). This reflects the decline in fishing effort as a consequence of management measures, as well as a reduction in the size of stocks. The nominal catches for 2016 are among the lowest in the time-series in both areas. The catch in Southern NEAC, which constituted around two-thirds of the total NEAC catch in the early 1970s, has been lower than that in Northern NEAC since 1999 (Figure 1).

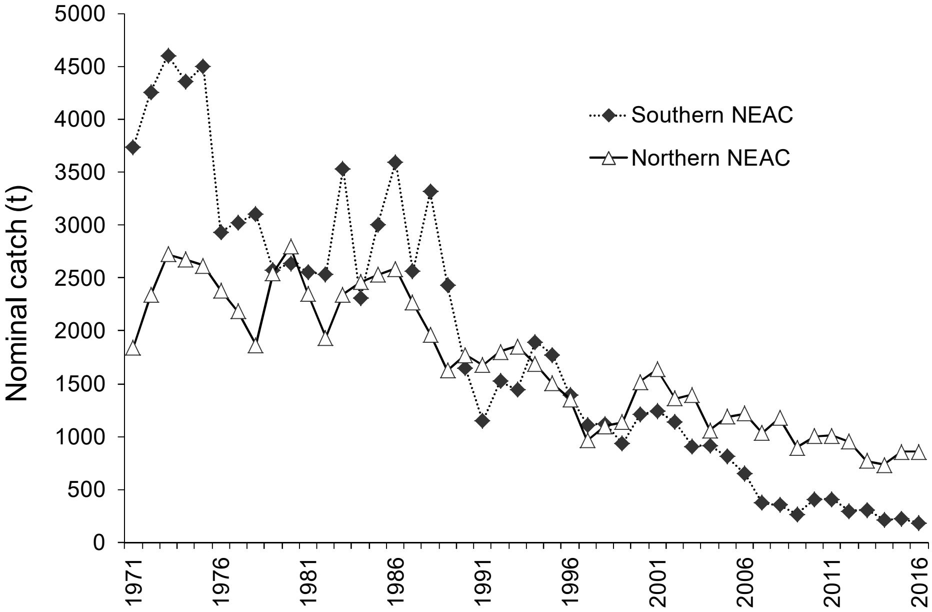


Figure 1 Nominal catches of salmon in the Southern NEAC and Northern NEAC subareas, 1971–2016.

1SW salmon constituted 52% of the total catch in Northern NEAC in 2016 (Figure 2). For the Southern NEAC countries, the overall percentage of 1SW fish in the catch in 2016 was estimated at 44%. In both areas, there has been a declining trend in the proportion of 1SW fish in the catch over the time-series; the reduction for Southern NEAC has been particularly marked in the last 10 to 15 years (Figure 2).

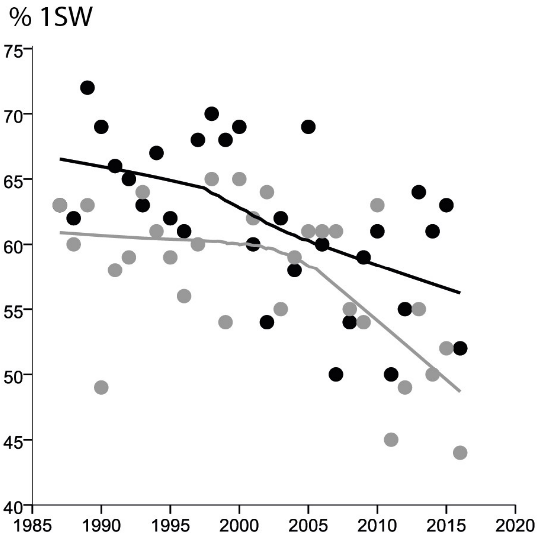


Figure 2 Percentage of 1SW salmon in the reported catch for Northern NEAC (black symbols) and Southern NEAC (grey symbols) subareas, 1987–2016. The lines indicate loess regressions over the time-series.

The contribution of escaped farmed salmon to national catches in the NEAC area in 2016 was again generally low in most countries, with the exception of Norway, Iceland, and Sweden, and is similar to the values reported in previous years (ICES, 2017a). Estimates of the proportion of farmed fish in Norwegian angling catches were in the lower range of observed values in the time-series (4%), while the proportion estimated in Norwegian rivers in the autumn was the lowest in the time-series (7%). No current data are available for the proportion of farmed salmon in coastal fisheries.

Estimated exploitation rates have been continually decreasing over a ca. 40-year time period in both the Northern and Southern NEAC subareas (Figure 3). The exploitation rates on 1SW and MSW salmon have become similar, with higher exploitation rates in Northern NEAC at just over 40% compared to 10% in Southern NEAC.

Estimates of the number of salmon caught and released in rod fisheries are not complete for all NEAC countries. There are large differences in the percentage of the total rod catch that is released: in 2016 this ranged from 18% in Sweden to 90% in UK (Scotland), reflecting varying management practices and angler attitudes among these countries.

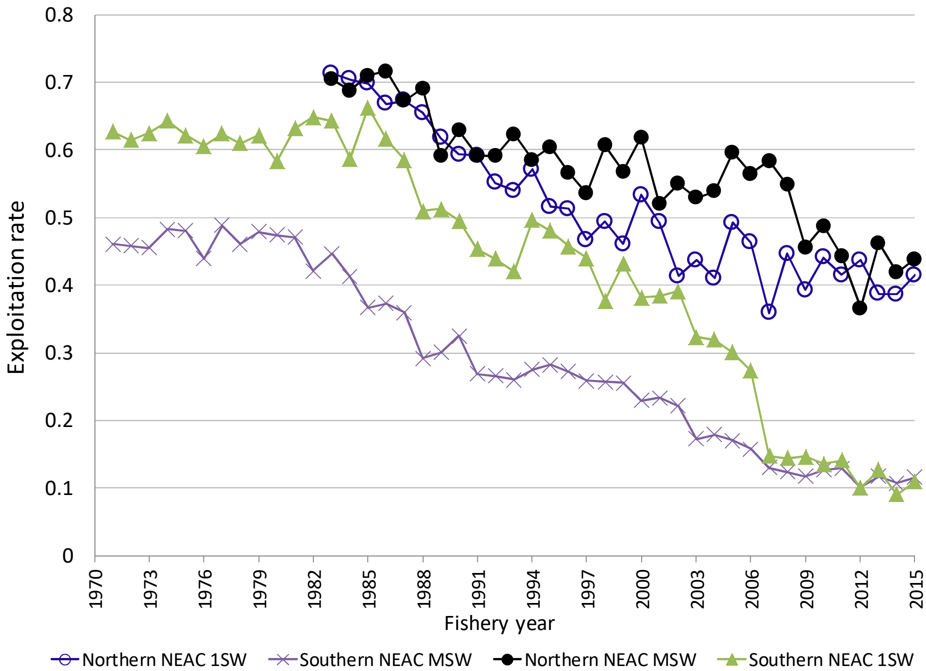


Figure 3 Exploitation rates of 1SW and MSW salmon in homewater fisheries in the Northern (1983–2016) and Southern (1971–2016) NEAC areas.

Origin and composition of catches

New information on the stock composition of fish originating from UK (Scotland) and UK (England and Wales) that are caught in the coastal fishery off northeast England was obtained using genetic stock identification (Gilbey *et al.*, 2016). The results from sampling of the 2011 catches were in close agreement with previous estimates based on tagging studies and estimates of stock status although there was a small increase (0.50 to 0.63) in the proportion of the catch of salmon from UK (England and Wales) and a corresponding small decrease (0.50 to 0.37) in the proportion derived from UK (Scotland).

In the coastal fisheries in northern Norway in 2011 and 2012, the incidence of salmon of Russian origin in the catches varied strongly within season and among fishing regions, averaging 17% in the coastal catches in Finnmark County, while nearly 50% of all salmon captured in Varangerfjord, close to the border, were of Russian origin (Svenning *et al.*, 2014). No information from recent years was provided on stock origin in these fisheries.

Table 2 Nominal catch of salmon in the NEAC area (in tonnes, round fresh weight), 1960 to 2016 (2016 figures are provisional).

Year	Southern countries	Northern countries (1)	Faroes (2)	Other catches in international waters	Total Reported Catch	Unreported catches	
						NEAC Area (3)	Internationa l waters (4)
1960	2.641	2.899	-	-	5.540	-	-
1961	2.276	2.477	-	-	4.753	-	-
1962	3.894	2.815	-	-	6.709	-	-
1963	3.842	2.434	-	-	6.276	-	-
1964	4.242	2.908	-	-	7.150	-	-
1965	3.693	2.763	-	-	6.456	-	-
1966	3.549	2.503	-	-	6.052	-	-
1967	4.492	3.034	-	-	7.526	-	-
1968	3.623	2.523	5	403	6.554	-	-
1969	4.383	1.898	7	893	7.181	-	-
1970	4.048	1.834	12	922	6.816	-	-
1971	3.736	1.846	-	471	6.053	-	-
1972	4.257	2.340	9	486	7.092	-	-
1973	4.604	2.727	28	533	7.892	-	-
1974	4.352	2.675	20	373	7.420	-	-
1975	4.500	2.616	28	475	7.619	-	-
1976	2.931	2.383	40	289	5.643	-	-
1977	3.025	2.184	40	192	5.441	-	-
1978	3.102	1.864	37	138	5.141	-	-
1979	2.572	2.549	119	193	5.433	-	-
1980	2.640	2.794	536	277	6.247	-	-
1981	2.557	2.352	1.025	313	6.247	-	-
1982	2.533	1.938	606	437	5.514	-	-
1983	3.532	2.341	678	466	7.017	-	-
1984	2.308	2.461	628	101	5.498	-	-
1985	3.002	2.531	566	-	6.099	-	-
1986	3.595	2.588	530	-	6.713	-	-
1987	2.564	2.266	576	-	5.406	2.554	-
1988	3.315	1.969	243	-	5.527	3.087	-
1989	2.433	1.627	364	-	4.424	2.103	-
1990	1.645	1.775	315	-	3.735	1.779	180-350
1991	1.145	1.677	95	-	2.917	1.555	25-100
1992	1.523	1.806	23	-	3.352	1.825	25-100
1993	1.443	1.853	23	-	3.319	1.471	25-100
1994	1.896	1.684	6	-	3.586	1.157	25-100
1995	1.775	1.503	5	-	3.283	942	-
1996	1.392	1.358	-	-	2.750	947	-
1997	1.112	962	-	-	2.074	732	-
1998	1.120	1.099	6	`	2.225	1.108	-

Year	Southern countries	Northern countries (1)	Faroes (2)	Other catches in international waters	Total Reported Catch	Unreported catches	
						NEAC Area (3)	International waters (4)
1999	934	1.139	0	-	2.073	887	-
2000	1.210	1.518	8	-	2.736	1.135	-
2001	1.242	1.634	0	-	2.876	1.089	-
2002	1.135	1.360	0	-	2.496	946	-
2003	908	1.394	0	-	2.303	719	-
2004	919	1.059	0	-	1.978	575	-
2005	809	1.189	0	-	1.998	605	-
2006	650	1.217	0	-	1.867	604	-
2007	373	1.036	0	-	1.408	465	-
2008	355	1.178	0	-	1.533	433	-
2009	266	898	0	-	1.164	317	-
2010	411	1.003	0	-	1.414	357	-
2011	410	1.009	0	-	1.419	382	-
2012	295	955	0	-	1.250	363	-
2013	310	770	0	-	1.080	272	-
2014	218	736	0	-	954	256	-
2015	223	859	0	-	1.081	298	-
2016	187	856	0	-	1.043	298	-
Average							
2011-2015	291	866	0	-	1157	314	-
2006-2015	351	966	0	-	1317	375	-

1. All Iceland has been included in Northern countries
2. Since 1991, fishing carried out at the Faroes has only been for research purposes.
3. No unreported catch estimate available for Russia since 2008.
4. Estimates refer to season ending in given year.

2.2 NASCO asked ICES to 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

River-specific conservation limits (CLs) have been previously derived for salmon stocks in most countries in the NEAC area (France, Ireland, UK (England and Wales), UK (N. Ireland), Finland, Norway, and Sweden). Preliminary results are also available for a small number of rivers in Russia. In UK (Scotland) stocks are assessed against CLs at the scale of individual rivers or groups of small rivers. Where sufficient numbers of CL estimates are available for individual rivers, these are summed to provide estimates at a country level. For countries that do not have sufficient river-specific CLs (Russia, UK (Scotland), and Iceland), an interim approach has been developed for estimating national CLs. This approach is based on the establishment of pseudo-stock–recruitment relationships for national salmon stocks.

To provide catch options to NASCO, CLs are required for stock complexes. These have been derived either by summing individual river CLs to national level, or by taking overall national CLs as provided by the national model, and then summing to the level of the four NEAC stock complexes. The CLs have also been used to estimate the spawner escapement reserves (SERs), which are the CLs (expressed in terms of spawner numbers) increased to take account of natural mortality (M = 0.03 per month) between

1 January of the first winter at sea and the return time to homewaters for each of the maturing (6–9 months) and non-maturing (16–21 months) 1SW salmon components from the Northern NEAC and Southern NEAC stock complexes.

Table 3 Conservation limits (CL) and spawner escapement reserves (SER) for the salmon stock complexes in the NEAC area.

Stock complex	Sea age group	CL (number)	SER (number)
Northern NEAC	1SW	145 590	184 055
	MSW	121 075	206 742
Southern NEAC	1SW	577 107	731 946
	MSW	269 153	456 480

For the nine jurisdictions where such data are available, time-series indicating the development in the definition of river-specific CLs, the number of rivers annually assessed against CLs, and the number of rivers that annually meet or exceed CLs (based on spawner numbers, after fisheries) are provided in Figure 4. This figure illustrates the increase in the number of CLs established within individual jurisdictions and the increasing number of jurisidictions (nine as of 2016) that have defined CLs.

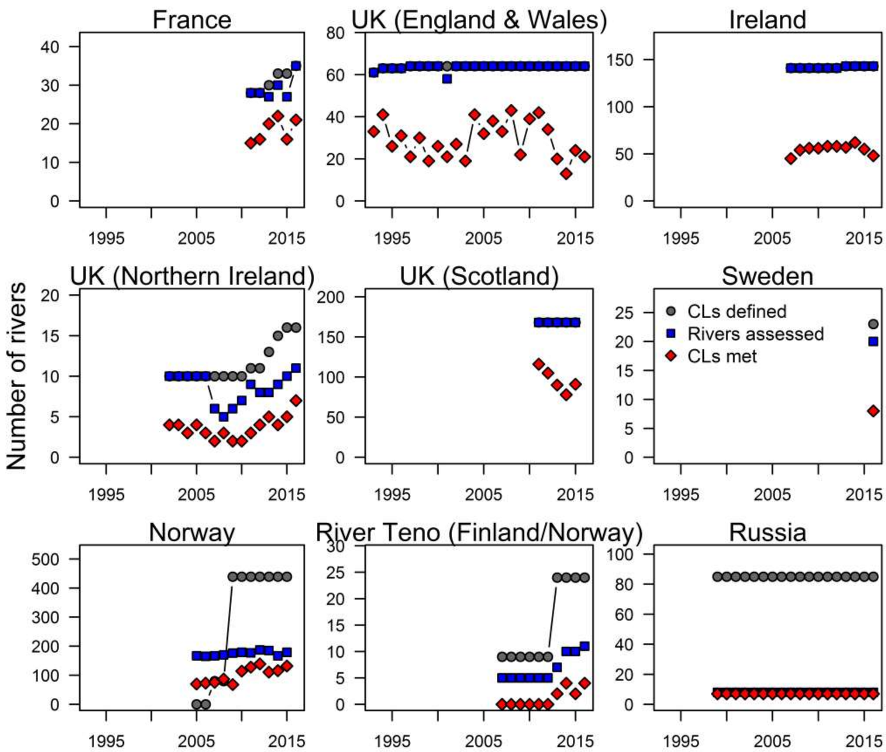


Figure 4 Time-series by jurisdictions in the NEAC area, showing progression in the number of rivers with established CLs, the number of rivers annually assessed, and the number of stocks annually meeting CLs.

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

Despite management measures aimed at reducing exploitation in recent years, there has been little improvement in the status of stocks over time. This is mainly a consequence of continuing poor survival in the marine environment.

National stocks within the NEAC area are combined into two groups for the provision of management advice for the distant-water fisheries at West Greenland and the Faroes. The northern group (Northern NEAC) consists of: Russia, Finland, Norway, Sweden, and the northeastern regions of Iceland. The southern group (Southern NEAC) consists of: UK (Scotland), UK (England and Wales), UK (N. Ireland), Ireland, France, and the southwestern regions of Iceland. Assessments are provided for two sea age groups, 1SW and MSW salmon, in each of the NEAC subareas.

Recruitment, expressed as pre-fishery abundance (PFA) by sea age group (maturing 1SW and non-maturing 1SW (MSW) salmon) and at 1 January of the first winter at sea, is estimated by stock complex (Northern NEAC and Southern NEAC) and by individual country, and further interpreted relative to the spawner escapement reserve (SER) (Figures 5 and 6).
The assessment of PFA against SER for the Northern NEAC and Southern NEAC complexes over the time-series is shown in Figure 5. The assessment of PFA against SER by countries for the most recent year is shown in Figure 6. The time-series of returns and spawners against CLs are shown by sea age groups for the Northern NEAC and Southern NEAC complexes (Figure 5) and for 2016 by individual countries for 1SW maturing (Figure 7) and MSW salmon (Figure 8). These assessments show the same broad contrasts between Northern (including Iceland) and Southern NEAC stocks that are seen in the stock complex data.

PFA relative to SER

PFAs of both maturing 1SW and non-maturing 1SW salmon for Northern NEAC show a general decline over the time period (since 1983), with the decline being more marked in the maturing 1SW stock (Figure 5). Both sea age complexes have, however, been at full reproductive capacity prior to the commencement of distant-water fisheries (i.e. meeting the SER with at least 95% probability) throughout the time-series. In the most recent year, both maturing 1SW and non-maturing 1SW salmon in all countries were at full reproductive capacity, with the exception of Sweden for which the maturing 1SW sea age component was at risk of suffering reduced reproductive capacity (Figure 6).

The PFAs of maturing and non-maturing 1SW salmon for Southern NEAC demonstrate broadly similar declining trends over the time period (since 1971; Figure 5). Both sea age complexes were at full reproductive capacity prior to the commencement of distant-water fisheries throughout the early part of the time-series. However, in approximately 50% of the years since the mid-1990s, the non-maturing 1SW stock has been at risk of suffering reduced reproductive capacity before any fisheries took place. The maturing 1SW stock, on the other hand, was only assessed as being at risk of suffering reduced reproductive capacity in 2009; in the majority of years since then this stock has been at risk of suffering, or suffering reduced reproductive capacity. With the exception of UK (N. Ireland), the maturing 1SW components in all countries in the most recent year are at risk of suffering (UK (Scotland)), or suffering reduced reproductive capacity (Figure 6). For the non-maturing 1SW salmon, the stocks in UK (Scotland), France, and Ireland are all at risk of suffering reduced reproductive capacity, whereas stocks in UK (England and Wales) and UK (N. Ireland) are assessed to be at full reproductive capacity (Figure 6).

Spawners relative to CLs

In terms of spawners in the Northern NEAC stock complex, 1SW spawners have been at full reproductive capacity (i.e. meeting the CL with at least 95% probability) throughout the time-series, albeit at reduced levels since 2007 (Figure 5). MSW spawners, on the other hand, while generally remaining at full reproductive capacity, have spent limited periods at risk of suffering reduced reproductive capacity, most recently in 2007 (Figure 5). Since 2000, MSW spawners have generally been above values in the early part of the time-series. In the most recent year, 1SW spawners were at risk of suffering (Russia), or suffering reduced reproductive capacity (Sweden, Teno/Finland) (Figure 7), whereas MSW stock complexes were at full reproductive capacity in all countries with the exception of Russia, in which stocks are suffering reduced reproductive capacity (Figure 8).

In the Southern NEAC stock complex, declines in spawner numbers are evident for both 1SW and MSW salmon (Figure 5). The 1SW spawning stock has been at risk of suffering, or suffering reduced reproductive capacity for most of the time-series. In contrast, the MSW stock was at full reproductive capacity for most of the time-series until 1996. After this point, however, the MSW stock has been either at risk of suffering, or suffering reduced reproductive capacity in almost every year (Figure 5). In the most recent year, 1SW spawners have been suffering reduced reproductive capacity with the exception of stocks in UK (N. Ireland) (Figure 7). For MSW spawners, stocks in UK (England and Wales) and UK (N. Ireland) in the most recent year were at full reproductive capacity, whereas stocks in France, Ireland, and UK (Scotland) were suffering reduced reproductive capacity (Figure 8).

Trends in rivers meeting CLs

In the NEAC area, nine jurisdictions currently assess salmon stocks using river-specific CLs (Figure 4). The attainment of CLs is assessed based on spawners, after fisheries. For River Teno (Finland/Norway), none of the assessed stocks met CLs prior to 2013; since 2014, between 20% and 40% of the assessed stocks met CLs. Norway has an overall increasing trend in CL attainment, increasing from 39% of the assessed stocks in 2009 to 74% in 2015. In Russia (Murmansk region), 88% of the assessed stocks have consistently met their CLs. In France, the percentage of stocks meeting CLs peaked in 2013 at 74%, declining to 60% in 2016. The mean percentage of stocks meeting CLs in Ireland was 34% over the time-series, with the highest attainment of 43% achieved in 2014 and with a progressive decline to 38% in 2015 and 34% in 2016. Since 1995, 46% of the rivers in UK (England and Wales) have met CLs, but with an evident downward trend from the 66% attained in 2011 to a low of 20% in 2014, showing the slightly higher values of 38% in 2015 and 33% in 2016. In UK (N. Ireland) a mean of 43% of the rivers have met their CLs over the presented time-series and an upward trend is evident from 2011, with 64% of the assessed stocks attaining CLs in 2016. UK (Scotland) established CLs for 168 individual rivers and groups of smaller neighbouring rivers in 2016. Retrospective assessment conducted up to 2011 indicated 57% mean attainment over the time-series. A progressive decline in meeting CLs was observed from 2011 (69%) to 2014 (46%), with a subsequent upturn to 54% evident in 2015.

Return rates

There has been an overall declining trend since 1980 in the return rates (marine survival) of both wild and hatchery-origin smolts to 1SW returns for both the Northern and Southern NEAC subareas (Figure 9). Results from these analyses are consistent with the information on estimated returns and spawners as derived from the PFA model, suggesting that returns are strongly influenced by factors in the marine environment. The declining trend is not evident for the 2SW wild components in either subarea, or for hatchery-origin smolts to 2SW in Northern NEAC (no data are available for hatchery-origin 2SW return rates for Southern NEAC).

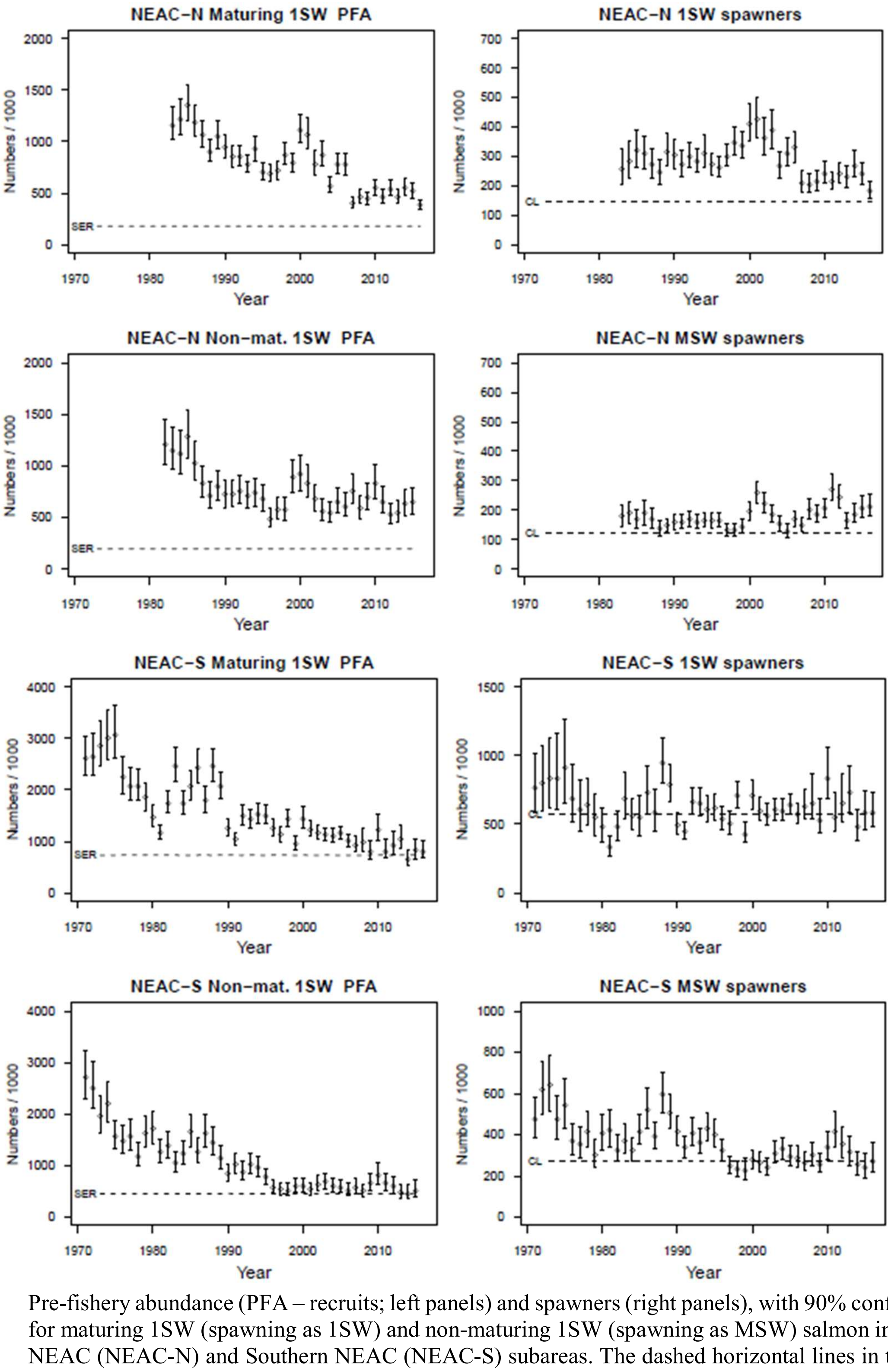


Figure 5 Pre-fishery abundance (PFA – recruits; left panels) and spawners (right panels), with 90% confidence limits, for maturing 1SW (spawning as 1SW) and non-maturing 1SW (spawning as MSW) salmon in the Northern NEAC (NEAC-N) and Southern NEAC (NEAC-S) subareas. The dashed horizontal lines in the left panels are the spawning escapement reserve (SER) values, and in the right panels the conservation limit (CL) values.

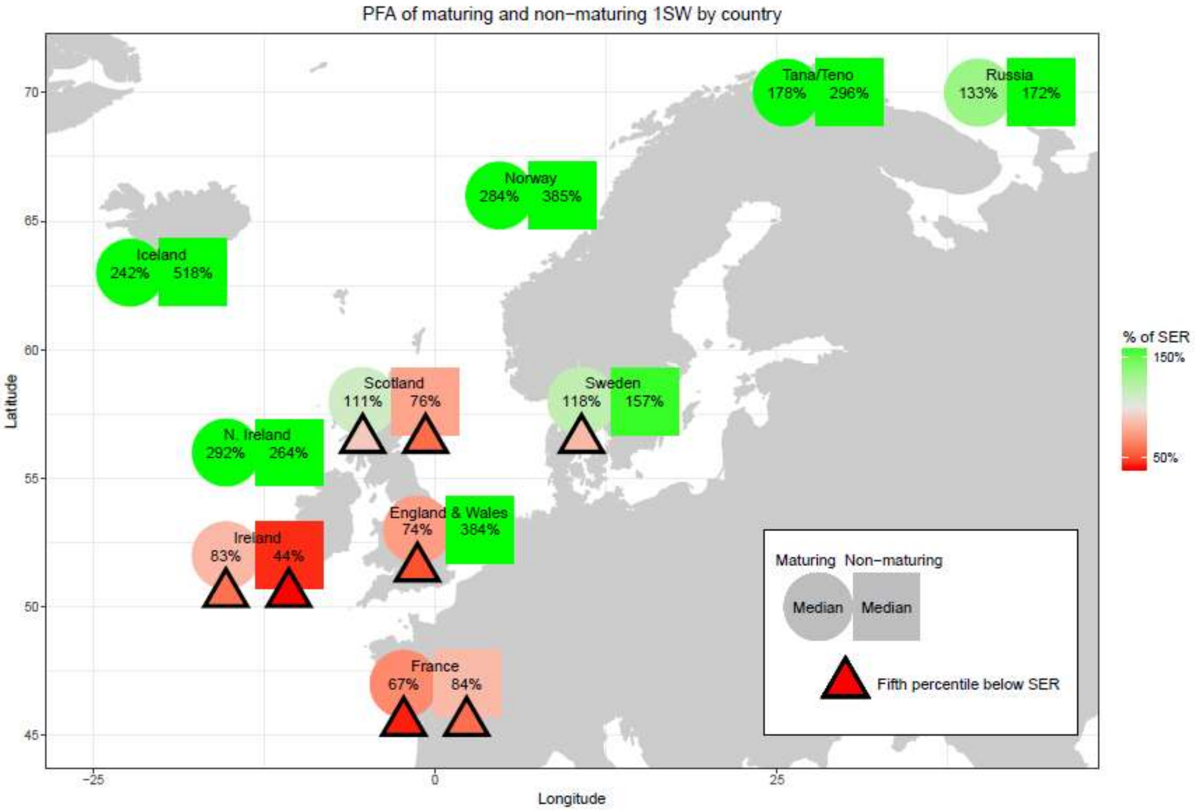


Figure 6 Medians of the most recent year PFA of maturing 1SW (for 2016; circles) and non-maturing 1SW (for 2015; squares), expressed as percentages of the respective spawner escapement reserve (% of SER). The colour shading of the symbols represents the percentage of the SER attained, with red being less than 100% and green greater than 100%. The triangles accompanying the respective PFA symbols indicate when the 5th percentiles of the estimates of PFAs are below the SERs, i.e. when the stocks are suffering reduced reproductive capacity.

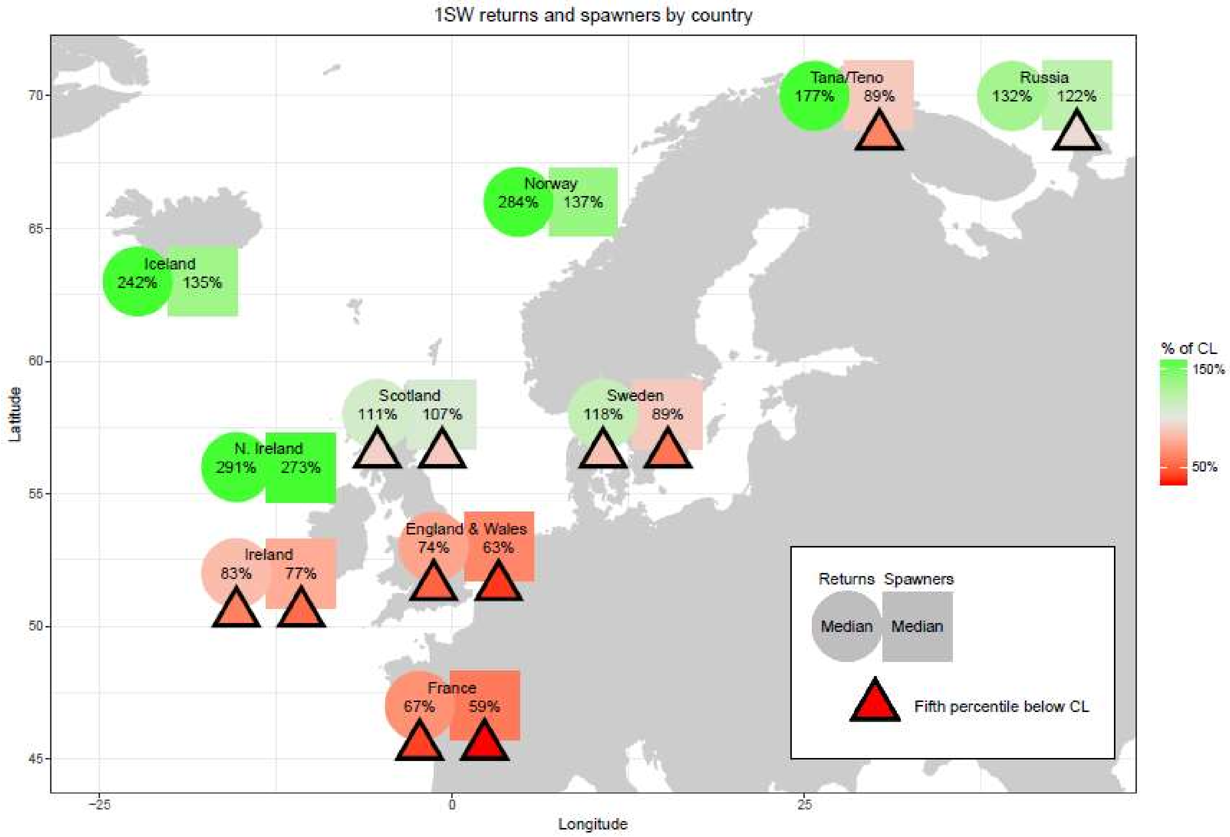


Figure 7 Medians of the estimated returns (circles) and spawners (squares) of 1SW maturing salmon, expressed as percentages of the respective CLs. The colour shading of the symbols represents the percentage of the CLs attained, with red being less than 100% and green greater than 100%. The triangles accompanying the respective returns and spawners symbols indicate when the 5th percentiles of the estimates of returns and spawners are below the CLs, i.e. when the stocks are suffering reduced reproductive capacity.

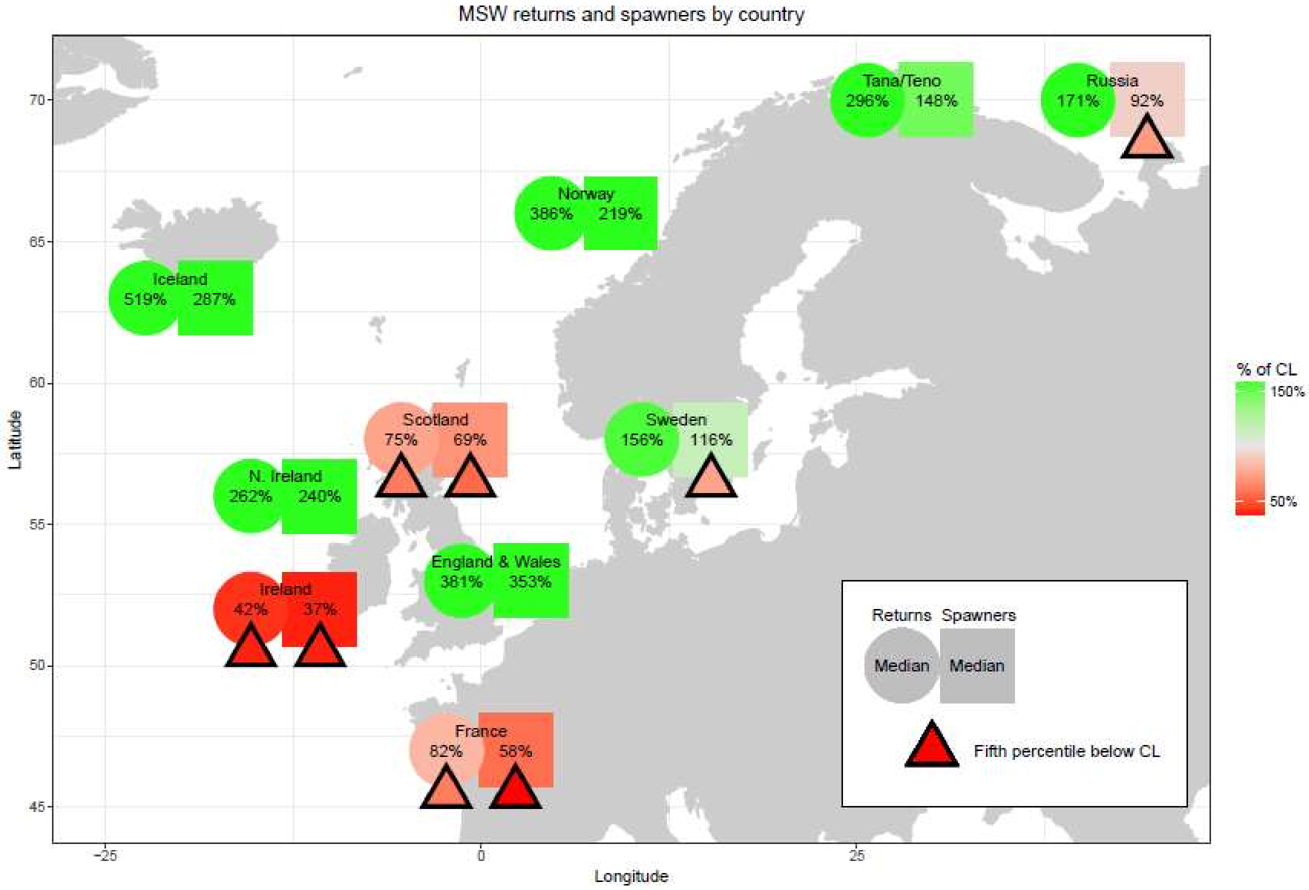


Figure 8 Medians of the estimated returns (circles) and spawners (squares) of MSW salmon, expressed as percentages of the respective CLs. The colour shading of the symbols represents the percentage of the CLs attained, with red being less than 100% and green greater than 100%. The triangles accompanying the respective returns and spawners symbols indicate when the 5th percentiles of the estimates of returns and spawners are below the CLs, i.e. when the stocks are suffering reduced reproductive capacity.

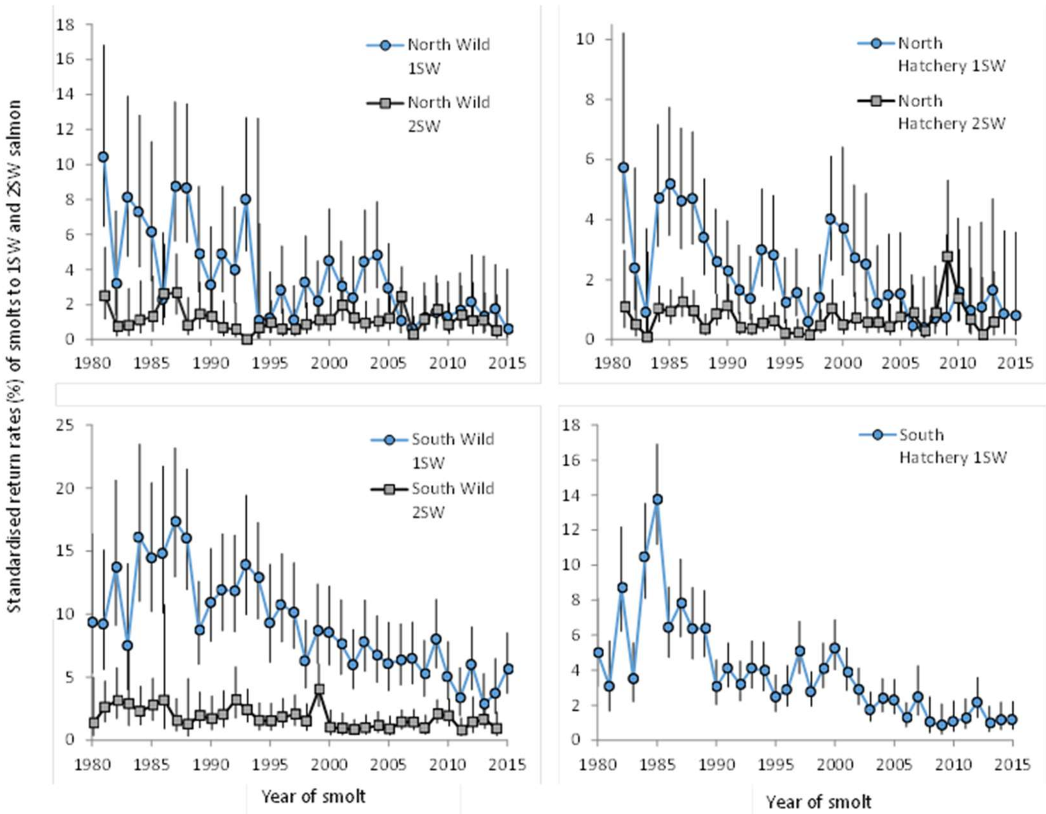


Figure 9 Standardized mean annual return rates (%) of wild (left panels) and hatchery-origin (right panels) smolts as 1SW and 2SW adult salmon to the Northern NEAC (top panels) and Southern NEAC (bottom panels) subareas. For Southern NEAC, the return rates are generally returns to the coast, whereas for Northern NEAC the return rates are to the rivers. The standardized values are derived from a general linear model analysis of rivers in a region. Note differences in scales of *y*-axes among panels. The *x*-axis denotes the smolt migration year.

2.4 NASCO asked ICES to 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 bycatch which may indicate possible impact of this fishery on wild salmon

Background information – the blue whiting fishery

Blue whiting (*Micromesistius poutassou*) is a small pelagic fish which spawns west of the British Isles in February and March. After spawning the fish disperse to feeding areas that cover a large part of the northeast Atlantic, but with most fish concentrated in the Norwegian Sea and the surrounding areas (Figure 10). The main fishery targeting this species occurs when the fish aggregate at the spawning grounds. The fishery starts in January southeast of the Faroes Islands, targeting fish migrating southwards towards the spawning areas. In February and March, the fishery moves to the west of Ireland and in April is located to the north and west of UK (Scotland). There is, however, some interannual variation in the areas fished depending on the geographic distribution of spawning fish. Nonetheless, the fishery on spawning blue whiting occurs prior to smolt migration from rivers and migration to the northeast Atlantic feeding areas.

The vessels used in the blue whiting fishery are ocean-going trawlers capable of operating large pelagic trawls. The fleet concentrates fishing effort on large aggregations of fish, which are often found close to the continental slope and typically at depths of 250 to 600 m. The trawl is set around 3 nautical miles from the aggregations of fish to allow time for the trawl to be positioned at the correct depth before the gear reaches the fish. A single catch can be as much as 800 tonnes and each vessel can store around 2000 tonnes or more before returning to harbour to deliver the catch. Most of the blue whiting are used for fishmeal production, but occasionally some fish go for human consumption. Annual landings have fluctuated in recent decades. This mainly reflects natural fluctuations in stock biomass owing to variable levels of recruitment success.

The largest landings were recorded in 2003 and 2004, with annual catches of more than 2 million tonnes (Figure 11). In 2015, total landings were close to 1.4 million tonnes. In years when coastal states have not agreed on a management plan, access to the spawning grounds has been restricted for vessels not belonging to the EU. A spring and summer fishery operated in these years, targeting blue whiting feeding in the Norwegian Sea. When this takes place, the fishery on feeding fish is similar to the one on the spawning grounds, deploying vessels with large pelagic trawls. However, during the feeding period the fish are more widely distributed and do not occur in the dense aggregations seen at the spawning grounds. This results in lower CPUE and longer trawling times. The fish are also higher in the water column during feeding, but nets are still typically fished at depths of 50 to 400 m.

Information about the potential bycatch of salmon in the blue whiting fishery

ICES Secretariat posed a query about potential bycatch of salmon to relevant ICES expert group members from the main countries participating in the blue whiting fishery (Norway, Netherlands, Germany, and the Faroe Islands). None of these representatives knew of any reports of bycatch of salmon in the fishery or had any data that might indicate that such bycatch had taken place.

ICES was informed about screening programmes for blue whiting in the Icelandic EEZ. The catch of blue whiting in 2016 was 5905 t. Observers examined a portion of this catch as it was landed to check for bycatch. For each catch above 100 tonnes, five random samples were taken, with each sample weighing approximately 100 kg. In 2016, no Atlantic salmon were detected from these samples. In 2015, 5 kg of Atlantic salmon were recorded as bycatch.

A number of additional investigations were conducted in Norway to gather information about the potential bycatch of salmon in the blue whiting fishery:

- Fishers who collaborate with the Institute of Marine Research in Norway were contacted for their views. These fishers responded that they had experienced some bycatch of salmon in the commercial fishery for mackerel and herring, but not in the fishery for blue whiting.
- Secondly, the Norwegian Directorate for Fisheries was consulted. There had been no formal reporting of any bycatch of salmon in the blue whiting fishery by Norwegian vessels. One vessel had reported 500 kg of "salmonfish" in 2007, but this was assumed to have been an error since no salmon were ever landed. Furthermore, screening of blue whiting landings in 2012 to 2014, and partly in 2015, had not revealed any bycatch of salmon.
- Finally, information was sought from the Norwegian reference fleet. This is a subset of the Norwegian fishing fleet reporting detailed information about their commercial catches, fishing effort, and any bycatch taken in the commercial fishery. Data from the reference fleet for the years 2008 to 2016 were retrieved and comprised more than 200 commercial blue whiting catches, each exceeding 1000 kg. These catches were taken in different areas, both from the spawning grounds and the feeding areas. There were no records of any salmon taken as bycatch in these blue whiting catches. In the same period (2008 to 2016), the Norwegian reference fleet targeting saithe, haddock, cod, ling, herring, capelin and/or redfish reported about 20 instances of salmon being taken as bycatch. The size of the bycaught salmon ranged from 0.4 to 7.1 kg.

None of the information available to ICES suggests that salmon is a frequent bycatch in the blue whiting fishery. Much of the blue whiting catch is taken at a time prior to salmon smolts emigrating into the marine environment. Furthermore, blue whiting are mainly captured at some depth, while salmon are generally thought to be distributed in surface waters.

It is nonetheless recognised that uncertainties remain. Aside from the Icelandic screening, there have been no independent observers on board vessels during the blue whiting fishery. This would, in any event, pose substantial practical and logistic difficulties. Detecting small numbers of salmon in large blue whiting catches that can exceed 2000 tonnes would be very challenging, not least since post-smolts and blue whiting are about the same size and fairly similar in appearance. However, the main portion of the fishery occurs in February and March, a time at which there are no post-smolts at sea, and any bycatch of salmon would be of adult size that would be more detectable by the fishing fleets. Detection of bycatch in the May–June fishery in the Norwegian Sea would be more challenging and post-smolts may be vulnerable in that time and location.

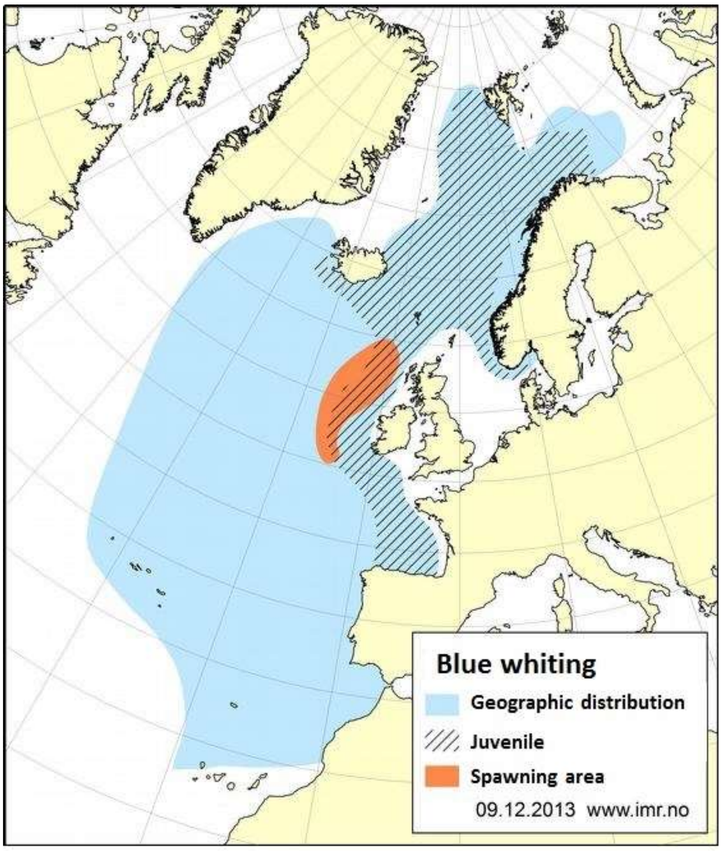


Figure 10 The geographic distribution of blue whiting. The orange-shaded region is the spawning area where most of the fishing takes place. During the summer, most of the fish are located in the Norwegian Sea and surrounding areas. Figure courtesy of imr.no.

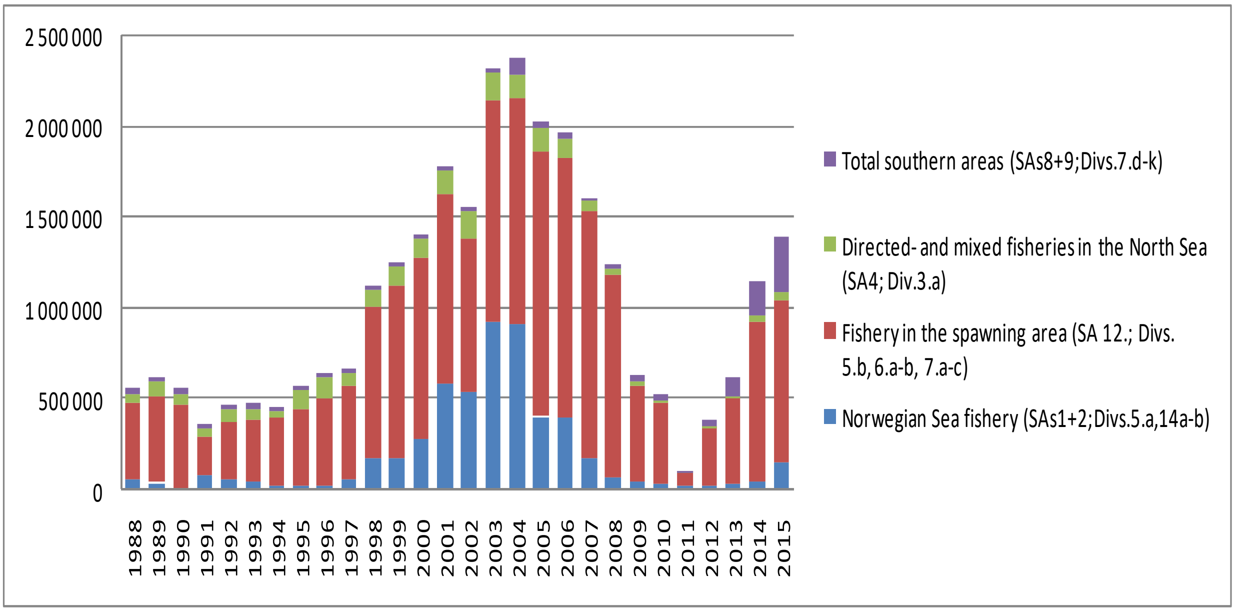


Figure 11 Catches (tonnes) of blue whiting by fishery subareas from 1988 to 2015. Figure from the ICES WGWIDE report (ICES, 2016b).

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

The following data deficiencies, monitoring needs, and research requirements of relevance to the Northeast Atlantic Commission were identified:

1) The continuation and expansion of tracking programmes would be useful in the assessment of marine mortality on North Atlantic salmon stocks. These techniques have been proposed and are being implemented, both in the Northwest and the Northeast Atlantic (e.g. SALSEA Track), in line with the NASCO International Atlantic Salmon Research Board resolution (International Atlantic Salmon Research Board, 2014).
2) In order to fully consider a life cycle model as an improvement and alternative to the current assessment and forecast model used for providing catch advice, improvements to data inputs and the incorporation of a number of alternative life history dynamics need to occur well ahead of the 2018 ICES meeting. A workshop of jurisdictional experts should be convened to review current national input data in the light of reductions in fisheries, to incorporate improved data inputs and alternate population dynamic functions, to enable the running of the inference and forecast components, and to develop documentation related to the model.

References

Gilbey, J., Cauwelier, E., Coulson, M. W., Stradmeyer, L., Sampayo, J. N., Armstrong, A., *et al*. 2016. Accuracy of assignment of Atlantic salmon (*Salmo salar* L.) to rivers and regions in Scotland and Northeast England based on single nucleotide polymorphism (SNP) markers. PLoS ONE, 11(10): e0164327. doi:10.1371/journal.pone.0164327.

ICES. 2015. Report of the Working Group on North Atlantic Salmon (WGNAS), 17–26 March 2015, Moncton, Canada. ICES CM 2015/ACOM:09. 461 pp.

ICES. 2016a. Report of the Working Group on North Atlantic Salmon (WGNAS), 30 March–8 April 2016, Copenhagen, Denmark. ICES CM 2016/ACOM:10. 323 pp.

ICES. 2016b. Report of the Working Group on Widely Distributed Stocks (WGWIDE). 31 August–6 September 2016, Copenhagen, Denmark. ICES CM 2016/ACOM:16. 604 pp.

ICES. 2016c. Advice basis. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 1, Section 1.2.

ICES. 2017a. Report of the Working Group on North Atlantic Salmon (WGNAS), 29 March–7 April 2017, Copenhagen, Denmark. ICES CM 2017/ACOM:20. 294 pp.

ICES. 2017b. Atlantic salmon at West Greenland. *In* Report of the ICES Advisory Committee, 2017. ICES Advice 2017, sal.2127.wgc.

International Atlantic Salmon Research Board. 2014. Resolution of the International Atlantic Salmon Research Board (IASRB) on Research on Salmon at Sea. ICR(14)10. http://www.nasco.int/sas/pdf/archive/papers/2014/ICR_14_10.pdf.

NASCO. 2015. Decision regarding the salmon fishery in Faroese waters in 2015/16, 2016/17 and 2017/18. NEA(15)10. http://www.nasco.int/pdf/2015%20papers/NEA_15_10.pdf.

Svenning, M. A., Falkegård, M., Fauchald, P., Yoccoz, N., Niemelä, E., Vähä, J. P., *et al.* 2014. Region and stock specific catch and migration models of Barents Sea salmon. Project report Kolarctic ENPI CBC – Kolarctic Salmon project (KO197). 95 pp.

Annex 1 Glossary of acronyms and abbreviation

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.

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.

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

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

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.

NASCO (*North Atlantic Salmon Conservation Organization*).

NEAC (*North-East Atlantic Commission).* The commission within NASCO with responsibility for Atlantic salmon in the Northeast Atlantic.

PFA *(pre-fishery abundance).* The numbers of salmon estimated to be alive in the ocean from a particular stock at a specified time.

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

TAC (*total allowable catch*). TAC is the quantity of fish that can be taken from each stock each year.

UK (*United Kingdom of Great Britain and Northern Ireland*).

Annex 2 General considerations

Management plans

The North Atlantic Salmon Conservation Organization (NASCO) has adopted an Action Plan for Application of the Precautionary Approach which stipulates that management measures should be aimed at maintaining all stocks above their conservation limits (CLs) by the use of management targets. CLs for North Atlantic salmon stock complexes have been defined by ICES as the level of a stock (number of spawners) that will achieve long-term average maximum sustainable yield (MSY). NASCO has adopted the region-specific CLs as limit reference points (S_{lim}); having populations fall below these limits should be avoided with high probability. Advice for the Faroes fishery (which takes both 1SW and MSW salmon) is currently based upon all NEAC area stocks, although NASCO has asked ICES to advise on options for taking account of recent genetic analyses which suggest there was a significant contribution of North American stocks to the historical mixed-stock fisheries in Faroese waters. The advice for the West Greenland fishery (ICES, 2017b) is based upon the Southern NEAC non-maturing 1SW stock and the non-maturing 1SW salmon from North America. A 75% risk level (probability) of achieving the management objectives simultaneously in the six North American regions and Southern NEAC has been agreed by NASCO for the provision of catch advice at West Greenland. No specific risk level has so far been agreed by NASCO for the provision of catch advice for the Faroes fishery; in the absence of this, ICES uses a 95% probability of meeting individual conservation limits, which can be applied at the level of the European stock complexes (two areas and two age classes) and the NEAC countries (ten countries and two age classes). A framework of indicators has been developed in support of the multi-annual catch options.

Biology

Atlantic salmon (*Salmo salar*) is an anadromous species found in rivers of countries bordering the North Atlantic. In the Northeast Atlantic area, their current distribution extends from northern Portugal to the Pechora River in Northwest Russia and Iceland. Juveniles emigrate to the ocean at ages of one to eight years (dependent on latitude) and generally return after one or two years at sea. Long-distance migrations to ocean feeding grounds are known to take place, with adult salmon from the Northeast Atlantic stocks being exploited at both West Greenland and the Faroes.

Environmental influence on the stock

Environmental conditions in both freshwater and marine environments have a marked effect on the status of salmon stocks. Across the North Atlantic, a range of problems in the freshwater environment play a significant role in explaining the poor status of stocks. In many cases, river damming and habitat deterioration have had a devastating effect on freshwater environmental conditions. In the marine environment, return rates of adult salmon have declined through the 1980s and, for some stocks, are now at their lowest levels in the time-series, even after closure of marine fisheries. Climatic factors modifying ecosystem conditions and the impact of predators of salmon at sea are considered to be the main contributory factors to lower productivity, which is expressed almost entirely in terms of lower marine survival.

Effects of the fisheries on the ecosystem

Salmon fisheries have no, or only minor, influence on the marine ecosystem. The exploitation of salmon in freshwater may affect the riverine ecosystem through changes in species composition. There is limited knowledge of the magnitude of these effects.

Quality considerations

Uncertainties in input variables to the stock status are incorporated in the assessment. Provisional catch data for 2015 were updated, where appropriate, and the assessment extended to include data for 2016.

Scientific basis

ICES stock data category	1 (ICES, 2016c).
Assessment type	Run-reconstruction models and Bayesian forecasts, taking into account uncertainties in data and process error. Results presented in a risk analysis framework.
Input data	Nominal catches (by sea-age class) for commercial and recreational fisheries. Estimates of unreported/illegal catches. Estimates of exploitation rates. Natural mortalities (from earlier assessments).
Discards and bycatch	Discards included in risk-based framework for the Faroes fishery. Not relevant for other NEAC assessments.
Indicators	Framework of Indicators (FWI) is used to indicate if a significant change has occurred in the status of stocks in intermediate years where multi-annual management advice applies.
Other information	Advice subject to annual review. Stock annex developed in 2014 and updated in 2017.
Working group	Working Group on North Atlantic Salmon (WGNAS) (ICES, 2017a).

3. Atlantic salmon from North America

Summary of the advice for 2017 and 2018

Management advice in the form of catch options is only provided by ICES for the non-maturing 1SW and maturing 2SW components, as they are the object of mixed-stock fisheries. The maturing 1SW component is not fished outside of home waters. In the 2015 advice, ICES indicated that there were no mixed-stock fishery catch options for 2015 to 2018 on 1SW non-maturing and 2SW salmon in North America consistent with the management objectives defined for this stock complex (ICES, 2015). The NASCO Framework of Indicators of North American stocks for 2016 did not indicate the need for a revised analysis of catch options for 2017 and no new management advice for 2017 is provided. The assessment was updated to 2016 and the stock status is consistent with the previous years' assessments and catch advice.

3.1 NASCO asked ICES to describe the key events of the 2016 fisheries (including the fishery at Saint Pierre and Miquelon), including details of catch, gear, effort, composition and origin of the catch, rates of exploitation, and location of the catch as in river, estuarine, and coastal

The provisional harvest of Atlantic salmon in eastern North America in 2016 was estimated at 139.5 t, of which 134.8 t was reported from Canada, 4.7 t from France (the islands of Saint Pierre and Miquelon), and 0 t from USA (Table 2 and Figure 1). The dramatic decline in harvested tonnage since 1980 is in large part the result of the reductions in commercial fisheries effort, with closure of the insular Newfoundland commercial fishery in 1992, the Labrador commercial fishery in 1998, and the Québec commercial fishery in 2000. All commercial fisheries for Atlantic salmon remained closed in Canada in 2016.

France (the islands of Saint Pierre and Miquelon) reported a total harvest of 4.7 t in the professional and recreational fisheries in 2016 (Table 2). There were no commercial or recreational fisheries for Atlantic salmon in USA in 2016 (Table 2).

Unreported catch for Canada in 2016 was 27 t and 0 t for USA. France (the islands of Saint Pierre and Miquelon) did not provide an unreported catch value.

Three groups exploited salmon in Canada in 2016: aboriginal peoples, residents fishing for food in Labrador, and recreational fishers. Mandatory catch and release of small salmon was implemented in the 2015 and 2016 recreational fisheries for the Gulf region, and mandatory release of large salmon continued. Fishing regulations changed in Québec prior to the 2016 season, limiting the retention of large salmon to be allowed only on 20 of 114 rivers, retention of small salmon allowed on 75 rivers, and with 32 rivers closed to salmon fishing.

For Canada in 2016, 5% of the harvests were taken in coastal areas, entirely from Labrador. The harvest from France (the islands of Saint Pierre and Miquelon) is entirely from coastal areas. Overall for eastern North America in 2016, 67% of the harvests were from rivers, 26% from estuaries, and 8% from coastal areas.

Table 1 2016 harvest of salmon by country and location.

	Canada					Saint Pierre and Miquelon	USA	North America
	Commercial	Aboriginal	Labrador resident	Recreational	Total			
2016 reported nominal catch (t)	0	63.9	1.6	69.3	134.8	4.7	0	139.5
% of NAC total	-	46	1	50	97	3	-	100
Unreported catch (t)	27					na	0	27
Location of catches								
% in-river					69	0	-	67
% in estuaries					26	0	-	26
% coastal					5	100	-	8

Nominal catch of salmon in Canada decreased strongly from the early 1980s to the late 1990s, and has remained very low since then (Figure 1). Exploitation rates of both large salmon (2SW, 3SW, and previous spawners) and small salmon (mostly 1SW) remained relatively stable until 1984 and 1992, respectively, then declined sharply with the introduction of restrictive management measures (Figure 2). Declines continued in the 1990s. In the last few years, exploitation rates have remained among the lowest in the time-series.

In the recreational fisheries of Canada, about 69 600 salmon (38 300 small and 31 300 large) were caught and released, representing about 65% of the total number caught (including retained fish).

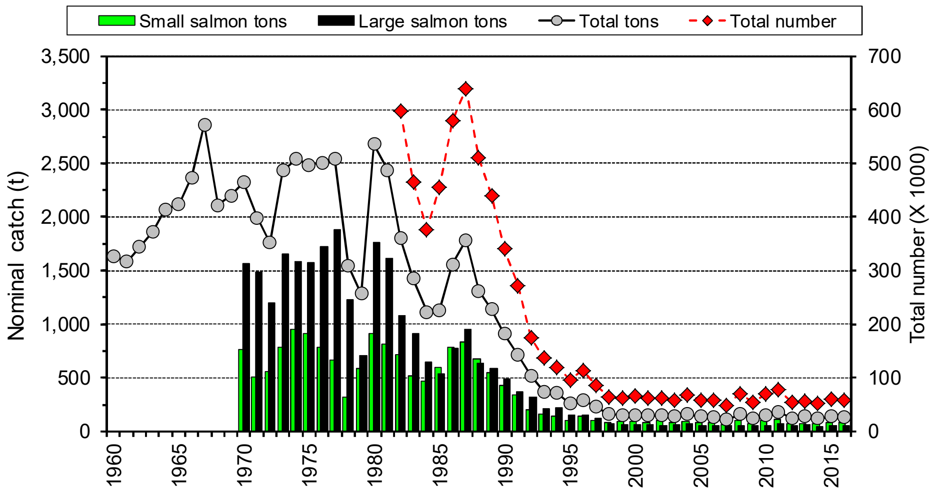


Figure 1 Nominal catch (harvest in tonnes) of salmon in Canada in the period 1960 to 2016. Combined catches in USA and Saint Pierre and Miquelon are ≤ 6 t in any year.

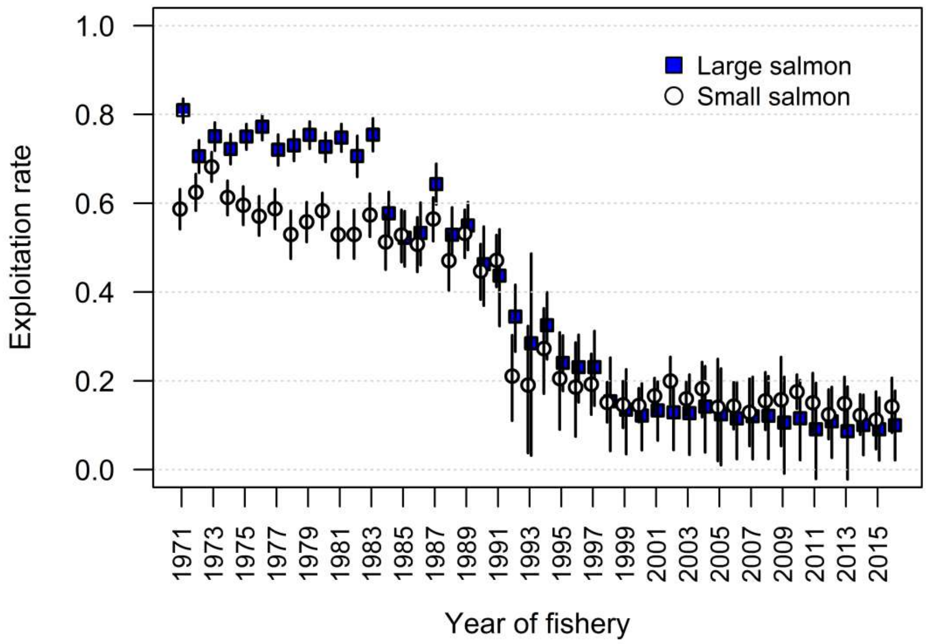


Figure 2 Exploitation rates in North America on small (mostly 1SW) and large (2SW, 3SW, and repeat spawners) salmon, 1971 to 2016.

Table 2 Total reported nominal catch (in tonnes, round fresh weight) of salmon in homewaters by country (Canada, USA, and France (Saint Pierre and Miquelon [SPM]), for the years 1980 to 2016 (2016 figures include provisional data).

Year	Canada			USA	SPM
	Small	Large	Total		
1980	917	1763	2680	6	-
1981	818	1619	2437	6	-
1982	716	1082	1798	6	-
1983	513	911	1424	1	3
1984	467	645	1112	2	3
1985	593	540	1133	2	3
1986	780	779	1559	2	3
1987	833	951	1784	1	2
1988	677	633	1310	1	2
1989	549	590	1139	2	2
1990	425	486	911	2	2
1991	341	370	711	1	1
1992	199	323	522	1	2
1993	159	214	373	1	3
1994	139	216	355	0	3
1995	107	153	260	0	1
1996	138	154	292	0	2
1997	103	126	229	0	2
1998	87	70	157	0	2
1999	88	64	152	0	2
2000	95	58	153	0	2
2001	86	61	148	0	2
2002	99	49	148	0	2
2003	81	60	141	0	3
2004	94	68	161	0	3
2005	83	56	139	0	3
2006	82	55	137	0	3
2007	63	49	112	0	2
2008	100	57	158	0	4
2009	74	52	126	0	3
2010	100	53	153	0	3
2011	110	69	179	0	4
2012	74	52	126	0	3
2013	72	66	137	0	5
2014	77	41	118	0	4
2015	86	54	140	0	4
2016	79	56	135	0	5

Origin and composition of catches

In the past, salmon from both Canada and USA were taken in the commercial fisheries of eastern Canada. Sampling programmes of current marine fisheries (Labrador subsistence and Saint Pierre and Miquelon [SPM]) are used to monitor salmon interceptions from other North American areas.

Recent genetic stock identification efforts provide an opportunity to identify the origin of North American salmon caught in the Labrador and SPM fisheries. The stock composition and variation in composition of salmon harvested in these mixed-stock fisheries has been determined using a North American genetic baseline for Atlantic salmon, which allows assignment to twelve regional groups (Bradbury *et al.*, 2014; Moore *et al.*, 2014) based on 15 microsatellite loci. Origin of salmon in the mixed-stock fisheries have been reported for the Labrador subsistence fishery (Bradbury *et al.,* 2015; ICES, 2015) and for the SPM fishery (ICES, 2015; Bradbury *et al.,* 2016). The accuracy of assignment in these analyses was very high (94.5%). The regional groups from the genetic assignments do not correspond directly to the ecoregions used by ICES to characterize stock status and to provide catch advice, but the genetic groups can be matched to the ICES groups.

Labrador fishery origin and composition of the catches

In 2015 and 2016, samples were collected from the Labrador aboriginal fisheries (a total of 880 samples in 2015 and 810 in 2016), representing 6% of the estimated harvest by number in both years. Based on the interpretation of the scale samples, the majority were 1SW salmon (77% in 2015, 69% in 2016), with lesser contributions from 2SW salmon (19% in 2015, 26% in 2016) and the remainder being primarily repeat spawners (4% in 2015, 5% in 2016). The majority (98% in 2015, 99% in 2016) of the sampled salmon were river ages 3 to 5 years (modal age 4). There were no river age 1 and only few river age 2 (0.5% in 2015, 0.3% in 2016) in the salmon samples, suggesting that, as in previous years (2006 to 2014), very few salmon from the southernmost stocks of North America (USA, Scotia–Fundy) were exploited in these fisheries.

Table 3 Percentage of samples by river age within the three sampled areas in 2016.

Area	Number of samples	River age						
		1	2	3	4	5	6	7
Northern Labrador (SFA 1A)	234	0.0	0.0	20.0	60.0	20.0	0.0	0.0
Lake Melville (SFA 1B)	153	0.0	0.7	21.6	70.6	7.2	0.0	0.0
Southern Labrador (SFA 2)	369	0.0	0.5	24.9	57.5	15.7	1.4	0.0
All areas	756	0.0	0.5	22.1	62.0	14.7	0.7	0.0

Based on genetic analyses of tissue samples from 2015 and 2016, the Labrador Central (LAB) regional group represented the majority (98% in 2015, 99% in 2016) of the salmon sampled from the aboriginal fisheries, values slightly higher than the 92% to 96% contributions of the Labrador Central region in the subsistence fisheries prior to 2014 (Bradbury *et al.,* 2015; ICES, 2015). In 2015 and 2016, no samples were assigned with greater than 1% probability to USA regional group.

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

Sampling of the salmon catches has been conducted in 2004, 2011, and annually since 2013. In 2016, 147 scale samples and 146 corresponding tissue samples (representing 9% of the harvest by number) were obtained from the fishery, covering the period 16 June to 12 July 2016. Salmon sampled in 2016 were predominantly river ages 2 (28%), 3 (43%), and 4 (25%), with the majority of the sampled fish being one-sea-winter maiden salmon (84%).

Table 4 Breakdown by river age and sea age of the 2016 salmon sampling at Saint Pierre and Miquelon (in numbers).

Sea age	River age					
	2	3	4	5	6	Total
1SW	27	56	32	2	2	119
2SW	10	5	3	2	0	20
Previous spawners	2	0	0	0	0	2
Total	39	61	35	4	2	141

Estimates of stock composition based on genetic analysis up to 2014 showed consistent dominance of three regions: Gulf of St. Lawrence, Québec (primarily the Gaspé Peninsula), and Newfoundland (ICES, 2015; Bradbury *et al.,* 2016). Genetic analyses of 2015 tissue samples are planned and will be reported accordingly to ICES when completed. Genetic analyses of the 2016 samples indicated that, as in previous years, the majority of the salmon in the fishery samples originated from three of ICES geographic regions: Newfoundland, Québec, and Gulf of St. Lawrence (Figure 3).

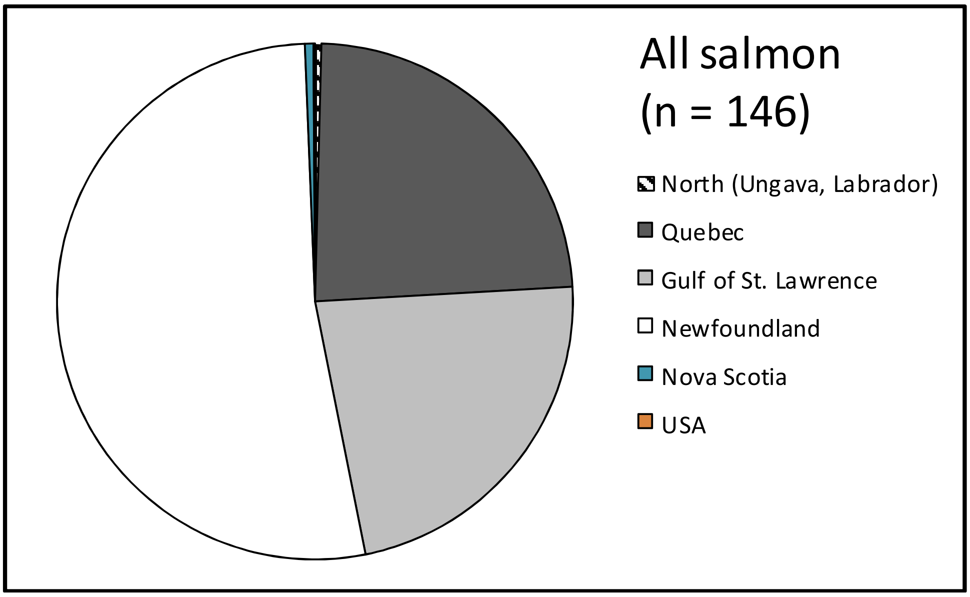


Figure 3 Assignment of Atlantic salmon samples from the 2016 fishery at France (the islands of Saint Pierre and Miquelon) to the larger ICES geographic regions of eastern North America.

3.2 NASCO asked ICES to 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

In Québec, reference points were reviewed and revisions implemented in the Atlantic salmon management plan for 2016–2026. A lower reference point, equivalent to a CL, was defined as the spawner abundance that, in terms of egg depositions, results in a risk of ≤ 25% of recruitment being less than 50% of the maximum recruitment. An upper reference point was set at a level equal to the 95th percentile of the posterior distribution of the spawner estimate that results in maximum sustainable yield. Conservation limits (CLs) for the mixed-stock fishery components by sea age have yet to be revised.

In Canada, CLs were first established in 1991 for 74 rivers. The number of rivers with defined CLs increased to 266 in 1997 and, since 2014, has increased to 476. CLs have been established for 33 river stocks in USA since 1995.

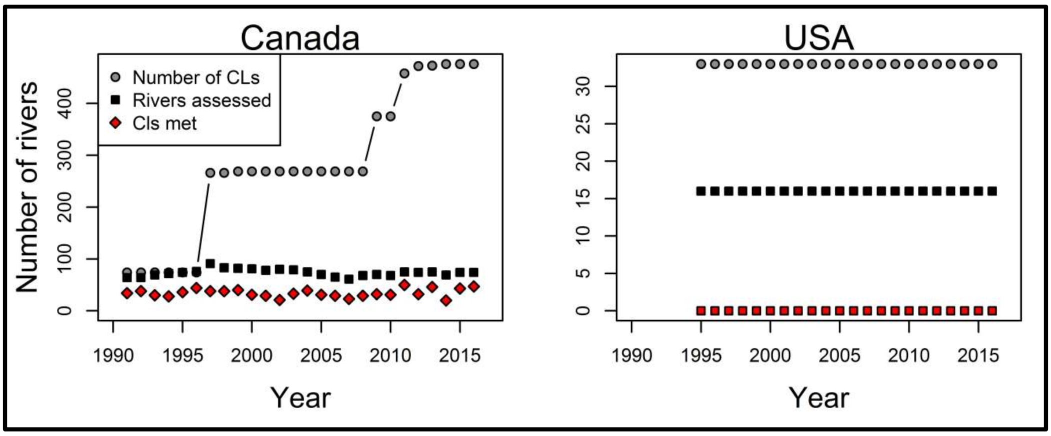


Figure 4 Time-series for Canada and the USA for the period 1991 to 2016, showing the number of rivers with established CLs, the number rivers assessed annually, and the number of annually assessed rivers meeting CLs.

There were no changes to the 2SW CLs for the regions in North America. Management objectives have been defined for Scotia–Fundy and USA. For Scotia–Fundy, the management objective is based on an increase of 25% in returns of 2SW salmon compared to the mean return in the base years 1992 to 1996. For USA, the management objective is to achieve 2SW adult returns of 4549 individuals or greater.

Table 5 2SW CLs and management objectives for 2016.

Country and commission area	Stock area	2SW conservation limit (no. of fish)	Management objective (no. of fish)
Canada	Labrador	34 746	
	Newfoundland	4 022	
	Gulf of St. Lawrence	30 430	
	Québec	29 446	
	Scotia–Fundy	24 705	10 976
	Total	123 349	
USA	USA	29 199	4 549
North American Commission	All	152 548	

3.3 NASCO asked ICES to describe the status of the stocks, including updating the time-series of trends in the number of river stocks meeting CLs by jurisdiction

Stock status is presented for six regions (Figure 5) and overall for North America.

Returns of small (1SW), large (MSW), and 2SW salmon (a subset of large) to each region are estimated by the methods reported by ICES (1993). The 2SW component of the large returns was determined using the sea age composition of one or more indicator stocks. Returns are the number of salmon that returned to the geographic region, including fish caught by homewater commercial fisheries, except in the case of the Newfoundland and Labrador regions where returns do not include landings in commercial and food fisheries.

The non-maturing component of 1SW salmon, destined to be 2SW returns (excluding 3SW and previous spawners) is the estimated number of salmon in the North Atlantic on August 1st of the second summer at sea. The pre-fishery abundance (PFA) estimates account for returns to rivers, fisheries at sea in North America, and fisheries at West Greenland, with estimates corrected for natural mortality. As the PFA estimate for potential 2SW salmon requires an estimate of returns to rivers, the most recent year for which an estimate of PFA is available is 2015. Maturing 1SW salmon are in some areas (particularly Newfoundland) a major component of salmon stocks, and their abundance when combined with that of the 2SW age group provides an index of the majority of a smolt cohort.

The total estimate of small salmon returns to North America in 2016 (430 900 fish) was 31% lower than in 2015 and in the mid-range of values of the 47-year time-series (Figure 6). Small salmon returns decreased in 2016 from the previous year in five of the six geographical regions (Labrador, Newfoundland, Québec, Gulf, and Scotia–Fundy), and increased in USA. Small salmon returns to Labrador (206 300 fish) and Newfoundland (164 200 fish) combined represent 86% of the 2016 total small salmon returns to North America (430 900 fish).

The total estimate of large salmon returns to North America in 2016 (174 100 fish) was 12% lower than in 2015 (196 800 fish) and in the lower third rank of the 47-year time-series (Figure 7). Large salmon returns in 2016 increased from the previous year in three of the six geographical regions (Québec, Gulf, and Scotia–Fundy) and decreased in the other three (Labrador, Newfoundland, and USA). Large salmon returns in 2016 were the second lowest on record for USA (392 fish), and the fourth lowest on record for Scotia–Fundy (1545 fish), whereas large salmon returns to Labrador (71 740 fish) in 2016 were the second highest on record. Large salmon returns to the Labrador, Québec, and Gulf regions collectively represented 85% of the total large salmon returns to North America in 2016.

The total estimate of 2SW salmon returns to North America in 2016 (107 400 fish) was 6% lower than in 2015 and ranks 25th (descending) out of the 47-year time-series (Figure 8). The regional trends in returns of 2SW salmon follow closely those of the large salmon as 2SW salmon are a relatively stable subset of the large salmon. Returns increased from the previous year in three of the six geographical regions (Québec, Gulf, and Scotia–Fundy) in 2016, and decreased in the other three (Labrador, Newfoundland, and USA). 2SW salmon returns in 2016 were the second lowest on record for USA (389 fish), and the sixth lowest on record for Scotia–Fundy (1494 fish), whereas 2SW salmon returns to Labrador (46 550 fish) in 2016 were the second highest on record. Three regions (Labrador, Québec, Gulf) collectively accounted for 95% of 2SW salmon returns to North America in 2016.

Estimates of recruitment (i.e. PFA, defined as the number of 1SW salmon on 1 August of the second summer at sea), suggest continued low abundance of North American salmon (Figure 9). The total population of 1SW and 2SW Atlantic salmon in the Northwest Atlantic has oscillated around a generally declining trend since the 1970s, with a period of persistent low abundance since the early 1990s. During 1993 to 2015, the total population of 1SW and 2SW Atlantic salmon was about 600 000 fish, about half of the average abundance during 1971 to 1992.

Recruitment of the 1SW cohort in 2015 was estimated at 827 700 fish. Abundance declined by 51% over the time-series from a peak of 1 705 000 fish in 1975 (Figure 9).

In 2016, the midpoints of the estimates of 2SW returns to rivers and 2SW spawners were below the 2SW CLs for all regions except Labrador, and the stocks are therefore suffering reduced reproductive capacity (Figures 8 and 10). The medians of the 2SW returns and spawners for Labrador exceeded the 2SW CL, but the 5th percentiles were below the CL and for this region the stock is at risk of suffering reduced reproductive capacity (Figure 10). Particularly large deficits relative to CLs are noted in the Scotia–Fundy and USA regions.

Egg deposition by all sea-ages combined in 2016 exceeded or equaled the river-specific CLs in 41 of the 70 (58%) assessed rivers, and was less than 50% of CLs in 21 rivers (30%; Figure 11). In Canada, 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% (66% in 2016) with no temporal trend (Figure 4). Sixteen rivers in USA are assessed against CL attainment annually with none meeting CLs to date (Figure 4).

Despite major changes in fisheries management two to three decades ago, and increasingly more restrictive fisheries measures since then, returns have remained near historical lows, except for returns to Labrador and Newfoundland. All salmon populations within USA and the Scotia–Fundy regions have been, or are being considered for listing under the country-specific species-at-risk legislation. The continued low abundance of salmon stocks in USA and in three regions of Canada (Scotia–Fundy, Gulf, and Québec), despite significant fishery reductions and generally sustained smolt production, strengthens the conclusions that factors acting on survival in the first and second years at sea are constraining the abundance of Atlantic salmon.

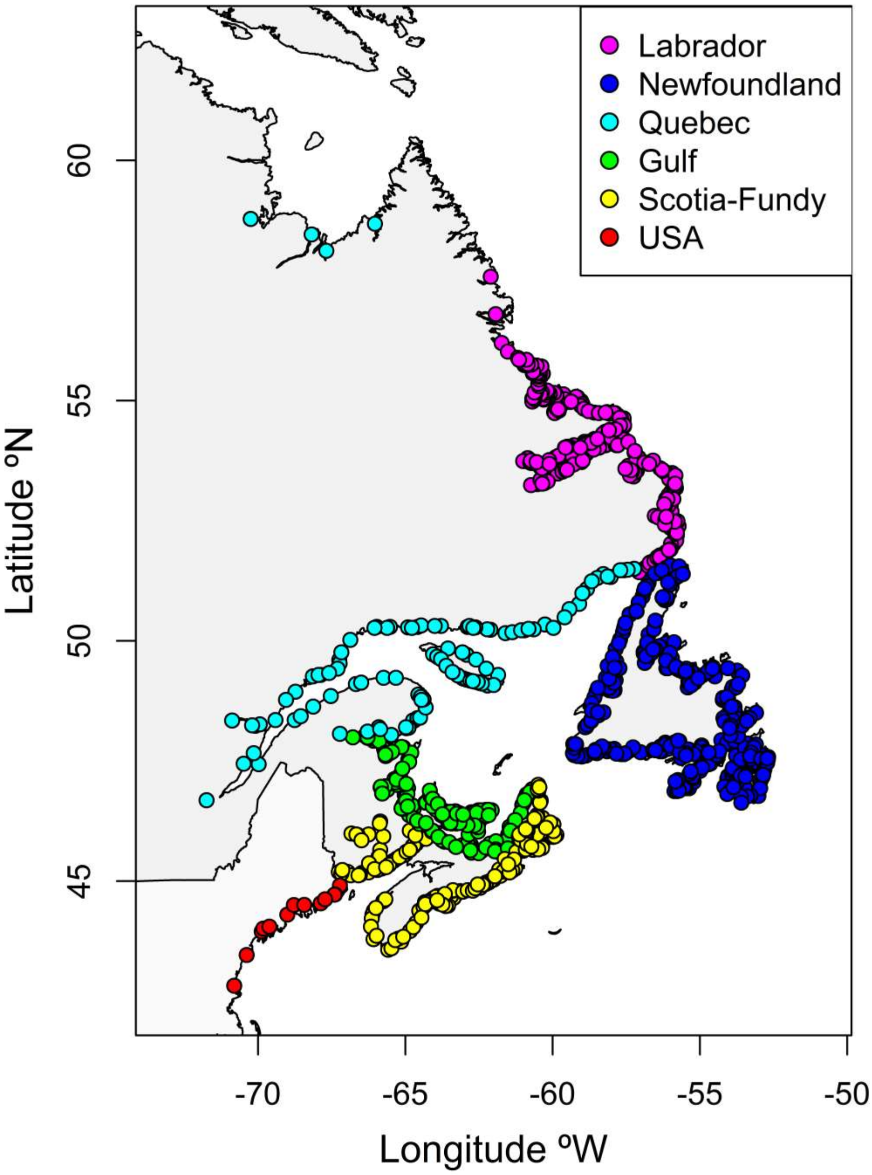


Figure 5 Regional groupings (colours) for assessment of Atlantic salmon in the North American Commission. Dots indicate locations of potential salmon rivers.

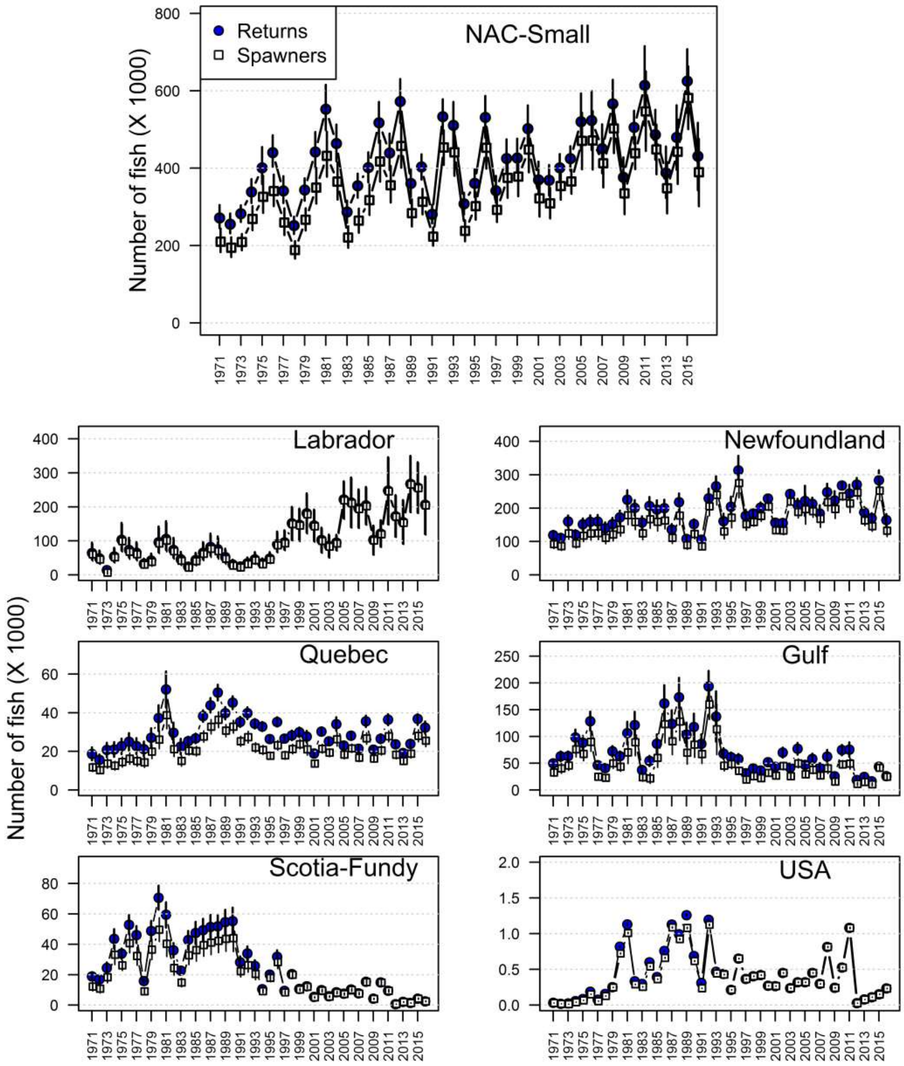


Figure 6 Estimated (median, 5th to 95th percentile range) returns (shaded circles) and spawners (open squares) of small salmon (primarily 1SW maturing), for eastern North America overall (top panel) and for each of the six regions.

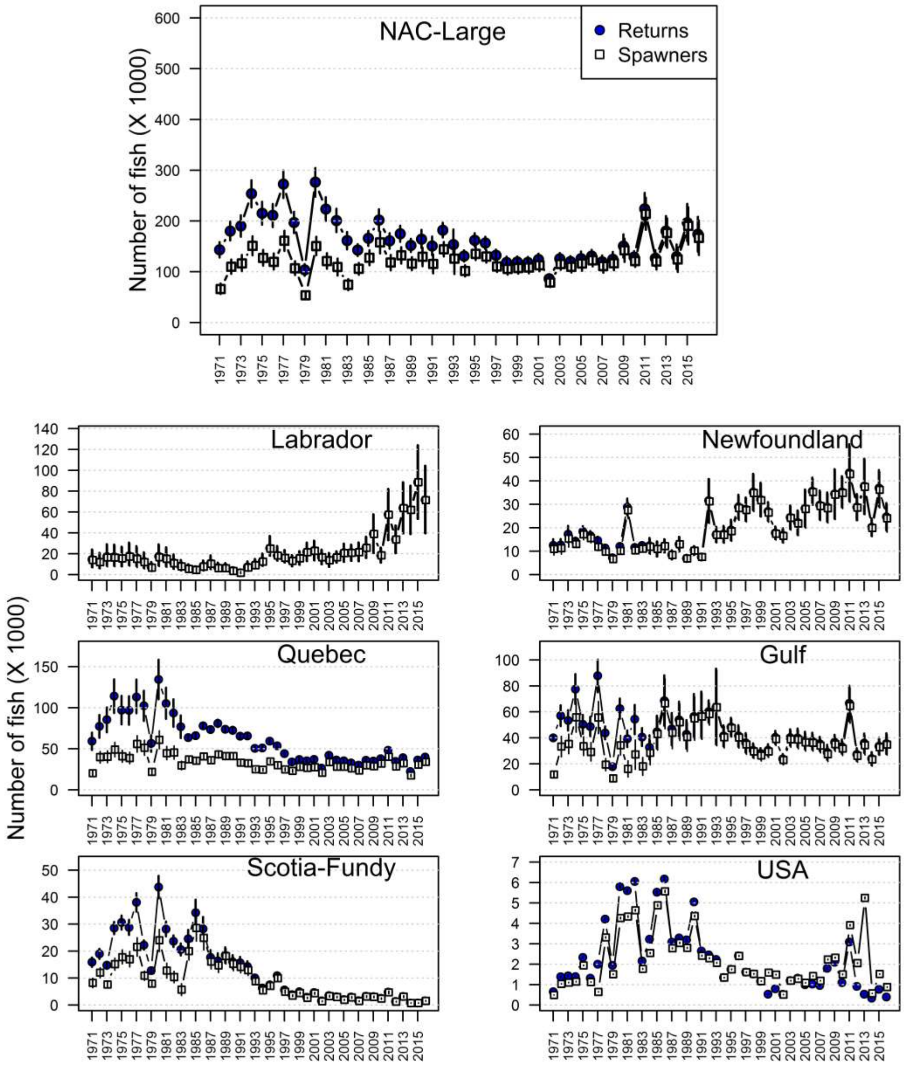


Figure 7 Estimated (median, 5th to 95th percentile range) returns (shaded circles) and spawners (open squares) of large salmon (primarily 1SW maturing), for eastern North America overall (top panel) and for each of the six regions.

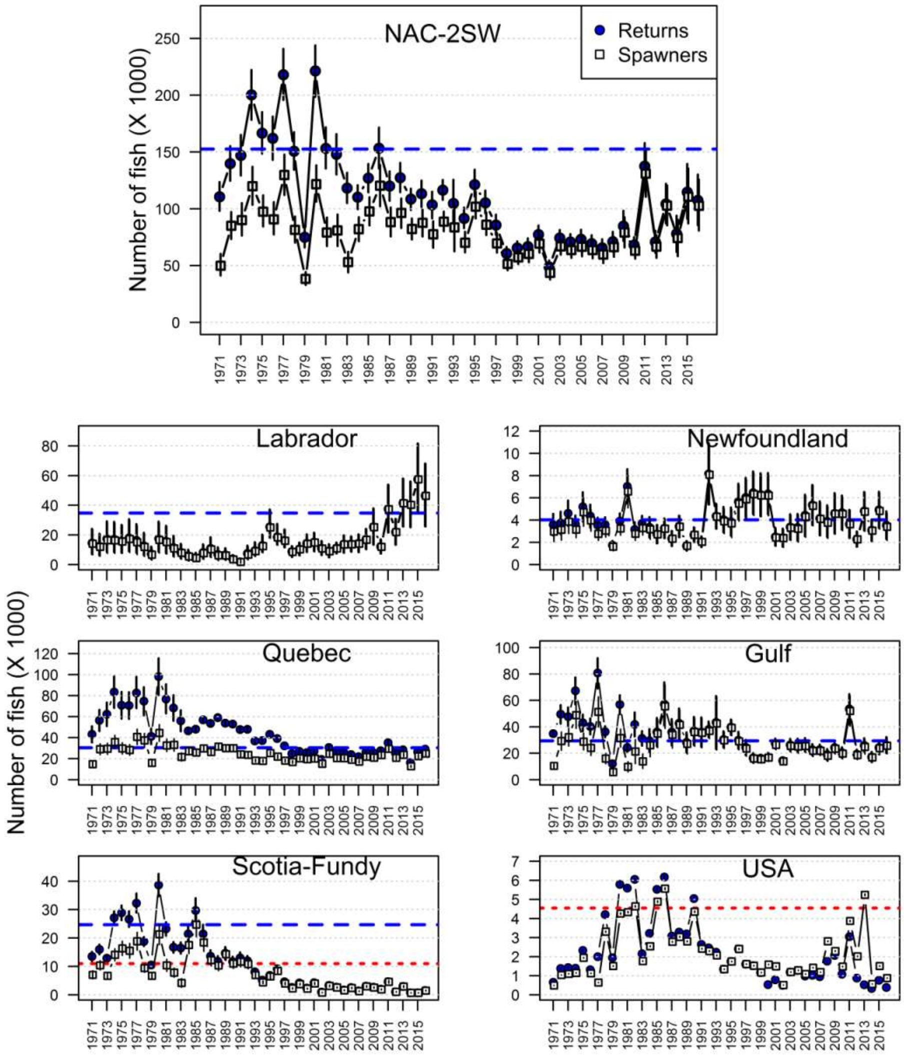


Figure 8 Estimated (median, 5th to 95th percentile range) returns (shaded circles) and spawners (open squares) of 2SW salmon, for eastern North America overall (top panel) and for each of the six regions. The blue dashed line is the corresponding 2SW CL; the 2SW CL (29 199 fish) is off the scale in the plot for USA. The red dotted lines in the Scotia–Fundy and USA panels are the region-specific management objectives. For USA, estimated spawners exceed the estimated returns in some years because of adult stocking restoration efforts.

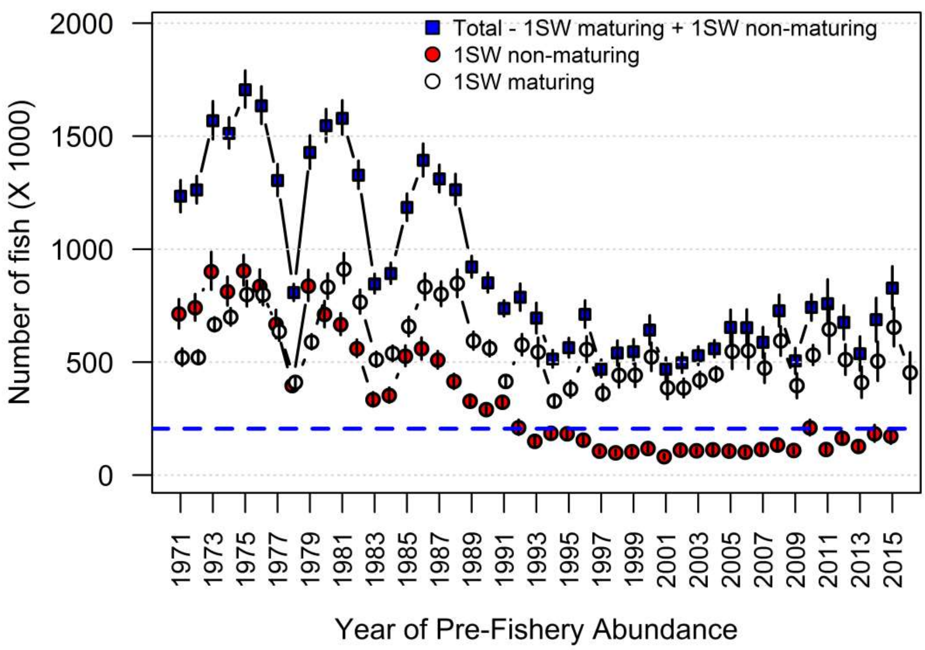


Figure 9 Estimated (median, 5th to 95th percentile range) pre-fishery abundance (PFA) for 1SW maturing, 1SW non-maturing, and total cohort of 1SW salmon for North America. The dashed blue horizontal line is the corresponding sum of the 2SW conservation limits for North America, corrected for 11 months of natural mortality (spawner escapement reserve), against which 1SW non-maturing abundance is assessed.

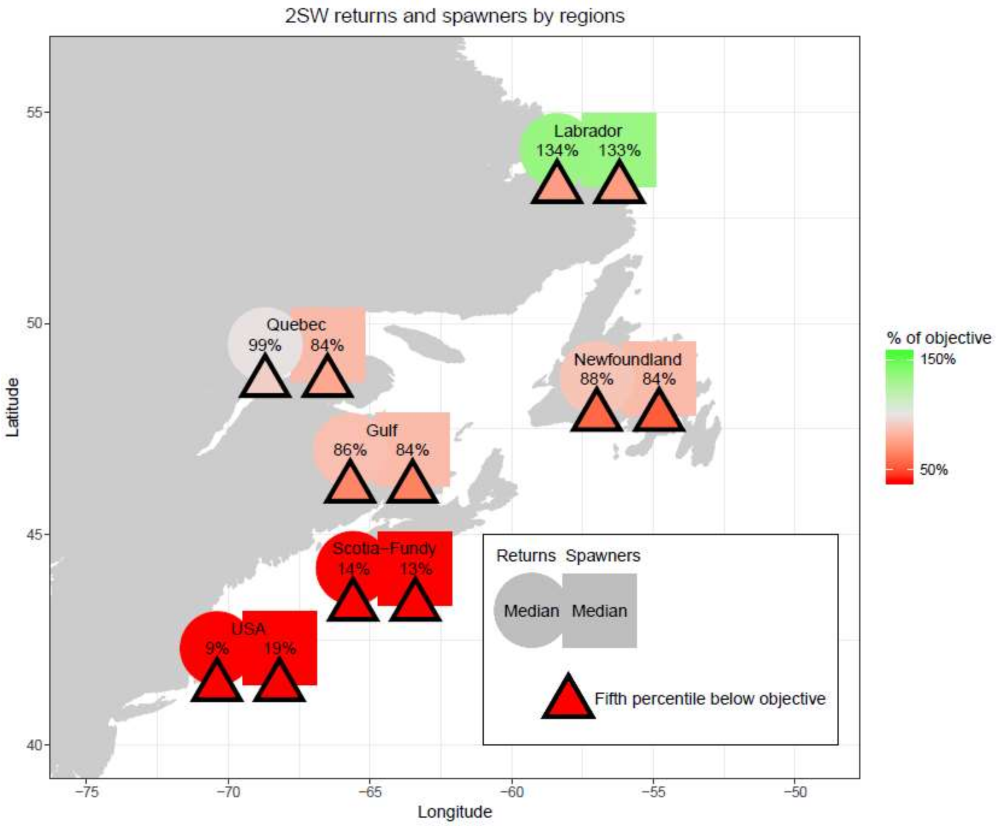


Figure 10 Medians of the estimated returns (circle) and spawners (square) of 2SW salmon in 2016 to six regions of North America, expressed as a percentage of the 2SW CLs for the four northern regions and to the rebuilding management objectives for the two southern areas. The colour shading of the symbols represents the percentage of the CL or rebuilding objective attained, with red indicating less than 100% and green greater than 100%. The triangles accompanying the respective returns and spawners symbols indicate when the 5th percentiles of the estimates are below the CLs or management objective, i.e. when the stocks are at risk of or suffering from reduced reproductive capacity.

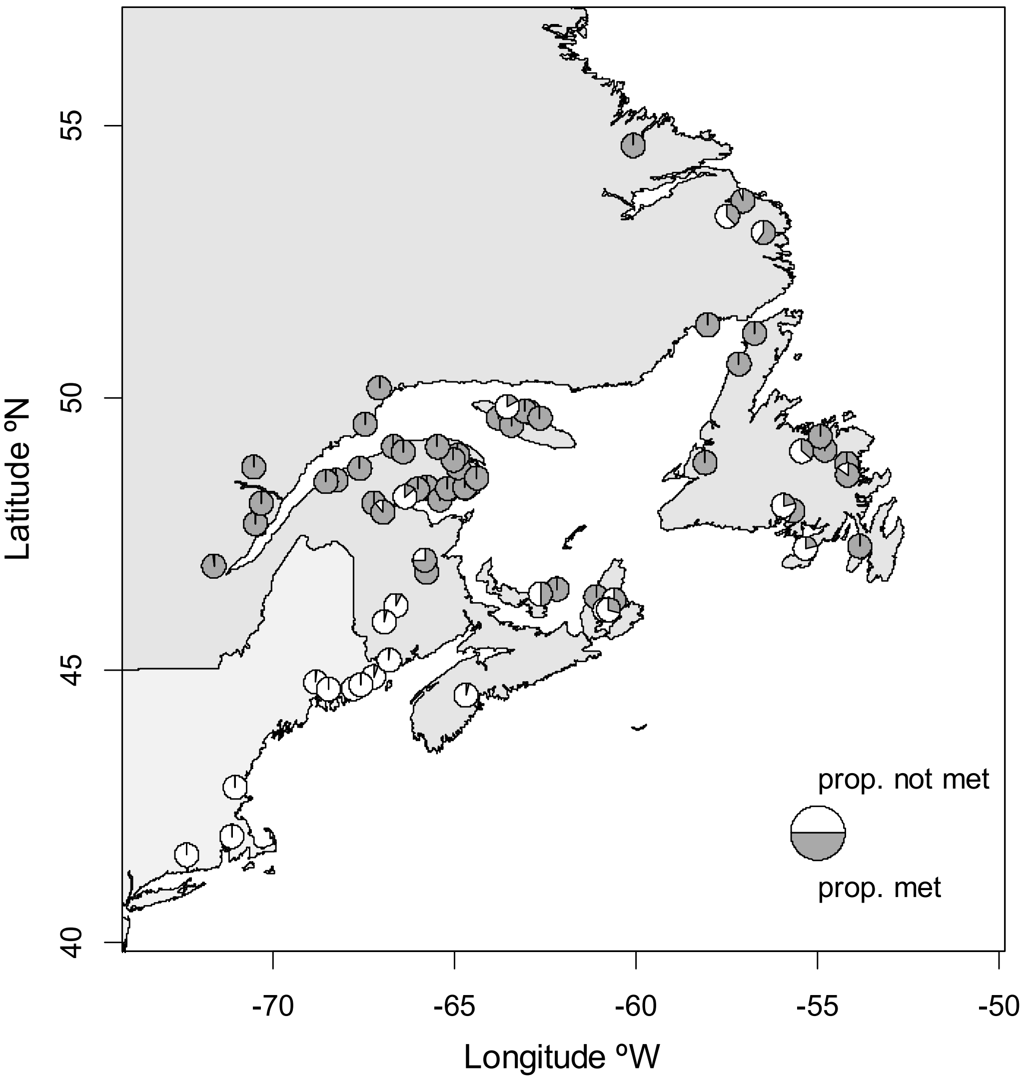


Figure 11 Proportion of the conservation egg requirement attained in the 70 rivers of the North American Commission area assessed in 2016.

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

The following relevant data deficiencies, monitoring needs, and research requirements of relevance to the North American Commission were identified.

3) Sampling and supporting descriptions of the Labrador and Saint Pierre and Miquelon mixed-stock fisheries should 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.
4) Additional monitoring should be considered in Labrador to estimate stock status for that region, including evaluation of the utility of other available data sources (e.g. Aboriginal and recreational catches and effort) to describe stock status in Labrador.

References

Bradbury, I. R., Hamilton, L. C., Robertson, M. J., Bourgeois, C. E., Mansour, A., and Dempson, J. B. 2014. Landscape structure and climatic variation determine Atlantic salmon genetic connectivity in the northwest Atlantic. Canadian Journal of Fisheries and Aquatic Sciences, 71: 1–13.

Bradbury, I. R., Hamilton, L. C., Rafferty, S., Meerburg, D., Poole, R., Dempson, J. B., *et al*. 2015. Genetic evidence of local exploitation of Atlantic salmon in a coastal subsistence fishery in the Northwest Atlantic. Canadian Journal of Fisheries and Aquatic Sciences, 72: 83–95.

Bradbury, I. R., Hamilton, L. C., Chaput, G., Robertson, M. J., Goraguer, H., Walsh, A., *et al*. 2016. Genetic mixed stock analysis of an interceptory Atlantic salmon fishery in the Northwest Atlantic. Fisheries Research, 174: 234–244.

ICES. 1993. Report of the North Atlantic Salmon Working Group, 5–12 March 1993, Copenhagen, Denmark. ICES CM 1993/Assess:10. 216 pp.

ICES. 2015. Report of the Working Group on North Atlantic Salmon (WGNAS), 17–26 March 2015, Moncton, Canada. ICES CM 2015/ACOM:09. 461 pp.

ICES. 2016. Advice basis. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 1, Section 1.2.

ICES. 2017. Report of the Working Group on North Atlantic Salmon (WGNAS), 29 March–7 April 2017, Copenhagen, Denmark. ICES CM 2017/ACOM:20. 294 pp.

Moore, J-S., Bourret, V., Dionne, M., Bradbury, I., O'Reilly, P., Kent, M., Chaput, G., and Bernatchez, L. 2014. Conservation genomics of anadromous Atlantic salmon across its North American range: outlier loci identify the same patterns of population structure as neutral loci. Molecular Ecology, 23: 5680–5697.

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.
3SW *(three-sea-winter).* Maiden adult salmon that has spent three winters at sea.
CL, i.e. S_{lim} *(conservation limit).* Demarcation of undesirable stock levels or levels of fishing activity; the ultimate objective when managing stocks and regulating fisheries will be to ensure that there is a high probability that undesirable levels are avoided.
FWI *(Framework of Indicators).* The FWI is a tool used to indicate if any significant change in the status of stocks used to inform the previously provided multi-annual management advice has occurred.
ICES (*International Council for the Exploration of the Sea*).
NAC (*North American Commission*). A commission under NASCO.
NASCO (*North Atlantic Salmon Conservation Organization*).
PFA *(pre-fishery abundance).* The numbers of salmon estimated to be alive in the ocean from a particular stock at a specified time.
SPM (*the islands of Saint Pierre and Miquelon [France]*).

Annex 2 General considerations

Management plans

The North Atlantic Salmon Conservation Organization (NASCO) has adopted an Action Plan for Application of the Precautionary Approach which stipulates that management measures should be aimed at maintaining all stocks above their conservation limits through the use of management targets. NASCO has adopted the region-specific CLs as limit reference points (S_{lim}); having populations fall below these limits should be avoided with high probability. Within the agreed management plan, a risk level (probability) of 75% for attainment of management objectives simultaneously in all regions has been agreed for the provision of catch advice on 2SW salmon exploited at West Greenland (as non-maturing 1SW fish) and in North America (as non-maturing 1SW and 2SW salmon). For the North American Commission, the management objectives are the 2SW CLs in the four northern regions (Labrador, Newfoundland, Québec, Gulf), aimed at achieving a 25% increase in regional returns relative to a baseline period (average returns in 1992–1996) for the Scotia–Fundy region, and to achieve 2SW adult returns of 4549 fish or greater for USA. A framework of indicators has been developed in support of the multiannual catch options.

Biology

Atlantic salmon (*Salmo salar*) is an anadromous species found in rivers of countries bordering the North Atlantic. In the Northwest Atlantic they range from the Connecticut River (USA, 41.6°N) northward to the Ungava Bay rivers (58.8°N; Québec, Canada). Juveniles emigrate to the ocean at ages of one to eight years (dependent on latitude) and generally return after one or two years at sea. Long-distance migrations to ocean feeding grounds are known to take place, with adult salmon from both the North American and Northeast Atlantic stocks migrating to West Greenland to feed in their second summer and autumn at sea. Recent genetic information has demonstrated that fish from North America were also exploited in the historical Faroes fishery.

Environmental influence on the stock

Environmental conditions in both freshwater and marine environments have a marked effect on the status of salmon stocks. Across the North Atlantic, a range of problems in the freshwater environment play a significant role in explaining the poor status of stocks. In many cases river damming and habitat deterioration have had a devastating effect on freshwater environmental conditions. In the marine environment, return rates of adult salmon have declined through the 1980s and are now at the lowest levels in the time-series for some stocks, even after closure of marine fisheries. Climatic factors modifying ecosystem conditions and predator fields of salmon at sea are considered to be the main contributory factors to lower productivity, which is expressed almost entirely in terms of lower marine survival.

Effects of the fisheries on the ecosystem

The current salmon fisheries probably have no or only minor influence on the marine ecosystem. However, the exploitation rate on salmon may affect the riverine ecosystem through changes in species composition. Knowledge on the magnitude of these effects is limited.

Quality considerations

Uncertainties in input variables to the stock status and stock forecast models are incorporated in the assessment. Recreational catch statistics for Atlantic salmon are not collected regularly in Canada and there is no mechanism in place that requires anglers to report their catch statistics, except in Québec. The reliability of recreational catch statistics could be improved in all areas of Canada. Estimates of abundance of adult salmon in some areas, in particular Labrador, are based on a small number of counting facilities raised to a large production area.

Basis of the assessment

ICES stock data category	1 (ICES, 2016).
Assessment type	Run-reconstruction models and Bayesian forecasts, taking into account uncertainties in the data.
Input data	Nominal catches (by sea-age class) for commercial, aboriginal, and recreational fisheries. Estimates of unreported/illegal catches. Estimates of exploitation rates. Natural mortalities (from earlier assessments).
Discards and bycatch	It is illegal to retain salmon that are incidentally captured in fisheries not directed at salmon (no bycatch). In the directed recreational fishery, mortality from catch and release is accounted for in the regional assessments to estimate spawners. There is no accounting of discarding mortality in non-salmon directed fisheries.
Indicators	The Framework of Indicators is used to indicate whether a significant change has occurred in the status of stocks in intermediate years where multiannual management advice applies.
Other information	Advice subject to annual review. A stock annex was developed in 2014 and updated to 2016.
Working group	Working Group on North Atlantic Salmon (WGNAS) (ICES, 2017).

4. Atlantic salmon at West Greenland

Summary of the advice for 2017

The advice provided by ICES in 2015 indicated that there were no catch options for the West Greenland fishery for the years 2015–2017. The NASCO Framework of Indicators for the West Greenland Commission was run in 2016 and 2017, and did not indicate a need for revised analysis of catch options in either year. The assessment was updated to 2016 and the stock status is consistent with the previous years' assessments and catch advice.

4.1 NASCO has asked ICES to describe the key events of the 2016 fishery, including details of catch, gear, effort, composition and origin of the catch, rates of exploitation, and location of the catch as in river, estuarine, and coastal

Fishing for salmon at Greenland is currently allowed using hook, fixed gillnets, and driftnets along the entire coast of Greenland (Figure 1). The commercial fishery for export closed in 1998; however, the fishery for internal use only continues. Since 2002, licensed fishers have only been allowed to sell salmon to hotels, institutions, and local markets. People fishing for private consumption only are not required to have a licence, but they are prohibited from selling salmon. From 2012, licensed fishers were also allowed to land to factories, although the export ban persisted and the landed salmon could only be sold within Greenland. Since 2012, the Government of Greenland has unilaterally set the quota for the fishery, since the quota could not be agreed to by all parties of the West Greenland Commission of NASCO (Table 2). In 2012 and 2013 a quota of 35 t was applied to the factory landings only. The factory quota was reduced to 30 t in 2014. In 2015 the Government of Greenland set a quota for all components of the fishery (private, commercial, and factory landings) of 45 t, indicating that any overharvest in a particular year would result in an equal reduction in the catch limit in the following year. As a result of an overharvest in 2015, the 2016 quota was set by Greenland to 32 t. The export ban persisted and landed salmon could only be sold within Greenland, but no sales to factories were allowed in 2016. The fishing season opened on 15 August and closed on 30 October.

Catches of Atlantic salmon at West Greenland (Figure 2 and Table 2) increased through the 1960s, reaching a peak reported harvest of approximately 2700 t in 1971 and then decreased until the closure of the commercial fishery for export in 1998. However, the fishery for internal use has been increasing in recent years.

A total catch of 27.1 t of salmon was reported for the 2016 fishery (Figure 1 and Table 3). In total, 72% of the landings in 2016 came from licensed fishers. Of the catches reported for private use, 41% (7.6 t) came from unlicensed fishers and 59% (10.8 t) were from licensed fishers. Although not allowed to sell their catch, 0.4% (0.1 t, approximately 30 fish) of the commercial landings were reported as coming from unlicensed fishers.

Table 1 Reported 2016 catches by fisheries.

Licence type	Reported consumption type	Reported 2016 catch (t)
Licensed	Commercial	8.6
	Private	10.8
Unlicensed	Commercial	0.1
	Private	7.6
All	Commercial	8.7
	Private	18.4
All	Total	27.1

Landings were reported across all NAFO divisions and a harvest of 1.5 t was reported from ICES Division 14 (East Greenland) (Tables 3 and 4). The 2016 commercial landings (8.7 t) decreased below the 2015 value (33.8 t) while the private landings in 2016 (18.4 t) remained approximately equal to the 2015 value (19.2 t; Table 4).

Review of the results of the recent phone surveys and advise on the appropriateness for incorporating resulting estimates of unreported catch into the assessment process

There is currently no quantitative approach for estimating the unreported catch for the private fishery, but the 2016 value is likely to have been at the same level as in recent years (10 t), as reported by the Greenlandic authorities. The 10 t estimate was historically meant to account for private non-licensed fishers in smaller communities fishing for personal consumption, and not meant to represent underreporting by commercial fishers.

The variations in the numbers of people reporting catches, variation in reported landings in each of the NAFO divisions, and documentation of underreporting of landings suggest that there are inconsistencies in the catch data. An adjustment for some unreported catch, primarily for commercial landings, has been done since 2002 by comparing the weight of salmon seen by the sampling teams and the corresponding community-specific reported landings for the entire fishing season (commercial and private landings combined). However, sampling only occurs during a portion of the fishing season and therefore these adjustments are considered to be minimum adjustments for unreported catch (Table 6).

Telephone surveys were conducted after the 2014, 2015, and 2016 fishing seasons to gain further information on catch and effort. The number of fishers contacted, the questions asked, and the method to estimate unreported catch differed from year to year. In 2015, attempts were made to contact all licensed fishers, including those who reported and those who did not report catches in 2014 (ICES, 2015). In 2016, a subset of licensed fishers who did not report catches were contacted (ICES, 2016a). In 2017 a random sample of 49 licensed fishers were interviewed, 30 who had not reported catches and 19 who had. In all years, one of the questions was aimed at obtaining an estimate of the landings by licensed fishers that were not reported to the Greenland authorities.

Analysis of the 2015 results suggested that there was no systematic bias between catches reported and values indicated during the telephone survey. A total of 12.2 t of non-reported harvest was recorded during the 2015 survey, but a division-specific weighting was not applied and a total estimate of non-reported harvest was not derived. In 2016 and 2017, division-specific weightings were developed and applied (Table 5). The total unreported catches by licensed fishers as estimated from these surveys were 12.2 t in 2014, 5 t in 2015, and 4.2 t in 2016.

The post-season telephone survey provides a method to derive unreported catches by licensed fishers who do not report during the year. It does not, however, provide an estimate of unreported catches from unlicensed fishers. There is currently no information with which to conduct a survey on the unlicensed pool of participants, and the unreported catch from this component remains unknown. In 2015 and 2016, the harvests declared by the interviewed licensed fishers who had not reported were raised to account for the total number of licensed fishers who had not reported during the year. This provided an estimate of the unreported catch by licensed fishers. These data, in combination with the adjusted landings values from sampling, are used by ICES for the assessment. Some of the extra catch observed by samplers may be accounted for during the phone survey. In the years when the adjustments were made, the sample adjustments were very small. Adjusted landings for assessment do not replace the official reported statistics. For the assessment the unreported catch of 10 t provided by the Government of Greenland is also included. The time-series of reported landings, adjusted landings (sampling), adjusted landings (survey), and landings for assessment is presented in Table 6.

Biological characteristics of the catches

The international sampling programme continued in the fishery in 2016 (Figure 1). In 2016, a total of 1302 samples were obtained from four communities representing four Northwest Atlantic Fisheries Organization (NAFO) divisions: Sisimiut in 1B (n = 318), Maniitsoq in 1C (n = 542), Paamiut in 1E (n = 125), and Qaqortoq in 1F (n = 317). DNA isolation and the subsequent microsatellite analyses were used to assign the continent of origin (King *et al.*, 2001) for the 2016 samples, and the North American region-specific origin of salmon in the 2015 fishery was reported by Bradbury *et al.* (2016).

In total, 66.4% of the salmon sampled were determined to be of North American origin and 33.6% of European origin. A large proportion of North American origin individuals contributed to the fishery in recent years; however, the 2016 value is the lowest proportion of North American origin fish since 2003 (Figure 3).

The 1SW age group represented over 95% of the sampled catch in 2016, similar to previous years (Table 7). Approximately 5100 (about 17.2 t) North American origin fish and approximately 3300 (about 8.7 t) European origin fish were estimated to have been harvested in 2016. The number of fish harvested in 2016 was the lowest since 2011, and well below the 2015 estimate. The harvest in 2016 was only 2.5% of the maximum estimated (336 000 fish) harvest from 1982 (Figure 4).

New assignment results were available for the North American contributions to the 2015 Greenland fishery. As in previous years (ICES, 2015; Bradbury *et al.*, 2016), three regions of eastern North America contributed to the majority of the samples in 2015: Québec, Gulf of St Lawrence, and Labrador. Smaller contributions were made by other regions (Newfoundland, Scotia–Fundy, and USA).

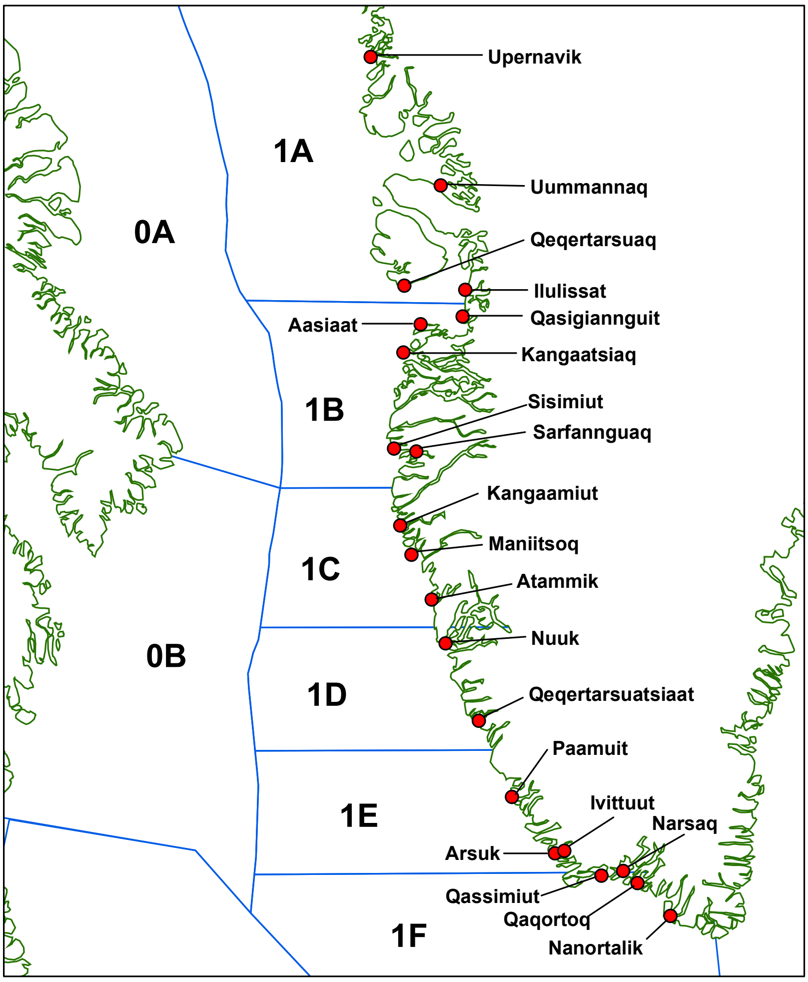


Figure 1 Map of southwest Greenland, showing communities to which Atlantic salmon have historically been landed and the corresponding NAFO divisions. In 2016 fishery samples were obtained from Sisimuit (NAFO division 1B), Maniitsoq (1C), Paamuit (1E), and Qaqortoq (1F).

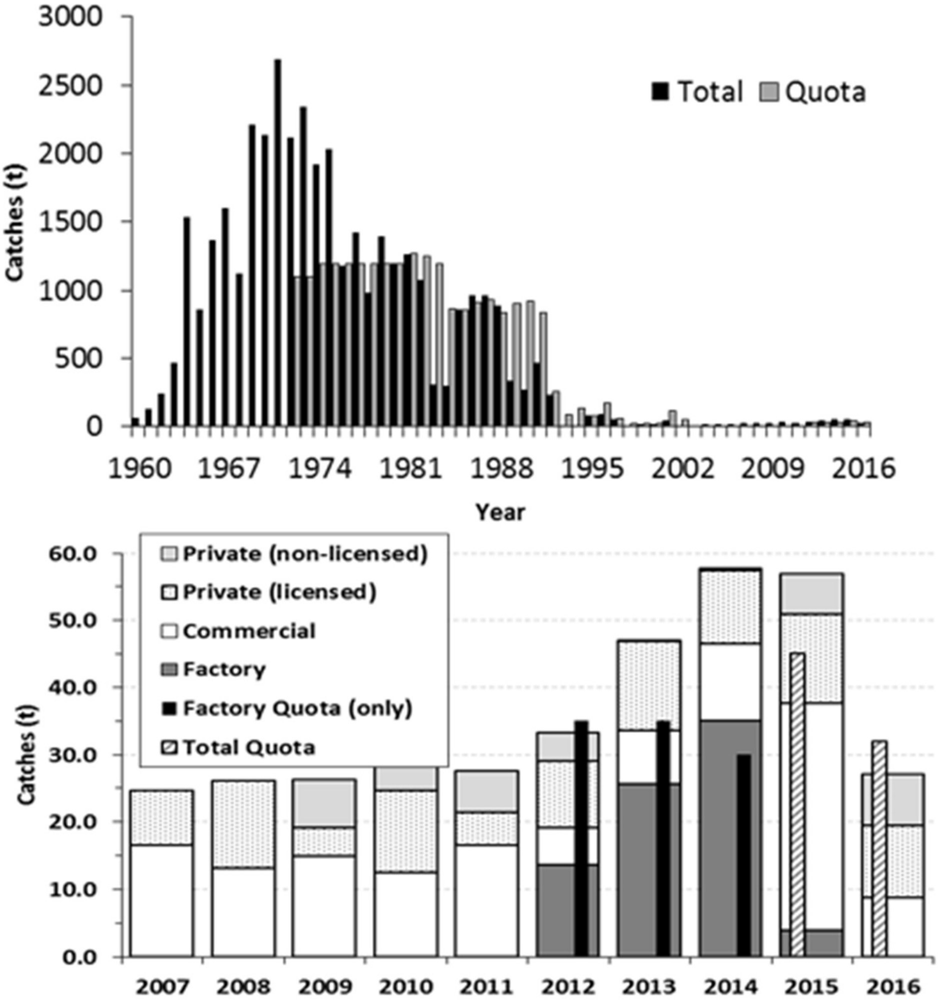


Figure 2 Nominal catches and commercial quotas (tonnes, round fresh weight) of salmon at West Greenland for 1960–2016 (top panel) and 2007–2016 (bottom panel). Total reported landings from 2007 to 2016 are displayed by landings type. No quotas were set from 2002 to 2011, a factory only quota was set from 2012 to 2014, and a single quota of 45 t for all components of the fishery was applied in 2015. The 2016 quota for all components of the fishery was reduced to 32 t because of overharvest of the 2015 TAC. There were no factory landings permitted in 2016.

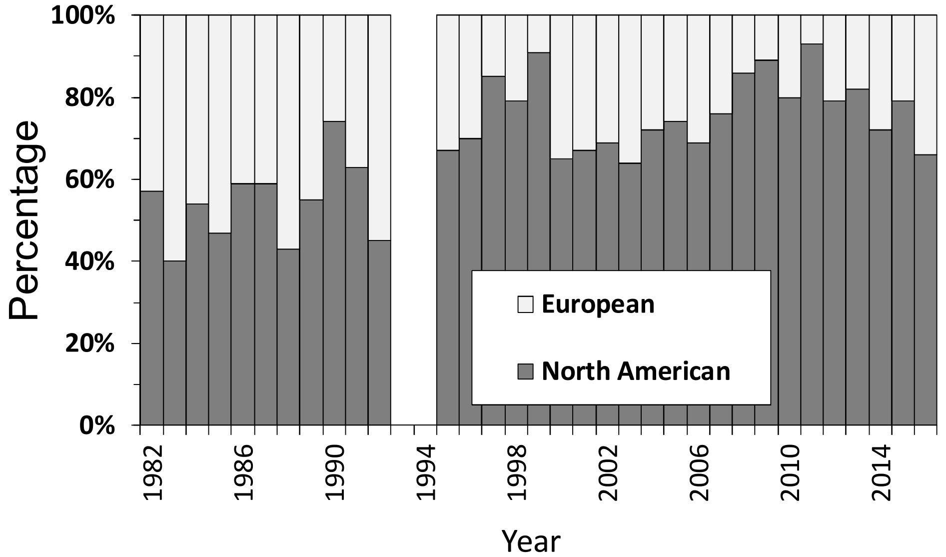


Figure 3 Percentage of the sampled catch by continent of origin of Atlantic salmon in the West Greenland fishery samples, 1982 to 2016.

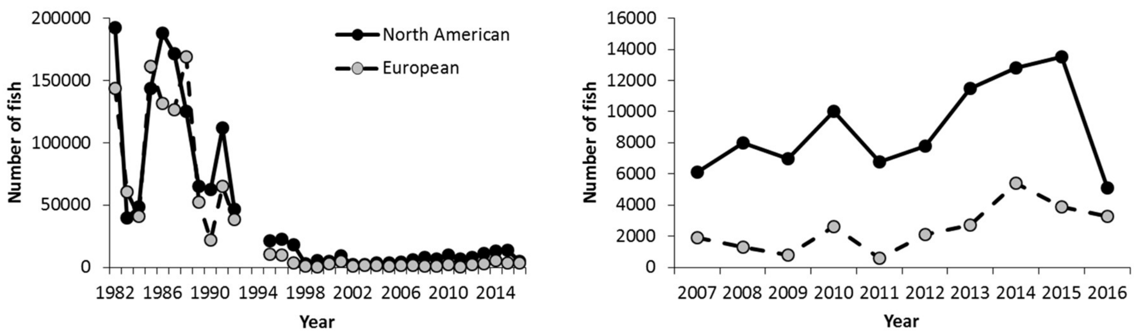


Figure 4 Estimated number of North American and European Atlantic salmon caught at West Greenland from 1982 to 2016 (left panel) and 2007 to 2016 (right panel). Estimates are based on continent of origin by NAFO division, weighted by catch (weight) in each division. Numbers are rounded to the nearest hundred fish. Unreported catch is not included in this calculation.

Table 2 Nominal catches of salmon at West Greenland since 1960 (tonnes, round fresh weight) by participating nations. For Greenlandic vessels specifically, all catches up to 1968 were taken with set gillnets only; catches after 1968 were taken with set gillnets and driftnets. All non-Greenlandic vessel catches from 1969 to 1975 were taken with driftnets. The quota figures applied to Greenlandic vessels only and entries in parentheses identify when quotas did not apply to all sectors of the fishery.

Year	Norway	Faroes	Sweden	Denmark	Greenland	Total	Quota	Comments
1960	-	-	-	-	60	60		
1961	-	-	-	-	127	127		
1962	-	-	-	-	244	244		
1963	-	-	-	-	466	466		
1964	-	-	-	-	1539	1539		
1965	-	36	-	-	825	858		Norwegian harvest figures not available, but known to be less than Faroese catch.
1966	32	87	-	-	1251	1370		
1967	78	155	-	85	1283	1601		
1968	138	134	4	272	579	1127		
1969	250	215	30	355	1360	2210		
1970	270	259	8	358	1244	2139		Greenlandic total includes 7 t caught by longlines in the Labrador Sea.
1971	340	255	-	645	1449	2689	-	
1972	158	144	-	401	1410	2113	1100	
1973	200	171	-	385	1585	2341	1100	
1974	140	110	-	505	1162	1917	1191	
1975	217	260	-	382	1171	2030	1191	
1976	-	-	-	-	1175	1175	1191	
1977	-	-	-	-	1420	1420	1191	
1978	-	-	-	-	984	984	1191	
1979	-	-	-	-	1395	1395	1191	
1980	-	-	-	-	1194	1194	1191	
1981	-	-	-	-	1264	1264	1265	Quota set to a specific opening date for the fishery.
1982	-	-	-	-	1077	1077	1253	Quota set to a specific opening date for the fishery.
1983	-	-	-	-	310	310	1191	
1984	-	-	-	-	297	297	870	
1985	-	-	-	-	864	864	852	
1986	-	-	-	-	960	960	909	
1987	-	-	-	-	966	966	935	
1988	-	-	-	-	893	893	840	Quota for 1988–1990 was 2520 t with an opening date of August 1. Annual catches were not to exceed an annual average (840 t) by more than 10%. The quota was adjusted to 900 t in 1989 and 924 t in 1990 for later opening dates.
1989	-	-	-	-	337	337	900	
1990	-	-	-	-	274	274	924	
1991	-	-	-	-	472	472	840	
1992	-	-	-	-	237	237	258	Quota set by Greenland authorities.
1993	-	-	-	-			89	The fishery was suspended. NASCO adopted a new quota allocation model.
1994	-	-	-	-			137	The fishery was suspended and the quotas were bought out.
1995	-	-	-	-	83	83	77	Quota advised by NASCO.
1996	-	-	-	-	92	92	174	Quota set by Greenland authorities.
1997	-	-	-	-	58	58	57	Private (non-commercial) catches to be reported after 1997.
1998	-	-	-	-	11	11	20	Fishery restricted to catches used for internal consumption in Greenland.
1999	-	-	-	-	19	19	20	

Year	Norway	Faroes	Sweden	Denmark	Greenland	Total	Quota	Comments
2000	-	-	-	-	21	21	20	
2001	-	-	-	-	43	43	114	Final quota calculated according to the *ad hoc* management system.
2002	-	-	-	-	9	9	55	Quota bought out, quota represented the maximum allowable catch (no factory landing allowed), and higher catch figures based on sampling programme information are used for the assessments.
2003	-	-	-	-	9	9		Quota set to nil (no factory landing allowed), fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments.
2004	-	-	-	-	15	15		Same as previous year.
2005	-	-	-	-	15	15		Same as previous year.
2006	-	-	-	-	22	22		Quota set to nil (no factory landing allowed) and fishery restricted to catches used for internal consumption in Greenland.
2007	-	-	-	-	25	25		Quota set to nil (no factory landing allowed), fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments.
2008	-	-	-	-	26	26		Same as previous year.
2009	-	-	-	-	26	26		Same as previous year.
2010	-	-	-	-	40	40		No factory landing allowed and fishery restricted to catches used for internal consumption in Greenland.
2011	-	-	-	-	28	28		Same as previous year.
2012	-	-	-	-	33	33	(35)	Unilateral decision made by Greenland to allow factory landing with a 35 t quota for factory landings only, fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments.
2013	-	-	-	-	47	47	(35)	Same as previous year.
2014	-	-	-	-	58	58	(30)	Unilateral decision made by Greenland to allow factory landing with a 30 t quota for factory landings only, fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information and phone surveys are used for the assessments.
2015	-	-	-	-	57	57	45	Unilateral decision made by Greenland to set a 45 t quota for all sectors of the fishery, fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information and phone surveys are used for the assessments.

YEAR	NORWAY	FAROES	SWEDEN	DENMARK	GREENLAND	TOTAL	QUOTA	COMMENTS
2016	-	-	-	-	27	27	32	Unilateral decision made by Greenland to reduce the previously set 45 t quota for all sectors of the fishery to 32 t based on coverage of 2015 fishery, fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information and phone surveys are used for the assessments.

Table 3 Distribution of nominal catches (metric tonnes) by Greenland vessels since 1960, by NAFO divisions 1A–1F. Since 2005, gutted weights have been reported and converted to total weight by a factor of 1.11.

Year	1A	1B	1C	1D	1E	1F	Unknown	West Greenland	East Greenland	Total
1960							60	60		60
1961							127	127		127
1962							244	244		244
1963	1	172	180	68	45			466		466
1964	21	326	564	182	339	107		1539		1539
1965	19	234	274	86	202	10	36	861		861
1966	17	223	321	207	353	130	87	1338		1338
1967	2	205	382	228	336	125	236	1514		1514
1968	1	90	241	125	70	34	272	833		833
1969	41	396	245	234	370		867	2153		2153
1970	58	239	122	123	496	207	862	2107		2107
1971	144	355	724	302	410	159	560	2654		2654
1972	117	136	190	374	385	118	703	2023		2023
1973	220	271	262	440	619	329	200	2341		2341
1974	44	175	272	298	395	88	645	1917		1917
1975	147	468	212	224	352	185	442	2030		2030
1976	166	302	262	225	182	38		1175		1175
1977	201	393	336	207	237	46	-	1420	6	1426
1978	81	349	245	186	113	10	-	984	8	992
1979	120	343	524	213	164	31	-	1395	+	1395
1980	52	275	404	231	158	74	-	1194	+	1194
1981	105	403	348	203	153	32	20	1264	+	1264
1982	111	330	239	136	167	76	18	1077	+	1077
1983	14	77	93	41	55	30	-	310	+	310
1984	33	116	64	4	43	32	5	297	+	297
1985	85	124	198	207	147	103	-	864	7	871
1986	46	73	128	203	233	277	-	960	19	979
1987	48	114	229	205	261	109	-	966	+	966
1988	24	100	213	191	198	167	-	893	4	897
1989	9	28	81	73	75	71	-	337	-	337
1990	4	20	132	54	16	48	-	274	-	274
1991	12	36	120	38	108	158	-	472	4	476
1992	-	4	23	5	75	130	-	237	5	242
1993*	-	-	-	-	-	-	-	-	-	-
1994*	-	-	-	-	-	-	-	-	-	-
1995	+	10	28	17	22	5	-	83	2	85
1996	+	+	50	8	23	10	-	92	+	92
1997	1	5	15	4	16	17	-	58	1	59
1998	1	2	2	4	1	2	-	11	-	11
1999	+	2	3	9	2	2	-	19	+	19
2000	+	+	1	7	+	13	-	21	-	21
2001	+	1	4	5	3	28	-	43	-	43
2002	+	+	2	4	1	2	-	9	-	9
2003	1	+	2	1	1	5	-	9	-	9
2004	3	1	4	2	3	2	-	15	-	15
2005	1	3	2	1	3	5	-	15	-	15
2006	6	2	3	4	2	4	-	22	-	22
2007	2	5	6	4	5	2	-	25	-	25
2008	4.9	2.2	10.0	1.6	2.5	5.0	-	26.2	-	26.2
2009	0.2	6.2	7.1	3.0	4.3	4.8	-	25.6	0.8	26.3
2010	17.3	4.6	2.4	2.7	6.8	4.3	-	38.1	1.7	39.6
2011	1.8	3.7	5.3	8.0	4.0	4.6	-	27.4	0.1	27.5
2012	5.4	0.8	15.0	4.6	4.0	3.0	-	32.6	0.5	33.1
2013	3.1	2.4	17.9	13.4	6.4	3.8	-	47.0	-	47.0
2014	3.6	2.8	13.8	19.1	15.0	3.4	-	57.8	0.1	57.9
2015	0.8	8.8	10.0	18.0	4.2	14.1	-	55.9	1.0	56.8
2016	0.8	1.2	7.3	4.6	4.5	7.3	-	25.7	1.5	27.1

* The fishery was suspended.
+ Small catches, < 0.5 t.
- No catch.

Table 4 Reported landings (tonnes) by landing category, the number of fishers reporting, and the total number of landing reports received for licensed and unlicensed fishers in 2015 and 2016. Empty cells identify categories with no reported landings and 0.0 entries represent reported values of < 0.5 t.

NAFO/ICES	Licensed	No. of fishers	No. of reports	Comm.	Private	Factory	Total	Licensed	No. of fishers	No. of reports	Comm.	Private	Factory	Total
2016								2015						
1A	NO							NO	5	6		0.1		0.1
1A	YES	9	19		0.7		0.7	YES	13	29	0.1	0.6		0.7
1A	TOTAL	9	19	0.0	0.7		0.7	TOTAL	18	35	0.1	0.7		0.8
1B	NO	4	9		0.2		0.2	NO	3	5		0.1		0.1
1B	YES	7	22	0.1	1.0		1.0	YES	15	96	7.3	1.5		8.7
1B	TOTAL	11	31	0.1	1.1		1.2	TOTAL	18	101	7.3	1.5		8.8
1C	NO	8	30		1.0		1.0	NO	16	58	0.1	1.7		1.8
1C	YES	23	113	4.1	2.1		6.2	YES	42	181	2.9	3.9	1.5	8.2
1C	TOTAL	31	143	4.1	3.1		7.3	TOTAL	58	239	3.0	5.6	1.5	10.1
1D	NO	8	13		0.9		0.9	NO	20	35		0.8		0.8
1D	YES	8	42	1.2	2.5		3.8	YES	11	161	14.3	0.5	2.4	17.1
1D	TOTAL	16	55	1.2	3.4		4.6	TOTAL	31	196	14.3	1.3	2.4	18
1E	NO	13	22		1.4		1.4	NO	3	5	0.1	0.2		0.2
1E	YES	10	74	0.6	2.5		3.1	YES	11	71	2.0	1.9		3.9
1E	TOTAL	23	96	0.6	3.9		4.5	TOTAL	14	76	2.1	2.1		4.2
1F	NO	27	66	0.1	2.9		3.0	NO	20	69		2.4		2.4
1F	YES	13	46	2.6	1.7		4.3	YES	21	173	7.1	4.6		11.7
1F	TOTAL	40	112	2.7	4.6		7.3	TOTAL	41	242	7.1	7.0		14.1
14	NO	9	46		1.3		1.3	NO	8	32		0.6		0.6
14	YES	1	1		0.2		0.2	YES	1	17	0	0.4		0.4
14	TOTAL	10	47	0.0	1.5		1.5	TOTAL	9	49	0	0.9		1
ALL	NO	69	186	0.1	7.6		7.7	NO	75	210	0.1	5.9		6
ALL	YES	71	317	8.6	10.8		19.4	YES	114	728	33.7	13.3	3.8	50.8
ALL	TOTAL	140	503	8.7	18.4		27.1	TOTAL	189	938	33.8	19.2	3.8	56.8

Table 5 Summary of the 2014 to 2016 post-season telephone surveys conducted by the GFLK (Greenland Fisheries Control Authority), APNN (the fisheries department), and GINR (Greenland Institute of Natural Resources).

	2014	2015	2016
Licensed fishers (total)	321	310	263
Number reporting catches by February the following year	98	114	75
Number reporting catches	114	189	143
Number not reporting catches	207	196	188
Number interviewed reporting catches	88*	0	19
Number interviewed not reporting catches	119*	105	30
Weighting	None	NAFO division-specific	NAFO division-specific
Estimated unreported catch (t)	12.2	5.0	4.2

* Includes approximately 11 nonprofessional fishers.

Table 6 Reported landings and adjusted landings (tonnes) used for assessment, 2002 to 2016. Adjusted landings (sampling) refer to estimated harvests made by sampling teams during sampling periods that exceeded the corresponding community-specific reported landings for the season. Dashes '-' indicate that no adjustment was necessary. Adjusted landings (survey) refer to landings by licensed fishers that were not reported during the season but were declared during the telephone survey. No phone surveys were conducted from 2002 to 2013. Landings for assessment are the summation of reported and adjusted landings from both sampling and surveys.

Year	Reported landings (West Greenland only; t)	Adjusted landings (sampling; t)	Adjusted landings (telephone survey; t)	Adjusted landings for assessment (t)
2002	9.0	0.7		9.8
2003	8.7	3.6		12.3
2004	14.7	2.5		17.2
2005	15.3	2.0		17.3
2006	23.0	-		23.0
2007	24.6	0.2		24.8
2008	26.1	2.5		28.6
2009	25.5	2.5		28.0
2010	37.9	5.1		43.1
2011	27.4	-		27.4
2012	32.6	2.0		34.6
2013	46.9	0.7		47.7
2014	57.7	0.6	12.2	70.5
2015	55.9	-	5.0	60.9
2016	25.7	0.3	4.2	30.2

Table 7 Summary of biological characteristics of catches at West Greenland in 2016 (NA – North America, E – Europe).

River-age distribution (%) by origin								
Continent	1	2	3	4	5	6	7	8
NA	0.1	21.3	43.3	26.8	7.3	1.1	0	0
E	10.4	59.0	26.3	3.8	0.4	0	0	0

Length and weight by origin and sea age								
Continent	1 SW		2 SW		Previous spawners		All sea ages	
	Fork length (cm)	Whole weight (kg)	Fork length (cm)	Whole weight (kg)	Fork length (cm)	Whole weight (kg)	Fork length (cm)	Whole weight (kg)
NA	65.2	3.18	85.1	7.77	72.2	4.03	n/a	3.32
E	62.6	2.79	76.0	5.18	70.9	4.12	n/a	2.89

Continent of origin (%)	
North America	Europe
66.4	33.6

Sea-age composition (%) by continent of origin			
Continent	1SW	2SW	Previous spawners
NA	93.5	2.5	4.0
E	95.5	3.5	1.0

4.2 NASCO asked ICES to describe the status of the stocks

Currently reliable estimates of stock status of salmon populations at West Greenland are not available. Stock status is inferred from the status of the populations in their homewaters.

Recruitment (pre-fishery abundance) estimates of non-maturing 1SW salmon suggest continued low abundance of North American (Figure 9 in ICES, 2017a) and southern North East Atlantic Commission (NEAC) (Figure 5 in ICES, 2017b) salmon at Greenland. The midpoints of the spawner abundance estimates for five out of the seven stock complexes exploited at West Greenland are below the conservation limits (CLs) and are therefore suffering reduced reproductive capacity (Figure 5). In 2016, North American 2SW spawner estimates were below CLs in five of the six regions (Québec, Gulf, Newfoundland, Scotia–Fundy, and the USA; Figure 5); the median estimate for Labrador was above the CL. Within each of the geographic areas there are individual river stocks that are failing to meet CLs. In the southern parts of the North American Commission (NAC) area (Scotia–Fundy and USA) numerous populations are in danger of extinction and are under consideration for, or receiving, special protection measures under federal legislation. The midpoint of the spawner abundance estimate for the Southern NEAC MSW stock complex was above the CL, but the stock complex is considered at risk of suffering reduced reproductive capacity (Figure 5). For individual countries within the Southern NEAC MSW stock complex, estimated spawners for two countries were considered at full reproductive capacity, whereas spawners for three countries were either at risk of, or suffering from reduced reproductive capacity.

The exploitation rate (catch at Greenland/PFA) on NAC fish in 2015 was 9.7%, which is slightly higher than the 2014 estimate (9.5%) and the previous five-year mean (8.4%, 2010–2014), but remains among the lowest in the time-series (Figure 6). The 2015 Southern NEAC exploitation rate was 1.0%, which is a decrease from the previous year's estimate (1.9%) and slightly above the previous five-year mean (0.8%, 2010–2014), but remains among the lowest in the time-series.

The abundance of salmon within the West Greenland area is thought to be low compared to historical levels. This is broadly consistent with the general pattern of decline in marine survival in most monitored stocks. Despite major changes in fisheries management in the past few decades and increasingly more restrictive fisheries measures since, returns in many of these regions have remained near historical lows. The continued low abundance of salmon stocks across North America and in the Northeast Atlantic, despite significant fishery reductions, further strengthens the conclusions that factors other than fisheries are constraining production.

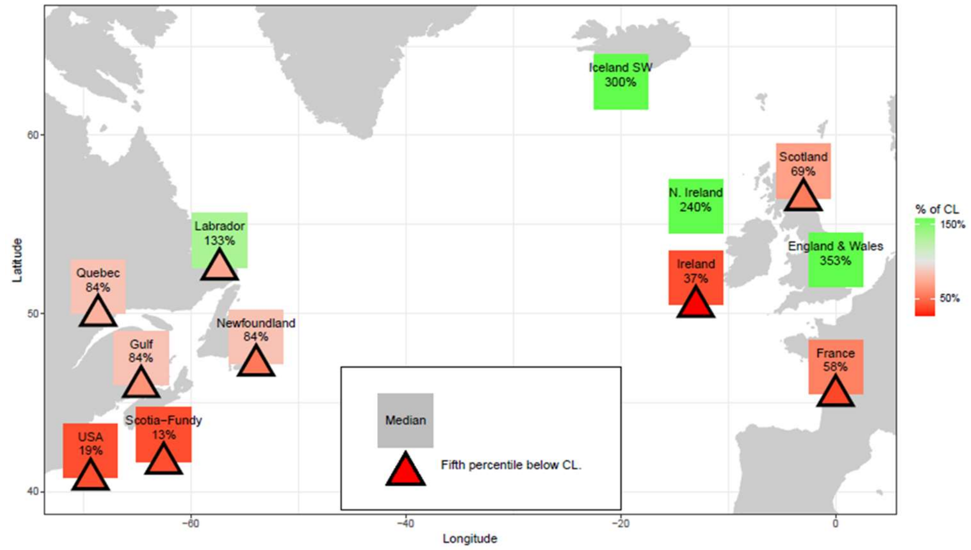


Figure 5 Summary of 2SW (NAC regions) and MSW (NEAC regions) spawner estimates in relation to CLs (or management objectives for USA and Scotia–Fundy in NAC). Median (squares) and the 5th percentile (triangles) refer to the values from the posterior distribution from Monte Carlo sampling. The colour shading of the symbols represents the percentage of the CL or management objective attained, with red indicating less than 100% and green greater than 100%. For squares, colours are in reference to the median as a percentage of CL or objective. For triangles, colours are in reference to the 5th percentile as a percentage of the CL or management objective. The triangles indicate when the 5th percentiles of the estimates are below the CLs or management objective, i.e. when the stocks are at risk of, or suffering from reduced reproductive capacity.

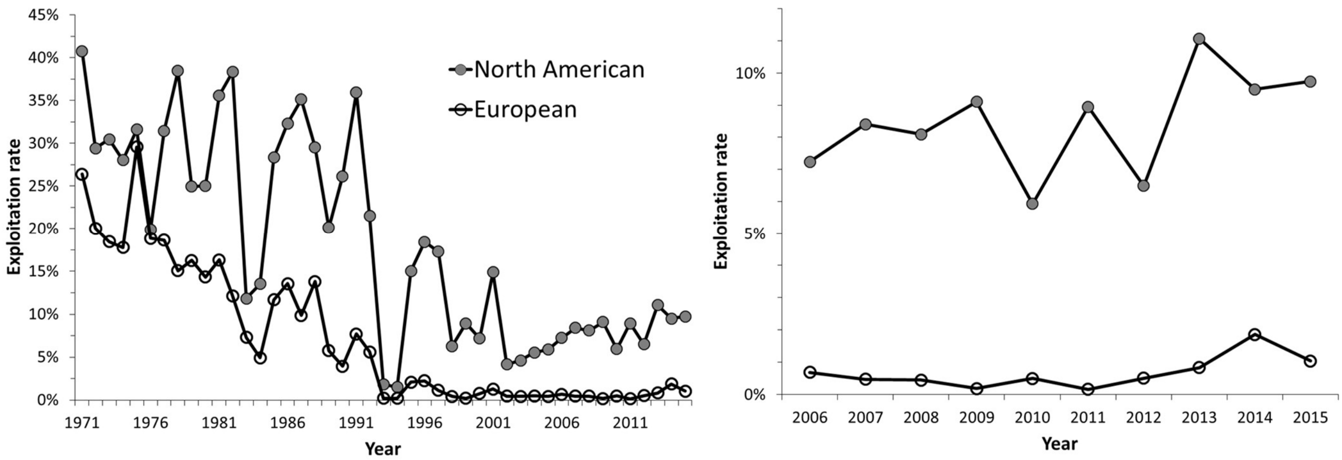


Figure 6 Exploitation rate (%) for NAC 1SW non-maturing and Southern NEAC non-maturing Atlantic salmon at West Greenland, 1971–2015 (left) and 2006–2015 (right). Exploitation rate estimates are only available until 2015, as the 2016 exploitation rates are dependent on 2017 returns.

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

The following relevant data deficiencies, monitoring needs, and research requirements of relevance to the West Greenland Commission were identified.

1) Continued efforts to improve the reporting system for catches in the Greenland fishery, and to provide detailed statistics related to spatially and temporally explicit catch and effort data for analyses.
2) The continuation of the phone survey programme in Greenland according to a standardized and consistent annual approach, with consideration given to surveying a higher proportion of licensed fishers and the inclusion of the non-licensed fishers. Information gained on the level of total catches for this fishery will allow a more accurate assessment of the status of stocks and assessment of risk with varying levels of harvest.
3) The continuation and potential expansion of the broad geographic sampling programme, including the re-introduction of sampling in Nuuk (in multiple NAFO divisions, and including factory landings when permitted) to more accurately estimate continent and region of origin and biological characteristics of the mixed-stock fishery.
4) Progress to be made in assigning the European origin salmon from the West Greenland fishery to a sub-complex region of origin.

References

Bradbury, I. R., Hamilton, L. C., Sheehan, T. F., Chaput, G., Robertson, M. J., Dempson *et al.* 2016. Genetic mixed stock analysis disentangles spatial and temporal variation in composition of the West Greenland Atlantic Salmon fishery. ICES Journal of Marine Science, 73: 2311–2321.

ICES. 2015. Report of the Working Group on North Atlantic Salmon (WGNAS), 17–26 March 2015, Moncton, Canada. ICES CM 2015/ACOM:09. 461 pp.

ICES. 2016b. Advice basis. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 1, Section 1.2.

ICES. 2016a. Report of the Working Group on North Atlantic Salmon (WGNAS), 30 March–8 April 2016, Copenhagen, Denmark. ICES CM 2016/ACOM:10. 323 pp.

ICES. 2017a. Atlantic salmon from North America. *In* Report of the ICES Advisory Committee, 2017. ICES Advice 2017, sal.21.nac.

ICES. 2017b. Atlantic salmon from the Northeast Atlantic. *In* Report of the ICES Advisory Committee, 2017. ICES Advice 2017, sal.27.neac.

ICES. 2017c. Report of the Working Group on North Atlantic Salmon (WGNAS), 29 March–7 April 2017, Copenhagen, Denmark. ICES CM 2017/ACOM:20. 294 pp.

King, T. L., Kalinowski, S. T., Schill, W. B., Spidle, A. P., and Lubinski, B. A. 2001. Population structure of Atlantic salmon (*Salmo salar* L.): a range-wide perspective from microsatellite DNA variation. Molecular Ecology, 10: 807–821.

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.
CL, i.e. S_{lim} *(conservation limit).* Demarcation of undesirable stock levels or levels of fishing activity; the ultimate objective when managing stocks and regulating fisheries will be to ensure that there is a high probability that undesirable levels are avoided.
CPUE *(catch per unit of effort).* A derived quantity obtained from the independent values of catch and effort.
ICES (*International Council for the Exploration of the Sea*).
NAC (*North American Commission*). A commission under NASCO.
NAFO (*Northwest Atlantic Fisheries Organization*). 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.
NASCO (*North Atlantic Salmon Conservation Organization*).
NEAC (*North East Atlantic Commission*). A commission under NASCO.
PFA *(pre-fishery abundance).* The numbers of salmon estimated to be alive in the ocean from a particular stock at a specified time.
TAC *(total allowable catch).* TAC is the quantity of fish that can be taken from each stock each year.

Annex 3 General considerations

Management plans

The North Atlantic Salmon Conservation Organization (NASCO) has adopted an Action Plan for Application of the Precautionary Approach which stipulates that management measures should be aimed at maintaining all stocks above their CLs by the use of management targets. NASCO has adopted the region-specific CLs as limit reference points (S_{lim}); having populations fall below these limits should be avoided with high probability. Within the agreed management plan, a simultaneous risk level (probability) of 75% has been agreed for the provision of catch advice on the stock complexes exploited at West Greenland (non-maturing 1SW fish from North America and Southern NEAC). The management objectives are to meet the 2SW CLs for the four northern areas of NAC (Labrador, Newfoundland, Québec, and Gulf), to achieve a 25% increase in returns of 2SW salmon from the average returns in 1992–1996 for the Scotia–Fundy region, to achieve 2SW adult returns of 4549 fish or greater for the USA, and to meet the Southern NEAC MSW CL. A framework of indicators has been developed in support of the multi-annual catch options.

Biology

Atlantic salmon (*Salmo salar*) is an anadromous species found in rivers of countries bordering the North Atlantic. In the Northeast Atlantic area their current distribution extends from northern Portugal to the Pechora River in northwestern Russia and Iceland. In the Northwest Atlantic distribution ranges from the Connecticut River in USA (41.6°N) to the Leaf River in Ungava Bay (Québec, Canada; 58.8°N). Juveniles emigrate to the ocean at ages one to eight years (dependent on latitude) and generally return after one or two years at sea. Long-distance migrations to ocean feeding grounds are known to take place, with adult salmon from both the North American and Northeast Atlantic stocks migrating to West Greenland to feed during their second summer and autumn at sea.

Environmental influence on the stock

Environmental conditions in both freshwater and marine environments have a marked effect on the status of salmon stocks. Across the North Atlantic, a range of problems in the freshwater environment play a significant role in explaining the poor status of stocks. In many cases river damming and habitat deterioration have had a devastating effect on freshwater environmental conditions. In the marine environment, return rates of adult salmon have declined through the 1980s and are now at the lowest levels in the time-series for some stocks, even after closure of marine fisheries. Climatic factors modifying ecosystem conditions and the impact of predators of salmon at sea are considered to be the main contributory factors to lower productivity, which is expressed almost entirely in terms of lower marine survival.

Effects of the fisheries on the ecosystem

The current salmon fishery uses nearshore surface gillnets. There is no information on bycatch of other species with this gear. The fisheries probably have no, or only minor, influence on the marine ecosystem.

Quality considerations

Uncertainties in input variables to the stock status and stock forecast models are incorporated in the assessment. Catch reporting is considered to be incomplete.

Scientific basis

ICES stock data category	1 (ICES, 2016b).
Assessment type	Run reconstruction models and Bayesian forecasts, taking into account uncertainties in the data.
Input data	Nominal catches (by sea-age class and continent of origin) for internal use fisheries. Estimates of unreported/illegal catches. Estimates of exploitation rates. Natural mortalities (from earlier assessments).
Discards and bycatch	No salmon discards in the directed salmon fishery.
Indicators	A framework of indicators (FWI) is used to indicate whether a significant change has occurred in the status of stocks in intermediate years where multi-annual management advice applies.
Other information	Advice subject to annual review. Stock annex completed in 2014 and updated in 2017.
Working group	Working Group on North Atlantic Salmon (WGNAS) (ICES, 2017c).

List of Participants

List of Participants

* Denotes Head of Delegation

CANADA

* Ms Sylvie Lapointe *sylvie.lapointe@dfo-mpo.gc.ca*	Representative Fisheries and Oceans Canada, Ottawa, Ontario
Mr Bud Bird *bhl@birdholdings.ca*	Representative Fredericton, New Brunswick
Mr Carl McLean *carl_mclean@nunatsiavut.com*	Representative Nunatsiavut Government, Happy Valley - Goose Bay, Newfoundland & Labrador
Dr Julien April *julien.april@mffp.gouv.qc.ca*	Ministère des Forêts de la Faune et des Parcs du Québec, Québec
Mr Doug Bliss *doug.bliss@dfo-mpo.gc.ca*	Fisheries and Oceans Canada, Moncton, New Brunswick
Mr Gérald Chaput *gerald.chaput@dfo-mpo.gc.ca*	Fisheries and Oceans Canada, Moncton, New Brunswick
Ms Shelley Denny *shelley.denny@uinr.ca*	Unama'ki Institute of Natural Resources, Eskasoni Nova Scotia
Ms Patricia Edwards *patricia.edwards@dfo-mpo.gc.ca*	Fisheries and Oceans Canada, Moncton, New Brunswick
Ms Susan A. Farquharson *s.farquharson@atlanticfishfarmers*	Atlantic Canada Fish Farmers Association, Letang, New Brunswick
Dr James Irvine *james.irvine@pac.dfo-mpo.gc.ca*	Fisheries and Oceans Canade, Nanaimo, Canada
Ms Kate Johnson *kate.johnson@dfo-mpo.gc.ca*	Fisheries and Oceans, Ottawa, Ontario
Mr Alan McNeill *mcneilla@gov.ns.ca*	Nova Scotia Fisheries and Aquaculture, Pictou, Nova Scotia
Ms Robyn Morris *robyn.morris@torngatsecretariat.ca*	Torngat Secretariat, Happy Valley - Goose Bay, Newfoundland and Labrador
Dr Martha Robertson *martha.robertson@dfo-mpo.gc.ca*	Fisheries and Oceans Canada, St.Johns, Newfoundland and Labrador

Ms Annette Rumbolt
annette.rumbolt@dfo-mpo.gc.ca
Fisheries and Oceans Canada, Newfoundland

Mr Craig Taylor
wctmmr@icloud.com
Torngat Secretariat, Happy Valley - Goose Bay, Newfoundland and Labrador

DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

*Mr Esben Ehlers
eseh@nanoq.gl
Ministry of Fisheries, Hunting & Agriculture, Nuuk, Greenland

Mr Jóannes Hansen
joannesv@tinganes.fo
Prime Minister's Office, Torshavn, Faroe Islands

Mr John Biilmann
johb@nanoq.gl
Ministry of Fisheries, Hunting & Agriculture, Nuuk, Greenland

Ms Margretha Nónklett
margrethan@uvmr.fo
Faroese Ministry of Foreign Affairs and Trade, Tinganes, Faroe Islands

EUROPEAN UNION

*Dr Stamatis Varsamos
stamatios.varsamos@ec.europa.eu
Representative
European Commission, Brussels, Belgium

Ms Erika Axelsson
erika.axelsson@lansstyrelsen.se
County Administrative Board of Halland, Sweden

Mr Magnus Andersson
magnus.anderssen@gov.se
Ministry for Enterprise and Innovation, Sweden

Dr Ingemar Berglund
ingemar.berglund@havochvatten.se
Swedish Agency for Marine and Water Management, Sweden

Dr Ciaran Byrne
ciaran.byrne@fisheriesireland.ie
Inland Fisheries Ireland, Dublin, Ireland

Mr Håkan Carlstrand
hakan.carlstrand@havochvatten.se
Swedish Agency for Marine and Water Management, Gothenburg, Sweden

Mr Seamus Connor
seamus.connor@dcalni.gov.uk
Department of Agriculture, Environment and Rural Affairs, Belfast, Northern Ireland, UK

Ms Inger Dahlgren
inger.dahlgren@havochvatten.se
Swedish Agency for Marine and Water Management, Gothenberg, Sweden

Mr Eric Degerman
erik.degerman@slu.se
Swedish University of Agricultural Sciences, Örebro, Sweden

Mr Simon Dryden *simon.dryden@gov.scot*	Marine Scotland, Edinburgh, Scotland, UK
Ms Delyth Dyne *delyth.dyne@defra.gsi.gov.uk*	Department for Environment, Food and Rural Affairs UK
Dr Dennis Ensing *dennis.ensing@afbini.gov.uk*	Agri-Food & Biosciences Institute Northern Ireland, Belfast, Northern Ireland, UK
Dr Jaakko Erkinaro *jaakko.erkinaro@luke.fi*	Natural Resources Institute Finland (Luke), Oulu, Finland
Mr Clemens Fieseler *clemens.fieseler@ble.de*	Federal Agency for Agriculture and Food, Bonn, Germany
Dr Cathal Gallagher *cathal.gallagher@fisheriesireland.ie*	Inland Fisheries Ireland, Dublin, Ireland
Dr Paddy Gargan *paddy.gargan@fisheriesireland.ie*	Inland Fisheries Ireland, Dublin, Ireland
Mr Peter Gough *peter.gough@naturalresourceswales.gov.uk*	Natural Resources, Monmouth, Wales, UK
Mr Tapio Hakaste *tapio.hakaste@mmm.fi*	Ministry of Agriculture and Forestry, Helsinki, Finland
Mr Denis Maher *denis.maher@dcenr.gov.ie*	Department of Communications, Energy and Natural Resources, Cavan, Ireland
Mr John McCartney *john.mccartney@loughs-agency.org*	Loughs Agency, Derry, Northern Ireland
Dr Michael Millane *michael.millane@fisheriesireland.ie*	Inland Fisheries Ireland, Dublin, Ireland
Dr Niall Ó Maoiléidigh *niall.omaoileidigh@marine.ie*	Marine Institute, Newport, Ireland
Mr Mike Palmer *mike.palmer@gov.scot*	Marine Scotland, Edinburgh, Scotland, UK
Mr Jens Persson *jens.persson@havochvatten.se*	Swedish Agency for Marine and Water Management, Gothenburg, Sweden
Dr Arnaud Peyronnet *arnaud.peyronnet@ec.europa.eu*	European Commission, Brussels, Belgium
Ms Christiane Pilz *christiane.pilz@bmel.bund.de*	Bundesministerium für Ernährung und Landwirtschaft, Berlin, Germany

Mr Ian Russell
ian.russell@cefas.co.uk
Centre for Environment, Fisheries and Aquaculture Science, Lowestoft, England, UK

Mr Hans Schibli
hans.schibli@lansstyrelsen.se
County Administrative Board of Halland, Sweden

Mr Lawrence Talks
lawrence.talks@ environment-agency.gov.uk
Environment Agency, Winchester, England, UK

Ms Bénédicte Valadou
benedicte.valadou@onema.fr
ONEMA, Direction Générale, Vincennes, France

NORWAY

*Mr Raoul Bierach
raoul.bierach@miljodir.no
Representative
Norwegian Environment Agency, Trondheim

Mr Helge Dyrendal
helge.axel.dyrendal@miljodir.no
Norwegian Environment Agency, Trondheim

Mr Arne Eggereide
arne.eggereide@miljodir.no
Norwegian Environment Agency, Trondheim

Dr Peder Fiske
peder.fiske@nina.no
Norwegian Institute for Nature Research, Trondheim

Mr Steinar Hermansen
steinar.hermansen@kld.dep.no
President of NASCO
Ministry of Climate and Environment, Oslo

Ms Anne Kristin Jøranlid
anne.kristin.joranlid@miljodir.no
Norwegian Environment Agency, Trondheim

Mr Helge Lorentzen
hl@kld.dep.no
Ministry of Climate and Environment, Oslo

Mr Arne Sivertsen
arne.sivertsen@miljodir.no
Norwegian Environment Agency, Trondheim

RUSSIAN FEDERATION

* Dr Konstantin Drevetnyak
drevetnyak@pinro.ru
Representative
Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO), Murmansk

Mr Andrey Merenkov
mrv@fishnet.ru
FGBU Murmanrybvod, Murmansk

Ms Alina Nikolaeva *nikolaeva@pinro.ru*	Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO), Murmansk
Dr Sergey Prusov *prusov@pinro.ru*	Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO), Murmansk
Mr Victor Rozhnov *rozhnov@bbtu.ru*	Barentsevo-Belomorskoe Territorial Department, Murmansk

USA

*Mr Daniel Morris *daniel.morris@noaa.gov*	Representative National Marine Fisheries Service, Gloucester, Massachusetts
Mr Stephen Gephard *steve.gephard@ct.gov*	Representative Department of Energy and Environmental Protection, Inland Fisheries Division, Old Lyme, Connecticut
Mr Sebastian Belle *futureseas@aol.com*	Maine Aquaculture Association, Hallowell, Maine
Ms Kimberly Blankenbeker *kimberly.blankenbeker@noaa.gov*	National Marine Fisheries Service, Silver Spring, Maryland
Ms Kimberly Damon-Randall *kimberly.damon-randall@noaa.gov*	National Marine Fisheries Service, Gloucester, Massachusetts
Ms Rebecca Dorsey *dorseyrj@state.gov*	US Department of State, Washington DC
Mr Rory Saunders *rory.saunders@noaa.gov*	National Marine Fisheries Service, Orono, Maine
Mr Tim Sheehan *tim.sheehan@noaa.gov*	National Marine Fisheries Service, Woods Hole, Massachusetts
Ms Julie Williams *julie.williams@noaa.gov*	National Marine Fisheries Service, Gloucester, Massachusetts

STATES NOT PARTY TO THE CONVENTION

France (in respect of St Pierre and Miquelon)

*Ms Christiane Laurent-Monpetit *christiane.laurent-monpetit@* *outre-mer.gouv.fr*	Ministère des Outre-Mer, Paris, France

Mr Herlé Goraguer *hgorague@ifremer.fr*	IFREMER, Saint-Pierre and Miquelon, France

INTER-GOVERNMENTAL ORGANISATIONS

Dr Cathal Gallagher *cathal.gallagher@fisheriesireland.ie*	European Inland Fisheries and Aquaculture Advisory Commission
Mr Gérald Chaput *gerald.chaput@dfo-mpo.gc.ca*	International Council for the Exploration of the Sea
Ms Kimberly Blankenbeker *kimberly.blankenbeker@noaa.gov*	Northwest Atlantic Fisheries Organization
Ms Margretha Nónklett *margrethan@uvmr.fo*	Faroese Ministry of Foreign Affairs and Trade, Tinganes, Faroe Islands
Dr George Iwama *george.iwama@ubc.ca*	North Pacific Anadromous Fish Commission, Vancouver, Canada
Mr Mark Saunders *m.saunders*@year*ofthesalmon.org*	North Pacific Anadromous Fish Commission, Vancouver, Canada

NON-GOVERNMENT ORGANISATIONS

** Denotes NGO Co-Chairs

Association Internationale de Défense du Saumon Atlantique, France

Mr Philippe Méry	*philippemery@yahoo.fr*

Atlantic Salmon Federation, Canada

Mr Dave Meerburg	*dmeerburg@asf.ca*
Dr Stephen Sutton**	*ssutton@asf.ca*

Atlantic Salmon Conservation Schools Network, UK

Mr David Ritchie	*ritchiebiology@gmail.com*
Mr Donald R. Sprangers	*sd.sprangers@gmail.com*

Atlantic Salmon Trust, UK

Dr Walter Crozier	*administrator@atlanticsalmontrust.org*
Professor Ken Whelan	*ken.whelan@hotmail.com*

Der Atlantische Lachs, Germany

Mr Siegfried Darschnik	*sd@schnittstelle-oekologie.de*

Federation of Irish Salmon and Sea-Trout Anglers, Ireland
Mr Noel Carr *dgl1@indigo.ie*
Mr Michel Stinson *mick.stinson@hotmail.com*

Fisheries Management Scotland, UK
Dr Alan Wells *alan@fms.org*

Institute of Fisheries Management, UK
Dr Nigel Milner *n.milner@apemltd.co.uk*

Irish Seal Sanctuary, Ireland
Mr Patrick Peril *perilpatsy@gmail.com*
Norske Lakseelver, Norway
Mr Torfinn Evensen *torfinn@lakseelver.no*
Dr Erik Sterud *erik@lakseelver.no*

Norwegian Association of Hunters and Anglers, Norway
Mr Oyvind Fjeldseth *o.f@njff.no*

Salmon and Trout Conservation Scotland, UK
Mr Andrew Graham-Stewart *director@salmon-troutscotland.org*

Salmon and Trout Conservation UK, UK
Mr William Hicks *william.hix@btinternet.com*
Mr Paul Knight ** *paul@salmon-trout.org*

Salmon Watch Ireland, Ireland
Mr Niall Greene *niall.b.greene@gmail.com*

INTERNATIONAL SALMON FARMERS ASSOCIATION (ISFA)

Dr Jon Arne Grøttum *jon.arne.grottum@sjomatnorge.no*

INVITED SPEAKERS AT THE THEME-BASED SPECIAL SESSION

Dr Dylan John Fraser *dylan.fraser@concordia.ca*
Dr Kyle Young *kyle.young@ieu.uzh.ch*

INVITED SPEAKERS AT THE IYS SPECIAL SESSION

Ms Emily Corcoran *emicorcoran@googlemail.com*
Dr Robert Arlinghaus *arlinghaus@igb-berlin.de*
Ms Kerry Brink *kerry@reachingrivers.com*

SECRETARIAT	*hq@nasco.int*
Dr Peter Hutchinson	Secretary
Ms Mairi Ferguson	PA to the Secretary
Ms Vicky Newton	PA
Ms Louise Forero	Information and Publications Assistant

SUPPORT STAFF

Jennie Ryberg	Varbergs Kusthotell, Varberg, Sweden
Emma Höjner	Varbergs Kusthotell, Varberg, Sweden
Ellinore Augustin	Varbergs Kusthotell, Varberg, Sweden