

ICR(12)11

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

*George Hotel, Edinburgh, Scotland, UK
Monday, 4 June 2012*

1. Opening of the meeting

- 1.1 The Chairman, Mr Raoul Bierach, opened the meeting and welcomed members of the Board, their scientific advisers and representatives of the accredited NGOs to Edinburgh.
- 1.2 A list of participants is contained in Annex 1.

2. Adoption of the agenda

- 2.1 The Board adopted its agenda, ICR(12)12 (Annex 2) but agreed to consider item 6 when it considers applications for funding under item 3.

3. Report of the Scientific Advisory Group

- 3.1 The Chairman of the Board's Scientific Advisory Group (SAG), Mr Tim Sheehan, presented a report on the Group's meeting, SAG(12)5 (Annex 3). The SAG had:
 - reviewed the updated inventory of research;
 - reviewed applications for potential funding by the Board;
 - reviewed progress in implementing the SALSEA Programme;
 - developed recommendations concerning the establishment of a metadatabase of marine salmon survey data and sample collections;
 - considered approaches to improving access to, and the usability of, data from the West Greenland sampling programme.
- 3.2 In reviewing the inventory, the SAG had considered how better use could be made of the inventory following completion of the SALSEA Programme. The SAG recommends that the Board should reconvene the Sub-Group that reported in 2009. This Sub-Group should review recent scientific investigations and summarise the findings that have significant management implications; review the inventory and identify opportunities for collaboration; identify research gaps which may be important for advising on management actions; develop a 'road map' to complete other elements of the SALSEA Programme; and advise on a possible future role for the SAG. The proposed ToRs for the Sub-Group are contained in document SAG(12)3. The SAG believes that participation by managers in the work of the Sub-Group is needed to ensure that important management issues are addressed. The Board agreed to the ToRs.
- 3.3 The SAG had recommended that the Board endorse or, if funds permit, support the following two projects, described in ICR(12)5, both of which were considered to have scientific merit:

- A proposal for a pilot project to undertake genetic stock of origin identification of European salmon captured at West Greenland;
 - A proposal for genetic stock identification of salmon caught in the Faroes fishery.
- 3.4 The Board agreed to contribute the sum of £6,000 to each of these projects. The Board also recognized that there could be public relations benefits to NASCO from supporting the production of the film ‘Atlantic salmon – lost at sea!’ While the Board’s resources do not permit it to support the film it recommends that the Finance and Administration Committee consider if NASCO could contribute funds to enable the filming to proceed in Greenland in 2012.
- 3.5 The Board agreed to the format for the metadatabase contained in document ICR(12)4. This will now be sent to jurisdictions for completion.
- 3.6 The Board thanked the SAG for its work and congratulated Mr. Sheehan on his re-election as Chairman.

4. Report on the NASCO/ICES ‘Salmon Summit’

- 4.1 The Secretary reported that the ‘Salmon Summit’ had been held in L’Aquarium, La Rochelle, France and was funded by NASCO’s International Atlantic Salmon Research Board (IASRB) and ICES with sponsorship from the Total Foundation and additional support from The French National Agency for Water and Aquatic Environments (ONEMA). It provided a forum for presentation of the findings from the SALSEA Programme and other recent research on salmon at sea. One hundred and twenty-eight scientists and managers from around the North Atlantic, North Pacific and Baltic regions, attended the symposium. There had been very positive feedback on the Summit. There will be two reports arising from the Summit. An issue of the ICES Journal of Marine Science (ICES JMS), containing some of the scientific papers that were accepted following peer review, will be published in November. A second report by the Convenors and the ICES JMS Guest Editor has been produced and focuses on the management implications and copies were made available to members of the Board.
- 4.2 In summary, the Secretary indicated that over the last forty years, increased mortality at sea, linked to a warming climate, has resulted in a dramatic decline in the abundance of Atlantic salmon. Since management options in the ocean are limited the report had concluded that the goal should be to maximise the number of healthy wild salmon that go to sea by focusing actions on impact factors in fresh, estuarine and coastal waters. There will need to be more outreach to politicians and the public and to those industries that are impacting the salmon and its habitat. The large and diverse community of non-government organizations supporting the species can play a major role. A more detailed report would be presented to the Council.

5. Progress Report on the SALSEA Programme and Future Actions

- 5.1 Progress reports on the various projects under the SALSEA Programme were presented in the report of the SAG. It was noted that the final report to the European Commission on the SALSEA Merge project had been made available on the Board’s website together with the presentations and abstracts from the Salmon Summit. The Board recognized that it would assist in publicizing the research being undertaken if the report of the Salmon Summit was made available on both the NASCO and IASRB

websites. In this regard the Atlantic Salmon Trust, in conjunction with NASCO, had held a one-day meeting entitled 'Ocean Silver' to highlight the findings from the research and consider the management implications.

- 5.2 It was noted that some samples collected under the SALSEA Programme remain to be analysed if funding becomes available. In this regard, the Board was advised of a new project in Ireland involving a PhD student. The aim is to maximize the use of the samples collected during the marine surveys.

6. Finance and administrative issues

- 6.1 The Secretary indicated that from initial 'seed corn' funding of only £30,000 very substantial funds had been raised that had enabled a multi-million pound programme of research to be implemented. He reported that the year-end accounts indicate a balance of ~£42,000 but because the Board had agreed to a request from the Council for a loan of £25,000, the available funds amount to only £17,000. The Board adopted the 2011 accounts and agreed that the funds remaining (~£5,000) after funding the two projects referred to in paragraph 3.3 above should be held as a reserve.

7. Other business

- 7.1 The Board agreed that it would consider its future working methods at its 2013 meeting in the light of the findings of the Sub-Group, the External Performance Review Panel's recommendations and the outcome of the Working Group established to take these recommendations forward.

8. Report of the meeting

- 8.1 The Board agreed a report of its meeting.

9. Date and place of next meeting

- 9.1 The Board agreed to hold its next meeting in conjunction with the Thirtieth Annual Meeting of NASCO.
- 9.2 The Chairman thanked participants for their contributions and closed the meeting.

List of Participants

Canada

Julia Barrow
Bud Bird
Serge Tremblay

Denmark (in respect of the Faroe Islands and Greenland)

Elin Mortensen

European Union

Marco D'Ambrosio
Cathal Gallagher
John McCartney
Niall Ó Maoiléidigh
Ted Potter

Norway

Raoul Bierach (Chairman)
Arne Eggereide
Peder Fiske

Russian Federation

Sergey Prusov

US

Mary Colligan
Rory Saunders
Tim Sheehan

NGOs

Dave Meerburg
Ken Whelan

ICES

Gérald Chaput

Secretariat

Peter Hutchinson
Malcolm Windsor

ICR(12)12

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Report of the Scientific Advisory Group
4. Report on the NASCO/ICES 'Salmon Summit'
5. Progress Report on the SALSEA Programme and Future Actions
6. Finance and administrative issues
7. Other business
8. Report of the meeting
9. Date and Place of next meeting

SAG(12)5

*Report of the Meeting of the Scientific Advisory Group of the
International Atlantic Salmon Research Board
George Hotel Edinburgh, Scotland, UK
Monday, 4 June, 2012*

1. Opening of the meeting

- 1.1 The Chairman, Mr Tim Sheehan (US), opened the meeting and welcomed participants to Edinburgh.
- 1.2 A list of participants is contained in Annex 1.

2. Adoption of the agenda

- 2.1 The SAG adopted its agenda, SAG(12)2 (Annex 2).

3. Election of officers

- 3.1 The SAG re-elected Mr Tim Sheehan as its Chairman for a period of two years and thanked him for his excellent work to date.

4. Review of the updated inventory of research

- 4.1 An overview of the updated inventory of research relating to salmon mortality in the sea, ICR(12)3, was presented. For 2012, 39 on-going and 65 completed projects had been included in the inventory with an annual expenditure of approximately £5 million. A summary of findings was not available for all completed projects. During the year some major projects had been completed, including SALSEA Merge, and one new project, *'The ecology of salmon (Salmo salar L.) at sea - environmental factors affecting marine growth, survival and migration of Atlantic salmon'* had been included by the European Union (Ireland) since the 2011 update. The objectives of this project are to investigate the decline in North Atlantic salmon stocks in the past two decades in an ecosystem context and to provide new information for use in forecast models of abundance and size of current stocks.
- 4.2 The SAG agreed that the jurisdictions should be given the opportunity to provide any feedback on the inventory to the Secretariat by the end of June, with a view to the inventory being made available on the Board's website by the end of July. It was also recommended that the Secretariat explore opportunities to make the inventory more visible and attractive on the Board's website and that efforts be made to bring it to the attention of researchers and other interested parties.
- 4.3 In 2009, the SAG had received a report from a Sub-Group established to advise on how information contained in the inventory could be better utilised. The Sub-Group's Terms of Reference were to review the inventory to identify areas where there may be merit in encouraging improved coordination of research and to highlight gaps in the research programme where new work might significantly benefit the Board and might

be funded by it. The Sub-Group had highlighted some workshops and study groups that might be considered for funding by the Board and some suggestions for improvements to the inventory had been made. The SAG had agreed that it would be useful to conduct a further review in 2011 but this had not been initiated to date.

- 4.4 The SAG agreed that the inventory provided a very valuable compilation of information on research on salmon at sea but that it could be more fully utilized. It therefore, recommends to the Board that it reconvene the Sub-Group and that it meet inter-sessionally to review the inventory in the light of the findings presented at the Salmon Summit and other information with a view to identifying future research needs and opportunities for enhanced coordination of research. The ToRs for the Sub-Group are contained in document SAG(12)3 (Annex 3).

5. Review of Applications for Potential Funding by the Board

- 5.1 Under the Board's Guidelines for Submitting Proposals for Research, Workshops, Symposia and Other Activities for Support by the IASRB, ICR(09)10, applications seeking either only endorsement by the Board or funding support from the Board may be considered. For projects seeking only endorsement, only a project summary, details of the relevance to the SALSEA Programme, the name of the leading scientist and details of any cooperating organizations are required. For proposals seeking funding, more detailed information is required and this should be submitted to the Secretariat no later than 31 December each year. These proposals are then reviewed by the SAG and its recommendations are made to the Board.

- 5.2 Since the last Annual Meeting, three applications seeking funding from the Board had been received, ICR(12)5. These were as follows:

- A proposal to film at Greenland as part of the Castletown Productions Film entitled 'Atlantic Salmon-Lost at Sea!';
- A proposal for a pilot project to undertake genetic stock of origin identification of European salmon captured at West Greenland;
- A proposal for genetic stock identification of salmon caught in the Faroes fishery.

- 5.3 The SAG decided that it could not undertake a scientific evaluation of the film although it recognised that this could have public relations value to the Board and to NASCO. The SAG agreed that the two genetic stock identification projects both have scientific merit. It was noted that the West Greenland project was important because there is currently an internal-use fishery under NASCO regulatory measures and that there has been a marked reduction in the proportion of European origin salmon harvested in the fishery raising concerns about the status of these contributing stocks. The SAG was advised that partial funding had already been obtained to support this project from the Department of Culture and Leisure in Northern Ireland (£16,000) and from the Atlantic Salmon Trust (£4,000) so a further £10,000 was being sought. The SAG considered that while this project had merit the findings would be unlikely to result in changes in the current management advice. The SAG noted that with regard to the project based on Faroese samples, there is currently no salmon fishery in Faroese waters. The risk framework that has been developed by ICES is currently based on a small amount of information on the origin of salmon tagged at the Faroes 20 years ago. The proposal involved genetic stock identification using archived scale samples that are also 20 years old but are more numerous and should increase the resolution of origin at a finer scale than stock complex currently used in the risk

framework developed by ICES. The sum sought was £33,500 although ‘seed corn’ funding by the Board might enable the remaining funds to be raised from other sources.

- 5.4 The SAG agreed to recommend to the Board that both of these projects should be endorsed and funded or partially funded if resources permit. In this regard, it was noted that the Board currently only had £17,000 available to it until 2013 and 2014 when the loan from the Council will be repaid.

6. Progress with Implementing the SALSEA Programme

(a) Report on the ‘Salmon Summit’

- 6.1 The Assistant Secretary reported that in October 2011, NASCO and ICES Co-Convened the ‘Salmon Summit’, an international symposium entitled 'Salmon at Sea: Scientific Advances and their Implications for Management'. The objectives of the symposium were to:

- review recent advances in our understanding of the migration, distribution and survival of salmon at sea and the factors influencing them;
- consider the management implications of recent advances in understanding of the salmon’s marine life;
- identify gaps in current understanding and future research priorities; and
- increase awareness of recent research efforts to improve understanding of salmon at sea and to encourage support for future research.

- 6.2 The ‘Salmon Summit’ was held in L’Aquarium, La Rochelle, France and was funded by NASCO’s International Atlantic Salmon Research Board (IASRB) and ICES, with sponsorship from the Total Foundation and additional support from the French National Agency for Water and Aquatic Environments (ONEMA). It provided a forum for presentation of the findings from the SALSEA Programme and other recent research on salmon at sea. One hundred and twenty-eight scientists and managers from around the North Atlantic, North Pacific and Baltic regions attended the symposium. While the focus was on research on salmon in the North Atlantic, the findings of recent research on Pacific and Baltic salmon were also presented. He indicated that a full report would be presented to the Council but, in summary, the Summit had been very well received. Two reports of the Summit will be produced. Following peer review, 15 of the papers presented in La Rochelle have been accepted for inclusion in a symposium issue of the ICES Journal of Marine Science that will be published in November 2012. A second report, focusing more on the management implications, has been prepared by the three Convenors and the Guest Editor of the ICES JMS symposium issue. This report will be issued to all delegates at the Summit, to all NASCO delegates and widely distributed.

(b) Report on the SALSEA-Merge project

- 6.3 Professor Ken Whelan reported on the SALSEA-Merge project. The project is now completed and the final report has been submitted to the European Commission. This report is available on the IASRB website. A unique, comprehensive biological and environmental database (SALSEA PGNAPES) was developed to facilitate future analyses and a powerful new molecular assignment protocol had been developed - **Genetically-based Regional Assignment of Atlantic Salmon Protocol (GRAASP)** based on a suite of 14 microsatellite loci. This tool is the basis of the research

proposals based on samples from West Greenland and Faroes referred to in paragraph 5.2 above. He indicated that a major challenge will be to analyse all the material collected during the SALSEA Merge project and in this regard a new PhD research project has just been initiated (referred to in paragraph 4.1 above). He also referred to the need to find an appropriate repository for the data and samples. ICES had offered to hold the data from the project but will not manage it. Currently the Freshwater Laboratory in Pitlochry holds the genetic data and the Faroe Research Institute the PGNAPES database.

(c) SALSEA North America

- 6.4 Mr Gérald Chaput reported on SALSEA North America. There had been no new research activity in 2011 but opportunities are being explored for further analyses of the data collected. While there is no overall technical report of the project, information obtained during the marine surveys has been included in a paper which summarises the project's findings that has been accepted for inclusion in the Salmon Summit issue of the ICES Journal of Marine Science.

(d) Report on SALSEA West Greenland

- 6.5 A report on the SALSEA West Greenland programme was presented by Mr Tim Sheehan. In 2011, a total of 430 fresh whole fish were purchased directly from individual fishermen under the enhanced sampling programme (additional to the ongoing, long-term baseline sampling). This was the third and final year of field sampling under SALSEA West Greenland. The enhanced samples will be used to evaluate a wide variety of topics such as age and growth, diet, origin, lipid analysis, stable isotope analysis, parasites, diseases, sea age at maturity as well as genetic aspects and SLICE resistance in sea lice. The samples collected (1,200 in total) are being analysed and a paper involving analysis of stable isotopes from salmon sampled at West Greenland and from several Canadian rivers has been accepted for inclusion in the Salmon Summit issue of the ICES Journal of Marine Science (see 6.8 below).

- 6.6 The SAG agreed that a priority should be to fully analyse all the data from SALSEA Merge, SALSEA North America and SALSEA West Greenland. In this regard reference was made to the excellent support provided by the Total Foundation. It was suggested that the Board might consider approaching other oil companies with biodiversity foundations if there were specific funding needs in the future.

(e) Analysis of historical tagging data

- 6.7 Since 2007, ICES has held three workshops on analysis of historical tagging data. The reports of all three workshops are available on the ICES and IASRB websites. The Board had supported these workshops by funding the participation of a GIS expert and a hydrographer and this had been extremely useful in facilitating the work. In 2010, a summary of the final Workshop had been presented to the SAG. The Workshop had recommended that all the tag data used by the Workshops should be compiled into a single database available to Workshop participants and held at the ICES Data Centre and that after a period of two years the data should be made freely available. Furthermore, the reports of the three Workshops should be combined into a single ICES Cooperative Research Report to be published in 2012. The analyses initiated by the Workshops will be written up in peer-reviewed papers and two papers reporting on distribution of tag recoveries at West Greenland and the Faroe Islands

have been accepted for the Salmon Summit issue of the ICES Journal of Marine Science.

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

6.8 The Board had supported a study to examine any changes in trophic levels of Atlantic salmon through the marine phase of their life-cycle. Mr Gérald Chaput presented a progress report. The aim was to comprehensively sample salmon at different stages of their life-cycle: smolts migrating out of rivers; post-smolts obtained in SALSEA North America; 1SW and 2SW salmon returning to rivers; and 1SW non-maturing salmon at West Greenland. He indicated that as a result of the initial funding provided by the Board, the project had expanded considerably with the employment of a PhD student at the University of Waterloo, Ontario. A paper based on this study has been accepted for inclusion in the Salmon Summit issue of the ICES JMS.

(g) Reports on sonic telemetry studies

6.9 Mr David Meerburg reported that the Atlantic Salmon Federation (ASF) has continued to assess estuarine and coastal survival of tagged Atlantic salmon released in rivers of the Gulf of St. Lawrence using acoustic tags. There is now a detector array across the Cabot Strait (37 km north from Cape Breton Island) meaning that each exit from the Gulf of St. Lawrence is now monitored. There are also plans to install a detector array at West Greenland with preparatory work in 2012 with a view to installation in 2013. This year an acoustically tagged kelt was caught at West Greenland.

(h) Coordination of the SALSEA Programme

Report of the IASRB Working Group on Marine Salmon Survey Data and Sample Collection

6.10 Last year, the Board had recognized that recent international initiatives under the SALSEA Programme had generated some extremely valuable databases. These include biological and genetic databases generated under the SALSEA Merge project, and time-series of data and historical tagging information compiled by ICES workshops supported by the Board. The Board had recognized that there is a need to ensure that these databases are securely held, maintained and agreed procedures developed to allow access to the data for further research. In addition, the Board had noted the existence of some historical marine survey samples, such as those generated by the international sampling programme at West Greenland, that represent an invaluable resource dating back some 40 years or more. The need to ensure that these samples are being maintained and agreed procedures developed to allow access to them for further research was recognised.

6.11 The Board had, therefore, established a Working Group to work by correspondence. The Working Group's interim report, ICR(11)4 had been presented by its Chairman, Professor Ken Whelan, at the 2011 SAG and IASRB meetings. In summary, the Working Group had recommended that the most important role that the IASRB could play with regard to marine salmon survey data and sample coordination would be to establish a meta-database of existing datasets and sample collections, using the list developed by the Group as a basis. The Board had welcomed the Group's progress and asked that it continue to work by correspondence so as to develop a format for the metadatabase and to populate it, in consultation with the jurisdictions, and to report

back on progress at the 2012 meeting of the Board. The Chairman of the Working Group presented a report, ICR(12)4, on progress in developing a metadatabase of salmon survey data and sample collections of relevance to mortality of salmon at sea. The SAG accepted the format proposed for this metadatabase and recommends that the Board now request that jurisdictions be requested to provide relevant information.

Discussion Document from the Chairman of SAG on Approaches to Improving Access to and the usability of Data from the West Greenland Sampling Programme

- 6.12 Last year the SAG had recommended to the Board that the Chairman of the SAG develop a discussion document on possible approaches to improving access to, and usability of, the data, access to samples and protocols concerning their possible use, particularly destructive use. The Board had agreed to this proposal. The West Greenland sampling programme was selected because it involved multi-Party collaboration.
- 6.13 Mr Tim Sheehan reported that consultations with DFO staff had indicated that the database that was started 30 or 40 years ago was not in a particularly useable form with the information divided among four databases. There had been personnel changes in DFO and those now responsible are trying to bring the data together but they are not in a common format. Eventually there will be one database of all the material and the SAG encourages continuation of this work so that the information is available to researchers at the earliest opportunity.

(i) Other activities

- 6.14 No other activities were brought to the attention of the SAG.

7. Other business

- 7.1 There was no other business.

8. Report of the meeting

- 8.1 The SAG agreed a report of its meeting.

9. Date and place of next meeting

- 9.1 The SAG decided to hold its next meeting in conjunction with the Thirtieth Annual Meeting of NASCO.
- 9.2 In closing the meeting the Chairman thanked the participants for their contributions to the meeting.

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

4 June, 2012

List of Participants

Julia Barrow

Bud Bird

Gérald Chaput

Peder Fiske

Cathal Gallagher

Peter Hutchinson

Paul Knight

Dave Meerburg

Niall Ó Maoiléidigh

Ted Potter

Sergey Prusov

Elena Samoylova

Tim Sheehan Chairman

Ken Whelan

SAG(12)2

Agenda

1. Opening of the meeting
2. Adoption of the agenda
3. Election of officers
4. Review of the updated inventory of research
5. Review of applications for potential funding by the Board
6. Progress with Implementing the SALSEA Programme
 - (a) Report on the 'Salmon Summit'
 - (b) Report on the SALSEA-Merge project
 - (c) Report on SALSEA North America
 - (d) Report on SALSEA West Greenland
 - (e) Analysis of historical tagging data
 - (f) Progress on stable isotope analysis of West Greenland samples
 - (g) Reports on sonic telemetry studies
 - (h) Coordination of the SALSEA Programme
 - (i) Report of the IASRB Working Group on Marine Salmon Survey Data and Sample Collection
 - (ii) Discussion Document from the Chairman of SAG on Approaches to Improving Access to and the Usability of Data from the West Greenland Sampling Programme
 - (i) Other activities
7. Other business
8. Report of the meeting
9. Date and place of next meeting

SAG(12)3

Terms of Reference for the Sub-Group on the Future Direction of Research on Marine Survival of Salmon

Background

The International Atlantic Salmon Research Board (IASRB) was established by the Council of NASCO, to promote collaboration and cooperation on research into the causes of marine mortality of Atlantic salmon and the opportunities to counteract this mortality (ICR(06)05). The IASRB established a Scientific Advisory Group (SAG) to assist in identifying research gaps and priorities and to develop recommendations for enhanced coordination of existing research, calls for proposals, recommendations for research and other activities that may be supported by the Board.

The first task the IASRB undertook was to develop an inventory of existing research on marine mortality of Atlantic salmon so as to facilitate improved coordination, to identify gaps and to develop priorities; this inventory has been updated annually. The IASRB also commissioned the development of an international programme of cooperative research on salmon at sea, the SALSEA programme. This programme contains a mix of freshwater, estuarine, coastal and offshore elements, ensuring a comprehensive overview of factors which may affect the marine mortality of Atlantic salmon. However, the IASRB agreed that their initial priority should be to support the implementation of the marine survey aspect of SALSEA, because this was where there was greatest need for international collaboration and funding.

With the completion of the SALSEA-Merge, SALSEA North America and SALSEA West Greenland field programmes, it is appropriate for the IASRB and SAG to review and evaluate their roles in supporting NASCO's objective to conserve, restore, enhance and rationally manage Atlantic salmon through international cooperation taking account of the best available scientific information. A Sub-Group will therefore be established to evaluate recent scientific progress and provide guidance for how the SAG can remain an effective and productive body into the future. The recommendations provided by the Sub-Group may also provide a basis for discussions on the future of the IASRB.

Terms of Reference:

- Review the outcome of recent scientific investigations and summarise the findings which have significant management implications.
- Review the Inventory of Marine Research and identify opportunities for collaboration within the suite of ongoing projects to facilitate progress with identifying the major causes of salmon mortality at sea.
- Based on the inventory and the results of recent scientific studies published in the literature, identify gaps in research efforts and knowledge which may be important for advising on salmon management actions.**
- Review the larger SALSEA project and advise on a "road map" to complete other elements of the research previously identified.
- Arising from these reviews, advise on possible future role of the SAG

** The Sub-Group should focus its gap analysis and subsequent recommendations on applied research requirements for management. If gaps are identified, recommendations to rectify the gap should be provided and evaluated in terms of the feasibility of carrying out the specific research. Additionally, the Sub-Group should evaluate if the gap can be filled from existing programmes, from a new programme based on current technology or if new tools and advances are needed.

The Sub-Group is expected to focus on applied science related topics, but participation of managers is needed to ensure that critical management issues are addressed. Highest priority should be given to issues requiring or benefitting from international collaboration. Where management issues are identified and science needs/solutions are suggested, the Sub-Group should consider how the results are most likely to be integrated into advice and those areas that are likely to have the most immediate effects on management actions. While the Sub-Group should focus on salmon, recent changes in marine ecology, particularly in the pelagic ecosystems, caused by global climate change, should also be considered as information from other scientific disciplines can inform Atlantic salmon science and management.

The Sub-Group will require a 2-3 day working meeting to be facilitated by the NASCO Secretariat (location to be determined). Participation should be between 6-8 people, including scientists, managers and a representative from the NGO community. Representation from both North America and Europe is critical. A significant amount of preparation can be undertaken prior to this working meeting to ensure that the time spent at the meeting is productive. The Sub Group should take account, *inter alia*, of the following documents:

- Original SALSEA research programme
- EU SALSEA Merge proposal and final report
- Salmon Summit proceedings (ICES JMS)
- Salmon Summit Convenors' report
- Current status of SALSEA projects
- Inventory of Marine Research
- National initiatives
- Current management priorities indicated by Parties
- Original IASRB and SAG Rules of Procedure and ToRs
- 2012 Reports of IASRB and SAG Meetings