International Atlantic Salmon Research Board

ICR(16)3

Progress Report on SALSEA - Track

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1. At its 2013 meeting, the Board had agreed that a particular focus of its work should be studies to partition mortality of salmon among the phases of its marine migration. In 2014 the Board adopted a Resolution on Research on Salmon at Sea, ICR(14)6, that *inter alia*:

   - encourages NASCO Parties to continue the development of local collaborative telemetry projects;
   - encourages the development of large international collaborative telemetry projects that together build upon and expand local efforts;
   - requests NASCO Parties to make efforts to identify funding sources to support telemetry projects.

2. In order to support an integrated collaborative telemetry programme, the Board organised a Telemetry Workshop in December 2014. At this Workshop, twelve outline project proposals for telemetry-based research were developed. In 2015, the Board recognised the high value of the SALSEA brand and the strong impact of NASCO as the international forum for consultation and cooperation on wild Atlantic salmon. The Board had reaffirmed its commitment to an international telemetry project under the SALSEA brand, named 'SALSEA - Track'. Specifically, the Board agreed at its last meeting that it would support SALSEA - Track as a continuing commitment to understanding the factors affecting mortality of salmon at sea, to make funds available to prepare a vision statement for SALSEA - Track and to advance existing initiatives towards an integrated collaborative telemetry programme.

3. A SALSEA - Track brochure has now been developed, in consultation with members of the Board/SAG and a professional fund-raiser, and will be circulated at the Board's 2016 meeting.

4. The Board has recognised that if the international telemetry programme is to proceed, it will be important to follow progress to date in taking forward the outline projects and to liaise with the project leaders with a view to providing support, where appropriate, to assist with their implementation. In accordance with this decision, each contact for the twelve outline project proposals was requested to provide the Secretariat with an update on progress to date, to identify challenges in progressing the projects and to advise of any assistance the Board may be able to offer to support implementation of the projects and in disseminating information relating to them. The responses received are contained in Annex 1 and were previously circulated to Members of the Board and its Scientific Advisory Group by the Chairman on 8 February 2016.

5. The following is a summary of the responses received:

Drifters and BioProbes: Options for detecting acoustically tagged fish in large geographic areas (NAC and/or NEAC)	No significant progress to date
New Receiver Lines/Arrays/Grids (NAC)	No significant progress on a broad-scale plan. Units deployed in Cobscook Bay. Second line of receivers deployed in the Strait of Belle Isle in 2015 to measure the efficiency of the existing line and calibrate stage specific survival estimates. It will be deployed again in 2016. There are plans to deploy a few receivers in the Labrador Sea in 2016. Bioprobes applied to seals detected US-origin salmon near Sable Island.
Platforms of Opportunity in the NAC area: Stationary Platforms of Opportunity Receiver Exchange (SPORE)	Opportunistic arrays expanded in 2015 to provide coverage into the MA Bay section of the Gulf of Maine (GoM). Efforts are underway to expand opportunities in the northwest GoM.
NAC kelt satellite tagging	No significant progress has been made to date. Work probably unlikely until 2017 given commitments and resource needs. 11 Miramichi kelts tagged with PSATs in 2015; plans to tag 10 Restigouche River kelts with PSATs in spring 2016.
Generic Index River Sites in the NEAC area	No progress report received
Malin Head to Islay Receiver Array (NEAC)	EU INTERREG funding being sought
North Sea Loose Array (NEAC)	No progress report received
West-coast Scottish arrays (NEAC)	Plans to deploy networks of acoustic receivers around the Isle of Mull in spring 2017. Smolt trapping facilities were established in tributaries of the River Lochy and tested in spring 2016 to confirm availability of suitably sized wild salmon smolts. Consultations among groups to harmonise methodology and ensure best value from concurrent studies on near-shore behaviour of smolts in 2017. Funds being sought for more extensive acoustic receiver networks on the west coast of Scotland via an EU INTEREG application.
Studies of migration along the European shelf edge and into the Norwegian Sea using drifters/AUVs etc (NEAC)	No progress report received
NEAC kelt satellite tagging	No progress report received
Sub-adult satellite tagging at Faroes	No progress report received
Adult satellite/acoustic tagging at Greenland	No significant progress – need to consider techniques to use, likelihood of success, timing, logistics, funding etc. Hope to proceed in 2017 but to conduct trials with a field kit to distinguish between European and North American salmon at Greenland in 2016

6. While no progress report was received for five of the outline projects, it is clear that there has been progress on a number of the twelve projects since last year and some are awaiting confirmation of funding. Furthermore, a large-scale project in Denmark is scheduled to commence in 2016 and will involve acoustic tagging of smolts and kelts, focusing primarily on in-stream, fjord and near-shore survival and with relevance to some of the suggested outline projects. However, a number of the responses indicate that a lack of resources, including financial, are hindering progress with the outline projects.

7. It is clear from the inventory of research that other new telemetry-based projects are being implemented. Fifteen ongoing projects involving telemetry (C16, C18, C25, C26, De4, Ir12, Ir13, Ir14, Ni3, N18, U4, U5, U10, U13, U16) are listed in the inventory, including the following three new projects that have commenced since last year:

   C26: Smolt monitoring on Middle River, Cape Breton, Nova Scotia, Canada (may include acoustic tagging of smolts in 2016);

   Ir13: Investigation of the early migration of salmon and brown trout from the Burrishoole National Index River using telemetry technology in freshwater, brackish and inshore marine areas; and

   Ir14: Investigation of the causes of early migration mortality in salmon and sea trout from the Burrishoole National Index River using acoustic telemetry in estuarine, marine and coastal areas.

8. Given that the Board has committed to support SALSEA - Track as a continuing effort to understanding mortality of salmon at sea, there are a number of measures it may wish to consider in order to further its goal of furthering an integrated, collaborative telemetry programme. Potential roles for the Board had been outlined in the reports of the Telemetry Sub-Group (ICR(14)4) and the Telemetry Workshop (see ICR(15)3). The Board has, of course, already played a significant role in support of this initiative by funding the Telemetry Workshop that brought together the key scientists who may collaborate in future telemetry studies on salmon and at which the outline project proposals were developed. The Board has previously recognised that it could play an important role by: supporting fund-raising initiatives; providing funds as resources permit; endorsing projects; serving as a forum for information exchange and collaboration among research groups; and facilitating coordination of the research programme. The Board will, therefore, need to consider its role in taking forward SALSEA - Track and the following points are intended to initiate the Board's deliberations:

   ***Supporting fund-raising*:** The Board has previously recognised that, in order to support fund-raising and other activities intended to advance the SALSEA - Track initiative, it would need to provide some 'seed corn' funding because it currently has very limited available resources. The Board was able to play an important role in the initial development of the SALSEA programme with funding of £30,000 contributed by NASCO over two years which led to several million pounds being raised. The Board has recognised that this will be necessary to advance SALSEA - Track. The Board has already developed the SALSEA - Track brochure which should be supportive of fund-raising initiatives but, as with the first phase of the SALSEA Programme, some professional support from fund-raisers may be needed. The proposed International Year of the Salmon may also be a good initiative that may be supportive of the planned research.

   ***Funding research*:** Some additional contributions to fund research were generously provided to the Board in 2015 by the United States (~£16,900) and Norway (~£6,000) and

these are very much appreciated. The contribution from the US was made to support an extension of the study undertaken in 2014/15 entitled '*Enhancement of a North American Atlantic salmon genetic baseline for individual and stock identification and application of the baseline to historical scales collected at West Greenland*', the initial findings from which were reported to the Board in June 2015 (SAG(15)4). While the Board currently has very limited resources available to fund research (around £17,000 after allowing for current commitments, including funding for the North American genetic baseline study), it has been able to play a valuable role by supporting several important studies of relevance to NASCO's work. These include genetic analyses of historic scale samples from the Greenland and Faroes salmon fisheries and study into changes in trophic status of salmon using stable isotope analyses. Modest support for these studies has delivered valuable outputs. Having resources available to continue this support, as required, in the future would be beneficial. For example, this year, a request has been made to the Board for partial funding (£10,000) for a study entitled '*Effects of recent ocean warming on growth and migration of Southern NEAC 1SW salmon',* ICR(16)4. If the Board is to directly support the SALSEA - Track projects, more substantial funds will need to be raised. Several of the progress reports in Annex 1 highlight a lack of financial resources as a constraint on progress. The Parties may, therefore, wish to consider if they can support these studies financially, either domestically or through the Board. Last year, the European Union indicated that after reviewing research priorities, the possibility of obtaining funds for the Board was being explored for two projects relating to marine survival of salmon. Such efforts are very much appreciated. The Board can, of course, raise funds independently from the NASCO budget, for which contributions are based on a formula linked to nominal catch. The Board has developed its own procedures governing applications for funding.

***Endorsements*:** The IASRB can serve to facilitate research in many ways, not least by endorsing telemetry-based projects in order to assist with funding applications to other bodies. There is no doubt such endorsements were important to the SALSEA-Merge project. In this regard, the adoption of the Resolution on Research on Salmon at Sea, ICR(14)6 (see paragraph 1 above) and the SALSEA - Track brochure should be of benefit to those applying to public agencies, private foundations etc. for funding, but such applicants could also request endorsement from the Board in support of their application. In that regard, it is assumed that the 12 project proposals detailed in the Annex already have the Board's endorsement and that, if requested, the Board could support their applications to other bodies for funding. The Telemetry Sub-Group noted that parts of the tracking programme (e.g. operation of index river trapping sites) would be expected to be funded from national research and monitoring budgets, but development of large coastal and oceanic acoustic receiver arrays will require funding from international programmes such as the EU's Horizon 2020 programme. As recommended by the Telemetry Workshop, the Secretary has written to key contacts in DG Environment and DG Research to update them on developments since the completion of the SALSEA Merge project and to offer to meet with them. Experience from the first phase of the SALSEA Programme suggests that obtaining funding from other bodies could be greatly facilitated by IASRB endorsement. Furthermore, the Board could be represented on Steering Committees of projects, as it did for the SALSEA-Merge project where the Secretariat played an important role in securing research funds and in the dissemination of information about the project.

Providing a forum for information exchange and collaboration: The Board was established to promote collaboration and cooperation on research into the causes of mortality of salmon at sea. It provides a unique international forum for information

exchange and collaboration among scientists around the North Atlantic. The Board's inventory of marine research related to mortality of salmon at sea is an important tool in exchanging information among scientists about ongoing research and in identifying gaps in the programme. It will be important to ensure that the inventory is complete and updated and in this regard the Board has previously noted the need to ensure that projects conducted by universities and NGOs. The proposed International Year of the Salmon should provide an opportunity to develop broader cooperation to include the North Pacific Ocean and Baltic Sea, e.g. through a major international symposium or symposia.

***Coordination*:** The Telemetry Sub-Group noted that the coordinated release of tagged smolts will depend upon collaboration and coordination between research agencies in different countries. Furthermore, to get the best value from the deployment of coastal receivers, offshore detection systems and mobile tracking, it will be essential to develop links with research groups working on other migratory species such as eel, sea trout, sharks and marine mammals. Many federal and state agencies, universities and regional NGO groups are engaged in localised studies investigating the ecology and migration of a variety of marine species (e.g. crustacea, fishes and mammals) in estuaries and coastal waters. Such studies can create regional networks of arrays which, if properly coordinated, will greatly enhance each individual study. Outreach, collaboration and coordination with these groups will be needed and the Board may be able to play a valuable role in this regard. The development of open ocean detection systems will depend upon international collaboration given the very large spatial extent of the study area and the significant costs associated with such an effort. The Telemetry Sub-Group noted that the Board/SAG's role in coordination could involve reviewing research plans and advising on ways to improve coordination between studies; receiving proposals for potential provision of support; reviewing progress with the overall programme and determining how to facilitate future activities; and ensuring continued co-ordination of the overall programme. Since last year, the Secretariat has been invited to participate in the review of applications for support from the Ocean Tracking Network.

In conclusion

9. SALSEA - Track is a novel and exciting project proposal that has the potential to answer key questions relating to the conservation and management of Atlantic salmon. If the necessary coordination and funding come together, it will undoubtedly have a high profile. The success of the project is entirely dependent upon extensive international cooperation and partnerships between scientists, public sector funders, private sector foundations, NGO groups and industry. This large-scale effort will also likely require collaboration with researchers and organisations working on a variety of other marine species that utilise the North Atlantic and Arctic Oceans. It will, therefore, further raise the profile of NASCO as a leader in marine resource management. The Board could have a very significant role in championing the overall aims of the proposed programme, such as enabling and supporting collaboration and coordination. We look forward to discussing what steps the Board now wishes to take to support the implementation of SALSEA - Track.

Chairman and Secretary of the IASRB
Edinburgh

3 May 2016

Annex 1

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SALSEA - Track Outline Project Plans Progress Reports

At the IASRB's Telemetry Workshop held in London during 1 -3 December 2014 a number of outline project plans were developed. It was recognised that they would need further development over time and that their implementation would be dependent on funding becoming available. The project plans are contained in annexes 3 – 13 of the workshop report, ICR(15)3. At its 2015 meeting, the Board had recognised that if the international telemetry programme is to proceed, it would be important to liaise with the outline project leaders for the project plans with a view to following progress and, where appropriate, to provide support to assist with their implementation. The following information has been received on the twelve project plans.

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

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

Progress report (John Kocik): I have had some tentative conversations within the US and with Atlantic Salmon Federation (ASF) as to possibly pursuing this type of effort, but no significant progress has been made to date. See Additional Information below.

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

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

Progress report (Tim Sheehan, John Kocik and Jon Carr): No significant progress has been made on this front. There are still discussions and interest in various arenas to see collective telemetry coverage increase, but we are not aware of a solid plan/idea to make a broad-scale plan happen in the near future. NEC also deployed units in Cobscook Bay in partnership with ASF. In 2015, ASF deployed a second line of receivers (N=28) in the Strait of Belle Isle to measure the efficiency of the existing line and calibrate stage specific survival estimates for post-smolt traveling through the Gulf of St Lawrence. That line will be deployed again in 2016. ASF has had discussions with DFO (St. Johns Newfoundland) and plans to deploy a few receivers in the Labrador Sea in 2016 (Number of receivers and positions to be determined before spring 2016). NEC and Ocean Tracking Network (OTN) reported that US origin Atlantic salmon were detected on bioprobes on Grey seals near Sable Island. This is the first detection of US salmon by bioprobes.

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

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

Progress report (John Kocik): The NEC team expanded opportunistic arrays in 2015 by working with the whale passive acoustic group. This extended coverage (6 units) into the MA Bay section of the Gulf of Maine (GoM). These new receivers are close to historic recapture sites (trap-net bycatch) of GoM salmon. Efforts are underway to expand opportunities in the northwest GoM and associated with other NOAA activities (so essentially phase I was undertaken as it was generically listed out).

4. North American Commission kelt satellite tagging, SRBTW(14)6

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

Progress report (Tim Sheehan and Jon Carr): I have had some tentative conversations within the US and with ASF as to possibly pursuing this type of effort, but no significant progress has been made to date. If work on this effort were to be conducted it likely would not occur until 2017 given ongoing commitments, resource needs and current commitments. The ASF tagged

11 Miramichi kelts with PSATs in 2015and plans to tag 10 Restigouche River kelts with PSATs in spring 2016.

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

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

Progress report: No progress report received.

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

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

Progress report (Paddy Boylan): While we have not undertaken any further tracking since the December meeting in London, where we first discussed the potential for follow on work to IBIS, we are investigating with our Scientific Advisors, from the Marine Institute and AFBI (Niall Ó Maoiléidigh and Robert Rosell), external funding (EU INTERREG V) opportunities to do so. We are in the early stages of application writing but would be looking to try and investigate further the local issues in Lough Foyle and the Clyde estuary with the University of Glasgow which were highlighted in IBIS and ideally an array between Malin to Islay, budgets are likely to be fairly tight in this measure so not sure what the outcome will be, but your support would be greatly appreciated and the idea of SALSEA - Track would be very useful when we are putting in the application. We will make sure to keep you posted if things progress. See Additional Information below.

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

Summary of project plan: *A broad distribution of receivers deployed on existing platforms and moorings in the area between Scotland and Norway may provide partial coverage of a relatively narrow area sectioning the North Sea from the Atlantic. Possible sites could be oceanographic and weather buoys and particularly offshore commercial enterprises (fishing, aquaculture, offshore energy, etc.). Some of these will provide environmental monitoring in addition to acoustic monitoring data. The aim is to use these opportunities to cover*

approximately 30% of the area along a rough line from Northern Scotland to Southern Norway. The aim would be to conduct the project during 2016 - 2019 if funding can be secured.

Progress report: No progress report received. See Additional Information below.

8. West-coast Scottish arrays

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

Progress report (John Armstrong): Marine Scotland Science is working with Scottish Natural Heritage to deploy networks of acoustic receivers around the Isle of Mull in spring 2017. The system will be used to track Atlantic salmon smolts and common skates. Smolt trapping facilities were established in tributaries of the River Lochy and tested in spring of 2016 to confirm availability of suitably sized wild salmon smolts. Tracking of smolts around Mull will extend work that MSS has already conducted, and submitted for publication, on smolt dispersal through Loch Linnhe. MSS has met with University groups from Glasgow and Highland and Islands (ERI) to harmonise methodology where appropriate to get best value from a series of concurrent studies commencing in 2017 to look at near-shore behaviour of smolts. MSS is also working with the Atlantic Salmon Trust to encourage liaison and cooperation among groups seeking to track smolts form Scotland's east coast rivers. MSS is commencing the seeking of funds for more extensive acoustic receiver networks on the west coast of Scotland via an EU INTEREG application in collaboration with Glasgow University and the Loughs Agency.

See Additional Information below.

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

Summary of project plan: *A particle drift model, developed as an output from the SALSEA-Merge project (2009 to 2011), indicated a strong likelihood that most southern European post-smolts (Spain, France, Ireland and UK) use the European shelf edge current as a marine 'highway', following currents to summer/autumn feeding grounds in the Norwegian sea. The SALSEA-Merge model assumed that much of the movement of post-smolts was a result of passive transport. This model and the associated hypotheses surrounding the migration paths of southern European post-smolts should be tested to see if it accurately portrays smolt migration, particularly in areas where smolts leaving freshwater have to migrate significant distances against the residual coastal and oceanic currents. Similarly, wind driven currents could have marked effects on migration routes and more information on movements of post-smolts in key areas would greatly assist in developing such models further. Potential methods to test the current migration hypotheses include deploying acoustic tag detection systems on a*

range of bioprobes, drifters, autonomous underwater vehicles (AUVs also known as gliders), oceanographic buoys, ocean monitoring stations and buoys attached to fixed fishing gear. Deployment of fixed receivers on oceanic platforms or establishing oceanic monitoring stations would be difficult in areas where the shelf edge was distant from the coastline. Where the shelf edge was closer, e.g. off the North West of Ireland, such platforms or arrays could be considered which would allow tracking of post-smolts from Spain, France, Ireland and the UK. Fixed moorings could be employed on the shelf and potentially on the upper continental slope. Alternatively, deployment of AUVs would allow strategic tracking of post-smolts at key points along the shelf edge which narrow to only 10s or 20s of kms. These AUVs would allow confirmation of pre-suppositions relating to the use of the shelf edge as a marine 'highway' as well as providing information on survival of electronically tagged groups of post-smolts released from each of the southern European salmon producing countries.

Progress report: No progress report received. See Additional Information below.

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

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

Progress report: No progress report received.

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

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

Progress report: No progress report received.

12. Adult satellite/acoustic tagging at Greenland, SRBTW(14)13

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

Progress report (Tim Sheehan and Jon Carr): I have had some tentative conversations with Jon Carr (ASF) and we are both interested in pursuing this type of effort. We have had preliminary conservations but no real commitments made at this time. We have many questions to be answered related to techniques to use, likelihood of success, timing, logistic needs, funding etc. There was some discussion of pursuing this effort for 2016, but I believe 2017 may be more likely. No commitments, but I do think that we will collaborate on this effort in the near future. ASF has had discussions with Ian Bradbury about DNA testing (using an onsite field kit) to distinguish between European and NA salmon at Greenland. We hope to conduct tests (proof of concept) in 2016.

13. Additional information

Progress report (Kim Aarestrup): At the workshop we mentioned that we were in the process of applying for funding for a large scale project focusing on the Danish salmon. We have now received a positive response on the project and aim to start the project in 2016. A considerable part of the project will involve acoustic tagging of smolt and kelts, focusing primarily on instream, fjord and near shore survival. However, there will be obvious synergistic effects to some of the suggested outline projects employing acoustics, specifically (SRBTW(14)3, SRBTW(14)8 and SRBTW(14)9, SRBTW(14)10 and potential Arrays in Scotland). We are also contemplating to start our kelt PSAT tagging again, but unfortunately funding won't be available until 2017. So please keep us updated on any progress in relation to the outline projects, we would be very keen on participating.