



***Report of the Twentieth Annual Meeting of the  
International Atlantic Salmon Research Board***

***By Video Conference***

***26 – 29 May 2021***

**1. Opening of the Meeting**

- 1.1 The Chair, Ciaran Byrne (European Union), opened the meeting and welcomed members of the International Atlantic Salmon Research Board (the Board), their scientific advisers and observers to the video conference.
- 1.2 The Board had adopted its Agenda, [ICR\(21\)10](#) (Annex 1), by correspondence on 30 April, prior to the inter-sessional correspondence period that ran from 3 – 14 May. Board members had been able to use this inter-sessional correspondence period to consider the documents issued under each Agenda item and ask, and respond to, questions on the various Agenda items. No issues were raised during the inter-sessional correspondence period.
- 1.3 A list of participants is contained in Annex 2.

**2. Election of Officers**

- 2.1 The Board unanimously re-elected Ciaran Byrne as its Chair for a further period of two years, to commence from the close of the 2021 Annual Meeting. Dr Byrne was nominated by the Board member from the United States and seconded by the Board member from Denmark (in respect of the Faroe Islands and Greenland).

**3. The Review of the Metadatabase of Salmon Survey Data and Sample Collections**

- 3.1 The Board had decided previously that it could play an important role with regard to marine salmon survey data and sample co-ordination by establishing a metadatabase of existing datasets and sample collections of relevance to mortality of salmon at sea. A metadatabase was established in 2014. In 2015, the Board agreed that information on archival scale collections should also be included in the Board's metadatabase. The Board's Scientific Advisory Group (SAG) had noted that these collections may be lost when individual scientists retire, unless appropriate arrangements are in place to archive them and ensure their safe storage so that they may be available for analysis. Even if the scales themselves are not lost, the information accompanying them could be or they could be damaged while in storage. In 2017, it was recognised that the Board could play a role in identifying such scale collections, raising their profile with a view to safeguarding them for future use. The Board agreed that information on these scale collections should, as a first step, be included in the Board's metadatabase. The Board also agreed that information on the West Greenland Sampling Programme Biological Characteristics database should be included in the metadatabase. Accordingly, Parties / jurisdictions were requested to provide details to the Secretariat of any archival scale collections.
- 3.2 Since the 2020 Annual Meeting, requests to update the metadatabase had been received

from European Union – Germany, UK – England and Wales and France (in respect of St Pierre and Miquelon).

- 3.3 In 2020, the ‘Working Group to Review the SALSEA-Track Programme and the Inventory of Research Relating to Salmon Mortality in the Sea’ noted that many of the issues it had identified relating to the Inventory, such as relevance and utility, may equally relate to the metadatabase (see [ICR\(20\)07](#)). The Working Group had recommended that the metadatabase be reviewed and consideration be given as to whether other areas of the Board’s work require review, and that this review be conducted by the Board. The Board agreed to this recommendation at its 2020 Annual Meeting. The Board had also agreed that:

*‘the timing of the review of should be agreed by the Chair and the Secretary, as and when NASCO business allows. The review will be conducted by correspondence, preferably before the next Annual Meeting of the Board.’*

- 3.4 In light of ongoing restrictions related to the Covid-19 pandemic and the high NASCO workload, the Chair and the Secretary agreed that the review should take place after the 2021 Annual Meeting, with the Terms of Reference for the review being agreed at the Board’s Annual Meeting in 2021.
- 3.5 The Chair introduced a document containing ‘Draft Terms of Reference for the Metadatabase Review’, [ICR\(21\)06](#). The Board member for the United States noted that the Draft Terms of Reference included in document [ICR\(21\)06](#) focused on enhancing the metadatabase and on making better use of it. He suggested that the first step should be to evaluate the utility of the metadatabase and whether it should be continued. If it is recommended that the metadatabase should continue, then the review should consider ways in which to improve it. ‘Revised Draft Terms of Reference for the Metadatabase Review’, ICR(21)11, incorporating this suggestion, were tabled and considered by the Board.
- 3.6 The Board Member for Norway requested clarification of the text in Point 3 of the ‘Revised Draft Terms of Reference’, ICR(21)11. The Secretary noted that this was a reflection of the language used in the recommendations from the Working Group for the Review of SALSEA-Track and the Inventory of Research, as agreed by the Board at its 2020 Annual Meeting, [CNL\(20\)12](#).
- 3.7 The Board adopted ‘Terms of Reference for the Metadatabase Review’, ICR(21)15 (Annex 3).
- 3.8 The Chair proposed that a subset of the Board conduct the review. The Board agreed to this proposal, noting that this group should comprise, at a minimum, the Chair and Secretary of the Board and representatives of two Parties. However, all Parties would be able to nominate a representative on the group. An NGO representative could also be nominated to serve on the group. The Board asked the Secretary to seek nominations for representatives on the group following the Annual Meeting.
- 3.9 The Board member for the UK asked for clarification of the workload anticipated in connection with the review, and the process for the review. The Chair indicated that the first step would probably be some correspondence, followed by a virtual meeting or conference call. The Secretary stated that the Secretariat would prepare a background paper for the review, containing information on previous discussions on the metadatabase. She noted that conducting such a review by correspondence would be difficult and that it may better to hold a virtual meeting. The Board member for the United States agreed that it would be better to arrange a series of calls to discuss the review, and that correspondence would not be as efficient. He suggested that it would

be better to have a few calls, several days apart. The Board agreed that the Chair and Secretary would make appropriate arrangements for conducting the review, taking into account the comments made during this discussion.

- 3.10 The representative of the NGOs noted that the Likely Suspects Framework has been searching for other metadatabases and working with NASCO's Assistant Secretary. He suggested that this may be helpful for the review in terms of what other similar platforms exist.
- 3.11 The Board agreed that Parties and jurisdictions would not be asked to contribute any information for inclusion in the metadatabase until the conclusion of its review.

#### **4. Review of the 2020 Updated Inventory of Research**

- 4.1 At its 2019 Annual Meeting, the Board agreed to establish a Working Group to review both the Inventory and the SALSEA-Track programme and to consider how the Inventory could be best updated and managed going forward. The 'Working Group to Review the SALSEA-Track Programme and the Inventory of Research Relating to Salmon Mortality in the Sea' met in February 2020 and made several recommendations to the Board (included in the Report of its Meeting, [ICR\(20\)07](#)). The Board adopted these recommendations at its 2020 Annual Meeting. Among the recommendations adopted in relation to the Inventory, the Board agreed that the Secretariat should consider how the utility of the updated website can best be evaluated with the use of hit statistics and related metrics, and that these statistics should be presented to the Board annually to understand the extent to which the Inventory is used.
- 4.2 The Chair referred to the 'Update on the Board's Website', [ICR\(21\)09](#). He noted that it was not possible to compare the hit statistics contained within the document with the previous year, as the updated Inventory was uploaded only a few months in advance of the meeting. The Board agreed to revisit this item at its 2022 Annual Meeting.
- 4.3 The Board member for the UK asked for clarification on how the Missing Salmon Alliance (MSA) Inventory interacts with the Board Inventory, noting that she had updated the MSA Inventory and it is problematic to update in two places. The Chair referred to the Board Inventory review conducted in 2020 and stated that the Working Group had recognised the overlap between both inventories. The Working Group had therefore been very prescriptive about the information it wanted to include in the Board Inventory and asked Parties to provide this. The representative of the NGOs noted that there was a lot of work involved in trying to pull all of the information together, but that the MSA did not want to affect the information going to NASCO. He stated that the MSA is working closely with the NASCO Assistant Secretary to ensure that the NASCO information is included in the MSA Inventory. He indicated that, at present, it is important to keep both inventories updated.
- 4.4 The Board noted that the Secretary would ask members to update and check the information held in the Inventory relevant to their Party / jurisdiction in November 2021. Board members should return their updates to the Secretariat by 31 December 2021. The Secretariat will post an updated Inventory spreadsheet on the website at the end of January 2022.

#### **5. A Potential Successor to SALSEA-Track**

- 5.1 The 'Working Group to Review the SALSEA-Track Programme and the Inventory of Research Relating to Salmon Mortality in the Sea' (see item 4 above) had recommended that the SALSEA-Track programme, in its current form, should be closed. The Board adopted this recommendation at its 2020 Annual Meeting and agreed that any successor to SALSEA-Track should have the following attributes: be problem focused with a

- clearly defined internationally relevant question, which was not solely developed based on the newest technology available; have clear SMART objectives; have clear timelines; have a clear budget; be at the basin-scale; and have an identified owner / co-ordinator. Additionally, it should address issues such as: data gaps / climate change / commonalities across the jurisdictions / mechanisms for supporting new technologies.
- 5.2 The Chair noted that the SALSEA-Track programme had been closed and referred to the paper entitled ‘SALSEA-Track Final Report’, [ICR\(21\)04](#).
  - 5.3 The Chair reminded the Board that the Working Group had proposed that Board members could canvass colleagues on a potential successor to SALSEA-Track if the ROAM programme was not deemed a feasible candidate successor. Additionally, the Board recognised that the process of considering a new programme can happen alongside developments in the ROAM programme. It had been noted that the Board could revisit progress under this Agenda item at its 2021 Annual Meeting. The Secretary had asked Board Members whether they were aware of any potential successor programmes to SALSEA-Track in advance of the 2021 Annual Meeting. In response, a project proposal on ‘Developing an International Atlantic Salmon Modelling and Management Initiative’ (ISMMI) was provided. Information on this and the ROAM programme was contained in paper ‘A Potential Successor to SALSEA-Track’, [ICR\(21\)07](#).
  - 5.4 The Board member for the United States gave a presentation on the ROAM programme, ICR(21)13 (Annex 4).
  - 5.5 Following the presentation, the Board member for the European Union (EU) expressed the EU’s excitement and support for the project. He stated that the ROAM programme could be a ‘game-changer’ in terms of our understanding of where the salmon are and their migratory paths. He hoped that this would provide real value for money in future and asked how the EU could best support the programme. He stated that care would need to be taken as the programme was not just relevant to salmon and it may, therefore, not be possible to guide its direction.
  - 5.6 The Board member for the United States noted that future progress would depend on the field trials which had been delayed, most recently due to the Covid-19 pandemic. If the field trials are successful, the next step will be to look at how the programme can be implemented. If there is a problem during the field trials, they will need to work out why, so there is not much that can be done at present. He noted that the ROAM approach was one component of a larger project being undertaken by the Woods Hole Oceanographic Institute, which is being funded by a US\$35 million award, so there is strong interest getting the ROAM approach up and running. It is hoped that the field trials will go ahead in July 2021 and all the data would be available by autumn 2021, at which point the next steps for the programme, including a possible workshop, can be considered.
  - 5.7 A representative of Canada asked for clarification on the likely timeline for initiating the programme if the field trials were successful. The Board member for the United States indicated that if all the data were available in autumn 2021, it was hoped that the West Greenland pilot could commence in autumn 2022 or perhaps 2023.
  - 5.8 The representative of Canada indicated that they are conducting a large study focused on the migration pathway of salmon from Canadian rivers until 2025. If the ROAM field trials in 2021 are successful, Canada may be able to support a larger trial in the Labrador Sea, through in-kind support (e.g. purchase of tags for tagging salmon from Canadian rivers). In response to a question from the representative of Canada, the Board member for the United States indicated that at least one receiver would be required for

location information, but three would be best to allow triangulation.

- 5.9 The Board member for the EU referred to the possibility of a workshop to support the project in autumn 2021. He noted that the Board had previously agreed to allocate funding towards a second ROAM workshop if needed and asked if this funding was still available. He also indicated that the EU would be supportive of the project, including the possibility of tagging fish.
- 5.10 The Chair confirmed that the funding for a potential second ROAM workshop was still available and asked the Board member for the United States to keep the Board updated on progress with this programme.
- 5.11 The representative of the NGOs gave a presentation on the ISMMI initiative, ICR(21)12 (Annex 5).
- 5.12 The Board member for the EU stated that it was interesting to see basin-level influences such as climate change and changes in the ecosystem being brought back in a Decision Support Tool for individual catchments. He indicated that this was very ambitious given the variations between the stocks. He asked how a basin-scale model could be reflected in the management of individual stocks.
- 5.13 The representative of the NGOs agreed that this was a hugely ambitious initiative and that it was time to start discussions on such an approach. He referred to a paper from the SeaSalar project which will be published shortly, and which updates the work undertaken in relation to SALSEA. SALSEA showed that there are groups of genetically similar regional stocks, and we are now beginning to see patterns where these stocks are located at times in the ocean. He noted that if managers know where their stocks are going in the ocean, and what the prospects are for that part of the ocean, their management goals could potentially be refined accordingly. He indicated that the managers involved with the pilot work have been very keen on getting this kind of information.
- 5.14 The Board member for the UK agreed that this is a very ambitious project and asked whether, given the paradigm shift proposed in terms of how Atlantic salmon are managed, this should be referred to the Council of NASCO for consideration. She stated that there was a lot included in the proposal and she would like to see a pilot in a more geographically constrained area to see what it means in practice. She felt that further scrutiny and background information was necessary. The representative of the NGOs noted that a pilot project was already planned as part of the Likely Suspects Framework. The pilot will cover an area from the west coast of France to Britain and Ireland, and northwards towards the post-smolt feeding areas, west of Norway. This area benefits from a range of index systems and good background data from the SeaSalar and SALSEA projects.
- 5.15 The Board member for the EU asked whether it would be useful to ask ICES formally for additional advice on this matter. The representative of the NGOs indicated that ICES was already involved and that a number of joint NASCO / ICES workshops were underway. He stated that there were now 11 very clear hypotheses, and the current focus was on looking at the data relating to these hypotheses. The first step was to ask ICES what data they have available, how these can be accessed and then how best to fit these data into the models. He suggested that the SAG could be asked to consider the technical aspects of the initiative and consider how realistic the prospects are and what the next steps should be, and to advise the Board accordingly.
- 5.16 The Board member for Canada indicated that he was very supportive of the concept but that the Board would need to know it was going to get somewhere. He agreed that

technical advice would be useful. The Board member for the UK agreed that the matter should be referred to the SAG.

- 5.17 The Board Member for the United States indicated that this was not an issue for Council as the request was for money to support participants, a workshop and developing a proposal. He indicated that there was no guarantee this concept would be successful as experts had been working on developing an ecosystem approach for many years. He asked what was new in this request that was not already planned under the Likely Suspects Framework.
- 5.18 The representative of the NGOs indicated that the funding requested was additional to the funding raised for the development of the Likely Suspects Framework. The funding sought from the Board would be used, as outlined in his earlier presentation, for preparatory work in advance of a bid for major research funding to international research funding sources such as the EU Horizon Europe Programme and the Galway Agreement. He stated that the same logic that applied to SALSEA applied to ISMMI; the aim was to encourage many different partners to buy into the initiative.
- 5.19 The Board member for the EU noted that while the Board had limited funds available to it, funders, other than NASCO Parties, could provide funding through the Board such as has been done for the SMOLTrack projects and ROAM.
- 5.20 The representative of the NGOs indicated that endorsement could be key in developing a larger project. He asked if the proposal could be referred to the SAG for a technical evaluation of the project. The Board could then make a decision on endorsing the project, which the NGO representative stated would be helpful in seeking external funding. He also encouraged Parties to consider donating to the development of the funding request.
- 5.21 The Board agreed that it would refer the proposal to the SAG. The Chair and Secretary would prepare Draft Terms of Reference for the SAG's evaluation of the proposal, which would be agreed inter-sessionally by the Board. The Board noted that individual SAG members could consult with other relevant experts on this evaluation. The SAG would be asked to address their Terms of Reference and report their technical evaluation to the Board. The Board would then consider this evaluation. The Board agreed that, if necessary, a virtual inter-sessional meeting of the Board could be arranged.

## **6. Projects of Interest to the Board and its Work**

- 6.1 At its 2020 Annual Meeting, the Board agreed to retain an Agenda item focused on projects where NASCO has some ownership (such as the EU-funded projects, the SALSEA-Track successor and the Likely Suspects Framework) and that if SAG and Board members knew of other relevant projects, those researchers could be invited to contribute information. The Board had asked the Secretary to provide updates on the first category of projects (i.e. where NASCO has some ownership), and, through the Board and SAG members, to seek information on new and emerging projects that would be of interest to the Board and its work.
- 6.2 The Chair referred to the document entitled 'Projects of Interest to the Board and its work', [ICR\(21\)08](#), which contained updates for 2021 on the on-going projects funded under the European Union's 'Grants for an Action' (SMOLTrack III: Quantifying smolt survival from source to sea: informing management strategies to optimise returns, and SMOLTrack IV: Quantifying salmon survival from river exit to return as adult: Collecting thermal and behavioural data to refine smolt to adult survival indices) and the Likely Suspects Framework project. No details of other projects that fall within the

scope of the Board's activities, or that are not already listed in the Board's Research Inventory, had been provided.

6.3 The Chair thanked the contributors for the information provided.

## **7. Finance and Administrative Issues**

7.1 The Chair referred to the Board's 2020 accounts, [ICR\(21\)03](#). The decision had been taken to have the 2020 accounts audited. The total value of the International Atlantic Salmon Research Fund as at 31 December 2020 was £541,373. Of the Funds available at the end of 2020, £449,827 was grant funding from the European Union in the Euro account and £91,546 was the pounds sterling account balance. Of the £91,546, £41,910 was a voluntary contribution from Canada in 2020 and £40,150 was a voluntary contribution from the United States in 2019. Thus, £82,060 of the £91,546 in the pounds sterling account was ring-fenced funding. In 2018 the Board had agreed to make a sum of up to £4,000 of the Board's funds available towards a second ROAM workshop if needed. This money is yet to be spent. The Board had previously indicated that it was desirable to retain a reserve of £4,000 - £5,000.

7.2 The Board agreed to accept the 2020 audited accounts.

7.3 At its 2006 Annual Meeting, the Board recognised that it was not necessary to have the accounts audited annually and agreed that, in future, the Board's accounts should be audited as required in relation to the funds held. For years in which an audit is not conducted, details of the Board's income and expenditure statements would be circulated to the members of the Board and discussed at its Annual Meeting.

7.4 The Board decided not to have its 2021 accounts audited. The Secretary was asked to provide income and expenditure statements.

## **8. Other Business**

8.1 The Board member for the UK referred to a potential development of a new North Atlantic SNP baseline and asked if this was something that could be referred to the SAG. She agreed to provide further background information on this SNP baseline. The Chair noted that it is likely that there would be an Inter-Sessional Meeting of the Board and suggested that this could be discussed at that meeting. The Board member for the UK agreed to this suggestion.

## **9. Report of the Meeting**

9.1 The Board agreed a report of its meeting.

## **10. Date and Place of the Next Meeting**

10.1 The Board agreed to hold its next Annual Meeting in advance of the Thirty-Ninth Annual Meeting of NASCO.

10.2 The Board member for the United States noted that the Board is often rushed in its work and suggested that meeting over two days at future Annual Meetings may be more efficient. The Secretary agreed to investigate options for scheduling a second meeting of the Board at future Annual Meetings.

## **11. Close of the Meeting**

11.1 The Chair thanked participants for their contributions and closed the meeting.

**ICR(21)10**

***Twentieth Meeting of the International Atlantic Salmon Research Board***

***By Video Conference***

***26 May & 28 May 2021***

***Agenda***

1. Opening of the Meeting
2. Election of Officers
3. The Review of the Metadatabase of Salmon Survey Data and Sample Collections
4. Review of the 2020 Updated Inventory of Research
5. A Potential Successor to SALSEA-Track
6. Projects of Interest to the Board and its Work
7. Finance and Administrative Issues
8. Other Business
9. Report of the Meeting
10. Date and Place of the Next Meeting
11. Close of the Meeting

*2021 Board Meeting List of Participants*

**Canada**

\*\*Tony Blanchard  
\*Martha Robertson  
Julien April  
Doug Bliss  
Cindy Breau  
Natalie Her  
Dave Meerburg  
Isabelle Morisset  
Justin Turple

**Denmark (In respect of the Faroe Islands & Greenland)**

\*\*Maria Strandgård Rasmussen

**European Union**

Ciaran Byrne (Chair)  
\*\*Cathal Gallagher  
Ida Ahlbeck Bergendahl  
Jaakko Erkinaro  
Ignacio Granell  
Arnaud Peyronnet

**Norway**

\*\*Raoul Bierach  
\* Helge Dyrendal  
Peder Fiske

**Russian Federation**

\*\*Alexander Khatuntsov  
\*Sergey Prusov  
Kristina Belogurova  
Alexander Lizogub

**United Kingdom**

\*\*Nora Hanson  
Simon Toms  
Alan Walker

**United States**

\*\*Tim Sheehan

\*Dan Kircheis

**IGOs**

Laura Poinso

**NGOs**

Ken Whelan (Nominated NGO Representative)

Nigel Milner

Mark Saunders

**Secretariat**

Emma Hatfield

Wendy Kenyon

Louise Forero

\*\*Nominated Board Member

\*Board Adviser

ICR(21)15

***Terms of Reference for the Review of the Metadatabase of Salmon Survey Data and Sample Collections***

1. A Working Group reporting to the Board is established with the following high-level objectives:
  - a. Consider the relevance and utility of the Metadatabase of Salmon Survey Data and Sample Collections (the Metadatabase)  
  
In the event that the Working Group recommends that the Metadatabase continue to be maintained:
    - b. Propose a future course for the Metadatabase by considering a full range of options, to increase its relevance and utility;
    - c. Consider how the Metadatabase could be better managed and presented.
2. In carrying out the objectives in paragraph one, the Working Group will:
  - a. Review the relevance and utility of the entries in the Metadatabase;
  - b. Review the processes related to the Metadatabase, including:
    - i. The process for maintaining and providing annual updates;
    - ii. The process of advertising to, or sharing the resource with, non-NASCO salmon researchers; and
    - iii. Propose modifications to procedures and tools related to the Metadatabase;
  - c. Propose ways to enhance awareness of the Metadatabase, to encourage greater use.
3. The Working Group should also consider whether other areas of the Board's work require review.

The Working Group should take into account the following documents and information:

- [ICR\(17\)7](#), Report of the Sixteenth Meeting of the International Atlantic Salmon Research Board;
- [SAG\(15\)7](#), Report of the Meeting of the Scientific Advisory Group of the International Atlantic Salmon Research Board;
- [ICR\(12\)4](#), Progress in Developing a Metadatabase of Salmon Survey Data and Sample Collections of Relevance to Mortality of Salmon at Sea; and
- [ICR\(11\)4](#), Interim Report of the IASRB Working Group on Marine Salmon Survey Data and Sample Collection.

ICR(21)13

# ROAM update

Timothy Sheehan

May 26, 2021



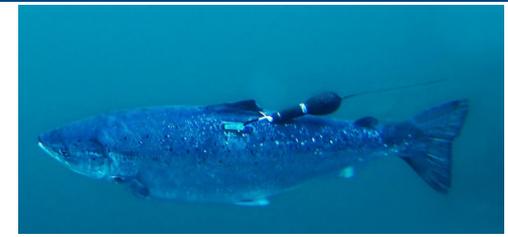
**NOAA**  
**FISHERIES**  
NEFSC

# Electronic tagging technologies

- Have advanced our understanding of the marine ecology for many species, including Atlantic salmon
- Two primary/contemporary tools used for Atlantic salmon:
  - Ultrasonic acoustic tags (acoustic tags)
    - Since 1994
    - Tag emits a signal that receivers detect and record
  - Pop off Satellite tags (PSAT)
    - Since 2008
    - Geo-positioning from collected data (temperature, depth, light, magnetic fields, etc.)



# A Few Pros and Cons



## Acoustic

- Small tag size
  - Precise locations
  - Predation events
  - Impacts considered minimal
- 
- Limited tag life
  - Small receiver detection radius
  - Data from monitored areas
  - Monitoring large expansive areas is logistically and economically challenging

## PSAT

- Long-term deployment
  - Continuous data collection
  - '*Daily precise*' locations
  - Predation events
- 
- Large tag size
  - Impacts on behaviour
  - Behaviour may be incompatible with data requirements
  - Sub-set of data informative
  - Imprecise location estimates

# ROAM (RAFOS Ocean Acoustic Monitoring) tag

- Evolution of a common oceanographic monitoring tool
  - Modification and miniaturization
- Overview:
  - Moored sound sources deployed in the ocean
    - 10-year life span
  - A hydrophone is incorporated into the fish tag
  - Daily precise estimates of tag position via triangulation ( $\pm 1$  km<sup>2</sup>)
  - Temperature and depth data also collected by tag
  - Archive (*smolt*) and pop-off satellite (*adults and sub-adults*) tags are being developed



# Timeline

## 2017

- 1<sup>st</sup> presented to IASRB

## 2018

- Workshop (June 7-8, 27 participants)
  - Bronger and Sheehan (2019)  
<http://www.nefsc.noaa.gov/publications/>
  - Approach holds promise
  - Significant challenges/unknowns remain
  - Questions on permitting
  - Fields trials a significant next step
- Update provided to IASRB
  - Continued support and interest
  - IASRB funds earmarked £4,000 for 2<sup>nd</sup> workshop
  - Interest expressed to seek domestic funding

## 2019

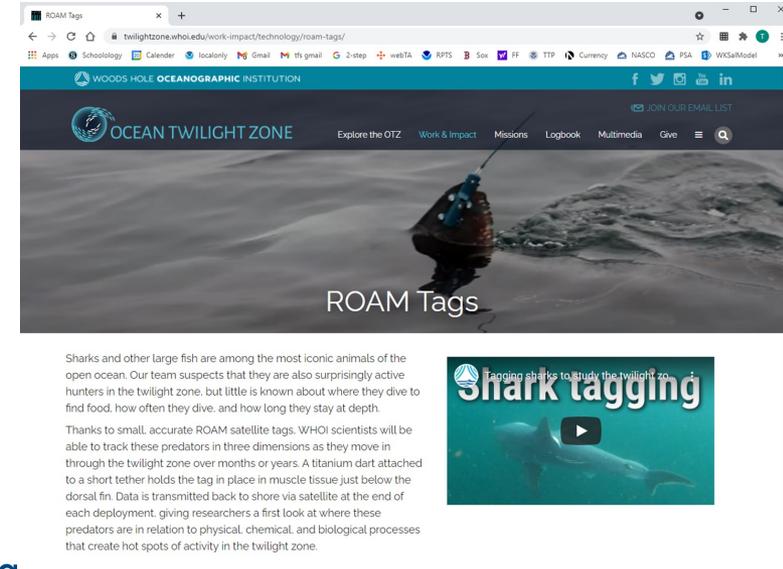
- 1<sup>st</sup> ROAM 'salmon' sound source fabricated
- Tags
  - Delays in pressure sensor delivery/proto-tag fabrication
  - 2<sup>nd</sup> and 3<sup>rd</sup> generation tags planned/pursued
    - PSAT housing, increase sensor capabilities, dual frequency
- Field trials
  - Delayed to incorporate commercial proto-types
  - Fall 2019 - cancelled due to logical issues
  - New target – summer 2020
- Permitting (U.S.)
  - No mammal concerns, permit obtained

## 2020

- Field trial piggy-back on July survey
  - Sound source deployment, range testing with ship and performance evaluation with glider
- Corona
- Field trial canceled

# 2021

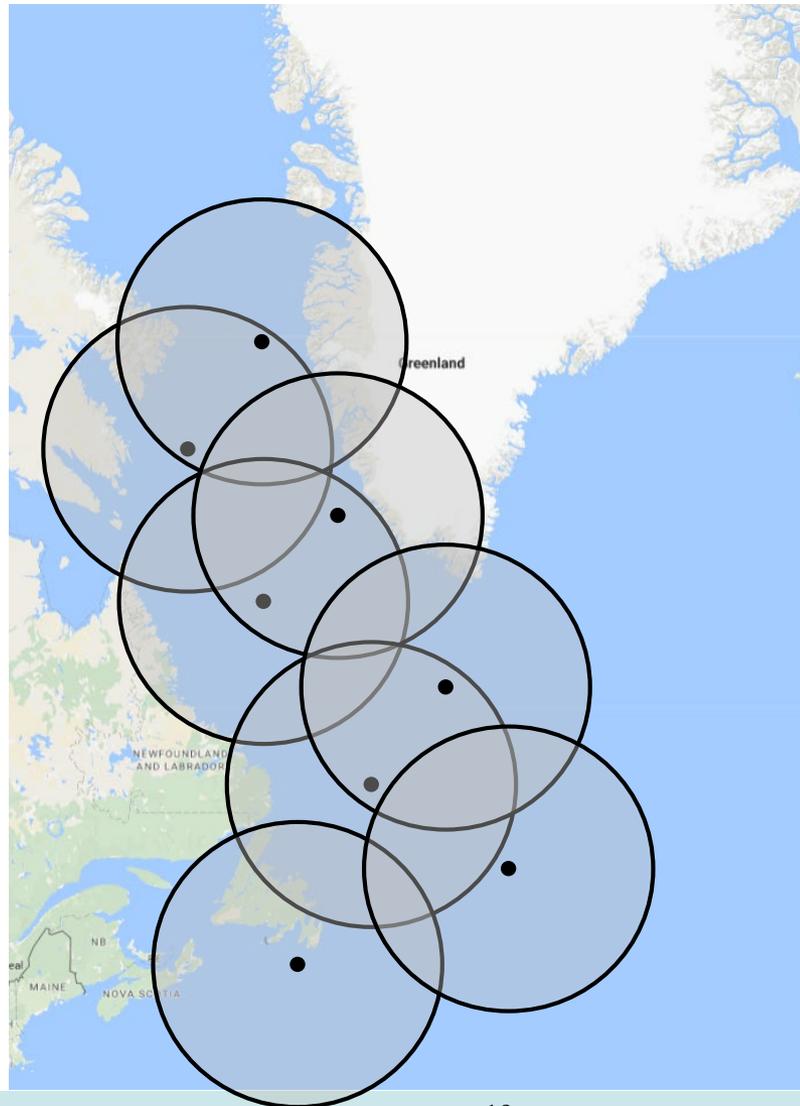
- Primary Investigators still keen to pursue
  - ROAM is integral to the *Ocean Twilight Zone* project (<https://twilightzone.whoi.edu/>)
- Advances with tag development/production
  - Vemco and Wildlife Computers still pursuing
  - Necessary components in hand
  - Multi-frequency ROAM tag being developed
    - Will increase the versatility (e.g. variable range, fw/sw)
- Marine surveys resumed, but at reduced staff making piggy-backing difficult
  - Pursuing an opportunity for July 2021
  - Collaborators working to secure commitments, ship time and glider support
- Great Lakes project being considered



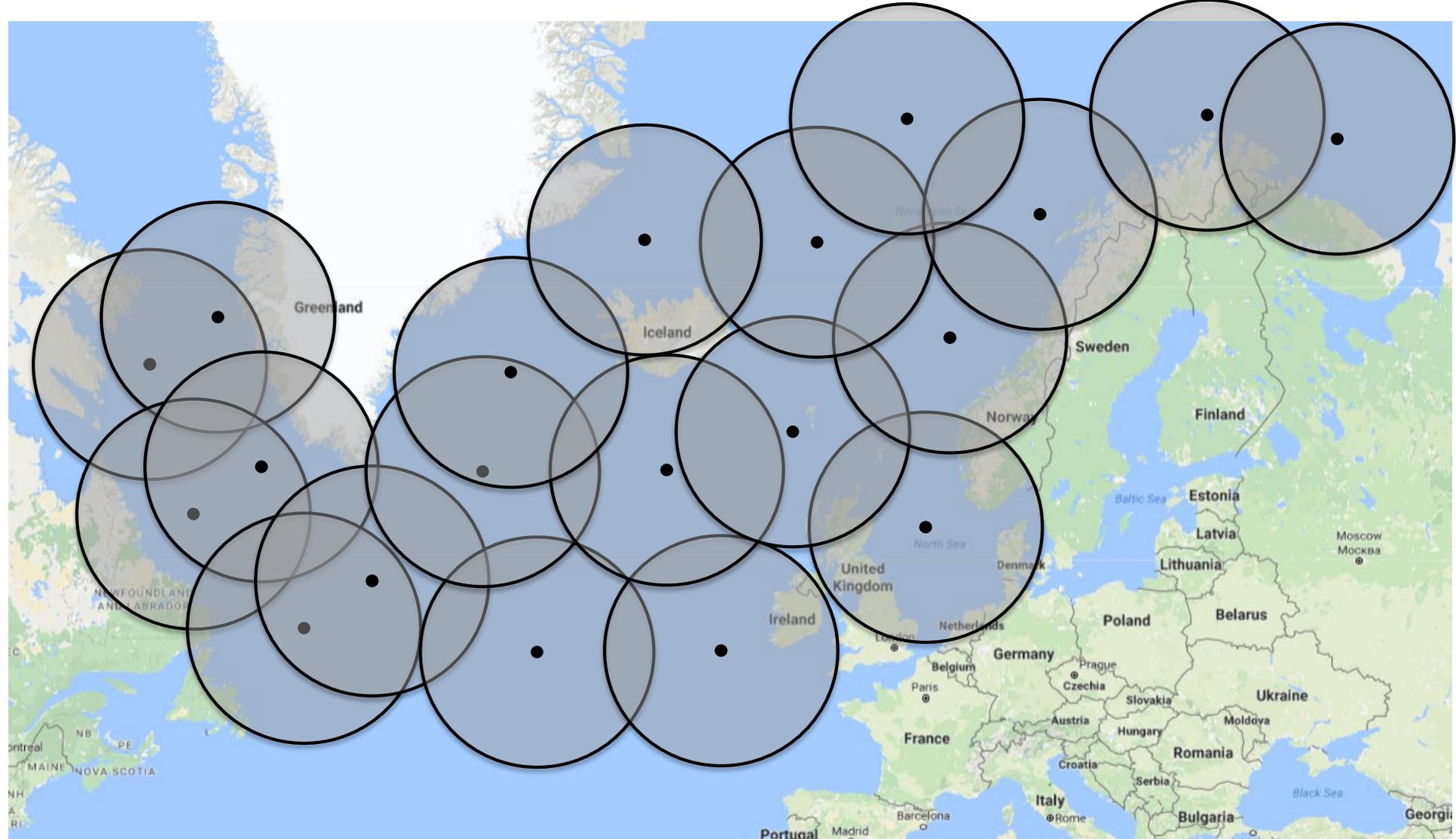
# RAFOS Ocean Acoustic Monitoring (ROAM)

- Offers the potential to accurately track further out to sea throughout the marine stage than previously able
  - New use for an old technology
  - Different tag types allow for different research approaches
  - Overall cheaper cost
  - Field testing is needed
- Prime for within and cross-basin multi-species collaborations

# Greenland Sub-adult PSAT Tracking



# Basin wide/global potential (~2-4 million USD)

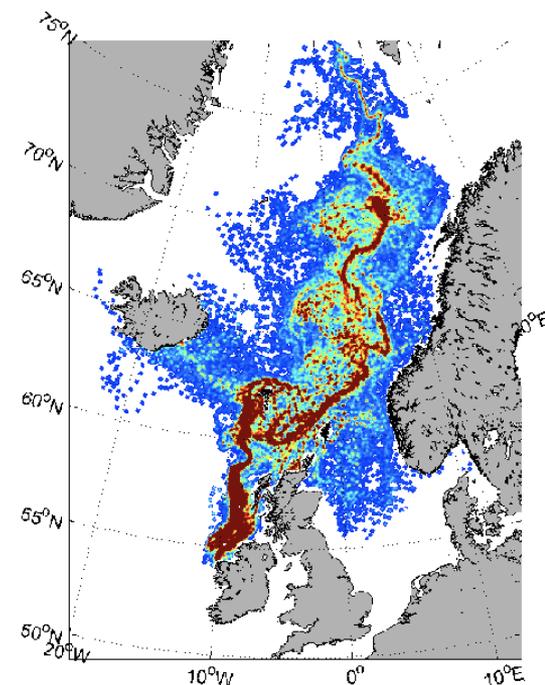


# ICR(21)12

## Developing an International Atlantic Salmon Modelling and Management Initiative (ISMMI)



**Ken Whelan, Colin Bull, Walter Crozier,  
Etienne Prévost, Etienne Rivot ,  
Matthieu Buoro**



**THE MISSING  
SALMON ALLIANCE**



# A Successor for SALSEA Track - A Vision

- International salmon conservation and management must move beyond the provision of catch advice, based on single-species, to a vision encompassing the whole salmon ecosystem
- Aligned with the provision of a new, management guidance/advice formats, addressing the salmon's wider needs
  - ***International Atlantic Salmon Modelling and Management Initiative (ISMMI)***

**Development of a major international funding bid to initiate, develop and support the building of an ecosystem-based management system for Atlantic salmon**

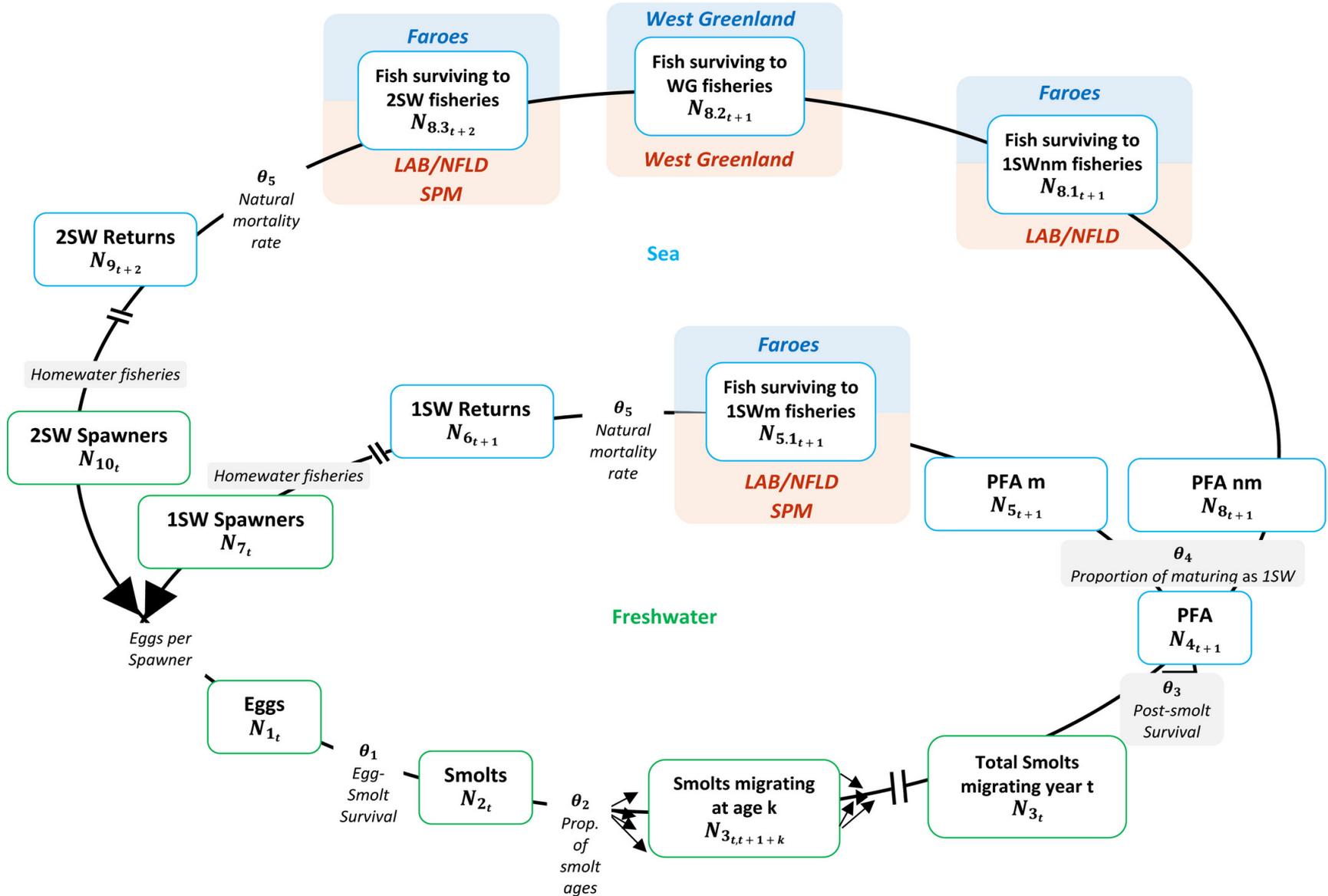
# What is ISMMI?

- **An initiative which will assist linking model development, mobilised data resources and prioritised research programmes to advance stock assessment and management efforts**
- A one-year pilot study to begin in 2022.
- Concurrently building an international consortium bid, spanning the three NASCO Commission areas, for a four-year science project (2023-2026) to develop the modelling and advice frameworks.
- 1. Further Development of Decision Support Tools for Managers
- 2. Alignment of Existing Salmon Stock Assessment and Management Models
- **3. Ecosystems Based Approach to Salmon Management**
- 4. Developing an Atlantic, basin-wide, international funding bid

# Background to ISMMI Proposal

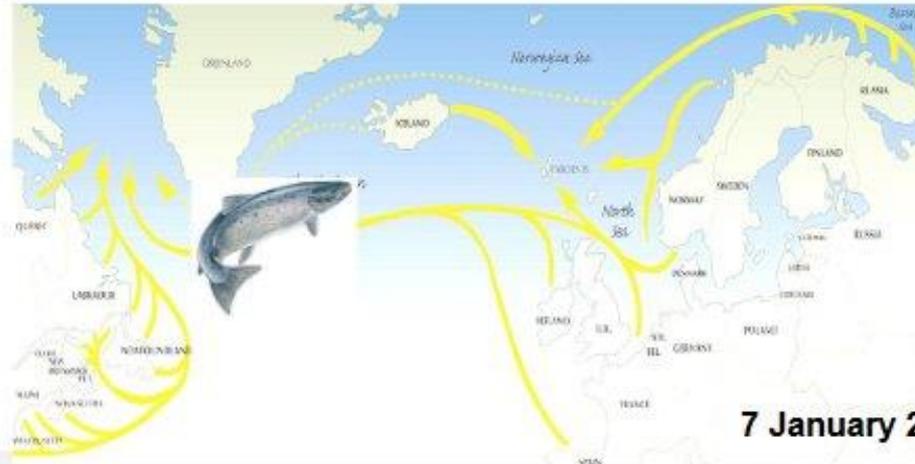
- Improved advice and guidance to ICES and NASCO must be capable of tackling the urgent and fast moving challenges facing salmon populations for the remainder of this century
- ICES Atlantic salmon advice must become more closely aligned with an ecosystems-based approach. Stock assessment methodology for salmon will require: further model development, assessment of potential indicators, and benchmarking
- NASCO/ IASRB has actively supported the Likely Suspects Framework, NASCO /ICES advisory group (WGNAS) has supported the Life Cycle Model (LCM): How best to integrate and benefit from the results of these two programmes?
- ISMMI facilitates enhanced linkage and alignment between programmes, directly supporting the work of WGNAS and assisting future benchmarking of Atlantic salmon assessments.

# The Life Cycle Model



# WK SalModel

WGNAS-SalmoGlob ToolBox  
A ToolBox for supporting Atlantic salmon stock assessment  
at the North Atlantic basin scale



7 January 2021, remote

**l'institut Agro**  
agriculture • alimentation • environnement



**INRAE**



**Pierre-Yves HERNVANN,  
Rémi PATIN,  
Maxime OLMOS, Jérôme GUITTON, Marie-Pierre ETIENNE,  
Maéva LABOUYRIE, Léa BEZIER,  
Etienne RIVOT**

WKSalmMod 2021 - Day #3

The WGNAS-SalmoGlob ToolBox, Hervann et al.

AGROCAMPUS OUEST, 7 Jan 2021

- Logon Button
- Introduction
- Search The LSF
- Metadata Node Report
- Submit Research Project
- Submit Data Source
- Refresh

Help Basket: 0

**Legend**

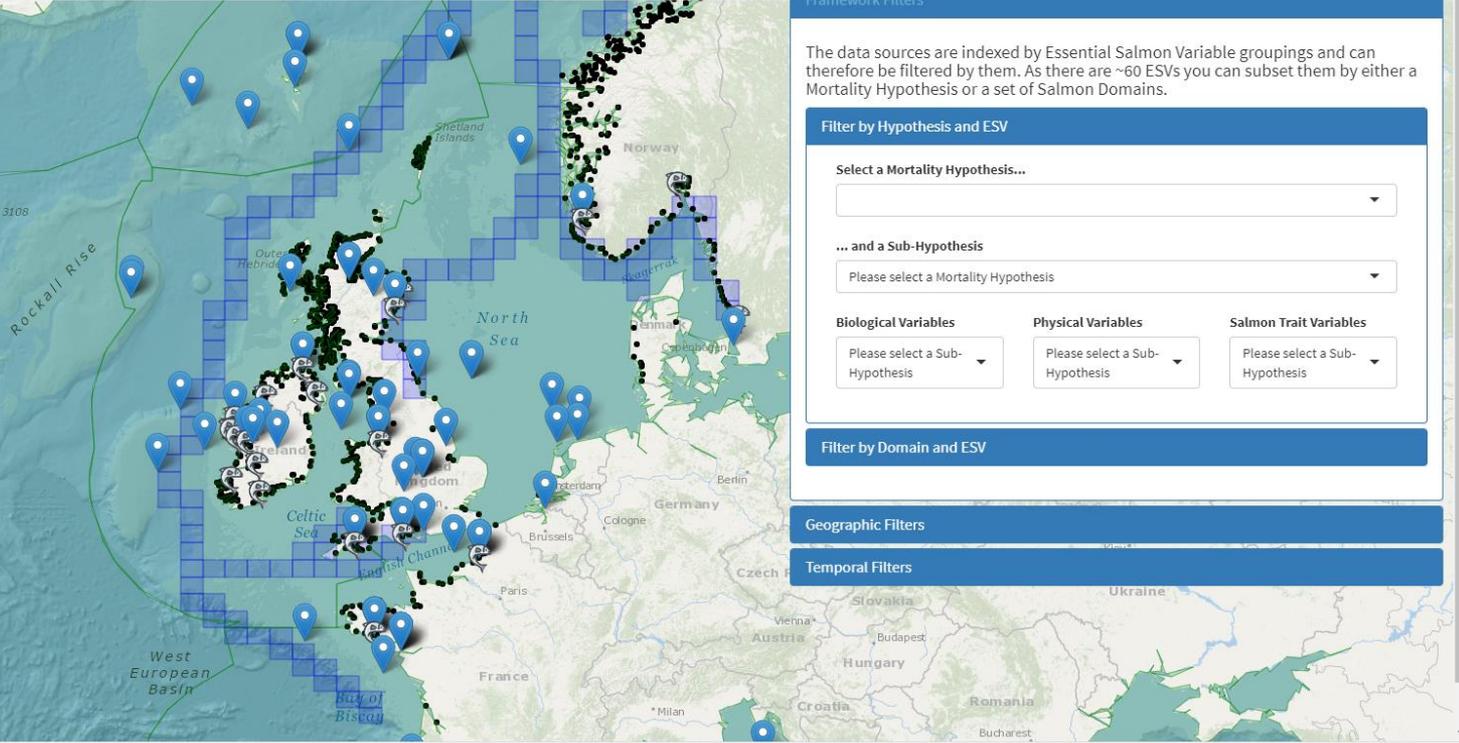
Ecoregions  
 NAFO Divisions  
 Migration Routes  
 NASCO Rivers  
 ICES Index Rivers

**Markers**

- Data Sources
- Index Rivers
- NASCO Rivers

**Polygon Overlays**

- ICES Ecoregions
- NAFO Divisions
- Area of Migration



### Framework Filters

The data sources are indexed by Essential Salmon Variable groupings and can therefore be filtered by them. As there are ~60 ESVs you can subset them by either a Mortality Hypothesis or a set of Salmon Domains.

#### Filter by Hypothesis and ESV

Select a Mortality Hypothesis...

... and a Sub-Hypothesis  
Please select a Mortality Hypothesis

**Biological Variables**  
Please select a Sub-Hypothesis

**Physical Variables**  
Please select a Sub-Hypothesis

**Salmon Trait Variables**  
Please select a Sub-Hypothesis

#### Filter by Domain and ESV

### Geographic Filters

### Temporal Filters

# 1. Further Development of Decision Support Tools

**Improved engagement with salmon management at all levels. Assist with translation of new model outputs better aligned to salmon management needs.**

---

## **Specific**

To provide a User Interface (UI) Decision Support Tool

## **Measureable**

Quantifiable use-data and metrics from engagement with UI Interface

## **Achievable**

Phase 1 development of UI underway and technical expertise within network of proposers

## **Relevant**

Salmon managers need better access to good management advice and forecasting tools

## **Time bound**

A functional UI to provide decision support is deliverable within 1 year, with iterative revision and refinement necessary via continued management

## **Budget**

**£12K**

- "Ask the Managers"
- Understand the needs of the managers
- Align outputs from ISMMI with management needs
- Contribution to support participation in workshops and meetings

## 2. Alignment of Existing Salmon Stock Assessment and Management Models

### **Improve biological realism in existing models**

#### **Specific**

Model evaluation and refinement to increase biological realism

#### **Measureable**

Documented revisions and evolution of modelling programmes

#### **Achievable**

Functional models exist and expertise within networks of proposers

#### **Relevant**

Recognised limitations in current modelling frameworks are addressed

#### **Time bound**

Development of specified elements within one year

### **Budget £15k**

- Fundamental to future work of WGNAS and alignment with ICES
- Ensure that output formally written up and is citable
- Contribution towards ensuring involvement of key players

# 3. Ecosystems Based Approach to Salmon Management

## Progress towards the Development of an Ecosystems based approach that guides future modelling work

### Specific

Development of IEA strategy and ecosystem indicators evaluation

### Measureable

Conduct comparison between outputs from current stock assessment methods and developing IEA approach

### Achievable

Multiple examples of developing IEA approach and expertise within ICES networks

### Relevant

An Ecosystem-based management system which addresses current challenges and future requirements

### Time bound

Initial IEA development will be to assemble and assess potential indicators in year 1

## Budget

£35K

- Fundamental change - from a catch based management model to an ecosystem model
- No manual on how to do this!
- Manage the transition process: data access, data mobilisation, refinement of indicators.
- Contribution towards travel costs to technical workshops
- To increase participation at WKSalmon 3 workshop

# 4. Developing and Preparing an Atlantic, basin-wide, international funding bid

**Develop a comprehensive bid to support ISMMI and the roll out of a 5-year strategic science plan for Atlantic salmon management**

## **Specific**

The production and submission of an international funding bid

## **Measureable**

Bid development provides identifiable research consortium and content will provide transferable resources/models

## **Achievable**

Previous track record of proposers. Key groups and individuals are well integrated within proposers' networks assisting bid development

## **Relevant**

International collaboration behind an agreed vision is required to address the scale of challenges facing Atlantic salmon

## **Time bound**

Bid development and submission completed within 1 year

## **Budget**

£34K

Employ a project bid developer - contribution towards salary and travel costs for 12 months

Develop IASRB Plan ~ similar to SALSEA – shared between Parties and research partners



## IASRB - Relevant TOR's

The Board will seek to advance an International Atlantic Salmon Research Programme **into the causes of marine mortality of Atlantic salmon and the opportunities to counteract this mortality** through the following activities:

- Identifying research needs
- Providing a forum for co-ordination of relevant research efforts by the Contracting Parties of NASCO
- Establishing terms and conditions for soliciting, evaluating, approving and funding relevant research projects
- Funding approved projects and reviewing results in relation to the objectives of the Programme
- Endorsing projects that are consistent with the objectives of the Programme

# Board Request

We believe that the ISMMI Initiative, as detailed in the full proposal presented to the Board, fulfils the criteria agreed at the 2020 meeting of the Board for a successor to SALSEA Track

- *be problem focused, with a clearly defined internationally relevant question, which is not solely developed based on the newest technology available*
- *have clear SMART objectives*
- *have clear timelines*
- *have a clear budget*
- *be at the basin-scale*
- *have an identified owner / co-ordinator – (Phase 1, MSA; Phase 2 – 5 Year Project / IASRB Plan – research partners)*

*Additionally, it should address issues such as:*

- *data gaps*
- *climate change*
- *commonalities across the jurisdictions*
- *mechanisms for supporting new technologies*

***Funding sought - £96k for year 1 of the project***

***Matching the LSF budget for 2021 / 2022 of £200k, INRAE / L'Institut Agro Budget of £85 and the ECOBIO budget of £175k – total £460k***

***18% of the total 2021 / 2022 Budget***

