

# ***International Atlantic Salmon Research Board***



## **Report to the NASCO Council**

*Prof Ken Whelan ~ Chairman, IASRB*

**Le Château Frontenac, Québec City, Canada**

**2<sup>nd</sup> June 2010**



*Photograph courtesy of Gilbert van Ryckevorsel*

# Meeting of the IASRB

- Guidelines on submitting proposals to the Board – accepted by the Board
- Activities of the Board generating unique and very valuable databases
- ICES SGBICEPS, WK LUSTRE, WK DUHSTI & the various SALSEA Pgms



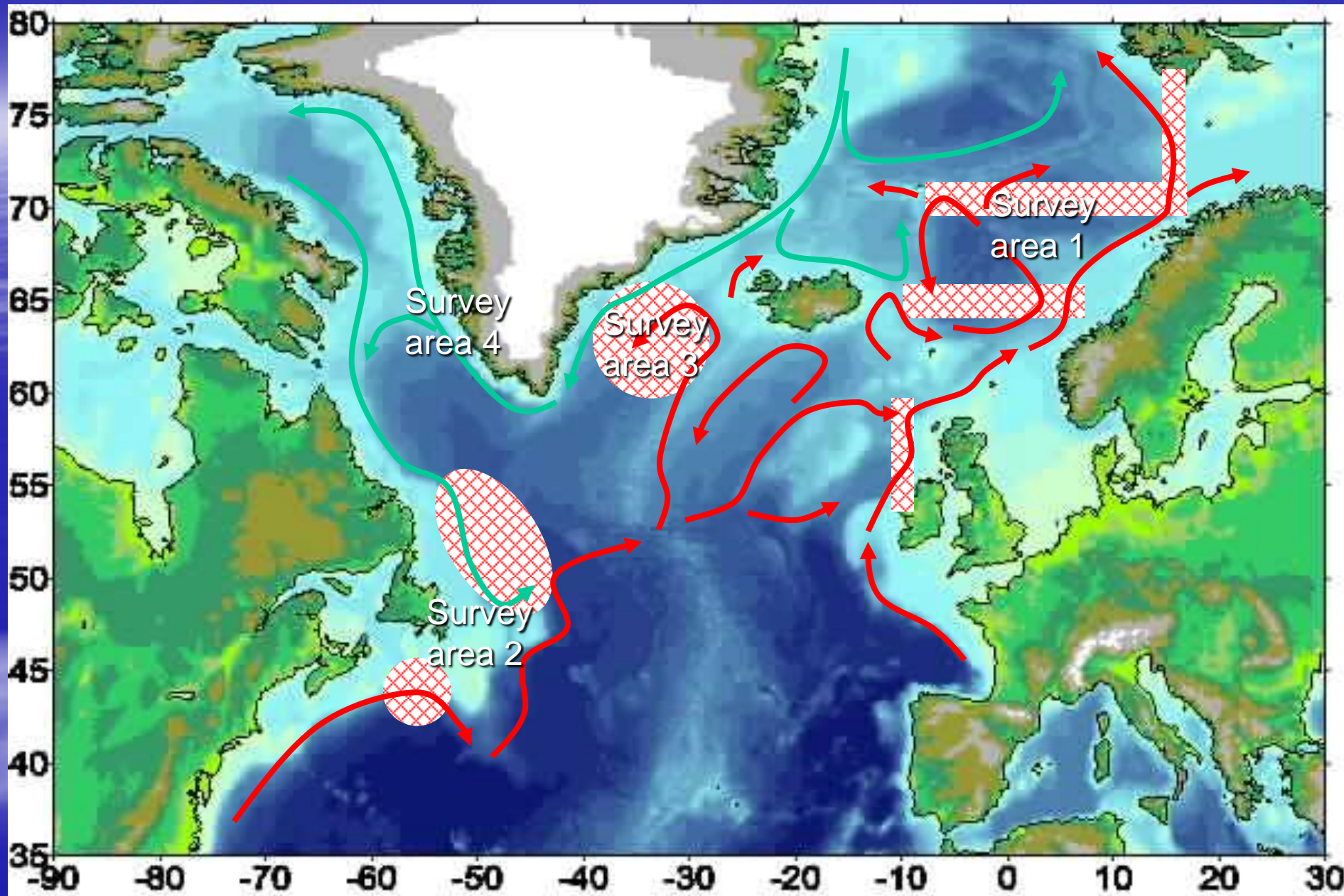
# NASCO Databases

- Three issues were discussed:
  - how best to archive the physical samples collected
  - how to archive the electronic data
  - how best to arrange for a management system, including quality control
- West Greenland –30 years of scale and genetic data
- How best to ensure the safe archiving of these invaluable shared data sets?
- What protocols are required to ensure, on a partnership basis, the full analysis and publication of these data?
- The Board needs some guidance in these areas
- Agreed to form a small group to review these issues and advise the Board

# SALSEA

- SALSEA North America (+ ASF Telemetry Studies)
- SALSEA Greenland
- SALSEA Irminger
- SALSEA Merge





# Results from research vessel survey in the Labrador Sea, fall 2009

**Dave Reddin, G. Chaput, T. Sheehan**



# Objectives

## (SALSEA North America)

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- Define upper portion (>20 m) of pelagic ecosystem
- Distribution in the marine environment (post-smolt, 1SW maturing, 1SW non-maturing)
- Temperature preferences, temperature ranges, salinity ranges, constraints on distribution
- Tissue collection for various studies

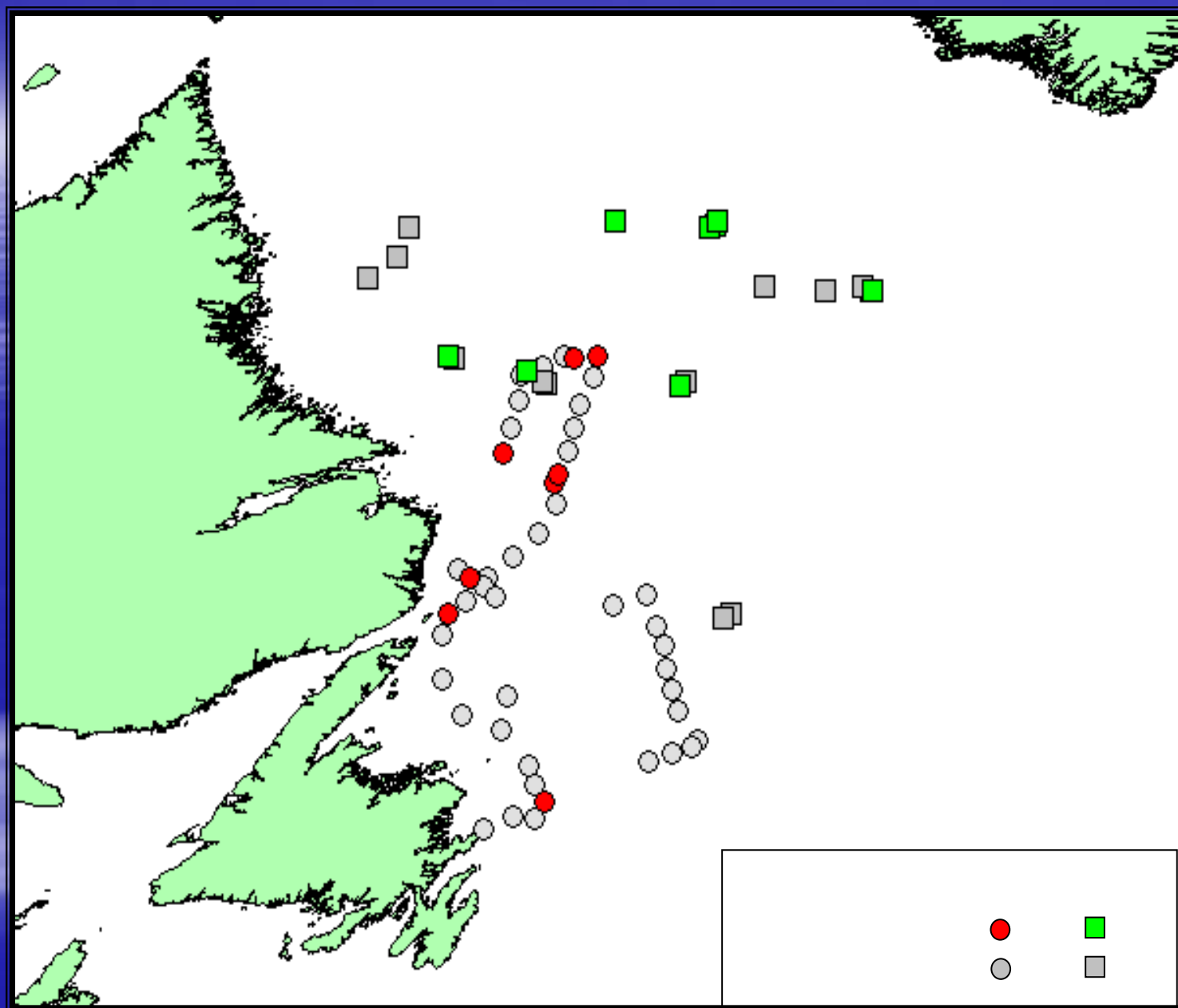


Labrador Sea is not  
user friendly











# Data Collection

- Fish samples
  - Measure fish for biological characteristics
  - Scales for ageing
  - Tissue for genetics
  - Tissue for lipid content
  - Salmon stomachs for prey/stable isotopes
  - Fish Health tissues
  - Parasites
  - Otoliths
  - Postmolt gonads for maturity study
  - Remainder of salmon frozen for future study
- Other data
  - Oceanographic
    - CTD data
    - XBTs
  - Biological
    - Plankton for species composition/stable isotopes





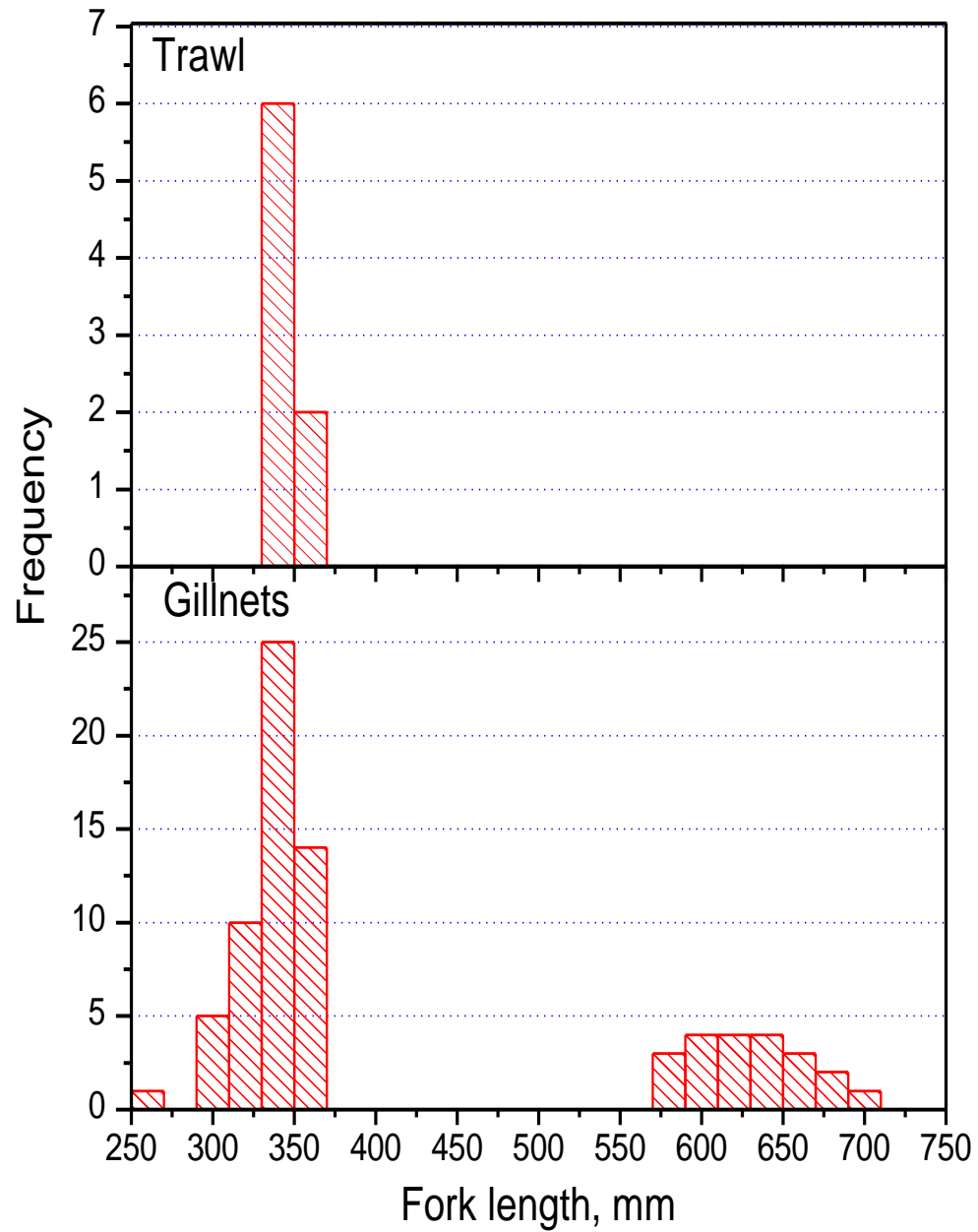






# Norwegian Postsmolt Trawl









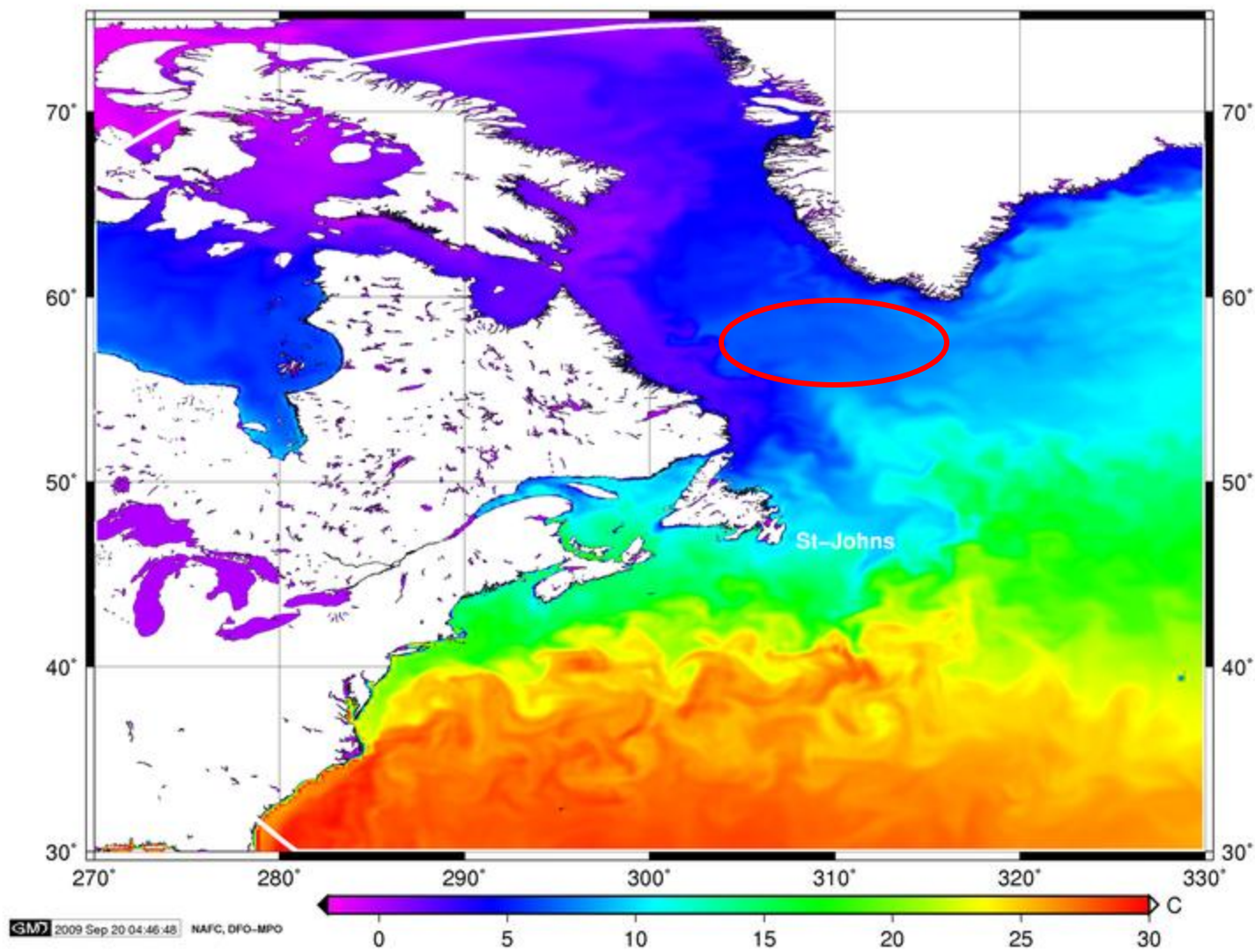


# What was in the trawl?



# Temperature on 2009-09-20 1200Z near 0m

Model run on 2009-09-20 0000Z





# SUMMARY

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- Incredible productivity of upper 20 m of water column
- Gillnets seem a better way to catch post-smolts in fall in Labrador Sea
- Salmon seem to avoid the colder Labrador Current
- Post-smolts abundant in late summer in Labrador Sea
- All sea ages found over most of Northwest Atlantic in summer
- Post-smolts and older sea age salmon over-winter in Labrador Sea
- Maturing 1SW salmon found along eastern slope of Grand Banks in spring

Sonic tracking of North  
American Atlantic salmon: lessons on the migration pathways, mortality points, and  
social dynamics  
Dr Fred Whoriskey  
Atlantic Salmon Federation





# Objectives

- Document migration routes of smolts from different rivers
- Establish quantitative, replicated estimates of smolt/post-smolt mortality rates, by migration stage (fresh water, estuary, Gulf)
- Study winners (survivors) and “losers”
- Explore evidence for social dynamics as determinants of salmon survival

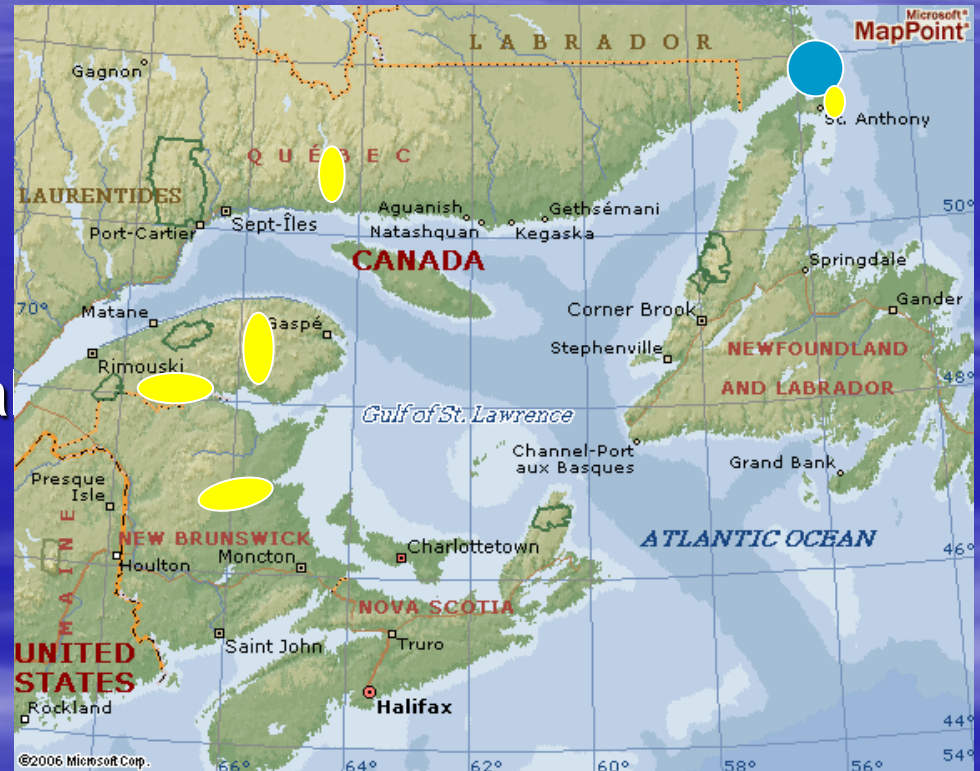
# Sonically tagged smolts released

	2007	2008	2009	
– Miramichi		80	80	80
– Restigouche	100	46	81	
– Cascapedia	47	40	54	
– St. Jean (North Shore)	25	58	44	
– Western Arm Brook	25	25	25	
– Margaree			25	
– Totals	277	249	309	
– Kelts Miramichi		50	50	



# Sonic telemetry strategies for North American Atlantic salmon

- Wire key choke points on migration routes
  - Head of tide zones
  - Estuary exits
  - Gulf (Straits, continental shelves)
- Long time series- natural experiments
- Leapfrog equipment from S to N

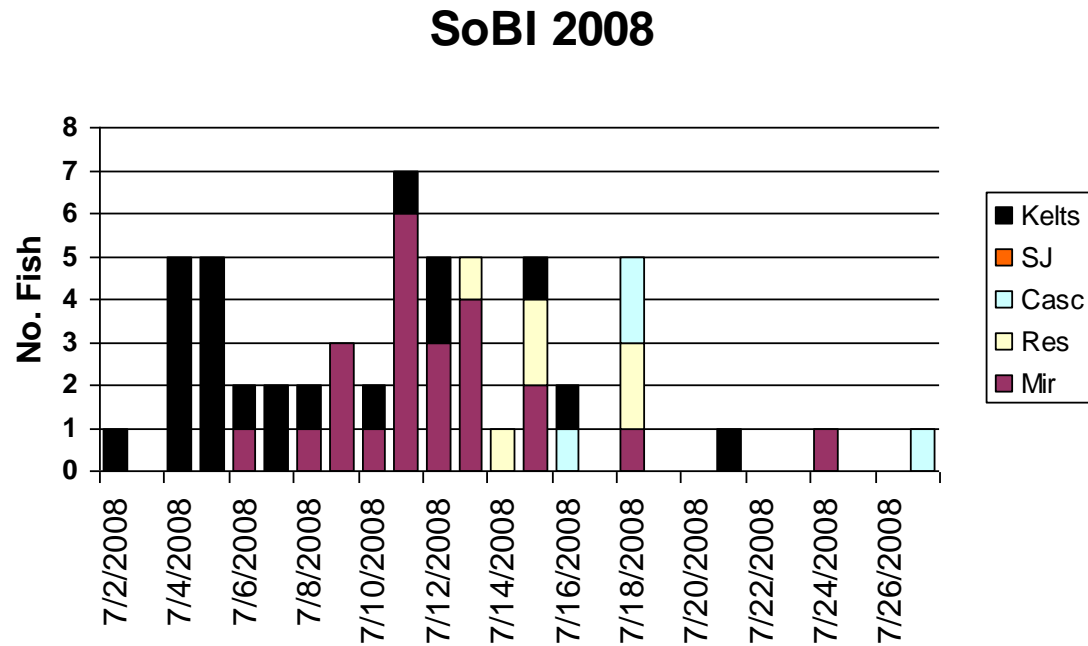


# Conclusions to date

- Reliable methodology for quantitative estimates, with relatively consistent mortality patterns within and among years and sites
- Lowest loss rates (%/d) in Gulf of St. Lawrence.
- Rivers differ as to whether the highest rates are in the estuary or fresh water
- Predator swamping works in the estuary
- Factors out from shore are driving the very poor adult returns



# Kelts and smolts 2009 (with MSA)



# New initiatives 2010

- Mobile receivers on gliders (OTN)
- Bioprobes (OTN grey seals)
- OTN Cabot Strait partial line
- Satellite drifters ([www.sensservice.com](http://www.sensservice.com), ID and password asftrack)
- Whales and seals



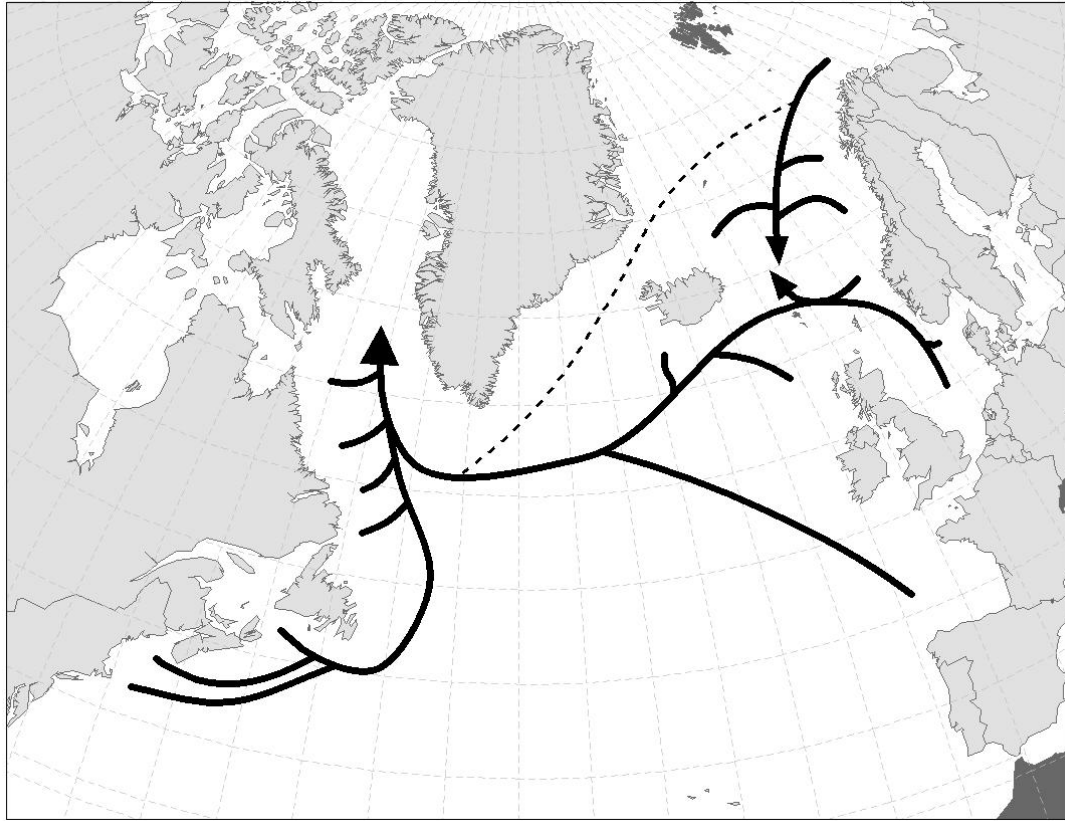


# Report on SALSEA West Greenland (2009)

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

**Rory Saunders & Tim Shehan**

**NOAA Fisheries Service**





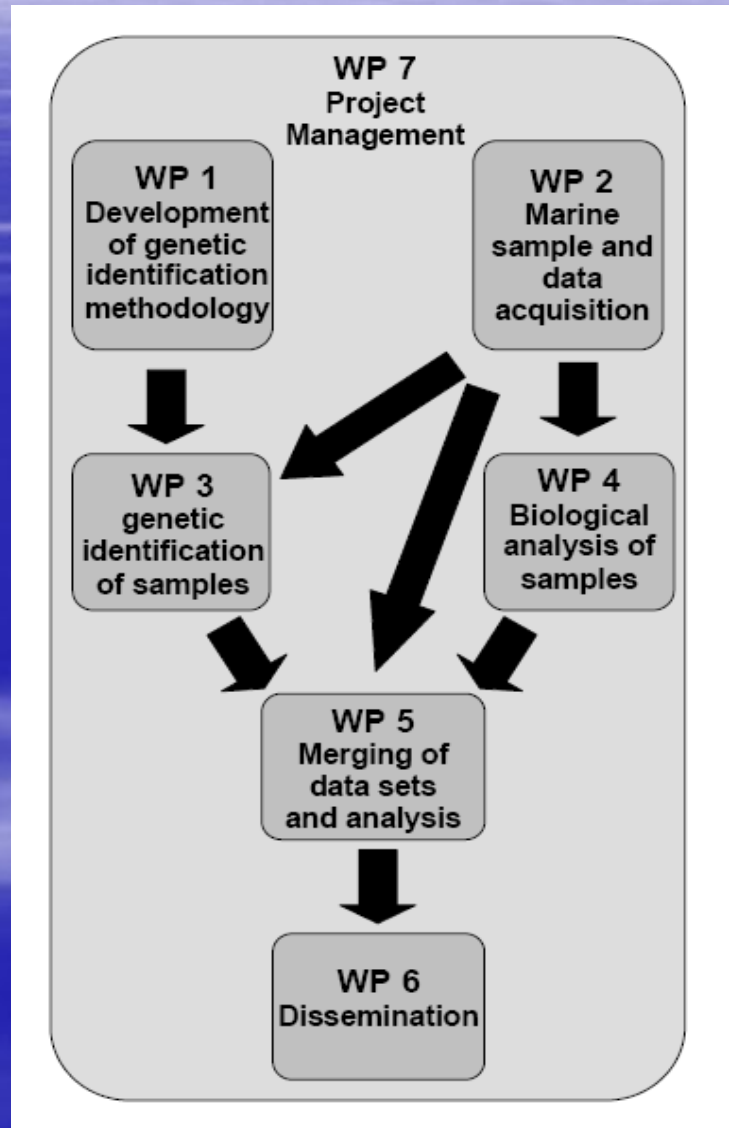
# Baseline Sampling Program West Greenland Fishery Sampling Agreement, 2009

- 7 Samplers - 2 USA, 1 CAN, 1 UK(E&W), 1 UK(SCOT), 1 IRE, and 1 DEN
- 3 out of 6 NAFO Divisions sampled
  - 1 Nuuk sample from Division 1C
- 10 out of 13 NAFO weeks sampled
- ~114 sampling days
  
- 1,683 fish sampled (2,602 seen)
- ~22% of total reported catch (by weight)
- Length, weight, tag, scale, and genetic samples

[WWW.salmonatsea.com](http://WWW.salmonatsea.com)

Co-ordinated MI Bergen

50+ scientists and technicians



















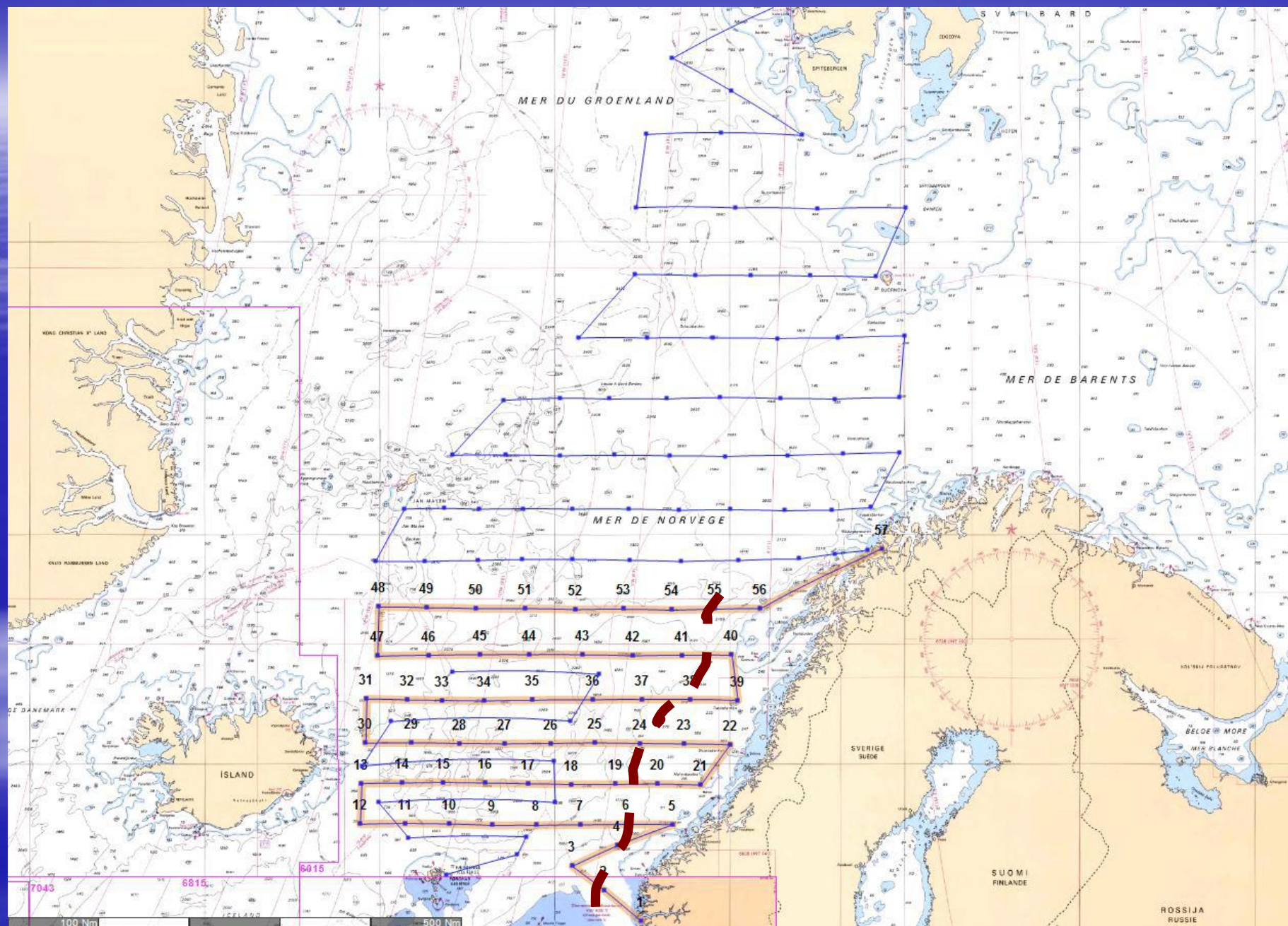












# Irish Surveys 2008 & 09

- The *Celtic Explorer* - 358 salmon post-smolts in 2008
- A further 76 post-smolts were taken during the 9-day cruise of the *Celtic Voyager*, resulting in a total catch of 434 salmon.
- 2009 – 464 post smolts & 10 adults





# Faroese Survey July 2008

- RV *Magnus Heinason* - 337 post-smolts and 20 adults were caught, with three hauls accounting for 184 fish
- 2009 – 325 post smolts and 6 adults



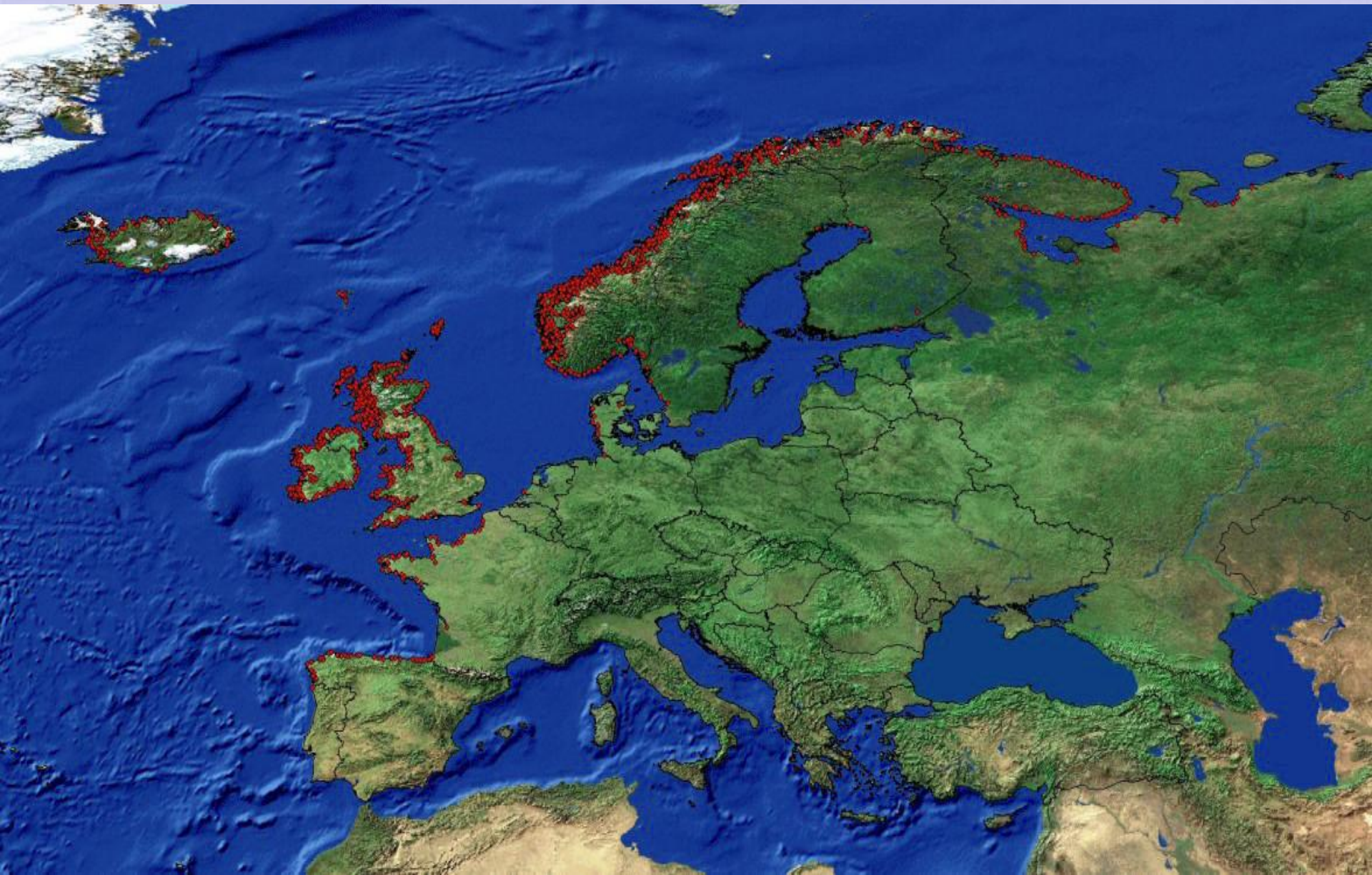


# Norwegian Survey July / August 2008

- RV *Eros* - covered the northern-most sector of the sampling area bounded by the north coast of Norway, Jan Mayen Island, Spitzbergen and Bear Island.
- A total of 88 salmon (mean length 24.8 cm and mean weight 143 g) and 6 adults
- 2009 – 78 post smolts & 5 adults
- **Total: 1732**



# Atlantic Salmon Rivers NEA

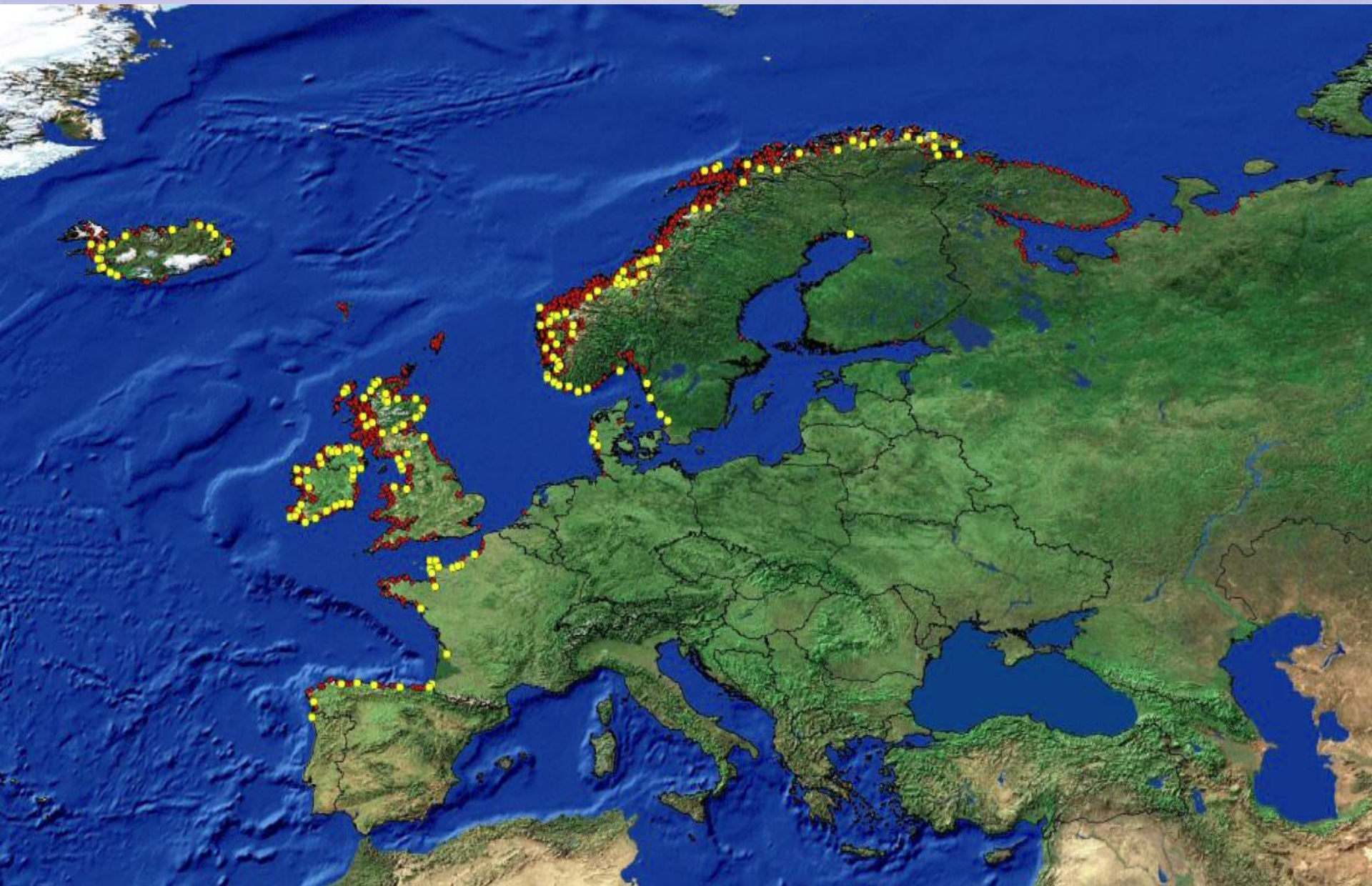


# Number of Rivers

- Total of 1694 salmon rivers in the Northeast Atlantic.
- NE Atlantic is composed of 35-40 major phylogeographic genetically distinctive population assemblages
- Readily discernable using the SALSEA panel, provided suitable baseline coverage is achieved in the project.



# Rivers Sampled to date





# SALSEA Merge - genetics

## Baseline

- 225 rivers, consisting of 497 sample sites
- 22,815 individual fish collected & screened
- 60% of the total production in the sampling area
- On going: Screening of 50 large rivers
- ~85% of production covered
- Russian samples yet to be included
- These markers encompasses 14 of the 15 microsatellite markers in Virginia panel.



# Regional Assignment

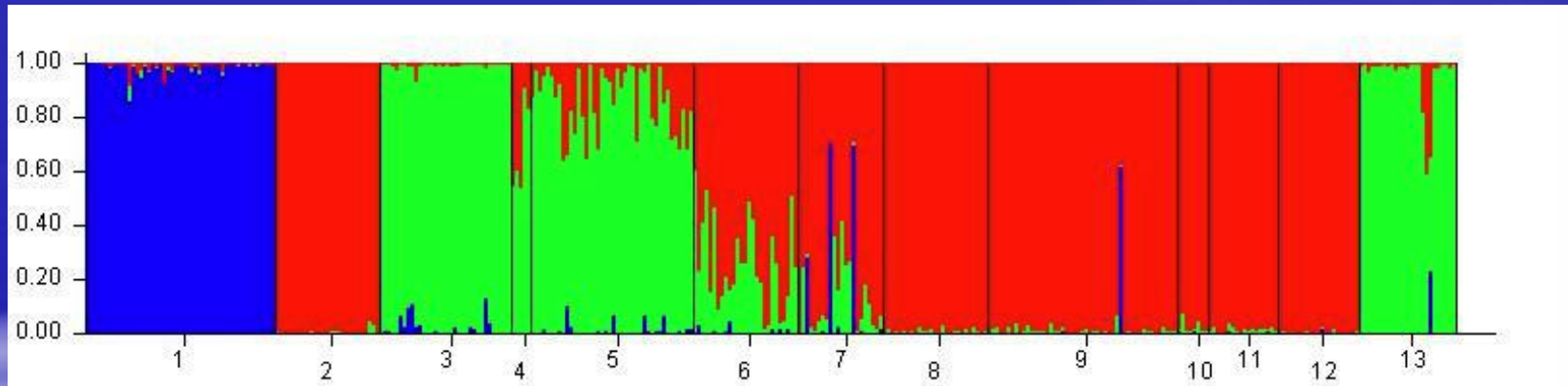
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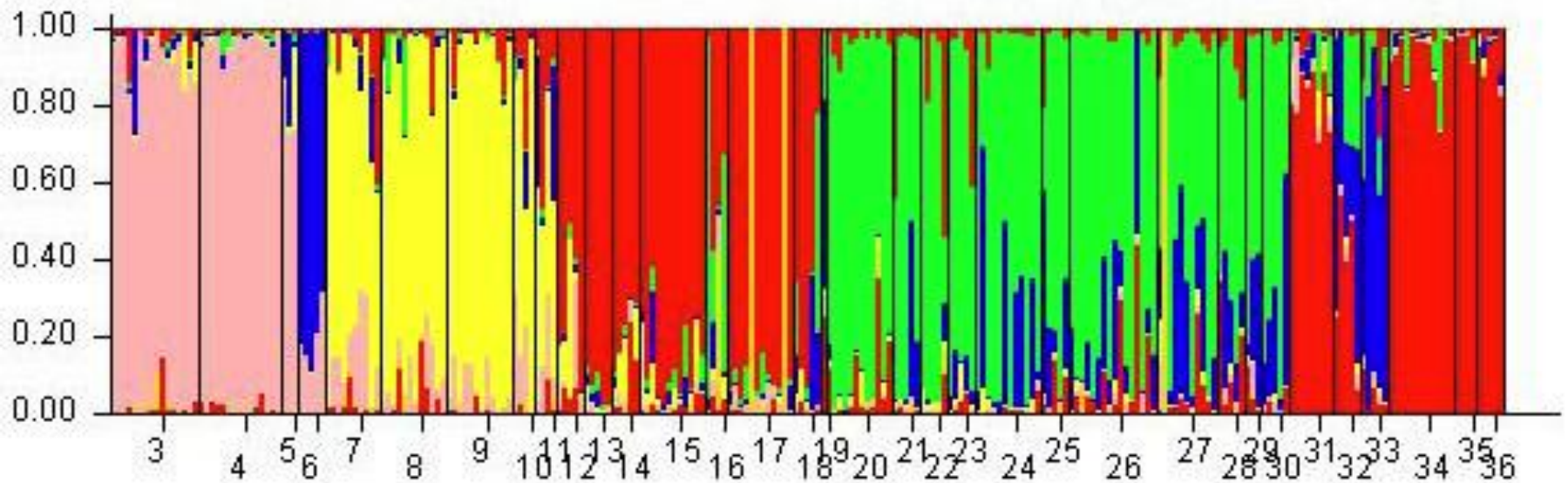
N. Eur.

S. Eur.

Baltic



# Country of Origin



Kola

N Norway

S Norway

Scotland

Ireland

France/Spain



# Results to date

- 660 marine samples analysed to date preliminary assignments,
- Assigned 237 fish to country of origin and 118 to river of origin.
- Baseline samples
- Super Computer 20 channels 72 hours
- Genetic analysis of ~2700 archival and 1800 contemporary marine samples is in progress

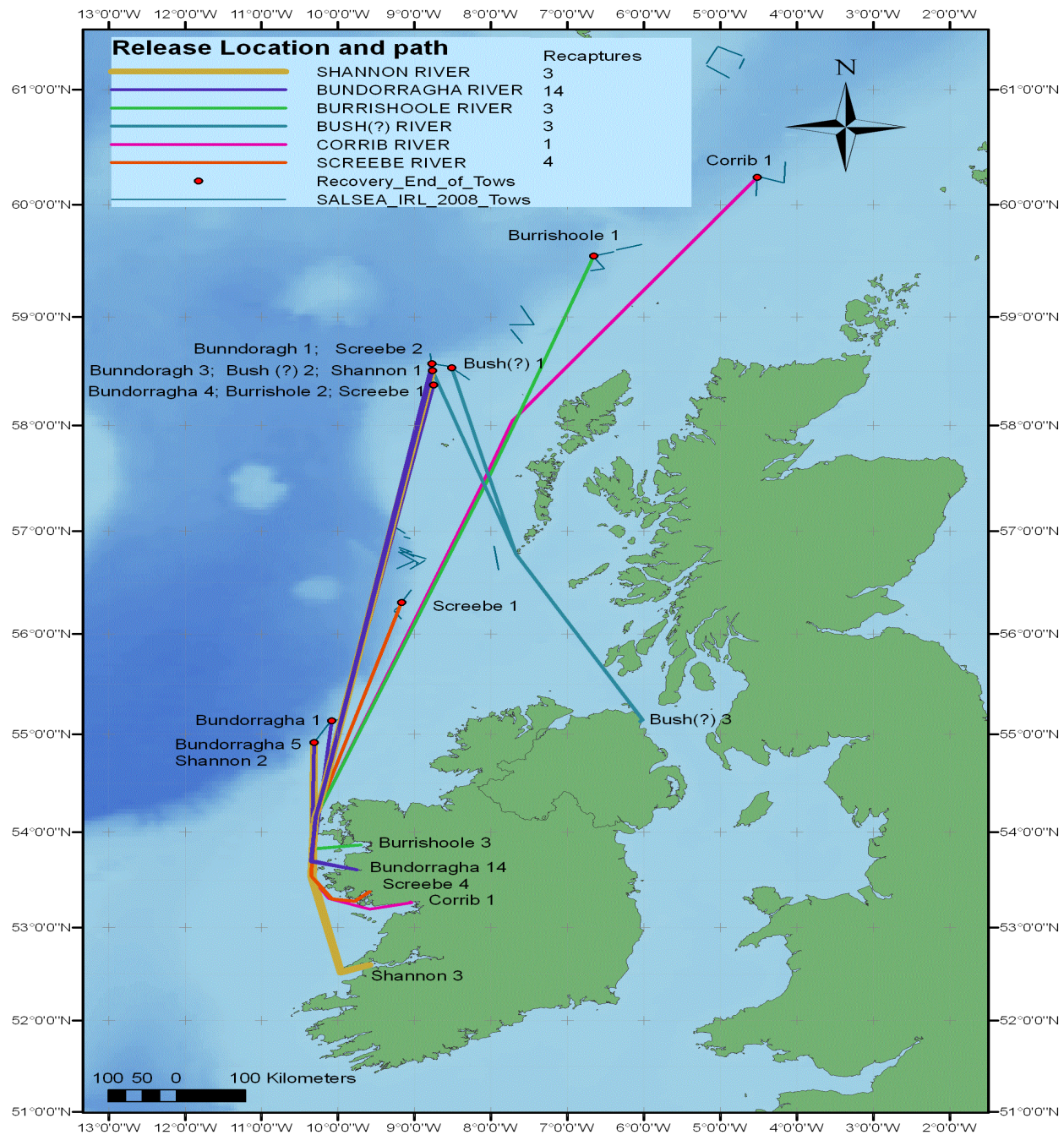
# Genetic Database

- An integrated electronic database for storage of existing and new genetic data on these markers has been developed, tested and validated
- Built in quality control procedures.
- It is capable of handling other marker data types (e.g. SNPs) so that it can still be used if the tool is upgraded using newly markers that can increase assignment resolution, accuracy and efficiency.

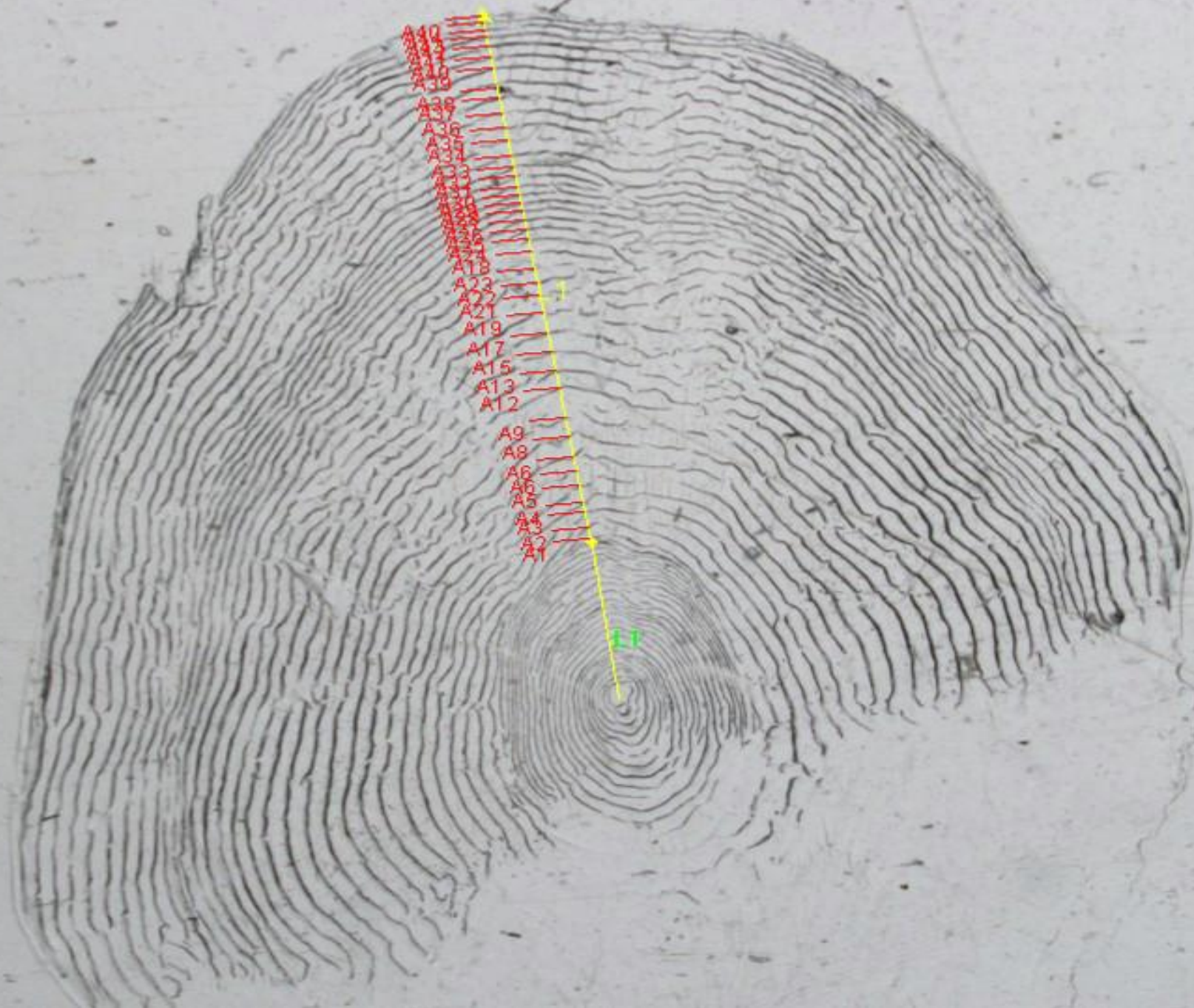


# CWT's

- Of particular value 39 CWT's
- Several countries of origin
- Estimation of migration speeds and routes from these countries.
- These high resolution migration data will form a very important input into the migration models







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# Biological sampling

- 3,000 of the 15,000 scale samples analysed.
- Growth and age analyses of all post-smolt scales from the 2008 expeditions completed
- Analyses of scales from the 2009 expeditions are in progress.
- Establishing a digital scale library is in progress.



# Biological sampling (cont.)

- 570 salmon stomachs
- 918 stomachs of other pelagic species (mainly mackerel) from the 2008 expeditions have so far been analysed.
- Analyses of stomachs from the 2009 expeditions are in progress.





# Merge workpackage

- The work to date has focused on developing and testing the hydrographic particle tracking model which will be used for simulating and studying the dynamics of post-smolt migrations in the North-East Atlantic.
- New working group has now embarked on integrating the various components of the programme

# Additional Material

- Isotopes
- Lipids
- Plankton
- Disease and parasites
- Cataracts
- Otoliths
- Chlorophyll
- Nutrients



# Thanks

- Thanks- Dr Lars Petter Hansen for his excellent work over past four years as Chairman of the SAG.
- Wish all the best to Dr Tim Sheehan who will take over the role