

**APPLICATION FOR THE CONSENT TO CONDUCT MARINE SCIENTIFIC
RESEARCH IN AREAS UNDER NATIONAL JURISDICTION OF THE UNITED
KINGDOM**

Date:

1. General information

1.1 Cruise name and/or number: Salsea Survey/CV0910

1.2 Sponsoring institution:

Name: Marine Institute

Address: Rinville
Oranmore
Co. Galway
Ireland

Name of Chief Executive: Dr. Peter Heffernan

1.3 Scientist in charge of the project:

Name: Niall O'Maoileidigh

Address: Marine Institute
Furnace
Newport
Co. Mayo

Telephone: +353 98 42300

Telefax:

1.4 Scientist(s) from UNITED KINGDOM involved in the planning of the project

Name(s): Dr. Richard Shelton

Address: Research Director, Atlantic Salmon Trust King James the VI Business Centre,
Friarton Road, Perth, PH2 8DG

Name(s): Dr. Eric Verspoor

Address: Fisheries Research Services, Pitlochry, Scotland, UK

1.5 Submitting officer:

Name and address: Carol Maloney

Rinville
Oranmore
Co. Galway

Country: Ireland

Telephone: 00 353 91 387200

Telefax: 00 353 91 387201

2. Description of project (Attach additional pages as necessary)

2.1 Nature of objectives of the project:

An increasing proportion of salmon are dying at sea and the reasons are as yet unknown. In some southern rivers, on both sides of the North Atlantic, wild salmon now face extinction. Arguably the greatest challenge in Atlantic salmon conservation science is to gain insight into the spatial and ecological use of the marine environment by different regional and river stocks, which are known to show variation in marine growth, condition, and survival. Different stocks may be predisposed to use different marine zones whose environmental conditions will potentially vary independently, differentially affecting growth, condition and survival. To date it has been impossible to identify the origin of sufficient numbers of wild salmon to enable this question to be addressed. This programme, which is funded under the EU 7th Framework, will provide the basis for advancing our understanding of oceanic-scale, ecological and ecosystem processes needed for implementing, in the future, sustainable management of this key marine species. SALSEA-Merge, a targeted collaborative research project on the marine ecology of the Atlantic salmon, SALSEA-Merge, through a partnership of 10 European nations, will deliver innovation in the areas of: genetic stock identification techniques, new genetic marker development, fine scale estimates of growth on a weekly and monthly basis, the use of novel high seas pelagic trawling technology, individual stock linked estimates of food and feeding patterns, the use of the three-dimensional Regional Ocean Modelling System, to deliver novel stock specific migration and distribution models merging hydrography, oceanographic, genetic and ecological data.

The overall objective of SALSEA-Merge is, by merging genetic and ecological investigations, to advance understanding of stock specific migration and distribution patterns and overall ecology of the marine life of Atlantic salmon and gain an insight into the factors, resulting in recent significant increases in marine mortality.

The information gained will be essential for the identification of areas critical to the species life cycle and needed for the designation of marine protected areas, the regulation of large pelagic fisheries to avoid mortality from by-catches, the regulation of fisheries for key prey species such as sandeel, herring and blue whiting the targeted regulation of inshore commercial salmon fisheries, and to maximise natural sustainable freshwater production.

Recent evidence shows strong regional and local structuring of Atlantic salmon stocks in Europe and North America which indicates that it will be possible to develop a stock identification methodology for Atlantic salmon, as has been done successfully for Pacific salmonids (Beacham et al., 2006). With recent developments in molecular marker identification and screening technology, it is now possible to develop accurate diagnostic and cost effective methods for identifying the origin or proportional contributions of individual stocks from congregations of salmon, sampled at sea.

The scientific and technical objectives of SALSEA-Merge focus on elucidating, at a regional and population specific level, the distribution and migration patterns during the marine phase of the salmon's life cycle. The results, which will be obtained, represent essential understanding for the effective formulation of mitigation policies to guide the rational future management of individual salmon populations. This is critical with regard to the potential impacts of a rapidly changing marine environment, particularly with regards to climate change.

2.2 Relevant previous or future research cruises:

Post smolt surveys were pioneered in the North east Atlantic by the Institute of Marine Research, Bergen and the Fisheries Research Services, Scotland throughout the 1990s and into the new millennium. In May 2007 a similar but preliminary project was carried out the results and details of which were presented by the European Union to the North Atlantic Salmon Conservation Organisation (O Maoláidigh et al, 2007).

Two research cruises were undertaken using Marine Institute research vessels in 2008. The first took place on board the Celtic Voyager (10th May 2007 to 15th May 2007) and the second on board the Celtic Explorer (16th May to the 25th May 2007)

In total, the Celtic Explorer took just over 350 post-smolts and a wide range of by-catch species including mackerel, herring (both species sub-sampled, measured and weighed with total weight of catch recorded – see figure 3), lumpfish, snake pipefish, garfish, and single specimens of sea trout, gurnard and sea lamprey. Towing speeds on board the Celtic Voyager ranged from 3.2 to 3.8 knots. All trawling was carried out in daylight hours.

Between the Celtic Voyager and the Celtic Explorer in 2008, therefore there were over 426 post-smolts taken for further scientific investigation. Also, with the inclusion of 72 post-smolts taken in pre-SALSEA Merge experimental trawling on board the Celtic Voyager in May 2007, this brings the total post-smolts sample by the Irish vessels to 498.

Data relating to water temperatures, depth and salinity have also been recorded using vessel underway data collection and CTD (see Figure 4 for preliminary output on surface salinity and temperatures during the Celtic Explorer cruise). In addition, samples of plankton were taken at seven stations where smolts were encountered on board the Celtic Explorer. Samples for disease and parasites were preserved for pathological investigations during both Celtic Voyager and Celtic Explorer research cruises.

This project is part of a larger international project and following the completion of the Celtic Explorers expedition, ships from Faroes and Norway continued the investigations in the Norwegian sea and further north in the Barents sea. Simultaneously, a North American expedition was carried out in the Labrador sea by colleagues from USA and Canada.

2.3 Previously published research data relating to the project:

Holm, M., Holst, J. C., and Hansen, L. P. 1996. Sampling Atlantic salmon in the NE Atlantic during summer: Methods of capture and distribution of catches. ICES CM 1996/M:12, 7 pp.

Holm, M., Holst J. C., and Hansen, L. P. 2000. Spatial and temporal distribution of post-smolts of Atlantic salmon (*Salmo salar* L.) in the Norwegian Sea and adjacent areas. *ICES Journal of Marine Science*, 57: 955-964.

Holm, M., Hansen, L. P., Holst, J. C., and Jacobsen, J. A. 2004. Atlantic salmon, *Salmo salar* L. In *The Norwegian Sea Ecosystem*, pp 315-356. Ed. by H.R. Skjoldal. Tapiracademic Press, Trondheim. 559 pp.

Holm, M., Holst, J. C., Hansen, L. P., Jacobsen, J. A., Ó Maoiléidigh, N., and Moore, A. 2003. Migration and distribution of Atlantic salmon post-smolts in the North Sea and North East Atlantic. pp. 7–23. In *Salmon at the edge*. Ed. by D. Mills. Blackwell Science Ltd., Oxford. 307 pp.

Holst, J. C. and McDonald, A. 2000. FISH-LIFT: A device for sampling live fish with trawls. *Fisheries Research*, 48: 87-91.

- Holst, J. C., Hansen, L. P., and Holm, M. 1996. Observations of abundance, stock composition, body size and food of postsmolts of Atlantic salmon in the NE Atlantic during summer. ICES CM/1996M:4, 15 pp.
- Holst, J. C., Shelton, R., Holm, M., and Hansen L. P. 2000. Distribution and possible migration routes of post-smolt Atlantic salmon in the North-east Atlantic. *In* The ocean life of salmon. Environmental and biological factors influencing survival, p. 65-74. Ed. by D. Mills. Fishing News Books, Blackwell Science Ltd., Oxford. 228 pp.
- Jacobsen, J. A., Lund, R., Hansen, L. P., and O'Maoileidigh, N. 2001. Seasonal differences in the origin of Atlantic salmon (*Salmo salar* L.) in the Norwegian Sea based on estimates from age structures and tag recaptures. *Fisheries Research*, 52: 169-177.
- Ó Maoiléidigh N., Whelan K., Gargan P., Bunn R., Bond N. 2007. Information from the EU on Irish experimental post-smolt cruise – May 07 - Marine Institute/Atlantic Salmon Trust Post-Smolt Experimental Research Cruise - May 2007. North Atlantic Salmon Conservation Organisation (NASCO) CNL(07)35 Edinburgh.
- Shelton, R. G. J., Turrell, W. R., MacDonald, A., McLaren, I. S., and Nicoll, N. T. 1997. Records of post-smolt Atlantic salmon, *Salmo salar* L., in the Faroe-Shetland Channel in June 1996. *Fisheries Research*, 31: 159–162.
- Shelton, R. G. J., Holst, J. C., Turrell, W. R., MacLean, J. C., and MacLaren, I. S. 2000. Young salmon at sea. *In* Managing wild Atlantic salmon. New challenges - new techniques, p.12-23. Ed. by F. G. Whoriskey and K. F. Whelan, 5th Atlantic salmon symposium. 244 pp.

3. Methods and means to be used

3.1 Particulars of vessel

Name: R.V. Celtic Voyager
Nationality: Irish
Owner: Marine Institute

Overall length: 31.5m
Maximum draught: 4m
Net tonnage: 340T
Propulsion: Wärtsilä UD25M5 (626 kW),
Cruising speed: 8kn
Call sign: EIQN
Method and capability of communication – GMDSS A class, E-mail. Mini M SAT C and GSM
Name of master: Denis Rowan/Fergus O Hehir
Number of crew: 5
Number of scientists on board: 5

3.2 Aircraft or other craft to be used in the project: N/A

3.3 Particulars of methods and scientific instruments

Types of samples and data	Methods to be used	Instruments to be used
Post smolts and other pelagic fish	Surface trawling	Purpose designed trawl for capture of post smolt salmon
Water column characterisation	Conductivity/temperature/ depth measurements (CTD)	Seabird sbe 911 CTD system
Plankton samples	Vertical plankton net tows	Hydrobios plankton net or similiar
Current profiler	ADCP analysis	ADCP

3.4 Indicate whether harmful substances will be used:

no

3.5 Indicate whether drilling will be carried out:

no

3.6 Indicate whether explosives will be used

no

4. Installations and equipment

Details of installations and equipment (dates of laying, servicing, recovery, exact locations and depth):

5. Geographical areas

5.1 Indicate geographical areas in which the project is to be conducted (with reference in latitude and longitude):

Voyager start (approx.) 54° 29' N , 10° 48' W

Voyager finish (approx.) 59° 11' N, 8° 28' W

5.2 Attach chart(s) at an appropriate scale showing the geographical areas of the intended work and, as far as practicable, the positions of intended stations, the tracks of survey lines, and the locations of installations and equipment.

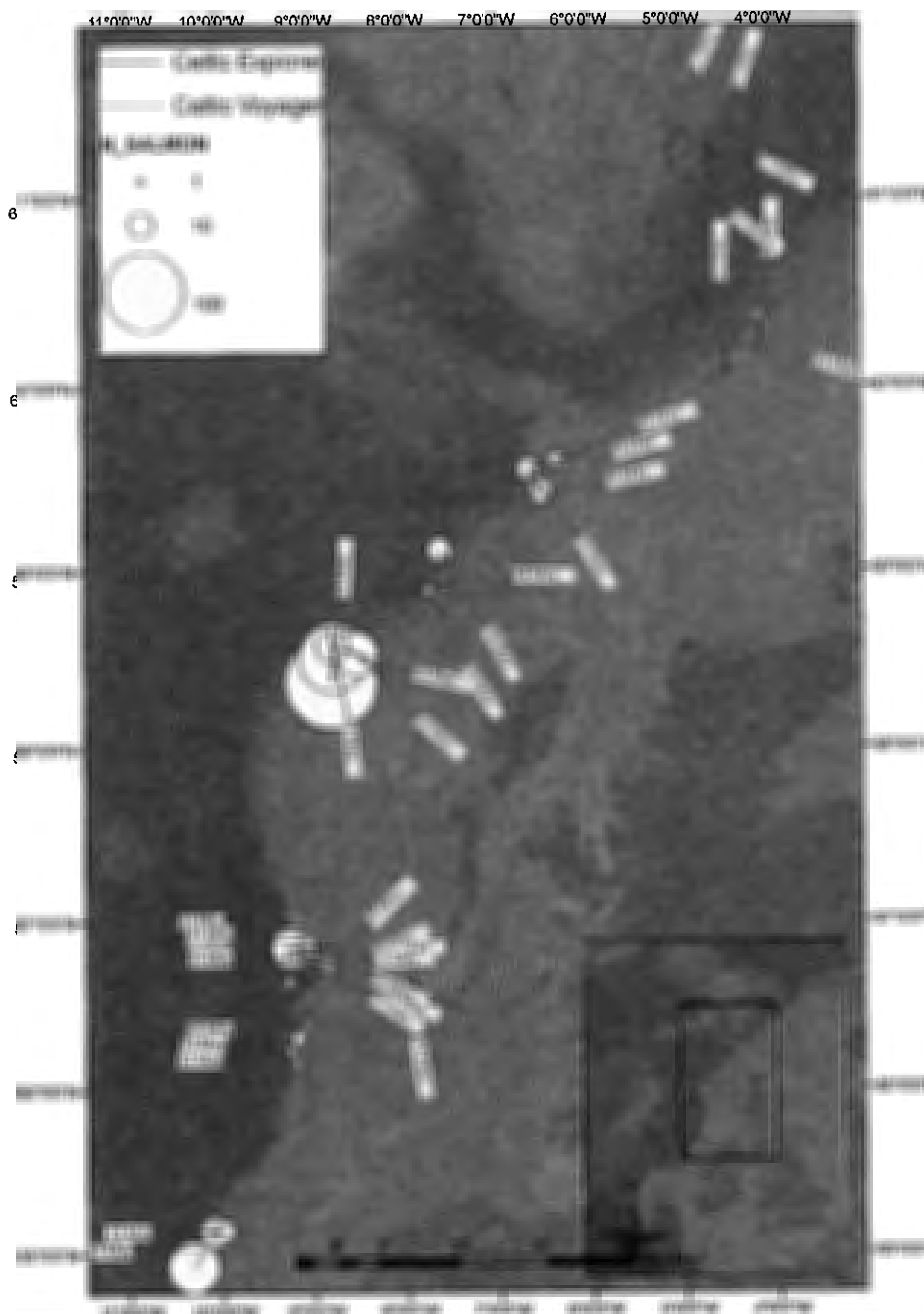


Figure 1 This project is largely exploratory in its attempts to locate the position of ocean migrating Atlantic salmon post-smolts. Above are the indicative trawl tracks and locations for the Celtic Voyager and the Celtic Explorer in 2008 with relative numbers of post-smolts taken indicated. In 2009 dates will be from the 8th May to the 12th May for the Celtic Voyager and 23rd June to the 2nd July for the Celtic Explorer. The later locations will be more northerly than in 2008 (see lats and longs attached above).

6. Dates

6.1 Expected dates of first entry into final departure from research area of the research vessel:

First entry: 8th May 2009

Final departure: 12th May 2009

6.2 Indicate if multiple entry is expected:

Yes but will depend on the presence or absence of Atlantic salmon post smolts.

7. Port calls

7.1 Dates and names of intended ports of calls in UNITED KINGDOM:

7.2 Any special logistical at ports of call:

7.3 Names/ Address / Telephone of shipping agent (if available)

P&O Maritime

8. Participation

8.1 Extent to which UNITED KINGDOM will be enabled to participate to in the project:
United Kingdom are full partners in the FP7 EU funded SALSEA Merge project. All information generated is shared by all of the partners in the project. Scientists from the cross boarder Ireland/UK Loughs Agency will participate in the experimental trawling on board each vessel.

8.2 Proposed dates and ports for embarkation / disembarkation:

8th May 2009 – Embark Killybegs, Donegal, Ireland

12th May 2009 – Disembark Killybegs, Donegal, Ireland

9. Access to data, samples and research results

9.1 Expected dates of submission to UNITED KINGDOM preliminary reports which should include the expected dates of submission of the final results:

The UK is a full partner in the EU Funded SALSEA Merge project (FRS, Scotland and the Atlantic Salmon Trust) and will be fully involved in the analysis and interpretation/publication of final scientific papers and reports. Preliminary cruise report and initial results were presented to the North Atlantic Salmon Conservation Organisation (NASCO) in June 2008. The UK is a member state of this international treaty organisation.

9.2 Proposed means for access by UNITED KINGDOM to data and samples:

UK is a full partner in the SALSEA Merge EU Funded programme and is entitled to progress all reports and publications arising from this project. All samples for genetics will be processed in association with the Freshwater Fisheries Laboratory, Pitlochry (Dr. E. Verspoor) who are the project leaders for this area of the project.

In addition, an invitation has been proffered to CEFAS scientific/technical staff to participate in survey through Mr. Ted Potter, Director, CEFAS, Lowestoft.

9.3 Proposed means to provide UNITED KINGDOM with assessment of data, samples and research results or provide assistance in their assessment or interpretation:

UK is a full partner in the SALSEA Merge EU Funded project. See above.

9.4 Proposed means of making research results internationally available:

UK is a full partner in the SALSEA Merge EU Funded project. See above

10. Scientific Equipment

**COMPLETE THE FOLLOWING TABLE-
SEPARATE PAGE FOR EACH COSTAL STATE:**

INDICATE YES OR NO

LIST SCIENTIFIC WORK BY FUNCTION				DISTANCE FROM COAST		
				Within 12nms	Between 12-200nms	(Continental shelf work only) Beyond 200nm but within the continental margin
TRAWLING ECHO SOUNDING WATER SAMPLING ECHO SOUNDING WATER SAMPLING	Water column includin g sedimen t samplin g of the Seabed YES	Fisher ies researc h within fishing limits YES	Research concerni ng the natural resource s of the continen tal shelf or its physical character istics NO			

WATER SAMPLING	YES VIA CTD PROFILE R	YES	NO	YES	YES	<u>no</u>
PROFILING INSTRUMENTS	Ctd SBE911	YES	NO	YES	YES	<u>no</u>
TRAWLING		YES	NO	YES	YES	<u>no</u>

Patricia Mulony

(On behalf of the Principle Scientist)

Dated 12/3/04