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Report of the International Bottom Trawl Survey Working Group (IBTSWG)

27–30 March 2012

Lorient, France



ICES

International Council for
the Exploration of the Sea

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Executive summary

The International Bottom Trawl Working Group (IBTSWG) met in Lorient, France, from 27–30 March 2012. There were 21 participants from 12 countries, all of whom are involved in designing and conducting bottom trawl surveys, and one participant representing the ICES Secretariat.

All terms of reference have been met, details are given in relevant sections (see table of contents). Major developments, achievements and recommendations from the 2012 meeting are given below:

Section 3 is dedicated to reviewing the recommendations of the previous year, split into two sections: follow up of recommendations from IBTSWG in 2011; and secondly to answer recommendations for IBTSWG from other EGs.

Individual surveys coordinated by IBTSWG are presented using the standard reporting format that summarizes the surveys design and coverage as well as aggregated results and samples collected for the target species, including summary tables that report samples collected under the DCF (Data Collection Framework). Section 4 and the summary tables provide a centralized and accessible overview of specific survey datasets for those using the data. Also this year IBTS first has provided the first combined index within the Western and southern areas, using Irish groundfish survey and French EVHOE survey data to produce a combined index for cod and haddock on the Celtic Sea area (ICES Division VIIjgh). These indices have been evaluated and accepted by the ICES benchmark process. Maps showing the distribution of the main target species over the entire IBTS coordinated area are presented as combined results for all surveys (see Section 4.4 and Annex 6).

Section 5 deals with the effect of sweep length on net geometry and provides a comparison of net geometry results for GOV gears from different vessels highlighting that differences with the manual expected geometry are produced independently of sweep length. This stresses the recommendation in the manual: 'gear net geometry, consistent between countries and year' should be the first aim and the warp/depth ratio should adjusted consequently during the survey'. Results of paired hauls carried out by Marine Scotland Science will be published in the latter half of 2012 and will be made available for discussion to North Sea Survey participants and coordinators before NSIBTS Q1 2013 surveys.

Section 6 about sensitivity of abundance indices looks at two approaches to essentially the same issue – variability of survey indices due to planned or un-planned changes in survey sampling or design. A forced change of vessel for the Swedish survey is used to illustrate the measurable change in sampling unit that can occur with an evolving survey, as well as predict possible scale of impact on the indices going forward. Conversely, a recommendation from WGWIDE to evaluate the potential for an IBTS Horse Mackerel Index for the North Sea is used as an example of taking a historically noisy index and seeing if it can be improved in retrospect using available survey information.

Section 7 deals with quality of the data stored in DATRAS, pointing out some problems detected in relation to DATRAS download products and with the data uploaded in the last year. Problems found resulted in a recommendation to close the download option of some products in DATRAS, and highlights once again the necessity of

checking products and algorithms used both when uploading data and when calculating the products. A course of action is proposed to solve these problems.

Section 8 deals with the updates of IBTS manuals (North Sea and Eastern areas) together with the MIK manual, new editions of the current versions will be issued online in the ICES website, with an ISSN assignment and consecutive numbering under this new system. A short summary of the updates to be issued is also presented.

Section 9 addresses the use of IBTS data in the Marine Strategy Framework Directive including again coverage and issues with sampling marine litter within IBTSurveys, an update from WGISUR last meeting and possibilities to build Ecosystem surveys from IBTSurveys.

Finally Section 10 presents the views of the group on the proposal for multi-annual ToRs and the implications of how it can be implemented in the case of the IBTSWG.

1 Opening of the meeting

1.1 Terms of reference

The International Bottom Trawl Survey Working Group (IBTSWG), chaired by Francisco Velasco, Spain will meet in Lorient, France, 27–30 March 2012 to:

- a) Coordinate report and plan for the next twelve months North Sea and Northeastern Atlantic surveys, including appropriate field sampling in accordance to the EU Data Collection Framework;
- b) Evaluate the effects of sweeps length on net geometry;
- c) Evaluate the sensitivity of abundance indices, and recommend approaches for alleviating gaps or taking account of vessel changes in coordinated surveys;
- d) Address DATRAS related topics including DUAP: data quality in relation to DATRAS data-checks and the use of WoRMS species codes and the progress in re-uploading corrected datasets. Prioritize further developments DATRAS;
- e) Review IBTS manuals and consider additional updates and improvements in survey design and standardization;
- f) Review the uses of IBTS as an Ecosystem Approach Fishery Management Oriented Survey and in relation with MSFD and provide written feedback to WGISUR and SSGESST.

A complete list of participants that attended the group is presented in Annex 1.

1.2 Adoption of the agenda

A first draft of the agenda was circulated to the participants on 12 March, a second draft was sent on 24 March and is presented in Annex 2 including the recommendations presented to IBTS from other groups and grouped by their relation with 2011 ToRs.

While a lot of the issues related with DATRAS and gears and calibrations were discussed on plenary, some of the discussions were dealt in subgroups and summaries of these discussions were then presented in plenary, the main subgroups were:

- MIK and ichthyoplankton

- Coordination within NS and Western and Southern surveys.
- Manuals for North Sea, Western and Southern surveys.

2 Introduction

The International Bottom Trawl Survey Working Group (IBTSWG) has its origins in the North Sea, the Skagerrak and the Kattegat where coordinated surveys have occurred since 1965. Initially these surveys only took place during the first quarter of the year, but between 1991 and 1996 coordinated surveys took place in all four quarters. Pressure on ship time caused the number of surveys to be reduced and currently coordinated surveys in the North Sea are only undertaken in the first and third quarters.

In 1994 the IBTSWG assumed responsibility for coordinating western and southern division surveys. Initially progress in standardization was slow due to the more heterogeneous nature of the survey area and target species in the west and array of survey operations as a result. Although western surveys largely continue to produce independent indices, these have benefit from much review work both within and between surveys in the area. Whereas centralized data exchange etc. is not at the level of that enjoyed in the North Sea, there is nevertheless excellent cooperation between the participating institutes.

In recent years, the IBTSWG has focused on improving the quality of the data collected in the surveys (including trawl, vessel, environmental, and catch parameters), as well as their availability by storing them in the common database at ICES headquarters, DATRAS (Database for TRAWL Surveys). The IBTSWG aims to make all data collected during IBTSurveys publicly available through this database. At the same time, public accessibility to the data makes it even more important to ensure the accuracy of the data stored and to document their usefulness and limitations. Apart from continuing the detection and correction of errors from data uploaded this year, and discussing a protocol to solve some problems arising with corrections, such protocols have been an important issue during the group.

Standardization of trawling protocols and net geometry are issues that have been discussed as well as comparing the actual values of net opening and door spread seen by the German, Danish, Scottish and Swedish vessels. The importance of maintaining the overall net geometry using net monitoring sensors in real-time is highlighted by the results presented in Section 5. This same aim is the reason for new additions to the IBTS Manuals that will be published intersessionally, independent from annual the report, with a reference system that will help the documentation and standardization of the IBTS protocols.

Finally a revision of the contribution of the IBTS to MSFD descriptors, specifically of descriptor 10, marine litter, and the implications and possibilities of transforming the IBTS into an ecosystem approach survey, are discussed with two examples of bottom trawl surveys that seek a wider sampling scope.

3 Review of IBTSWG 2011 Recommendations

3.1 Recommendations from IBTSWG 2011

3.1.1 CGFS indices

The work on the indices and the results obtained from the CGFS survey has not provided additional information on how to improve the results and coherency of the indices of this survey with either of the neighbour surveys, namely the North Sea survey or surveys in the western area. Nevertheless, France is proposing the establishment of a new survey (see Sections 4.3.1, 9.3.1 and WD: 3 in Annex 5) that would cover the western part of the English Channel and could provide further information on the stocks inhabiting the area and the movements to and from the North Sea. The English Channel (ICES Area VIIId) is an important area for spawning and also sees significant migration and exchange between stocks. Following inclusion of tagging and other datasets at the ICES Benchmark Workshop on Flatfish (ICES 2010) it was suggested that 10–15% of the plaice landings in quarter 1 should be allocated to VIIe while 50–60% should be allocated to the North Sea. This level of stock migration in any area is likely to confound the consistency of any indices when taken in isolation. However, work done such as that at the benchmark shows that additional information can be used to improve the information coming from this important area. Any surveys in this, or similar transition areas, should prioritize addressing complex stock structure/mixing as part of their survey protocols. This should be presented to and discussed with both relevant the survey coordination group and the expert group(s) identified as being the primary end-user.

3.1.2 Staff exchange

One exchange of staff was carried out during 2011 IBTSNS Q3, information on this exchange is presented in Section 4.2.6.2. At least one staff exchange is also expected to occur during 2012 Q3 North Sea surveys. The group supports the purposes and utility of these exercises that are strongly recommended as a valuable manner to standardize and improve experiences for the staff and the institutes involved.

3.1.3 Upload *Pomatoschistus* in genus level

Most of the *Pomatoschistus* records were uploaded at genus level although a few cases still have been detected highlighting the importance of the quality checks performed by the group (see Section 7.4) to improve the quality of the information stored in DATRAS.

3.1.4 Tool-box talks to prepare scientific staff

This practice is a common use in most of the surveys within the IBTS, though the way they are carried out varies depending on the frequency of the surveys performed by the different institutes and the changes in the scientific crews participating in those surveys.

3.1.5 Collection of marine litter data

Marine litter has been collected in most of the surveys during 2011 and North Sea IBTS Q1 (see Section 9.1).

3.1.6 Upload of complete HH haul and weather parameters on DATRAS

Although there has been an improvement in the quality of the data uploaded in DATRAS regarding haul and weather parameters, being Section 5 a result of this fulfilment, still the problems to obtain the full equipment for some institutes, and the problems to re-upload old datasets are hindering a more complete dataset and enhancing the quality controls permitted by the net monitoring.

3.2 Recommendations to IBTSWG 2011

3.2.1 Request from SGSIPS '3.To conduct a winter spawning habitat survey covering the whole North Sea in 2013':

The request was for the sampling of eggs during the 2013 IBTS survey. SGSIPS recognized that the addition of sampling to the current IBTS could create problems with the time allocations for the tasks currently undertaken. As such SGSIPS looked at the possibility of adding small (20 cm diameter) rings with 333µm mesh nets for collecting eggs at the same time as the standard MIK deployments. Trials were undertaken during the 2012 IBTS by Norway, Denmark, The Netherlands and France. The nets were all made by one manufacturer and to a specific design. Each country made their own rings and attached them on to the frames to suit the configuration of their vessel. The preliminary results indicate that the flow rates are acceptable, eggs are captured as are small larvae on occasions, there does not appear to be any effect on the catchability of herring larvae in the standard MIK and the on deck processing of the small mesh samples did not add significantly to the sampling process. A full report will be submitted to SGSIPS in May 2012 and made available to the IBTSWG.

3.2.2 Quality of the IBTS data for sprat in quarters 1 and 3

The HAWG asked the IBTSWG to investigate the quality of the IBTS data for sprat in quarters 1 and 3. The IBTSWG looked into the sprat sampling in quarters 1 and 3 for the years 2000 to 2010. Table 3.2.2.1 provide the numbers of otoliths collected per sampling area per quarter and per year, and the overall resulting ALK's for both quarters (all years combined Table 3.2.2.2 for Q1 and Table 3.2.2.2 for Q1)

The numbers of otoliths collected per year and per quarter are generally quite high, resulting in detailed results. For some areas and for some years numbers may be too low (highlighted in the Table 3.2.2.1), but it should be realized that the number of sprat caught in these areas may be rather small.

Table 3.2.2.3. Age Length Key for sprat in the North Sea, Skagerrak and Kattegat in quarter 3, for the years 2000 – 2010 combined. Outliers are highlighted.

Year	(All)										
Quarter	3										
Area	(All)										
		age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8	age 9	age 10
25											
30											
35											
40											
45			1	3	1						
50											
55											
60											
65											
70	5										
75	40										
80	117	1									
85	297										
90	483	8									
95	679	24									
100	898	87	1								
105	1111	169	5								
110	1216	335	14	2							
115	1213	501	34	1							
120	1065	756	82	5							
125	681	1060	164	11	1						
130	264	1195	267	24	5						
135	99	1006	397	32	7	4					
140	18	614	420	106	12	5	1	1			
145	5	201	353	110	33	12					
150		49	193	122	52	14	1	1			
155		10	61	67	49	10	3	1			
160		1	12	9	16	4	4	1			
165			1	3	6	3					
170					1	1		1			
175											
180											
185					1						

3.2.3 WGCEPH: cephalopods length frequency by species

As mentioned in IBTSWG 2011 (ICES, 2011) report, cephalopod length frequency data has been collected by species since 2009. The data are stored in DATRAS from where they are accessible, although some countries from the Western and Southern areas are still being set up for submission to DATRAS.

3.2.4 WGEF: provision of data for analysis

WGEF recommends that IBTSWG provide catch data for analysis, particularly information that is not available from DATRAS. These data should include the numbers-at-length of the main elasmobranchs, by species, by haul, and by sex (where available), along with haul positions, including zero-catch hauls. The data required are provided through DATRAS and working documents presented yearly to the group.

3.2.5 WKCOD: generate new IBTS Q1 survey, including coastal squares in the south and squares to the west of Shetland

Cod extended indices calculation procedure is part of the standard species calculations performed within DATRAS (see Section 7.1), but given that requests to calculate

different “extended” indices are frequent, and that this data request demands quality checking to ensure that indices are estimated with sufficient coverage in all the ICES squares. It has been decided that the index will be provided by e-mail request but not automatically on DATRAS download page.

3.2.6 WKCOD and WGNSSK recommended the establishment of a Working Group on improving the use of survey data for assessment

This recommendation was also supported by IBTSWG that recommended IBTS members to participate in the newly established WGISDAA, the group finally met in January 2012 and was attended by two members of the IBTSWG; an update of the work undertaken at the group was presented during meeting, since the WGISDAA report was not available yet. Part of the recommendations posed to IBTSWG are considered to be more adequate to be dealt with in the WGISDAA since some recommendations deal with subjects and stocks clearly related with the ToRs of the new group.

3.2.7 WGWIDE Availability of IBTS North Sea data and indices for Horse mackerel

North Sea horse mackerel: The provision of advice for the North Sea horse mackerel stock is hampered by the availability of a suitable abundance index. WGWIDE requests that an evaluation of the suitability of North Sea IBTS in the third quarter as an index of abundance for horse mackerel is included in the IBTS group ToRs.

This recommendation was considered appropriate to be discussed within the aims and the objectives of ToR c) as a good case study to review the sensitivity of survey indices, specifically in this case the potential to improve precision using additional survey information. Therefore it has been addressed in Section 6.

3.3 References

- ICES. 2011. Report of the International Bottom Trawl Survey Working Group (IBTSWG). ICES CM 2011/SSGESST:06. 237 pp.
- ICES. 2010. Report of the Benchmark Workshop on Flat-fish (WKFLAT). ICES CM 2010/ACOM:37. 270 pp.

4 North Sea and Eastern Atlantic coordination (ToR a)

ToR a) Coordinate report and plan for the next twelve months North Sea and Northeastern Atlantic surveys, including appropriate field sampling in accordance to the EU Data Collection Framework;

4.1 Q1 North Sea Survey

4.1.1 General overview

The North Sea IBTS Q1 survey aims to collect data on the distribution, relative abundance and biological information on a range of fish species in ICES area IIIa, IV and VIIId. During daytime a bottom trawl is used. This is the GOV (Grand Ouverture Verticale), with groundgear A or B. A CTD was deployed at most trawl stations to collect temperature and salinity profiles. During night-time herring larvae are sampled with a MIK-net (Methot Isaac-Kidd). Age data were collected for cod, haddock,

whiting, saithe, Norway pout, herring, mackerel, and sprat, and a number of additional species (see information provided per country).

One of the vessels, Argos that traditionally has participated in the IBTS Q1 was not available in 2012, due to a major refit of the vessel. This part was taken over by a vessel, "Dana", of another country, due to which the Swedish survey was executed earlier as normal directly in the first week of January. There were some issues with the Norwegian vessel as well, due to which they started later in the season even though the full survey was executed in the first quarter.

The full fleet that participated in the quarter 1 survey in 2012 consisted of six vessels: "Dana" (Sweden+ Denmark), "G.O. Sars" (Norway), "Scotia" (Scotland), "Thalassa" (France), "Tridens II" (Netherlands) and "Walther Herwig III" (Germany). The survey covered the period 9 January to 14 March (see Table 4.1.1). In total, 379 GOV and 713 MIK hauls were carried out (see Figure 4.1.1 and 4.1.2). All rectangles were covered by at least 1 GOV haul and nearly all planned rectangles were covered by at least 1 MIK haul.

Table 4.1.1. Overview of the surveys performed during the North Sea IBTS Q1 survey in 2012.

country	ship	Dates
Denmark	Dana	26-1/ 11-2
France	Thalassa II	14-1/ 13-2
Germany	Walter Herwig	23-1/ 24-2
Netherlands	Tridens 2	23-1/ 24-2
Norway	G.O. Sars	15-2/ 14-3
Scotland	Scotia III	26-1/ 15-2
Sweden	Dana	9-1/ 22-1

y	E5	E6	E7	E8	E9	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	G0	G1	G2	G3
52																			
51				1	1	1	1	1											
50			1	2	2	1	2	1	1										
49			1	2	2	2	2	2	2										
48			2	2	2	3	1	2	2										
47		2	2	2	2	2	2	2	2										
46		2	2	2	2	2	2	2	2							3			
45	2	2	3	3	1	2	2	2	2	2					2	3	3		
44	2	2	2	2	2	2	2	2	2	2	2				3	3	5	3	
43				2	2	2	2	2	2	2	2	2	2	2			1	5	2
42			2	2	2	2	2	2	2	2	2	2	2					3	3
41			2	2	2	2	2	2	2	2	2	2	2				1	2	2
40				1	2	2	3	2	2	2	2	2	2						
39				2	2	3	3	2	2	3	2	2	2	1					
38					2	3	2	2	3	2	2	2	4	2					
37						3	2	2	2	3	3	2	3	2					
36						2	2	2	2	2	2	2	2						
35						2	2	3	2	2									
34							2	3	2	2									
33							2	2	3	2									
32							2	3	2										
31							3	2											
30						4	5												
29						2	3												
28						3													

Figure 4.1.1. Number of hauls per ICES-rectangle with GOV during the North Sea IBTS Q1 2012.

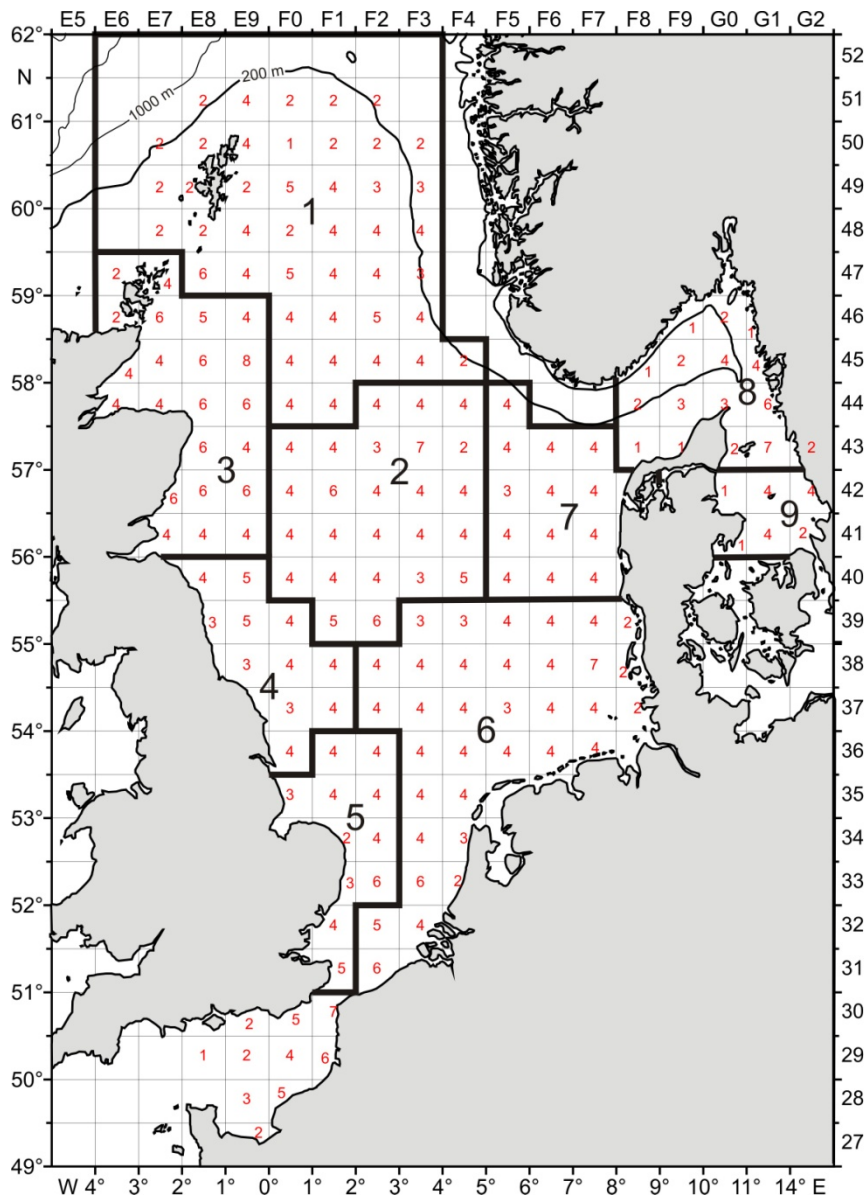


Figure 4.1.2 Number of hauls per ICES-rectangle with MIK during the North Sea IBTS Q1 2012.

4.1.2 Survey summaries by country

4.1.2.1 Denmark – North Sea Quarter 1 IBTS

Nation:	Denmark	Vessel	RV Dana
Survey:	02/12	Dates	26 January – 11 February 2012

Cruise	The IBTS North Sea Q1 survey aims to collect data on the distribution, relative abundance and biological information on a range of fish species in ICES area IIIa and IV. CTD was deployed at each trawl station to collect temperature and salinity profiles. Age and maturity data were collected for cod, haddock, whiting, saithe, Norway pout, hake, herring, mackerel, sprat, plaice, dab, lemon sole, turbot, brill and monkfish. Sampling for herring larvae is carried out during night-time
Gear details:	The bottom trawl used was the GOV 36/47 rigged with groundgear A (38 stations) or groundgear B (2 stations) and the Exocet kite. Herring larvae are sampled with a MIK-net (Midwater ringnet with a diameter of 2 mm).
Notes from survey (e.g. problems, additional work etc.):	The cruise plan was fulfilled as planned. SCANMAR data for net opening and door spread were received for all hauls. 5 additional MIK hauls were conducted for testing a small fine-meshed ringnet (designed for the collection of fish eggs) attached to the main MIK.
Number of fish species recorded and notes on any rare species or unusual catches:	About 65 species of fish and shellfish were recorded during the survey.

Table 4.1.2.1. Stations fished in the Danish participation in NS IBTS Q1.

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	GOV-A	40	37	0	1	100	
		GOV-B	0	2				
		MIK	80	78			98	

Table 4.1.2.1.2. Number of biological samples (maturity and age material).

Species	Age	Species	Age
<i>Clupea harengus</i>	715	<i>Scomber scombrus</i>	6
<i>Gadus morhua</i>	67	<i>Merluccius merluccius</i>	37
<i>Melanogrammus aeglefinus</i>	264	<i>Lophius piscatorius</i>	8
<i>Merlangius merlangus</i>	487	<i>Pleuronectes platessa</i>	545
<i>Pollachius virens</i>	32	<i>Limanda limanda</i>	127
<i>Sprattus sprattus</i>	478	<i>Scophthalmus maximus</i>	7
<i>Trisopterus esmarki</i>	91	<i>Scophthalmus rhombus</i>	2
<i>Microstomus kitt</i>	105		

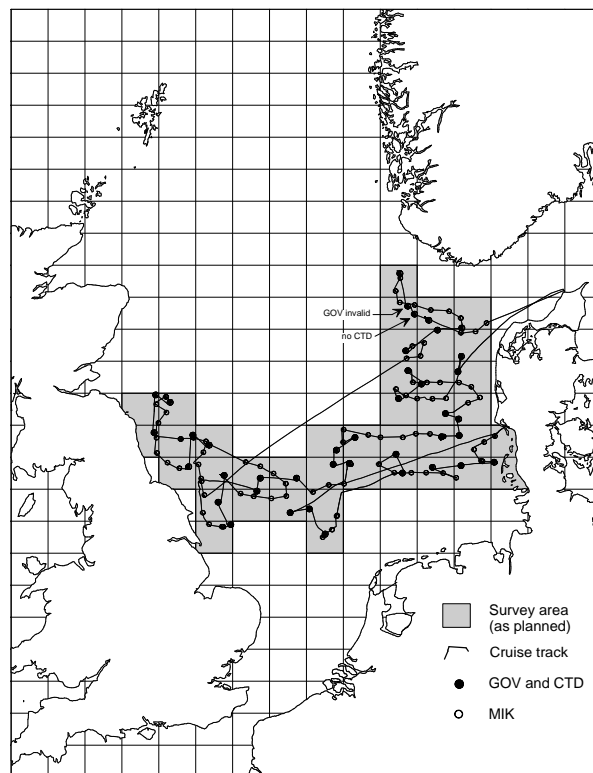


Figure 4.1.2.1.1. Cruise track of Dana during the Q1 IBTS 2012.

4.1.2.2 France – North Sea Quarter 1 IBTS (IBTS1Q – FRA)

Nation:	France	Vessel:	Thalassa
Survey:	IBTS12	Dates:	14 January – 13 February 2012

Cruise	Participation to the North Sea IBTS Q1 survey. France sampled the southern part of the North Sea and the Eastern English Channel. Sampling for herring larvae (MIK) were carried out during night-time. CTD was deployed at each trawl station and each MIK stations to collect temperature and salinity profiles. Age data were collected for the main species.
Gear details:	The gear used is the IBTS standard GOV 36/47 with groundgear A, Exocet kite and with Marport device. Door, wing (unavailable for some hauls) and vertical opening sensors. For larvae the standard MIK net is used.
Notes from survey (e.g. problems, additional work etc.):	<p>The Thalassa left Brest (France) the 14th of January. On the way, there were 12 GOVs and 11 MIKs in the Western Channel (Bay of Seine and off English coast). At each station, hydrological measurements were made.</p> <p>Then, the Eastern Channel (area 10) was covered first with 12 GOV hauls and 14 MIK stations.</p> <p>In the North Sea, 74 GOV hauls and 94 MIK stations were carried in the areas south of 56°30N. At each trawl and MIK net station, a CTD was deployed (209 for the whole survey)</p> <p>Additional works :</p> <ul style="list-style-type: none"> - The Wishin8 was put up the MIK ring and used at each MIK stations - The CUFES device (Continuous Underwater Fish Egg Sampler) was used during all the survey (day and night) in the English Channel and the North sea and more than 600 samples were collected. - Samples for zoo and phytoplankton were collected ("bongo" net (162) and "Niskin" bottle (193)). - Acoustic data were recorded (Echosounder ER60 and multibeam echosounder) and one pelagic hauls was deployed on herring schools. - Observers for mammals and birds collected information during the 10 days in the English Channe and Southern North Sea. - Wastes were counted and weighted at each trawl stations - benthic species were determined at each station <p>Problem encountered :</p> <p>A MIK net damaged at the beginning of the survey</p> <p>Trawl information (net opening, doors, wings) are not yet available, due to issue processing the Marport-output data.</p>
Number of fish species recorded and notes on any rare species or unusual catches:	98 species were recorded. Shellfish were also measured and benthic fauna identified at each hauls.

Table 4.1.2.2.1. Stations fished during IBTS1Q – FRA.

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished
VIIId	ICES squares	GOV	5	20	15	1	100%
VIIId		MIK	10	14	15	1	100%
IVb,c		GOV	58	66	8	1	100%
IVb,c		MIK	110	94	0	0	90%
TOTAL			63/120	86/108	23/15	2/1	

Table 4.1.2.2.2. Number of biological samples (maturity and age material).

Species	Age	Species	Age
<i>Merlangus merlangius</i>	1 180	<i>Pleuronectes platessa</i>	1 060
<i>Gadus morhua</i>	162	<i>Scophthalmus maximus</i>	6
<i>Melanogrammus aeglefinus</i>	233	<i>Scophthalmus rhombus</i>	6
<i>Limanda limanda</i>	477	<i>Dicentrarchus labrax</i>	67
<i>Clupea harengus</i>	310	<i>Mullus surmuletus</i>	72
<i>Sprattus sprattus</i>	207	<i>Pollachius pollachius</i>	3
<i>Solea solea</i>	127	<i>Platichthys flesus</i>	205
<i>Chelidonichthys lucernus</i>	15	<i>Zeus faber</i>	6

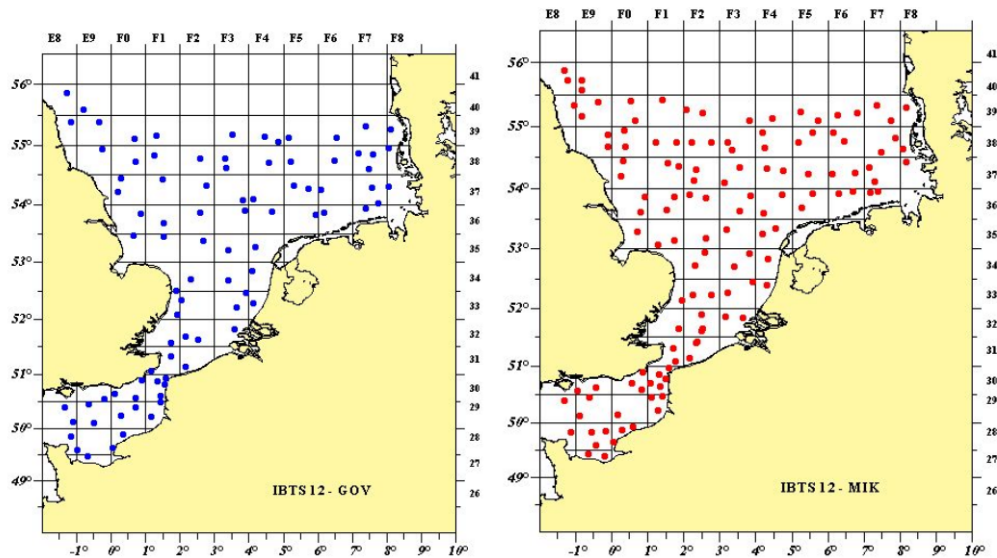


Figure 4.1.2.2.1. "Thalassa" GOV hauls (left) and MIK hauls (right) IBTS-1Q 2012.

4.1.2.3 Germany – North Sea Quarter 1 IBTS (IBTS1Q – GER)

Nation:	Germany	Vessel:	Walther Herwig III
Survey:	351	Dates:	23 January – 24 February 2012

Cruise	North Sea IBTS Q1 survey aims to collect data on the distribution, relative abundance and biological information of bottom fish in ICES Subareas IVa, b and c. The primary focus is on the demersal species cod, haddock, whiting, saithe, and Norway pout and the pelagic species herring, sprat and mackerel. Abundance and size spectra of all fish species caught are recorded.
Gear details:	IBTS standard GOV 36/47 with groundgear A (standard); SCANMAR sensors for door and wing spread and vertical net opening.
Notes from survey (e.g. problems, additional work etc.):	Of the planned 77 stations for the IBTS Q1 survey, 67 were fished (9 rectangles not fished due to rough weather, 1 rectangle with invalid tow). The GOV in the standard version was used and 68 accompanying depth profiles of temperature and salinity were obtained with a CTD combined with a water sampler for nutrient samples.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 64 species of fish were recorded during the survey. One <i>Lophius budegassa</i> caught close to Norwegian Trench. Two herring schools east of Orkneys (48F0, 48E8) examined for Ichthyophonus infection. Infection rates were 5.5 and 2.2%, respectively.

Table 4.1.2.3.1. Stations fished (aims: to complete 77 valid tows per year).

ICES Divisions	Strat.	Gear	Towsplanned	Valid	Add.	Inv.	% stations fished	comments
IV	N/A	Std. GOV	77	67	0	1	87%	
IV	N/A	MIK	154	129	0	0	84%	

Strat: strata; Add: Additional tows; inv: Invalid.

Table 4.1.2.3.2. Number of biological samples (maturity and age material).

Species	Age	Species	Age
<i>Clupea harengus</i>	1309	<i>Trisopterus ermarki</i>	269
<i>Gadus morhua</i>	496	<i>Pleuronectes platessa</i>	580
<i>Melanogrammus aeglefinus</i>	811	** <i>Merluccius merluccius</i>	324
<i>Merlangius merlangus</i>	924	* <i>Lophius budegassa</i>	1
<i>Pollachius virens</i>	379	* <i>Lophius piscatorius</i>	20
<i>Scomber scombrus</i>	322	* <i>Microstomus kitt</i>	313
<i>Sprattus sprattus</i>	512	* <i>Scophthalmus maximus</i>	5
* <i>Scophthalmus rhombus</i>	6		

* Maturity only. ** Otoliths taken but age readings not conducted yet.

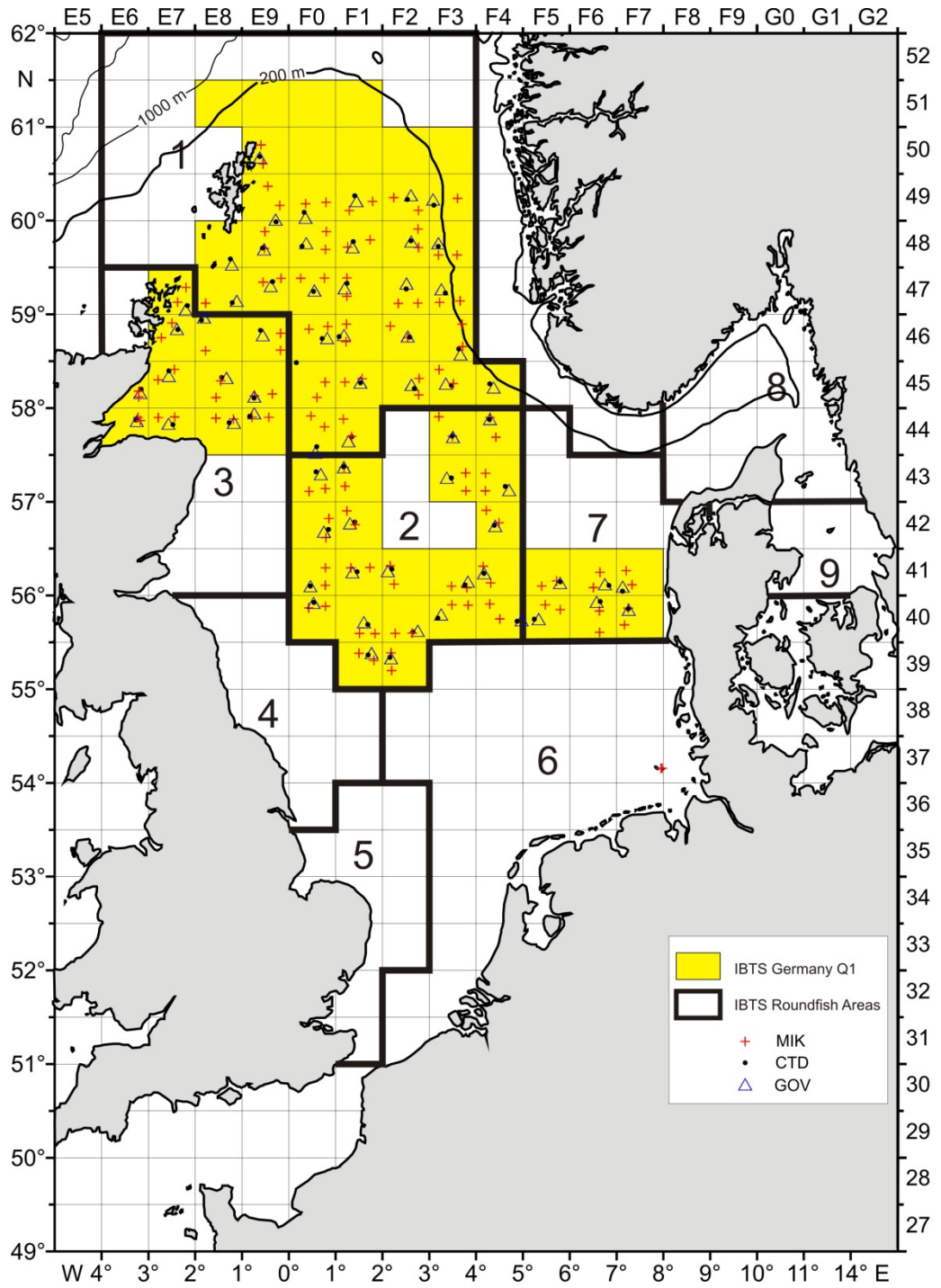


Figure 4.1.2.3.1. Stations of Walther Herwig III (cruise 351) during the IBTS Q1 2012.

4.1.2.4 Netherlands – North Sea Quarter 1 IBTS (IBTS1Q – NED)

Nation:	Netherlands	Vessel:	RV Tridens
Survey:	01/12	Dates:	23 January – 24 February 2012

Cruise	The IBTS North Sea Q1 survey aims to collect data on the distribution, relative abundance and biological information on a range of fish species in ICES area IIIa and IV. CTD was deployed at each trawl station to collect temperature and salinity profiles. Age and maturity data were collected for cod, haddock, whiting, Norway pout, herring, mackerel, sprat, plaice, sole and flounder. Sampling for herring larvae is carried out during night-time.
Gear details:	The bottom trawl used was the GOV 36/47 rigged with groundgear A (57 stations). MARPORT door and headline height sensors were used. Larvae are sampled with a MIK-net (Midwater ringnet with a diameter of 2 mm; 115 stations).
Notes from survey (e.g. problems, additional work etc.):	The cruise plan was fulfilled as planned and a week less than planned. This was possible because the MIK-samples were taken the whole night, rather than till midnight. For the first time CTD information was collected at each MIK-haul as well. Nearly all MIK hauls were conducted for testing a small fine-meshed ringnet (designed for the collection of fish eggs) attached to the main MIK. We changed from SCANMAR to MARPORT, however there were problems with the MARPORT system, due to which it was impossible to collect door-spread and especially net opening for each haul. 8 rays and 53 sharks have been tagged during this year survey.
Number of fish species recorded and notes on any rare species or unusual catches:	About 68 species of fish and 93 benthic species were recorded during the survey. A single haul with a large amount of sea bass was caught in 32F2.

Table 4.1.2.4.1. Stations fished.

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	GOV-A	49	52	3	1	106	
		MIK	98	101	3	2	103	
VIIId	N/A	GOV-A	5	5	0	0	100	
		MIK	10	12	2	0	120	

Table 4.1.2.4.2. Number of biological samples (maturity and age material).

Species	Age	Species	Age
<i>Clupea harengus</i>	440	<i>Trisopterus esmarki</i>	110
<i>Gadus morhua</i>	133	<i>Scomber scombrus</i>	100
<i>Melanogrammus aeglefinus</i>	275	<i>Pleuronectes platessa</i>	421
<i>Merlangius merlangus</i>	842	<i>Solea solea</i>	48
<i>Pollachius virens</i>	1	<i>Dicentrarchus labrax</i> *	25
<i>Sprattus sprattus</i>	490	<i>Buglossidium luteum</i>	20

* Also scales are collected.

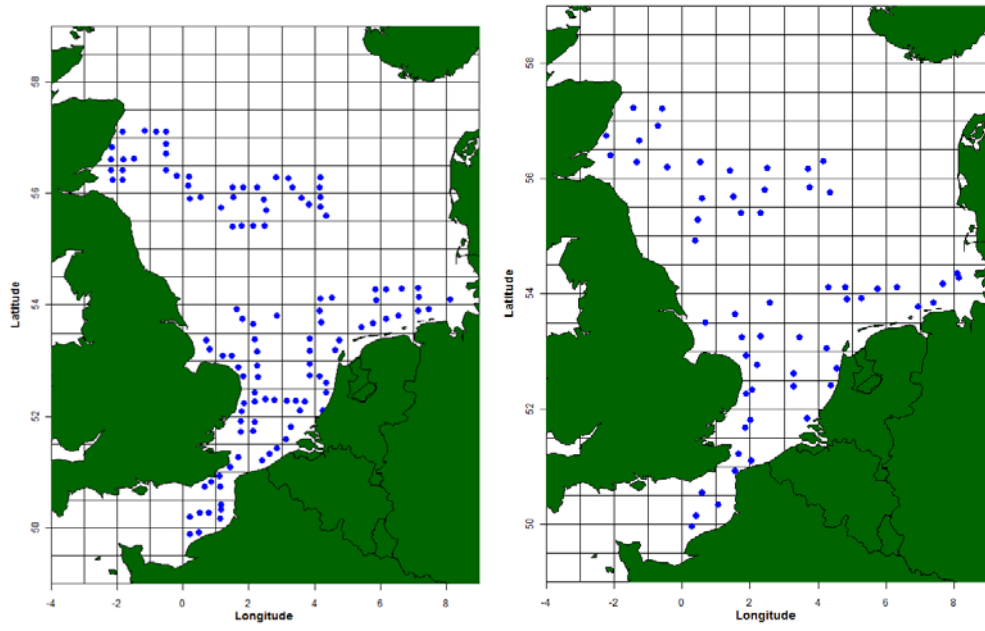


Figure 4.1.2.4.1. GOV trawls (left) and MIK-hauls (right) carried out on "Tridens II" during the Q1 IBTS 2012.

4.1.2.5 Norway – North Sea Quarter 1 IBTS (IBTS1Q – NOR)

Nation:	Norway	Vessel	G.O. Sars
Survey:	2012102	Dates	15 February – 14 March 2012

Cruise	The survey was a combination of the IBTS Q1 and hydrographical transects where also phytoplankton and zooplankton were sampled. The IBTS Q1 aims to collect data on the distribution and relative abundance and biological information on commercial fish in the North Sea. The primary species are herring, saithe, cod, haddock, whiting, sprat, mackerel, Norway pout and plaice. During the cruise a hydrographic transect (Utsira - Start Point) collect data on hydrography, nutrients, plankton and herring larvae.
Gear details:	The trawl used was a IBTS standard GOV 36/47 with groundgear A, the Exocet kite, and SCANMAR sensors. The sensors logged door distance, depth and angle, headline height and all trawl-eye data. Problems with the wirelength and winch system made the survey shorter than planned. All stations were covered, but the acoustic survey that was planned into the survey (“The Bad Hair Day”) had to go out. Long sweeps were not used for all of the deeper stations.
Notes from survey (e.g. problems, additional work etc.):	One hydrographical transect was taken (Utsira-Startpoint).
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 42 species of fish and 23 species of invertebrate were recorded during the survey.

Table 4.1.2.5.1. Stations fished.

ICES Div	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished
IV	N/A	GOV	40	41	1	0	100
		MIK	83	78	0	0	93
TOTAL			40/83	41/78	0	0	

Table 4.1.2.5.2. Number of biological samples (maturity and age material).

Species	Age	Species	Age
<i>Lophius piscatorius</i>	4	<i>Micromesistius poutassou</i>	27
<i>Engraulis encrasicolus</i>	1	<i>Scomber scombrus</i>	1082
<i>Trisopterus esmarkii</i>	152	<i>Glyptocephalus cynoglossus</i>	6
<i>Trachurus trachurus</i>	29	<i>Merlangius merlangus</i>	344
<i>Clupea harengus</i>	1662	<i>Pollachius virens</i>	189
<i>Gadus morhua</i>	229	<i>Trisopterus esmarkii</i>	151
<i>Melanogrammus aeglefinus</i>	539	<i>Sprattus sprattus</i>	85
<i>Merluccius merluccius</i>	113	<i>Pleuronectes platessa</i>	212
<i>Microstomus kitt</i>	144	<i>Pollachius pollachius</i>	1

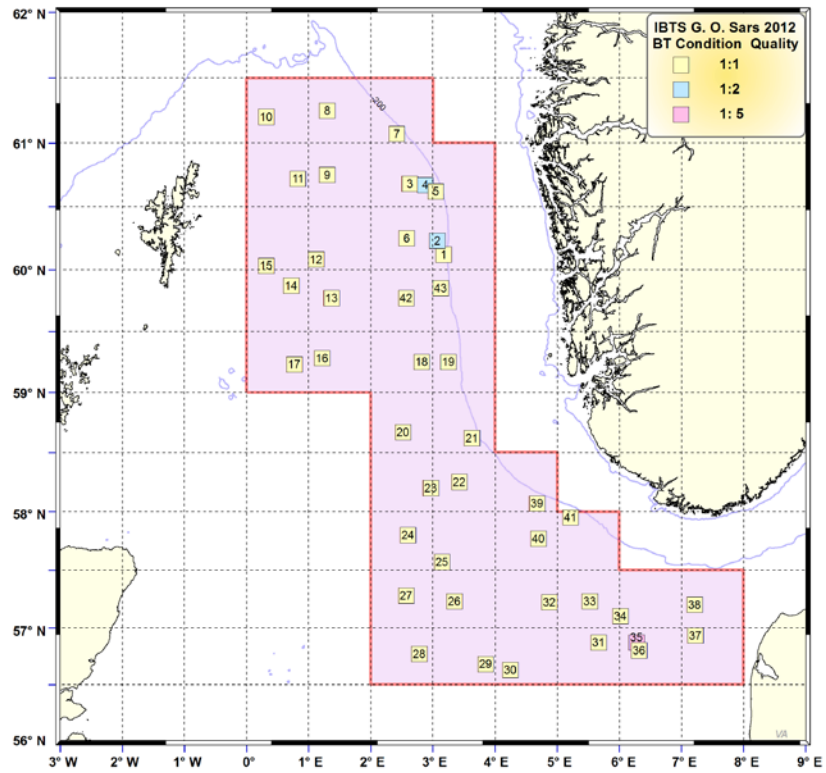


Figure 4.1.2.5.1 Trawl stations during IBTS 2011 Q1. Bottom trawl is the GOV 36/47 with exocet kite. The extra stations (in in blue) were taken for an Acoustic estimate of saithe, and not uploaded as a standard IBTS haul.

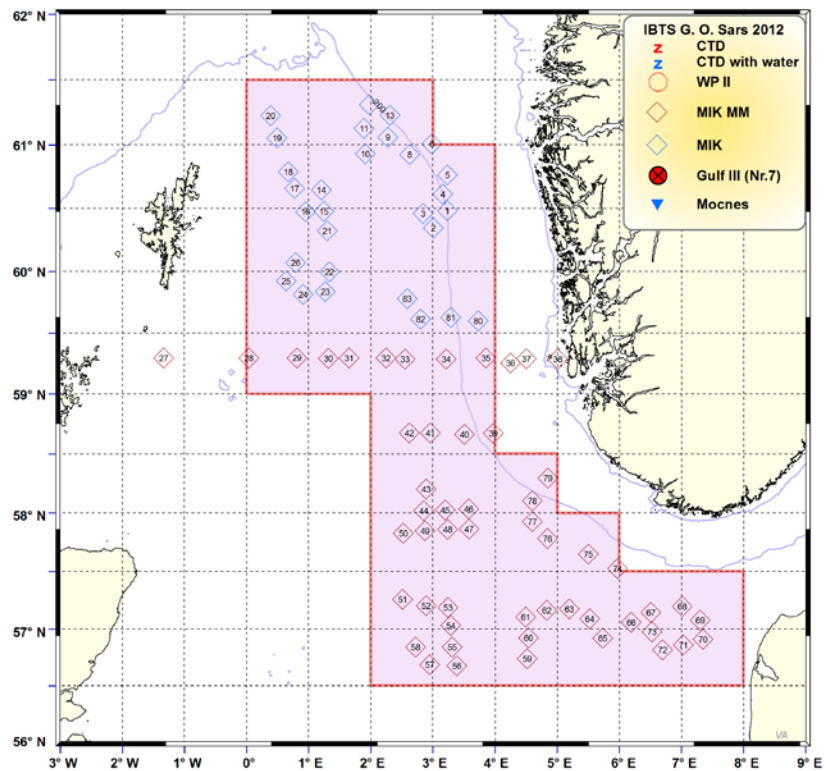


Figure 4.1.2.5.2 MIK samples taken during the cruise.

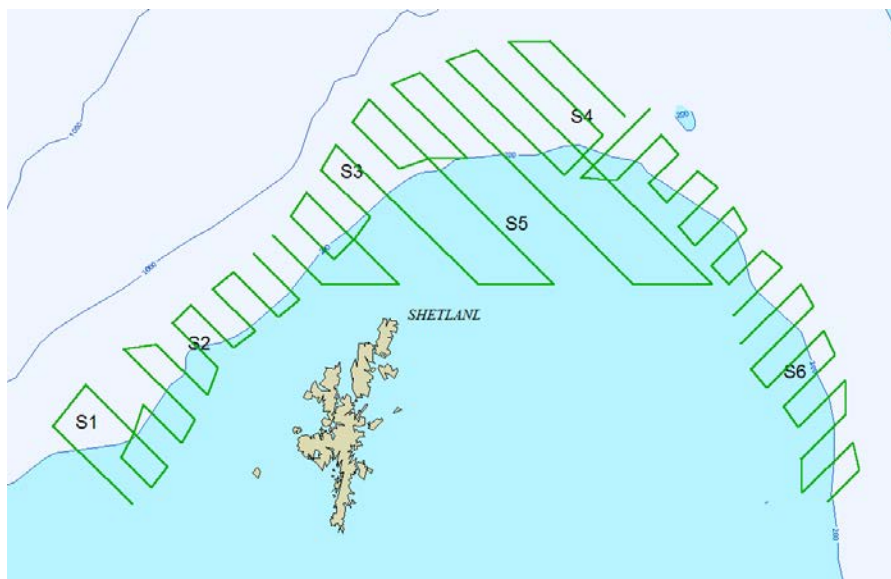


Figure 4.1.2.5.3 Acoustical survey planned for saithe, based on stratification from commercial fisheries in the spawning season (February-March). Due to bad weather and winch problems, only strata 6 was covered

4.1.2.6 Sweden – North Sea Quarter 1 IBTS (IBTS1Q – SWE)

Nation:	Sweden	Vessel:	Dana
Survey:	1/12	Dates:	9 January – 22 January 2012
Cruise	<p>Q1 North Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in IV. The primary species are cod, haddock, sprat, herring, Norway pout, plaice, sole, hake and saithe.</p> <p>The aim of the MIK- trawl survey is mainly to catch North Sea autumn spawning herring larvae.</p>		
Gear details:	<p>IBTS standard GOV 36/47 with groundgear A, Exocet kite with SCANMAR door, bottom contact, trawl eye and headline height sensors.</p> <p>Methot Isaacs–Kidd midwater ringtrawl. Night-time oblique hauls.</p>		
Notes from survey (e.g. problems, additional work etc.):	<p>The cruise was undertaken and completed as planned. Due to asbestos problems on board Argos discovered in 2011, Sweden was using RV Dana. Sweden fished the survey with their own trawl and doors using Dana's sensors. No bottom contact sensor was available. The Swedish kite broke and was exchanged during the survey for the Danish.</p> <p>In total 46 valid GOV-hauls were made; 27 in the Skagerrak and 19 in the Kattegat. Hydrographical sampling was carried out with the CTD probe and related probe for oxygen measurement.</p> <p>In total 14.8 tonnes were caught. Biological sampling was undertaken as usual on the target species recommended in the manual except for sole. Biological data were also collected for witch flounder.</p> <p>Additional tasks performed during the survey: Herring and cod for radioactivity analysis in Lowestoft, England 58 MIK-hauls were executed as planned. Gladly there was an increase in herring larvae this year. No particular problems with the setting/hauling of the net were recorded.</p>		
Number of fish species recorded and notes on any rare species or unusual catches:	<p>Overall, 64 species of fish were recorded during the survey.</p>		

Table 4.1.2.6.1. Stations fished (aims: to complete 47 valid tows per year).

ICES Divisions	Strata	Gear	Tows				% stations fished
			planned	Valid	Additional	Invalid	
IIIa	N/A	GOV	46	46	0	0	100
IIIa	N/A	MIK	58	58	0	0	100
TOTAL			46/58	46/58	0	0	100

Table 4.1.2.6.2. Number of biological samples (maturity and age material):

Species	Age	Species	Age
<i>Clupea harengus</i>	1623	<i>Sprattus sprattus</i>	1158
<i>Gadus morhua</i>	579	<i>Trisopterus esmarki</i>	124
<i>Melanogrammus aeglefinus</i>	345	<i>Merluccius merluccius</i>	118
<i>Pollachius virens</i>	23	<i>Pleuronectes platessa</i>	729
<i>Solea solea</i>	0	<i>Glyptocephalus cynoglossus</i>	252

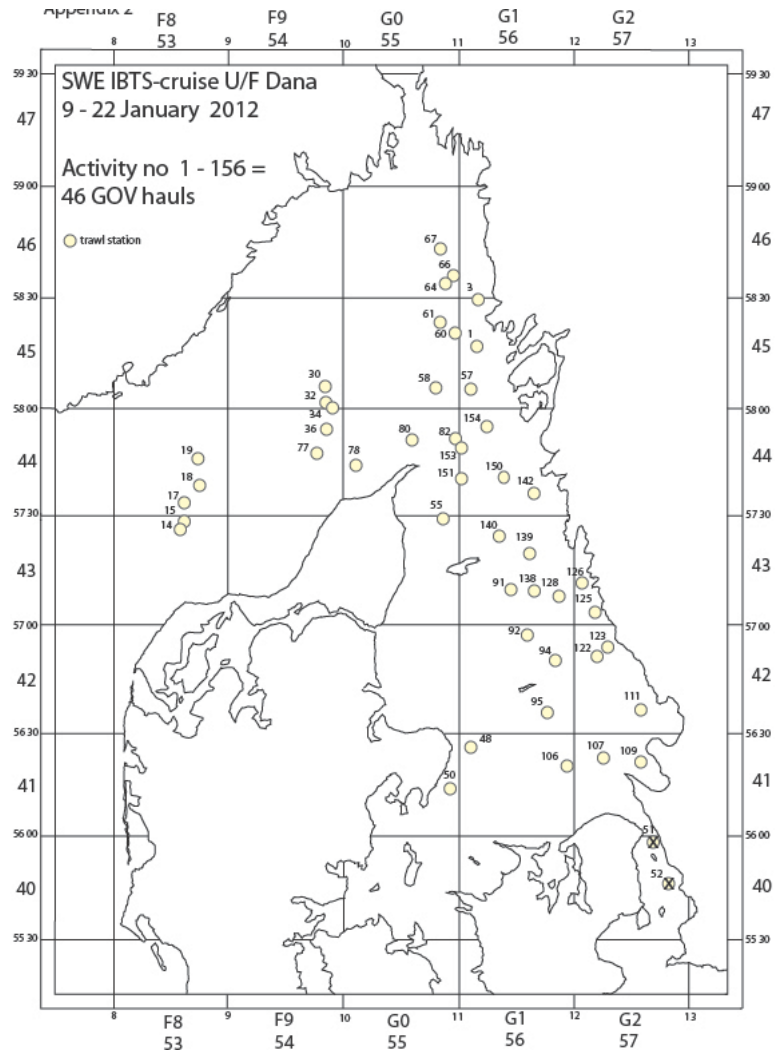


Figure 4.1.2.6.1. Fished stations with the Dana during the Q1 IBTS - SWE 2012.

4.1.2.7 UK (Scotland) – North Sea Quarter 1 IBTS (IBTS1Q – SCO)

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	0212S (IBTS Quarter 1)	Dates:	26 January – 15 February 2012
Cruise	Q1 North Sea IBTS survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on a range of fish species in ICES area IVa and IVb. Age data were collected for cod, haddock, whiting, saithe, Norway pout, herring, mackerel and sprat.		
Gear details:	GOV using groundgear B on 3 stations off the northeast coast of Scotland and all stations north of 57 deg 30 min North and groundgear A used on all other stations south of 57deg 30min North.		
Notes from survey (e.g. problems, additional work etc.):	<p>With very favourable weather conditions for the majority of the cruise Scotia made good progress right up until the end of the survey.</p> <p>Ship's thermosalinograph was run continuously throughout the cruise. Temperature, salinity and water samples for nutrient analyses were collected at each station.</p> <p>A total of 56 valid hauls was achieved with all allocated stations covered, including 1 extra stations.. A total of 99 valid MIK tows were completed with 2 undertaken within each statistical rectangle where fishing events occurred. MIK tows were not undertaken in stat rectangle 49E9 due to weather related issues.</p> <p>SCANMAR and bottom contact sensors were used throughout the cruise to monitor net parameters and performance.</p>		
Number of fish species recorded and notes on any rare species or unusual catches:	<p>A total of 74 species were recorded during the survey. Ichthyophonous infection in herring was reported in 43 individual fish.</p> <p>Biological data were recorded for a number of species in accordance with the requirements of the EU Data Regulations.</p>		

Table 4.1.2.7.1. Stations fished (aims: to complete 54 valid tows per year).

ICES Divisions	Strata	Gear	Tows		Valid with		%stations		
			Planned	Valid	rock-hopper	Additional	Invalid	fished	comments
IVa		GOV-B	39	41	-	0	1	104	
IVa		GOV-A	0	0		0	0	n/a	
IVb		GOV-A	12	12		0	0	100	
IVb		GOV-B	3	3	-	0	0	100	
TOTAL			54	56		0	1	104	

Table 4.1.2.7.2. Number of biological samples (maturity and age material):

Number of biological samples (maturity and age material, *maturity only):			
Species	No.	Species	No.
<i>Clupea harengus</i>	817	<i>Scomber scombrus</i>	234
<i>Gadus morhua</i>	388	<i>Trisopterus esmarki</i>	348
<i>Melanogrammus aeglefinus</i>	1065	* <i>Merluccius merluccius</i>	54
<i>Merlangius merlangus</i>	897	<i>Spattus sprattus</i>	470
* <i>Pleuronectes platessa</i>	196	<i>Pollachius virens</i>	310

*maturity only

Table 4.1.2.7.3. Variance in catch rates and estimates of sampling precision

Variance in catch rates and estimates of sampling precision					
Species	Stock Area	Valid tows	Mean cpue (nos/hr)	Total weight (kg)	Mean weight (kg/hour)
<i>Gadus morhua</i>	IV	56	15.27	750.06	27.27
<i>Melanogrammus aeglefinus</i>	IV	56	1011.71	7635.37	277.65
<i>Merlangius merlangus</i>	IV	56	470.18	2083.45	75.76
<i>Pollachius virens</i>	IV	56	25.34	607.75	22.10
<i>Scomber scombrus</i>	IV	56	423.74	746.82	27.16
<i>Clupea harengus</i>	IV	56	596.47	2162.35	78.63
<i>Pleuronectes platessa</i>	IV	56	110.11	397.47	14.45
<i>Trisopterus esmarki</i>	IV	56	3256.4	2083.76	75.77
<i>Sprattus sprattus</i>	IV	56	2817.85	890.56	32.38

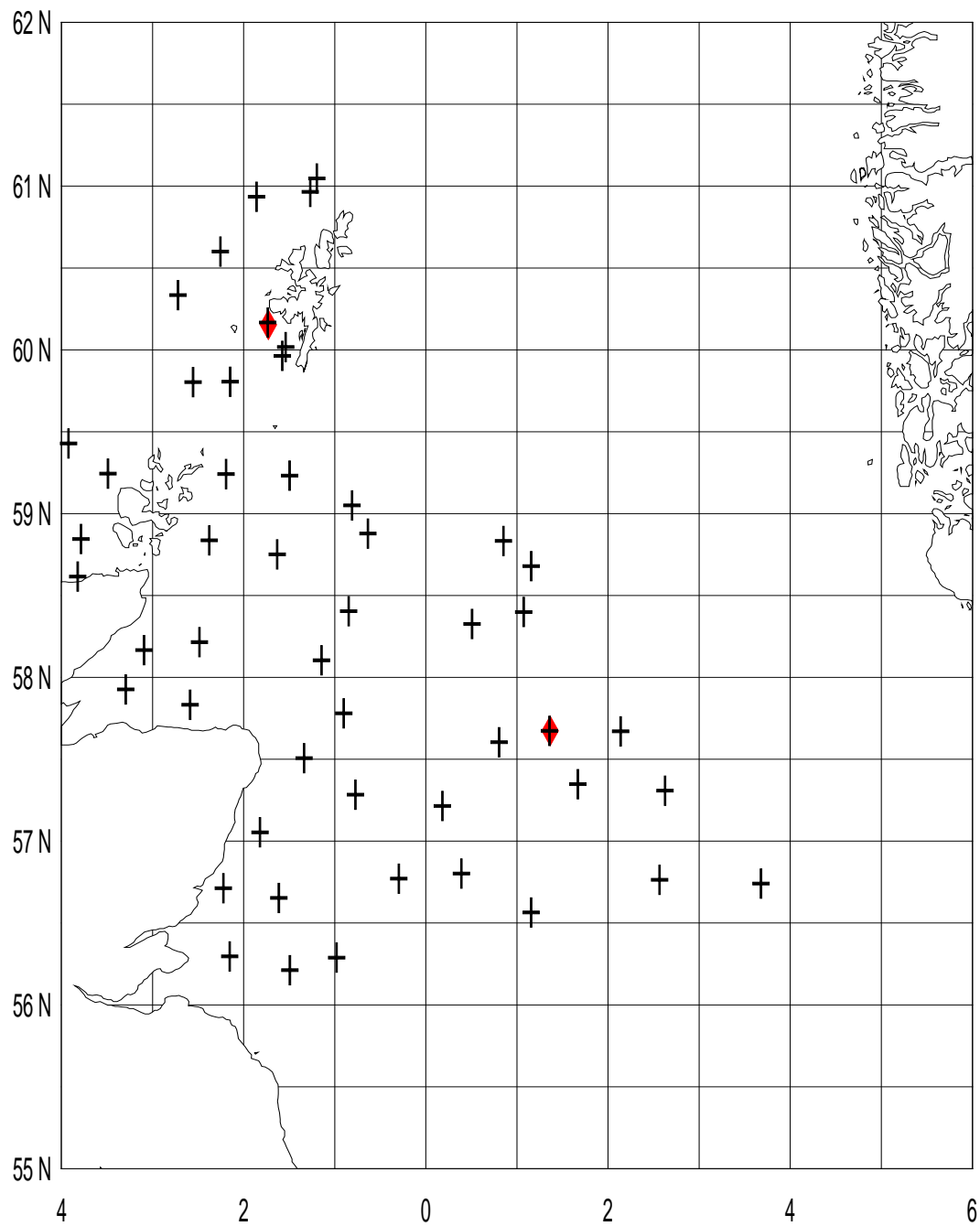


Figure 4.1.2.7.1. Haul locations. 2012 IBTS Q1 Scotia (foul hauls in red).

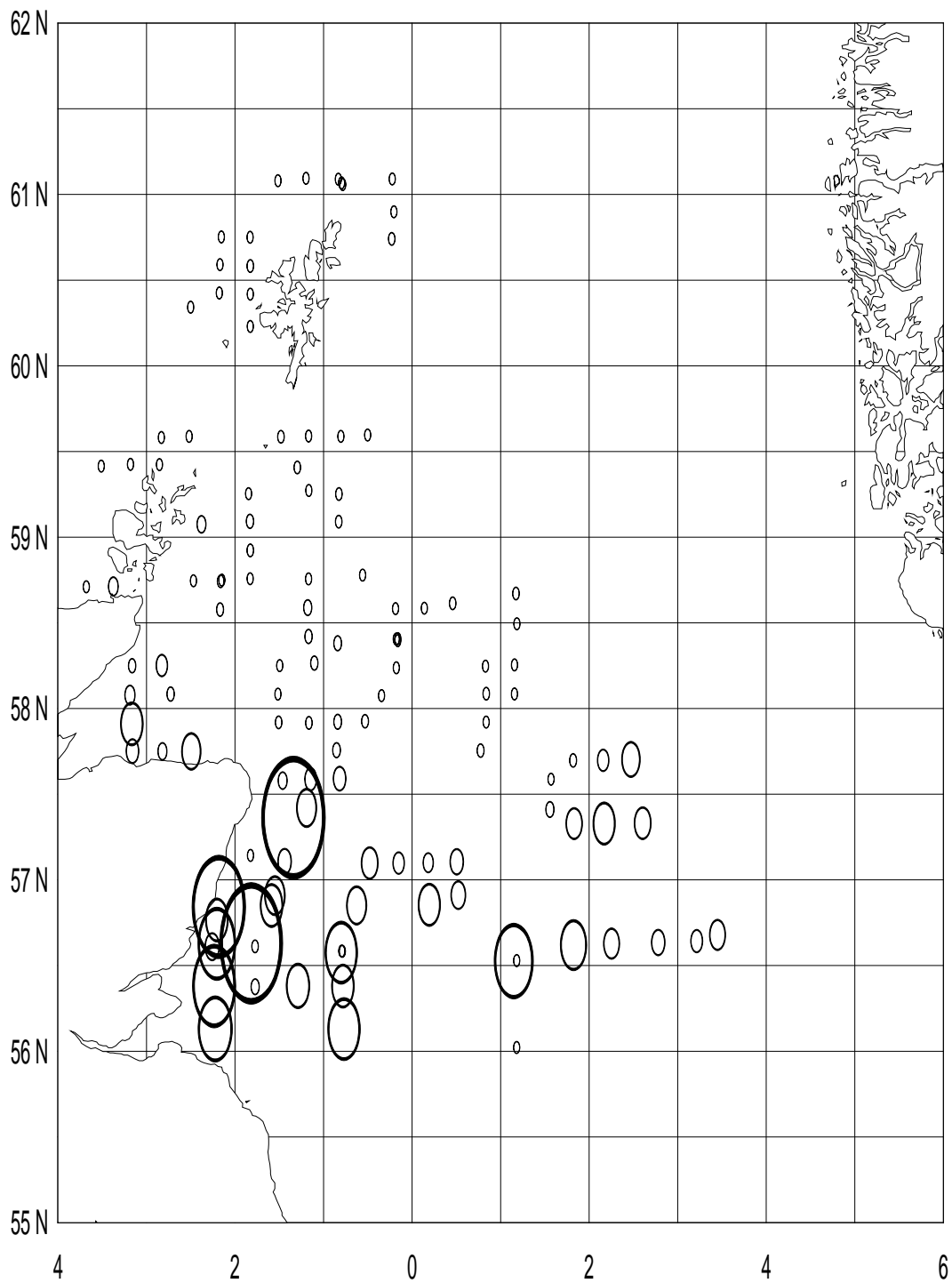


Figure 4.1.2.7.1. MIK tow positions and relative sample size for Herring larvae. 2012 IBTS Q1 Scotia.

4.1.3 GOV

The preliminary indices for the recruits of seven commercial species based on the 2012 quarter 1 survey are shown in Figure 4.1.3.1. According to these preliminary results, sprat showed a year class in 2012 well above the long-term average for the years 1980–2011, while mackerel showed a year class slightly above the long year average. The catches of the other species are below average; especially the index of haddock is very low compared to the other years in the time-series.

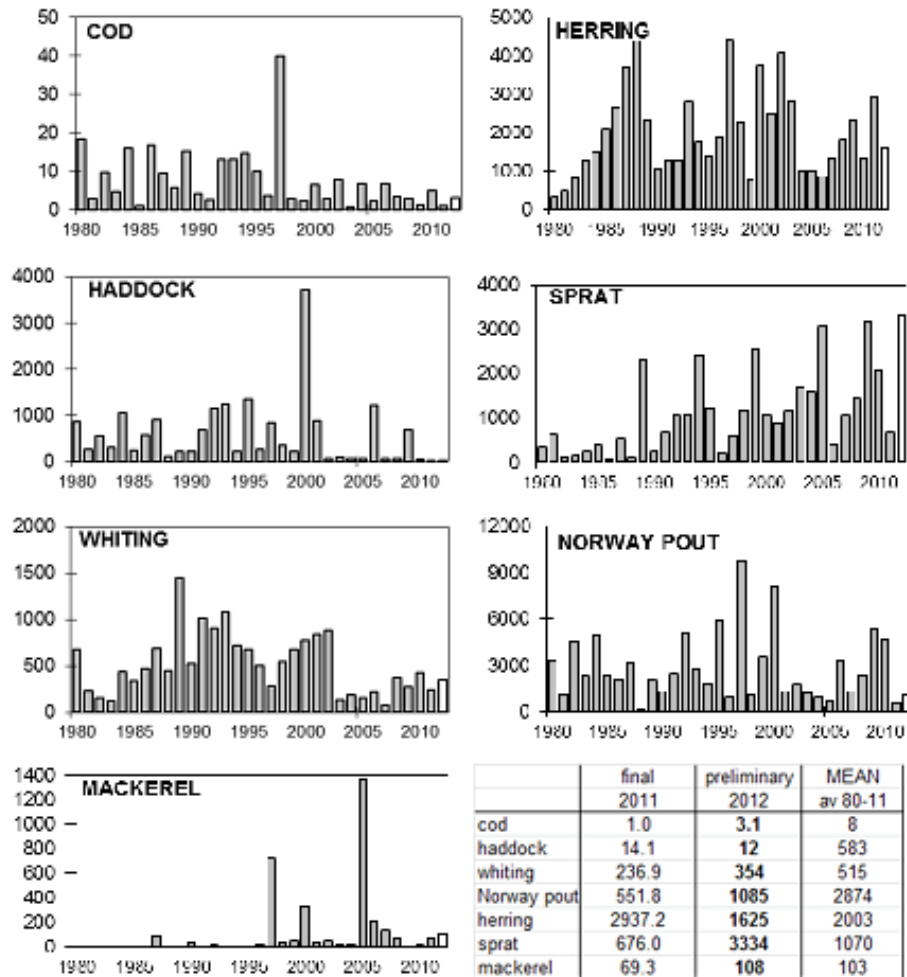


Figure 4.1.3.1. Time-series of indices for 1-group (1-ring) herring, sprat, haddock, cod, whiting, Norway pout, and mackerel caught during the quarter 1 IBTS survey in the North Sea, Skagerrak and Kattegat. Indices for the last year are preliminary, and based on a length split of the catches.

4.1.4 MIK

For the ICES Herring Assessment Working Group for the area South of 62°N (HAWG), the IBTS survey provides recruitment indices and abundance estimates of adults of herring and sprat. Sampling at night with fine-meshed nets (MIK; Midwater Ring Net) was implemented from 1977 onwards, and the catch of herring larvae has been used for the estimation of 0-ringer abundance in the survey area. The 0-ringer abundance (IBTS-0 index) the total abundance of 0-ringers in the survey area is used as recruitment index for the North Sea herring stock. Index values are calculated as described in the HAWG report of 1996 (ICES, 1996/ACFM:10). The index value of 0-

ringer abundance of the 2011 year class is estimated at 68.0. The index estimate is less than last year's estimate for the 2010 year class, although in Kattegat and Skagerrak a considerable amount of herring larvae was found. This is about only 62% of the long term mean, and shows a further continuation of the series of relatively poor recruitments starting from the 2002 year class. The 0-ringers caught in 2012 were predominantly found in dense concentrations off the Scottish coast south of the Moray Firth with some extension into the central North Sea (Figure 4.1.4.1). Moderate larval densities were also found in the southern North Sea as well as in the Skagerrak. Virtually no herring larvae were found in the Northern and Northeastern parts of the North Sea. This pattern of distribution is similar to that of last year with high concentrations close to the Scottish coast.

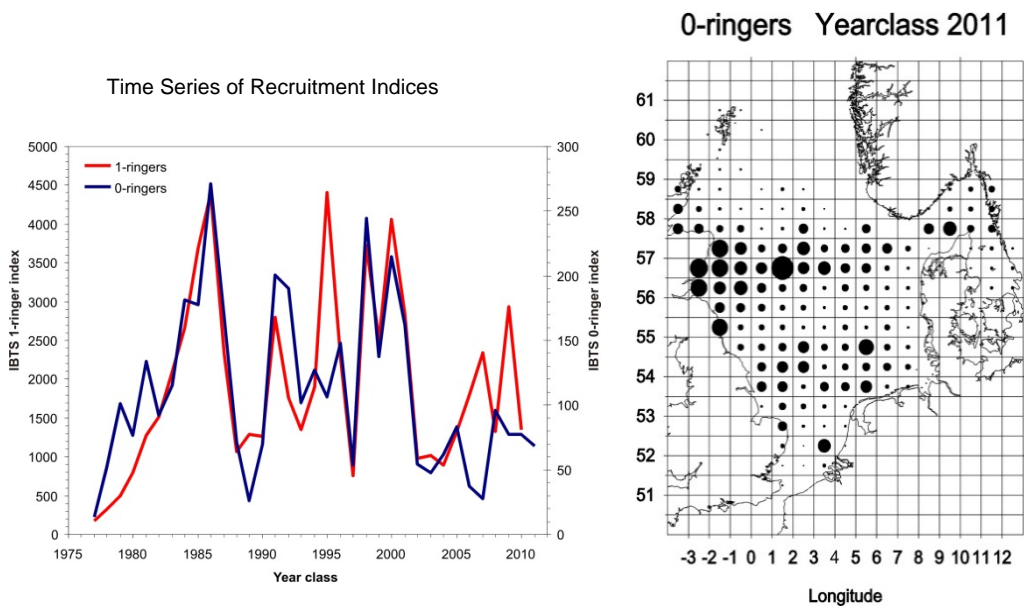


Figure 4.1.4.1 Distribution of MIK caught herring larvae during the IBTS Q1 2012 (right) and the time-series of herring larvae and 1-ringers since 1976 (left).

4.1.5 Participation in 2013

The ships time available for the quarter 1 survey in 2012 is expected to be as usual as described in the manual, with an aim to carry out the survey in the month of February.

Denmark, France, Germany, Netherlands, Norway, Scotland and Sweden have confirmed their intention to participated in 2012 Q1 survey as in the last years. Sweden will participate again using the Dana for at least another two years.

During the meeting it is agreed that all countries will try to execute the MIK-tows with a small fine-meshed ringnet (designed for the collection of fish eggs) attached to it (Annex 5 - WD: 1). A manual on how to collect and store the eggs and larvae with these extra nets will be supplied prior to the 2013 survey.

4.1.6 Other issues

4.1.6.1 Biological sampling of additional species

During the IBTSWG meeting in 2009, new requirements from the DCF became available, meaning that the decision made in 2007 was overruled, and additional sampling

upon a new group of species (including some already sampled) needed to be performed (see IBTSWG report 2009 Table 12.2; ICES, 2009).

In order to avoid an overload in work, the survey coordinators were appointed to design a sampling scheme in which the sampling of all species would be divided among the participating countries. The sampling scheme agreed upon by the participants of the first quarter North Sea IBTS is given in Table 4.1.6.1. The sampling scheme was created for the years 2010–2012, as at this moment it looks as if the DCF-requirements will continue at least up to 2013; it is decided to in 2013 to use the same sampling scheme as was used in 2010.

The responsibility for sampling of specific species is appointed to the countries that are most likely to catch these species (based upon catches from the years 2007–2009). To assure a valuable dataset, the same protocol for sampling will be followed as accounts for the standard species, including the aim for sampling a number of 8 individuals per 1 cm group.

Because Sweden is the only country sampling in the Skagerrak/Kattegat area, Sweden was invited to decide for themselves upon the sampling scheme in Skagerrak/ Kattegat, following the DCF requirements.

Table 4.1.6.1. Scheme for biological sampling of additional species during the NS-IBTS Q1.

Species (Engl.)	Species (Latin)	A/S/W/Mat	sampling
Witch flounder	<i>Glyptocephalus cynoglossus</i>	T	Sweden to consider DCF requirements
Plaice	<i>Pleuronectes platessa</i>	Y	Sweden to consider DCF requirements
Sole	<i>Solea solea</i>	Y	Sweden to consider DCF requirements
Hake	<i>Merluccius merluccius</i>	Y	Sweden to consider DCF requirements

Species (Engl.)	Species (Latin)	A/S/W/Mat	RCM numbers	sampling	2010	2011	2012	2013
Red gurnard	<i>Chelidonichthys cuculus</i>	T	100	8 per 1 cm group	Ge-Sc			Ge-Sc
Witch flounder	<i>Glyptocephalus cynoglossus</i>	T	100	8 per 1 cm group	Dm-No			Dm-No
Ling	<i>Molva molva</i>	T	100	8 per 1 cm group		Ge-No		
Turbot	<i>Scophthalmus maximus</i>	T	920	8 per 1 cm group		Dm-NI		
Brill	<i>Scophthalmus rhombus</i>	T	920	8 per 1 cm group			Dm-Fr	
Sole	<i>Solea solea</i>	Y	5570	8 per 1 cm group	Fr-Dm-NI	Fr-Dm-NI	Fr-Dm-NI	Fr-Dm-NI
Tub gurnard	<i>Chelidonichthys lucernus</i>	T	480	8 per 1 cm group		Fr-Sc		
John Dory	<i>Zeus faber</i>	T	10	5 per country	Ge-Sc			Ge-Sc
Lemon sole	<i>Microstomus kitt</i>	T	350	8 per 1 cm group			No-Ge	
Hake	<i>Merluccius merluccius</i>	Y	800/550	8 per 1 cm group	Ge-No-Sc	Ge-No-Sc	Ge-No-Sc	Ge-No-Sc
Flounder	<i>Platichthys flesus</i>	T	450	8 per 1 cm group			Fr-NI	
Striped red mullet	<i>Mullus surmuletus</i>	T	600/200	8 per 1 cm group	Fr-NI			Fr
Plaice	<i>Pleuronectes platessa</i>	Y	9550	8 per 1 cm group	All countries	All countries	All countries	All countries
Spotted ray	<i>Raja montagui</i>	T			Continue with national collection. Review after WK outcome			
Cuckoo ray	<i>Leucoraja naevus</i>	T			Continue with national collection. Review after WK outcome			
Starry ray	<i>Raja radiata</i>	T			Continue with national collection. Review after WK outcome			

4.1.6.2 Staff Exchange

No staff exchange has occurred during the 2012 Q1 surveys, and no concrete plans are there yet to have an exchange in 2013. However, it is still encouraged to have a staff exchange between the different countries. As there is a growing awareness within the ICES internationally coordinated monitoring programs of the usefulness to exchange sea-going technical and scientific personnel between countries. Taking part in other countries surveys allows the study of each other trawling and biological sampling procedures on-board ships, and may lead to new insights to improve one's own protocol.

4.1.7 References

ICES 1996. Report of the Herring Assessment Working Group for the Area South of 62°N. ICES CM 1996/ACFM:10.

ICES 2009. Report of the International Bottom Trawl Survey Working Group (IBTSWG). ICES CM 2009/RMC:04.

4.2 Q3 North Sea Survey

4.2.1 General overview

Five vessels for six countries, participated in the quarter three survey in 2011: Dana (Denmark and Sweden), Walther Herwig III (Germany), Johan Hjort (Norway), Cefas Endeavour (England) and Scotia (Scotland). In all, 325 valid GOV hauls were made. Although this allowed at least one station in every rectangle, a few rectangles did not achieve the required 2 stations (52E9-F1, 51E9, 50E9, 49F0-F1). The impact this may have on the indices cannot be assessed at this time. It is likely that there is an effect on the number of observed species in the respective rectangles.

The North Sea, Skagerrak and Kattegat quarter 3 surveys have now completed 21 years in its coordinated form. Table 4.2.1.1 shows the effort ascribed in the current year. From 2007 onwards a combined index is calculated for Norway pout and used by the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK, ICES 2007a), whereas the remaining indices were calculated by country. The combined Q3 cod index was once again rejected after issues described in the WGNSSK 2011.

With the loss of their research vessel, Sweden was required to charter the Danish research vessel Dana to carry out their survey (see Section 4.2.6.1 for more information). From 2010 clear tow information was accessible through DATRAS by downloading the data for all countries. It should be noted that this information should be used with caution but it is still a useful guide to help survey leaders identify clear tows.

Table 4.2.1.1. Number of valid hauls and days at sea per country for quarter 3 surveys in 2011.

Year		Denmark	Germany	Sweden	Norway	UK		Total
						England	Scotland	
2011	Days	17	15	13	28	32	22	129
	Hauls	49	29	45	44	76	84	325

Table 4.2.1.2. Planned number of stations per country for quarter 3 surveys in 2012.

COUNTRY	VESSEL	NUMBER OF PLANNED STATIONS IN
		QUARTER 3 2012
Denmark	Dana	46
Germany	Walther Herwig III	29
Sweden	Dana	49
Norway	Johan Hjort	54
UK England	Endeavour	75
UK Scotland	Scotia	84
Total		336

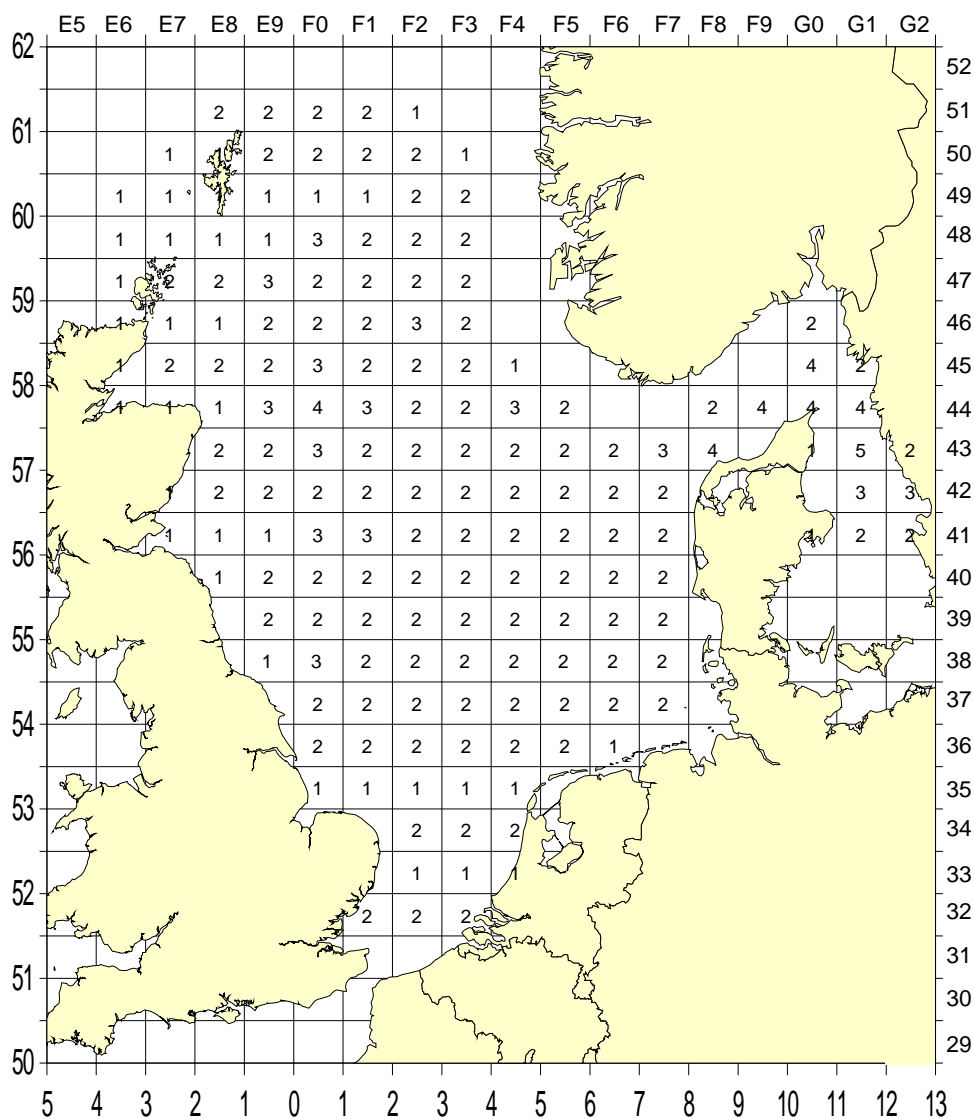


Figure 4.2.1.1 Plot of number of stations fished by rectangle by all participants of the 3rd Quarter IBTS survey 2011.

4.2.2 Survey summaries by country

In 2006, to satisfy a request from WGN SDS (ICES, 2006) to standardize the summary reports within this working group report, a standard form to report individual surveys was approved, since then the survey summaries for all cruises are provided in a standard form.

4.2.2.1 UK (England and Wales) – North Sea Quarter 3 IBTS

Nation:	UK (England and Wales)	Vessel:	Cefas Endeavour
Survey:	14/11	Dates:	8 August – 8 September 2011

Cruise	Q3 North Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in IV. The primary species are cod, haddock and whiting, sprat, herring, mackerel, Norway pout, plaice and saithe.
Gear details	IBTS standard GOV 36/47 with groundgear A, Exocet kite with SCANMAR door, wing and headline height sensors.
Notes from survey (e.g. problems, additional work, etc.):	As well as the usual 75 GOV stations, a further 10 primary stations were fished with a polyethylene GOV. This is the 3 rd year of a medium term project to analysis possible differences in catchability between the nylon and poly gears. In addition 80 valid CTD casts were carried out to collect high quality environmental data. On Every station the litter in the trawl was recorded to the new protocol requested at the 2010 IBTS meeting in Lisbon. A further 20 additional aims were carried out during the survey, the three most significant of which were 1) to deploy the Seaglider (an unman ROV) at a site of potential reduced oxygen concentration in lower waters in the Central North Sea, 2) samples of muscle and scales from herring were taken with the aim of using stable isotope analysis to determine whether separate spawning stocks are truly mixed on their feeding grounds and 3) 13 plankton ringnet dips were carried out to fix any <i>Calanus</i> spp. for ongoing plankton genetic studies as the Sir Alister Hardy Foundation for Ocean Science (SAHFOS).
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 85 species of fish were recorded during the survey. Species of note caught this year during the survey are <i>Galeus melastomus</i> , <i>Dipturus batis</i> species-complex, <i>Liza ramada</i> , <i>Triglops murrayi</i> , <i>Lycodes vahlii</i> , <i>Pholis gunnellus</i> , <i>Sebastes marinus</i> , <i>Sebastes viviparous</i> and <i>Brosme brosme</i> .

Table 4.2.2.1.1 Stations fished (aims: to complete 75 valid tows per year).

ICES Divisions	Strata	Gear	Tows Planned	Valid	Additional	Invalid	% Stations fished	Comments
IV	N/A	IBTS standard GOV	75	75	0	4	100	
IV	N/A	IBTS Q4 poly GOV	-	10	-	-	-	Internal study

Table 4.2.2.1.2. Number of biological samples (age material).

species	number	species	number
<i>Clupea harengus</i>	943	<i>Limanda limanda</i>	404
<i>Gadus morhua</i>	448	<i>Scomber scombrus</i>	403
<i>Melanogrammus aeglefinus</i>	775	<i>Lophius piscatorius</i>	26
<i>Merlangius merlangus</i>	976	<i>Scophthalmus rhombus</i>	9
<i>Pollachius virens</i>	321	<i>Aspritrigla cuculus</i>	256
<i>Sprattus sprattus</i>	279	<i>Mullus surmuletus</i>	24
<i>Scophthalmus maximus</i>	5	* <i>Dipterus batis</i> complex	5
<i>Trisopterus esmarki</i>	262	* <i>Leucoraja naevus</i>	52
<i>Microstomus kitt</i>	232	* <i>Raja clavata</i>	19
<i>Pleuronectes platessa</i>	1019	* <i>Raja montagui</i>	78
<i>Chelidonichthys lucernus</i>	33	* <i>Amblyraja radiata</i>	188
<i>Eutrigla gurnardus</i>	223		

*maturity only.

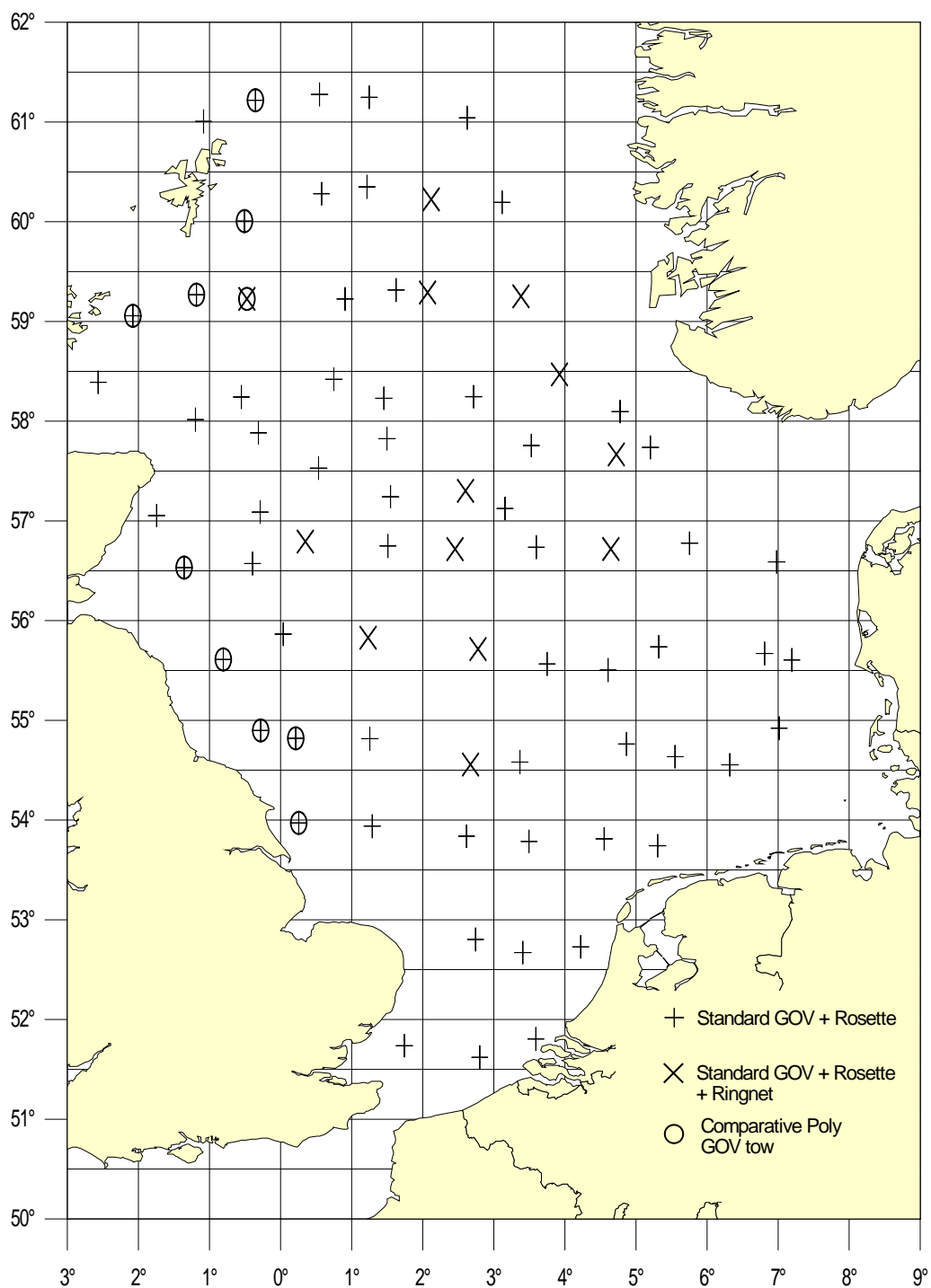


Figure 4.2.2.1.1. Stations performed by the RV Cefas Endeavour during IBTS Q3 Survey.

4.2.2.2 Sweden – North Sea Quarter 3 IBTS

Nation:	Sweden	Vessel:	Dana
Survey:	6/11	Dates:	29 August – 10 September 2011

Cruise	Q3 North Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in IV. The primary species are cod, haddock, sprat, herring, Norway pout, plaice, sole, hake and saithe.
Gear details:	IBTS standard GOV 36/47 with groundgear A, Exocet kite with SCANMAR door, bottom contact, trawl eye and headline height sensors.
Notes from survey (e.g. problems, additional work etc.):	<p>The cruise was undertaken and completed as planned with one big exception, the use of another ship. Due to asbestos problems on board Argos, Sweden was using RV Dana. Sweden fished the survey with their own trawl and doors. Basically Dana has the same sensors as Argos with a couple of exceptions; for instance the bottom contact sensor wasn't available</p> <p>In total 45 valid hauls were made; 26 in the Skagerrak and 19 in the Kattegat. An invalid haul (the whole trawl was lost but luckily also retrieved) in the southeast Skagerrak was replaced by an additional haul in the surrounding area in the same depth strata. Hydrographical sampling was carried out with the CTD probe and related probe for oxygen measurement.</p> <p>In total 17.2 tonnes were caught. Biological sampling was undertaken as usual on the target species recommended in the manual except for whiting, hake and sole. Biological data were also collected for witch flounder.</p> <p>Additional tasks performed during the survey:</p> <ul style="list-style-type: none"> • Herring and cod for radioactivity analysis in Lowestoft, England • Cod, 0-group to Patrik Jonsson, SLU-Aqua, Institute of Marine Research for genetical analysis. • Herring from Fladen to the Natural History Museum for analysis of environmental pollutants. • Hagfish and rabbit fish to the Museum of Life Science, Jhansi, India for training purposes.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 63 species of fish were recorded during the survey.

Table 4.2.2.2.1 Stations fished (aims: to complete 47 valid tows per year).

ICES Divisions	Strata	Gear	Tows				% stations fished	comments
			planned	Valid	Additional	Invalid		
IIIa	N/A	GOV	45	45	1	1	100	

Table 4.2.2.2. Number of biological samples (maturity and age material):

Species	Age	Species	Age
<i>Clupea harengus</i>	1363	<i>Sprattus sprattus</i>	704
<i>Gadus morhua</i>	413	<i>Trisopterus esmarki</i>	132
<i>Melanogrammus aeglefinus</i>	213	<i>Merluccius merluccius</i>	0
<i>Pollachius virens</i>	106	<i>Pleuronectes platessa</i>	680
<i>Solea solea</i>	0	<i>Glyptocephalus cynoglossus</i>	148
<i>Merlangus merlangius</i>	0		

*maturity only.

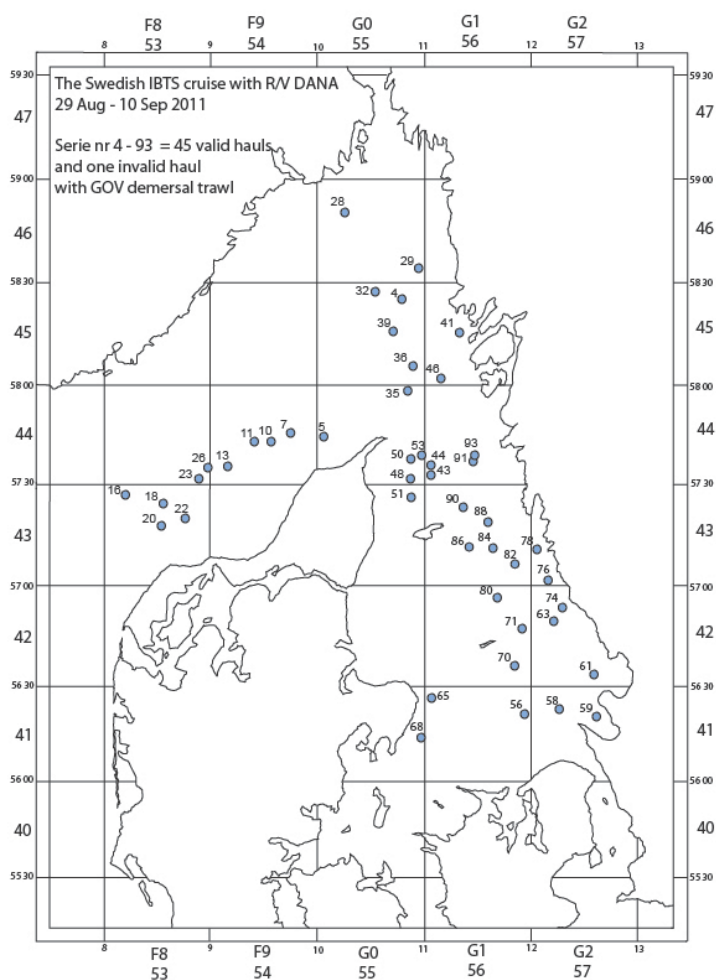


Figure 4.2.2.2. Cruise track of Dana during the IBTS Q3 SWE 2011.

4.2.2.3 Germany – North Sea Quarter 3 IBTS

Nation:	Germany	Vessel:	Walther Herwig III
Survey:	345	Dates:	26/07/2011 – 24/08/2011

Cruise	<p>This cruise contributed to the Q3 IBTS in the North Sea, and also had the second objective and to monitor small-scale distributions of bottom fish and benthic epifauna in six 10-by-10 nm areas (part of the German Small-Scale Bottom Trawl Survey; GSBTS). North Sea IBTS Q3 survey aims to collect data on the distribution, relative abundance and biological information of fish in ICES Subareas IVa, b and c. The primary focus has been on the demersal species cod, haddock, whiting, saithe, and Norway pout and the pelagic species herring, sprat and mackerel. In addition, abundance and size spectra of all fish species caught are recorded.</p> <p>Unfortunately, the 2011 cruise had to be interrupted due to a winch failure. The WHIII returned to Bremerhaven for repairs, before leaving for the second leg. While the GSBTS suffered from this loss in ship time, all IBTS stations could be completed.</p>
Gear details:	IBTS standard GOV 36/47 with groundgear A (standard); SCANMAR distance sensors for door and wing spread and “Trawl eye” for vertical net opening.
Notes from survey (e.g. problems, additional work etc.):	Depth profiles of temperature and salinity were obtained with a CTD combined with a water sampler for nutrient samples. A 2m-beam trawl was applied to survey epibenthic fauna, and sediment samples were taken with a van Veen grab. Two ornithologists recorded abundances of seabirds for the “Seabirds at Sea” program.
Number of fish species recorded and notes on any rare species or unusual catches:	During the survey, 49 species of fish were recorded on IBTS stations.

Table 4.2.2.3.1. Stations fished (Goal: 29 valid tows per year).

ICES Divisions	Strata	Gear	Tows				% stations fished
			planned	Valid	Additional	Invalid	
IV	N/A	IBTS standard GOV	29	29	0	0	100

Table 4.2.2.3.2 Number of biological samples (maturity and age material)

Species	Number	Species	Number
<i>Clupea harengus</i>	429	* <i>Lophius piscatorius</i>	3
<i>Gadus morhua</i> ¹	12	* <i>Merluccius merluccius</i>	15
<i>Melanogrammus aeglefinus</i> ¹	227	* <i>Microstomus kitt</i>	133
<i>Merlangius merlangus</i> ¹	421	* <i>Pleuronectes platessa</i>	222
<i>Scomber scombrus</i>	317	* <i>Scophthalmus maximus</i>	2
<i>Sprattus sprattus</i>	295	* <i>Scophthalmus rhombus</i>	5
<i>Trisopterus esmarckii</i>	108		

* Samples taken, age not determined.

¹Maturity not recorded in Q3.

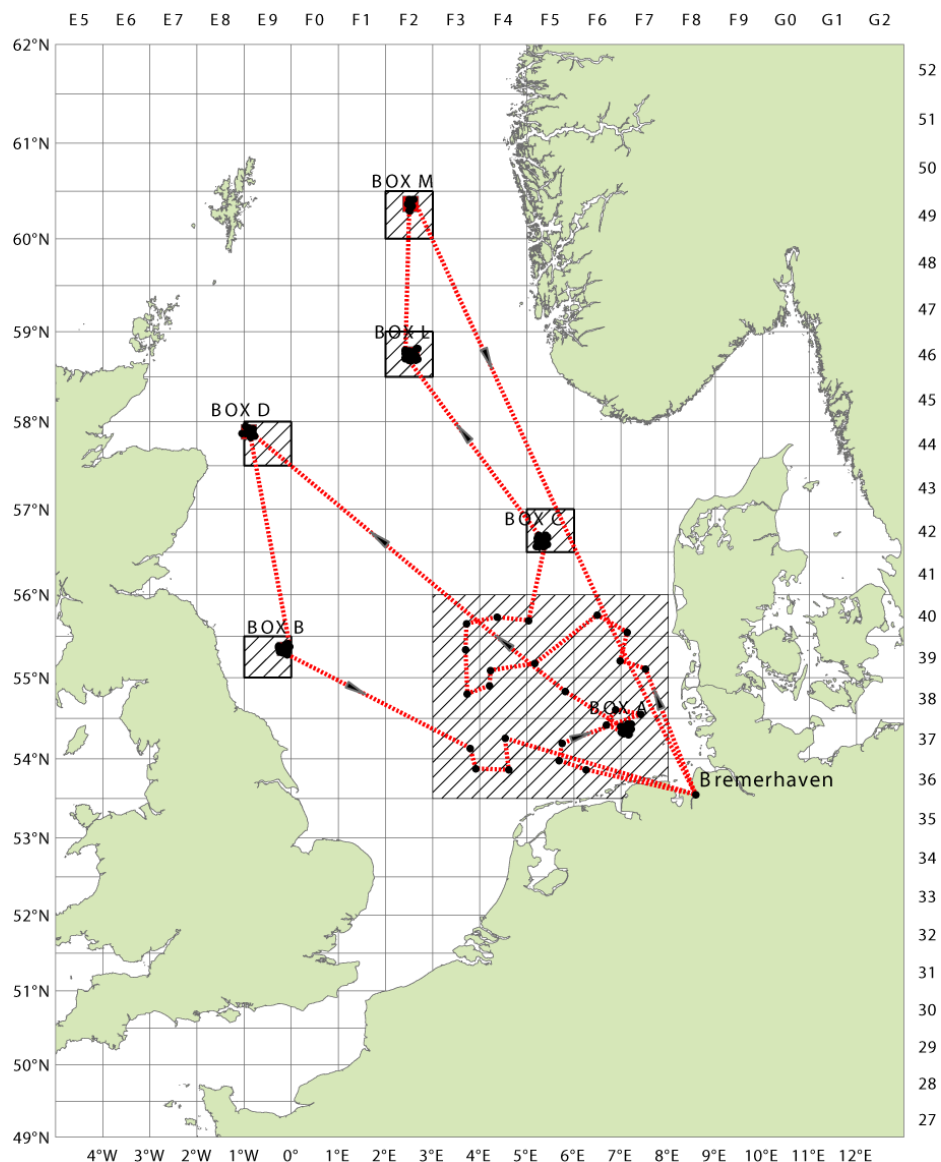


Figure 4.2.2.3. Cruise track of WHIII 345, GSBTS and IBTS, 26/07/-24/08/2011. Hatched area: ICES rectangles sampled within the IBTS; "Boxes", areas of investigation within the German Small-scale Bottom Trawl Survey (GSBTS); 36F7 not fished.

4.2.2.2 Denmark – North Sea Quarter 3 IBTS

Nation:	Denmark	Vessel:	Dana
Survey:	05/11	Dates:	10–26 August 2011
Cruise	The IBTS North Sea Q3 survey aims to collect data on the distribution, relative abundance and biological information on a range of fish species in ICES area IIIa and IV. CTD was deployed at each trawl station to collect temperature and salinity profiles. Age data were collected for cod, haddock, whiting, herring, mackerel, sprat, plaice and monkfish. Saithe and Nor way pout were not caught.		
Gear details:	The bottom trawl used was the GOV 36/47 rigged with groundgear A(44 stations) or groundgear B (5 stations) and the Exocet kite.		
Notes from survey (e.g. problems, additional work etc.):	SCANMAR sensors were used during all hauls, but not always data from for net opening and door spread were received.		
Number of fish species recorded and notes on any rare species or unusual catches:	About 65 species of fish and shellfish were recorded during the survey.		

Table 4.2.2.4.1. Stations fished.

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	GOV	49	49	0	0	100	

Table 4.2.2.4.2. Number of biological samples (individual length, weight and age).

Species	No	Species	No
<i>Clupea harengus</i>	657	<i>Sprattus sprattus</i>	369
<i>Gadus morhua</i>	272	<i>Trisopterus esmarki</i>	0
<i>Melanogrammus aeglefinus</i>	273	<i>Scomber scombrus</i>	353
<i>Merlangius merlangus</i>	610	<i>Pleuronectes platessa</i>	830
<i>Pollachius virens</i>	0	<i>Lophius piscatorius</i>	1

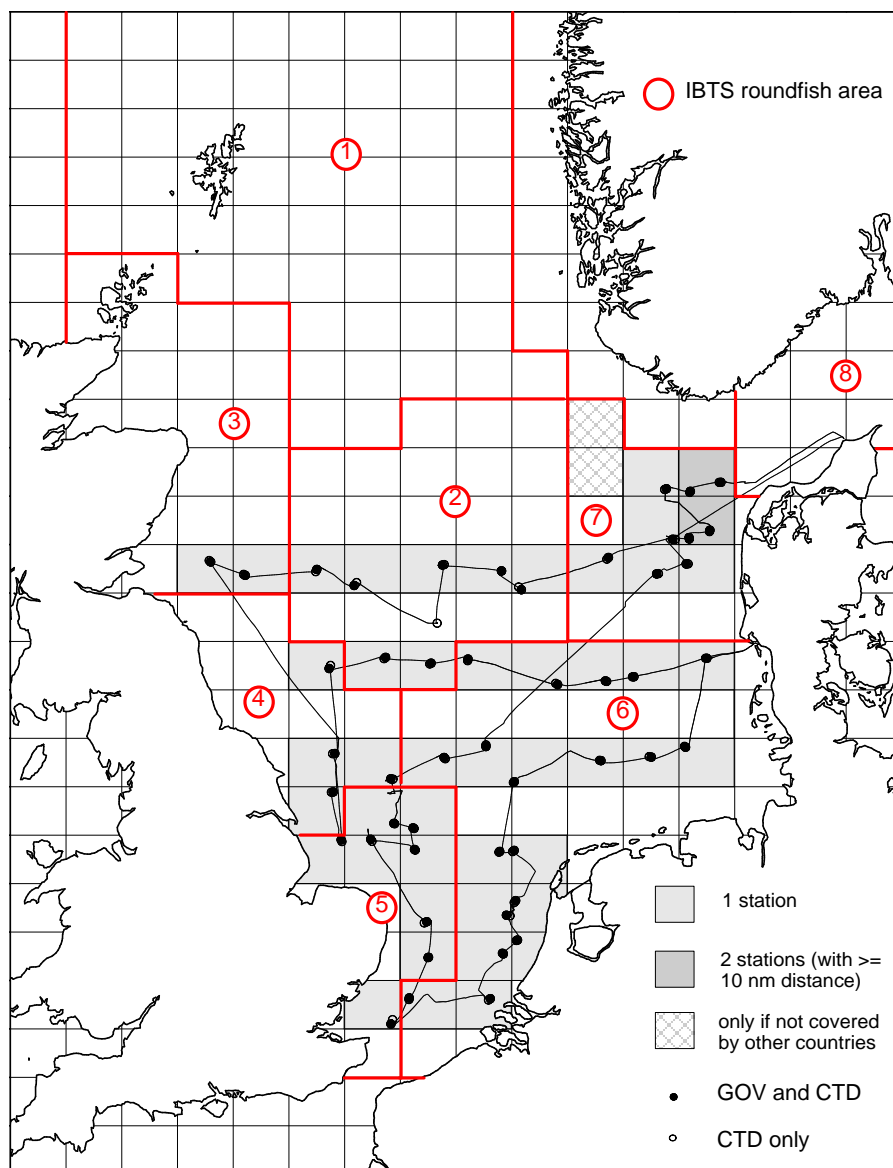


Figure: 4.2.2.4. Cruise track and sampling locations for Dana during the Q3 IBTS 2011.

4.2.2.3 UK (Scotland) – North Sea Quarter 3 IBTS

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	0911S (IBTS Quarter 3)	Dates:	29th July – 19th August 2011

Cruise	Q3 IBTS North Sea Groundfish survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on a range of fish species in ICES area IVa and IVb. Age data were collected for cod, haddock, whiting, saithe, Norway pout, herring, mackerel and sprat.
Gear details:	GOV using groundgear B on stations north of 57deg 30min North and groundgear A on stations south of 57deg 30min North.
Notes from survey (e.g. problems, additional work etc.):	<p>No significant problems encountered.</p> <p>A total of 84 valid hauls were achieved and there were no foul hauls. Fishing was carried out during the daylight period commencing each day at first light. Otoliths from all pelagic species were aged at sea with the demersal species being aged back at the institute. SCANMAR system was used throughout the cruise to monitor net parameters. Bottom contact sensor was used throughout the cruise and data retained for future analyses. Problems with the CTD deployments meant that bottom temperature and salinity data from more than half the survey were lost. The thermosalinograph was running throughout the survey providing surface temperature and salinity data.</p> <p>Opportunistic benthic work in partnership with JNCC was carried out on 15 nights during the survey with the drop frame being deployed successfully on 37 occasions in areas within the UK EEZ. In addition to the video footage and photographs obtained from the drop frame. The Day Grab was also deployed successfully a total of 40 times, with sediment and infauna being collected for analysis back at the laboratory..</p> <p>A request to collect additional biological samples from within the area affected by the Gannet pipeline oil spill was received on the 16th August requiring Scotia to respond upon completion of the fishing survey. In total 12 sediment and water samples were collected and 6 trawls were completed in order to collect the necessary quantity of fish of each species required.</p>
Number of fish species recorded and notes on any rare species or unusual catches:	<p>83 species with a total catch weight of 44.2 metric tons were recorded during the survey with the most interesting specimen encountered being a greater weever (<i>Trachinus draco</i>) which was caught in ICES rectangle 41F6. Catch weights for the major species are as follows, 6.2 mt (tons) haddock, 3.4 mt whiting, 16.4 mt herring, 2.4 mt mackerel, 2.0 mt sprat, 2.2 mt Norway Pout, 4.1 mt cod and 0.8 mt saithe. Unusual catches were experienced where a 30 minute tow at haul 339 yielded 2.7 mt of large Cod. Similarly at haul 381 0.75 mt of Cod was also caught for 30 minutes tow duration.</p> <p>Length, weight, sex and maturity data were collected from several species, as defined by IBTSWG. Following recommendations from IBTS and WKMSCWHS (ICES, 2007a), no maturity information was taken for cod, haddock, whiting and saithe. Additional biological data were collected from species in support of EU Data Collection Framework (DCF). Information on length, total weight, gutted weight, sex and maturity was collected for 13 species.</p>

Table 4.2.2.5.1. Stations fished (aims: to complete 84 valid tows per year).

ICES Divisions	Strata	Gear	Tows Planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	Comments
IVb		GOV-A	39	39	-	0	0	100	
Iva		GOV-B	45	45	-	0	0	100	
	TOTAL		84	84	-	0	0	100	

Table 4.2.2.5.2 Number of biological samples (maturity and age material):

Species	Age	Species	Age
<i>Gadus morhua</i>	532	<i>Sprattus sprattus</i>	307
<i>Melanogrammus aeglefinus</i>	1329	<i>Dipturus intermedia</i>	3*
<i>Merlangius merlangius</i>	1288	<i>Amblyraja radiata</i>	97*
<i>Pollachius virens</i>	491	<i>Leucoraja naevus</i>	46*
<i>Clupea harengus</i>	798	<i>Raja brachyura</i>	9*
<i>Scomber scombrus</i>	362	<i>Raja montagui</i>	95*
<i>Trisopterus esmarkii</i>	309		

*maturity only.

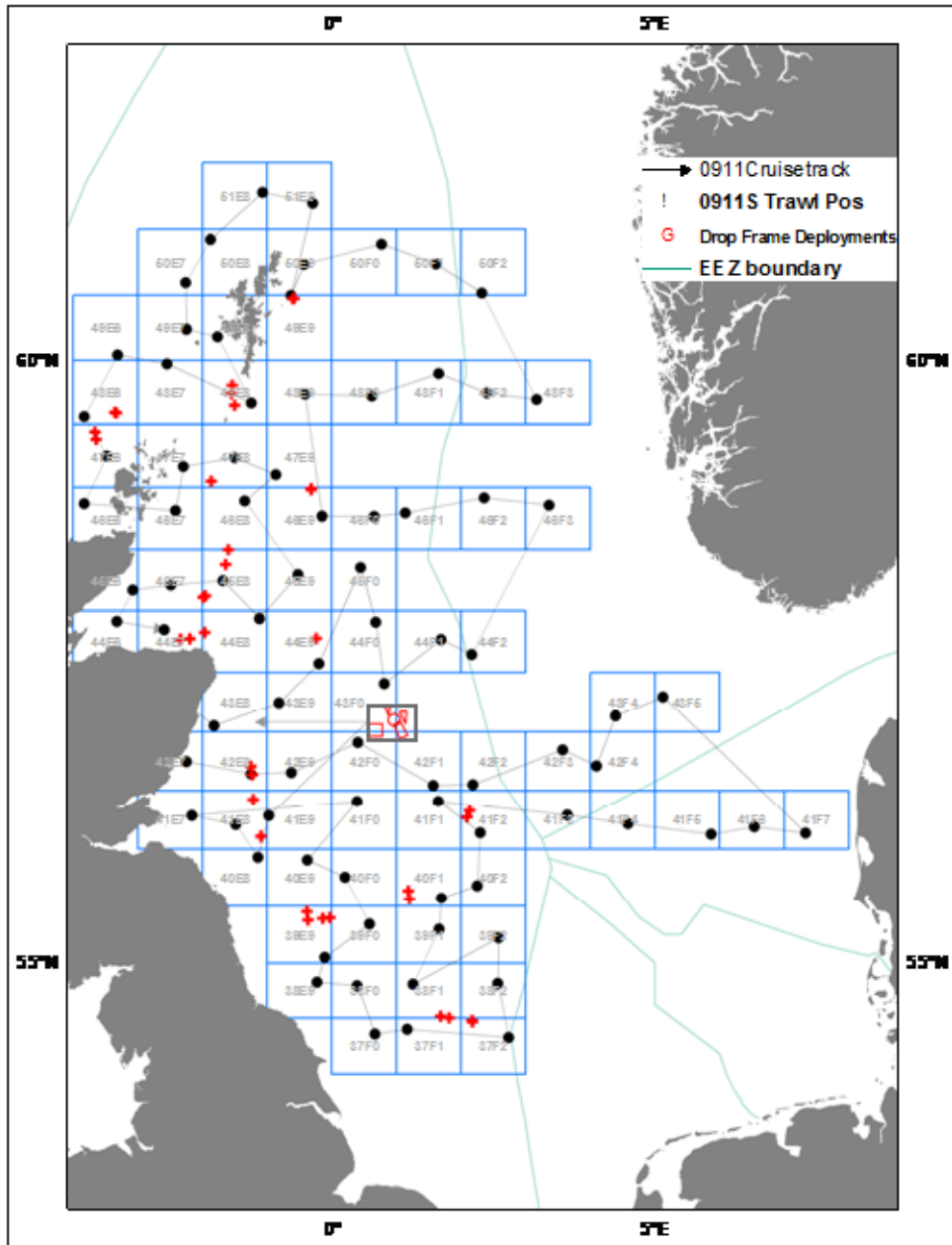


Figure 4.2.2.5.1. 0911S survey map. Grey rectangle represents the area of the Gannet oil spill (see figure below).

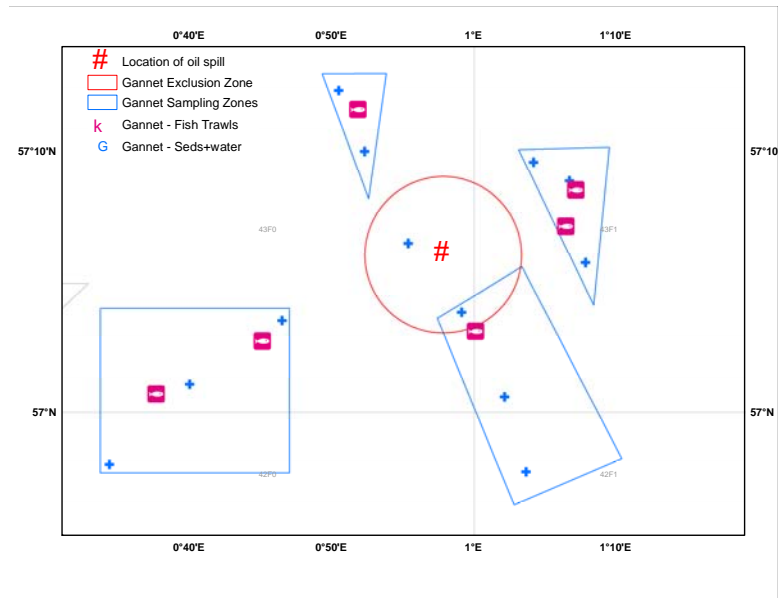


Figure 4.2.2.5.2. Area of the Gannet oil spill and subsequent sampling zones within.

4.2.2.4 Norway – North Sea Quarter 3 IBTS

Nation:	Norway	Vessel:	Johan Hjort
Survey:	2011210	Dates:	28 June – 25 July 2011

Cruise	Q3 North Sea survey aims to collect data on the distribution and relative abundance and biological information of commercial fish in Area IV. The primary species are cod, haddock, sprat, herring, Norway pout, plaice, sole, hake and saithe. The acoustic survey is coordinated by PGECCS and provides indices to calculate the quantity of herring, sprat and saithe. The two hydrographic sections (Hansthalm - Aberdeen, Utsira - Start Point) collect data on hydrography, nutrients, plankton, herring and sprat larvae. Process studies (2 days) examines the life-history dynamics of fish larvae. The survey also includes examination of the level of contaminants (from oil production) in fish (every 3rd year). Additional sampling includes gill samples of saithe for genetic analysis and stomach sampling for saithe was done.
Gear details:	IBTS standard GOV 36/47 with groundgear A, Exocet kite with SCANMAR door, bottom contact, trawl eye and headline height sensors was used for the IBTS stations, In addition, a Campellen trawl was used for contamination samples, for the pelagic index an small salmon-trawl (spectra) 50x10 meter was used, and a scrape was used for benthos.
Notes from survey (e.g. problems, additional work etc.):	Due to bad weather, the squares 52E9-F1, 51E9. 50E9, 49F0-F1 could not be fished; this meant that these rectangles were only fished once by the IBTS Q3 group of research vessels. Because of problems with stability of the trawl geometry, a strapping rope was used between the warps (11 m long, 150 m in front of the doors) for the last part of the survey. This secured a door spread of 70–75 meters. The impact to catchability has not been assessed.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 55 species of fish were recorded during the survey.

Table 4.2.2.6.1. Stations fished (aims: to complete 55 valid tows per year).

ICES Divisions	Strata	Gear	Tows				% stations fished	comments
			planned	Valid	Additional	Invalid		
VI	N/A	GOV	54	44	2	0	82	

Table 4.2.2.6.2. Number of biological samples (maturity and age material):

Species	Age	Species	Age
<i>Clupea harengus</i>	981	<i>Pollachius virens</i>	147
<i>Gadus morhua</i>	370	<i>Trisopterus esmarki</i>	215
<i>Melanogrammus aeglefinus</i>	541	<i>Merlangius merlangus</i>	300

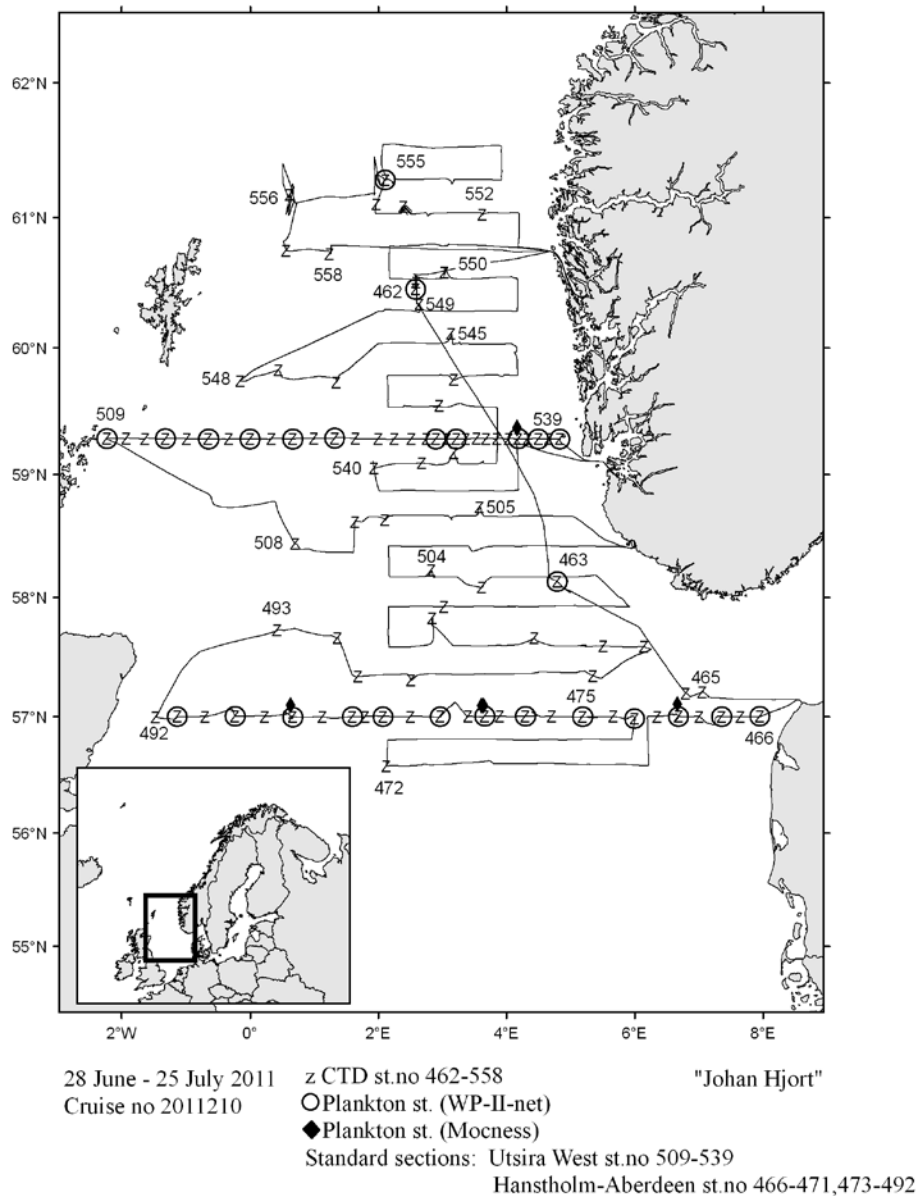


Figure 4.2.2.6. Cruise track of Johan Hjort during Cruise 2011210.

4.2.3 Results

The combined indices for the 0-group recruits of seven commercial species based on the 2011 quarter 3 surveys are shown in Figure 4.2.3.1. Every index for the target species are below the long-term mean, with haddock and cod being around the lowest for the time-series.

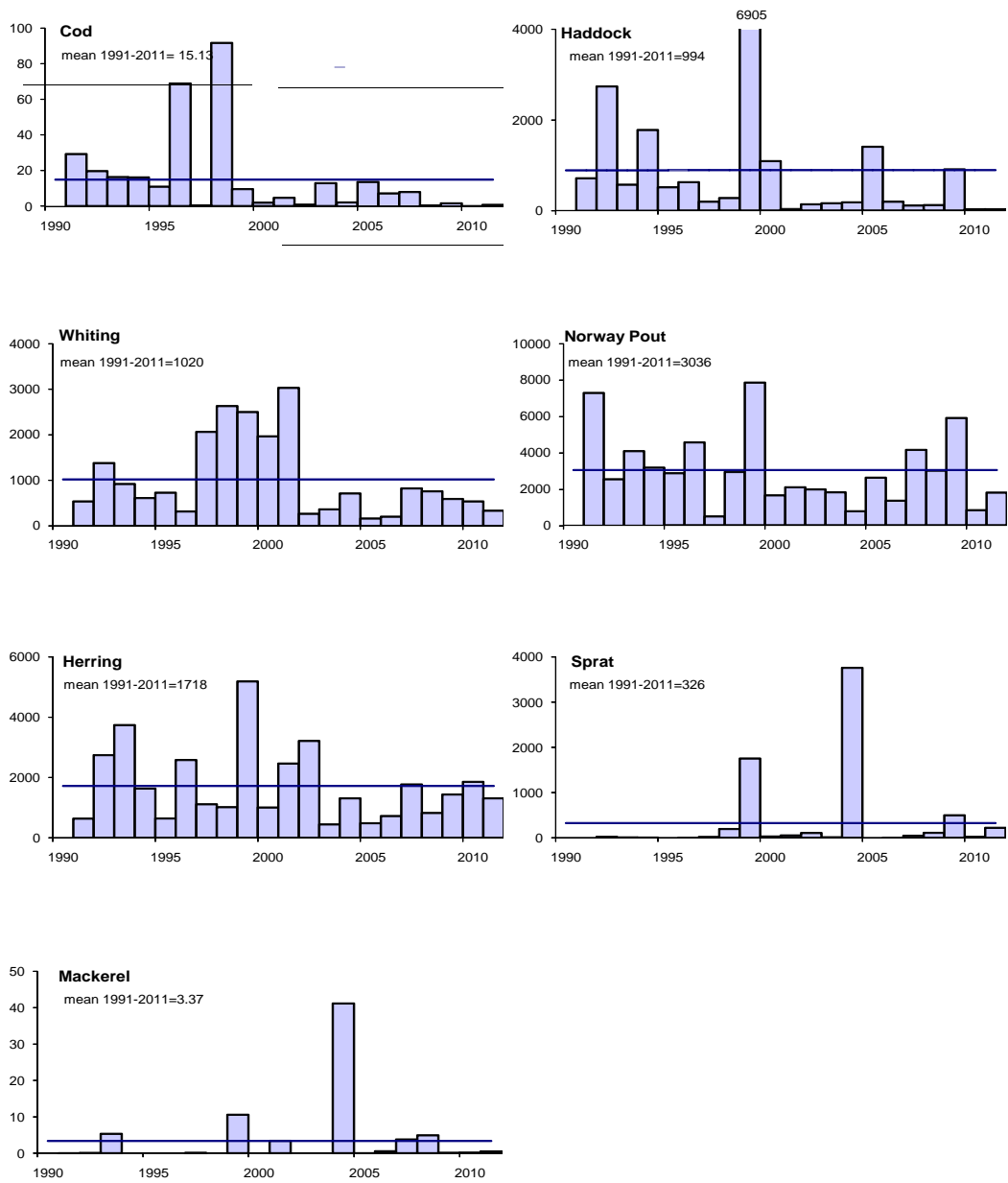


Figure 4.2.3.1. Time-series of indices for 0-group species during the quarter 3 IBTS survey in the North Sea, extracted from DATRAS.

Table 4.2.3.1 gives an overview of the number of biological samples as reported per country in Section 4.1.2. ** no additional species information available at time of reporting from Norway.

species	Den	Eng	Ger	Sco	Swe	Nor	total
Target species							
<i>Clupea harengus</i>	657	943	429	798	1363	981	5171
<i>Gadus morhua</i>	272	448	12	532	413	370	2047
<i>Melanogrammus aeglefinus</i>	273	775	227	1329	213	541	3358
<i>Merlangius merlangus</i>	610	976	421	1288		300	3595
<i>Pollachius virens</i>		321		491	106	147	1065
<i>Sprattus sprattus</i>	369	279	295	307	704		1954
<i>Trisopterus esmarki</i>		262	108	309	132	215	1026
<i>Scomber scombrus</i>	353	403	317	362		356	1791
Additional species						**	
<i>Scophthalmus rhombus</i>		9	5				14
<i>Microstomus kitt</i>		232	133				365
<i>Glyptocephalus cynoglossus</i>					148		148
<i>Lophius piscatorius</i>	1	26	3				30
<i>Lophius budegassa</i>							0
<i>Merluccius merluccius</i>			15				15
<i>Mullus surmuletus</i>		24					24
<i>Scophthalmus maximus</i>		5	2				7
<i>Trachurus trachurus</i>							0
<i>Pleuronectes platessa</i>	830	1019	222		680		2751
<i>Limanda limanda</i>		404					404
<i>Eutrigla gurnardus</i>		223					223
<i>Aspritlegla cuculus</i>		256					256
<i>Chelidonichthys lucernus</i>		33					33
<i>Amblyraja radiata</i>		188	139	97			424
<i>Dipturus batis complex</i>		5					5
<i>Raja montagui</i>		78		95			173
<i>Raja clavata</i>		19					19
<i>Raja brachyura</i>				9			9
<i>Leucoraja naevus</i>		52	13	46			111

4.2.4 Precision estimates

The ICES DATRAS system now provides precision estimates for the survey area. They are provided in Figures 4.2.4.1–7 as plots over the time-series.

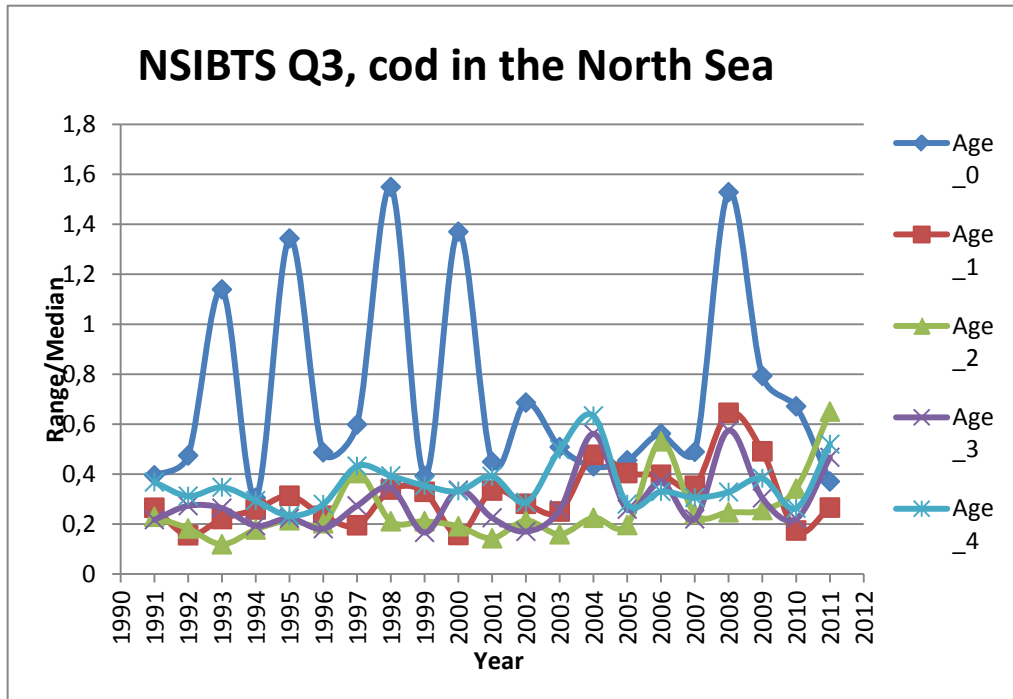


Figure 4.2.4.1. Precision estimate for cod in NSIBSQ3 for the North Sea.

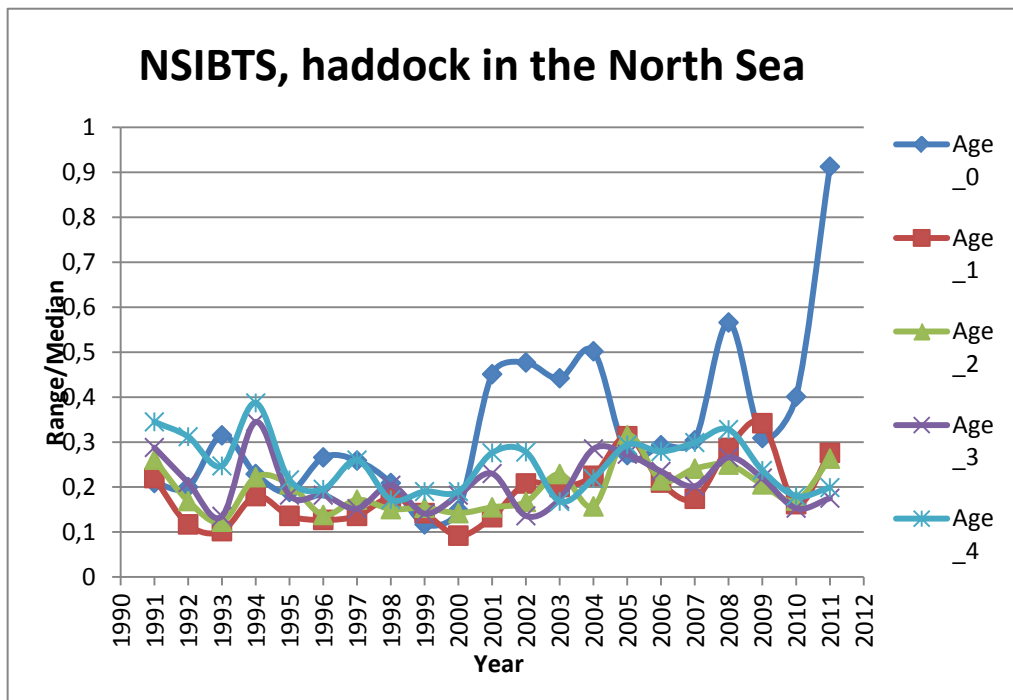


Figure 4.2.4.2. Precision estimate for haddock in NSIBSQ3 for the North Sea.

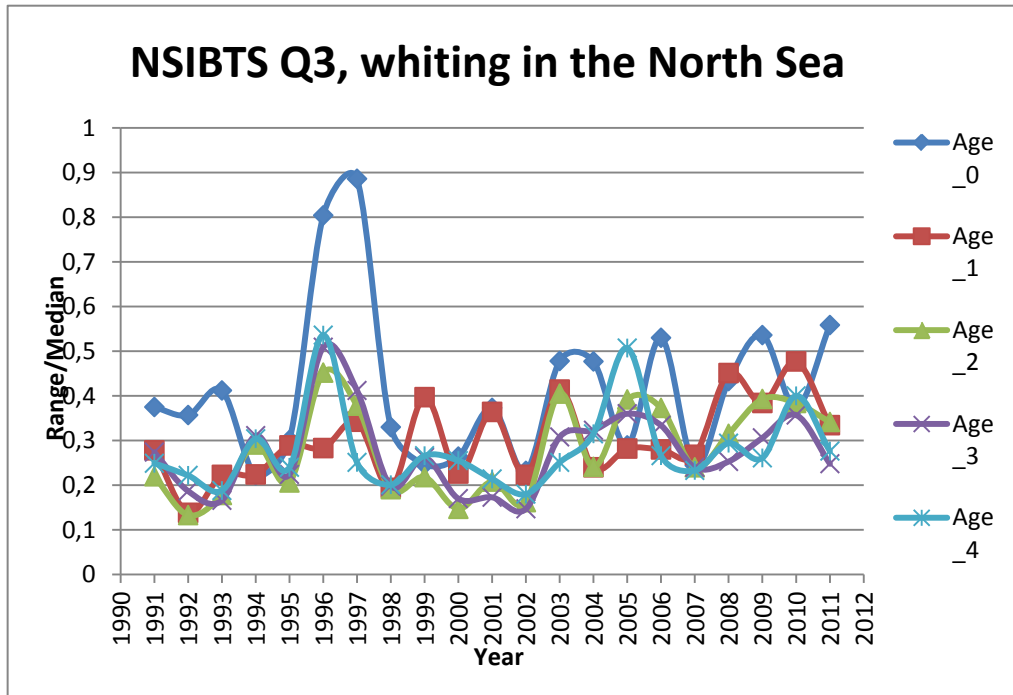


Figure 4.2.4.3. Precision estimate for whiting in NSIBSQ3 for the North Sea.

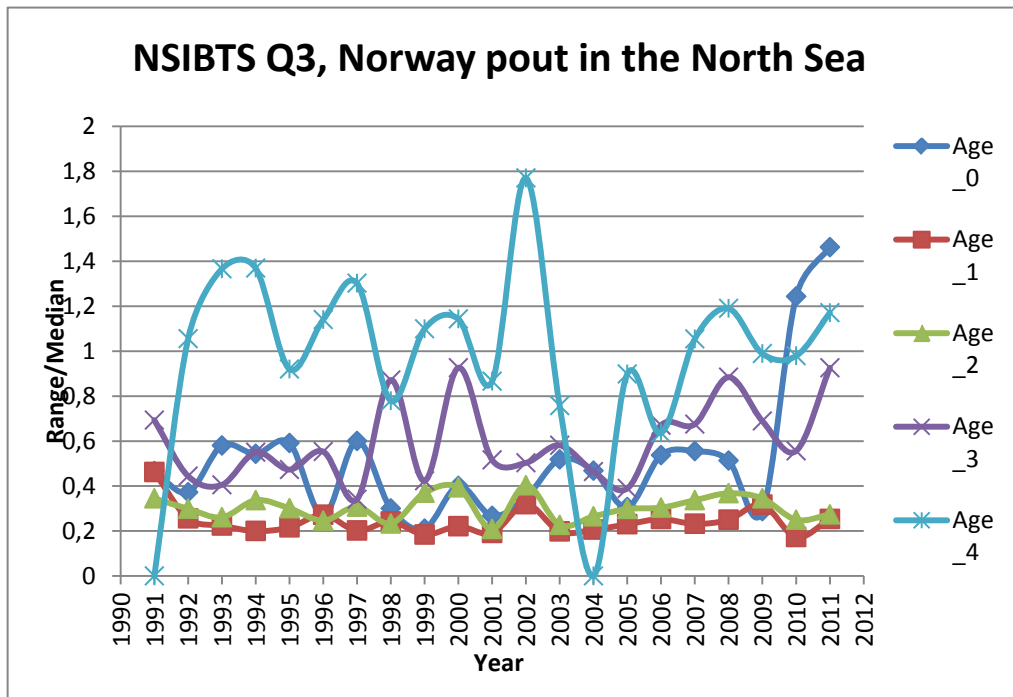


Figure 4.2.4.4. Precision estimate for Norway pout in NSIBSQ3 for the North Sea.

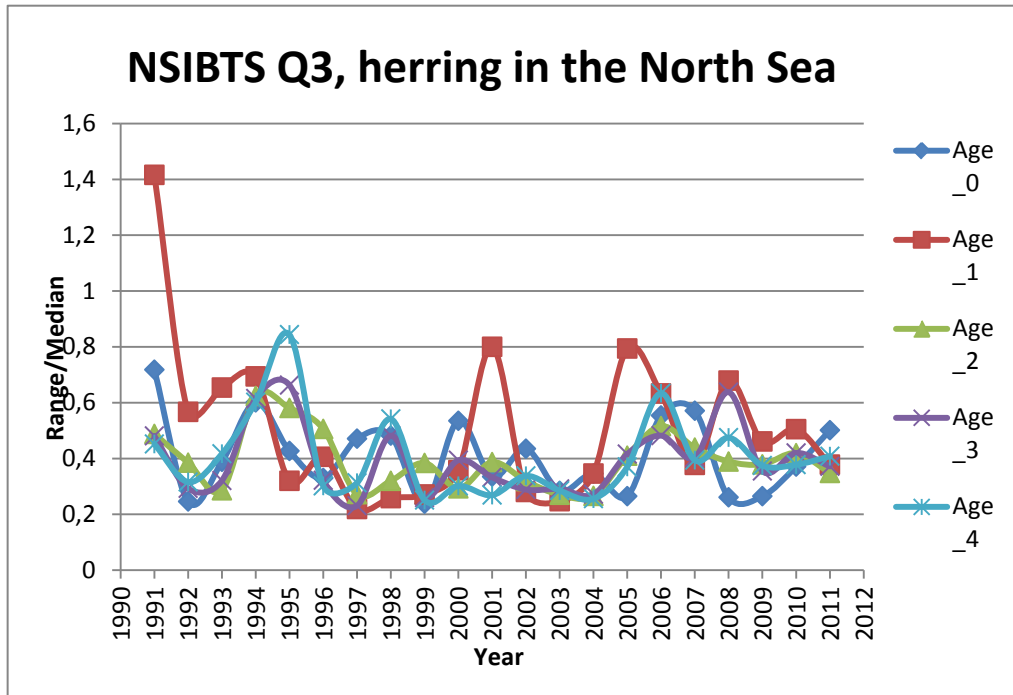


Figure 4.2.4.5. Precision estimate for herring in NSIBSQ3 for the North Sea.

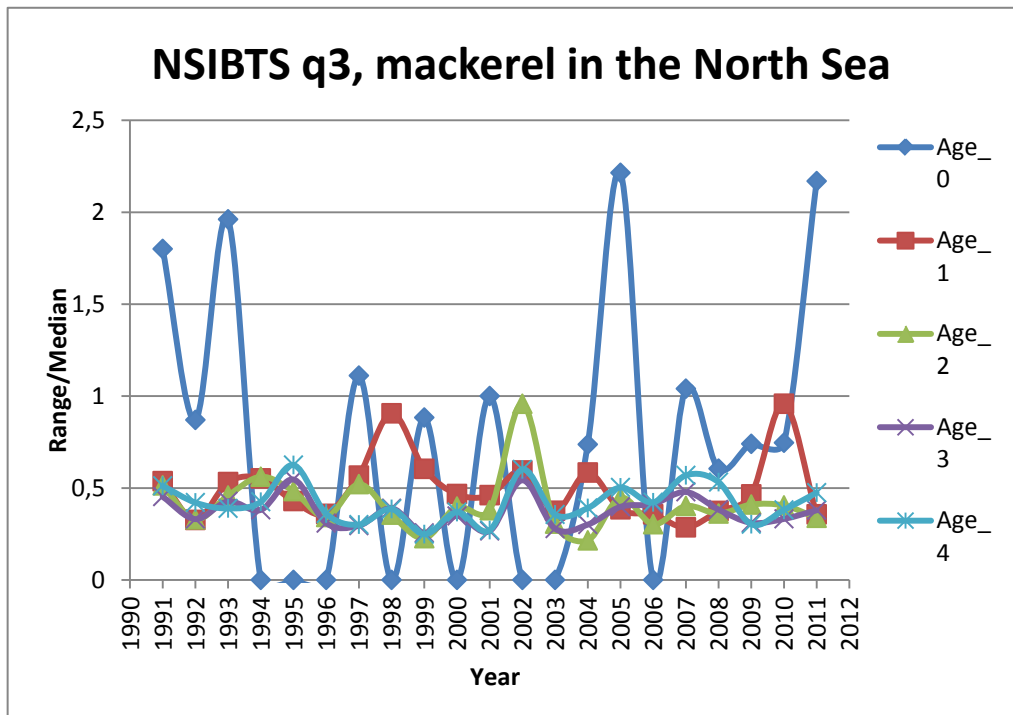


Figure 4.2.4.6. Precision estimate for mackerel in NSIBSQ3 for the North Sea.

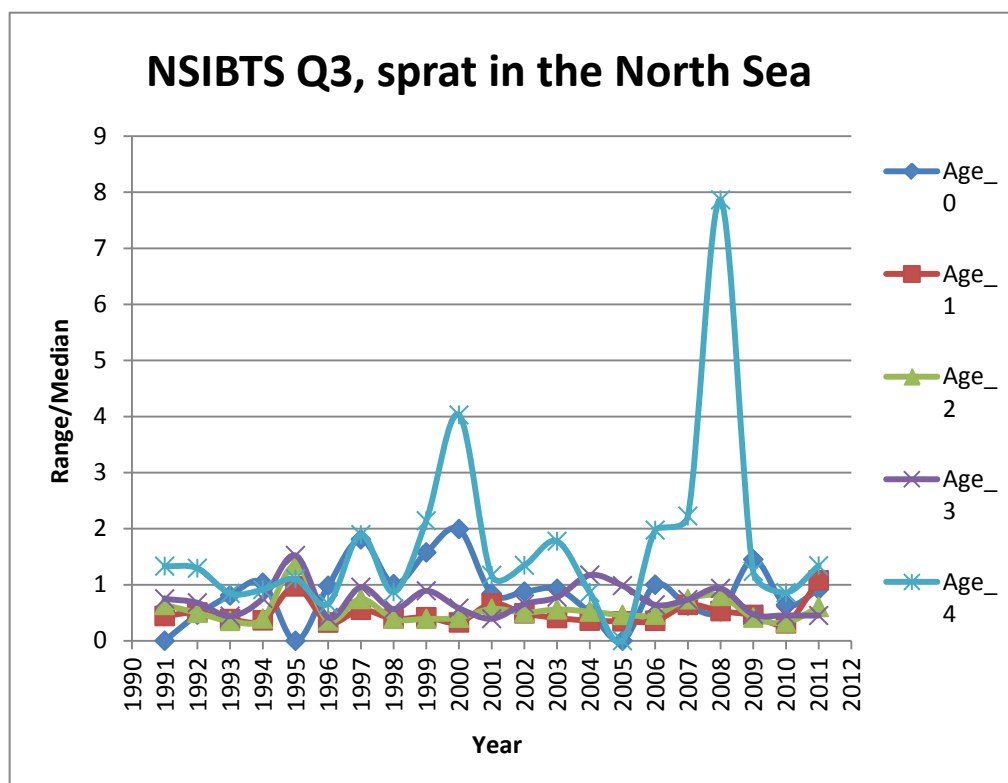


Figure 4.2.4.7. Precision estimate for sprat in NSIBTS Q3 for the North Sea.

4.2.5 Participation in 2012

All countries intend to participate in the quarter 3 2012 IBTS survey program. Below is a table showing the expected program dates for each country for this year.

Country	Vessel	Starting Date	End Date
England	Cefas Endeavour	7 August	7 September 2012
Denmark	Dana	23 July	9 August 2012
Germany	Walther Herwig III	19 July	17 August 2012
Norway	Johan Hjort	25 June	25 July 2012
Scotland	Scotia	22 July	12 August 2012
Sweden	Dana	11 August	23 August 2012

It is hoped that at least one staff exchange will occur during the 2012 quarter 3 surveys, with an offer from Cefas for a scientist from the France to join their survey in August.

4.2.6 Other issues

4.2.6.1 Swedish vessel issue

Background

In late 2010 when the Swedish research vessel RV “Argos” was due to have an auxiliary engine repaired it was discovered that ceilings and walls in the aisles of the ship were covered with asbestos sheets. Since asbestos is classified as a carcinogenic, the Swedish Board of Transportation closed the ship down in early in 2011 leaving the Institute of Marine Research in an awkward position, having to replace RV “Argos”

just a few weeks before running the IBTSQ1. Because of the short notice we had to resort to our smaller vessel RV “Mimer” which was not quite appropriate to this kind of survey and we had to reduce number of hauls and skip MIK-hauls altogether.

Finding a replacement for RV “Argos”

Realizing that Argos wouldn't sail the seven seas again, a request was put forth to our fellow IBTS-member states whether any research vessels of suitable size were available for charter. With great appreciation, IBTSWG members from almost every country promptly replied to the request saying whether or not they had the possibility to help. Six vessels were available for charter. After some consideration we decided to go forward with the Danish research vessel RV Dana. Some of the reasons behind the choice were:

- Dana had the capacity to perform the different tasks we wanted in terms trawling, larvae-trawling, CTD and acoustics.
- Dana was available within the time span required.
- At least two of our personnel had already sailed with RV Dana so we were already quite familiar with the procedures and labs on board.
- Chartering Dana included a technician who would be responsible for CTDs and the data software.
- Dana's home port is Hirtshals, a mere 6 hours sailing from Lysekil which played a role in costs and time.
- No significant language barrier.

During spring and summer representatives from IMR, Lysekil met with the Danish ship-owner and captain to make more detailed plans. Obviously we wanted to use our own trawls and trawl doors to maintain the same conditions for our time-series. The increased need for staff that Dana had for these extra days at sea was discussed. It was suggested that some of our officers and crew from RV Argos would join the cruise which would ensure that the trawling and rigging would be the same as previous years and the knowledge to trawl our waters would be passed on to the Danish crew.

Running the cruise

First time out with RV “Dana” was IBTS 2011Q3. Dana sailed to Lysekil to pick up gear and Swedish personnel. Trawls and trawl doors were transported by lorry from Gothenburg to Lysekil. Two of the Swedish deck crew supervised the rigging of the trawl. The Swedish captain was onboard to help out with the trawling. One test haul was performed to make sure everything was in place and working. We used the sensors from RV Dana measuring door spread, opening and warp length but the bottom contact sensor was not available.

On RV Argos all parameters were compiled automatically into one excel-sheet to produce mean values but on RV “Dana” the data output was made from several different reports which led to a lot cutting and pasting to fit our standard forms.

Shooting and hauling the trawl was a lengthier procedure than what we were used to on Argos. Having a number of hauls in close vicinity to each other and fast handling when shooting and hauling allowed us to make 5–6 hauls on Argos but this was almost impossible on the Dana (two exceptions). On Argos we also could, if we were

short of time, easily run the CTD while hauling, this was not possible on Dana since the CTD was operated by the same people who were taking in the trawl.

Sorting the catch and taking biological samples basically followed the same routine we had on Argos, only we weighed the total catch on Dana before sorting whereas on board Argos the weighing took place after sorting. The catch data were registered on our return to the institute but for the following cruise we brought the database on a laptop and all the catch data were punched in on board which saved a lot time.

Summary

- The ship owner as well as the entire Danish crew onboard has, all through this adventure, been very service-minded and helpful, easing the stress of a new set up.
- Having a mix of Swedish and Danish crew was invaluable; one lot knew the boat, the other the gear and waters.
- Having technical assistance with the running of the CTD and the export of data from the internal information system was extremely valuable.
- Switching boats is a bit stressful; you lose your routines etc., so having experienced staff in the lab and on the bridge is certainly important.

4.2.6.2 Staff exchange in 2011

There is a recommendation from the IBTS working group as well as the SSGESST (SCICOM Steering Group on Ecosystem Surveys Science and Technology) that seagoing technical or scientific personnel take part in other countries surveys in order to study trawling and biological sampling procedures onboard ships partaking in internationally coordinated programs.

There is a growing awareness within the ICES internationally coordinated monitoring programs of the usefulness to exchange sea-going technical and scientific personnel between countries. Taking part in other countries surveys allows the study of each others' trawling and biological sampling procedures onboard ships, and may lead to new insights to improve one's own protocol.

During the 3rd quarter Matthias Kloppmann from vTI-SF participated in the Norwegian IBTS on RV "Johan Hjort" from 14–19 July 2011. The major objective of the participation was to gather experience on research vessel ship design for the planning of the replacement of the current German FRV "Walther Herwig III". However, valuable information on combined IBTS and herring acoustic survey design together with other ecosystem directed studies could be collected. Furthermore, information on semi-automated data collection during sample workup was obtained. On the Norwegian vessel all data are collected using Scantrol electronic measuring boards while on the German vessel data collection is still pen and paper method. Another outcome of the exchange was the comparison between the GOV specification and deployment between the Norwegian and the own, German vessel. The major difference between both nations is that the Norwegian GOV is made of only two types of twine while the German GOV is made of 4 types. Particularly in the bottom panel the twines in the German net are thinner, 1.8 mm opposed to 2.4 mm in the Norwegian net. All twines in the Norwegian nets are impregnated black while the German net twines are not. While the Norwegian net is spooled onto a net drum that is capable to take sweeps, bridles and net, the German net is hauled onto the deck. The Norwegian method

makes it much easier to shake specimens that are caught in the wings and fore net into the codend.

4.2.7 References

ICES. 2006. Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks (WGNSSDS). ICES CM 2006/ACFM:30. 870 pp.

ICES. 2007a. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Combined Spring and Autumn (WGNSSK). ICES CM 2007/ACFM:18 and 30. 960 pp.

ICES. 2007b. Report of the Workshop on Sexual Maturity Staging of Cod, Whiting, Haddock and Saithe (WKMSCWHS). ICES CM 2007/ACFM: 33. 62 pp.

4.3 Eastern Atlantic

4.3.1 General overview

In 2011, since the March coordination meeting, 14 groundfish surveys have taken place in the ICES NE Atlantic area. Survey coverage is consequently back in line with previous years having been restricted in the northwest (ICES Division VIa) after Scotland encountered a significant vessel breakdown in 2010 (see IBTS 2011 report). The number of valid tows reported for the western area surveys detailed below is 945, which includes the three spring surveys (Scotland, Northern Ireland and Spanish survey of the Gulf of Cádiz) as well as the more common autumn and winter surveys.

Weather is reported to have significantly impacted on surveys by Scotland (Q1 and Q4); Ireland (Q4 area VIIb specifically); England (Q4 area VIIh specifically); Spain (Porcupine Bank Survey) and Portugal (Q3–4). Of these the Spanish Porcupine survey seems to have been most significantly impacted with continual poor conditions and it is suggested the data are interpreted in that context. For the Irish survey there was a significant weather impact in Division VIIb with only 21 valid out 38 target stations completed (55%). The remaining surveys mentioned above seem to have lost just a couple of days each, but data should still be interpreted in the context of presumably unsettled conditions around these weather impacts.

Access to historical survey tows/areas is flagged again (Portugal and Ireland) as being problematic in some regions due to static gear, even though the areas are often localized. The habitats on which pots and other static gears are not random. Survey managers and data users should be mindful of any potential bias in sampling.

A short presentation of a combined index for cod in area VIIg was given by Ireland. This combined data from the FR-EVHOE and IR-GFS surveys in the Celtic Sea and was submitted to the roundfish benchmark meeting (WKROUND 2012) in spring (Annex 5 - WD: 2). The index was approved by the benchmark meeting as an improvement on the current independent indices and will be used in stock assessments going forward. A combined haddock index for the same surveys and area was also accepted by the benchmark process. This marks the first two combined indices for the western area.

France presented a proposal for a new ecosystem survey in the western English Channel (CAMANOC: Annex 5 - WD: 3). The complex fisheries dynamics in this area has been highlighted a number of times in light of the French Channel Survey not being able to achieve reasonable internal consistency in survey indices. The presenta-

tion on CAMANOC drew attention again to the importance of this particular region, both in terms of ecosystem and fisheries. That being the case it was recommended that the new Working Group on Improving use of Survey Data for Assessment and Advice (WGISDAA) look at this survey area in terms of the difficulties and importance of providing survey data from what is likely to be a transition area for some stocks at least. Secondly that, as per IBTS criteria, a relevant ICES expert group be identified as having an interest in the data and willing to provide expert feedback to the IBTS survey group as to the quality and utility of the results as the survey develops over the initial period (usually taken as 5 years for time-series data).

UK-England presented their intention to cease the UK-Cefas Q4 Survey in favour of a spring survey. Currently no indices are being used in assessment from this survey, and the new survey will have reduced station coverage in VIIa south. It will be important to review these gaps intersessionally and look at sharing out the vacated clear tows among the remaining surveys where appropriate to existing sampling designs.

The three Scottish surveys are presented below as a commencement of the new survey design outlined in working documents to IBTS 2011, the Working Group for the Celtic Seas Ecoregion 2011 (WGCSE 2011 report, ICES 2011), and Working documents presented to the group. While significant intra-calibration work had been done in relation to the trawl modifications in particular (Annex 5 - WD 5), the comparative fishing results were not readily available at the time. The lack of numerical guidance as reference to potential changes in catchability caused significant difficulties for the assessment of stocks in the VIa area, and there were no alternate survey data that covered the stock area.

Major changes to standardized survey operations are invariably difficult and the enforced break in the Scottish time-series due to vessel failure the previous year was an unforeseen "window of opportunity" in which to consider implementing an impending change. More formal analysis of a number of comparative fishing operations are now finalized and were presented at IBTS 2012 (WD 4). Analysis of catchability differences between new and old gear (WD 5) appeared comprehensive and robust and should be of benefit to WGCSE who would be better placed to comment on the statistical analysis. As the intention is to commence a new time-series with this design any bias issues arising between new and old survey designs therefore disappear.

The design, justification and documentation of both the modified gear and sampling protocol have been well presented and draw on the concluding recommendations from several ICES expert groups tasked specifically with ongoing survey issues experienced by IBTS and others (e.g. WKSAD2004–05: ICES 2004a and 2005a; SGSTG2003–04 ICES 2003 and 2004b; SGSTS2005–09 ICES 2005b, 2006). While a sound foundation was being put in place to incorporate such a change the level of coordination within IBTS and between it and other working groups was acknowledged as poor at the time, partly for reasons outlined above.

Had the current analytic information been available at the time of the unforeseen break in the time-series there is no doubt the change over process could have been less dramatic. That should be seen however, as reminder of the important assumptions around survey data that need to be provided for, rather than a barrier to sensible changes in survey operations if and when these assumptions are addressed. Overall, the difficulties experienced were largely timing and coordination rather than technical.

4.3.2 Survey summaries by country

4.3.2.1 UK–Scotland: SCOGFS–Q4 (Western Division Bottom Trawl Survey*)

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	1411S	Dates:	19 November – 8 December 2011

Cruise	Q4 Western Groundfish survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on a range of fish species in ICES areas VI. Age data were collected for Cod, Haddock, Whiting, Saithe, Herring, Mackerel and Sprat.
Gear details:	GOV (+belly lines) with groundgear D for all stations. (nb/ change of groundgear for this survey)
Notes from survey (e.g. problems, additional work etc.):	55 valid hauls In 2011 the survey design, rather than relying on fixed trawling locations moved to a new random-stratified survey design with trawl locations randomly distributed within 10 a priori sampling strata. Trawls were undertaken on suitable ground as near to the specified sampling position as was practicable and within a radius of 5 nautical miles of the sample position. Scotia was plagued with terrible weather for the majority of this survey. Due to the admirable work ethic of the ships Captain and crew, we only lost approx 1 day of survey time due to weather conditions. This resulted in the trip achieving a total of 59 trawl hauls with the GOV. Of this total, 3 were assigned as foul hauls due to the level of gear damage sustained and the other due to the capture (and subsequent safe release) of a 7m basking shark. The SCANMAR gear monitoring system and the NOAA bottom contact sensor were used throughout the survey to observe the gear performance. Limited TV and grabbing work was undertaken during the night to provide information for the Scottish Governments Marine Protected Area (MPA) programme..

Table 4.3.2.1.1. Stations fished (aim to complete 170 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid with rock-hopper	Additional Invalid	% stationscomment fished s
VIa		GOV-D	60	55	-	4 92
TOTAL			60	55	-	4 92

Table 4.3.2.1.2. Number of biological samples (maturity and age material, *maturity only):

Species	Age	Species	Age
<i>Clupea harengus</i>	630	<i>Merluccius merluccius*</i>	142
<i>Gadus morhua</i>	177	<i>Chelidonichthys cuculus *</i>	195
<i>Melanogrammus aeglefinus</i>	905	<i>Pollachius virens</i>	189
<i>Merlangius merlangus</i>	609	<i>Scomber scombrus</i>	435
<i>Molva molva*</i>	25	<i>Microstomus kitt*</i>	77
<i>Pollachius pollachius*</i>	7	<i>Spratus spratus</i>	134
<i>Conger conger*</i>	5	<i>Trisopterus esmarkii</i>	252

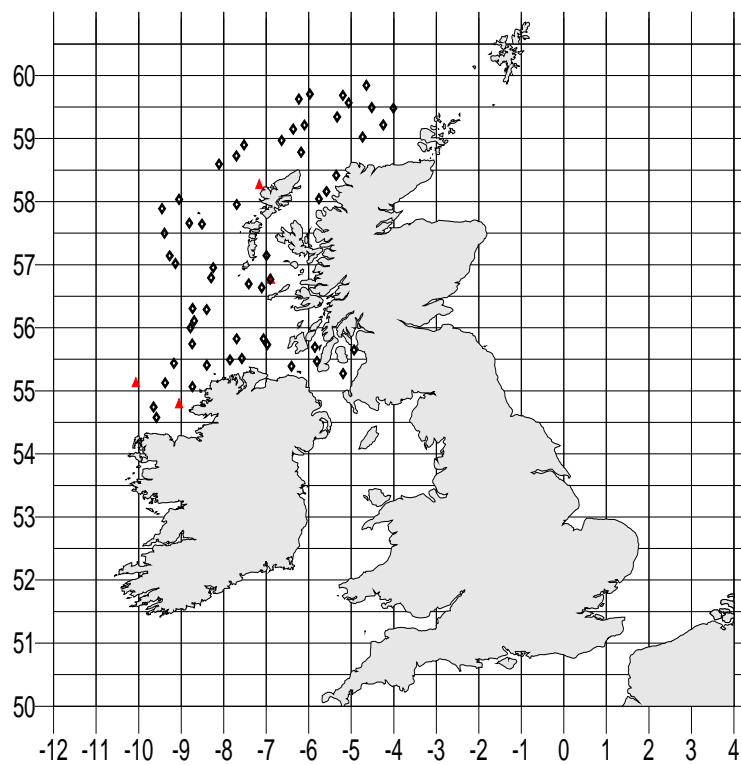


Figure 4.3.2.1. Trawl Positions for Scotland Q4 IBTS survey 2011 (Foul / Invalid tows displayed in red).

4.3.2.2 UK–Scotland: SCORoc Q3 (West of Scotland Rockall Survey** Q3)

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	1011S	Dates:	24th August – 3 September 2011

Cruise	Q3 Rockall Haddock survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on haddock and a range of other fish species in ICES area VIb. Age data were collected for Haddock and Saithe.
Gear details:	The GOV was used throughout the cruise with groundgear "D". The SCANMAR system was used throughout the cruise to monitor headline height, wing spread, door spread and distance covered during each tow. A bottom contact sensor was attached to the groundgear for each tow and a temperature at depth sensor attached to the headline.
Notes from survey (e.g. problems, additional work etc.):	This year a new survey design was introduced. The new design was randomized by depth stratum and extended the depth coverage to 400 m. Trawl stations were selected randomly by computer. If the precise location of the station posed problems with respect to unsuitable ground for trawling, the station was moved to the nearest trawlable ground within a maximum of 5 nm from the original site and within the same depth stratum. A total of 45 valid hauls were achieved. There were two foul hauls caused by obstructions on the seabed. Fishing was carried out during daylight commencing each day at first light. Otoliths were aged subsequently at the laboratory. All haul summary data and length frequency was entered at sea. A CTD was deployed at selected stations across the survey. At night video transects were made of the seabed.
Number of fish species recorded and notes on any rare species or unusual catches:	54 species were caught during the survey for a total catch weight of 23464 kg. No cod were recorded this year and only total of 7 saithe were recorded. Large catches of sandeels (3 tonnes) and grey gurnards (4 tonnes). For haddock, although a different survey design was adopted in 2011, it is nevertheless useful to put the abundance indices in the context of previous years (Fig 1). 2011 was the worst year since 1992 for recruitment for haddock at Rockall (number 0-gp fish per 10 hours = 5) with a grand total of only 13 0-group fish being recorded. There were very small numbers of 1 year old through 5 year old fish, representing the poor state of recruitment since 2005 (Fig 2). Accordingly only 6 year old fish were present in good number, representing the strong year class of 2005. No haddock were recorded at depths greater than 300 m.

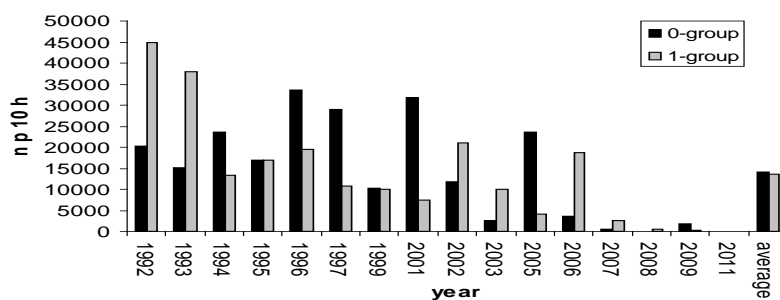


Figure 1 – The provisional 0-group indices for haddock at Rockall in 2011, shown relative to the previous years and the long-term average.

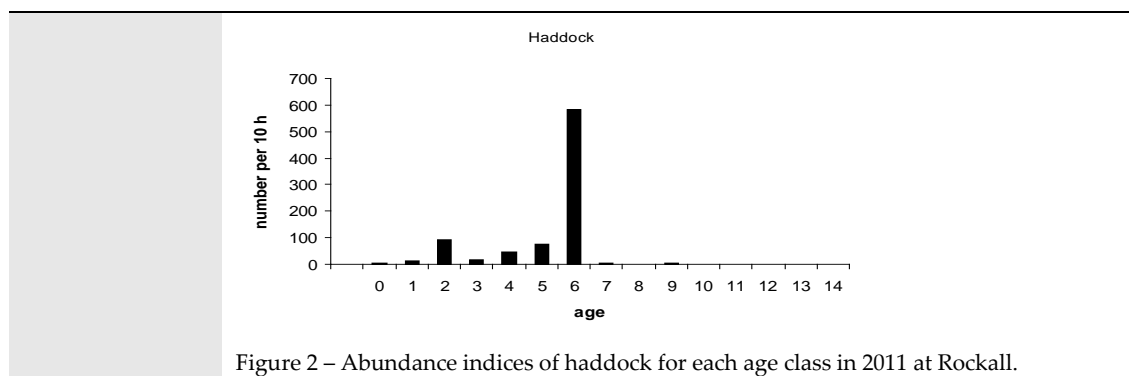


Figure 2 – Abundance indices of haddock for each age class in 2011 at Rockall.

Table 4.3.2.2.1. Stations fished (aims: to complete 45 valid tows per year in ICES Subarea VIb).

ICES Divisions	Strata Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIb	GOV - D	45	45	2	2	100	

Table 4.3.2.2.2. Q3 SCRocGFS cpue data for major species: 2011.

Species	Strata	Mean nos/hr	Mean kgs/hr
<i>Eutrigla gurnardus</i> : Grey gurnard	All	1316.7	291
<i>Ammodytes tobianus</i> : sandeel	All	1802.1	130
<i>Gadiculus argenteus</i> Silvery Pout	All	4254.1	124
<i>M. poutassou</i> Blue Whiting	All	1794.1	106
<i>Sebastes viviparus</i> Norway haddock	All	698.9	93.9
<i>M. aeglefinus</i> Haddock	All	93.2	60
<i>Trisopterus minutus</i> Poor cod	All	2588.7	51.2
<i>Argentina sphyraena</i> Lesser argentine	All	735.7	43.6
<i>Chimaera monstrosa</i> Chimarea	All	27.2	30.1
<i>H. dactylopterus</i> Blue mouth	All	134.6	24
<i>Molva molva</i> Ling	All	7.7	15.1

Table 4.3.2.2.3. Number of biological samples (maturity and age material):

Species	Age	Species	Age
<i>Pollachius virens</i>	7	<i>Dipturus intermedia</i>	10*
<i>Melanogrammus aeglefinus</i>	557	<i>Dipturus flossada</i>	6*
<i>Dipturus oxyrinchus</i>	4*	<i>Raja clavata</i>	6*

*maturity only.

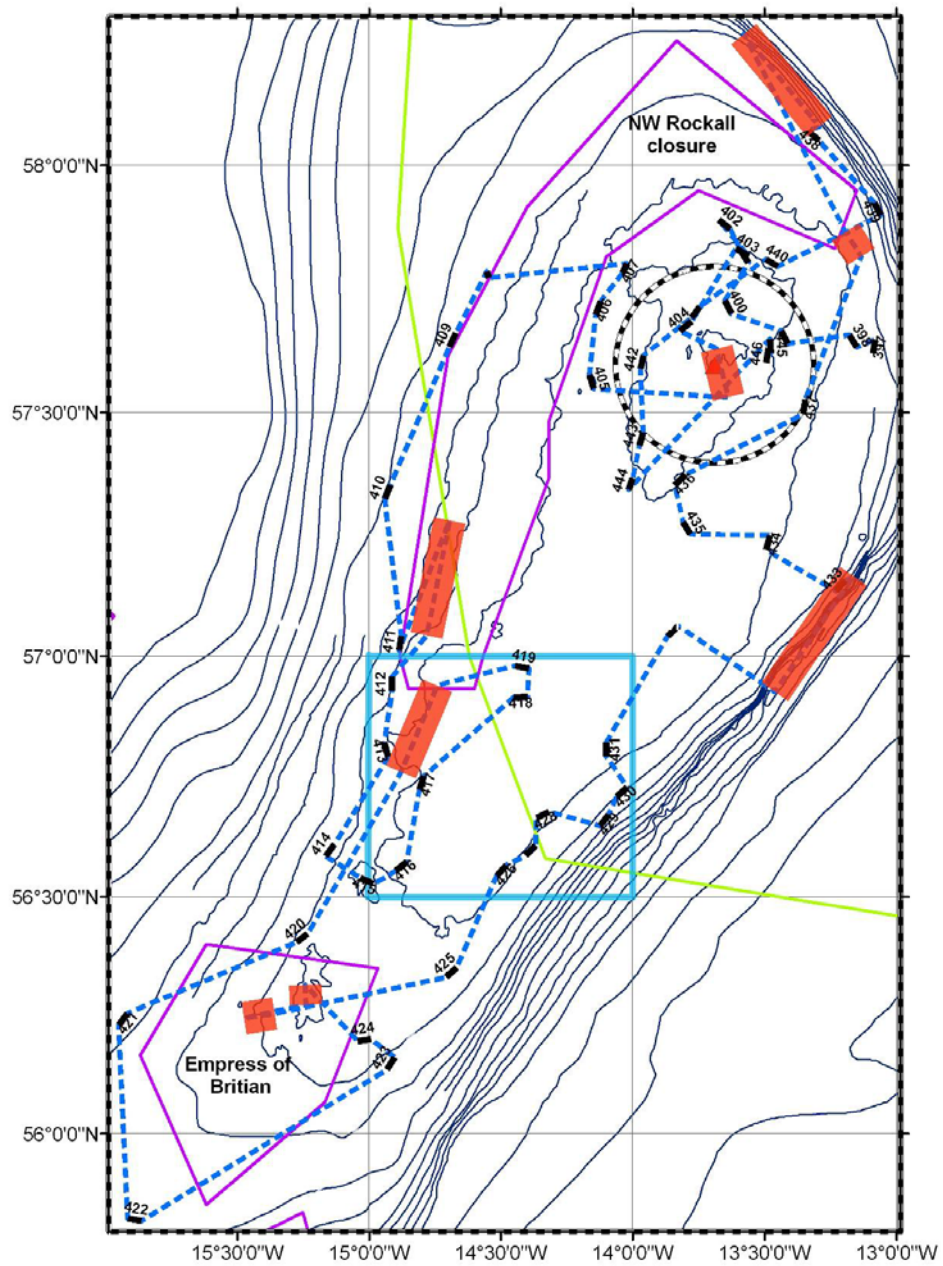


Figure 4.3.2.2.1. Trawl stations completed at Rockall. Dashed blue line: approximate cruise track, numbered black lines: trawl positions, thick red lines: towed video deployments. Purple boxes: NEAFC coral closures, blue box: NEAFC haddock closure. Dashed line: 12 nm UK limit. Green line: 200 mile EEZ fishing limits.

4.3.2.3 UK–Scotland: SCOGFS–Q1 (Western Division Bottom Trawl Survey Q1)

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	0311S (WIBTS Quarter 1)	Dates:	22 February – 16 March 2011

Cruise	<p>Random stratified demersal trawling survey of the grounds off the north and west coast of Scotland. ICES Subarea VIa. Collect abundance data on pre – metamorphosed herring larvae using the 2 meter circular framed methot net.</p> <p>To obtain temperature and salinity data from the surface and seabed at each trawling station. Collect additional biological data in connection with the EU data collection framework (DCF). Trial Cefas electronic data collection system during the survey as a potential replacement for the outdated SHEETS system.</p>																																																												
Gear details:	GOV Trawl (BT 137) fitted with groundgear D. Full size Methot Net with round frame.																																																												
Notes from survey (e.g. problems, additional work etc.):	<p>No significant problems encountered. In 2011 the survey design, rather than relying on fixed trawling locations moved to a new random-stratified survey design with trawl locations randomly distributed within 10 a priori sampling strata. (See Figure1.) Trawls were undertaken on suitable ground as near to the specified sampling position as was practicable and within a radius of 5 nautical miles of the sample position. 56 out of 60 core sample positions were undertaken using these criteria, with 4 stations being dropped on account of bad weather or unsuitability of terrain. 3 replacement stations were completed to negate the impact of the dropped stations. Bad weather hampered progress during the second part of the survey, however 57 valid hauls were completed for the survey and there were 2 foul hauls. 9 of the valid tows were conducted outwith the daylight period. A total of 69 valid Methot samples were completed with most statistical rectangles on the continental shelf being sampled twice. Methot Net hauls were carried out using the circular frame in order to obtain an estimate of the numbers of pre-metamorphosing herring larvae</p>																																																												
Number of fish species recorded and notes on any rare species or unusual catches:	<p>A total of 102 species were recorded for a total weight of 36tonnes. Species of note included streaked gurnard (<i>Trigloporus lastoviza</i>). A 70%increase in the catch weight for mackerel was observed in 2011 compared with 2010, with 9.2 tonnes for 2011 being recorded compared to 5.8 tonnes for 2010. It should be noted that a large proportion of the mackerel observed were juveniles. Total weight of herring recorded for the survey also showed a decrease compared to 2010 with 5.6 tonnes for 2011 being recorded compared to 10.2 tonnes for 2010. Total catches of Norway Pout increased in weight with 7.4 tonnes in 2011 compared with 6.9 tonnes in 2010. The cpue index – numbers caught per 10 hours fishing - calculation for 1-group gadoids (cod, haddock, whiting and saithe) now weights the indices for each of the 10 new sampling strata (Figure 1) by the surface area of said stratum. These are then pooled to produce the index for the ICES Subarea VIa. This is seen as a more unbiased and more precise method than the previous method that weighted the indices by the number of valid hauls within each of the previous strata (old demersal sampling areas). The indices for the 4 species can be found below in table 1.</p> <p>Table 1. New cpue indices for ICES Subarea VIa (nos caught/10 hrs) derived from the new survey strata and weighted according to area of each stratum for cod, haddock, whiting and saithe.</p> <table border="1"> <thead> <tr> <th>Species</th> <th>Age.0</th> <th>Age.1</th> <th>Age.2</th> <th>Age.3</th> <th>Age.4</th> <th>Age.5</th> <th>Age.6</th> <th>Age.7</th> <th>Age.8</th> <th>Age.9</th> <th>year</th> </tr> </thead> <tbody> <tr> <td>cod</td> <td>NA</td> <td>0.6</td> <td>33.9</td> <td>20.8</td> <td>0.9</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>2011</td> </tr> <tr> <td>haddock</td> <td>NA</td> <td>23.1</td> <td>3758.6</td> <td>309.6</td> <td>97.5</td> <td>109</td> <td>831</td> <td>11.7</td> <td>10.1</td> <td>33</td> <td>2011</td> </tr> <tr> <td>whiting</td> <td>NA</td> <td>219.1</td> <td>1770</td> <td>400.9</td> <td>69.2</td> <td>31.6</td> <td>46.6</td> <td>12.8</td> <td>1.9</td> <td>2</td> <td>2011</td> </tr> <tr> <td>saithe</td> <td>NA</td> <td>0</td> <td>28.8</td> <td>129.7</td> <td>8.2</td> <td>2.8</td> <td>1.3</td> <td>0</td> <td>0</td> <td>0.5</td> <td>2011</td> </tr> </tbody> </table> <p>This is a new index and as such is not comparable with the previous index that was created using the old demersal sampling areas and therefore the cpue values for previous years are not displayed.</p>	Species	Age.0	Age.1	Age.2	Age.3	Age.4	Age.5	Age.6	Age.7	Age.8	Age.9	year	cod	NA	0.6	33.9	20.8	0.9	1	1	0	0	0	2011	haddock	NA	23.1	3758.6	309.6	97.5	109	831	11.7	10.1	33	2011	whiting	NA	219.1	1770	400.9	69.2	31.6	46.6	12.8	1.9	2	2011	saithe	NA	0	28.8	129.7	8.2	2.8	1.3	0	0	0.5	2011
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Table 4.3.2.3.1. Stations fished (aims: to complete 84 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	stations fished %
Vla	GOV-D	60	57	57		2	95

Table 4.3.2.3.2. Number of biological samples (maturity and age material, *maturity only):

Species	Age	Species	Age
<i>Gadus morhua</i>	170	<i>Dipturus intermedia</i>	33*
<i>Melanogrammus aeglefinus</i>	1054	<i>Dipturus flossada</i>	1*
<i>Merlangius merlangius</i>	845	<i>Leucoraja naevus</i>	41*
<i>Pollachius virens</i>	256	<i>Raja clavata</i>	47*
<i>Merluccius merluccius</i>	372*	<i>Molva molva</i>	45*
<i>Lepidorhombus whiffiagonis</i>	190*	<i>Raja montagui</i>	99*
<i>Clupea harengus</i>	749	<i>Mustelus mustelus</i>	8*
<i>Scomber scombrus</i>	412	<i>Mustelus asterias</i>	4*
<i>Pollachius pollachius</i>	14*	<i>Scophthalmus rhombus</i>	1
<i>Brosme brosme</i>	7*	<i>Conger conger</i>	22*
<i>Chelidonichthys cuculus</i>	235*	<i>Microstomus kitt</i>	264*
<i>Trisopterus esmarkii</i>	267	<i>Leucoraja fullonica</i>	1*
<i>Trigloporus lastoviza</i>	1*	<i>Sprattus sprattus</i>	356

Table 4.3.2.3.3. Q1 cpue data for major species: 2011.

Species	Strata	Mean nos/hr	Mean kgs/hr
<i>Gadus morhua</i>	All	6.39	9.583
<i>Melanogrammus aeglefinus</i>	All	541.27	148.75
<i>Merlangius merlangus</i>	All	283.8	49.298
<i>Merluccius merluccius</i>	All	36.28	22.22
<i>Pollachius virens</i>	All	20.98	10.76
<i>Clupea harengus</i>	All	1731.35	210.194
<i>Scomber scombrus</i>	All	2970.6	347.06
<i>Lophius piscatorius</i>	All	0.38	0.63
<i>Lepidorhombus whiffiagonis</i>	All	14.4	3.11
<i>Pleuronectes platessa</i>	All	59.47	6.71
<i>Microstomus kitt</i>	All	33	4.68
<i>Limanda limanda</i>	All	107.74	5.25
<i>Hippoglossoides platessoides</i>	All	14.32	0.48
<i>Glyptocephalus cynoglossus</i>	All	2.14	0.27
<i>Trachurus trachurus</i>	All	71.05	21.68
<i>Trisopterus esmarkii</i>	All	10465.3	280.91
<i>Trisopterus minutus</i>	All	134.36	4.84
<i>Gadiculus argenteus</i>	All	54.02	1.01
<i>Argentina silus</i>	All	11.35	3.5
<i>Argentina sphyraena</i>	All	27.14	1.16

Species	Strata	Mean nos/hr	Mean kgs/hr
<i>Micromesistius poutassou</i>	All	381.2	30.29
<i>Scophthalmus rhombus</i>	All	0.04	0.07

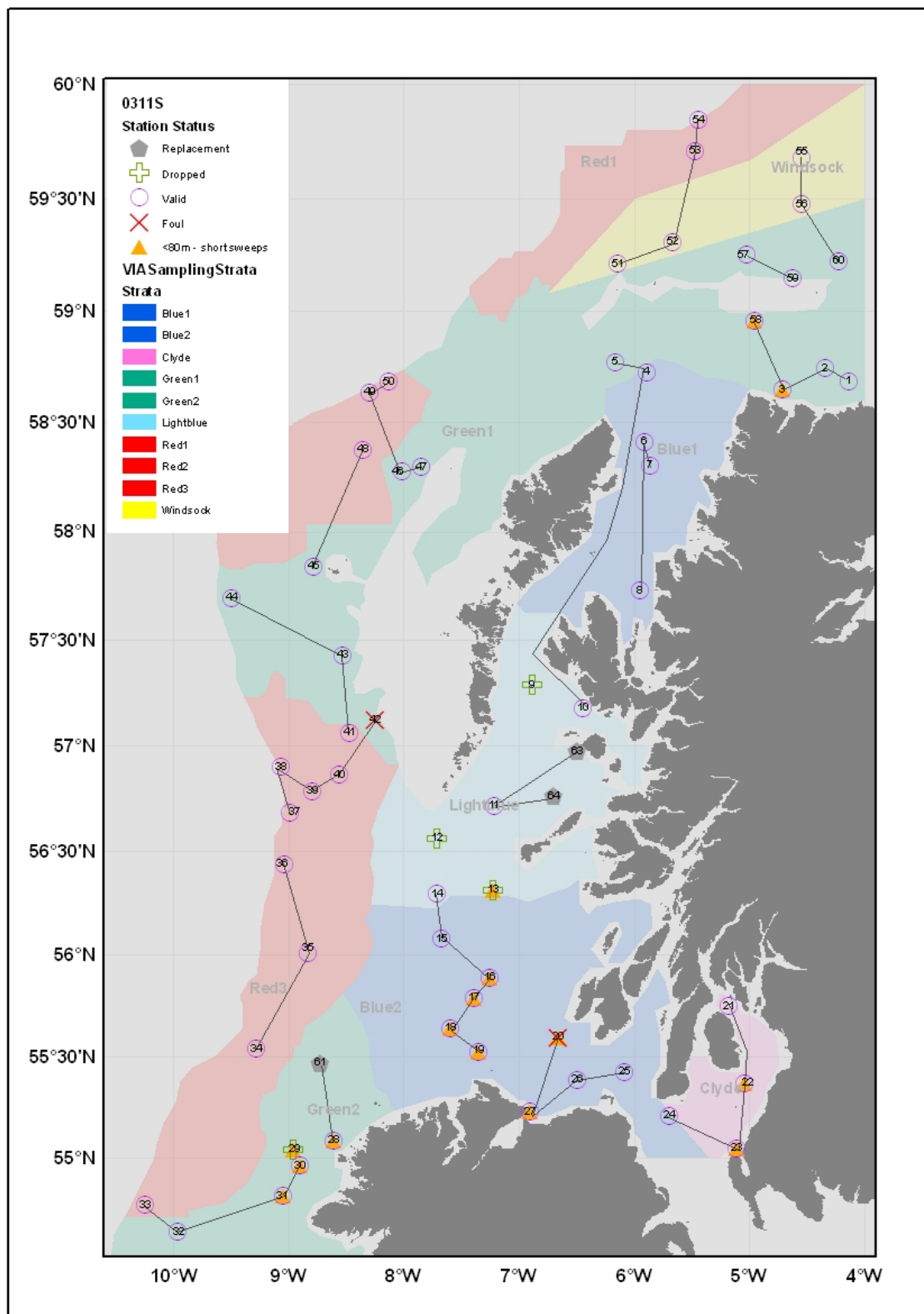


Figure 4.2.3.3. Cruise track of Scotia during the Q1 WC - IBTS 2011 (0311S).

4.3.2.4 UK – Northern Ireland: Northern Irish Groundfish Survey Q4 2011 – Q4NIGFS

Nation:	UK (Northern Ireland)	Vessel:	Corystes
Survey:	41/11	Dates:	01–23 October and 04–06 November 2011
Cruise	Q4 Irish Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in VIIa. The primary species are cod, haddock and whiting, herring and plaice.		
Gear details:	Rock-hopper otter trawl with a 17m footrope fitted with 250 mm non-rotating rubber discs. SCANMAR sensors were fitted to gear and trawl parameters recorded, including trawl eye sensor.		
Notes from survey (e.g. problems, additional work etc.):	The survey was disrupted by frequent periods of poor weather and sea conditions. As a result the majority of the southern stations in the St Georges Channel could only be fished in November having to accommodate the survey schedule of the ship. 2 days testing new doors. Three days of the survey was used to complete an acoustic survey grid of approximately 600 nm around the Isle of Man and Scottish coastal waters as part of an extended herring acoustic survey programme in the Irish Sea. Additional work included quantifying external parasite loads in whiting and cod by area and collection of tissue samples from mature cod and hake for a genetics study.		
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 63 species of fish were recorded during the survey. A large haul of whiting (<i>Merlangius merlangus</i>) of 970kg (for 20 min tow) was caught southwest of the Isle of Man. Unusual individual fish catches of interest are a sea lamprey (<i>Petromyzon</i> sp.) in the northeastern Irish Sea and a lump sucker (<i>Cyclopterus lumpus</i>).		

Table 4.3.2.4.1. Stations fished (aims: to complete 60 valid tows per survey).

ICES Divisions	Strata	Gear	Tows				stations fished %
			planned	Valid	Additional	Invalid	
VIIa	All	Rock-hopper	60	58	0	0	97
	TOTAL		60	58	0	0	97

Table 4.3.2.4.2. Number of biological samples (maturity and age material):

Species	No	Species	No
<i>Chelidonichthys cuculus</i>	137	<i>Pollachius pollachius</i>	1
<i>Conger conger</i>	3	<i>Scophthalmus maximus</i>	2
<i>Dicentrarchus labrax</i>	0	<i>Scophthalmus rhombus</i>	8
<i>Gadus morhua</i>	51	<i>Squalus acanthias</i>	82
<i>Melanogrammus aeglefinus</i>	528	<i>Zeus faber</i>	38
<i>Merlangius merlangus</i>	1037	<i>Raja brachyura</i> *	18
<i>Merluccius merluccius</i>	33	<i>Raja clavata</i> *	55
<i>Microstomus kitt</i>	61	<i>Raja montagui</i> *	122
<i>Molva molva</i>	1	<i>Leucoraja naevus</i> *	12

* Maturity only.

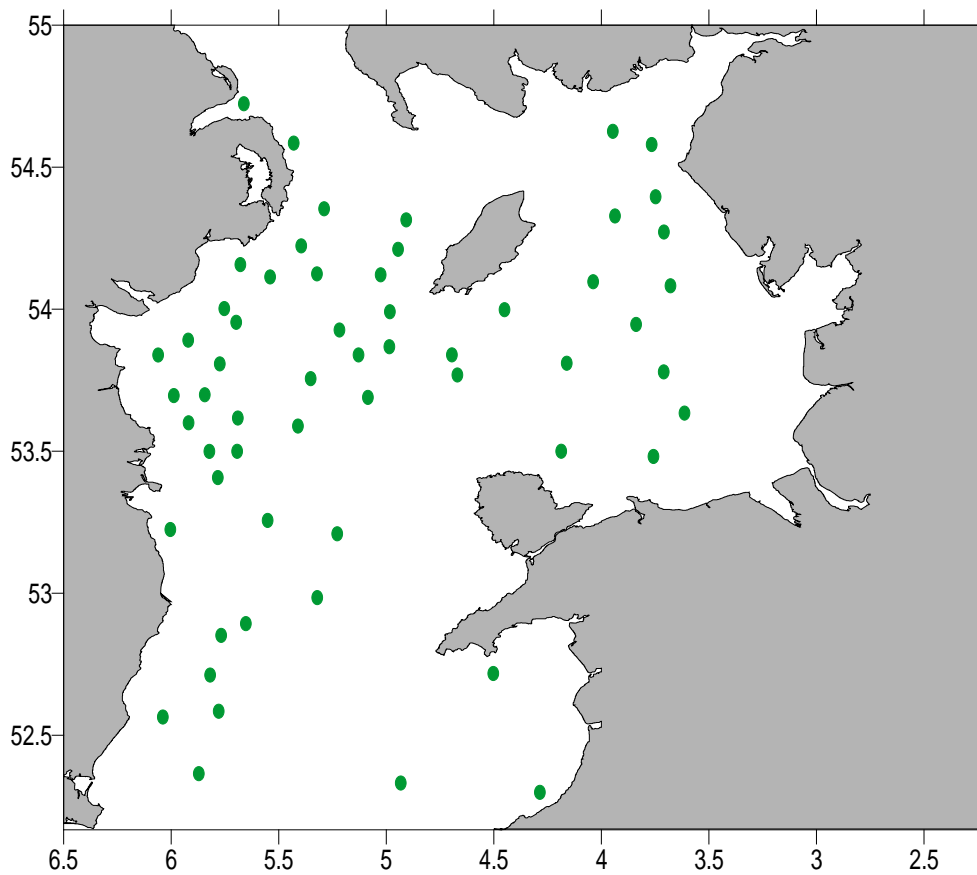


Figure 4.3.2.1. Map of valid survey stations completed during the Northern Irish Q4 groundfish survey.

4.3.2.5 UK – Northern Ireland: Northern Irish Groundfish Survey Q1 2011 – Q1NIGFS

Nation:	UK (Northern Ireland)	Vessel:	RV Corystes
Survey:	10/11	Dates:	27 February – 18 March 2011

Cruise	Q1 Irish Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in VIIa. The primary species are cod, haddock and whiting, herring and plaice.
Gear details:	Rock-hopper otter trawl with a 17m footrope fitted with 250 mm non-rotating rubber discs. SCANMAR sensors were fitted to gear and trawl parameters recorded.
Notes from survey (e.g. problems, additional work etc.):	Very little gear damage and relatively good weather meant very little fishing time was lost overall. Strong tides in the eastern Irish Sea were a particular problem in the second week of the survey. One of the prime station had to be moved slightly due to a new windfarm. Expansion of existing and the construction of new windfarms is becoming a problem in the eastern Irish Sea. Additional work included quantifying external parasite loads in whiting and cod by area and collecting tissue samples from cod and hake for a genetics study.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 66 species of fish were recorded during the survey. Large catches of herring were common particularly to the east/southeast of the Isle of Man where >1t catches were recorded at 2 stations. Large proportion of the cod caught during the survey was in the station North Channel (121 individuals) Five-bearded rockling (<i>Ciliata mustela</i>) in deep water in the St Georges Channel, goldsinny wrasse (<i>Ctenolabrus rupestris</i>) off the southeast of Isle of Man

Table 4.3.2.5.1. Stations fished (aims: to complete 60 valid tows per year).

ICES Divisions	Strata	Gear	Tows				stations fished %
			Planned	Valid	Additional	Invalid	
VIIa		Rock-hopper	60	61	1	0	102
		TOTAL	60	61	1	0	102

Table 4.3.2.5.2. Number of biological samples (maturity and age material).

Species	No	Species	No
<i>Chelidonichthys cuculus</i>	141	<i>Microstomus kitt</i>	108
<i>Conger conger</i>	0	<i>Pollachius pollachius</i>	9
<i>Dicentrarchus labrax</i>	0	<i>Scophthalmus maximus</i>	4
<i>Clupea harengus</i>	100	<i>Scophthalmus rhombus</i>	17
<i>Gadus morhua</i>	342	<i>Squalus acanthias</i>	12
<i>Melanogrammus aeglefinus</i>	714	<i>Zeus faber</i>	15
<i>Merlangius merlangus</i>	1250		
<i>Merluccius merluccius</i>	71	<i>Leucoraja naevus</i> *	16
<i>Molva molva</i>	4	<i>Raja brachyura</i> *	29
<i>Pleuronectes platessa</i>	498	<i>Raja clavata</i> *	53
<i>Lepidorhombus whiffiagonis</i>	0	<i>Raja montagui</i> *	159

* Maturity only.

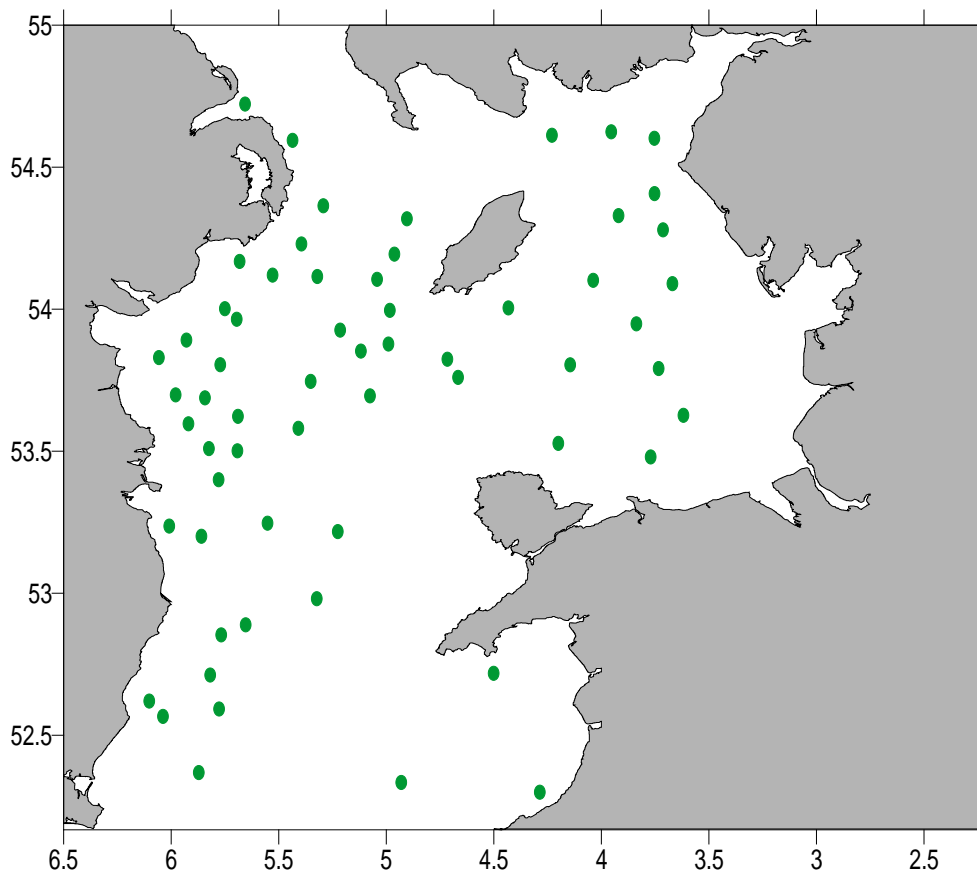


Figure 4.3.2.5. Map of valid survey stations completed during the Northern Irish Q1 groundfish survey (filled circles: valid tows; open circles: repeat station).

4.3.2.6 Ireland: IGFS (Irish Shelf Groundfish Survey Q3–Q4)

Nation:	Ireland	Vessel:	Celtic Explorer
Survey:	IGFS2011	Dates:	23 September – 5 October (VIa) 12 November – 17 December (VIIb,g,j)

Cruise	The Q4 Irish Groundfish survey collects data on the distribution, relative abundance and biological parameters of commercial fish in VIa south, VIIb and VIIg,j north. The indices currently utilized by assessment WG's are for haddock, whiting, plaice, cod, hake and sole. Survey data also provided for white and black anglerfish, megrim, lemon sole, saithe, ling, blue whiting and a number of elasmobranchs as well as several pelagics (herring, horse mackerel and mackerel). An additional deep-water strata (200–600m) was added in 2005 and is recently incorporated into the main survey area for index calculation.
Gear details:	Two gear survey since 2004, using GOV groundgear "A" for areas VIIb,g and j; and "D" for area VIa.
Notes from survey (e.g. problems, additional work etc.):	Significant weather disruption in 2011 resulted in limited coverage of VIIb. Six full days lost to weather so some time used inshore on experimental tows to evaluate IBTS gear geometry issues. Gear damage was suffered in VIIg on historically clear tows which may coincide with beam trawlers operating in the area again, as was suspected in 2010. A lot of time spent coordinating position of static commercial gear again in VIa. Ongoing problem and some tows proving hard to sample last few years. Additional work included 4 intercalibration tows with Cefas Endeavour.
Number of fish species recorded and notes on any rare species or unusual catches:	In 2011, 91 species of fish, 16 elasmobranch, 9 cephalopod and 50 crustacean species were caught. As is evident in the table of survey trends below, plaice* was significantly up in the Celtic Sea, as was haddock and cod. Sole, and again plaice, were relatively strong on the west coast (VIIb), and to a lesser extent hake. Whiting was a main component in the northwest catches (VIa), followed by saithe, plaice and sole to a far lesser degree.

Table 4.2.3.6.1. Stations fished (aim to complete 170 valid tows per year). Where intercalibration stations are a repeat of a valid tow spatially and temporally, they are included in the "Additional" flagged hauls which also include gear trials etc. Both additional and invalid stations are excluded from ICES/DCF assessment data.

ICES Divisions	Strata	Gear	Tows			% stations		comments
			planned	Valid	Additional	Invalid	fished	
VIa	All	D	45	49	1	2	115	
VIIb,c	All	A	38	21	8	1	78	
VIIg	All	A	48	47	1	2	104	
VIIj	All	A	40	42	0	0	112	
TOTAL			170	159	10	5	105	

Table 4.2.3.6.2. Number of biological samples (maturity and age material, *maturity only, ** additional/triennial sampling):

Species	No.	Species	No.
<i>Chelidonichthys cuculus</i> **	215	<i>Molva molva</i>	132
<i>Clupea harengus</i>	424	<i>Pleuronectes platessa</i>	1185
<i>Conger conger</i> **	57	<i>Pollachius pollachius</i> **	38
<i>Dicentrarchus labrax</i>	32	<i>Pollachius virens</i>	412
<i>Gadus morhua</i>	456	<i>Raja brachyura</i> *	33
<i>Glyptocephalus cynoglossus</i> **	435	<i>Raja clavata</i> *	325
<i>Lepidorhombus whiffiagonis</i>	1182	<i>Raja montagui</i> *	515
<i>Leucoraja naevus</i> *	110	<i>Scomber scombrus</i>	665
<i>Lophius budegassa</i>	129	<i>Scophthalmus maximus</i> **	35
<i>Lophius piscatorius</i>	392	<i>Scophthalmus rhombus</i> **	39
<i>Melanogrammus aeglefinus</i>	2135	<i>Solea solea</i>	295
<i>Merlangius merlangus</i>	1653	<i>Squalus acanthias</i> *	123
<i>Merluccius merluccius</i>	702	<i>Trachurus trachurus</i>	510
<i>Micromesistius poutassou</i>	649	<i>Zeus faber</i> **	388
<i>Microstomus kitt</i>	669		

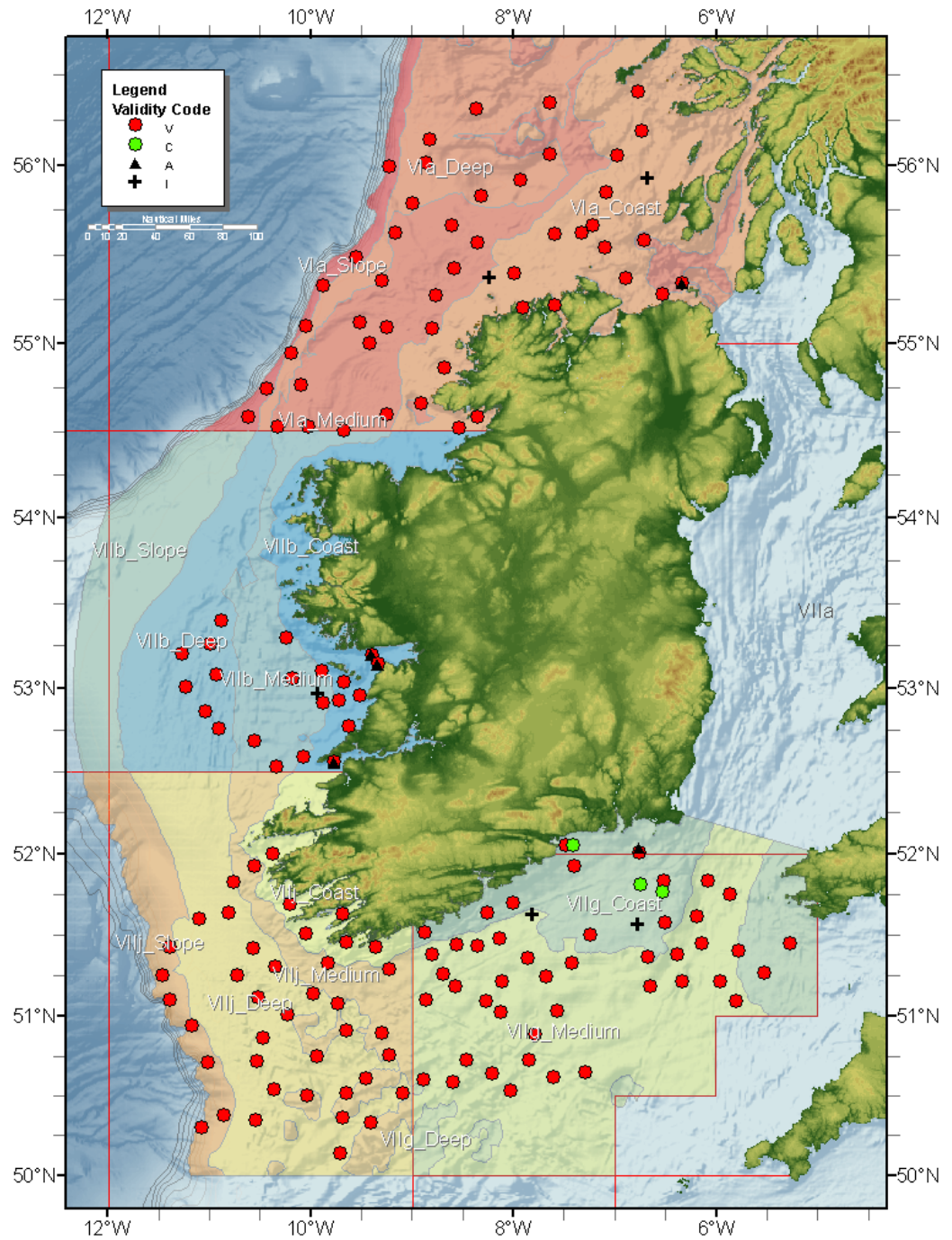


Figure 4.3.2.6. Map of Survey Stations completed by the Irish Groundfish Survey in 2011. Valid: red circles; Invalid: crosses; Intercalibration tows: green circles; Additional tows outside IBTS protocols: black triangles. Survey strata are coloured polygons relating to the 80m, 120m, 200m and 600m contours respectively with an agreed arbitrary survey limit running north–south in VIIC to demark the Porcupine Bank.

Table 4.3.2.6.3. Year estimate 2011 (y_i); previous year estimate 2010 (y_{i-1}); average of last two years estimate ($y_{(i,i-1)}$); average of the previous three year estimates 2007–2009 ($y_{(i-2,i-3,i-4)}$). As results for survey trends are ratios they are sensitive to stocks with high variance, therefore comparing the 2 yr vs. 5 yr trend is advisable.

Biomass and number estimates								
Species	Strata	Valid	Biomass index			Number index		
			y_i	y_i/y_{i-1}	$y_{(i,i-1)}$	y_i	y_i/y_{i-1}	$y_{(i,i-1)}$
			tows		$y_{(i-2,i-3,i-4)}$	tows		$y_{(i-2,i-3,i-4)}$
			kg/Hr	%	%	No/Hr	%	%
<i>Gadus morhua</i>	VIa	49	5.1	-31.3	-2.4	3.4	-39.1	-21.2
<i>Melanogrammus aeglefinus</i>	VIa	49	140.2	177.1	103.8	465.4	163.6	115.6
<i>Clupea harengus</i>	VIa	49	579.9	1388.5	800.4	3192.6	1013.0	427.3
<i>Merluccius merluccius</i>	VIa	49	19.2	-46.9	-4.5	31.4	-68.7	-45.5
<i>Trachurus trachurus</i>	VIa	49	496.5	266.5	10.8	2765.4	357.3	-9.9
<i>Scomber scombrus</i>	VIa	49	274.2	56.6	98.0	2053.9	101.0	118.3
<i>Lepidorhombus whiffiagonis</i>	VIa	49	2.3	31.8	32.2	8.4	14.2	4.9
<i>Lophius piscatorius</i>	VIa	49	1.8	30.3	-37.0	1.0	-12.3	4.8
<i>Pleuronectes platessa</i>	VIa	49	18.1	33.0	111.5	119.4	20.4	137.4
<i>Solea solea</i>	VIa	49	0.7	41.1	107.3	2.6	20.2	91.6
<i>Micromesistius poutassou</i>	VIa	49	84.3	-16.1	1.6	3918.5	13.3	23.9
<i>Merlangius merlangus</i>	VIa	49	62.7	-15.4	60.7	313.4	-38.6	-3.3
<i>Gadus morhua</i>	VIIbgj	110	11.8	139.7	263.4	6.4	6.3	483.5
<i>Melanogrammus aeglefinus</i>	VIIbgj	110	189.3	-32.5	51.6	881.1	-53.3	-36.2
<i>Clupea harengus</i>	VIIbgj	110	23.8	-66.5	603.3	311.7	-68.4	865.4
<i>Merluccius merluccius</i>	VIIbgj	110	15.7	-2.8	-43.5	262.7	21.5	1.4
<i>Trachurus trachurus</i>	VIIbgj	110	2.1	-96.3	-76.1	16.9	-96.4	-71.2
<i>Scomber scombrus</i>	VIIbgj	110	103.5	-27.8	11.5	3158.2	49.1	217.8
<i>Lepidorhombus whiffiagonis</i>	VIIbgj	110	5.7	23.2	20.4	29.6	0.6	-9.4
<i>Lophius piscatorius</i>	VIIbgj	110	7.0	7.7	63.6	6.6	11.3	165.9
<i>Pleuronectes platessa</i>	VIIbgj	110	10.0	4.7	54.3	60.0	-1.2	56.3
<i>Solea solea</i>	VIIbgj	110	0.8	35.4	87.4	3.6	45.8	86.4
<i>Micromesistius poutassou</i>	VIIbgj	110	40.3	-39.2	-43.0	2039.2	6.4	-42.1
<i>Merlangius merlangus</i>	VIIbgj	110	185.6	52.6	65.9	1373.6	72.0	-14.7

4.3.2.7 UK – England: EN_Cefas–A,B (Western Area Groundfish Survey Q4)

Nation:	UK (England and Wales)	Vessel:	Cefas Endeavour
Survey:	19/11	Dates:	05 November – 04 December 2011
Cruise	Q4 Western Groundfish survey aims to collect data on the distribution, relative abundance, and biological information of commercial fish in VIIa and VIIe-h. The primary species are cod, haddock, hake and whiting, with data also collected for other demersal fish (e.g. skates and rays, spurdog, anglerfish, plaice, megrim) and pelagic fish (herring and mackerel). Data on the distribution and relative abundance of all non-target fish and the benthic bycatch are also recorded.		
Gear details:	Two gear survey, using the modified rock-hopper GOV with groundgear D on hard ground stations, and GOV with groundgear A on fine ground stations (though with extra floats instead of kite and the toggle chains set to 10 cm). Since 2006, the trawls have been made from polyethylene (nylon nets were used in earlier years), a lifting bag of 200 mm mesh size (double 4 mm twine) covered the codend to minimize damage to the codend when bringing the net on board and emptying the codend. Since 2008 a symmetry/flow sensor has been used in the centre of the headline.		
Notes from survey (e.g. problems, additional work etc.):	A shakedown tow was undertaken in the western English Channel while en route to the main fishing area. The rock-hopper GOV trawl was used on hard ground stations around the Cornish peninsula and then, with good weather in parts of the Celtic Sea, the fine ground stations in the Celtic Sea were fished. Following a mid-survey change of staff in Cork, stations off southern Ireland and fine ground stations in the Irish Sea were fished. The hard ground stations in parts of St George's Channel were then fished with rock-hopper trawl, with remaining stations north of Cornwall also fished. Poor weather in the last two weeks of the survey restricted fishing on some days, and not all stations were fished. Additional work included CTD casts, and a tag/release programme for various elasmobranchs. A few comparative fishing tows with RV Celtic Explorer were also undertaken off the south coast of Ireland.		
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 85 species of fish were recorded during the survey, and most of the species caught were relatively common. Unusual fish species caught included specimens of garfish <i>Belone belone</i> , big-eye rockling <i>Antonogadus macrophthalmus</i> and a porbeagle shark <i>Lamna nasus</i> . Several specimens of common skate <i>Dipturus batis-complex</i> were caught in the Celtic Sea, these specimens were tagged and released.		

Table 4.3.2.7.1. Number of Stations fished (aim to complete 72 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid	Addi- onal	Invalid	% stations fished	Comments
VII a	A-C	Standard	12	14	0	0	>100%	
	H	Rock-hopper	14	8	0	0	56%	
VII e-h	D-E	Standard	18	16	1	1	89%	1 station with Rock-hopper
	E	Rock-hopper	1*	1	0	0	100%	
	F	Standard	14	14	2	1	93%	
	G	Rock-hopper	9	11	0	1	>100%	
TOTAL			67	64	3	3	94%	

Table 4.3.2.7.2. Number of biological samples (maturity and age material):

Species	Stock	No.	Species	Stock	No.
<i>Gadus morhua</i>	VIIa	27	<i>Scophthalmus maximus</i>	-	3
<i>Gadus morhua</i>	VIIe-k	78	<i>S. rhombus</i>	-	12
<i>M. aeglefinus</i>	VIIa	90	<i>Lophius budegassa</i>	-	8
<i>M. aeglefinus</i>	VIIe-k	446	<i>Lophius piscatorius</i>	-	72
<i>Merlangius merlangus</i>	VIIa	233	<i>Mullus surmuletus</i>	-	4
<i>Merlangius merlangus</i>	VIIe-k	340	<i>Dicentrarchus labrax</i>	-	17
<i>Pleuronectes platessa</i>	VII a	411	<i>Chelidonichthys cuculus</i>	-	96
<i>Pleuronectes platessa</i>	VII e and VII f-g	296	<i>Eutrigla gurnardus</i>	-	122
<i>Solea solea</i>	VII a	5	<i>Ch. lucernus</i>	-	51
<i>Solea solea</i>	VII e and VII f-g	23	<i>Triglaporus lastoviza</i>	-	-
<i>Clupea harengus</i>	VII a	152	* <i>Dipturus batis</i>	-	4
<i>Clupea harengus</i>	Celtic Sea	139	* <i>Leucoraja fullonica</i>	-	1
<i>Merluccius merluccius</i>	Northern	208	* <i>Leucoraja naevus</i>	-	10
<i>Lepidorhombus whiffiagonis</i>	VIIb,c,e-k, VIIIa,b,d	284	* <i>Raja brachyura</i>	-	13
<i>Scomber scombrus</i>	Northern	147	* <i>Raja clavata</i>	-	13
<i>Molva molva</i>	-	10	* <i>Raja microocellata</i>	-	5
<i>Conger conger</i>	-	2	* <i>Raja montagui</i>	-	87
<i>Microstomus kitt</i>	-	159	<i>Squalus acanthias</i>	-	62

*maturity only.

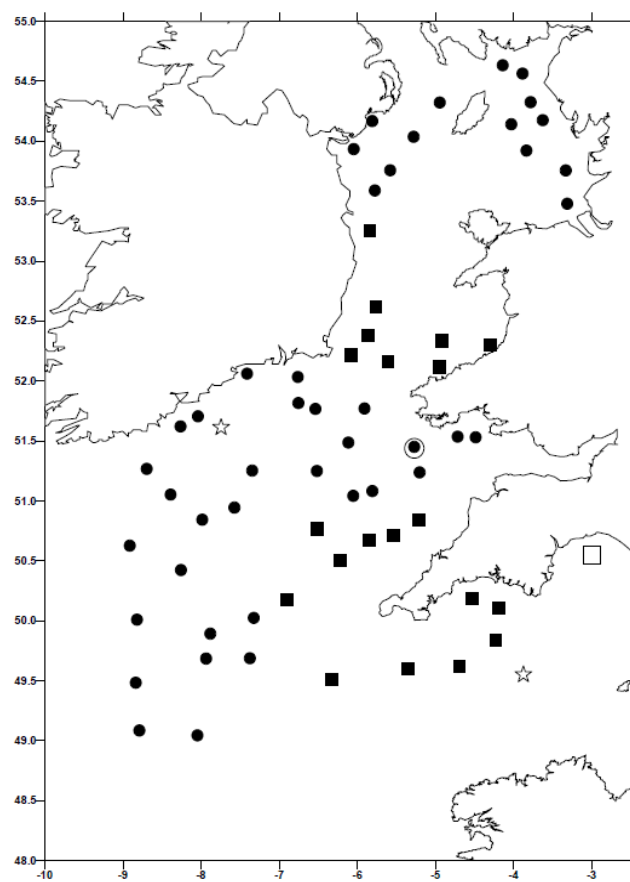


Figure 4.3.2.7. Map of study area showing sites sampled with GOV trawl with rock-hopper groundgear (filled squares: valid tows, open square additional tow) and standard groundgear (filled circles: valid tows; open star: invalid tows).

4.3.2.8 France: FR-EVHOE (Celtic Sea/Bay of Biscay Groundfish Survey Q4)

Nation:	France	Vessel:	Thalassa
Survey:	Q4 EVHOE 2011	Dates:	17 October – 1 December 2011
Cruise	EVHOE Groundfish survey aims to collect data on the distribution and relative abundance, and biological information of all fish and selected commercial invertebrates in subareas VII-f-j VIIIa,b. The primary species are hake, monkfishes, anglerfishes, megrim, cod, haddock and whiting, with data also collected for all other demersal and pelagic fish. CTD temperature and salinity profiles recorded at each trawling position. Sampling design is stratified random.		
Gear details:	A GOV with standard Groundgear (A) but no kite replaced by 6 extra floats. Marport sensors for door, wing, and vertical netopening		
Notes from survey (e.g. problems, additional work etc.):	<ul style="list-style-type: none"> -96% of the initial program was achieved. (153 hauls of 159 planned). 93% valid. -153 CTD temperature and salinity profiles recorded. -23 "boxes" with multibeam echosounder in bathymetric mode. -5 pelagic hauls carried out during the leg 1 . -5 videos transects with the SCAMPI (towed fish for submarine photo and videoshooting) -Marport net monitoring data collected during all hauls -mammals and birds observations during the legs 1 and 2 - 84 samples of sediment -Wastes were counted and weighted at each trawl station. 		
Number of fish species recorded and notes on any rare species or unusual catches:	<p>185 species encountered.</p> <p>Benthic fauna identified at each station.</p> <p>Biological data were collected from species in support of European Data Collection Framework (DCF). length, weight, sex and maturity was collected (table 2).</p>		

Table 4.3.2.8.1. Stations fished.

ICES Divisions	Strata	Tows planned	Valid	Additional	% stations fished	comments
VII	Cc3	9	10	1	111%	
	Cc4	20	16		80%	
	Cc5	3	2		67%	
	Cc6	3	2		67%	
	Cc7	2	1		50%	
	Cn2	7	8	1	114%	
	Cn3	7	7		100%	
	Cs4	20	18		90%	
	Cs5	10	11	1	111%	
	Cs6	3	3		100%	
VIII	Cs7	2	4	2	200%	
	Gn1	3	3		100%	
	Gn2	4	4		100%	
	Gn3	16	16		100%	
	Gn4	21	20		95%	

ICES Divisions	Strata	Tows planned	Valid	Additional	% stations fished	comments
	Gn5		3	3		100%
	Gn6		2	2		100%
	Gn7		2	2		100%
	Gs1		3	4	1	133%
	Gs2		3	3		100%
	Gs3		3	3		100%
	Gs4		3	3		100%
	Gs5		2	2		100%
	Gs6		2	2		100%
	Gs7		2	2		100%
TOTAL			155	151		98%

Table 4.3.2.8.2. Number of biological samples (maturity and age material, *only maturity, weight, length no age):

Species	Age	Species	Age
<i>Merluccius merluccius</i>	878*	<i>Lophius piscatorius</i>	256*
<i>Gadus morhua</i>	42	<i>Solea solea</i>	134
<i>Melanogrammus aeglefinus</i>	307	<i>Pleuronectes platessa</i>	149
<i>Merlangius merlangus</i>	576	<i>Chelidonichyis cuculus</i>	161
<i>Lepidorhombus whiffiagonis</i>	378	<i>Microstomus kitt</i>	167
<i>Lophius budegassa</i>	145*	<i>Glyptocephalus cynoglossus</i>	179

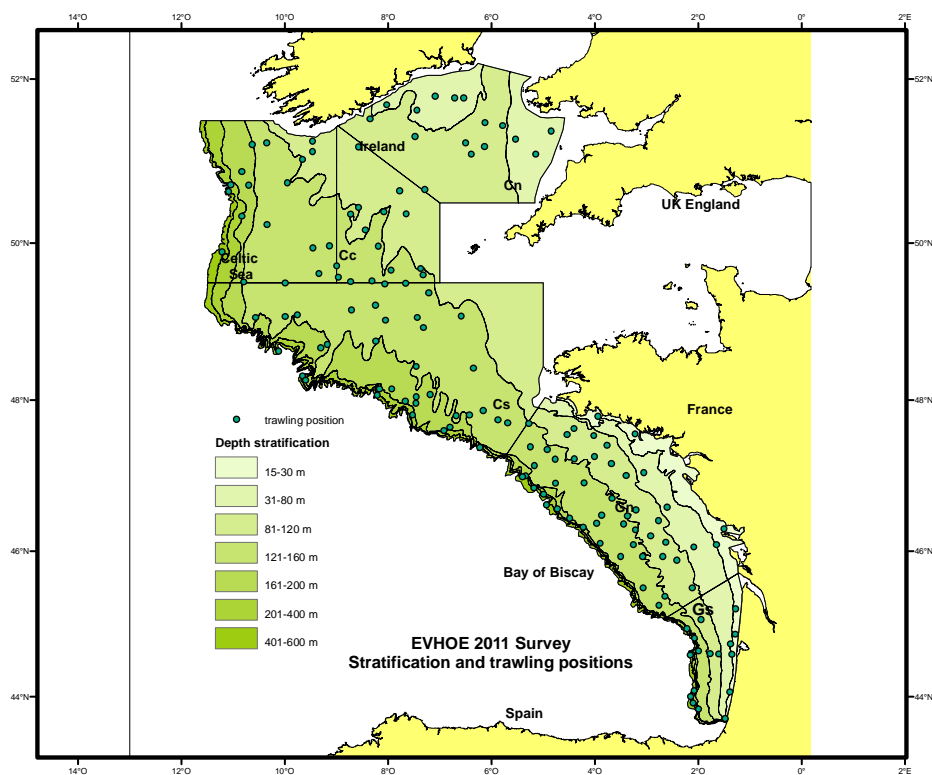


Figure 4.3.2.8. Map of station positions and depth strata for the EVHOE 2011 Q4 survey.

4.3.2.9 France: FR-CGFS (The Channel Groundfish Survey Q4)

Nation:	France	Vessel:	Gwen Drez
Survey:	CGFS11	Dates:	2 October 2011– 30 October 2011

Cruise	The first objective of the Channel Ground Fish Survey carried out every years in October since 1986 sea is to collect data on the distribution, the relative abundance, and biological informations on commercial fish in in the Eastern English Channel and the South of the North. The most important species are cod, whiting, plaice, striped red mullet and sea bass
Gear details:	The gear used is a GOV trawl adapted to the ship power. The headline and the groundrop are respectively 19.70 m and 25.90 m long. The mesh size in the codend is 10mm (20 mm stretched). To record the main trawl parameters, SCANMAR sensors are used.
Notes from survey (e.g. problems, additional work etc.):	103 valid hauls were carried out in the whole area at the same position as every year but six hauls were not validated because of trawl damages. Hydrological parameters were recorded for 107 hauls.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 70 species of fish were recorded during the survey. Benthic fauna were also determinate and counted at each hauls. Total biomass and abundance calculated from the area always prospected all along the serial is decreasing compare to 2010.

Table 4.3.2.9.1. Stations fished (aims: to complete valid tows per year).

ICES Divisions	Strata	Gear	Tows				% stations fished	comments
			planned	Valid	Additional	Invalid		
VIIId, IVc		GOV -	110	103	10	7	100%	

Table 4.3.2.9.2. Number of biological samples (maturity and age material:

Species	Age	Species	Age
<i>Gadus morhua</i>	32	<i>Pleuronectes platassa</i>	408
<i>Merlangius merlangus</i>	333	<i>Mullus surmuletus</i>	69
<i>Dicentrachus labrax</i>	85		

*maturity only.

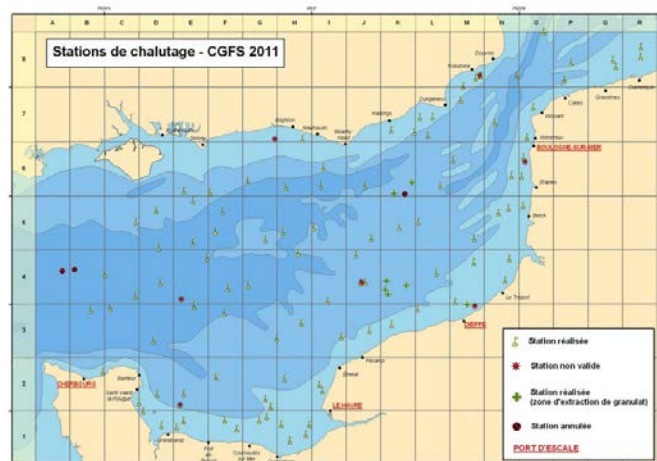


Figure 4.3.2.9. Map of station positions for CGFS 2011, Quarter 3.

4.3.2.10 Spain: SP-PorcGFS (The Porcupine Groundfish Survey Q3)

Nation:	SP (Spain)	Vessel:	RV: Vizconde de Eza
Survey:	Porcupine 2011	Dates:	9 September – 8 October 2011
Cruise	Spanish Porcupine bottom trawl survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in Porcupine bank area (ICES Division VIIIbc-k). The primary target species are hake, monkfish, white anglerfish and megrim, which abundance indices are estimated by age, with abundance indices also estimated for Nephrops, four-spot megrim and blue whiting. Data collection is also collected for several other demersal fish species and invertebrates.		
Survey Design	This survey is random stratified with two geographical strata (northern and southern) and 3 depth strata (170–300 m, 301–450 m, 451–800 m). Stations are allocated at random according to the strata surface.		
Gear details:	Porcupine baca 39/52 (Otter trawl gear)		
Notes from survey (e.g. problems, additional work etc.):	Weather conditions were particularly rough during 2011 survey, with only two days of wind force below 6–7 Beaufort, this also impacted on gear behaviour and low-results for some species have to be considered with this caution. Additional work undertaken included 86 CTD casts at most trawl stations and in non-trawlable areas to obtain a general image of the hydrography. Due to the mentioned conditions only 7 boxcorer were carried out, and only 3 were valid.		
Number of fish species recorded and notes on any rare species or unusual catches:	First estimates: Overall, 104 species of fish, in addition to 42 crustacean, 28 mollusc and 26 echinoderm species were recorded during the survey.		

Table 4.3.2.10.1. Stations fished (aims: to complete 80 valid tows per year).

ICES Divisions	Strata	Gear	Tows			% stations fished	comments
			planned	Valid	Additional		
VIIIbc-k	All	Porcupine baca 39/52-80	80	5	3	100%	Also available by depth and geographical strata

Table 4.3.2.10.2. Number of biological samples (maturity and age material):

Species	Age	Species	Age
<i>Merluccius merluccius</i>	1628	<i>Scomber scombrus</i>	6
<i>Lepidorhombus whiffiagonis</i>	675	<i>Nephrops norvegicus</i> *	313
<i>Lepidorhombus boscii</i>	278	<i>Molva molva</i>	73
<i>Lophius budegassa</i>	36	<i>Conger conger</i>	44
<i>Lophius piscatorius</i>	128	<i>Helicolenus dactylopterus</i>	200

*maturity only.

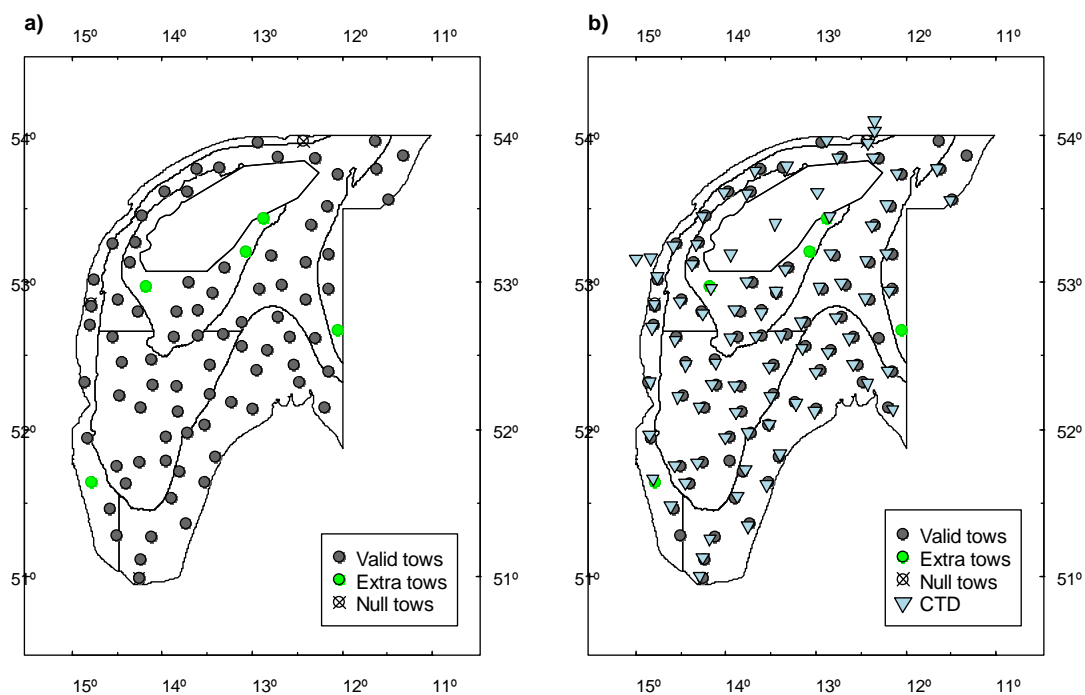


Figure 4.3.2.10. a) Trawl stations in Porcupine 2011 survey, b) CTD stations in relation to trawl stations.

Table 4.3.2.10.3. Biomass and number estimates

Species	Strata	Valid tows	Biomass index			Number index		
			y_i kg/.5h	y_i/y_{i-1} %	$y(i,i-1)/y(i-2,i-3,i-4)$ %	y_i $n^{\circ}/.5h$	y_i/y_{i-1} %	$y(i,i-1)/y(i-2,i-3,i-4)$ %
<i>Merluccius merluccius</i>	All	80	30.20	-17.8	107.2	37.2	-12.9	3.3
<i>Lepidorhombus whiffiagonis</i>	All	80	9.82	15.3	28.5	126.6	12.5	-10.5
<i>Lepidorhombus boscii</i>	All	80	6.78	-7.9	22.3	90.5	-7.8	32.0
<i>Lophius budegassa</i>	All	80	0.75	92.3	-26.3	0.3	20.8	-54.0
<i>Lophius piscatorius</i>	All	80	7.06	-0.3	-9.7	2.0	-16.7	13.1
<i>Micromesistius poutassou</i>	All	80	115.07	-12.4	-23.7	1443.4	-47.0	-24.7
<i>Nephrops norvegicus</i>	All	80	0.54	-48.1	282.3	13.5	-59.5	372.5

y_i , year estimate (2011); y_{i-1} , previous year estimate (2010); $y(i,i-1)$, Average of last two year estimates (2011 and 2010); $y(i-2,i-3,i-4)$, Average of the previous three year estimates (2009, 2008 and 2007).

4.3.2.11 Spain: Sp–North (Spanish North Coast Survey Q3–Q4)

Nation:	SP (Spain)	Vessel:	Cornide de Saavedra
Survey:	N11	Dates:	15/09/2011 – 19/10/2011
Cruise	Spanish North Coast bottom trawl survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in ICES Divisions VIIIc and Northern IXa. The primary species are hake, monkfish and white anglerfish, megrim, four-spot megrim, blue whiting and horse mackerel abundance indices are estimated by age, with abundance indices also estimated for Nephrops, and data collection for other demersal fish and invertebrates.		
Survey Design	This survey is random stratified with five geographical strata along the coast and 3 depth strata (70–120 m, 121–200 m, 201–500 m). Stations are allocated at random within the trawlable stations available according to the strata surface.		
Gear details:	Standard baca 36/40		
Notes from survey (e.g. problems, additional work etc.):	Additional work undertaken included CTD casts at all trawl stations and ground sediment samples with a cylinder attached to the groundrope. Seabirds census was also carried out during fishing manoeuvres. Analyses of stomach contents of main demersal species was performed in all hauls during the survey. As in previous years 2 additional hauls were done to cover shallow stations between 30 and 70 m though gillnets in some of the expected areas reduced the sampling in shallow waters, and 9 deeper stations between 500 and 700 m. Calibration hauls in the French EEZ were not planned due to schedule constrains		
No. of species caught, notes on rare species and unusual catches	A total of 302 species were captured, 105 fish species, 47 crustaceans, 39 molluscs, 26 echinoderms and 24 other invertebrates.		

Table 4.3.2.11.1. Stations fished (aims: to complete 111 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIIIc	All	Standard baca	94 / 12 ⁽¹⁾	92	8	1	98%	Also available by depth
IXa North	All	Standard baca	19 / 4 ⁽¹⁾	19	3	0	100%	
TOTAL			113	111	11	1	98%	

(1) Additional hauls on shallow and deep grounds.

Table 4.3.2.11.2. Number of biological samples (maturity and age material):

Species	Age	Species	Age
<i>Merluccius merluccius</i> tot+daily growth	926	<i>Merluccius merluccius</i> daily growth	361
<i>Lepidorhombus whiffiagonis</i>	411	<i>Trisopterus luscus</i>	329
<i>Lepidorhombus boscii</i>	502	<i>Helicolenus dactylopterus</i>	158
<i>Lophius budegassa</i>	31+48	<i>Phycis blennoides</i>	386
<i>Lophius piscatorius</i>	61+112	<i>Conger conger</i>	244
<i>Trachurus trachurus</i>	435	<i>Engraulis encrasicolus</i>	293
<i>Micromesistius poutassou</i>	856	<i>Scomber scombrus</i>	538

, *maturity only

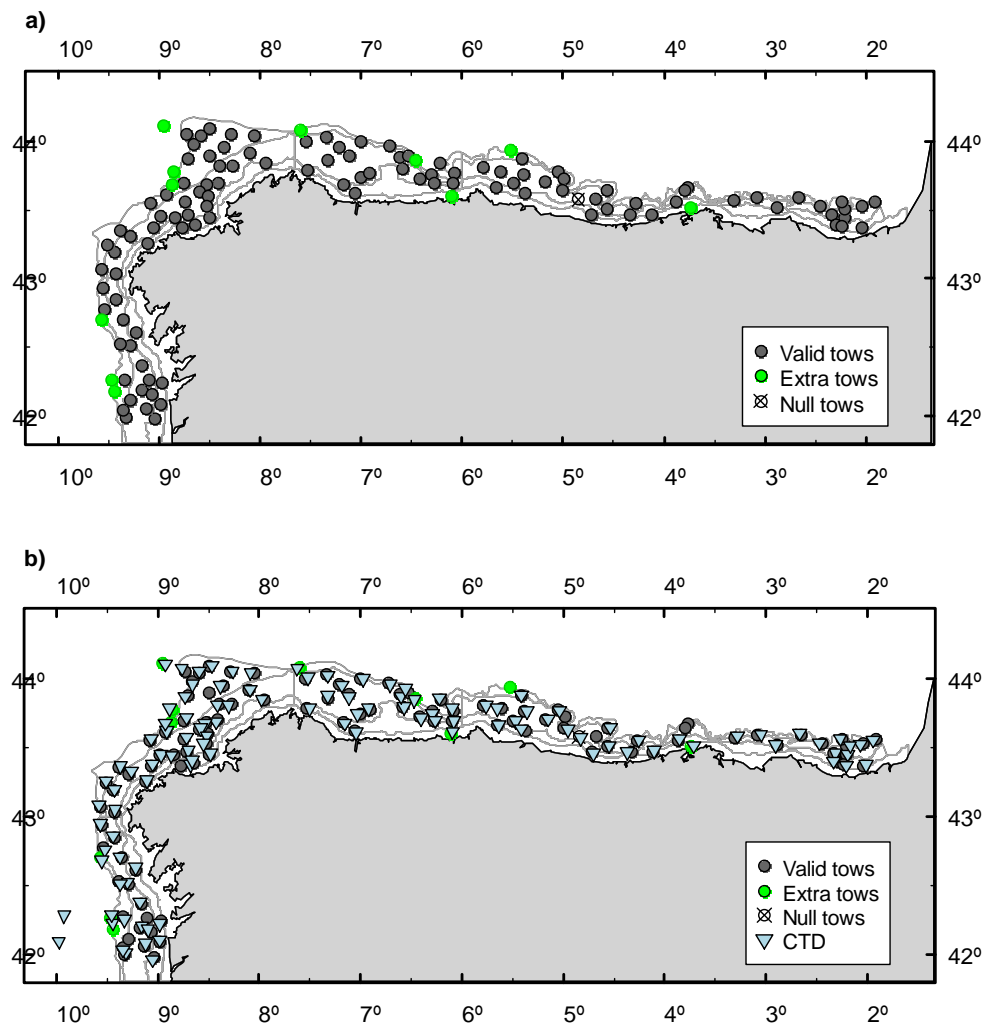


Figure 4.3.2.11. a) Trawl stations in Northern Spanish Shelf 2011 survey, b) CTD stations in relation to trawl stations.

Table 4.3.2.11.3. Biomass and number estimates.

Species	Strata	Valid tows	Biomass index			Number index		
			y_i kg/.5h	y_i/y_{i-1} %	$y_{(i,i-1)}/y_{(i-2,i-3,i-4)}$ %	y_i $n^{\circ}/.5h$	y_i/y_{i-1} %	$y_{(i,i-1)}/y_{(i-2,i-3,i-4)}$ %
<i>Merluccius merluccius</i>	VIIIc	92	7.70	21.6	36.4	212.1	34.3	-17.8
<i>Lepidorhombus boscii</i>	VIIIc	92	4.98	22.4	32.3	74.9	8.3	54.8
<i>L. whiffiagonis</i>	VIIIc	92	2.19	104.7	58.8	20.9	71.9	175.2
<i>Lophius budegassa</i>	VIIIc	92	0.63	65.8	48.5	0.6	3.4	63.9
<i>Lophius piscatorius</i>	VIIIc	92	0.92	-41.0	-30.7	1.3	-43.8	-28.4
<i>Micromesistius poutassou</i>	VIIIc	92	39.00	-55.4	117.5	763.6	-82.7	66.7
<i>Nephrops norvegicus</i>	VIIIc	92	0.04	300.0	87.5	0.7	94.1	100.0
<i>Trachurus trachurus</i>	VIIIc	92	5.66	-19.1	-35.2	116.7	-11.5	-54.2
<i>Scomber scombrus</i>	VIIIc	92	2.76	790.3	74.4	57.6	1619.4	188.6

y_i , year estimate (2011); y_{i-1} , previous year estimate (2010); $y_{(i,i-1)}$, Average of last two year estimates (2011 and 2010); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2009, 2008 and 2007).

Table 4.3.2.11.4. Biomass and number estimates.

Species	Strata	Valid tows	Biomass index			Number index		
			y_i kg/.5h	y_i/y_{i-1} %	$y_{(i,i-1)}/y_{(i-2,i-3,i-4)}$ %	y_i $n^{\circ}/.5h$	y_i/y_{i-1} %	$y_{(i,i-1)}/y_{(i-2,i-3,i-4)}$ %
<i>Merluccius merluccius</i>	IXaN	19	15.19	-16.3	33.6	382.8	-6.3	-20.9
<i>Lepidorhombus boscii</i>	IXaN	19	2.99	-23.7	37.6	42.3	-53.1	65.3
<i>L. whiffiagonis</i>	IXaN	19	0.09	200.0	-52.6	0.6	57.5	-37.4
<i>Lophius budegassa</i>	IXaN	19	0.65	225.0	-44.3	0.2	-44.4	-53.0
<i>Lophius piscatorius</i>	IXaN	19	0.06	500.0	-85.8	0.1	-44.4	-68.2
<i>Micromesistius poutassou</i>	IXaN	19	23.47	-76.8	21.6	601.1	-78.0	2.1
<i>Nephrops norvegicus</i>	IXaN	19	0.01	-75.0	50.0	0.1	-86.2	103.4
<i>Trachurus trachurus</i>	IXaN	19	1.48	-33.6	43.4	6.8	25.8	-84.1
<i>Scomber scombrus</i>	IXaN	19	19.33	-7.6	3846.1	343.8	25.4	7564.8
<i>Merluccius merluccius</i>	All	111	8.98	7.4	35.3	241.5	20.1	-18.8
<i>Lepidorhombus boscii</i>	All	111	4.64	14.9	33.0	69.3	-4.8	56.4
<i>L. whiffiagonis</i>	All	111	1.83	105.6	56.3	17.5	71.9	169.4
<i>Lophius budegassa</i>	All	111	0.63	80.0	18.5	0.5	-1.9	40.6
<i>Lophius piscatorius</i>	All	111	0.77	-40.3	-32.4	1.1	-44.1	-29.1
<i>Micromesistius poutassou</i>	All	111	36.33	-59.6	91.9	735.7	-82.1	55.1
<i>Nephrops norvegicus</i>	All	111	0.03	50.0	25.0	0.6	30.2	100.7
<i>Trachurus trachurus</i>	All	111	4.94	-20.1	-33.1	97.8	-11.2	-55.1
<i>Scomber scombrus</i>	All	111	5.61	45.7	479.2	106.8	114.1	729.9

y_i , year estimate (2011); y_{i-1} , previous year estimate (2010); $y_{(i,i-1)}$, Average of last two year estimates (2011 and 2010); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2009, 2008 and 2007).

4.3.2.12 Spain: SP-GC-Q1 (Spanish Gulf of Cadiz Bottom Trawl Survey)

Nation:	SP (Spain)	Vessel:	Cornide de Saavedra
Survey:	Q1 SP-GCGFS (ARSA 0311)	Dates:	09–19 March 2011
Cruise	Spanish Gulf of Cadiz bottom trawl survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in the Gulf of Cadiz area (ICES Division IXa). The primary species are hake, horse mackerel, wedge sole, sea breams, mackerel and Spanish mackerel. Data and abundance indices are also collected and estimated for other demersal fish species and invertebrates as rose and red shrimps, Nephrops, and cephalopod molluscs.		
Gear details:	Standard baca 36/40		
Notes from survey (e.g. problems, additional work etc.):	Additional work undertaken included CTD stations from one at every trawl stations.		
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 129 species of fish, 54 of crustacean and 50 of mollusca were recorded during the survey.		

Table 4.3.2.12.1. Stations fished (aims: to complete 41 valid tows per year).

ICES Divisions	Strata	Gear	Tows			Additional	Invalid	% stations fished	Comments
			planned	Valid	Valid with rock-hopper				
IXa	All	Standard baca 36/40	43	42	-	-	1	98%	Also available by depth
	TOTAL		43	42	-	-	1	98%	

Table 4.3.2.12.2. Number of biological samples (maturity and age material, *maturity only).

Species	Age	Species	Age
<i>Merluccius merluccius</i>	506	<i>Octopus vulgaris</i> *	36
<i>Merluccius merluccius</i> *	2233	<i>Loligo vulgaris</i> *	153
<i>Parapenaeus longirostris</i> *	2914	<i>Sepia officinalis</i> *	48
<i>Nephrops norvegicus</i> *	128	<i>Eledone cirrhosa</i> *	17
<i>Squilla mantis</i> *	76	<i>Eledone moschata</i> *	102

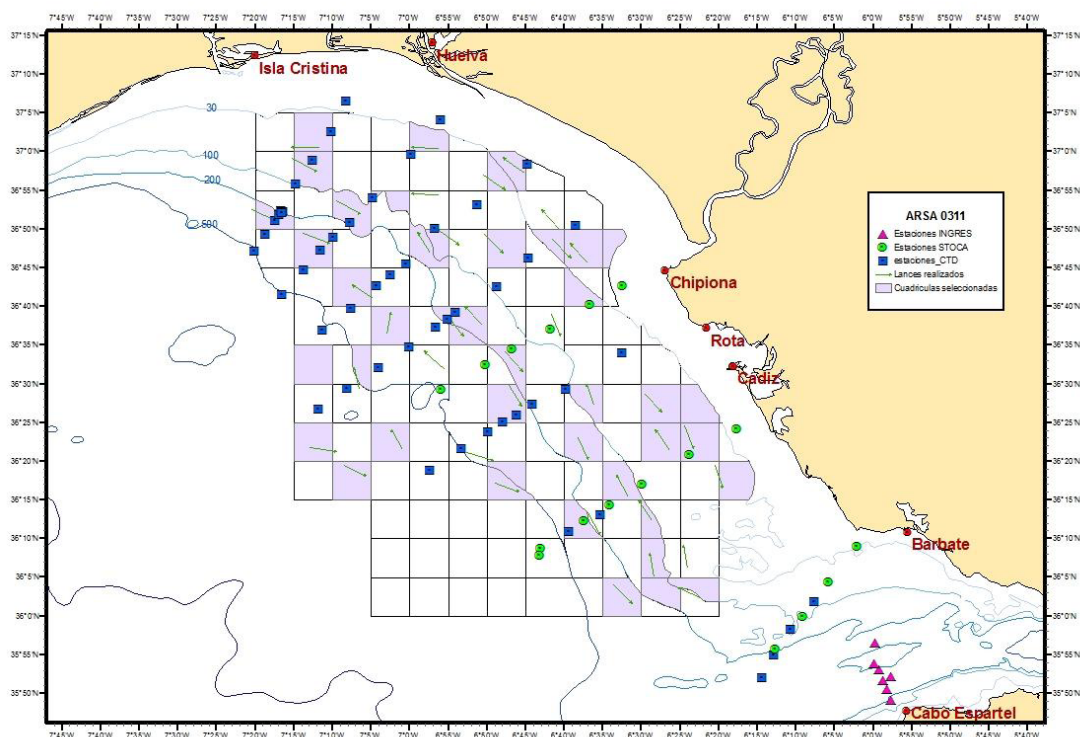


Figure 4.3.2.12. Map of sampling grid and station positions (green vector lines), CTD casts (blue squares), invalid tows (red circled cross) for Gulf of Cadiz Q1 Survey. Additional plankton tows for STOCA project (green circles) and CTDs for INGRES project (purple triangles).

Table 4.3.2.12.3. Biomass and number estimates.

Species	Strata	Valid tows	Biomass index			Number index		
			y_i kg/.5h	y_i/y_{i-1} %	$y_{(i-1)}/y_{(i-2,i-3,i-4)}$ %	y_i $n^{\circ}/.5h$	y_i/y_{i-1} %	$y_{(i-1)}/y_{(i-2,i-3,i-4)}$ %
<i>Merluccius merluccius</i>	ALL	42	1.88	-45.7	47.2	25.4	-57.6	26.1
<i>M. poutassou</i>	ALL	42	3.63	224.1	1325	76.42	269.9	2576.8
<i>Nephrops norvegicus</i>	ALL	42	0.05	-44.4	-38.2	1.64	-42.5	-26.6
<i>Parapenaeus longirostris</i>	ALL	42	1.58	110.7	-14.1	262.67	171.8	-38.2
<i>Octopus vulgaris</i>	ALL	42	0.29	-65.5	-67.5	0.44	-56	-65.8
<i>Loligo vulgaris</i>	ALL	42	0.25	-7.4	30	1.73	43	98.6
<i>Sepia officinalis</i>	ALL	42	0.25	-88.5	153.1	0.52	-89.8	157.8

y_i , year estimate (2011); y_{i-1} , previous year estimate (2010); $y_{(i-1)}$, Average of last two year estimates (2011 and 2010); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2009, 2008 and 2007).

4.3.2.13 Spain: Sp-GC-Q4 (Spanish Gulf of Cadiz Bottom Trawl Survey)

Nation:	SP (Spain)	Vessel:	Cornide de Saavedra
Survey:	Q4 SP-GCGFS (ARSA 1111)	Dates:	10–20 November 2011
Cruise	Spanish Gulf of Cadiz bottom trawl survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in the Gulf of Cadiz area (ICES Division IXa). The primary species are hake, horse mackerel, wedge sole, sea breams, mackerel and Spanish mackerel. Data and abundance indices are also collected and estimated for other demersal fish species and invertebrates as rose and red shrimps, Nephrops, and cephalopod molluscs.		
Gear details:	Standard baca 36/40		
Notes from survey (e.g. problems, additional work etc.):	Additional work undertaken included CTD stations from one at every trawl stations.		
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 148 species of fish, 53 of crustacean and 45 of mollusca were recorded during the survey.		

Table 4.3.2.13.1. Stations fished (aims: to complete 41 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	% Invalid	% stations fished	comments
IXa	All	Std baca 36/40	43	40	-	-	2	93%	Also available by depth
TOTAL			43	40	-	-	2	93%	

Table 4.3.2.13.2. Number of biological samples (maturity and age material, *maturity only):

Species	Age	Species	Age
<i>Merluccius merluccius</i>	336	<i>Loligo vulgaris</i> *	177
<i>Merluccius merluccius</i> *	1491	<i>Loligo forbesi</i> *	13
<i>Parapenaeus longirostris</i> *	2419	<i>Sepia officinalis</i> *	210
<i>Nephrops norvegicus</i> *	163	<i>Eledone cirrhosa</i> *	250
<i>Squilla mantis</i> *	390	<i>Eledone moschata</i> *	306
<i>Octopus vulgaris</i> *	129		

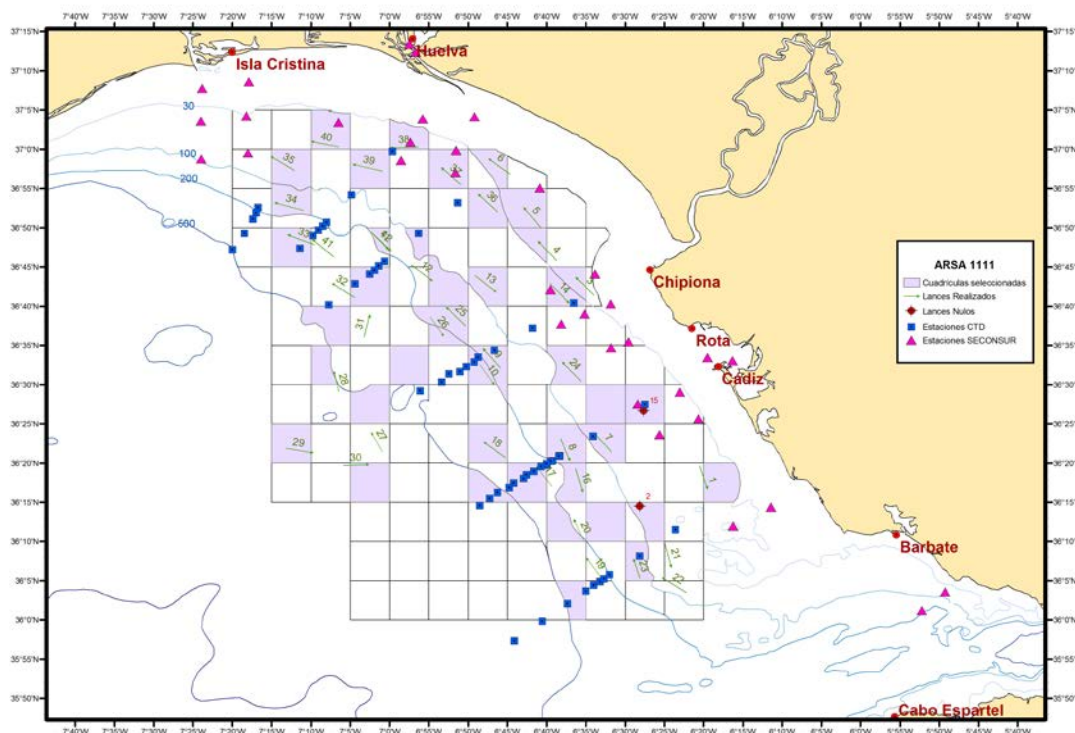


Figure 4.3.2.13. Map of sampling grid and station positions (green vector lines), CTD casts (blue squares), invalid tows (red circled cross) for Gulf of Cadiz Q4 Survey. Additional sampling for SCONSUR project (purple rectangles).

Table 4.3.2.13.3. Biomass and number estimates Biomass and number estimates.

Species	Strata	Valid tows	Biomass index			Number index		
			y_i kg/.5h	y_i/y_{i-1} %	$y_{(i-1)}$ $y_{(i-2,i-3,i-4)}$ %	y_i $n^0/.5h$	y_i/y_{i-1} %	$y_{(i-1)}/$ $y_{(i-2,i-3,i-4)}$ %
<i>Merluccius merluccius</i>	ALL	40	1.48	-49.1	-29.1	29.63	-23.7	-51.4
<i>Micromesistius poutassou</i>	ALL	40	0.2	-94.7	-1.8	1.5	-99	59.6
<i>Nephrops norvegicus</i>	ALL	40	0.06	-53.8	9.6	2.28	-57	33.9
<i>Parapenaeus longirostris</i>	ALL	40	1.23	-12.1	-11.7	227.34	-44.1	-11.1
<i>Octopus vulgaris</i>	ALL	40	0.69	40.8	-62.7	1.31	40.9	-60.9
<i>Loligo vulgaris</i>	ALL	40	0.25	-54.5	-43.9	2.07	-46.1	-26.5
<i>Sepia officinalis</i>	ALL	40	0.8	14.3	56.3	2.45	80.1	102.7

y_i , year estimate (2011); y_{i-1} , previous year estimate (2010); $y_{(i-1)}$, Average of last two year estimates (2011 and 2010); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2009, 2008 and 2007).

4.3.2.14 Portugal: PT-GFS (Autumn Groundfish Survey Q3-Q4)

Nation:	Portugal	Vessel:	RV Noruega
Survey:	Autumn 2011	Dates:	28 September – 24 October 2011
Cruise	Autumn Groundfish survey aims to estimate the abundance and distribution of hake and horse mackerel recruits, indices of abundance and biomass of the most important commercial species, biological parameters, e.g. maturity, ages, sex-ratio, weight, food habits and biodiversity indicators. The primary species are hake, horse mackerel, blue whiting, mackerel and Spanish mackerel. Other data are also collected for several other demersal fish species and invertebrates.		
Area	Portuguese continental waters (Div. IXa), from 20 to 500 m depth.		
Survey design	96 fishing stations, 66 at fixed (grid) positions and 30 at random. Tow duration is 30 min, with a trawl speed of 3.5 knots, during day light.		
Gear details	NCT (Norwegian Campbell Trawl) gear with rollers in the groundrope. The mean horizontal opening between the wings is 14.7 m and the mean vertical opening is 4.4 m. Codend mesh size is 20 mm.		
Notes from survey (e.g. problems, additional work etc.)	Ten stations could not be performed due to static gears present in the area. Weather disruption was reduced to 2 full days. Temperature was recorded with a CTD (Conductivity, Temperature, Depth) equipment: – 39 CTDs Stations took place in the final position of each fishing station. SCANMAR equipment not used due to be damaged.		
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 94 species of fish, 14 of cephalopods and 20 of crustaceans were recorded during the survey. 35 species of other groups were recorded, including Echinodermata, Cnidaria, Bivalvia, Gastropod, Polychaeta, Ascidiacea and Nudibranchia.		

Table 4.3.2.14.1. Stations fished.

ICES Divisions	Strata	Gear	Tows			% stations fished	comments
			planned	Valid	Invalid		
IXa	ALL	NCT	96	86	-	90	

Table 4.3.2.14.2. Number of biological samples (maturity and age material).

Species	Samples	Otoliths
<i>Merluccius merluccius</i>	43	≈1012
<i>Trachurus trachurus</i>	11	393
<i>Micromesistius poutassou</i>	18	301
<i>Scomber colias</i>	9	491
<i>Scomber scombrus</i>	13	220
<i>Lophius budegassa</i>	1	1
<i>Lepidorhombus boscii</i>	4	37
<i>Lepidorhombus whiffiagonis</i>	-	-

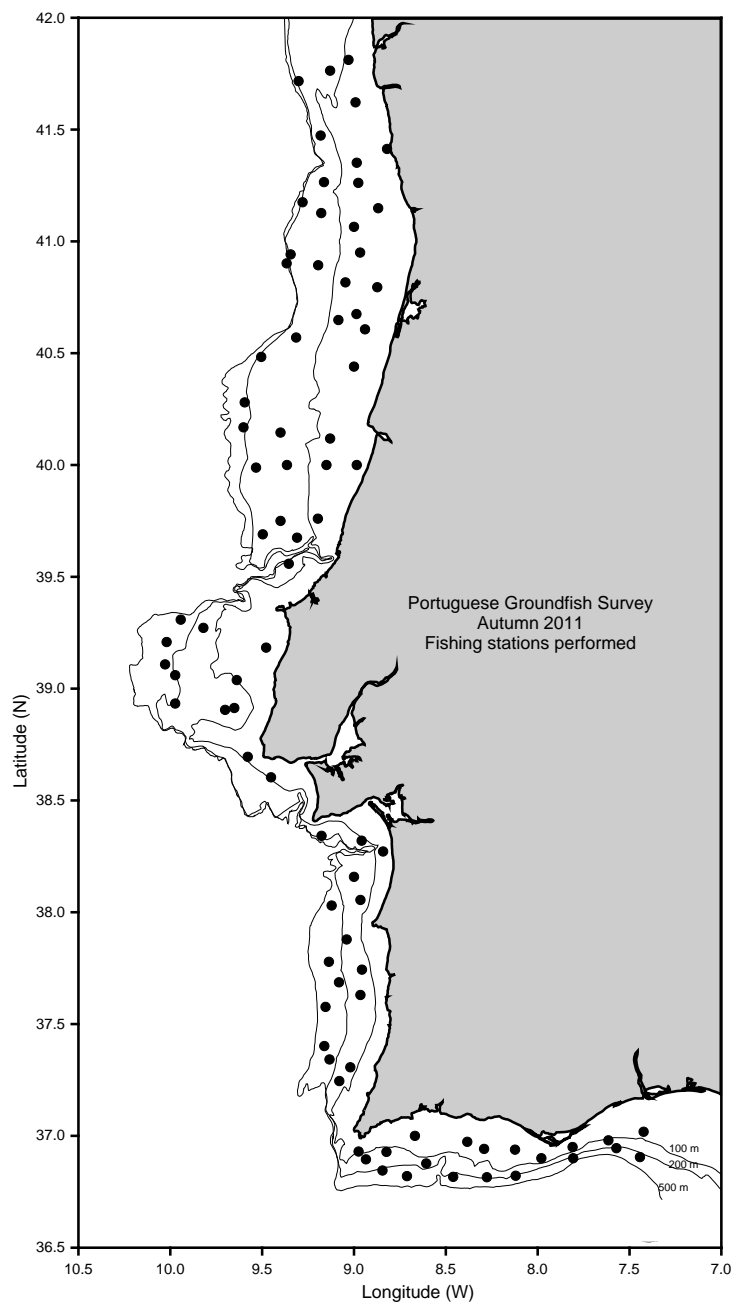


Figure 4.3.2.14. Map of station positions for Portuguese autumn groundfish survey.

Table 4.3.2.14.3. Biomass and numbers estimates.

SPECIES	STRATA	VALID TOWS	BIOMASS INDEX			NUMBER INDEX		
			Y _i KG/H	Y _i /Y _{i-1} %	Y _(i,i-1) / Y _(i-2,i-3,i-4) %	Y _i N/H	Y _i /Y _{i-1} %	Y _(i,i-1) / Y _(i-2,i-3,i-4) %
<i>Merluccius merluccius</i>	All	86	18,72	-50,99	-13,79	272,87	-34,71	-9,16
<i>Trachurus trachurus</i>	All	86	12,33	-55,39	-12,81	264,56	-19,59	-61,06
<i>Trachurus picturatus</i>	All	86	1,99	20,83	-93,69	18,96	-3,63	-95,92
<i>Micromesistius poutassou</i>	All	86	49,96	-57,13	18,25	979,63	-74,58	-6,38
<i>Scomber colias</i>	All	86	5,01	34,85	-46,27	75,26	140,15	-42,92
<i>Scomber scombrus</i>	All	86	9,31	-68,68	-39,24	142,84	-71,56	-18,31
<i>Lophius budegassa</i>	All	86	0,05	-56,14	-9,83	0,02	-71,62	120,06
<i>Lophius piscatorius</i>	All	86	-	-	-	-	-	-
<i>Lepidorhombus boscii</i>	All	86	0,13	368,74	-11,41	2,49	908,35	64,21
<i>L. whiffiagonis</i>	All	86	0,002	16,74	1096,93	0,06	774,15	466,29
<i>Nephrops norvegicus</i>	All	86	0,02	-69,06	108,41	0,46	-73,91	134,44

y_i, year estimate (2011); y_{i-1}, previous year estimate (2010); y_(i,i-1), Average of last two year estimates (2011 and 2010); y_(i-2,i-3,i-4), Average of the previous three year estimates (2009, 2008 and 2007).

4.3.3 Results

4.3.3.1 Biological samples

Table 4.3.3.1 gives an overview of the number of biological samples as reported per country/survey in Section 4.3.2.

Table 4.3.3.1. Number of individuals sampled for maturity and/or age.

	SCO			NIRL		IRL	ENG	FRA		SP		PT
	Q1	Q3	Q4	Q1	Q4			CGFS	EVHOE	PORC	NORT	
Target species												
<i>Clupea harengus</i>	749		630	100		424	291					
<i>Gadus morhua</i>	170		177	342	51	456	105	32	42			
<i>Lepidorhombus boscii</i>										278	502	
<i>L. whiffiagonis</i>	190*					1182	284		378	675	411	37
<i>Lophius budegassa</i>						129	8		145*	36	31+48 ⁽¹⁾	1
<i>L. piscatorius</i>						392	72		256*	128	61+112 ⁽¹⁾	
<i>M. aeglefinus</i>	1054	557	905	714	528	2135	536		307			
<i>Merlangius merlangus</i>	845		609	1250	1037	1653	573	333	576			
<i>Merluccius merluccius</i>	372		-	71	33	702	208		-	1628	926	506+336
<i>Merluccius merluccius*</i>			142*						878*			1012
<i>Pollachius virens</i>	256	7	189			412						43
<i>Scomber scombrus</i>	412		435			665	147			6	538	220
<i>Sprattus sprattus</i>	356		134									
<i>Trachurus trachurus</i>						510					435	393
<i>Trisopterus esmarki</i>	267		252									
<i>Nephrops norvegicus*</i>										313		128+163
Additional species												
<i>Brama brama</i>												
<i>Brosme brosme</i>	7*											
<i>Chelidonichthys cuculus</i>	235*		195	141	137	215	96		161			
<i>Chelidonichthys lucerna</i>												
<i>Conger conger</i>	22		5*		3		2			44	244	
<i>Dicentrarchus labrax</i>							17	85				
<i>Engraulis encrasicolus</i>											293	
<i>Eutrigla gurnardus</i>							122					
<i>G. cynoglossus</i>									179			
<i>H. dactylopterus</i>										200	158	
<i>Mic. poutassou</i>						649					856	301
<i>Microstomus kitt</i>	264*		77	108	61	669	159		167			
<i>Molva molva</i>	45*		25*	4	1	132	10			73		
<i>M. macrophthalma</i>												
<i>Mullus surmuletus</i>							4	69				
<i>Phycis blennoides</i>											386	
<i>Pleuronectes platessa</i>				498		1185	707	408	149			
<i>Pollachius pollachius</i>	14*		7*	9	1	38						

	SCO			NIRL		IRL	ENG	FRA			SP		PT
	Q1	Q3	Q4	Q1	Q4			CGFS	EVHOE	PORC	NORT	G.CADIZ ⁽²⁾	
<i>Scophthalmus maximus</i>				4	2	35	3						
<i>Scophthalmus rhombus</i>	1			17	8	39	12						
<i>Scomber colias</i>													491
<i>Solea solea</i>						295	28	134					
<i>Ch. lucernus</i>							51						
<i>Trigloporus lastoviza</i>	1*												
<i>Trisopterus luscus</i>											329		
<i>Zeus faber</i>				15	28	388*							
<i>Raja brachiura</i> *				29	18	33	13						
<i>Raja clavata</i> *	47	6		53	55	325	13						
<i>Raja microocellata</i> *							5						
<i>Raja montagui</i> *	99			159	122	515	87						
<i>Dipturus batis</i> *							4						
<i>Dipturus intermedia</i> *	33	10											
<i>Dipturus flossada</i> *	1	6											
<i>Dipturus oxyrinchus</i>		4											
<i>Leucoraja fullonica</i> *	1						1						
<i>Leucoraja naevus</i> *	41			16	12		10						
<i>Mustelus mustelus</i> *	8												
<i>Mustelus asterias</i> *													
<i>Squalus acanthias</i>				12	82	123*	62						

* Samples collected for maturity only

⁽¹⁾ Q1 + Q4

⁽²⁾ Otoliths + Illiciums

4.3.4 Participation 2012/2013

Survey	Code	Starting	Ending	No. expected hauls	Intercal
UK-Scotland Rockall	UK-SCRocQ3	06/09/12	14/09/12	40	
UK-Scotland Western (aut.)	UK -SCOWQ4	13/11/12	03/12/12	60	
UK-Scotland Western (spring)	UK-SCOWQ1	19/02/13	12/03/13	60	
UK-North Ireland (aut.)	UK-NIGFS			60	
UK-North Ireland (spring)	UK-NIGFS			60	
Ireland – Groundfish Survey Via	IE-IGFS	23/09/12	15/11/12	45	No
Ireland – Groundfish Survey VIIb,g,j	IE-IGFS	15/11/12	17/12/12	125	Yes
UK-England & Wales		Na	Na	-	-
France – EVHOE	FR-EVHOE	17/10/12	01/12/12	155	Yes
France - Western Channel	FR-CGFS			110	
Spain – Porcupine	SP-PorcGFS	01/09/12	30/09/12	80	No
Spain - North Coast	SP-NGFS	21/09/12	25/10/12	115	Internal
Spain - Gulf of Cádiz (Aut.)	SP-GCGFS Q4	06/11/12	16/11/12	43	No
Spain - Gulf of Cádiz (Spring)	SP-GCGFS Q1	02–03/13	02–03/13	43	
Portugal - (Aut.)	PT-PGFS 2012	28/09/12	27/10/12	96	No

4.3.4.1 References

- ICES. 2003. Study Group on Survey Trawl Gear for the IBTS Western and Southern Areas. ICES CM 2003/B:01. 19 pp.
- ICES. 2004a. Report of the Workshop on Survey Design and Data Analysis (WKSAD). ICES CM 2004/B:07, Ref. D,G. 65 pp.
- ICES. 2004b. Study Group on Survey Trawl Gear for the IBTS Western and Southern Areas. ICES CM 2004/B:01 Ref. G.
- ICES. 2005a. Report of the Workshop on Survey Design and Data Analysis (WKSAD). ICES CM ICES CM 2005/B:07. Ref D.G. 170 pp.
- ICES. 2005b. Report of the Study Group on Survey Trawl Standardisation (SGSTS). ICES CM 2005/B:02 REF. D, G, WGFTFB. 63 pp.
- ICES. 2006. Report of the Study Group on Survey Trawl Standardisation (SGSTS). ICES CM 2006/FTC:05 REF. LRC, RMC, WGFTFB, IBTSWG 65 pp.
- ICES. 2011. Report of the Working Group for Celtic Seas Ecoregion (WGCSE). ICES CM 2011/ACOM:12. 1564 pp.

4.4 Combined results

4.4.1 Combined North Sea and Eastern Atlantic survey results

Catches from latest bottom trawl surveys (IBTS) in the North Sea and the Northeastern Atlantic areas covered by the IBTS (see Table 4.4.1 and Figure 4.4.1) are mapped and presented in Annex 6. In 2011 maps Scottish surveys are again represented after the major breakdown in the RV “Scotia” impeded carrying out 2010 surveys.

Table 4.4.1 Species for which distribution maps have been produced, with length split for prerecruit (0-group) and post-recruit (1+ group) where appropriate. The maps cover all the area encompassed by surveys coordinated within the IBTSWG (North Sea and Northeastern Atlantic Areas).

Scientific	Common	Code	Fig No	Length Split (<cm)
<i>Clupea harengus</i>	Herring	HER	6–7	17.5
<i>Gadus morhua</i>	Atlantic Cod	COD	2–3	23
<i>Galeorhinus galeus</i>	Tope Shark	GAG	32	
<i>Lepidorhombus boscii</i>	Four-Spotted Megrim	LBI	16–17	19
<i>Galeus melastomus</i>	Blackmouthed dogfish	DBM	40	
<i>Lepidorhombus whiffiagonis</i>	Megrim	MEG	14–15	21
<i>Leucoraja naevus</i>	Cuckoo Ray	CUR	30	
<i>Lophius budegassa</i>	Black-bellied Anglerfish	WAF	20–21	20
<i>Lophius piscatorius</i>	Anglerfish (Monk)	MON	18–19	20
<i>Merlangus merlangius</i>	Whiting	WHG	24–25	20
<i>Melanogrammus aeglefinus</i>	Haddock	HAD	4–5	20
<i>Merluccius merluccius</i>	European hake	HKE	8–9	20
<i>Micromesistius poutassou</i>	Blue whiting	WHB	26–27	19
<i>Mustelus asterias</i>	Starry Smooth Hound	SDS	33	
<i>Mustelus mustelus</i>	Smooth Hound	SMH	34	
<i>Nephrops norvegicus</i>	Norway Lobster	NEP	28	
<i>Pleuronectes platessa</i>	European Plaice	PLE	22–23	12
<i>Raja clavata</i>	Thornback ray (Roker)	THR	35	
<i>Raja microocellata</i>	Painted/Small Eyed Ray	PTR	36	
<i>Raja montagui</i>	Spotted Ray	SDR	37	
<i>Raja undulata</i>	Undulate Ray	UNR	38	
<i>Scomber scombrus</i>	European Mackerel	MAC	12–13	24
<i>Scyliorhinus canicula</i>	Lesser Spotted Dogfish	LSD	29	
<i>Scyliorhinus stellaris</i>	Nurse Hound	DGN	39	
<i>Sprattus sprattus</i>	European sprat	SPR	41	
<i>Squalus acanthias</i>	Spurdog	DGS	31	
<i>Trachurus picturatus</i>	Blue Jack Mackerel	JAA	43	
<i>Trachurus trachurus</i>	Horse Mackerel (Scad)	HOM	10–11	15
<i>Trisopterus smarkii</i>	Norway pout	NPO	42	

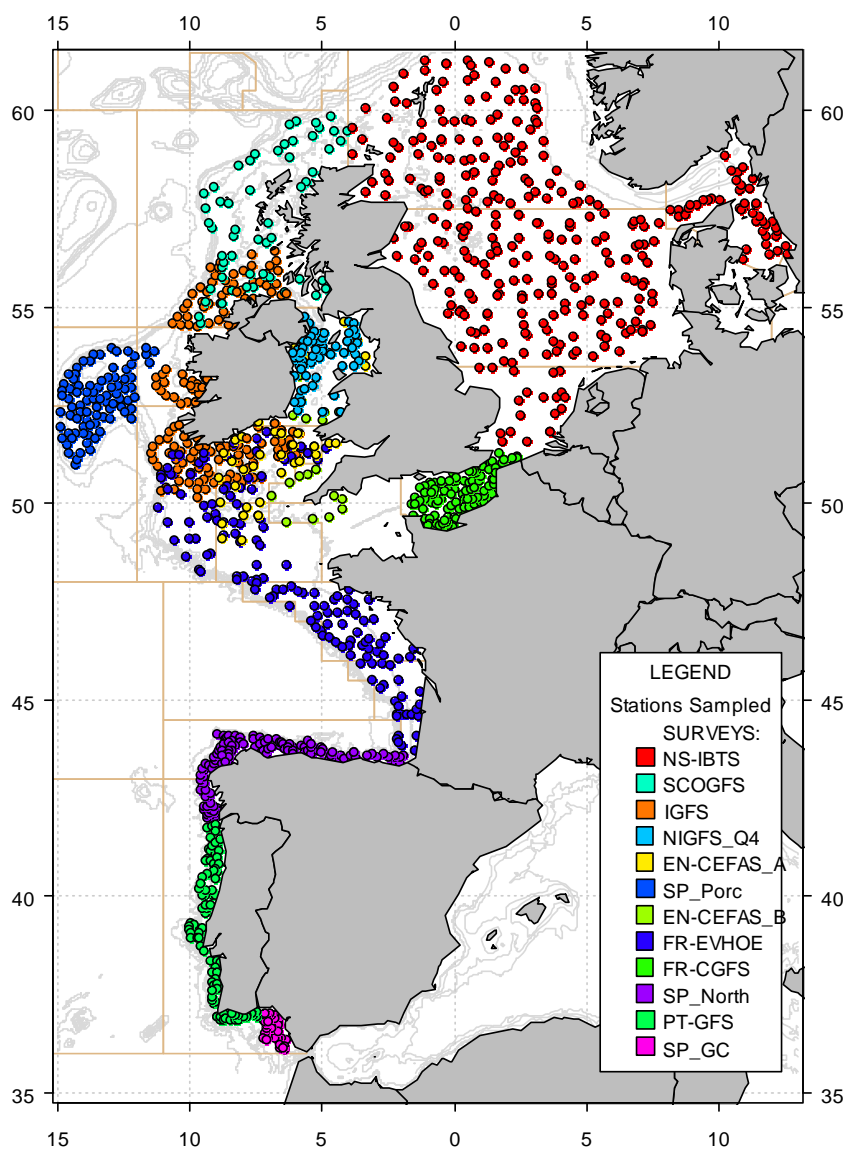


Figure 4.4.1. Station positions for the IBTS Surveys carried out in the Northeastern Atlantic and North Sea area in summer/autumn of 2011.

5 Evaluate the effect of sweeps length on net geometry (ToR b)

ToR b) Evaluate the effect of sweeps length on net geometry

The IBTS considered thoroughly the recommendations from SGSTS concerning an ideal survey trawl during its meeting in 2010. At the same meeting, an analysis on the ratio of warp length to be deployed at depth was presented. The results indicated that countries which followed the warp length to depth ratio as recommended in the IBTS Manual had considerable problems to maintain the trawl geometry within the specified ranges for net opening and door spread. This issue was widely discussed and it was agreed that 'gear net geometry, consistent between countries and year' should be the first aim and the warp/depth ratio should be adjusted consequently during the survey' (ICES CM 2010/SSGEST:06) and the IBTS Manual was revised accordingly.

An analysis on GOV trawl geometry comparing trawl performance during the Danish, German, Scottish and Swedish part of the NS-IBTS in the 3rd quarter 2011 and the 1st quarter 2012 was presented at the IBTS WG meeting this year (Annex 5 - WD 6). During these surveys, Denmark and Sweden used the same vessel (RV Dana) but their own GOV and trawl doors (Denmark 4.5 m² 1250 kg, Sweden 6.1 m² 1050 kg). Denmark, Germany and Sweden changed from short to long sweeps at depths > 70 m in the 1st quarter whereas Scotland does not. The analysis showed that Scotland and Sweden used shorter warp lengths at depth than Denmark and Germany which deployed warp to depth ratios still close to the recommended values in the IBTS Manual. Net opening was highly variable and none of the countries was able to maintain net opening for all warp lengths within the recommended range. Germany and Sweden encountered too low net openings at short warp length whereas the opposite was the case for Denmark. Door spread was considerably above the recommended values at a given warp length for Denmark, Germany and Sweden when using the longer sweeps in the first quarter. Relationships between door spread and net opening exist but were different between countries and differed in respect to sweep length. The relationship between door spread and wing spread was similar between Germany and Scotland for the short sweeps but differed completely for the deeper stations at which Germany used the long sweeps. Net opening at depth was close to the recommended range for Scotland whereas net opening for Germany and in particular Sweden was 1 to 1.5 m below the recommended values at most of the stations at depths shallower than 100 m (Figure 5.1). However, Sweden started to use the same kite as Denmark in the 1st quarter 2012 which increased the net opening by about 0.5 m on average compared to the 3rd quarter 2011. Door spread at depth followed closely the recommended range for Scotland and there were few deviations for the other countries when using the short sweeps. However, at greater depths when using the long sweeps, door spread for Denmark, Germany and Sweden were consistently above the recommended values and the deviation increased with depth (Figure 5.1). The considerable differences in the trawl geometry between the countries require further adjustments. Denmark and Scotland could use somewhat longer warp lengths at shallower depths whereas Sweden and Germany may consider the opposite in addition to the use of a more efficient kite or smaller trawl doors. At greater depths, shorter warp lengths might be considered but it appears unlikely that the recommended values for net opening and door spread can be achieved while the use of long sweeps continues.

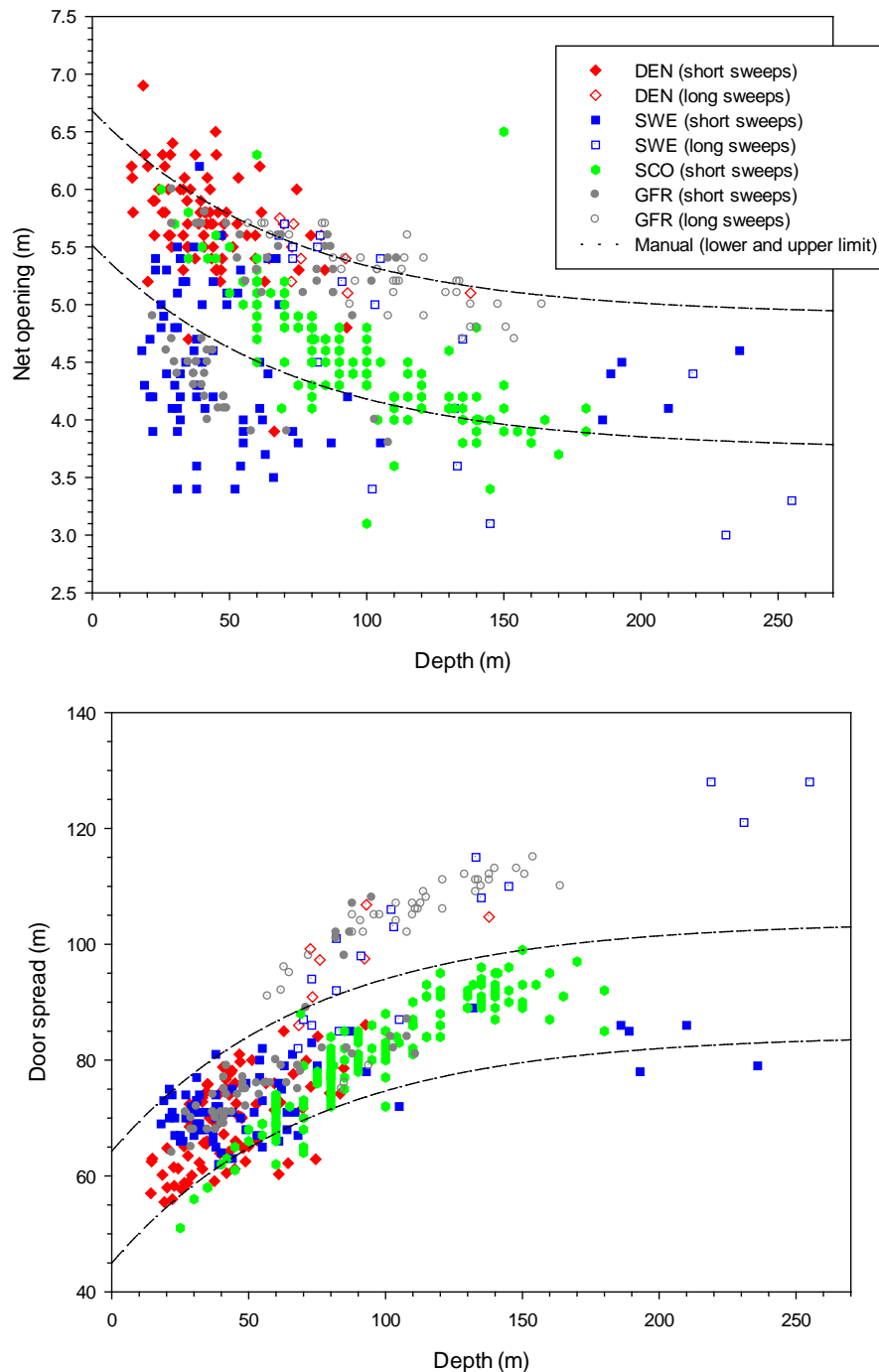


Figure 5.1. Net opening and door spread in relation to depth for Denmark (DEN), Germany (GFR), Scotland (SCO) and Sweden (SWE) in the 3rd quarter 2011 and 1st quarter 2012 North Sea IBTS (Note: two outliers of net opening for Scotland to be checked for possible data entry errors in DATRAS).

Marine Scotland Science has conducted a comparability study aimed at analysing catch rates of the GOV using both short (60 m) and long sweeps (110 m). Sufficient data were available from a series of paired hauls to allow analysis to be completed on cod, haddock, whiting and saithe. The results of these analyses will be published in the latter half of 2012 and upon publication the report will be made available to the North Sea survey coordinators as well as all participants of the IBTS for discussion in advance of the Q1 2013 surveys.

6 Evaluate sensitivity of abundance indices and approaches for alleviating changes in coordinated surveys (ToR c)

6.1 Introduction

Over recent meetings a number of issues with the potential to impact on standardized sampling have been reported on. These include some operational changes to gear deployments as well as the rare, but significant, unavailability of a vessel to undertake survey sampling at a particular time or location. While these issues have largely been unplanned or unavoidable, they have invariably been reported on in terms of technical changes to the extent or method of sampling.

Implications for survey indices relying on the assumption of standardized sampling can be difficult to quantify in isolation to the natural variability of survey catches. However, recent gaps in survey coverage in particular, and the impact on stock assessments relying on IBTS data, prompted a request to the IBTSWG to try to evaluate the sensitivity of survey indices to changes in spatial coverage (see WGNSK recommendations to IBTSWG – IBTSWG Report, ICES, 2011a).

Whether deviations from standard sampling are due to spatial or technical changes, the implications are potentially the same as are methods to evaluate the scale of any impact. Therefore the ToR will take two case studies to look at both aspects independently.

- 1) An existing request from WGWIDE, to evaluate the suitability of North Sea IBTS data as an index of abundance for horse mackerel, is used as a preliminary example of the sensitivity of an index to the spatial coverage of a survey (Section 6.2).
- 2) Technical sampling issues relating to a recent forced change in survey vessel for Sweden, within its normal spatial and temporal coverage, is presented in Section 6.3.

The likely scale of these example changes are summarized in Section 6.4, along with discussion on approaches for alleviating their impact in the field, as well as on primary data users consequently.

6.2 Changes in spatial survey coverage – Horse mackerel abundance indices

Due to the lack of an analytical assessment ICES management advice for North Sea, Horse Mackerel has remained constant since 2002 (WGWIDE report 2011, ICES, 2011b). The TAC is set at a catch of 18,000 t which is the 1982–1997 average. Stock structure, and even the TAC area, is quite complex with the North Sea TAC area currently delineated as IIIa, IVbc and VIId (Figure 6.2.1). VIId was not included historically and landings in IVa are included in the assessment in the first two quarters of the year, although the TAC area for IVa remains part of the western area allocation.

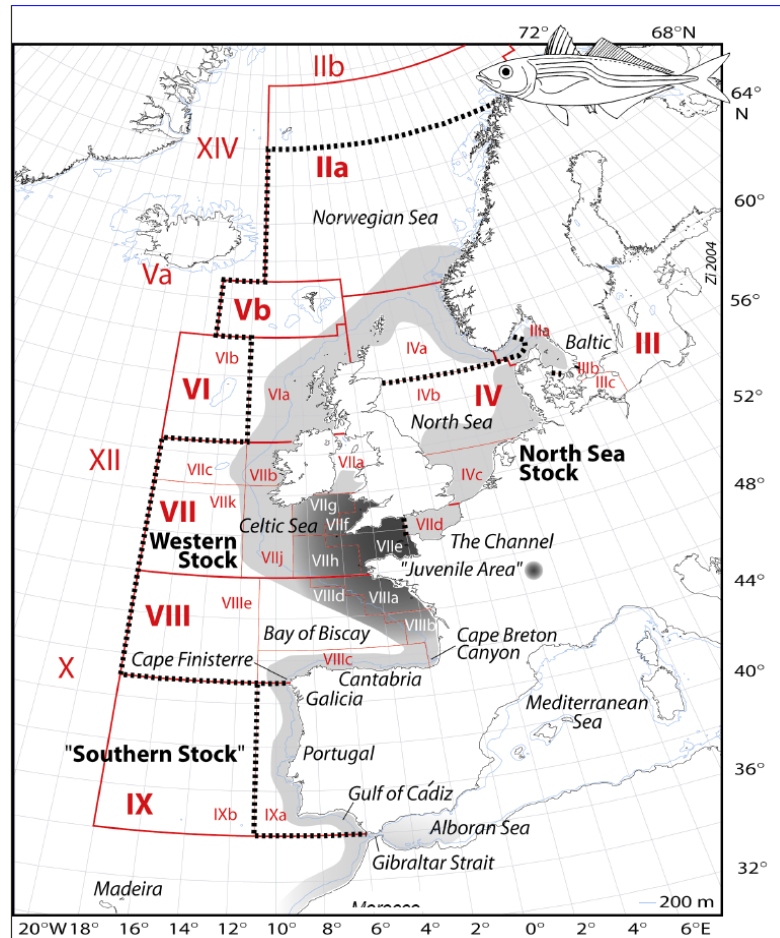


Figure 6.2.1. Distribution of Horse Mackerel in the Northeast-Atlantic: Stock definitions as used by ICES (ICES CM 2005/ACFM:08). North Sea Stock covers IIIa, IVbc and VIId. Map source: GEBCO, polar projection, 200m depth contour drawn, reproduced from WGWIDE 2011.

To initially review the utility of the IBTS data the above current stock/TAC definition was used as per the North Sea Horse Mackerel Stock Annex. The most recent working group report, WGWIDE 2011, referred to earlier work (WGMHSA 2007, ICES 2007) constructing an IBTS quarter 3 index area based on 2 criteria. Firstly, length classes were derived as a proxy for cohorts (<14cm = 0-group; ≥14cm and <23cm = 1yr-2yrs+ juveniles; ≥23cm = adults). Secondly, ICES rectangles in which all three groups occurred reasonably consistently between 1995 and 2010 were taken as the index area.

6.2.1 Survey Data

The approach outlined above was replicated initially for the current review. All quarter 3 North Sea IBTS Horse Mackerel data were downloaded from DATRAS to see how index area and survey data matched up. Given the WGWIDE 2011 recommendation that the TAC area should cover all areas where this stock is caught (i.e. IIIa, IVbc and VIId) data were also sourced from the Ifremer English Channel Groundfish Survey (CGFS) and also the Baltic Survey in IIIa (BITS). The BITS survey does not report by rectangle so an ArcMap was used to allocate rectangles to individual haul data.

Cpue of length per ICES rectangle was grouped into the 3 length classes defined above and the mean per group per rectangle for the time-series plotted. Data for BITS

was only readily available back to 1999 so the time-series analysed is NS-IBTS, CGFS and BITS, Q3–4 1999–2011.

The existing index grid consists of 24 ICES rectangles and is plotted on the map of survey data for length groups 1–3 (Figure 6.2.2a-c). While the legend scale changes for each group there appears to be reasonable amounts of data beyond the existing index area. The map for Group 3 (Figure 6.2.2c) shows the average adult catch is quite significant beyond the index area for IVb and IVc as well as VIIId and IIIa.

To minimize the loss of survey information it was decided to include the all rectangles in the current TAC area for which a reasonable time-series of survey data exists. This was examined on a length group basis by year, but is not presented here. The final new index area covers 94 statistical rectangles and is presented in Figure 6.2.2.d along with the Group 3 survey data for context.

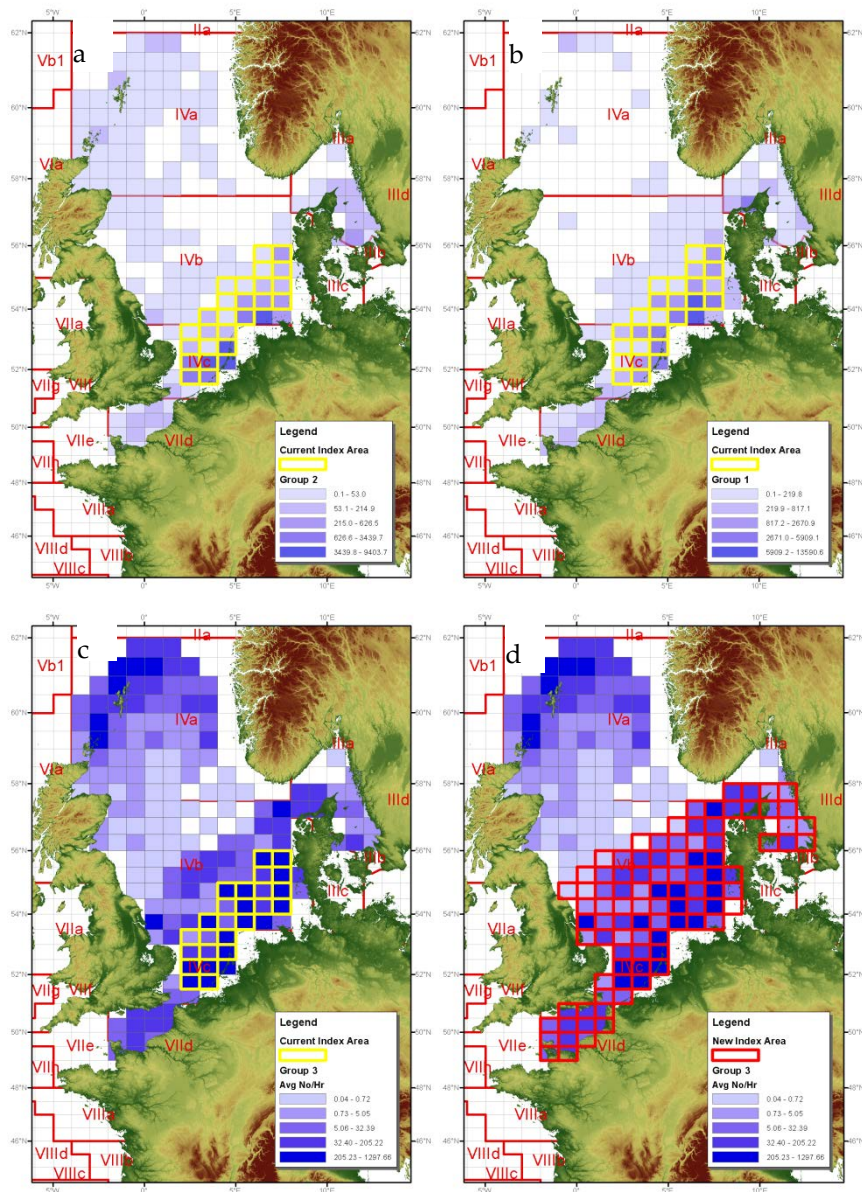


Figure 6.2.2. Map of horse mackerel survey data from NS-IBTS, CGFS and BITS 1999–2011. Group 1 = <14cm; Group 2 = ≥ 14 cm and <23cm; Group 3 = ≥ 23 cm fish. The current index area (yellow boxes) is plotted in maps a-c, with the modified new grid (red boxes) in map d. Only catches >0 are displayed.

6.2.2 Index Calculation

Log mean standardized indices for the original index area were constructed simply in excel as a starting point. IBTS data for this area was available back to 1992 so the index covers NS-IBTS Q3 1992–2011. The mean log index by Year (Figure 6.2.3) shows an overall downward trend from about 2002 onwards, indicating a reduction in catches or catchability over that period within the index area. A strong Group 1 peak in 1997 is followed by only a moderate Group 2 signal in 1998. Likewise a Group 2 time-series peak in 2002 does not translate into any significant Group 3 signal in 2003 or subsequently.

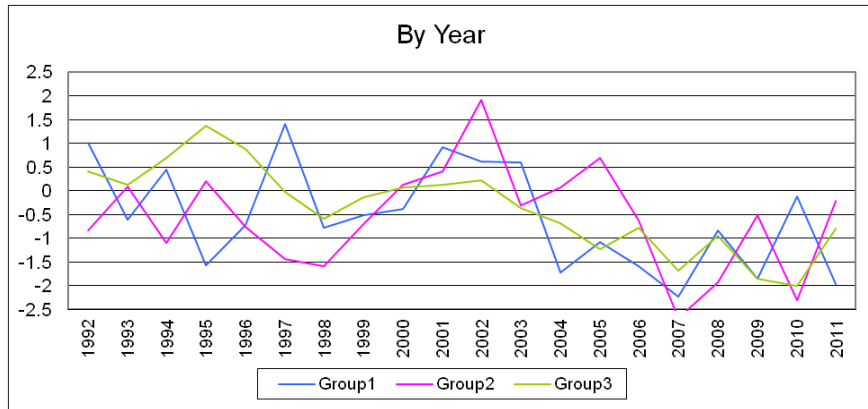


Figure 6.2.3. Log mean index for original index area.

The log mean index by Year-Class (cohort) shows various positive and negative correlations between cohorts (Figure 6.2.4). The 1997, 2004 and 2006 track quite poorly while other years seem more reasonable.

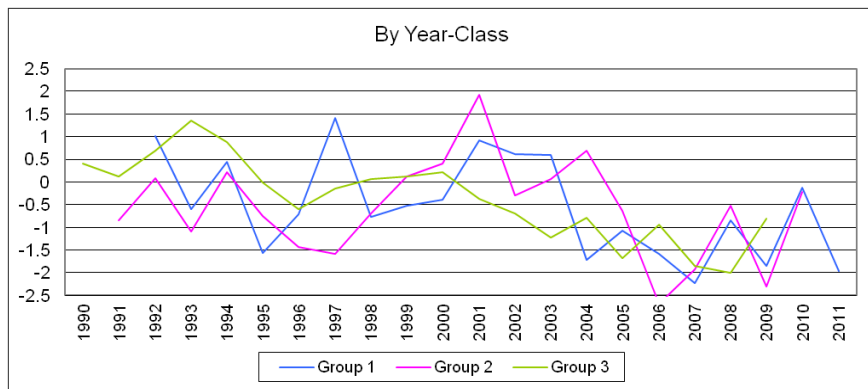


Figure 6.2.4. Log mean index for original index area.

Log mean standardized indices for the extended index area are presented by Year (Figure 6.2.5) and Year-Class (Figure 6.2.6). The updated index by year shows a similar downward slope from 2001–2002 again flattening somewhat after 2006.

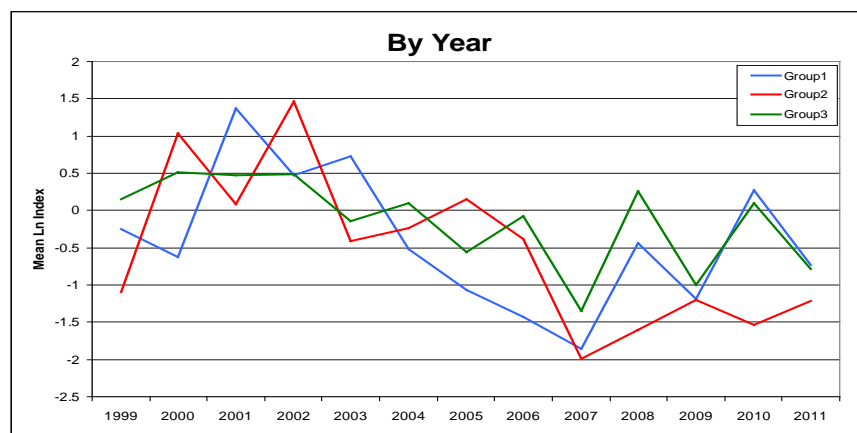


Figure 6.2.5. Log mean standardized index for extended index area.

Apart from 2006 cohort tracking in the extended index appears reasonable, especially for Group 1 and 2 fish (Figure 6.2.6). The strong 2001 year class is evident, but with much closer correlation between Group 1–2 than was evident in the earlier index. There is also now a more positive correlation fish in the 2004 year class, whereas this was inverse between Group 1 and 2 previously (Figure 6.2.4). Both indices show the anomalous 2006 cohort however.

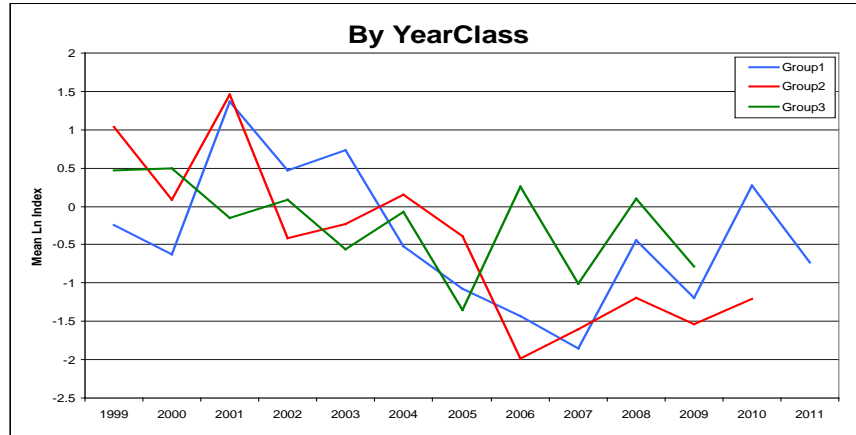


Figure 6.2.6. Log mean standardized index by cohort for extended index area.

SURBA 3.0 was used to do some further simple data exploration. Paired scatterplots of subsequent ages for the original (Figure 6.2.7) and new index (Figure 6.2.8) show marginal differences other than a few potential outliers. Slopes are positive between successive length groups however, indicating at least some capacity to predict strong year class at least.

In contrast the plots of log cohort abundance for the original index (Figure 6.2.9) show some improvement with the extended index area (Figure 6.2.10).

Combined IBTS Q4 No/Hr per length group □□□□: Comparative scatterplots at age

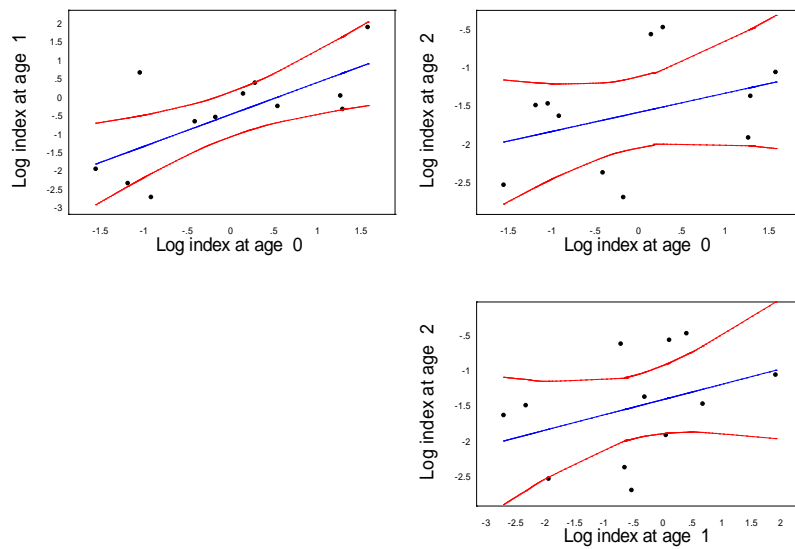


Figure 6.2.7. Scatterplots of paired length groups with confidence intervals for the original index.

Combined IBTS Q4 No/Hr per length group □□□□: Comparative scatterplots at age

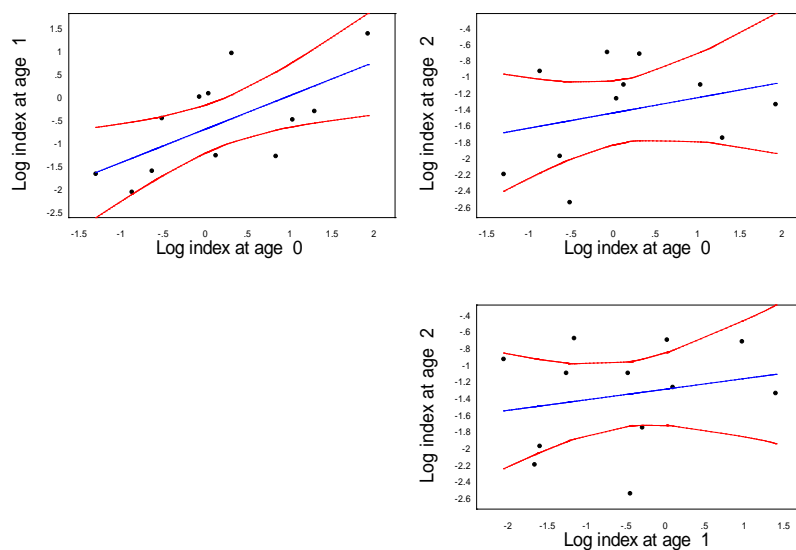


Figure 6.2.8. Scatterplots of paired length groups with confidence intervals for the extended index area. The slopes are generally straighter, less hooked and parallel for the extended index area.

Combined IBTS Q4 No/Hr per length group □□□□: log cohort abundance

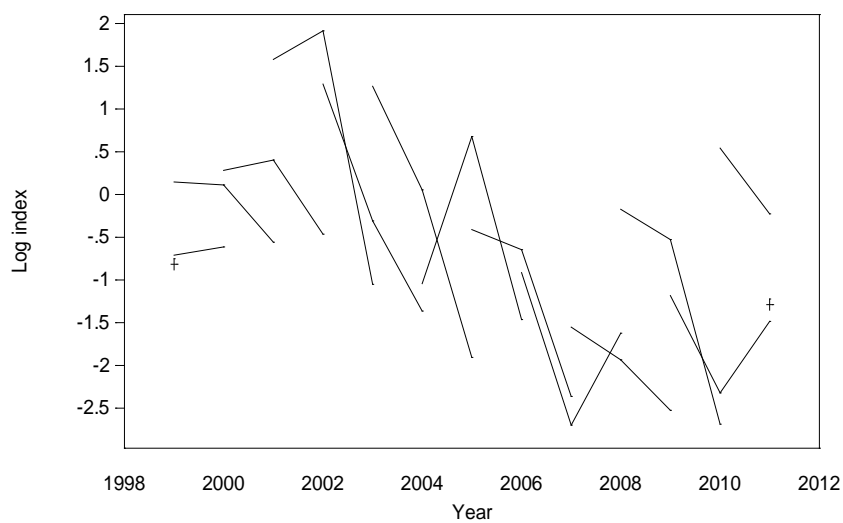


Figure 6.2.9. Plot of log index by age for original index.

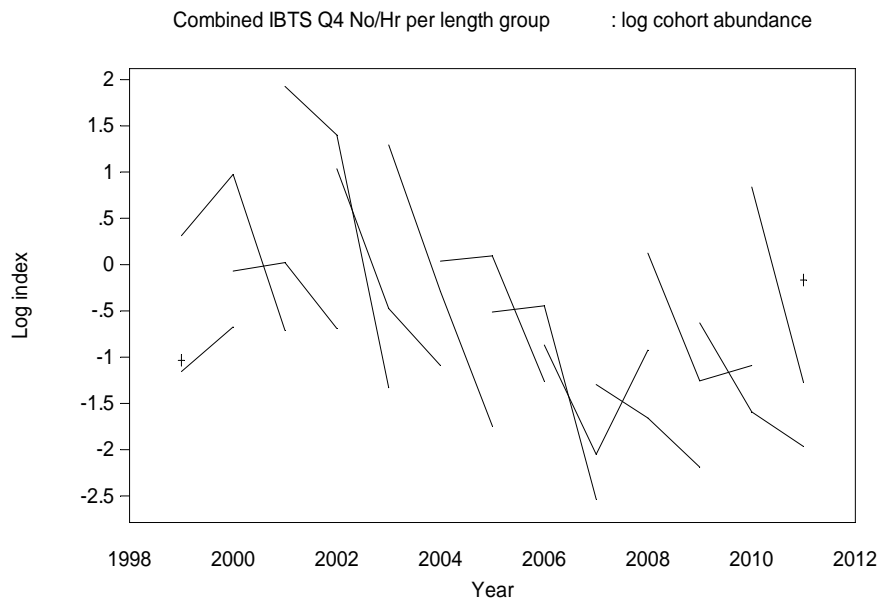


Figure 6.2.10. Plot of log index by age for extended index area.

6.2.3 Results

The brief exploratory study done here highlights the additional survey data that is available and relevant to the stock area of interest for this term of reference. Some downward trends in catches or catchability are evident however and should be investigated further. While some improvement is seen with the extended area, and indices show ability to track cohorts, the data would no doubt benefit from a more rigorous exploration of possible sources of variability. Standardizing by swept-area across different surveys and survey gears as well as information on horse mackerel biology such as diurnal migrations etc may all help clean the data further.

In the context of an IBTS horse mackerel index it would be worth progressing on a collaborative working document to WGWIDE with input from both survey assessment and biological expertise. This should help to evaluate the utility of extending the dataset as outlined above. However, for this stock at least, survey coverage in isolation appears to have some, but not a major influence on survey precision.

6.3 Technical changes in survey sampling – a shift in swept-area effort with changing vessel

During routine maintenance of the national research vessel *R.V. Argos* in early 2011, Sweden discovered asbestos linings in the vessel. Given the nature of this substance, the Swedish Transportation Board immediately withdrew the vessel from use leaving limited time to find a replacement for the IBTS Q1 Survey. Therefore, the smaller *R.V. Mimer* was employed to carry out a scaled down spring survey program in 2011, while the Danish vessel; *R.V. Dana* was chartered for autumn in 2011 and spring 2012.

A brief overview of the impact of changing survey vessel is given here to examine the potential sensitivity of the survey indices to this change. For a broader context refer to the work presented in Section 5 and also earlier work in the IBTS gear performance term of reference (ToR C: IBTSWG reports 2009–2011).

While the research vessel was replaced for the 2011–2012 Q1 surveys, doors and trawl remained the standard ones used by the Swedish survey historically. However, since Q3 in 2010, survey warp length was reduced intentionally to bring trawl opening more in line with expected values, following the recommendations from IBTSWG in 2010 (ICES, 2010). Therefore we can see that the warp out to depth ratio (scope ratio) for the two most recent years is distinctly less than the earlier *Argos* time-series (Fig 1).

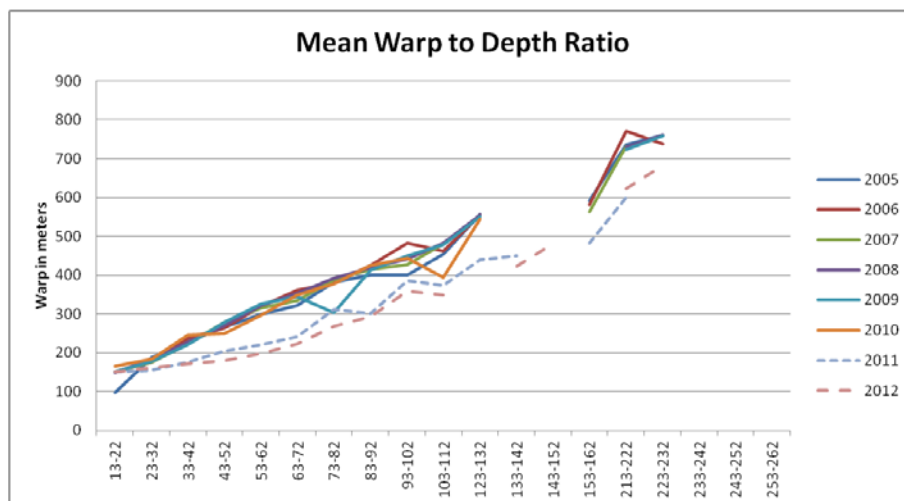


Figure 6.3.1. Average warp out to depth ratio showing the reduction in ratio for the two most recent years (dashed lines) compared to earlier observations (solid lines).

The scope ratio will affect the door spread (Figure 6.3.2) and also the ground contact due to the increased length and weight of wire between the trawl and vessel. Increased spreading of the trawl beyond an optimum can reduce ground contact of the footrope (Von Szalay and Somerton 2005), although the issue is complex and species-specific (Dickson 1993; Ramm and Xiao 1995; Von Szalay, 2004). The catching efficiency in relation to sweep angle is also related to fish length for some species at least (Dickson 1993). Historically we can see that the Swedish survey displayed greater mean door spread at depth (Figure 6.3.2) which would be expected from the increased scope ratio. Intuitively, sand clouds from the trawl doors will be most effective in herding fish where they are in line with sand clouds from the sweeps and lower bridles.

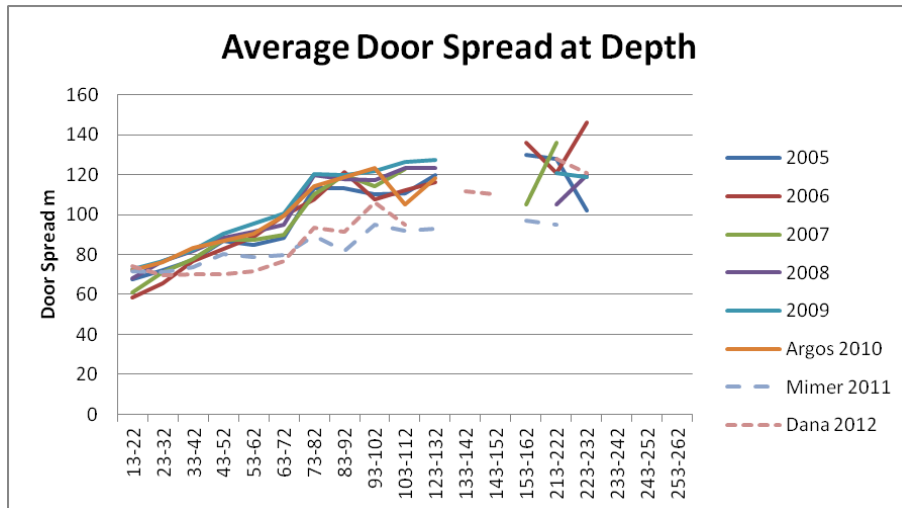


Fig 6.3.2. Mean door spread at depth between the historic Swedish survey (solid lines) and the more recent years using replacement vessels (dashed lines).

The most immediately obvious impact of increasing door spread is the increase in swept-area. This is unavoidable and has been highlighted previously at IBTS (e.g. IBTSWG report 2011, ToR C, ICES 2011). A significant reduction in mean swept-area in the last two years is evident in Figure 6.3.3, coincident with the vessel changes. The 2011 data are slightly skewed however as the normal practice of changing from short sweeps (60m) to long sweeps (110m) at depths >70m was not observed and short sweeps were maintained for the duration of the survey.

If we assume catching efficiency has not changed between years then at a minimum the area sampled per 30min tow has reduced and therefore any data not standardized to historic swept-areas at each depth will appear artificially low.

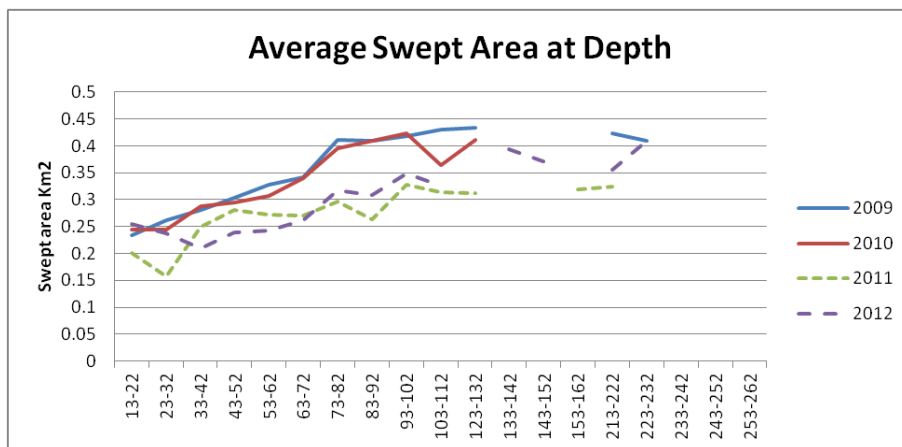


Figure 6.3.3. Mean swept-area in Km² for the Swedish recent time-series. Original vessel (Argos – solid lines) compared to recent substitute vessels (dashed lines).

As mentioned above the assumption is that catching efficiency, the ability to capture fish in the path of the trawl, remains constant for a given depth in a given area with a standard trawl. The catching efficiency of a generic otter trawl is intrinsically linked to its herding efficiency which is the main function of the trawl doors, sweeps and bridles. The intention being that fish in the path of the trawl between the trawl doors

will be funnelled back toward the net along the wall of noise and sand clouds created by the line of sweeps and bridles (Figure 6.3.4).

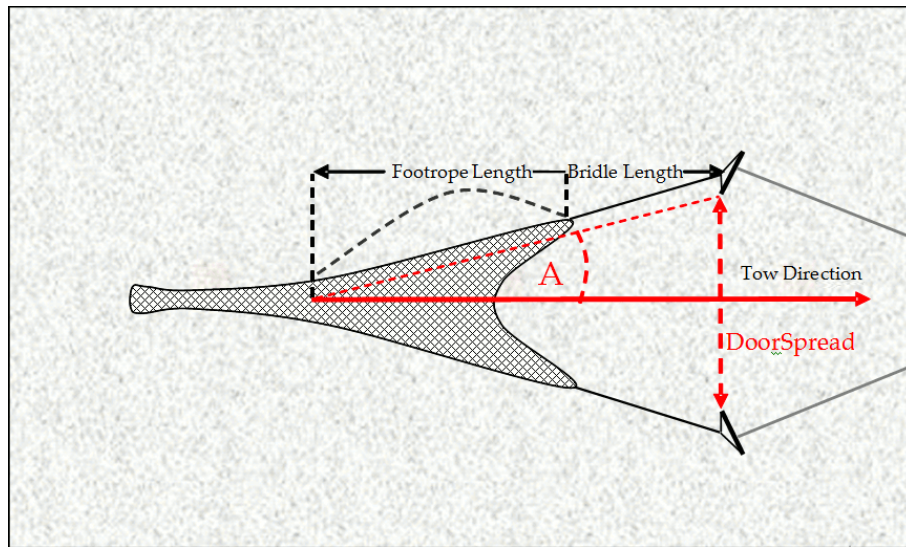


Figure 6.3.4. General otter trawl schematic illustrating the main geometry measurements involved in calculating bridal (Attack) angle (A).

The trawl doors and rigging therefore not only spread the net, but greatly increase the effective catching area for species that shoal in particular. This effective catching area is affected by depth and scope ratio as illustrated above, but also the angle of the sweeps and bridles between the trawl and doors. A greater angle implies greater door spread and swept-area obviously, but provides more of an obstacle for slower moving individuals (species or ages) which are more likely to jump the hurdle rather than be nudged gently back into the trawl at narrower angles (see IBTS 2011 report, Section 6 for discussion and references, ICES, 2011b). In other words changes in gear geometry from area to area are expected and will impact on catching efficiency of any herding trawl. However, changes for a given area between years is problematic, tend to be species-specific and hard to quantify and should be minimized as a priority.

A plot of mean bridle angle at depth for the last 4 years of the Swedish survey demonstrates the complexity that can arise (Figure 6.3.5). The method used for calculating the bridle angle uses the sweep and bridle length added to the footrope length to form a right angled triangle, with half the door spread as the base (for details see IBTSWG 2011 report).

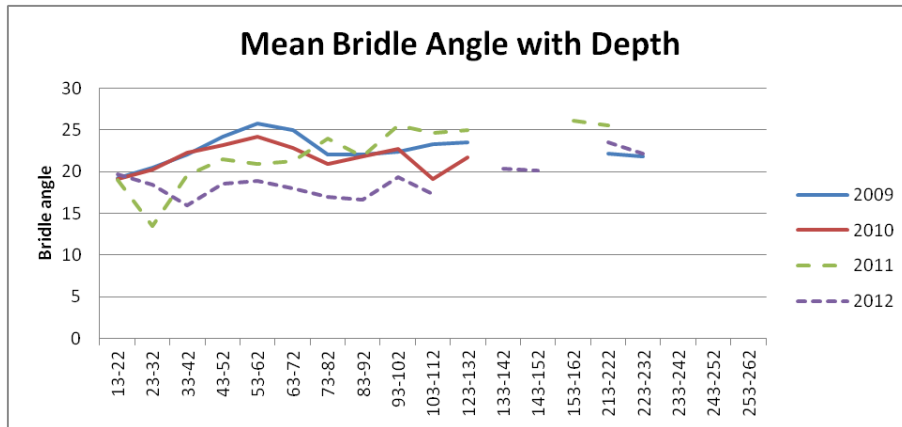


Figure 6.3.5. Plot of mean bridle angle at depth for the historic Argos surveys (solid lines) and recent replacement vessels *R.V. Mimer* (2011 - green dashed line) and *Dana* (2012 - purple dotted line)

The two recent years show lower bridle angles compared to the historic time-series, but only down to about 70 m, due to the lower door spread. The 2012 survey continues with a lower angle for all depth, but the shorter sweep lengths used for the entire 2011 survey dramatically increases the bridle angle beyond 70m depth.

In purely catch per unit of effort terms (cpue) the simple effect of swept-area adjustment can be seen in Figure 6.3.6. Plotting numbers purely as an average per 30 min tow clearly shows a downward bias in cpue from 2011 onwards as proportionately less area is being sampled. In order to plot the datasets as closely as possible the mean cpue in number per Km² has actually been re-scaled here to Avg. No/0.3Km² to approximate the average swept-area for a valid 30 min tow.

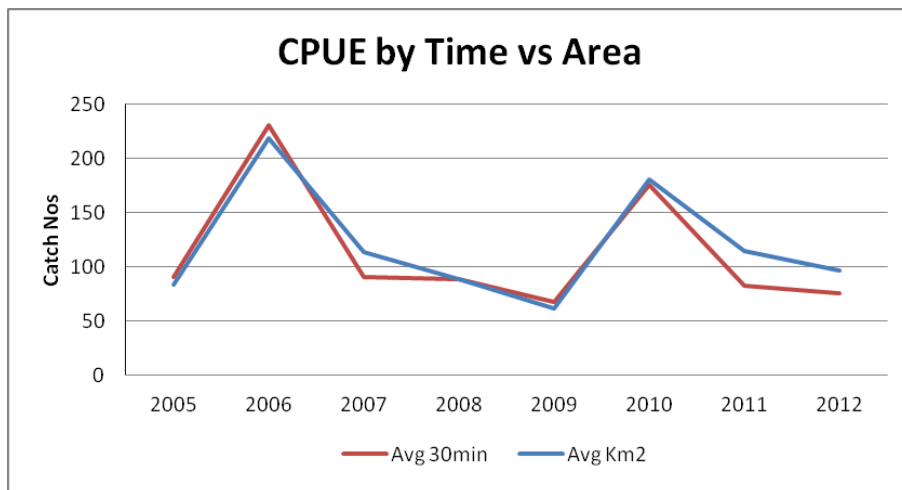


Figure 6.3.6. Plot of mean catch numbers per 30 min tow (red line) and mean number per 0.3 Km² (blue line).

This standardizing of the survey cpue takes account of a shift in effective swept-area only. As long as the change in catchability is constant across lengths (and therefore age classes) an index of catch numbers-at-age might just require scaling. Where catchability affects size classes unequally however, the ability to follow even strong cohorts through the fishery can break down. Using haddock (*Melanogrammus aegle-*

finus) as the example, survey indices of catch numbers-at-age per hour and also per Km² were constructed back to 2002 and are given in Tables 6.3.1–2.

Table 6.3.1. Haddock catch numbers-at-age per hour for the Swedish Q1 IBTS survey.

cpue in No/Hr											
Age	1	2	3	4	5	6	7	8	9	10	Avg
2002	95.59	400.13	22.28	0.31	0.00	0.00	0.00	0.00	0.09	0.00	51.8
2003	23.82	9.67	13.48	4.61	0.18	0.00	0.00	0.00	0.00	0.00	5.2
2004	193.53	24.33	0.59	3.20	0.22	0.00	0.00	0.00	0.00	0.00	22.2
2005	149.38	38.37	1.81	0.30	2.55	0.08	0.00	0.00	0.00	0.00	19.2
2006	560.88	13.24	3.38	0.27	0.00	0.36	0.00	0.00	0.00	0.00	57.8
2007	127.82	78.67	4.35	1.27	0.08	0.00	0.08	0.00	0.00	0.00	21.2
2008	163.30	33.15	10.21	0.55	0.43	0.00	0.00	0.00	0.00	0.00	20.8
2009	116.38	32.82	6.31	0.71	0.00	0.00	0.00	0.00	0.00	0.00	15.6
2010	397.48	18.26	10.57	1.67	2.30	0.00	0.00	0.00	0.00	0.00	43.0
2011	143.11	45.18	28.42	4.05	0.29	1.62	0.19	0.00	0.00	0.00	22.3
2012	51.88	34.45	49.99	37.86	9.76	1.53	0.26	0.09	0.09	0.09	18.6

Table 6.3.2. Haddock catch numbers-at-age per Km sq for the Swedish Q1 IBTS survey.

cpue in No/Km ²											
Age	1	2	3	4	5	6	7	8	9	10	Avg
2002	153.02	640.51	35.66	0.50	0.00	0.00	0.00	0.00	0.14	0.00	82.98
2003	39.68	16.12	22.47	7.68	0.29	0.00	0.00	0.00	0.00	0.00	8.62
2004	313.16	39.37	0.95	5.19	0.35	0.00	0.00	0.00	0.00	0.00	35.90
2005	246.17	63.23	2.98	0.50	4.21	0.13	0.00	0.00	0.00	0.00	31.72
2006	903.71	21.33	5.45	0.43	0.00	0.58	0.00	0.00	0.00	0.00	93.15
2007	201.31	123.90	6.86	2.00	0.13	0.00	0.13	0.00	0.00	0.00	33.43
2008	252.02	51.16	15.75	0.84	0.66	0.00	0.00	0.00	0.00	0.00	32.04
2009	173.33	48.88	9.39	1.06	0.00	0.00	0.00	0.00	0.00	0.00	23.27
2010	613.16	28.17	16.31	2.57	3.54	0.00	0.00	0.00	0.00	0.00	66.37
2011	258.48	81.60	51.33	7.31	0.52	2.92	0.35	0.00	0.00	0.00	40.25
2012	93.51	62.10	90.12	68.25	17.59	2.76	0.47	0.16	0.16	0.16	33.53

Looking at the log mean standardized indices by year (Figure 6.3.7) shows overall the indices are noisy as well as virtually identical with each other. However, both indices show an upward relative trend in the older age classes appears, particularly in the last two years. Conversely, the proportion of 1-group fish being caught in the last two years in comparison to the time-series is slightly reduced.

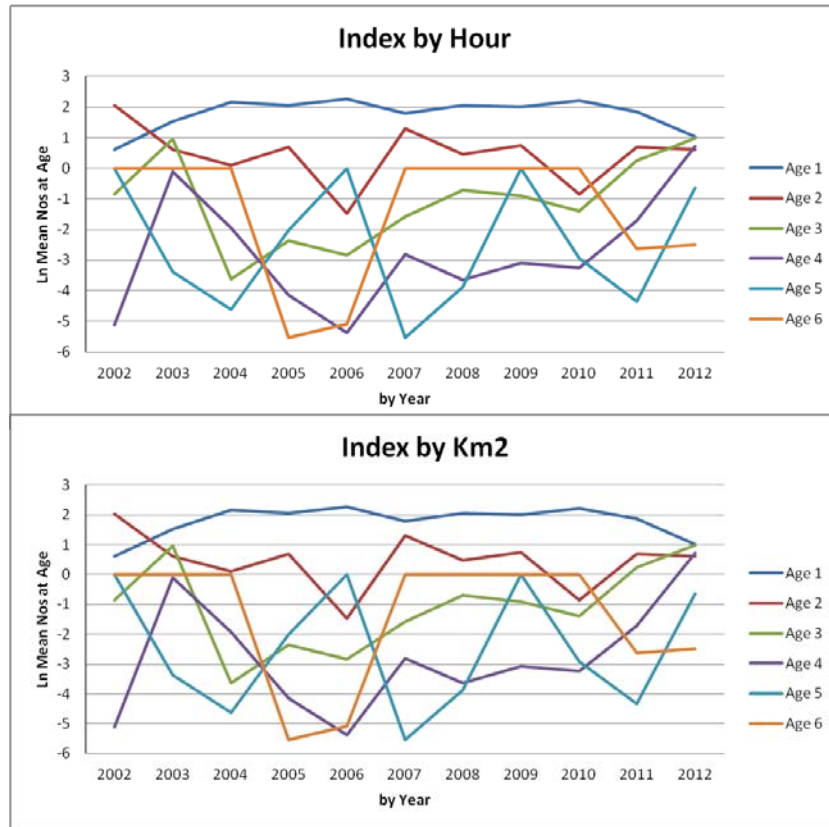


Figure 6.3.7. IBTS Q1 haddock indices from Sweden by hour (above) and swept Km² (below). Zero line indicates the mean. Ignoring age 6, all ages older than 1 increase together in both years from 2011 to 2012 for both the swept-area and time standardized indices. Inversely, 1-group fish show a slight downward trend.

The time standardized index was compared to the swept-area corrected index using the survey based assessment software SURBA 3.0. As part of routine exploratory analysis a linear regression is fit to numbers-at-age between all pairs of ages for each index (Figure 6.3.8). For an index to be useful we hope to see a good fit between successive years at least. Then we can say that the relative abundance of 1 year old fish, for example, is indicative of the relative strength of that cohort as 2 year olds the following year. The more positive the slope and tighter the confidence intervals in Figure 6.3.8, the better the index is at predicting catch numbers-at-age the following year for those age groups. With very distinctive strong and weak year classes an index may be able to predict year-class strength even several years ahead.

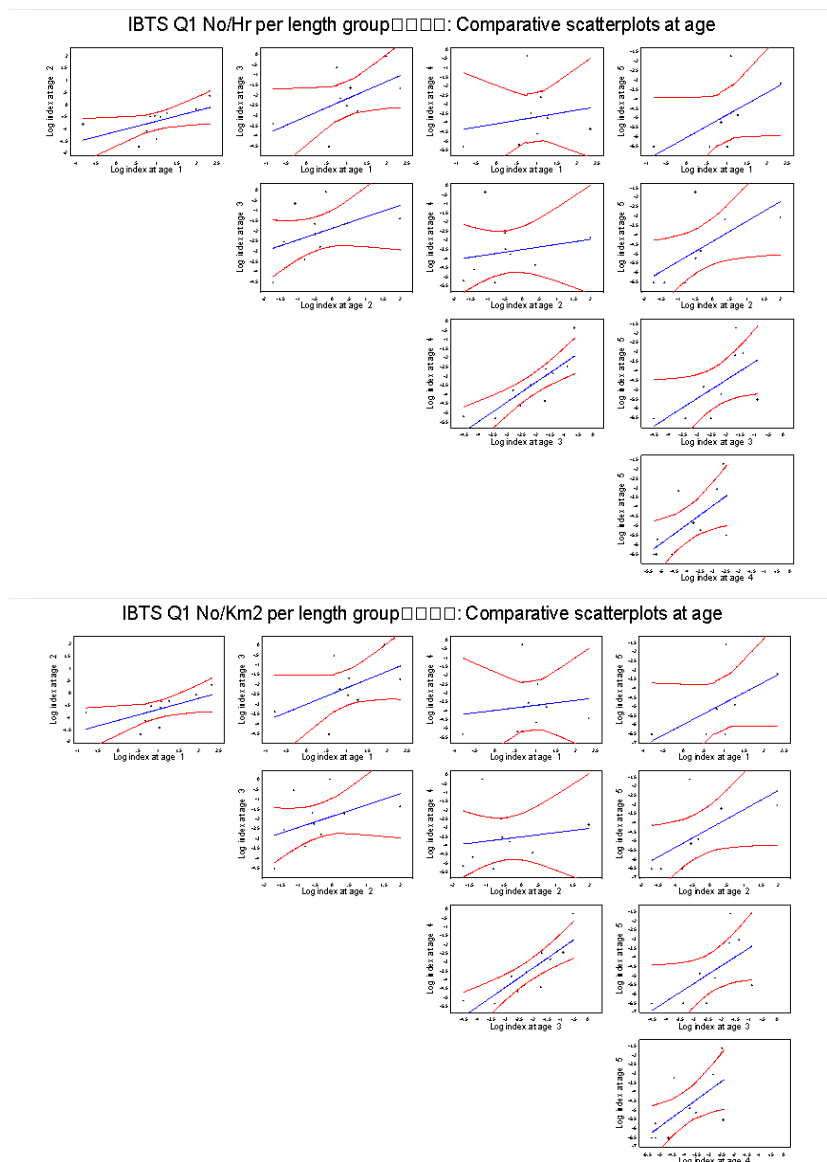


Figure 6.3.8. IBTS Q1 haddock indices from Sweden by hour (above) and swept Km2 (below). Successive pairs of ages show a progressively more positive correlation with pair 3–4 in particular showing a good positive slope with narrow confidence intervals.

Results from the regression fits showed no clear improvement in the predictive power of the swept-area index. This might be expected however as the data for each pair of age groups in this part of the analysis are taken across the time-series so should be fairly robust to moderate outliers in a given year. A prolonged change however should be picked up as either a change in slope or confidence intervals and is evidence of a change in catchability.

Catch curves for the log indices are virtually identical also so only those for swept-area are presented here (Figure 6.3.9). The mortality curves are relatively steep, but parallel indicating each cohort is removed quite quickly from the fishery, but also in a fairly consistent and predictable manner. After 2009 however hooks appear suggesting that larger numbers from that cohort are removed in 2010 for example, than was the case the year previously. Therefore, either abundance of that cohort has increased

in the area, or the surveys catchability has increased for older larger fish. This is evident across a number of cohorts.

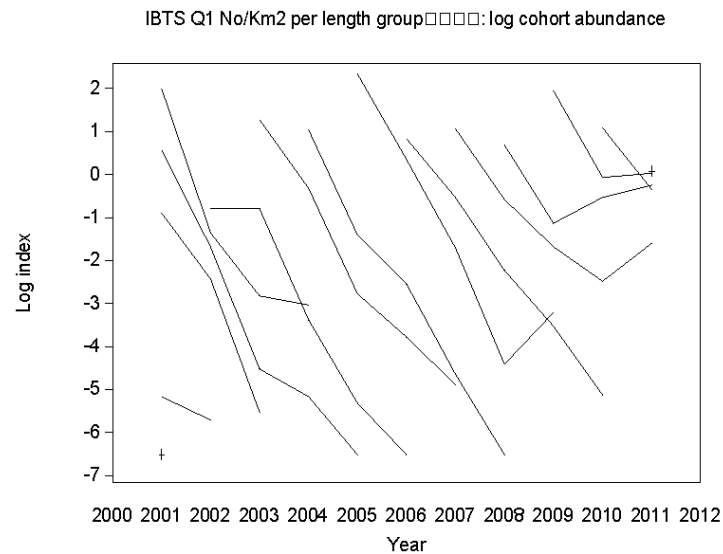


Figure 6.3.9. Catch curves for IBTS Q1 haddock indices from Sweden by swept Km². Each line plots the rate of removals from the fishery over time for a particular year class. Upward hooks indicate the rate of removals has increased in a subsequent year. Where lines do not decay steadily over time we assume that either abundance or catchability of that year class in the area has changed.

Discussion

In conclusion there has been a shift from an average swept-area of 0.353Km² in the Swedish survey 2005–2010 to an average per tow of 0.294Km², a drop of 17% in the average area sampled per tow. As discussed this sampling shift is a simple re-scaling matter to deal with, but is essential in maintaining continuity of a cpue index. Relative survey indices rely on sampling units and catchability being held constant over time so that changes in cpue will reflect actual changes in species abundance. Where changes in vessel and possible changes in trawl geometry become complex is in terms of catchability. For example, where changes in door spread are accompanied by a significant change in bridle angle this is likely to lead to a shift in herding efficiency as well ground contact, both important facets of catchability.

The survey haddock data presented here represent only partial coverage for a larger combined index. Therefore the high variability of the index is likely compounded by stock movements in the survey area. Likewise the same noise makes perception of variability due to year effects in sampling, hard to discern from background noise in the index.

Many factors influence trawl geometry and have been discussed in more detail in recent IBTSWG reports and references therein. The objective of this ToR was to suggest an approach to dealing with planned or un-planned changes in survey vessel and/or gear in order to maintain the integrity of the index as far as possible. While none of the parameters presented above are independent, changes in geometry can and should be standardized as far as possible in the field. Where this wasn't or isn't possible a corrected unit of effort should be made available and known, as matter of course, in consultation with key data users such as ICES stock co-ordinators. The

correction made here using swept-area had an obvious effect on total biomass in numbers (Figure 6.3.6), but had no adverse effect on the perception of year-class strength in the indices at this point.

The greater problem arises where catching efficiency is affected such as a change in attack angle. Maintaining scope ratio for example has not led to standard door spreads among the IBTS surveys for reasons such as national differences in door weight and design touched on above. While a year effect in catchability is impossible to conclude from a small dataset like this, some recent trends are evident and one should not be complacent. Focusing on attack angle, rather than individual symptoms such as door spread at depth, could help in standardizing the critical Issue of catchability for herding gears.

IBTS recommended configurations are a good starting point for an adjusted survey series, but in setting up a new vessel and/or trawl to maintain an existing time-series it is useful to have a vessel/door/warp independent target value to aim for. When implementing changes to survey sampling it is strongly recommended therefore that the standard trawl parameters are monitored not just individually, but combined in the context of the herding efficiency of the historic survey sampling in the local area of interest.

6.4 Alleviating changes in coordinated surveys

In a more general sensitivity context stocks often cover large areas, beyond the scope of a single national survey. Should a survey, or vessel, not cover sampling in a given year for whatever reason (NS-IBTS, CGFS or BITS in the study above for example) then significant quantities of data are lost. One might say that horse mackerel in the North Sea seem reasonably robust to data omissions. The distribution of this stock is reasonably homogeneous however, and it is likely that where stocks have more localized distribution the loss of data becomes significantly more problematic. As highlighted in this report (see Section 4.3) as well as earlier IBTSWG reports a number of surveys have encountered vessel problems in recent years as well as changes to gear and design, planned and unplanned. These have caused problems for both survey and fishery managers with a number of stock assessments relying entirely on survey data unable to provide analytical advice.

The solution to this problem is twofold. Firstly, agreed methodology for a review of catch-at-age variability for the main indices of interest across the IBTS coordinated area is required. This would set minimum levels of sampling required to maintain a basic level of precision for various indices as a whole, in contrast to each countries historic survey area. In other words, where an issue arises at short notice, would international effort be best spread evenly over the entire coordinated area, or simply a minimum number of stations allocated to the gap area to avoid major problems with the index. This might most usefully be done by a multidisciplinary group such as WGISDAA which could combine statistical and logistical considerations.

At the next level, agreement would be needed at national and international level that countries would meet the sampling shortfall. This would be on a strictly short-term basis and providing there were defined targets and the facilitating country/ies encountered no loss of funding or perceived performance under their national or EU programs.

6.5 References

- Dickson, W. 1993. Estimation of the capture efficiency of trawl gear. II: Testing a theoretical model. *Fisheries Research* 16(3): 255–272.
- ICES. 2007. Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy (WGMHSA). 4–13 September 2007, ICES Headquarters. ICES CM 2007/ACFM:31: 712 pp.
- ICES. 2010. Report of the International Bottom Trawl Survey Working Group (IBTSWG), 22–26 March 2010, Lisbon, Portugal. ICES CM 2010/SSGESST:06. 267 pp.
- ICES. 2011a. Report of the International Bottom Trawl Survey Working Group (IBTSWG), 28 March – 1 April 2011, ICES Headquarters, Copenhagen. ICES CM 2011/SSGESST:06. 237 pp.
- ICES. 2011b. Report of the Working Group on Widely Distributed Stocks (WGWIDE), 23–29 August 2011, ICES Headquarters, Copenhagen, Denmark. ICES CM 2011/ACOM:15. 642 pp.
- Main, J., and G. I. Sangster (1981). A study of the sand clouds produced by trawl boards and their possible effect on fish capture, Department of Agriculture and Fisheries for Scotland/Aberdeen (UK).
- Ramm, D. C., and Y. Xiao (1995). Herding in groundfish and effective pathwidth of trawls. *Fisheries Research* 24(3): 243–259.
- Somerton, D. A. 2003. Bridle efficiency of a survey trawl for flatfish: measuring the length of the bridles in contact with the bottom. *Fisheries Research (Amsterdam)* 60(2–3): 273–279.
- Von Szalay, P. G. 2004. The effect of improved footrope contact measurements on trawl area swept estimates. *Fisheries Research (Amsterdam)* 69(3): 389–398.
- Von Szalay, P. G., and D. A. Somerton (2005). The effect of net spread on the capture efficiency of a demersal survey trawl used in the eastern Bering Sea. *Fisheries Research (Amsterdam)* 74(1–3): 86–95.

7 DATRAS related topics (ToR d)

ToR d) Address DATRAS related topics including DUAP: data quality in relation to DATRAS data-checks and the use of WoRMS species codes and the progress in re-uploading corrected datasets. Prioritize further developments DATRAS;

7.1 Developments and progress

Following suggestions and needs occurred during this year some changes and developments have been produced in DATRAS, main changes implemented and in progress are listed below:

Implemented:

- Date Stamp is implemented on the download product, showing the date of calculation of that product; this extra information helps those who want to compare the product with their own previous download to identify the changes.
- ALT-IBTS survey name has been changed to SWC-IBTS (Scottish West Coast IBTS) in the DATRAS database
- A new enhancement is an e-mail sent to data-submitters after each screening. Contents of the mail are screened file information and list of errors and warnings.
- Also an e-mail is sent to data-submitters after each upload, to notify the file is successfully uploaded.
- Implemented new errors-warnings:
 - If DataType=S, SubFactor is always >1 for all species in the haul.
 - When species are uploaded on a taxonomic level higher than species.
 - Create check for unique haul number per cruise - critical error.
- Cod extended indices calculation procedure is part of the other standard species calculation, nevertheless it has been decided that it will be available by e-mail request but not on DATRAS download page. This data request demands quality checking and to ensure that indices are estimated with sufficient coverage in all the ICES squares, therefore the index will be provided by request.
- Frequently Asked Question (FAQ) document (WD7) is written for data submitters and data users. FAQ document is in draft stage and IBTSWG members are going to review and give feedback to ICES data centre.
- (http://groupnet.ices.dk/duap/Background%20and%20working%20documents/Datras%20FAQ%20for%20data%20submitters_final1.pdf ; document name: 1.1.DATRAS FAQ draft)
- All the existing TSN codes in the DATRAS database are mapped with WoRMS Aphia codes and the mapping list is available on the DATRAS website. Aphia codes mapping also implemented in indices calculation procedures.

In-progress:

- After each submission DATRAS is performing a substitution of Age Length Key procedure by round fish areas. The new facility in DATRAS

shows the web report of with and without filled ALK and list of areas from ALK are borrowed. This web based report is available after 2012 1Q final submission.

- Web based report which shows filling ALK result of borrowing ALK within different length class.
- A data comparison tool is in development and testing stage, it allows ICES data centre to identify the changes in the two separate uploads, creating a summary of the changes. This utility helps to assist experts groups and also data submitters by being informed of their changes.

7.2 Progress and problems in re-uploaded data

Comparisons between Megrin (IVa and VIa) cpue indices derived from DATRAS exchange data and data received directly from national laboratories

A working document submitted to the group (WD: 8) highlights the differences in the results of a bootstrap estimates of megrim cpue in areas IVa and VIa using data derived and downloaded from DATRAS and data received from national laboratories. The results obtained with the two datasets were different, a comparison of the stations in both datasets (Figure 7.2.1) shows that some data are missing from DATRAS downloadable set.

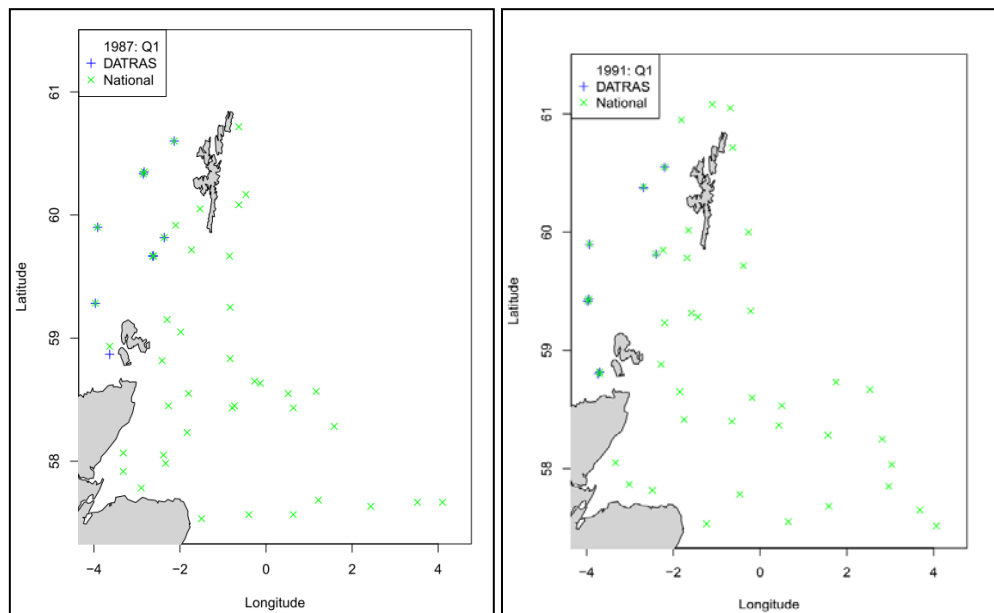


Figure 7.2.1. Two examples of missing observations when contrasting data received from national laboratories with those extracted from DATRAS exchange data.

A similar problem with changes in time-series datasets arose during the HAWG 2012 assessment, where data from the time-series had changed producing unexpected changes in the time-series indices. After the study of these problems it was found that they were related with the process of re-uploading new versions of old data in DATRAS. Now DATRAS is facing a problem of having different versions of the same dataseries.

Due to this problem ICES Data Centre request uploaders to enhance change-log documentation with the following procedure:

- 1) Before uploading any updates, please download your own data from the DATRAS webpage, then check and keep the copy in your lab. This is to ensure that you have the old version of your data, and you should keep track of changes made in the new submissions.
- 2) Please make a report on which kind of changes are made to the data, and e-mail it to datrasadministration@ices.dk. Only writing on the remarks field upon upload is not enough.
- 3) When uploading is complete and products have been calculated, a DATRAS data officer will send an e-mail to data-submitter to check the newly uploaded data from the DATRAS web, and the data-submitter will reply back with their comments after cross checking.

7.3 Progress and problems in the use of WoRMS species codes

In 2011 IBTSWG meeting, following the proposal from ICES Data Centre, it was decided that WoRMS Aphial species codes would replace ITIS/TSN species codes. With this purpose a check-up table with conversions between ITIS/TSN and WoRMS codes was prepared by ICES Data Centre, and data uploaders were asked to report all data from IBTS 2012 Q1 in WoRMS codes. Nevertheless, part of the data uploaders were unaware of this table and in IBTS 2012 quarter 1 submission half of the countries still reported TSN codes.

Since ICES Data Centre still needs to check the index calculations with the WoRMS codes, the coexistence of two different species codes is delaying the final adoption of the WoRMS codes and ICES Data Centre needs 2012 Q1 data in both codes TSN and Aphia base.

7.4 Data quality checks

As in recent years, IBTSWG has undertaken some checking of recently uploaded data on DATRAS. These show some of the types of error that can occur in such datasets, emphasizes the need for all data contributors and ICES to further develop quality assurance routines, and for data users to also undertake data checks on extracted data.

7.4.1 Differences in products downloaded from DATRAS

During the group revisions it was found that the DATRAS results were flawed for:

- cpue per length per haul,
- cpue per length per statrec and
- cpue per length per area.

Products which total sum of indices should add up the same total produced different results, as presented in Table 7.4.1

Table 7.4.1. *Microstomus kitt* cpue in IBTS 2012 Q1 survey obtained per Area 7 with different procedures theoretically all should add up the same value.

Procedure selected from DATRAS	Total Sum	Problem
cpue per length per haul	3.923	
cpue per length per statrec	3.795	Mean value for rect 44F5
cpue per length per area	22.202	Unknown calculation error

Checks carried out by ICES Data Centre after the group spotted that the problem with rectangle 44F5 was a haul with no catches of *Microstomus kitt*, and overlooked by the calculation done during the group revision.

The problem with the cpue per length per area also has been found related with taking into account null catches, though the specific problem in the algorithm is still being checked by ICES Data Centre.

7.4.2 Data quality checks for the North Sea IBTS (Q1–Q3 2011; Q1 2012)

Data for 'cpue per length per haul' for the North Sea surveys were downloaded from DATRAS (27/03/2012), and some preliminary data checks undertaken, including for minimum cpue, incorrect species recording, and individuals outside the expected size range.

There were several instances where the minimum number per hour (catch rates by species and length) were outside the expected range. Given that standard, valid hauls should be 30 minutes (ranging from 15–45 minutes), the minimum cpue at any one stations should be about 2 ind.h⁻¹ (1.33–4 ind.h⁻¹). Stations where values fall outside this range would indicate that either entire catches were subsampled or that the tow duration was outside the accepted range for a valid tow. There seemed to be a major problem with 2011-Q3 data (Table 7.4.2.1) in that the minimum cpue was usually 12 ind.h⁻¹ instead of 2 ind.h⁻¹, and it appears that catch rates have somehow been inflated.

It is necessary for this issue to be addressed and corrected as soon as possible. Furthermore, it is also recommended that when downloading 'cpue per length per haul' from DATRAS, that the downloaded data includes information on tow duration.

Table 7.4.2.1. Total number of hauls in DATRAS for the North Sea IBTS, with the number of stations where the minimum cpue is outside the expected range.

Year	Quarter	Total number of hauls:		
		In DATRAS	Min. cpue within the range 1.3–4.0	Min. cpue outside this range
2011	Q1	390	388	2
2011	Q3	281	1	280
2012	Q1	343	340	3

Comparatively few obvious errors were observed in the species reported for the most recent North Sea IBTS, these included:

Agone agone: This species was reported by France and Denmark. Danish records of *Alosa agone* were 25–40 cm total length, which would be in the expected range for another *Alosa* spp., although French records included several specimens across the length range of 10–40 mm. which seem unlikely.

Atherina presbyter: This coastal species was only reported by France, and these records could usefully be verified

Chelidonichthys lucerna / *Chelidonichthys lucernus*: Tub gurnard has been reported under two scientific names (see Richards and Jones (2002) for notes on the taxonomy of gurnards).

Maja: Although only a single species of *Maja* occurs in the study area, these were only reported to genus, and not as *Maja brachydactyla*.

Mustelus / Mustelus asterias / Mustelus mustelus: Recent genetic studies have highlighted that the presence/absence of white spots is not a reliable characteristic for these two species (Farrell *et al.*, 2009), and most records of *Mustelus mustelus* are likely to refer to *M. asterias*.

Pomatoschistus lozanoi / Pomatoschistus minutus / Pomatoschistus pictus: The accuracy of species identifications for sand gobies *Pomatoschistus* spp. is questionable and, unless accuracy of species identification can be assured, IBTS participants should report as *Pomatoschistus* spp.

Sepia orbignyana: Scotland reported two catches with *Sepia orbignyana* (Q3 2011, hauls 21 and 32), and these records seem quite far north for this species.

Loligo subulata: These data should refer to *Alloteuthis subulata*

There were also a few instances where some fish were outside the likely length range (Table 7.4.2.2), with the most numerous problem simply associated with confusion between measurement units (mm/cm) for shellfish.

Table 7.4.2.2. Records in the North Sea IBTS data that are outside the expected size range.

Species	Min TL	Max TL	Comment	Action
<i>Callionymus maculatus</i>	30	230	Largest individuals (2011, Q3, SCO3, haul 34) are outside L max and probably incorrect. These records may refer to <i>C. lyra</i>	Scotland
<i>Ciliata mustela</i>	90	240	Records of some of the larger individuals in dataset are questionable	France
<i>Leucoraja naevus</i>	220	830	One record of an 83 cm individual (2011, Q1, SCO3, haul 41) is marginally above L max.	Scotland
<i>Lithodes maja</i>	10	960	Records of <i>Lithodes</i> larger than L max (2011, Q3, DAN2, haul 33), presumably due to confusion in units (mm and cm)	Denmark
<i>Loligo subulata</i>	20	400	Many records of <i>Loligo subulata</i> (which should be <i>Alloteuthis subulata</i>) greater than L max, and may refer to <i>Loligo</i> spp.	Germany, Denmark
<i>Maja</i>	110	1360	Many records of <i>Maja</i> 450–1360 mm, presumably due to confusion in units (mm and cm)	France
<i>Pecten maximus</i>	90	1400	Many records of <i>P. maximus</i> 650–1400 mm, presumably due to confusion in units (mm and cm)	France
<i>Scyllorhinus canicula</i>	50	1000	One individual (50 mm) less than L birth (2012, Q1, WAH3, haul 56) and one individual (1000 mm) above L max (2012, Q1, WAH3, haul 55)	Germany

7.4.3 Data quality checks for the EVHOE survey

Data for 'cpue per length per haul' for the EVHOE surveys were downloaded from DATRAS (27/03/2012). These data indicated a few records of fish outside the expected length range (Table 7.4.3.1). While undertaking data checks for the EVHOE survey, it was apparent that extracting data for "cpue per length per haul" resulted in some duplicate records (Table 7.4.3.2). This was also observed recently by the ICES Data Centre. Although corrections to this were made during the course of the meeting, this type of error is shown here to document the type of problem.

Table 7.4.3.1. Records in the EVHOE data that are outside the expected size range.

Species	Min TL	Max TL	Comment
<i>Ammodytes tobianus</i>	60	380	38 cm is outside the L max for the species and likely refers to <i>Hyperoplus</i> spp.
<i>Callionymus maculatus</i>	40	290	Several records of fish >20 cm (1998 Haul 1; 2001 Haul 102; 2003 Haul 134; 2008 Haul 150; 2008 Haul 134; 2010 Haul 111) which are probably erroneous. May refer to <i>C. lyra</i> .
<i>Homarus gammarus</i>	90	1370	Numerous incidences of <i>H. gammarus</i> of 900–1370 mm, presumably due to confusion in units (mm and cm)
<i>Leucoraja circularis</i>	170	1420	Most records are for fish 17–115 cm, and the record of a 142 cm specimen seems unlikely (2006, haul 99).
<i>Palinurus elephas</i>	740	790	Numerous incidences of <i>Palinurus</i> of 560–1500 mm, presumably due to confusion in units (mm and cm)
<i>Palinurus mauritanicus</i>	120	1500	

Table 7.4.3.2. Example of extracted data for 'cpue per length per haul' for *Homarus gammarus* for the EVHOE survey (Quarter: 4, Ship: THA2, Gear: GOV) illustrating instances of duplicate records.

Year	Haul	Lat	Long	Depth	Area	Species	Sex	Lngt Clas	cpue_number _per_hour	Multiple record
1997	29	44.615	-2.0133	157	Gs	<i>Homarus gammarus</i>	M	420	2	
2000	68	47.2749	-3.4552	90	Gn	<i>Homarus gammarus</i>	F	190	2	
2002	154	51.4538	-5.2649	68	Cn	<i>Homarus gammarus</i>	M	230	2	
2004	143	50.749	-6.2657	97	Cn	<i>Homarus gammarus</i>	F	90	2	
2006	46	47.0483	-3.1945	84	Gn	<i>Homarus gammarus</i>	M	900	2	
2007	52	46.3205	-4.2218	165	Gn	<i>Homarus gammarus</i>	M	290	2	Yes
2007	52	46.3205	-4.2218	165	Gn	<i>Homarus gammarus</i>	M	290	2	
2007	77	47.8163	-6.3232	158	Cs	<i>Homarus gammarus</i>	M	1370	2.4	Yes
2007	77	47.8163	-6.3232	158	Cs	<i>Homarus gammarus</i>	M	1370	2.4	
2008	60	46.455	-3.8426	140	Gn	<i>Homarus gammarus</i>	F	1260	2	
2008	61	46.4124	-4.0775	150	Gn	<i>Homarus gammarus</i>	F	1360	2	
2009	130	51.421	-5.2662	68	Cn	<i>Homarus gammarus</i>	F	1000	2	
2009	130	51.421	-5.2662	68	Cn	<i>Homarus gammarus</i>	F	1000	2	Yes
2009	130	51.421	-5.2662	68	Cn	<i>Homarus gammarus</i>	F	1000	2	

Year	Haul	Lat	Long	Depth	Area	Species	Sex	Lngt Clas	cpue_number _per_hour	Multiple record
2009	130	51.421	-5.2662	68	Cn	<i>Homarus gammarus</i>	F	1000	2	
2009	130	51.421	-5.2662	68	Cn	<i>Homarus gammarus</i>	F	1000	2	
2009	130	51.421	-5.2662	68	Cn	<i>Homarus gammarus</i>	F	1000	2	
2010	83	47.6199	-6.8043	171	Cs	<i>Homarus gammarus</i>	F	990	2	
2010	83	47.6199	-6.8043	171	Cs	<i>Homarus gammarus</i>	F	1140	2	
2010	86	47.9612	-7.471	166	Cs	<i>Homarus gammarus</i>	F	1300	2	
2010	86	47.9612	-7.471	166	Cs	<i>Homarus gammarus</i>	F	1370	2	
2010	137	51.7975	-7.09	72	Cn	<i>Homarus gammarus</i>	M	880	2	
2010	140	51.3746	-4.8507	61	Cn	<i>Homarus gammarus</i>	F	970	2.069	

7.4.4 Data quality checks for the Scottish West Coast IBTS

Data for 'cpue per length per haul' for the Scottish West Coast IBTS were downloaded from DATRAS (28/03/2012), and preliminary data checks undertaken for potential incorrect species recording and individuals outside the expected size range. A few potential erroneous records were noted (Table 7.4.4.1).

Table 7.4.4.1. Records in the SWC-IBTS dataset that may require further checking.

Species	Min TL	Max TL	Comment
<i>Galeus melastomus</i>	100	900	90 cm fish (1996, haul 8) appears to be too large
<i>Raja clavata</i>	110	1500	Larger fish (>110 cm) probably misidentified (1992 haul 15; 1994 haul 27; 2009 hauls 63 and 74)
<i>Raja montagui</i>	80	1030	Many records of <i>R. montagui</i> >85 cm (though none since 1993). Occurrence of larger fish in the area should be confirmed. May represent misidentifications
<i>Callionymus maculatus</i>	40	300	Several records >20 cm that are probably misidentified (1992 haul 2; 1993 haul 10; 1994 haul 1; 1999 haul 15; 2010 haul 48; 2011 haul 29).
<i>Crystalllogobius linearis</i>	50	90	Other surveys recording <i>C. linearis</i> generally record fish of < 5 cm. Records of fish of up to 9 cm (mostly in 1989) questionable
<i>Echiichthys vipera</i>	60	240	Records of <i>E. vipera</i> of 23 and Larger 24 cm (2005 haul; 32) probably incorrect
<i>Squalus acanthias</i>	80	1060	The smallest reported fish (8 and 11 cm) < Lbirth, and need to be checked (2000 haul 28; 2002 haul 67)
<i>Mullus barbatus</i>	220	220	Does the species occur in the area?

Species	Min TL	Max TL	Comment
<i>Mustelus mustelus</i>	410	1090	Recent genetic studies have highlighted that the presence/absence of white spots is not a reliable characteristic for these two species, and most records of <i>Mustelus mustelus</i> are likely to refer to <i>M. asterias</i> .
<i>Zenopsis conchifer</i>	380	380	Record could usefully be verified
<i>Eledone cirrhosa</i>	50	120	There is inconsistency in IBTS in terms of how <i>Eledone</i> are reported, and most participants are not measuring them
<i>Gymnammodytes semisquamatus</i>	140	1500	Numerous records of fish >Lmax. Presumably issues with units (mm/cm)
<i>Homarus gammarus</i>	910	910	One record of a very large <i>Homarus</i> , which needs to be investigated (2002 haul 49)
<i>Necora puber</i>	1000	1000	One record of a very large <i>Necora</i> , which needs to be investigated (2008 haul 3)
<i>Nephrops norvegicus</i>	10	800	Numerous records of <i>Nephrops</i> >Lmax. Presumably issues with units (mm/cm)
<i>Anguilla</i>	0	0	
<i>Aphia minuta</i>	0	0	
<i>Polyprion americanus</i>	0	0	Species appear in extraction, but only with 'zero' records for length class and cpue.
<i>SpondylIOSoma cantharus</i>	0	0	
<i>Trachipterus arcticus</i>	0	0	

7.4.5 Portuguese Survey

Portuguese data (2002–2008) were examined, and a few errors (in terms of length measurements and taxonomic inconsistencies) were noted, which are summarized in Table 7.4.5.1 It was noted that length measurements were not available for all fish (prior to 2007), which may limit the utility of these data for length-based fish assemblage metrics.

Table 7.4.5.1. Records in the Portuguese trawl survey that requires further checking.

Scientific name	Min TL	Max TL	Comment
<i>Ammodytes tobianus</i>	110	340	Greater than Lmax, confusion with <i>Hyperoplus</i>
<i>Callionymus reticulatus</i>	0	140	Only reported in one year (2004). Unclear if these were misidentified, or are currently overlooked
<i>Cepola macrophthalma</i>	30	830	Inconsistency of measuring procedures (see Table 7.4.4.2)
<i>Chimaera monstrosa</i>	50	260	Possible inconsistencies in measurement units
<i>Eledone cirrhosa</i>	0	650	Largest specimen >> Lmax
<i>Etmopterus pusillus</i>	160	310	Mostly reported in 2004, when no <i>E. spinax</i> were reported
<i>Gadiculus argenteus</i>	0	290	Largest specimen >> Lmax
<i>Gaidropsarus mediterraneus</i>	0	170	Only reported in one year (2005). Unclear if these were misidentified with other <i>Gaidropsarus</i> spp.
<i>Hoplostethus atlanticus</i>	60	80	Only reported in one year (2007). Probable confusion with <i>H. mediterraneus</i>
<i>Labrus bimaculatus</i>	90	310	Should be reported as <i>L. mixtus</i>

Scientific name	Min TL	Max TL	Comment
<i>Lepidotrigla cavillone</i>	50	190	Early records probably include specimens of <i>L. dieuzeidei</i>
<i>Lepidotrigla dieuzeidei</i>	110	140	Only separated from other <i>Lepidotrigla</i> since 2008
<i>Lesueurigobius friesii</i>	0	130	Confusion between <i>L. friesii</i> and <i>L. sanzoi</i>
<i>Lesueurigobius sanzoi</i>	80	130	Confusion between <i>L. friesii</i> and <i>L. sanzoi</i>
<i>Macroramphosus</i>	0	270	Largest specimens greater than Lmax
<i>Malacocephalus laevis</i>	30	350	Inconsistency of measuring procedures
<i>Microchirus variegatus</i>	0	800	Largest specimen >> Lmax
<i>Raja circularis</i>	370	550	Should be <i>Leucoraja circularis</i>
<i>Raja naevus</i>	0	610	Should be <i>Leucoraja naevus</i>
<i>Raja oxyrinchus</i>	670	1110	Should be <i>Dipturus oxyrinchus</i>
<i>Rossia macrosoma</i>	0	280	Greater than Lmax, confusion between mm and cm
<i>Sepia orbignyana</i>	20	470	Greater than Lmax, confusion between mm and cm
<i>Solea lascaris</i>	0	410	Should be <i>Pegusa lascaris</i>
<i>Todaropsis eblanae</i>	0	1020	Four records (320, 700, 920, 1020 mm) greater than Lmax, confusion between mm and cm
<i>Torpedo torpedo</i>	620	630	Unlikely, as <i>T. torpedo</i> usually occurs in Mediterranean. Thought to be <i>Torpedo nobiliana</i>
<i>Zeus faber</i>	0	1330	Greater than Lmax, confusion between mm and cm

Length measurements for *Cepola* were inconsistent (Table 7.4.5.2), using a combination of total length and anal length. Such issues may also affect *Chimaera* and grenadiers. Further studies to clarify exactly which fish species are not measured to total length and required for this and all other IBTS surveys. It is also suggested that IBTS participants collect relevant data to allow conversion factors to be estimated for all the various length measurements that may be taken for such species.

Table 7.4.5.2. Length distribution of *Cepola* recorded in the Portuguese IBTS over time.

Length (mm)	2002-2008								Length (mm)	2002-2008							
	2002	2003	2004	2005	2006	2007	2008	2002		2003	2004	2005	2006	2007	2008		
30						1		510			1						
40					1	1		520			3						
50		3		2		3		530			2						
60		2		3		2		540			3						
70	1	4		2	3	1	2	550			1						
80	2	4		3		1		560			2						
90		1		1		2	2	570			2						
100	1	1		1				580			1						
110		1						590			1						
190			1					600			1						
200			1					620			1						
210			2					710			1						
220			2					720			1						
230			3					730			1						
240			2					740			2						
250			1					750			2						
270			1					770			1						
310				1				780			1						
330			1					790			1						

Length (mm)	2002	2003	2004	2005	2006	2007	2008
380			1				
430			1	1		1	
470			1				
480			1				

Length (mm)	2002	2003	2004	2005	2006	2007	2008
800				1			
830				1			

It should also be noted that a different groundgear was used in 2003 and 2004 (so some of the more benthic fish species were more frequently encountered in these years), and there have been subtle temporal differences in the depth distribution of trawl stations (with stations deeper than 500 m fished in 2003 and 2005, Table 7.4.5.3), and both these issues will influence any fish assemblage studies (e.g. biodiversity metrics).

Table 7.4.5.3. Numbers of stations by depth band in the Portuguese IBTS.

Depth (m)	2002	2003	2004	2005	2006	2007	2008	Total
20–100	21 (31.8%)	21 (26.3%)	26 (32.9%)	33 (37.1%)	36 (40.9%)	32 (33.3%)	28 (32.2%)	197
101–200	31 (47.0%)	34 (42.5%)	36 (45.6%)	33 (37.1%)	32 (36.4%)	39 (40.6%)	36 (41.4%)	241
201–500	14 (21.2%)	17 (21.3%)	17 (21.5%)	21 (23.6%)	20 (22.7%)	25 (26.0%)	23 (26.4%)	137
501–750	- (0.0%)	8 (10.0%)	(0.0%)	2 (2.2%)	(0.0%)	(0.0%)	(0.0%)	10
Total	66 (100%)	80 (100%)	79 (100%)	89 (100%)	88 (100%)	96 (100%)	87 (100%)	585

7.5 Proposals for further developments

As a result of the problems highlighted above and the potential errors that could be derived from them, some DATRAS download options including cpues are temporarily disabled. Until it is clear whether errors exist, and if so to what extent, it was decided that it was better to disable these options.

ICES Data Centre is reviewing the algorithms involved in the calculations of these indices, and a protocol for this revision has been proposed within the group: a common dataset is agreed and distributed to the reviewers, together with the formulae of the products to be calculated including ALKs (with procedures for filling the ALK if needed), and weighting factors (if products per area are calculated). Once the results consistency between DATRAS algorithm and the reviewers the download option could be allowed again. Possible reviewers for this task were identified within the IBTSWG participants (David Stokes, Henk Heessen and Francisco Velasco volunteered to take part in the process).

Further developments discussed and proposed during the meeting included also:

- Recommend to implement a workshop on DATRAS data review priorities and checking procedures to improve quality during the uploading/reuploading process and detecting errors as those highlighted in Sections 7.4.2 to 7.4.5. Participants expected to participate in this workshop were IBTS scientists, assessment experts and personnel from the DATRAS Team. The use of Length weight relationships and SOP procedures were discussed as suitable improvements to consider with this purpose.

- With the use of the RV Dana by Sweden due to the problems with RV Argos, there's a need to implement the option to download indices by countries instead of vessels, since RV Dana is currently being used by two countries within the NS IBTS Q1 and Q3 surveys.
- Review and discuss through DUAP the way quarter is used in DATRAS, given the problem that it is both related with the date, but is also used as a series identifier and a few times at the end of the NS Q1 a few hauls actually are carried out in April, i.e. Q2, but still belong to NS Q1 series. The way this is handled both from uploading and downloading has to be decided. This problem also affects to those surveys carried out over two different quarters i.e. March-April or Sept-Oct.

7.6 References

- Richards, W. J., and Jones, D. L. 2002. Preliminary classification of the gurnards (Triglidae: Scorpaeniformes). *Marine and Freshwater Research*, 53: 274–282.

8 Updates to IBTS and MIK manuals (ToR e)

ToR e) Review IBTS manuals and consider additional updates and improvements in survey design and standardization;

Over the last year or so, ICES and IBTSWG have wanted to be able to reference manuals, from any survey working group, in such a way that they can be easily identified and referenced for ICES, the working groups and users. To this end ICES have agreed that there will be ISSN assignment for the online manuals (no hard copies, however printable if needed). There will be consecutive numbering applied also to updates. The responsibility for ensuring the process is implemented will fall to the Chair of SSGESST, in cooperation with the secretariat.

8.1 North Sea IBTS manual revision VIII update

Last year some updates and modifications to the North Sea IBTS manual were explained in Section 10 of the report (ICES, 2011), nevertheless the modifications were not included in the new version of the NS IBTS Manual due to the afore mentioned problem with manuals referencing. Those changes will be included in the new edition of the manual already submitted to ICES and expected under the new referencing system. Besides Kai Wieland (DTU Aqua) presented new data on the most recent SCANMAR records from the North Sea IBTS surveys. There is now enough data to produce new plots of headline height and door spread for the water depth of deployment. These new plots have been added to the new North Sea IBTS manual VIII. It was also noted that in the table of additional species to be measured, those Cephalopods that are measured should be measured to the cm below. However, the diagram that describes where the measurements of the mantle length should be taken shows it as mm. This diagram has been amended to reflect the correct measurement interval, cm.

Other changes include:

- Change to text that describes the quarter 3 station distributions with regard to how the Kattegat and Skagerrak stations are distributed.
- It was noted that the maximum depth of a valid tow was missing from the draft version VIII and this has been included.
- Measuring deep-water species has not been consistent over time, and text has been added to this section to reflect this.

In the next revision of the manual an update of the sensors used will be added as some countries are now using Marport sensors (France/Netherlands).

8.2 MIK Manual

In 2011 the description of the MIK rigging and sampling procedures were removed from the IBTS manual and placed in an own manual, the "Manual for the Midwater Ring Net sampling during IBTS Q1". The manual will be available on the ICES website.

The new MIK manual contains updated information and instructions on MIK rigging, deployment and sample processing. Included are also pictures/photos of different parts of the nets.

During the 2012 IBTSWG meeting a subgroup met to discuss the new manual. Several items were brought up and will be remedied in an updated version before the next IBTS Q1 cruises in 2013:

- Descriptions of the clupeid type larvae i.e. herring *Clupea harengus*, sprat *Sprattus sprattus*, sardine *Sardina pilchardus* and anchovy *Engraulis encrasicolus* which may be confused in these surveys are to be given and care needs to be taken to ensure the correct identification of these species.
- Larval species that can be easily identified such as the pearlside *Maurolicus muelleri*, Lemon sole *Microstomus kitt*, crystal *Crystallogobius linearis* and transparent *Aphia minuta* goby and sand *Pomatoschistus minutus* and Norwegian *Pomatoschistus norvegicus* goby shall be measured and recorded in future.
- Pictures and descriptions of the above species will be added to the manual to aid identification
- There will be a new reporting template for the herring larvae data that is more suitable for incorporation in the ICES egg and larvae database.
- The current manual contains no description of the net material. Net material of different nations were compared and showed large differences in utilized fabric, pore width, and in proportion of filtering area. The problem will be passed on to SGSIPS to be solved and clarified. The manual will be updated with a clear statement on the net material to be utilized for future surveys.
- It was discussed whether the procedure for the calculation of the MIK herring larvae index shall be described in the manual. Currently, there is only a reference to the HAWG 1996 report (ICES, 1996/ACFM:10). However, that description appears to be incomplete particularly the application of area weighting factors is not mentioned. It is recommended that SGSIPS deals with this issue. In addition the current index does not take the Downs component in to account and since this is a relatively large proportion of the North Sea stock there may be a necessity to change the estimation of the index to incorporate this component of the stock. Both SGSIPS and the HAWG have been requested to investigate and report on this issue.

8.3 Eastern Atlantic IBTS manual revision III update

As it occurred in the case of the North Sea IBTS Manual, changes and updates proposed in the IBTSWG 2011 report (ICES, 2011) for the Western and Southern areas IBTS Manual finally were not issued for the reasons mentioned above. Those changes that mainly were the inclusion of the Marine litter data collection protocol and the form, will be included this year intersessionally with the new referencing system. Further updates were decided to be included in this new updated manual, this will be:

- Update the description of the Scottish surveys (Q1, Q4 and Rockall) to reflect the new changes undertaken this year.
- Include information on the area of the depth strata in Table 7.1., for surveys in which these areas are used to obtain the stratified indices.
- Include survey specific plots of warp shot, headline height and door spread for the water depth of deployment, for surveys using gears not in-

cluded and considered in the North Sea IBTS manual (namely GOV with different groundgears configuration).

8.4 References

ICES. 1996. Report of the Herring Assessment Working Group for the Area South of 62°N. ICES CM 1996/ACFM:10.

ICES. 2011. Report of the International Bottom Trawl Working Group (IBTSWG). ICES CM 2011/SSGESST:06.

9 IBTS uses in the Marine Strategy Framework Directive (ToR f)

ToR f) Review the uses of IBTS as an Ecosystem Approach Fishery Management Oriented Survey and in relation with MSFD and provide written feedback to WGISUR and SSGESST.

9.1 Marine Litter

Regarding marine litter data collection from the IBTS some questions were posed to the group from the Cefas WKMAL lead this included: possibilities of further harmonization between nets and an overview of gears used, and also harmonization between different cruises, previous studies comparing litter catches between different nets, adaptations of fishing gears and surveys to allow a better catch of marine litter, suggestions regarding the protocol presented last year, etc.

During the 2011 quarter 3 and 2012 quarter 1 IBTS surveys, litter was collected according to the recommendations of WKMAL. The spreadsheet template that was made available was used by the majority of IBTS participants. It was recommended that either the datasheets are given to the institutes MSFD Descriptor 10 coordinator that collected them or, they can be sent to the IBTS representative from Cefas for distribution to the Cefas WKMAL lead. Besides the protocol and form will be included in the new version of the IBTS manuals, both North Sea and Western and Southern areas.

The group reviewed the questions presented and concluded that:

The MSFD marine litter descriptor and the information that can be collected and provided by the IBTS (and as far as I know by some other trawl surveys) have been extensively discussed in our last two meetings:

- In 2010 (IBTSWG 2010) a review of the information collected in the different surveys: since when it was collected and how it was collected and stored (see Section 12.1 in ICES IBTSWG Report 2010 <<http://www.ices.dk/reports/SSGESST/2010/ibtswg10.pdf>>), in that meeting also it was discussed the possibility of including the marine litter data into DATRAS, but the group felt that it was not adequate to store the information in a database meant to collect information on living organisms.
- The group also asked for further information and clarification on how to store the information and exchange formats to ensure the quality and effective information is collected, in any case it was recommended that all surveys would try to collect the marine litter information and report back with problems and doubts found.
- The form to register the data collected was meant to be included in the IBTSNS manual, but finally this revision of the IBTSNS manual was not issued, nevertheless the forms were circulated and are in fact included in WGBEAM 2011 report (<<http://www.ices.dk/reports/SSGESST/2011/wgbeam11.pdf>>).

Concerning the proposal for further harmonization proposed, the different gears used within the IBTS respond to different grounds characteristics and different organisms targeted, so it's not possible to harmonize the gears further, some standardization is always sought within the same "type of surveys", but the differences in gear design, have a purpose and a meaning. Nevertheless extensive information on the different gear and survey designs is available at least in the case of IBTS (see manuals in DATRAS web: <http://datras.ices.dk/Documents/Manuals/Manuals.aspx>).

Information on stations fished and parameters as position, time, wind direction, sea force... are stored in DATRAS and available for download, therefore to cross his information with shipping routes, fishing hot-spots or storm events is something that probably should be done depending on what is sought, but it is difficult to store all this information if it is of no particular interest within the survey purposes. The original idea when marine litter collection was proposed to the IBTS was that IBTSWG could make the effort to collect the information, but as mentioned in IBTSWG 2010 report (ICES, 2010) DATRAS cannot store the information, since it is meant to collect information on the organisms collected in the surveys; therefore Marine Litter information collation and storage has to be agreed and organized within the group developing Descriptor 10 in the MSFD.

IBTSWG has done everything possible to collect litter data in our surveys without compromising their primary aims. So the information will be collected if asked in future, but the surveys will not change the procedures or sampling methodology to collect any more information on marine litter.

9.2 Updates on the WGISUR and the Ecosystem Survey

During IBTSWG in 2011 we reviewed a table provided to the group from WKCATDAT. The Working Group on Integrating Surveys for the Ecosystem Approach (WGISUR) met in IJmuiden, the Netherlands, 24–26 January 2012, to discuss our revisions and other matters pertaining to their ToRs.

As a general overview of the survey group responses, it was noted that, for most of this increment in data collection, there would be a need for additional resources (People, time, equipment, skills). They also noted the following:

- Appropriate experts in a particular data type would be needed to help plan data collection.
- Additional data would need additional data/material storage.
- While collection of material at sea could be straightforward, post analysis could be much less so, e.g. stomach contents or plankton samples.
- Sampling that required vessels slowing or stopping would potentially compromise quasi-synoptic surveys.

The WGISUR recommended that the Norwegian ecosystem surveys be evaluated in detail, in terms of their current design and achievements, in terms of potential improvements, and as a model for the development of other designed-for-purpose fishery ecosystem surveys. The WG proposed that this be carried out as an ICES Workshop on Evaluation of Current Ecosystem Surveys (WKECES) to be held in November 2012.

It is recommended that participants of IBTSWG attend WKECES in order to contribute to the discussions and report back to IBTSWG 2013 on the progress and implications to IBTS surveys, with particular relevance to MFSD.

9.3 Working documents related with “Ecosystem Surveys”

Two working documents presented during the meeting were related with additional samplings performed during the IBTSurveys to collect information relevant to the ecosystem approach and therefore are briefly commented here:

9.3.1 Proposal for an ecosystem survey in the western English Channel (Vlle; CAMANOC: CAmPagne MANChe Occidentale)

A project for an ecosystem survey in the western English Channel in 2014 was submitted by Ifremer (France) with two main objectives:

- 1) Initiate a time-series of an “IBTS-type” survey for the western English Channel, which could be used at different levels (evolution of species of interest, providing some indices and parameters...) and in relation with the neighbour surveys EVOHE and NS-IBTS.
- 2) Provide an overview of the ecosystem from the abiotic environment up to the top predators.

The western English Channel is a particular ecosystem, linking the Atlantic Ocean and North Sea with strong tidal currents and strong physical diversity (depth, bottom types, oceanic and terrestrial influences...). Furthermore, it is an important fishing area for several countries.

The knowledge for this area is very low and except benthic community surveys in the years 1970, there is no sampling available on fish stocks abundance and distribution.

In order to characterize the state of whole ecosystem in the western English Channel and monitor its evolution in the following years, all biological compartments need to be sampled (benthos, fish plankton, top predators) and the abiotic environment has to be characterized.

Data collected should be used to identify the key components of this ecosystem, to understand its functioning, and analyse its evolution under environmental and anthropogenic pressures.

The whole working document is presented in (Travers *et al.*, see WD3 in Annex 5) and as commented in Section 4.3. this survey would help to understand and clarify the dynamic of the stocks inhabiting and passing through the Channel, one of the problems that has been discussed within the IBTSWG in the last years. But given the complexity of the area covered the WG recommended that sampling strategy should be coordinated with the adjacent surveys (CGFS and EVHOE). Results from the survey would have to be presented at the IBTSWG to consider its coordination as an IBTS Survey. It was also commented that from the IBTS point of view one of the requirements is that results are relevant to the assessment, and therefore it was convenient to discuss with the pertinent assessment working groups what commercial species are relevant in order to decide on the sampling strategy, and obtaining support concerning the relevance of the indices for the assessment.

From the point of view of the Ecosystem surveys design, it was discussed that the ecosystem approach of the survey was only contemplated in the proposal for the first year which could be used as a proposal of an “ecosystem survey” but plans to continue the samplings different from those usual in the IBTS would need to be taken into account to continue with the “Ecosystem survey” though budget availability is always a constrain to consider.

9.3.2 Benthic macrofaunal observations onboard fish assessment research surveys

A working document addressing the results from benthic macrofaunal invertebrates caught on the Ifremer surveys within the North Sea between 2006 and 2011 was presented to the group. The document is included in Annex 5 (Nebout *et al.*, WD.9) and

it address the work done to analyse and compile the results on the distribution of macro-epibenthic invertebrates using the samples collected during bottom trawl samples and the use that can be done of this information to build distribution maps of species included in the OSPAR list of endangered species, and distribution of threatened habitats. The work was deemed interesting and being part of what an ecosystem survey should cover to provide relevant information for MSFD, nevertheless problems with the adequacy of the sampling gear to some of the species (e.g. results on *Arctica islandica*, being an endo-benthic species are biased and cannot be derived from a GOV sampling). Thus the work emphasizes the importance of considering the use of different samplers, as beam trawls or underwater video as mentioned in the Working Document itself, to address the sampling of different faunal components of the ecosystem.

9.3.3 Bad hair day Survey

The Manual of the “Bad Hair Day Survey” (see WD 10 – Annex 5), an acoustic survey for Spawning saithe in the North Sea was presented during the meeting; the survey was planned as additional activities to be developed in combination with the Norwegian IBTS NS Q1. As stated in the summary for the IBTS NS Q1 (see Section 4.1.2.5) due to a combination of problems with the winches and bad weather, only one of the transects planned in the program was performed. Nevertheless the combination of acoustic transects within the IBTS surveys is considered adequate as long as it does not interfere with the sampling of the stations agreed within the IBTS coordination.

10 Other issues

10.1 Visit to the Lorient Ifremer flume tank

During the meeting the group visited the flume tank within the Ifremer station where a demonstration on different riggings and a couple of floats configurations on a model of the GOV were performed. Unfortunately there was not enough time to explore further configurations since they required preparations of the models. But the use of these facilities in combination with simulation software is considered very interesting in relation to intercalibration experiments and understanding the implications of changes in the gear configuration.

10.2 IBTSWG views on multi-annual ToRs proposal

The proposal of Multi-annual ToRs, being discussed as a new process for EGs within SCICOM, was also commented during the meeting. The opinion was that multi-annual ToRs should have an alternative implementation in the case of coordination WGs, at least survey Coordination WGs, since the tasks undertaken by these WGs include core information regarding the annual results of the surveys of the year that is intended for the ACOM WGs and also the coordination agreed for the next year. These issues are important and should be in the annual report that would exceed the size of the interim reports described within the proposal. On the other hand there are other more complex issues that could be dealt in ToRs that have a relatively distinct "lifespan". This discussion has driven also the proposal of ToRs for next meeting where some multiannual ToRs are proposed together with more traditional ones containing annual results and coordination work (see Annex 3).

10.3 Nominations for a new chair

Francisco Velasco has served as Chair for the period of three years and a new Chair will be designated in October 2012. Three members were nominated for the vacant post and they accepted their nomination. A vote was held and Anne Sell from Germany was selected as the Group's preferred choice for new Chair. This selection will be presented to SCICOM for ratification during the ICES Annual Science Conference in September 2012.

10.4 Changes in regional coordinators

There are three regional survey coordinators with the IBTSWG – one for Q1 North Sea survey (Ralf van Hal, IMARES), one for Q3 in the North Sea Brian Harley (Cefas) and one for the eastern Atlantic (David Stokes – Marine Institute – Ireland). Brian Harley and David Stokes have been doing this task since 2004 and the WG appointed Kai Wieland (DTU - Aqua) as the new Q3 coordinator, while Francisco Velasco will take the coordination for the eastern Atlantic, both new coordinators will take the coordination job from 2013 given that an important part of the coordination is compiling and coordinating the reports for the IBTSWG yearly report.

Annex 1: List of participants

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Annex 2: Agenda

A draft of the agenda of the meeting was distributed on 18 March. Apart from the ToRs presented in Section 1, the agenda distributed contained additional ToRs, the recommendations to/from IBTS and presentations and working documents for the group:

Tuesday 27th March

09:30–10:30	Start of the meeting
	Opening and introduction of participants
	Local practicalities
	Outline of agenda and schedule of presentations
	Appointment of ToR-leaders and collaborators
10:30–11:00	Coffee
11:00–13:00	Plenary
	Review of recommendations from IBTSWG 2012
	Review and discussion on ToR a) recommendations
13:00–14:00	Lunch
14:00–15:00	Plenary ToR b) and ToR c)
15:00–16:00	WDs (Survey design and Sweeps) and update on WGISDAA
16:00–16:30	Coffee
16:30-	Individual work on ToRs a,b,c

Wednesday 28th March

09:00–10:30	Plenary to discuss ToR d) DATRAS and DUAP and recommendations
10:30–11:00	Coffee
11:00–12:00	Plenary to discuss ToR d) DATRAS and DUAP
12:00–13:00	Plenary to discuss ToR e) Manuals and recommendations
13:00–14:00	Lunch
14:00–16:00	Subgroups to discuss Manuals (North Sea – W&S – MIK)
16:00–16:30	Coffee
16:30-	Individual work

Thursday 29th March

09:00–10:30	Plenary to discuss ToR f) MSFD - Marine Litter - WGISUR
10:30–11:00	Coffee
11:00–12:00	Plenary to update and discuss on coordination ToR a) and WD SCO-survey stratification

12:00–13:00	Subgroups (NS/W&S/MIK) to work on coordination and report writing
13:00–14:00	Lunch
14:00–15:00	WD on benthic species/endangered species and habitats in the North Sea WD on CAMANOC survey
15:00–16:00	Subgroups / individual work report writing
16:00–16:30	Coffee
16:30-	Subgroups / individual work report writing

Friday 30th March

09:00–10:30	Plenary to review and agree on report Discuss and review recommendations from the report
10:30–11:00	Coffee
11:00–13:00	Plenary to agree on IBTSWG: new chair and ToRs (Multi-annual) dates and venue
13:00–14:00	Lunch
14:00–16:00	Closing

Recommendations grouped by ToRs

a) Surveys coordination

- Extended NS-IBTS area for COD (confirm DATRAS that index has to be calculated)
- Data submission deadlines: problems with HAWG / WGNSSK
- Mackerel and horse mackerel fecundity samplings (2012–2013)
- Ichthyoplankton samples for mackerel and horse mackerel (has been done? If not: Is it feasible for 2013? / Extend analysis of IHLS every third year)
- Changes in survey coordinators: North Sea Q3...
- WGCEPH data collected and available in DATRAS?

b) Sweeps length and net geometry

- Working document by Kai

c) Sensitivity abundance indices

- Horse Mackerel NS index also within a)
- Sprat indices and consistency also within a)
- SWE: comparison Argos vs. Dana results
- SCO: changes in survey design
- Update on WGISDAA

d) DATRAS and DUAP

- Developments and progress
- Progress in re-uploads: document and track the effects of them? Take note of Data Centre request for data re-uploads on DUAP Discussion board, and WD by Norman Graham on Megrin (IVa and VIa) cpue indices
- Quality checks based on length-weight relationships
- Have the selection criteria extended with country code as well (not of vessel only since some are changing)
- Complete/Incomplete status in DUAP posts

e) IBTS Manuals

- Revisions of the manuals and references within ICES referencing framework
- In the Western and southern area no MIK samples are taken, though sampling was carried out in former times and procedures are within IBTSNS manual
- Include plots warp length/depth and vertical opening/depth per survey within the survey Description.
- Marine litter forms...
- Enable calculations of abundance indices per swept-area and comparisons sent to WGISDAA
- Areas of strata for Western-Southern surveys with area-stratified survey design (designs new stratified surveys): Update on the strata areas used in all western area surveys (Northern Ireland and area of depth strata in the rest of surveys) and especially update description of Scottish survey Via and
- Update on table of sampling species according to DCF requirements: PGCCDBS
- GOV materials
- Include *a* and *b* regression factors for length-weight relationships. Cefas is producing a technical report with plots of the relations, not only parameters. Complete results for species in the limits of the area covered since Cefas is doing that for UK and Great Britain.
- In The Western and southern area no MIK samples are taken, though sampling was carried out in former times and procedures are within IBTSNS manual.

f) Marine Strategy

- Marine litter revisited: Draft from last year response
- Updates on WGISUR progress
- Plans to build an MSFD Survey from NSIBTS
- Presentation on the Norwegian "Bad Hair Survey": combines trawl (IBTSNS Q1) and acoustics
- Other issues
- New Chair IBTSWG
- ToRs for 2013: multi-annual ToRs

Please note that the following are only Provision ToRs, the Working Group members are aware of the need to submit a set of Multi-annual ToRs as required by SCICOM.

Annex 3: IBTSWG terms of reference for the next meeting

The **International Bottom Trawl Survey Working Group** (IBTSWG), chaired by Anne Sell*, Germany, will meet in Lisbon, Portugal, 8–12 April 2013 to:

- a) Intersessionally coordinate report and plan for the next twelve months North Sea and Northeastern Atlantic surveys, including appropriate field sampling in accordance to the EU Data Collection Framework;
- b) Intersessionally review IBTS manuals and consider additional updates and improvements in survey design and standardization;
- c) Address DATRAS-related topics, including DUAP, data quality in relation to DATRAS data-checks and the progress in re-uploading corrected datasets, quality checks of indices calculated and prioritizing further developments in DATRAS;
- d) Produce a swept-area-based index (instead of haul time-based index) to be explored in collaboration with the WGSDAA (Multiannual ToR);
- e) Compile status quo, report and propose ways forward in standardization, on the different materials and specifications of the GOVs and gears currently used by the IBTS participants. Analyse and report on the effect of variable sweep length and standardization on present uses in the IBTS (Multiannual ToR);
- f) Review the possible contributions of the IBTS as an Ecosystem Approach Fishery Management Oriented Survey and in relation to supporting MSFD indicators.

ToR Leaders

ToR	Lead	ToR	Lead
ToR a)	Area coordinators	ToR d)	Netherlands, Denmark, Sweden, Northern Ireland, Portugal
ToR b)	Germany, Scotland, England	ToR e)	Scotland, Norway, France
ToR c)	Netherlands, Spain, Ireland, England	ToR f)	England, Germany, Portugal, France, Spain

Supporting Information

Priority	Essential, The general need for monitoring fish abundance using surveys is evident in relation to fish stock assessments, and it has increasing importance in relation to MSFD GES descriptors biodiversity, foodwebs, and bottom integrity. Besides the relation of fish abundance with descriptor 3 Exploited stocks.
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Scientific justification	<p>ToR a) This is a core function of the IBTSWG, an important forum for coordination and evaluation of standardized bottom trawl surveys in the Eastern Atlantic Area, to ensure good survey coverage in relation to stocks and areas, inter-calibration work, and high quality of data. The group also provides a brief overview the result of the individual surveys undertaken during the previous year and in the first quarter of the ongoing year. IBTSWG will continue to review feedback and implement modifications, including coordination and implementing new requirements of the EU DCF.</p> <p>ToR b) To ensure quality and traceability of sampling protocols, changes in the design and procedures used in the surveys coordinated by the IBTSWG have to be implemented and documented in detail in the IBTS manuals.</p> <p>ToR c) DATRAS has become the core database containing the data obtained in the national IBTSurveys, the The development of DATRAS needs to be evaluated annually, and the group is also the forum to discuss with ICES Data Centre and agree on the priority of desired further developments.</p> <p>ToR d) The change from an index based on haul duration as effort unit to a swept-area-based index will be explored to improve robustness of the indices (considered as adequate for multiannual ToR)</p> <p>ToR e) Further efforts to standardize gears due to the concerns on availability of materials used, and “technological creep” (considered also multiannual)</p> <p>ToR f) Surveys time-series are one of the major sources of information and data for the EU MSFD, and the group will discuss the feasibility of IBTS products for this purpose and coordinate within IBTS how to implement the data requirements from the MSFD.</p>
Resource requirements	A five day IBTS meeting. Pre-prepared documents from members following ToR Leaders identified above. Eight days Chair’s time to edit. It is estimated that each ToR will require at least 8 hours preparation.
Participants	The Group is normally attended by some 20–25 members and guests. All members will participate on the discussion of all ToRs, but ToRs leaders have been identified and appointed to intersessionally prepare the work and lead it in the meeting.
Secretariat facilities	Sharepoint plus normal secretariat support.
Financial	No financial implications.
Linkages to advisory committees	ACOM. IBTS indices are used in the assessment of multiple stocks.
Linkages to other committees or groups	There are relations with other bottom trawl surveys (WGBEAM, WGBIFS) that also use DATRAS as the international repository for its data (WGDIM, DUAP). There are also a linkages with Assessment WGs using IBTS indices and WGISDAA. Also relevant to the Working Group on Ecosystem Effects of Fisheries.
Linkages to other organizations	IOC. GOOS.

Annex 4: Recommendations

Recommendation	Adressed to
1. It is recommended to implement a Workshop on DATRAS data review priorities and checking procedures, to improve quality during the uploading/reuploading processes, and checking errors.	SSGESST
2. It is recommended that deadlines for data call take into account the dates of the surveys (see Sections 4.1–4.3), and that to ensure data quality there is a need for sufficient time to process and upload the data (Section 3)	HAWG, WGNSSK.
3. It is recommended that WGISDAA studies survey data in the western English Channel area, in terms of the difficulties and importance of providing survey indices from this transitional area between North Sea and the Celtic Sea (taking into account the new combined index for the Celtic Sea Area; see Section 4.3.1)	WGISDAA
4. It is recommended that WGISDAA run sensitivity analysis on the existing IBTS survey designs to provide guidance on how best to deal with unplanned gaps in survey coverage. For example, should effort be allocated evenly over the entire coordinated area or should local precision be maintained with a specific minimum station allocation to the gap area be applied by neighbouring survey(s)?	WGISDAA
5. It is recommended that when downloading 'cpue per length per haul' from DATRAS, that the downloaded data includes information on tow duration.	DATRAS, ICES Data Centre
6. It is recommended that survey acronyms and names are harmonized across reports, manuals and DATRAS pages and download products, taking into account acronyms used in assessment working groups.	ICES Secretariat
7. SGSIPS are requested to evaluate the netting material currently used by each country for the MIK nets and provide recommendations for which type of net material should be used in all future surveys in the IBTS using MIKs	SGSIPS
8. SGSIPS is requested to investigate the calculation of the MIK herring larvae index, provide a clear and unambiguous description of the methodology to be used in the estimate, and determine which Working Group will be responsible for estimating and supplying the index.	SGSIPS
9. SGSIPS and HAWG are requested to provide advice as to whether the Downs component should be included in the MIK 0-wr index and how this should be accomplished.	SGSIPS, HAWG
10. WGWIDE is requested to review results on the availability of horse mackerel indices for the North Sea (Section 6.2) and consider a possible collaboration with IBTSWG to further develop this work	WGWIDE

List of recommendations and actions to IBTS member institutes

Recommendation	Adressed to
1. It is suggested that IBTS participants collect additional relevant data on fish lengths where total length is not the standard measurement, so as to allow conversion factors to be estimated for the various length measurements with total length (Section 7)	All institutes
2. It is recommended that sea-going technical or scientific personnel take part in other countries surveys in order to compare and develop best practice for the various aspects of surveys (including trawling and gear checks, catch sampling, species identification and biological sampling procedures) on board ships participating in internationally coordinated programmes	All Institutes
3. It is recommended that participants of IBTSWG attend WKECES (Bergen, November 2012) in order to contribute to the discussions and report back to IBTSWG 2013 on the progress and implications to IBTS surveys, with particular relevance to MFSD. (Section 9.2)	IBTS participants
4. It is recommended to use the MIKey Mouse Net if feasible to sample within the IBTS NS Q1. SGSIPS to provide details of where samples are to be sent (Section 4)	IBTS NS Q1 participants, SGSIPS
5. It is recommended that EGs be identified as primary data users for the proposed new surveys of CAMANOC and Cefas Q1 as per IBTS criteria. This allows a peer review and support during the development of the survey of both the technical and analytical aspects which require varied expertise.	IBTS participants, ICES

Annex 5: Working documents

List of Working documents presented to the International Bottom Trawl Survey Working Group (IBTSWG)

These Working Documents have not been peer-reviewed by IBTSWG and should therefore not be interpreted as the view of the Group. The Working Documents are appended for information only.

WD 1: **Richard Nash**. – MIK – Midwater Ring Net with added extras. Egg surveys in the North Sea Spawning distributions.

WD 2: **David Stokes**: A proposed combined groundfish survey index for Cod (*Gadus morhua*) in the Celtic Sea ICES Area VIIe-k. (Presented to WKROUND 2012)

WD 3: Travers, M., Vaz, S., Desroy, N. and **Verin, Yves**. – Proposal of an ecosystem survey in the western English Channel (CAMANOC)

WD 4: Jaworski, A., **Burns, Finlay** and Kynoch, R. Changes to the Q1+Q4 Scottish VIa. IBTS and Q3 Scottish VIb. IBTS.

WD 5: Kynoch, R.J., **Burns, Finlay** and Edridge, A. – Catch comparisons trials to assess the effect of a rockhopper ground gear on the catches of the Scottish GOV survey trawl.

WD 6: **Kai Wieland**. – Gov trawl geometry: Comparisons from the Danish and Swedish NS-IBTS in Q3 2011 and Q1 2012 with R/V Dana, with reference to Scottish and German observations.

WD 7: ICES Data Centre, presented by **Vaishav Soni**: FAQs for DATRAS data submitters.

WD 8: Graham, N. – Comparisons between Megrim (IVa and VIa) CPUE indices derived from DATRAS exchange data and data received directly from national laboratories.

WD 9: **Nebout, T.**, Foveau, A., Vaz, S. and Desroy, Nicolas. Benthic Macrofaunal Observations Onboard Fish Assessment Research Surveys.

WD 10: Institute of Marine Research (Norway, presented by **Irene Huse**). Program of the “Bad Hair Day” Acoustic Survey for Spawning Saithe in the North Sea 1 Quarter 2012.

MIK – Midwater Ring Net

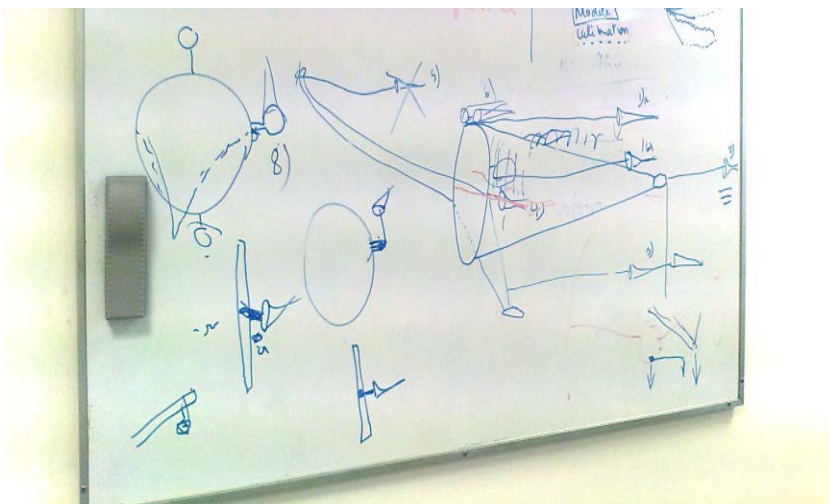
with added extras

Egg surveys in the North Sea
Spawning distributions

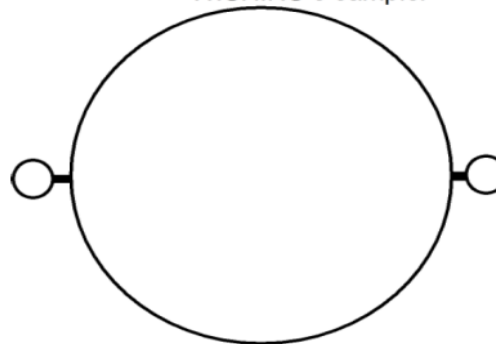
3. To conduct a winter spawning habitat survey covering the whole North Sea in 2013

Background

During the WGEGGS meeting in Sète (October 2011), the question of how to collect egg samples from the North sea early in the year was addressed. A new ichthyoplankton net was suggested which could work in conjunction with the MIK sampling. The suggested solution was to add a small plankton net on the side of the MIK with the intention of using the standard MIK hauling and shooting operations. The additional sampler was dimensioned so as to filter about 20m³ of water during an average MIK haul.



MIKy mouse nets
WISHINS 8 sampler



MIKy mouse nets	
phi	3,1415
r	0,1 m
rsq	0,01 m ²
Area	0,0314 m ²

In reality:

Nets 333 micron mesh, clamp on and lacing to the rings. Rings to be robust enough to survive normal MIK operations in the North Sea 1Q IBTS.

Nets constructed by SPARTEL, UK and all supplied by Norway

Norway , IMR,	x4, 2 long and 2 standard
Denmark, DTU-Aqua,	x2
The Netherlands, IMARES,	x2
France, IfreMer,	x2

Ring construction and placement responsibility of each trial group.

IfreMer

• 1 anneau de filet secondaire

- Dimension : $\varnothing 200$ intérieur
- Matière : inox 304L
- Fixation par 2 vis et positionnement autour de l'anneau de fixation de l'anneau de filet principal

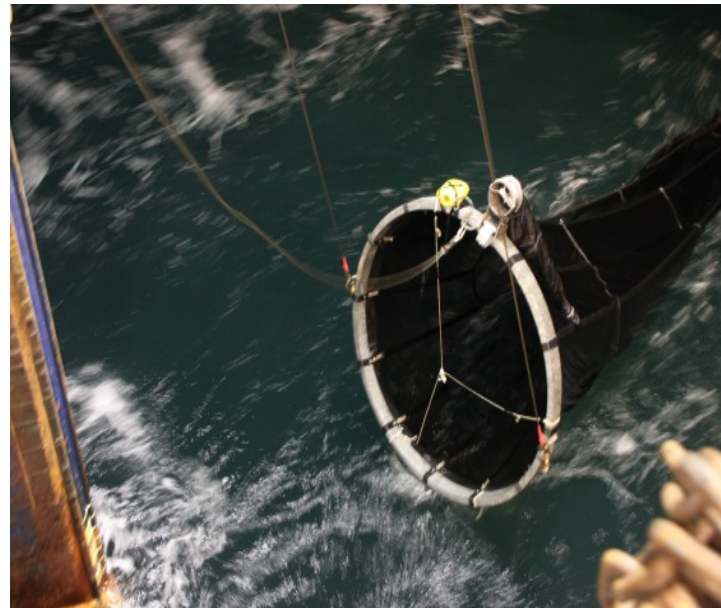


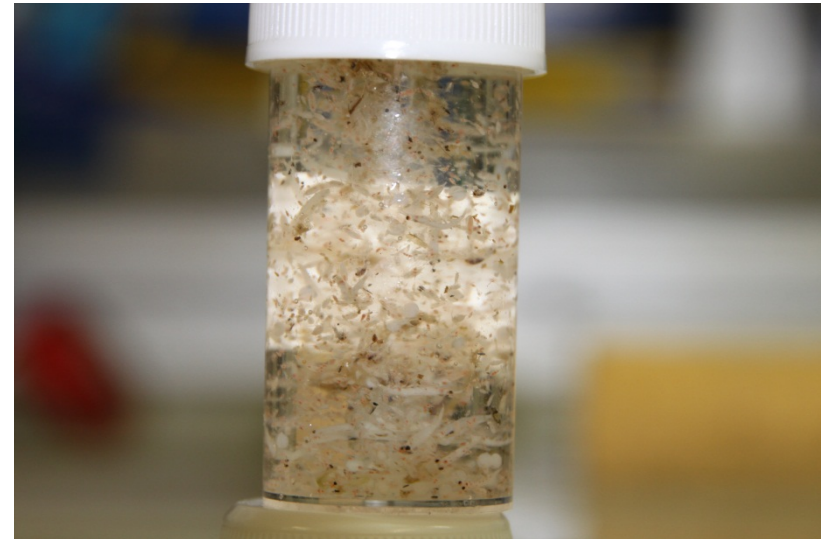
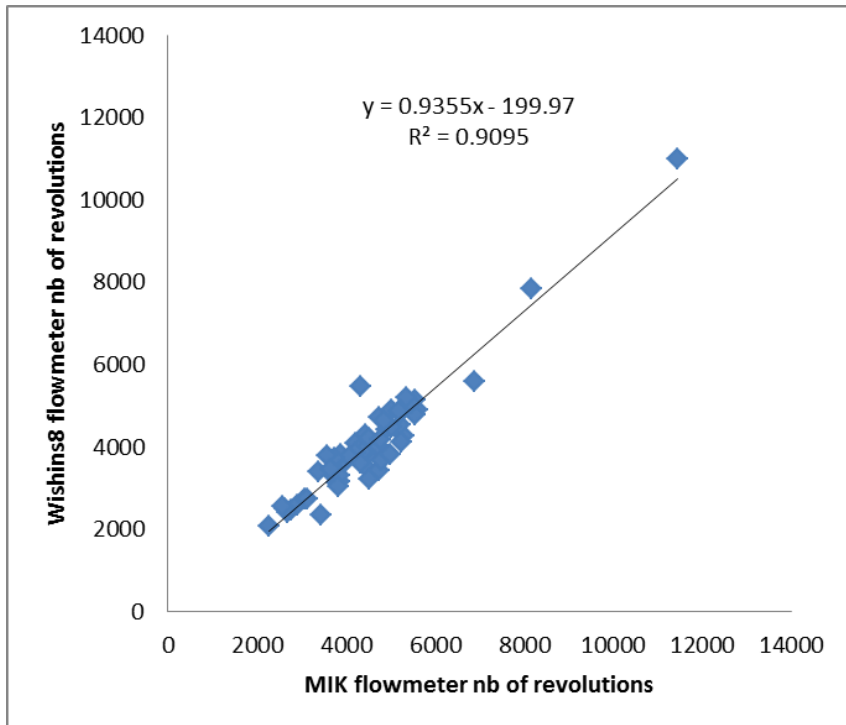
**Photo non contractuelle*



PRIX UNITAIRE

175,00 € HT





From Peter Munk (DTU-Aqua

This appeared to be no problem in our setup with fouling the nets, but it is suggested that the mounting on the ring should be changed, while there could be some damage to the big net when lowered to the deck. See the enclosed pictures for illustration of how it works. The crew were reasonably happy with the gear, and believed it would be possible to use routinely.

We made comparative hauls, with and without the Mickey, these have to be processed, however a quick look at samples showed no sign of differences in catchability. I will come up with full interpretation later.

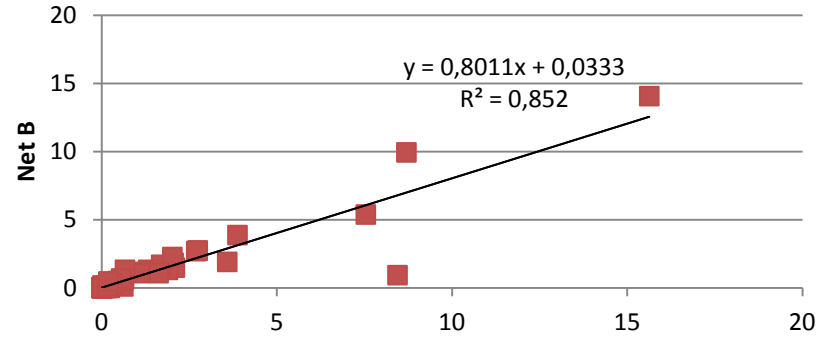


IMARES

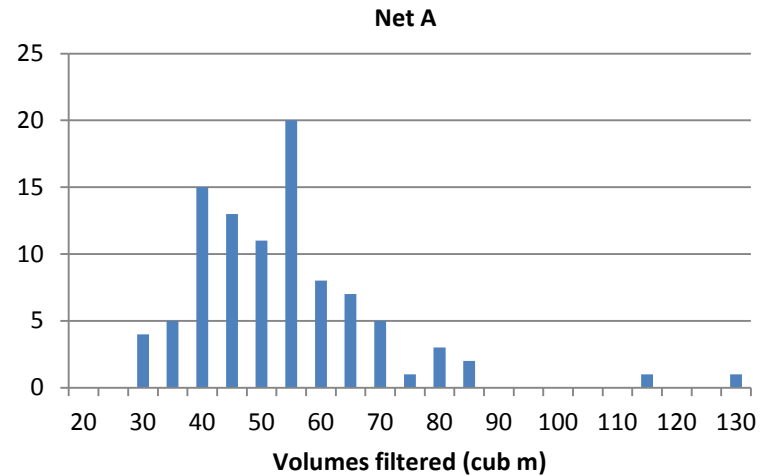
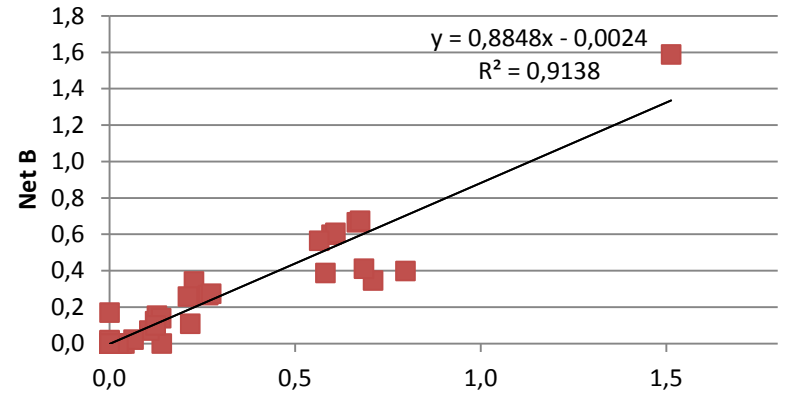


Eggs (Nos per cub m)

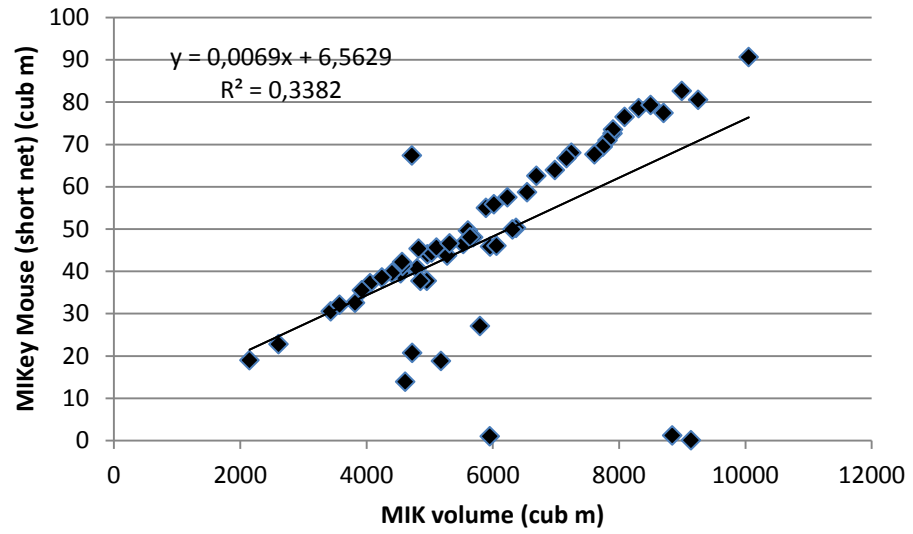
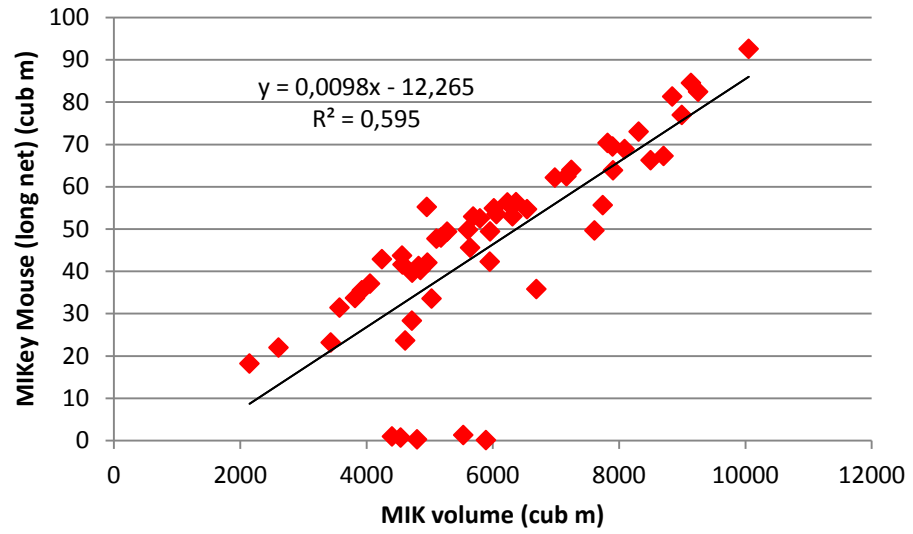
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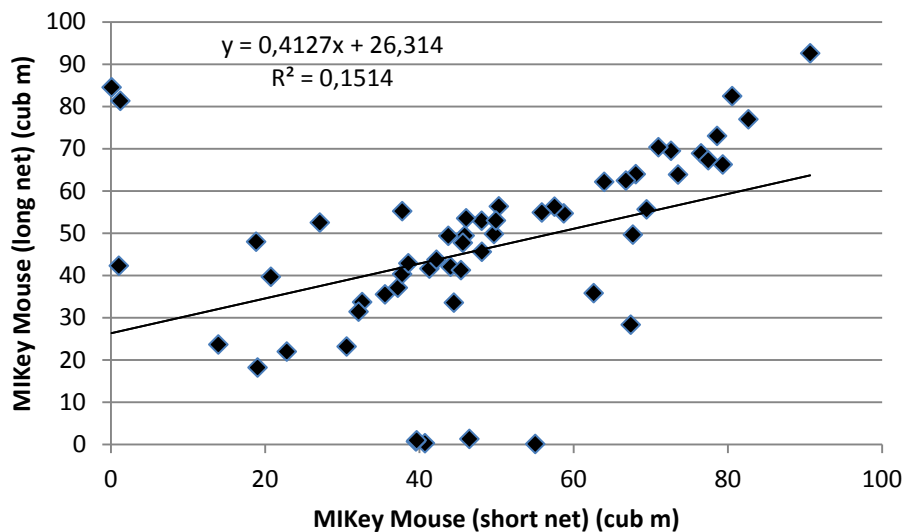
Clupeoid larvae (Nos per cub m)



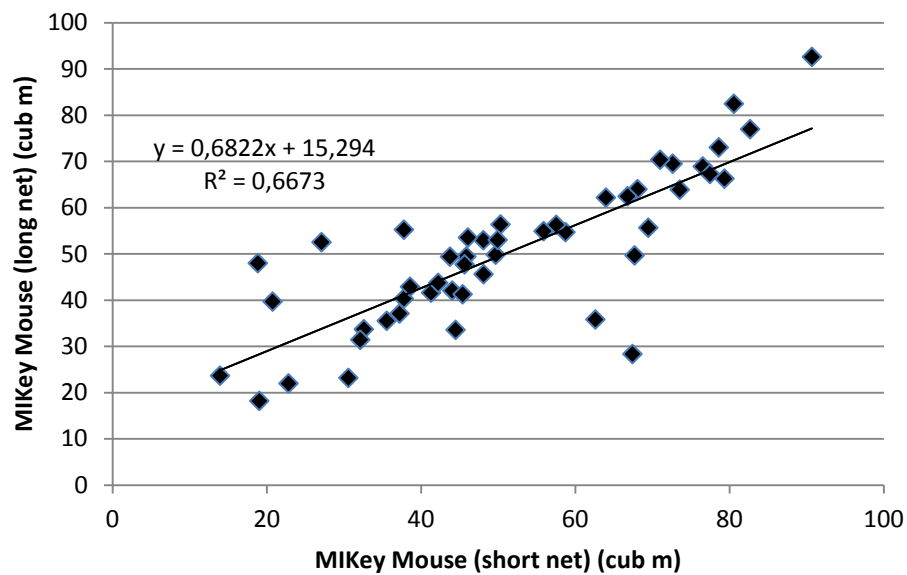
IMR, Bergen



All data

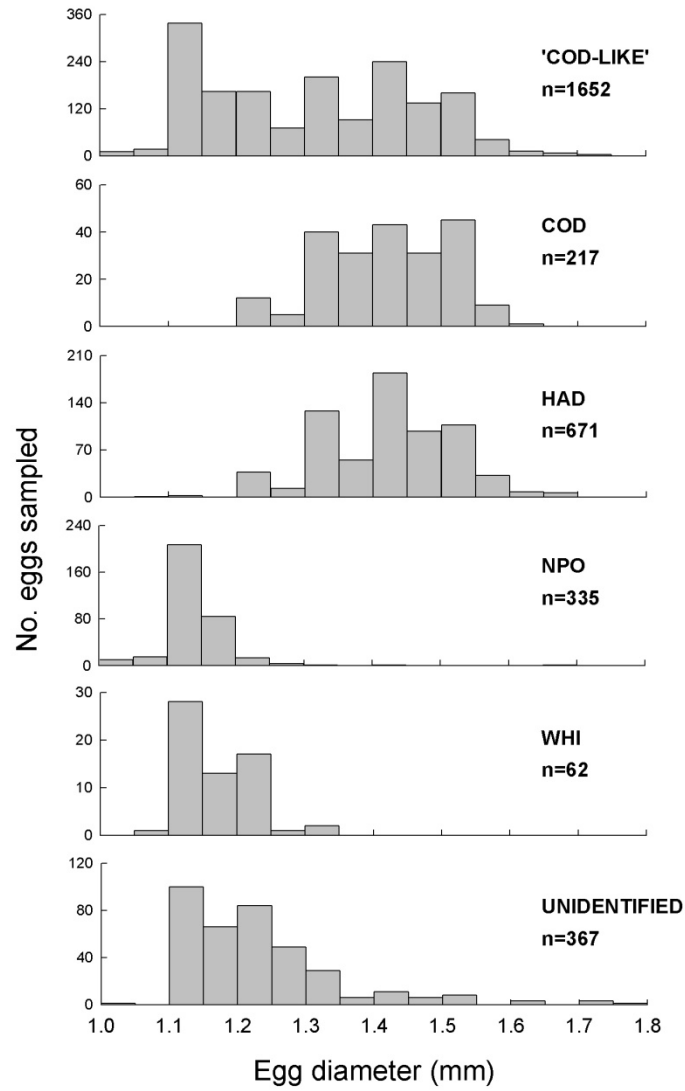


Valid meter readings



The End/Beginning?

2009 output (some)



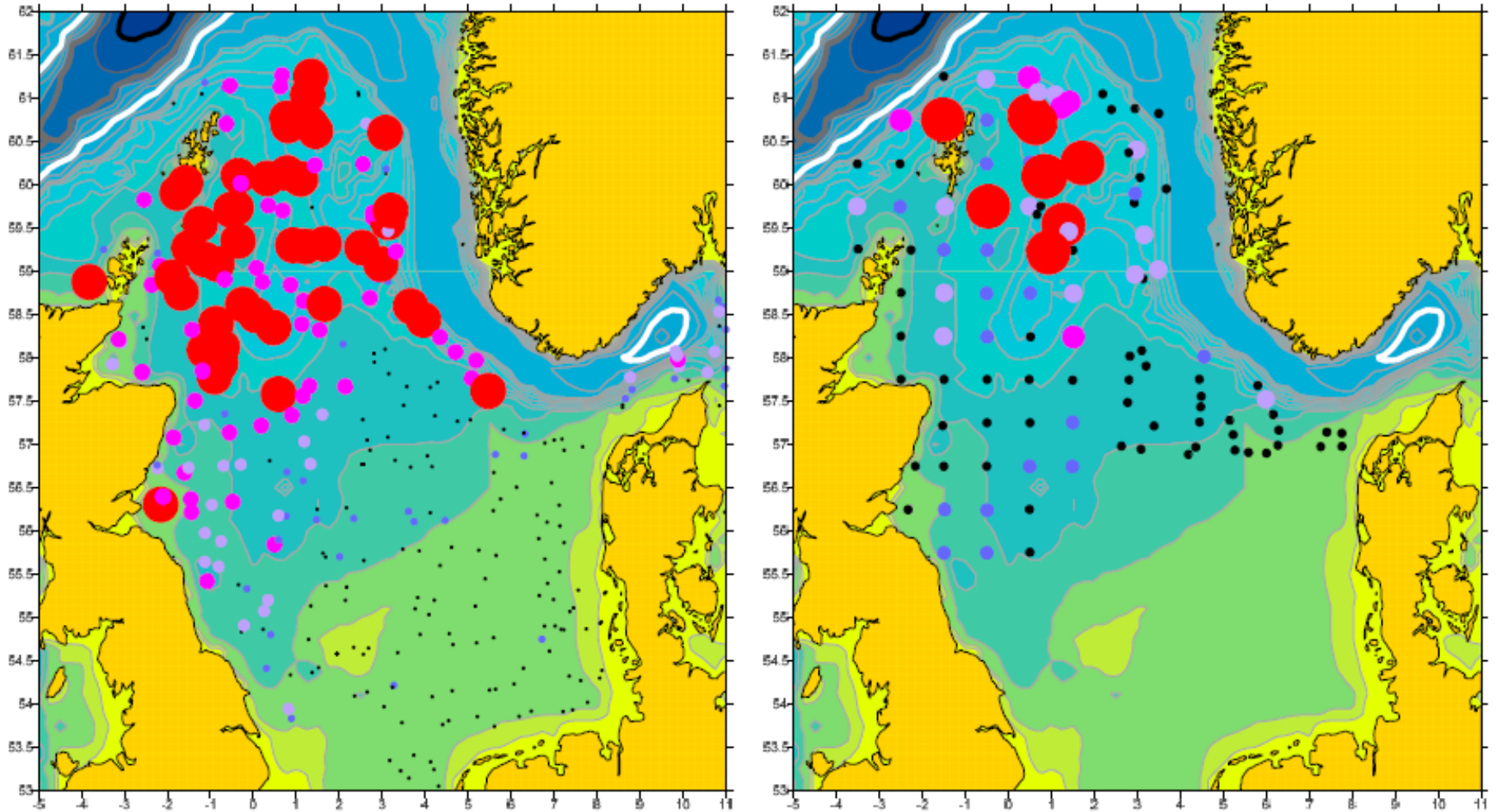


Figure 4. The distribution of Norway pout (*Trisopterus esmarkii*) a. Adults (age 2+) and b. Stage I eggs in the northern North Sea in January/March 2009. Size of the dot reflects the abundance on a logarithmic scale. Black dots represent a complete absence.

A proposed combined groundfish survey index for Cod (*Gadus morhua*) in the Celtic Sea ICES Area VIIe-k

By
David Stokes
Marine Institute, Rinville, Oranmore, Co Galway, Ireland

Introduction

Management of cod in the Celtic Sea (ICES VIIe-k) has been problematic for some time, largely related to poor information around discarding and high-grading practices in recent years. No analytical assessment was performed between 2008 and 2009 and only an exploratory assessments in 2010 - 2011.

Two of the surveys used as tuning fleets in the assessment provide virtually total coverage of the VIIe-k assessment area. The French EVHOE survey covers the area from the southern Bay of Biscay up to the Irish south coast. The Irish Groundfish Survey (IGFS) extends from the Irish south coast to cover VIIg & j north, as well as VIIb in the west, included in the TAC area (Fig. 1). The current time series extends back to 2003 for the IGFS and from 1997 for the EVHOE survey.

Given the shortcomings in commercial data for this stock, the intention here is to evaluate whether a combined index of IGFS and EVHOE survey data provided a more precise index as well as just improved coverage.

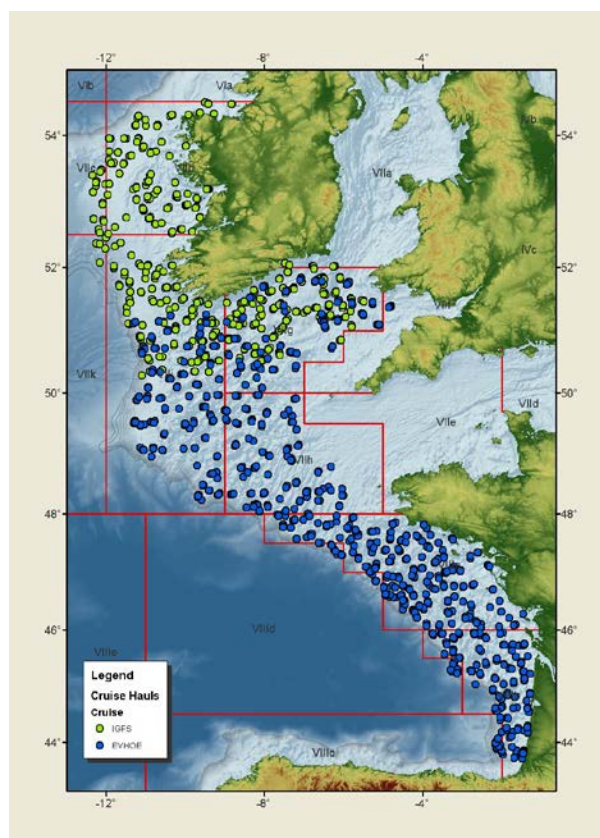


Fig 1. Survey haul distribution for the French EVHOE survey and the Irish Groundfish Survey (IGFS for ICES Area VII) between 2003 – 2010.

Survey data overview

Both surveys are coordinated by the International Bottom Trawl Working Group (IBTS) at ICES, and therefore operate under agreed sampling protocols (ICES, 2010). In broad terms, both vessels use a GOV high headline demersal trawl towed at 4 knots for 30min to acquire the catch. Catches are carried out during daylight only and fish from each haul are sorted and sampled at sea.

Catch numbers at age (CNA) and length frequency (LF) data for EVHOE was sourced through the ICES survey database, DATRAS, and all data is standardised to numbers per hour. For IGFS data ALK's were applied by strata to the standardised length frequencies to generate the CNA data.

Length frequencies for the surveys show a reasonably similar distribution (Fig 2a-b), although the IGFS has a tendency to catch more smaller fish than the EVHOE.

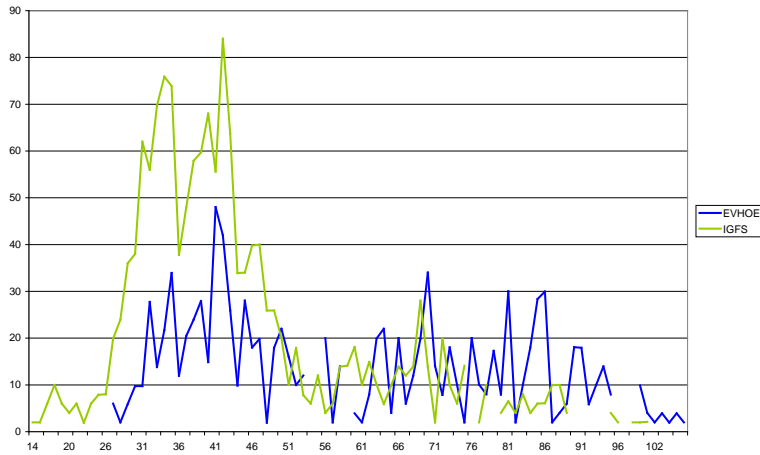


Fig 2a. Total length frequency 2003 – 2010 for the EVHOE Survey (n= 1054) and the IGFS Survey (n= 1598).

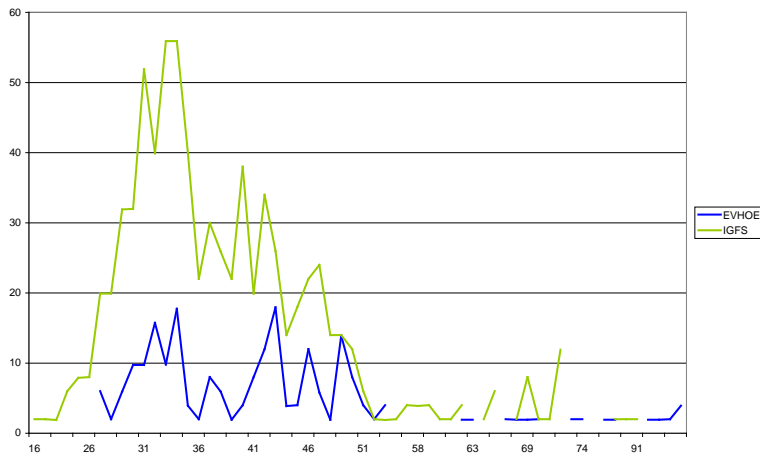


Fig 2b. IGFS (n=392) vs EVHOE (n=115) LF's for 2010.

Limited amounts of cod are landed on the Irish survey in VIIb, so length frequencies are further compared just between the catches in the area of overlap VIIg,j and further to the south in VIIIh on the EVHOE survey. Lengths predictably look similar within VIIg,j between the IGFS & northern EVHOE (Fig 3). As can be seen in Fig 4, only the northern part of the EVHOE encounters smaller fish and a within year comparison for all three survey components in 2010 is given in Fig 5.

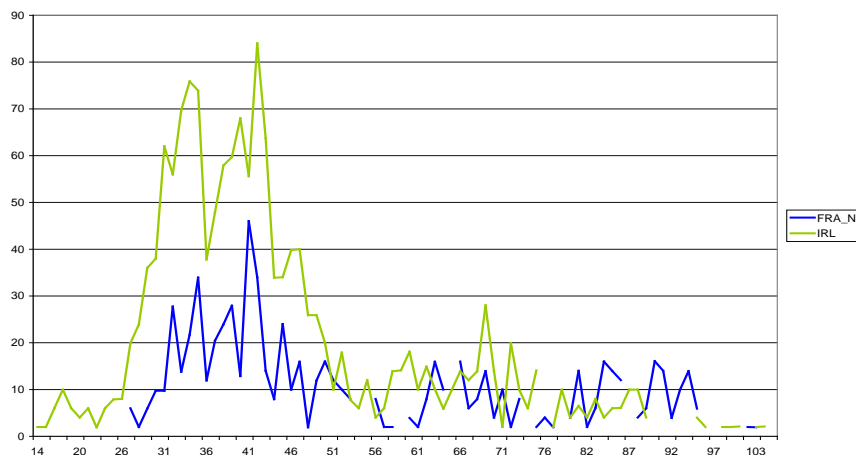


Fig 3. Lfs for 2003 – 2010 between IGFS (n=1598) and EVHOE (n=735) northern component (north of 50 deg Lat).

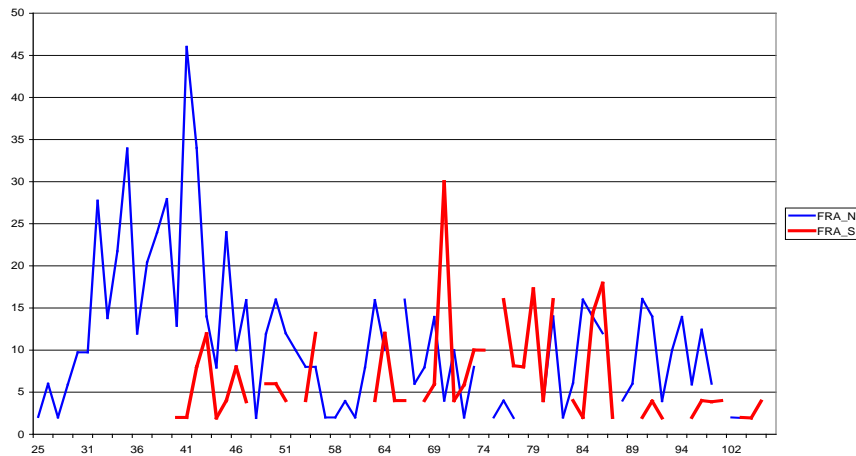


Fig 4. Total length frequency for cod 2003 – 2010 for the northern EVHOE (FRA_N > 50deg Lat) and southern EVHOE (FRA_S < 50deg Lat) components of the EVHOE survey in the Celtic Sea. [FRA_N n=735; FRA_S n=319].

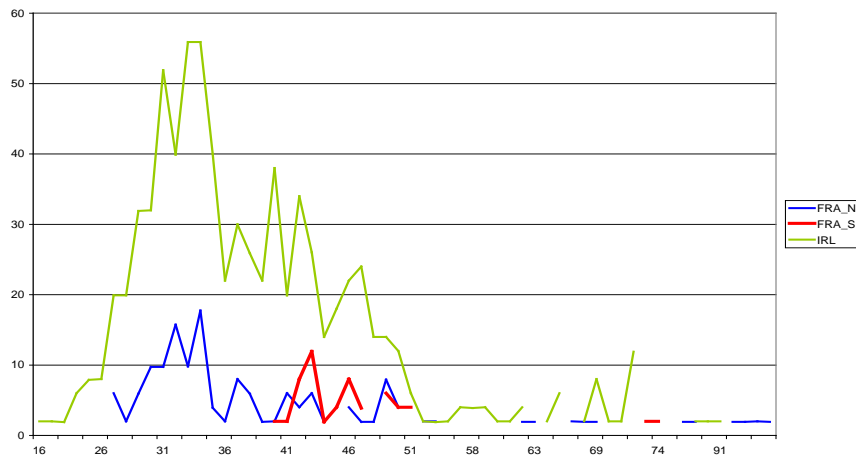
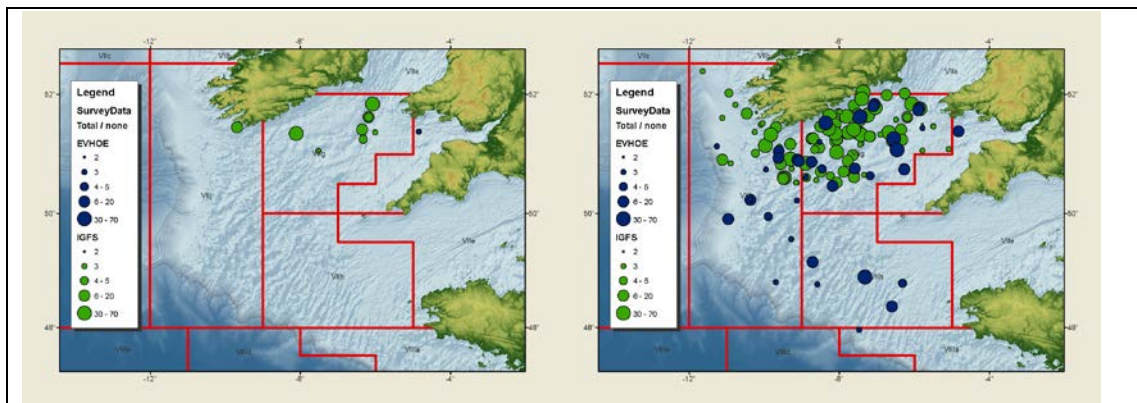


Fig 5. IGFS (n=392), EVHOE north (n=82) and EVHOE south (n=33) LF's for 2010.

To see how the size distributions convert to a numbers at age distribution the catch at age for the time series of both surveys was plotted for age years 0-5+ (Fig 6.). The greatest density of younger fish tend to aggregate in northern and coastal VIIg, with distribution extending further south with increasing age.



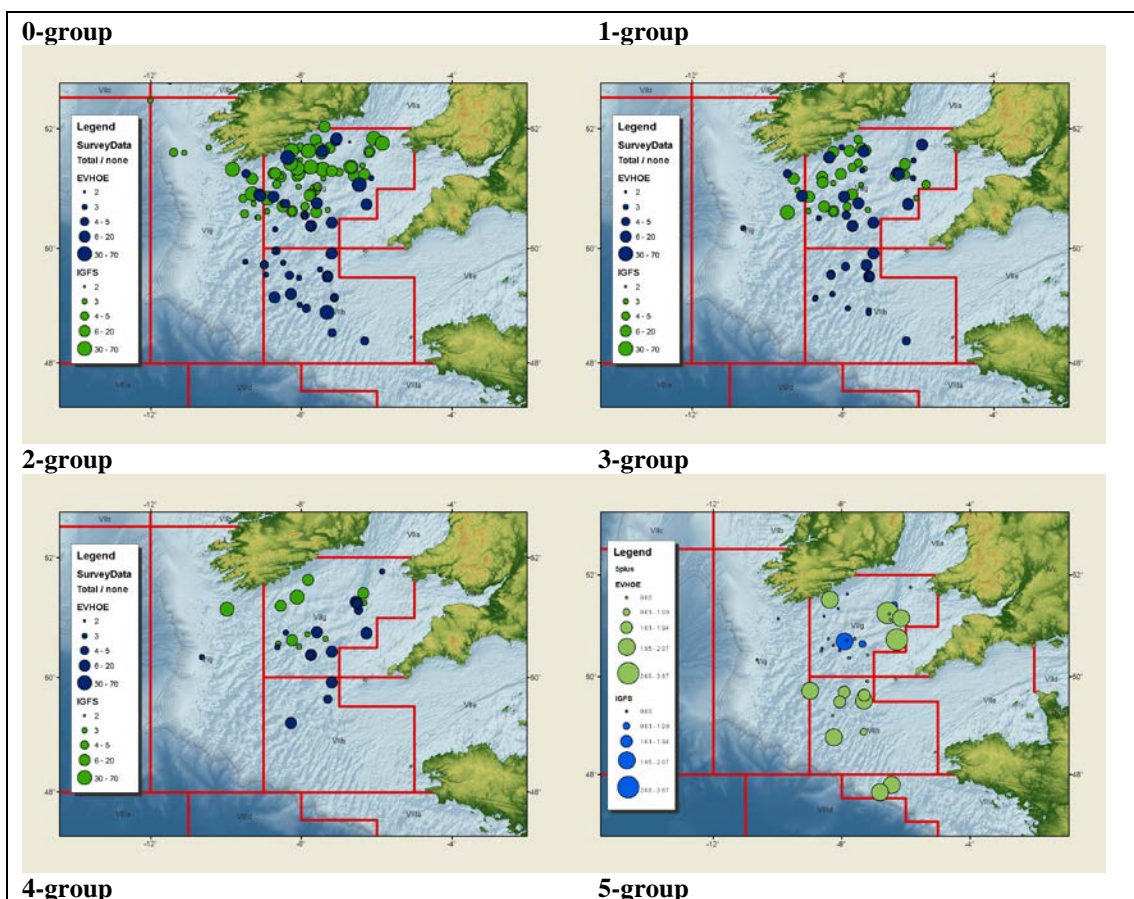


Fig 6. Plot of cod catches by age for IGFS and EVHOE survey time series (2003 – 2010) in No/Hr for each year.

Combining survey indices

Given both surveys historically cover different areas and employ a stratified design, it is reasonable to expect that haul allocation (survey effort) will vary between them for a given area. In combining the two data sets it is important to minimise bias whereby a survey might contribute proportionately more of one size class, for example, because it happens to have more stations in one part of the stock. With a consistent survey design this is not a problem within a survey series. However, where surveys bring different sampling distributions together the area of overlap in particular needs to be adjusted to down weight the resulting increase in effort for the combined area.

A simple way to achieve this is to divide the survey area into a series of grid cells. Subsequently a mean value for each cell can be achieved across all survey point data within each grid cell. This ensures each haul only influences its localised grid cell area regardless of how many/few hauls are done in that cell. It also avoids formal

fitting of a spatial model which can be problematic with the patchy distributions common in fisheries data sets.

Station positions for both surveys for the comparable time period, 2003-2010, were used. Grid resolution was constructed so as to maximise the number of cells with information by finding the average max distance between paired hauls across years. Within the area of overlap this averaged 0.2 degrees of latitude, whereas for the entire survey area the average max distance was 0.5 deg (Table 1.).

Table 1. Max and mean distances in degrees latitude between hauls for IGFS and EVHOE surveys by year. Distances are calculated for both the area of survey overlap as well as full survey extent for both surveys. On average a 0.5 degree grid will ensure haul information in each cell covering the full area for both surveys.

	EVOHE				IGFS			
	overlap area meandist	maxdist	all extent meandist	maxdist	overlap area meandist	maxdist	all extent meandist	maxdist
2010	0.02431	0.1299	0.1946	0.5718	0.01005	0.04681	0.1658	0.3531
2009	0.02174	0.08338	0.1935	0.7909	0.01026	0.05742	0.1652	0.3242
2008	0.02178	0.1104	0.1972	0.5614	0.01488	0.162	0.1764	0.508
2007	0.02034	0.103	0.2112	0.5083	0.01056	0.04649	0.171	0.3186
2006	0.02299	0.1128	0.199	0.5356	0.01107	0.09636	0.1751	0.4314
2005	0.02097	0.147	0.1999	0.4724	0.01482	0.2059	0.173	0.3432
2004	0.009406	0.06842	0.1155	0.423	0.01579	0.1166	0.1662	0.3344
2003	0.01991	0.1312	0.1786	0.4254	0.01445	0.1156	0.1589	0.3388
average	0.02	0.1	0.2	0.5	0.01	0.1	0.2	0.4
	=survey resolution in overlap area		=global survey resolution = appropriate kriging resolution	= ideal a posteriori survey grid strata	=survey resolution in overlap area		=global survey resolution = appropriate kriging resolution	= ideal a posteriori survey grid strata
notes:								
both surveys have a higher resolution in the overlap area than in global average								
both surveys may be interpolated using a 0.2 degree (decimal of latitude) resolution								
ideal compromise grid size for spatial indices computation is 0.5 degree (to ensure a max number of grid cells with information)								

The catch data was plotted on a 0.5 degree grid in ArcGIS and cells relating to the area of survey overlap selected to produce a final grid for the Celtic Sea Combined North grid (CCN grid). Figure 7 shows the CCN grid in relation to non zero cod catches for the time series of both surveys.

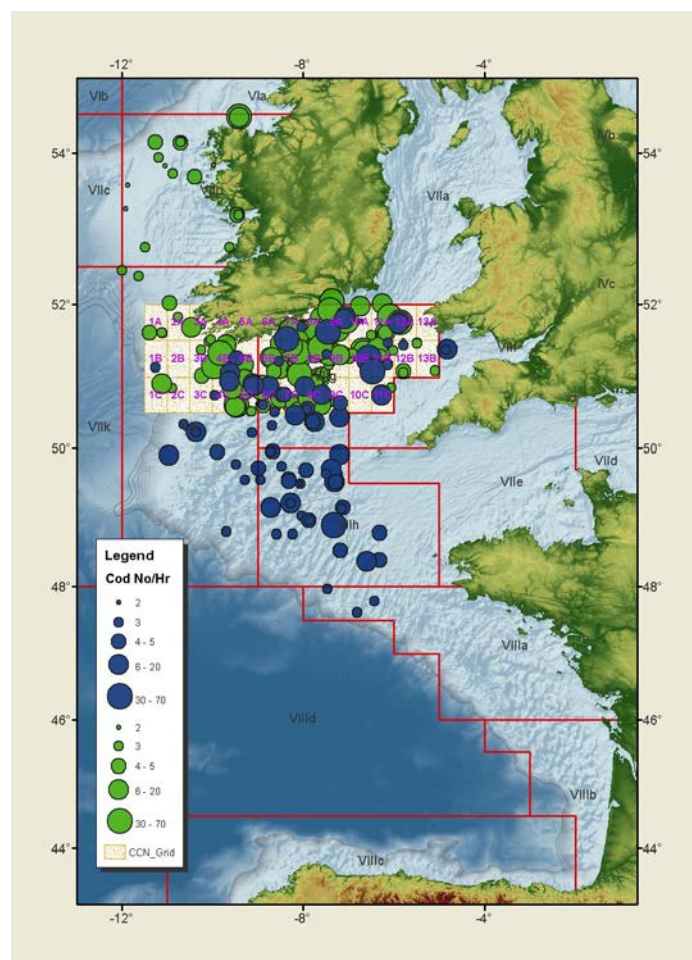


Fig 7. Non zero cod catches for both surveys 2003 – 2010. Also shown is the final 0.5 degree grid used to combine surveys in the area of overlap only CCN grid (Celtic Sea Combined North grid).

Number at age for each survey haul for in the data set was then allocated to the appropriate grid cell via a spatial join. The mean number at age for both surveys, including zero hauls, could then be calculated for any age and year combination for any grid cell. These are then summed across the grid to produce an annual combined index. Fig 8 shows an example of mean No/Hr 2yr old cod for the combined surveys. The same approach is applied to combine survey data for the full extent of both surveys and again an example of 2 year old cod for 2010 is presented in Fig 9.

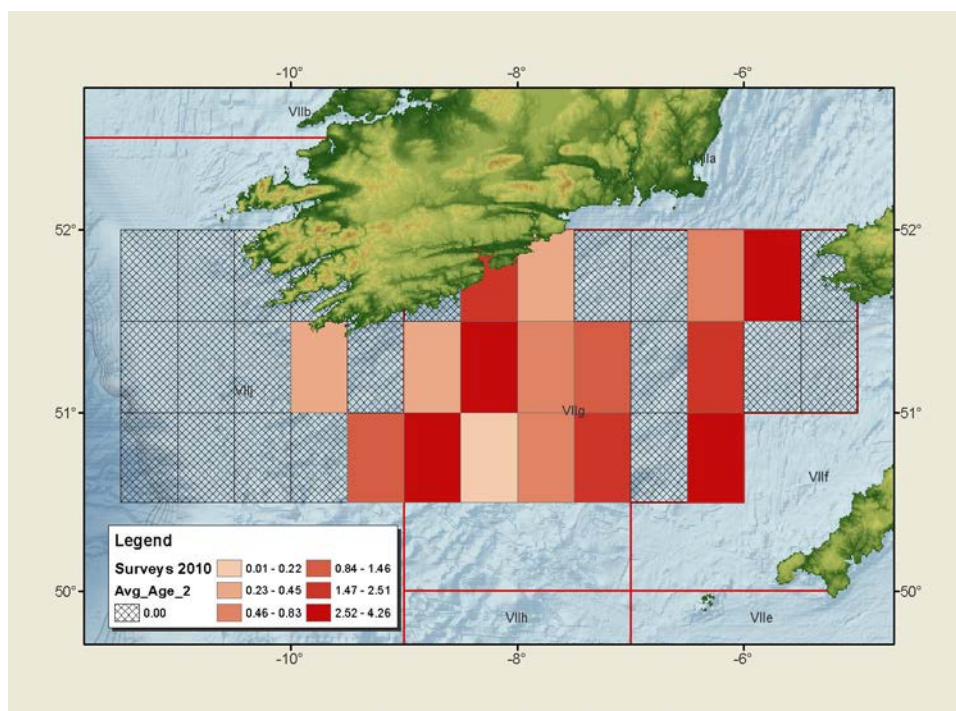


Fig 8. Mean number of 2yr old cod across IGFS and EVHOE surveys, per hour, for 2010. Area of overlap only.

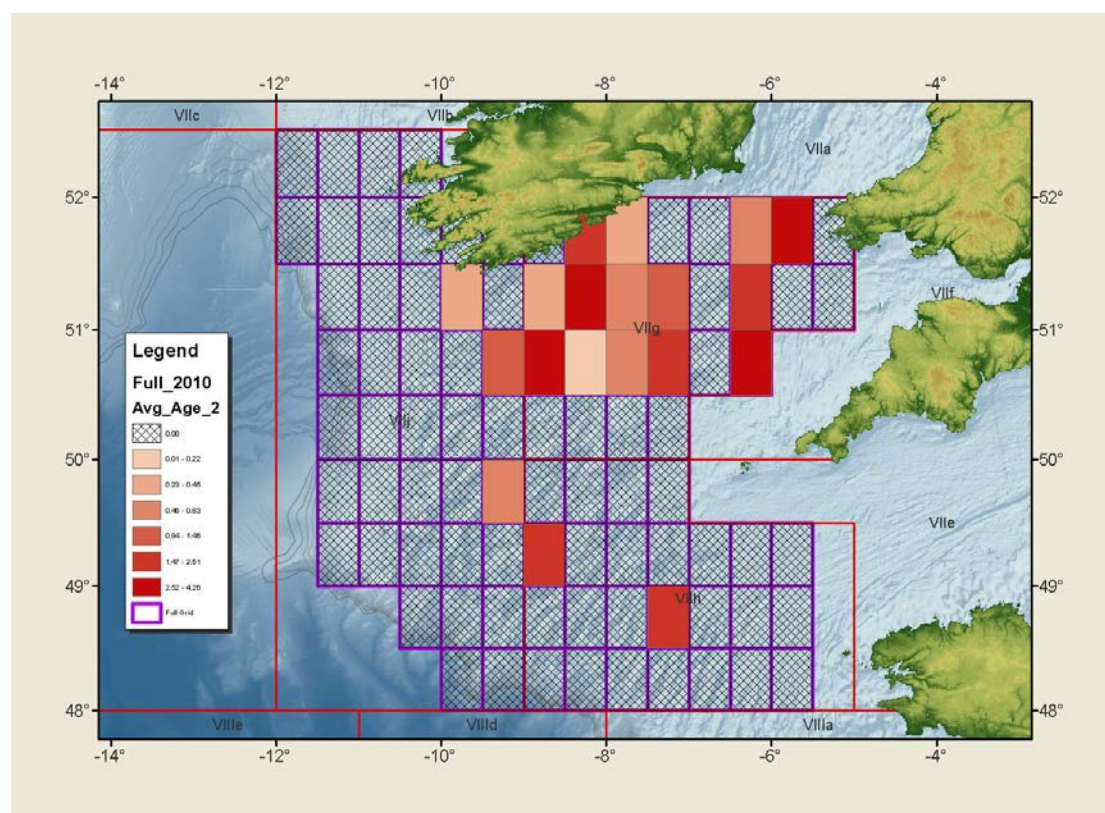


Fig 9. Mean number of 2yr old cod across IGFS and EVHOE surveys, per hour, for 2010. Full survey extent.

Results

The combined index for the IGFS and EVHOE surveys is given in Table 2., with an extended index including derived from the full grid presented in Table 3. Exploratory analysis of the overlap area CCN grid index showed improvements over the original independent indices. Standard exploratory plots for the CNN grid are presented in Fig 10a-e with plots for the independent indices given in Fig 11a-e and 12a-e for EVHOE and IGFS respectively.

Catch curves for the combined index is demonstrably more stable and internal consistency for cohorts up to age 4 are positive compared to either of the independent indices. The improvements breaks down somewhat when the full index is examined Fig 13. Catch curves become more unstable and even hooked and we loose an age class with the lack of internal consistency between 3-4 year olds seen in the scatterplot (Fig 13d). Whether this is an artefact of a relatively small and noisy dataset or whether there is some biological/stock structure that introduces noise when the VIIh data is added is not clear. The absence of juveniles in the VIIh area of the survey at any point between 2003-2010 suggests spatial structuring in quarter 4 at some level.

Table 2. Combined index for IGFS and EVHOE cod in survey overlap area (CNN grid). Number per hour.

Cod									
101									
Combined IGFS:EVHOE Survey in Vllg.j Cod no. @ age									
	2003	2010							
1	1		0.79	0.92					
0	7								
1	0.0	9.9	13.8	14.4	3.6	0.0	0.0	0.0	0.0
1	3.0	18.7	7.7	3.5	4.8	2.3	0.0	0.0	0.0
1	1.3	48.3	5.8	2.9	0.0	0.0	0.0	0.0	0.0
1	1.0	31.6	15.2	2.5	0.0	0.0	0.5	0.0	0.0
1	0.0	55.0	16.8	7.4	1.5	0.0	0.0	0.0	0.0
1	0.0	19.0	23.4	6.4	3.2	0.0	0.0	0.0	0.0
1	1.1	45.8	5.5	6.9	2.7	0.0	0.3	0.0	0.0
1	2.1	254.8	26.9	2.6	2.7	4.4	0.0	0.0	0.0

Table 3. Combined index for IGFS and EVHOE cod in VIIe-k using the full 0.5 deg grid. Number per hour.

Cod									
101									
Combined IGFS:EVHOE Survey in Vllg.j Cod no. @ age									
	2003	2010							
1	1		0.79	0.92					
0	7								
1	0.0	9.9	13.8	17.9	5.1	1.0	0.0	0.0	0.0
1	3.0	20.7	16.3	6.0	7.8	3.5	0.0	0.0	0.0
1	1.3	55.3	19.3	6.8	0.0	3.9	0.0	0.0	0.0
1	1.0	31.6	15.2	2.5	0.0	0.0	2.4	3.9	0.0
1	0.0	55.0	30.4	14.7	6.2	0.0	0.0	0.0	0.0
1	0.0	19.0	30.4	11.9	3.7	0.0	0.0	0.0	0.0
1	1.1	46.8	13.5	14.0	2.7	0.0	0.3	0.0	0.0
1	2.1	306.9	31.5	2.6	2.7	4.4	0.0	0.0	0.0

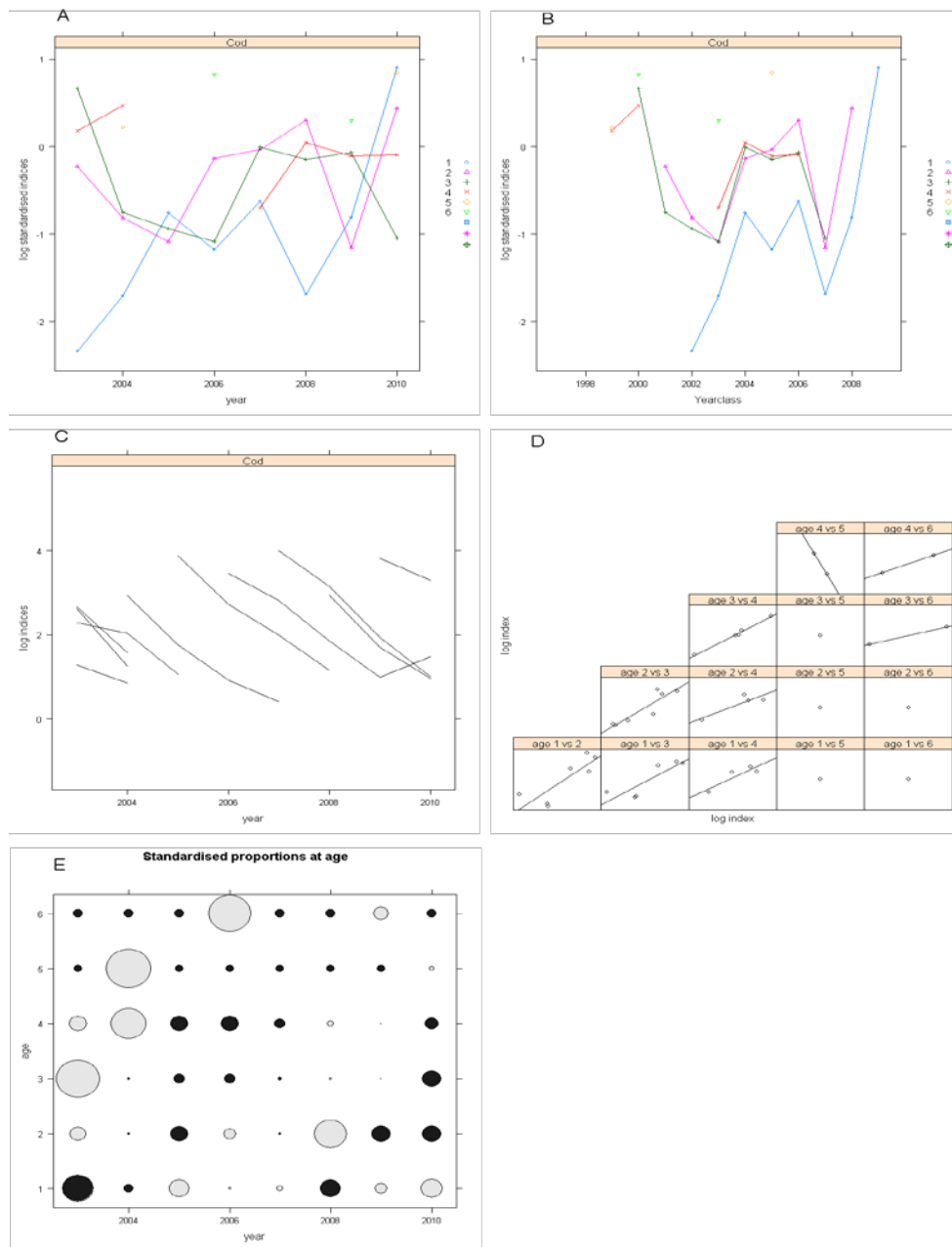


Fig 10a-e. Exploratory plots for combined IGFS and EVHOE survey indices for the overlapping survey area – CNN grid. Figs a-b show the log standardised indices by year and by year class and both show the relatively strong 2010 year class. Mortality curves are very stable (c) and cohort tracking from ages 1-4 is good (d). Bubble plots of proportions at age show some, but weak indication of the 2010 year class, and remnants of the earlier 2000 recruitment (e).

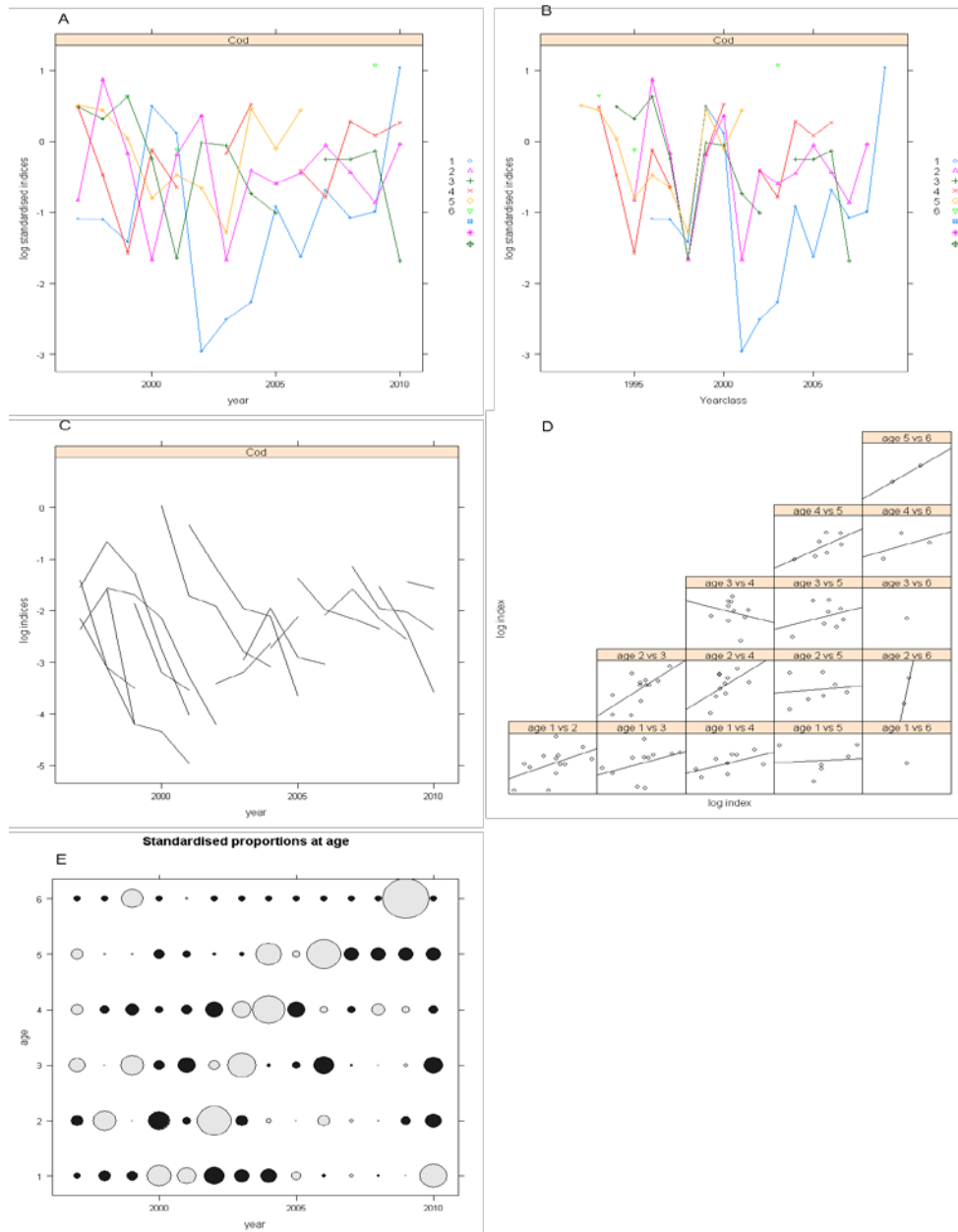


Fig 11. EVHOE exploratory plots from Surba 3.0 . Log mean standardised index for ages 1-6 by year (a) and year-class (b). Catch curves (c) and scatterplots (d). Proportions by age are given in Fig E.

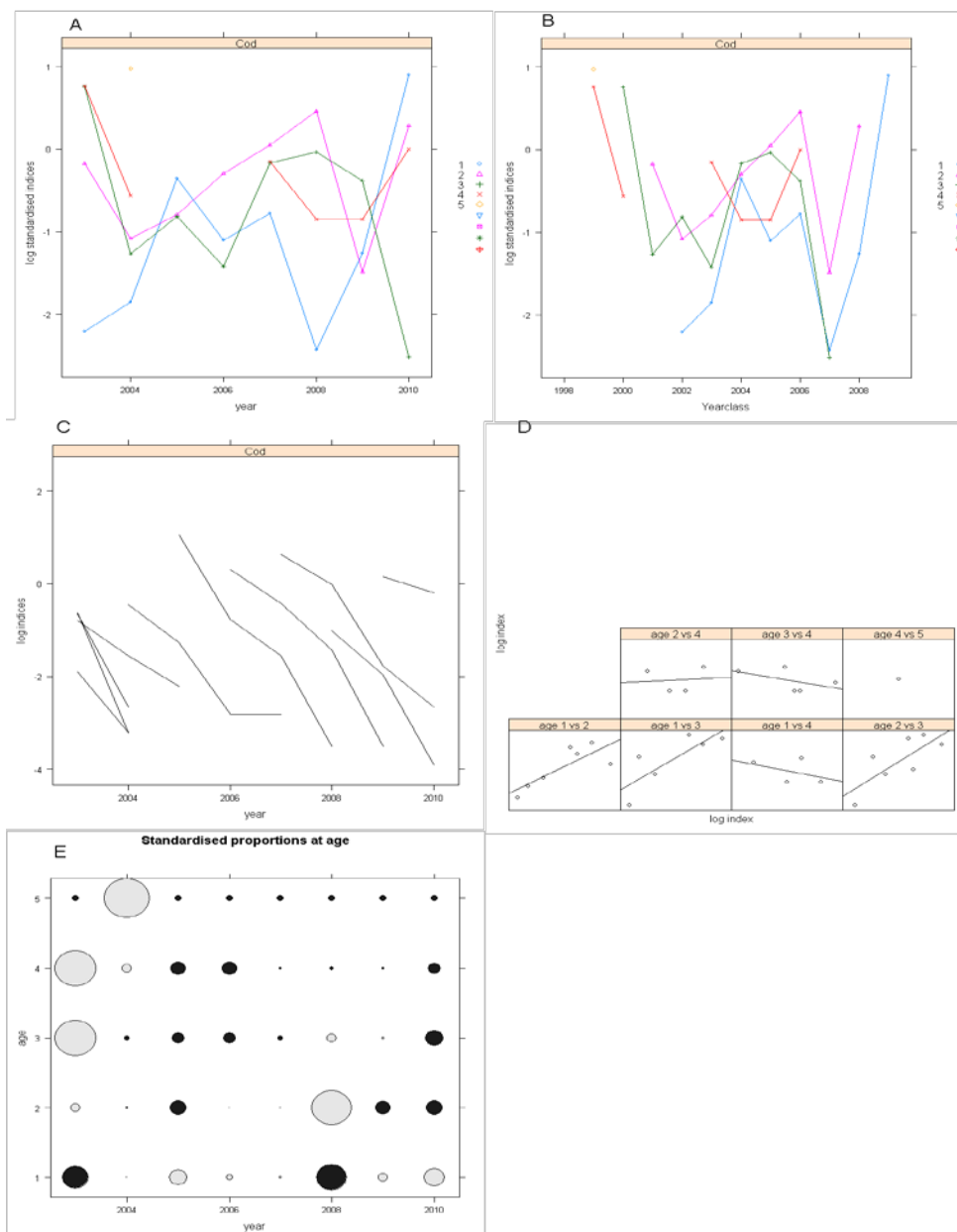


Fig 12. IGFS exploratory plots from Surba 3.0 . Log mean standardised index for ages 1-5 by year (a) and year-class (b). Catch curves (c) and scatterplots (d). Proportions by age are given in Fig E.

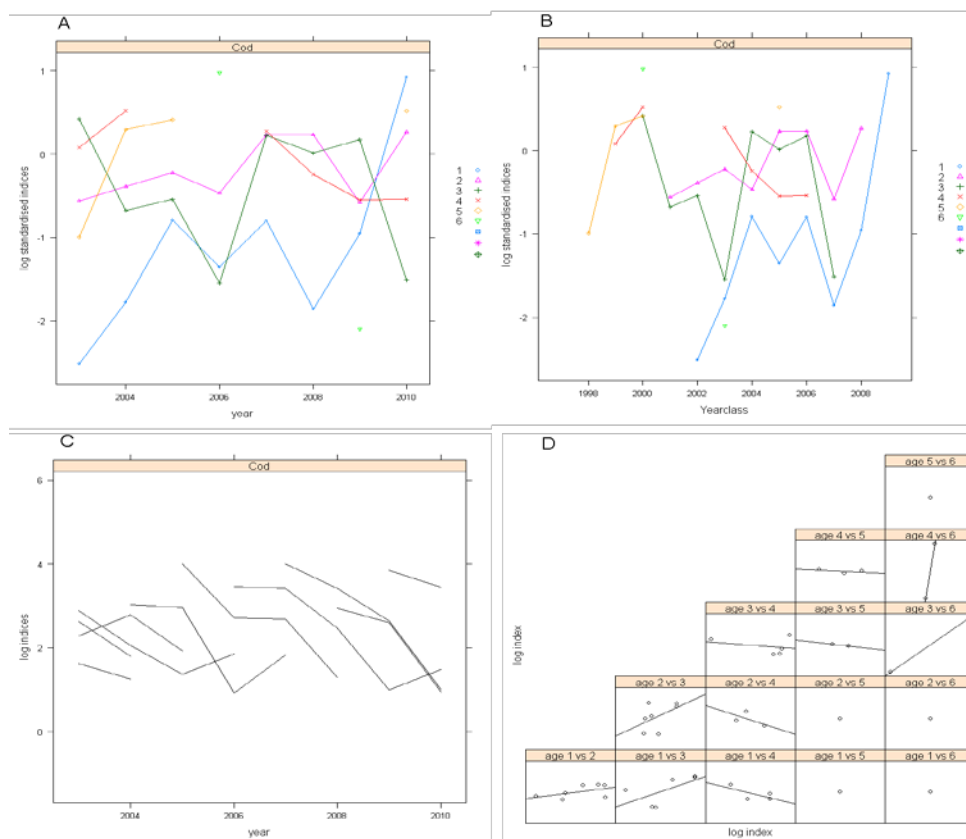


Fig 13. Combined index for IGFS and EVHOE for full survey area. Exploratory plots from Surba 3.0 . Log mean standardised index for ages 1-6 by year (a) and year-class (b). Catch curves (c) and scatterplots (d). Proportions by age are given in Fig E.

References

ICES, 2010. ADDENDUM 2: Manual for the International Bottom Trawl Surveys in the Western and Southern Areas. Revision VIII. Addendum to ICES CM 2002/D:03. In: ICESs (Ed.), Lisbon.

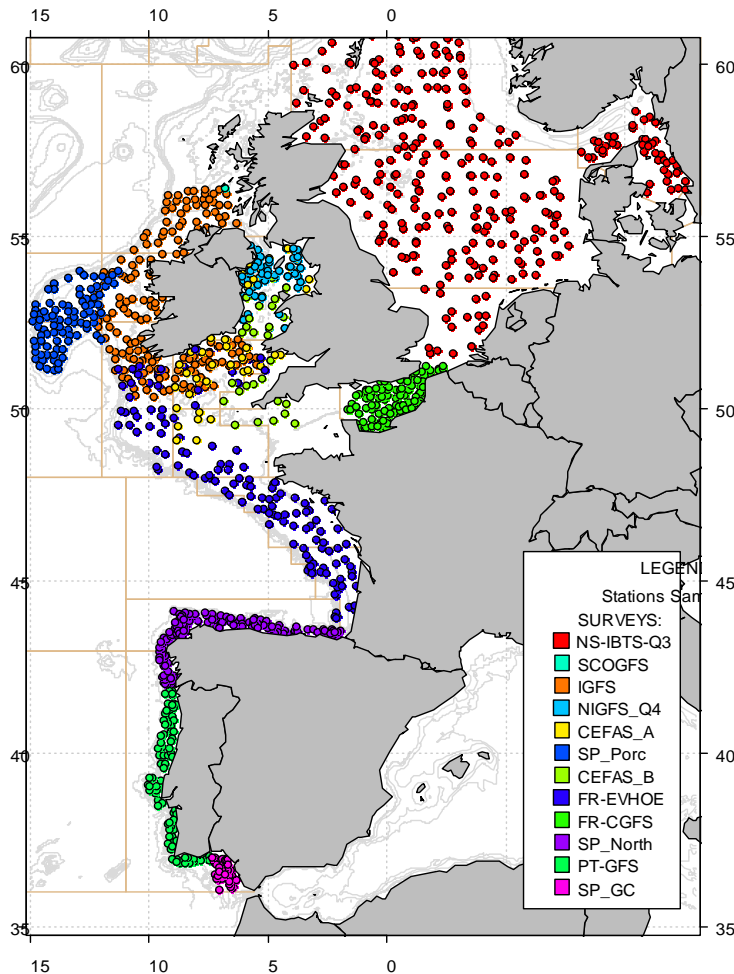
Proposal of an ecosystem survey in the western English Channel (CAMANOC)

Could this survey be part of the WGIBTS ?

Morgane Travers, Sandrine Vaz, Nicolas Desroy, Yves Vérin

*Within IFREMER, survey proposal has to be made 2 years in
advance for logistic purposes*

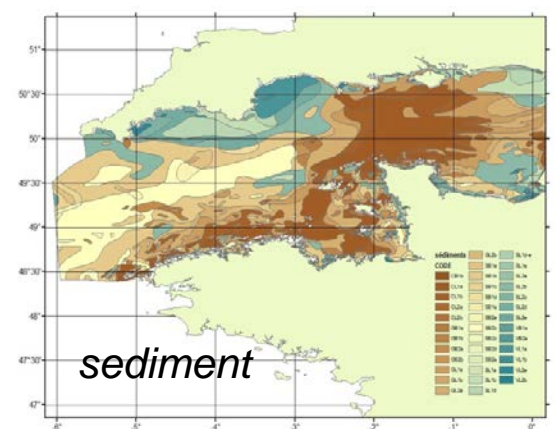
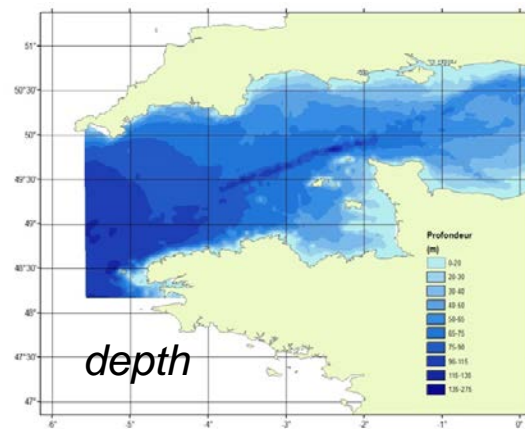
Lack of data in the western Channel



Spatial coverage of international surveys targeting ichthyofauna

A particular ecosystem linking the Atlantic Ocean and North Sea with :

- Strong tidal currents
- Strong physical diversity (depth, bottom types, oceanic and terrestrial influences...)



- Only old knowledge of benthic communities (from 1970s)
- No GOV 'scientific' data available on fish, but area where important catch are made by several countries

Objectives of the survey

To characterize **the state of whole ecosystem** for the western English Channel **and monitor its evolution** in the following years

It will be used to identify the key components of this ecosystem, to understand its functioning, and analyze its evolution under environmental and anthropogenic pressures.

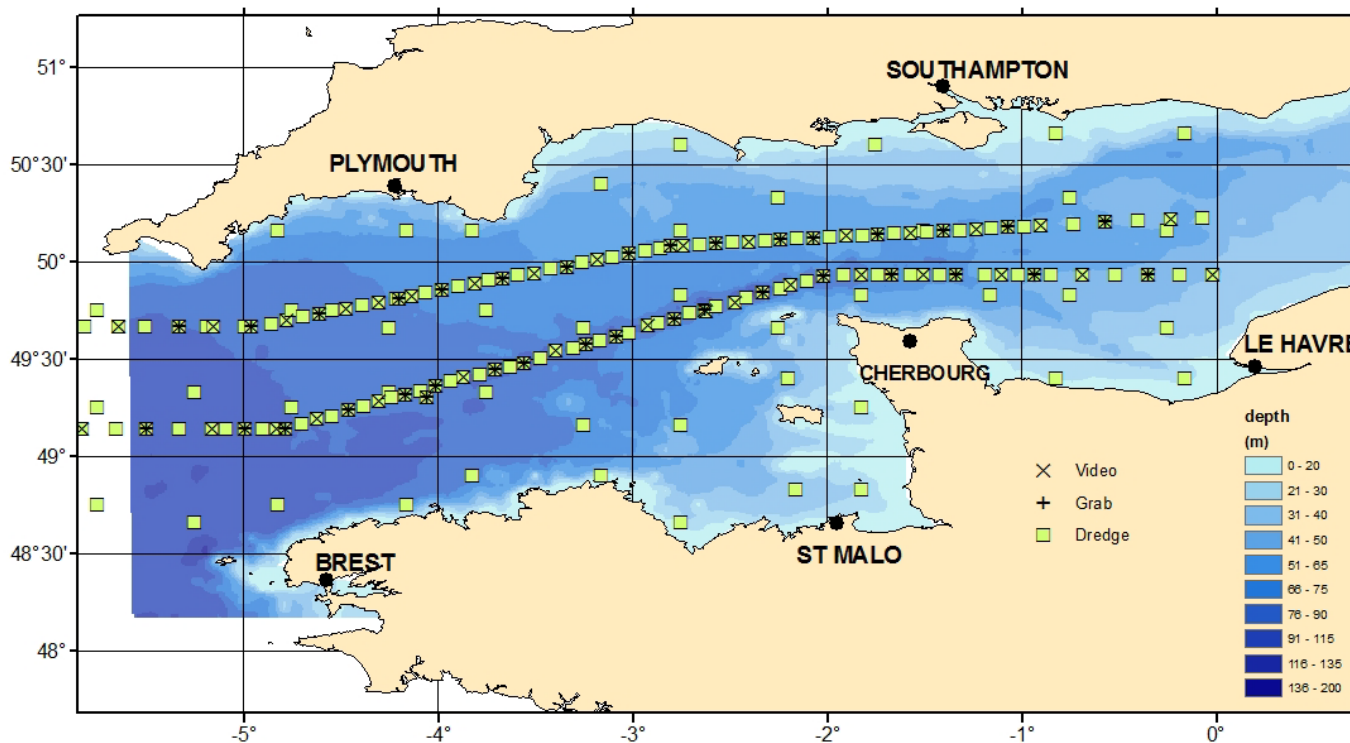
To do so, all biological compartments need to be sampled (benthos, fish plankton, top predators) and the abiotic environment has to be characterized.

First year survey planned in September for zooplankton and larval bloom and fish abundance (large commercial catch at this season) – IBTS protocol

Sampling the benthic community

Using a combination of gears, the sampling of benthos will address 3 objectives :

- To precise the **geomorphology** of the bottom (sedimentology) and the EUNIS typology
- To characterize the **spatial coverage of benthic species** in the western Channel
-> systematic sampling
- To evaluate the **evolution of benthos in the past 40 years** (comparison with the distribution limits observed in the 1970s for species of interest, and analysis of possible link with environmental changes) -> samples along 2 transects

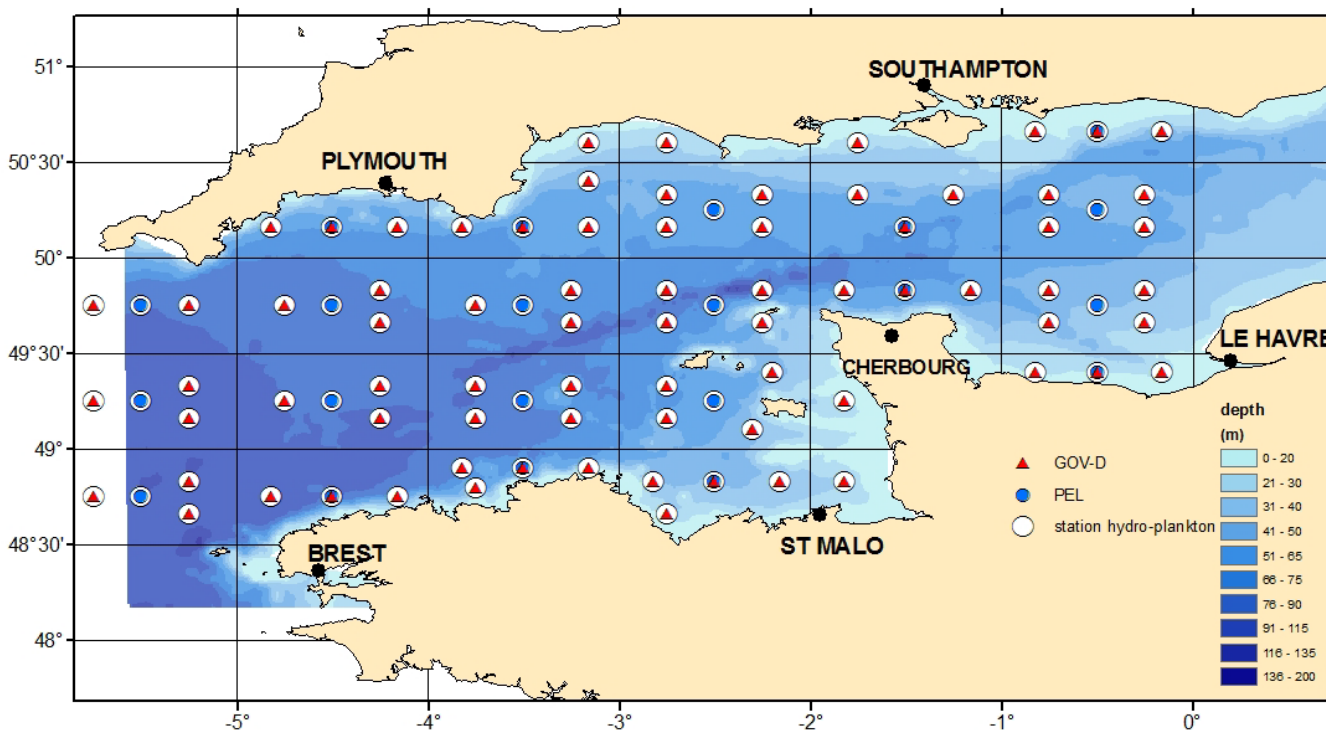


- Ralier du Baty dredge
- Hamon grab
- Megafauna sampled in GOV
- Under water videos

Sampling the fish community

Ifremer

- To assess the **species composition** of the fish community and their **relative abundance** in the western Channel
- To characterize **life history traits** of some species of interest (length distribution, growth parameters, diets ...) -> *cf next slide*
- To characterize the **spatial coverage** of the main species in the western Channel
- To assess their **evolution** years after years and provide some abundance indexes



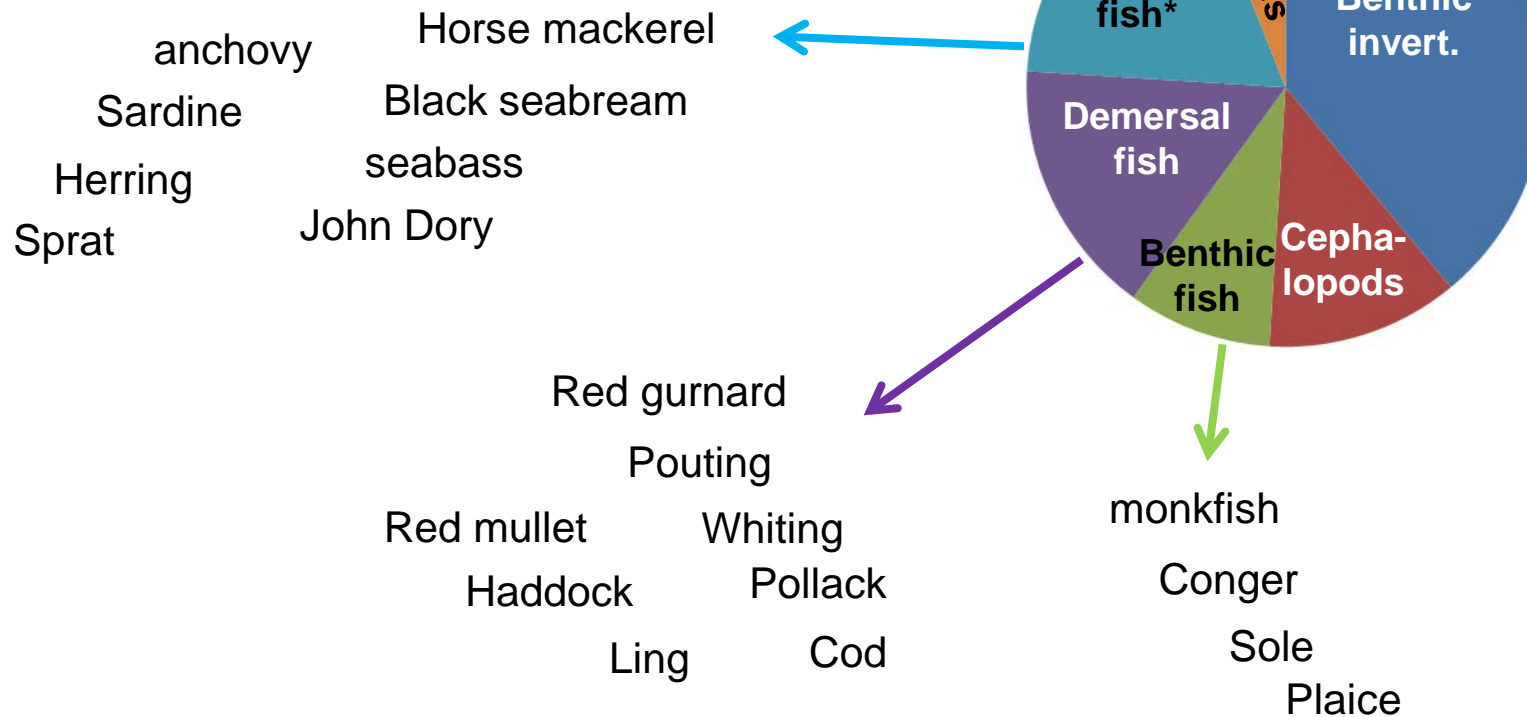
- Systematic sampling using an adapted GOV trawl (with rockhopper)
 - Spatial distribution and abundance indices
- Some pelagic trawls (1 per rectangle) according to acoustic detection
 - Spatial distribution only

Details on fish species of interest (DCF)

Ifremer

For these species, data collection for :

- Size spectrum
- Relation between size, age, maturity
- Stomach content / trophic level



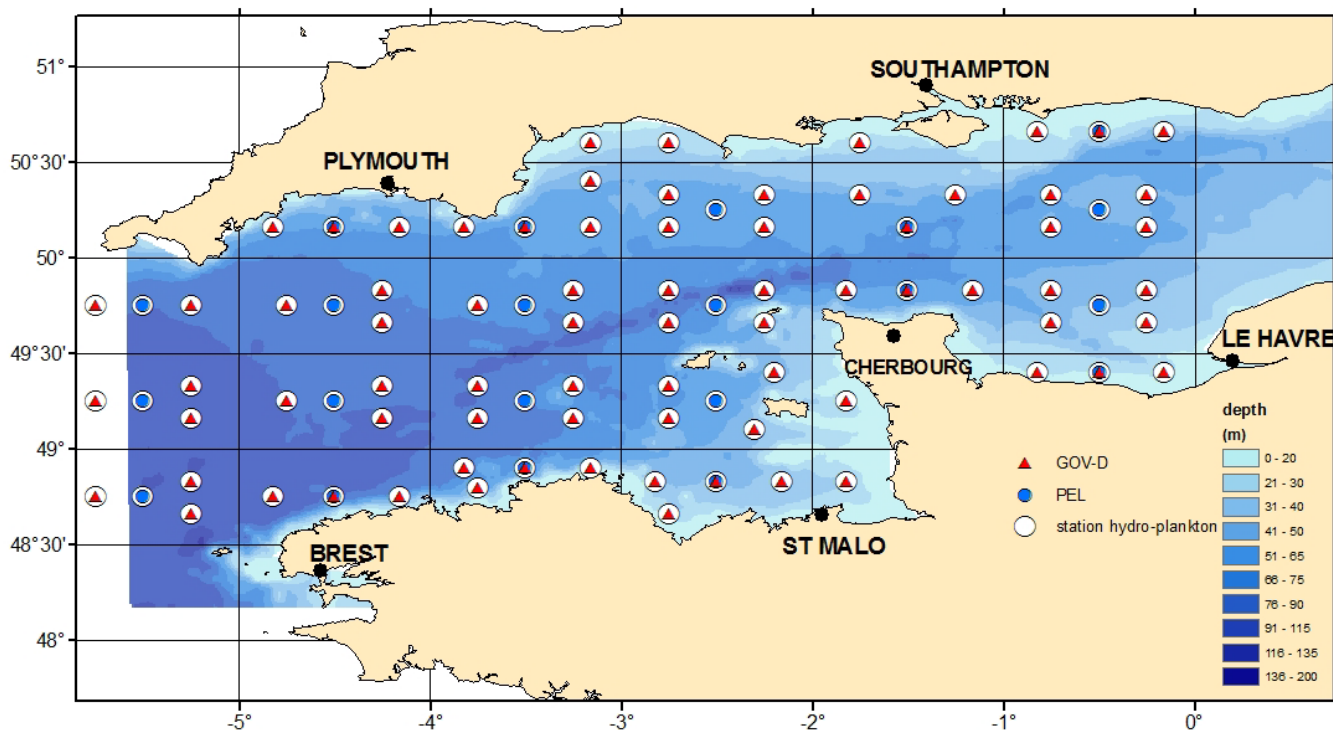
*Catch in september
(2000-2008)
in western channel*

*Proportion of pelagic fish is underestimated

Sampling the plankton and abiotic environment

Ifremer

- To characterize the **abiotic environment**, needed to derived habitat preferences of living components
- To evaluate the importance of **primary production** through phytoplankton abundance and distribution
- To characterize the spatial distribution, the taxonomic composition and the length distribution of the secondary production (**zooplankton**)
- To locate and estimate the importance of **spawning and nursery areas** (eggs and larvae of fish)



Systematic sampling at trawling locations:

- CTD + LOPC
- CUFES (eggs pump)
- Niskin bottle
- Zooplankton net
- Ichthyoplankton net (larval index)
- Acoustic (continuously, for bathymetry, pelagic fish, zooplankton biomass)

Observation of top predators and « food web sampling »

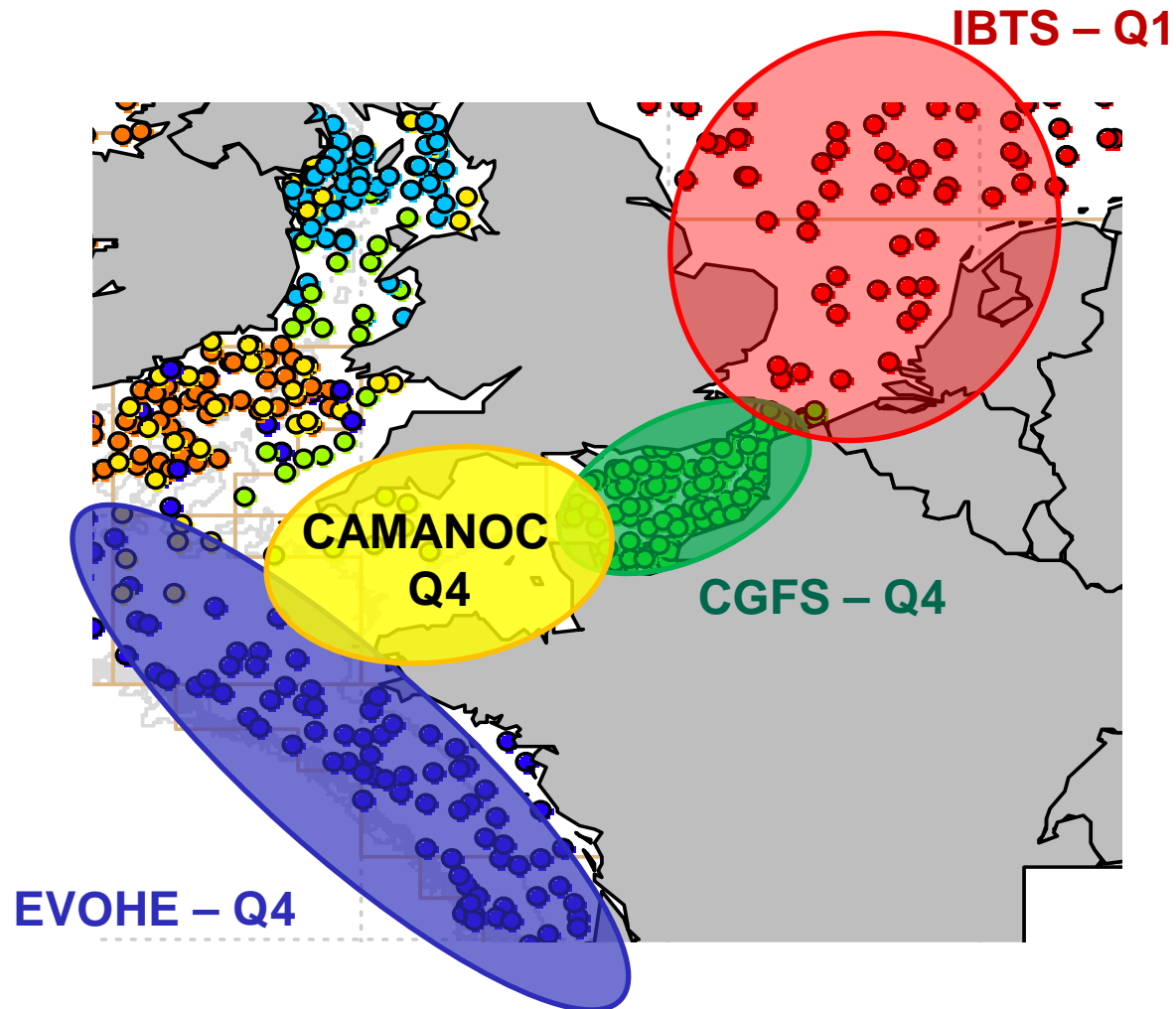
- To estimate the relative abundance and spatial distribution of the **top predators**: marine mammals and birds (providing data to larger groups within the context of Natura 2000)
 - Continuous observation during daylight
- To understand the **food web dynamics** by evaluating the links between predators (mostly fish species of interest) and prey (other fish, ichthyoplankton, zooplankton, phytoplankton, benthos).
 - Sampling and preserving individuals from plankton nets and trawls, to be analyzed latter at lab (possibly through morphology, stomach content, stable isotopes, fatty acids...)

Some details

- Proposal to be (re)submitted in September 2012, following the IBTS sampling protocol
- 1st “complete” survey planned for September 2014 (Q3) : 30 days, all components of the ecosystem will be assessed - > reference point of the ecosystem state
- Every October (Q4) there will be an annual survey: 15 days, it will not include such sampling effort for benthos (only megafauna from the trawl) and will not include pelagic trawl
- **Indices derived from this annual survey may be used in the MSFD, for biological measurement of DCF fish, and as time series develop, they could be used for fish abundance indices in the 7E area for ICES WG.**

Links with other surveys

ifremer



Changes to the Q1 + Q4 Scottish VIa.IBTS and Q3 Scottish VIb.IBTS

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Introduction

The Q1 Scottish VIa IBTS survey has been running since 1981 and up until 2010 this was performed using a repeat station format with the GOV survey trawl together with the west coast groundgear 'C' rig,. Similarly the Q4 Scottish VIa IBTS and Q3 Scottish VIb.IBTS (Rockall haddock) have been running in their present form since 1990 and 1999 respectively, once again using the GOV survey trawl with groundgear 'C' and the fixed station format.

2011 heralded the start of a new randomised stratified survey design in both these areas replacing the previous repeat station survey format consisting of the same series of survey trawl positions being sampled at approximately the same temporal period every year. A move towards some sort of random stratified survey design was therefore judged necessary. The largest obstacle preventing an earlier move to a more randomised survey design was the lack of confidence in the 'C' rig to tackle the potentially hard substrates that a new randomised survey was likely to encounter in both these areas. The first step in the process of modifying the survey was therefore to design a new groundgear that would be capable of tackling such challenging terrain. The modifications made to the trawl configuration are thus summarised below.

Groundgear

All three surveys were undertaken using the standard GOV research trawl but with a modified groundgear more suited to the hard and often undulating topography encountered within ICES subareas VIa and VIb. This gear consisted of 530mm, 450mm and 350mm rubber wheel bobbins with 15m x 150mm rubber leg sections along each wing. Despite the large bobbins present in the 'C' rig it consistently failed to provide adequate protection to the trawl on harder ground – especially in the wing sections - and in 2006 the search began to find a new replacement rockhopper rig for the west coast - groundgear 'D'. The configuration selected was that already being used by Ireland in VIa during their quarter 4 groundfish survey and consists of 400mm hoppers discs in the centre reducing to 350mm discs at the quarters and then 300mm discs out to the wingends. Instead of being attached to the groundgear using toggle chains – as was the case with 'C' - the footrope is lashed directly to the groundgear using a series of steel rings. This gear has been used during a number of gear trials and throughout has proved robust and reliable. See figure 1.

Wire Sweep Rig

The Rockall survey is conducted exclusively in depths greater than 100m whereas on the Scottish West Coast surveys approximately 80% of tows are

made in depths deeper than 80m. Historically, only 60m sweeps were used throughout, during all Scottish western surveys, despite the IBTS recommendation that for trawls conducted in depths deeper than 70m that the 110m sweep rig be used. From 2011, the new configuration - in an effort to maintain net geometry parameters (wingend spread & headline height) and ground gear bottom contact – will utilise both 60m and 110m sweep rigs. Although the IBTS recommends 70m as the cutoff for changing the sweep length the new survey will aim to standardise with the current Irish Groundfish survey and adopt the cut off for deploying the long sweep rig on trawls in depths in excess of 80m in both ICES subareas VIa and VIb.

GOV Trawl

No modifications have been made to the GOV trawl frame ropes nor the mesh sizes used in the different netting panel sections. The only alteration from the previous trawl design is the incorporation of tearing strips and guard meshes constructed from 5mm high tenacity double braided polyethylene twine. The mesh sizes of the double netting panels corresponded to the mesh sizes being replaced. To maintain consistency with the old netting the overall dimensions of the double netting panels, tearing strips and guard panels were determined by stretched length and not mesh counts. Double netting has also been inserted into upper/lower wing tips, 6 mesh deep guard inserted into upper/lower 1st wing sections, 1st belly section, 2nd belly section tearing strip and 5 mesh deep headline guard. See figure 1.

This strengthening of the netting in the panels around the fishing line coupled with the other modifications made to both groundgear and sweep rig afford the GOV the best possible chance of being able to complete a comprehensively stratified and random bottom trawl survey that will aim to sample all fishable areas within ICES Subarea VIa/VIb.

Figure 1. GOV lower wingend showing 5mm double PE guard netting and Ground gear D hoppers



MSS West Coast, and Rockall Survey designs

ICES Subarea VIa, West Coast Q1 and Q4 surveys

Stratification

ScoGFS-WIBTS-Q1 is primarily a juvenile gadoid survey. In the design phase for this survey, the focus was on demersal species: cod, haddock, whiting, saithe and hake.

Abundance data for these species in the period 1999–2010 were analysed. In addition, data from a charter survey which was conducted in the first quarter of 2010 were analysed (however, no hake data were available for this survey). This gadoid survey was completed on charter vessels using a non-standard rockhopper gear and was intended to complement the ScoGFS-WIBTS-Q1 survey carried out within the same temporal period and geographical area. Similar to the ScoGFS-WIBTS-Q1 survey, the design of ScoGFS-WIBTS-Q4 was aimed at using data for the five main demersal species. In this case, data for the period 1996–2010 were used.

All fish densities in either ScoGFS-WIBTS-Q1 (complemented with the 2010 charter data) or in ScoGFS-WIBTS-Q4 were standardised (they were given as log numbers per 30 minutes). To account for year-to-year differences in abundance, these densities were then expressed in relation to the average density for a given species/size group and in a given survey/year. As a result, maps of average distribution could be generated for the five demersal species based on the historical data.

Tentative *K*-means clustering of density data was carried out with four clusters, separately for each of the two surveys. The resulting clusters for ScoGFS-WIBTS-Q1 are shown in Figure 1. Species/size class composition for each cluster is displayed in the barplot in Figure 2.

A brief description of the four clusters follows (see also species/size class composition by haul in Figure 3):

Cluster 1 (red): generally deeper waters, much less small fish (particularly whiting), a bit of medium/big fish (mainly hake).

Cluster 2 (green): more fish than in Cluster 1 (mainly whiting and haddock), but small fish are still less than the average.

Cluster 3 (blue): more small fish (particularly whiting), less big fish.

Cluster 4 (light blue): more small whiting (but less than in Cluster 3), considerably less haddock and markedly more hake (small/medium) than in other strata.

The inverse distance weighting (IDW) was used to interpolate fish density at any position in the 2'x2' grid. In this method, estimates of an attribute are made based on values at nearby locations weighted by distance from the interpolation location. The weights λ_i are given by

$$\lambda_i = \frac{1/d_i^p}{\sum_{i=1}^n 1/d_i^p}$$

where d_i is the distance between x_0 (interpolation location) and x_i , p is a power parameter and n is the number of sampled points used for the estimation (Shepard, 1968). With the present data, the choice of power parameter and neighbourhood size was based on the results of cross-validation. In this procedure, each haul was excluded in turn to determine how accurate the prediction was, given the remaining observations. Some optimal values for the minimum distance and for the parameter p in IDW could thus be determined, which minimised the error of prediction. These values were used to calculate the mean density for each cell in the grid.

Subsequently, K -means clustering was applied to all grid cells (except those in the protected areas shown in Figure 1), again with four clusters as a result. The optimal parameter values from the cross-validation were not very effective here as they tended to generate patchy/irregular shapes, which was undesirable for the purpose of stratification. However, choosing some sub-optimal values resulted in satisfactorily smooth shapes. The selected values for these parameters were 25 nm for the minimum distance and 0.80 for the power parameter p . These could be interpreted roughly as the maximum distance over which an individual sample is allowed to influence the surrounding ones and as an indication of smooth peaks (with $0 < p < 1$) over the interpolated points. The final strata separation for ScoGFS-WIBTS-Q1 is shown in Figure 4.

Allocation of sampling effort

In the process of effort allocation, each individual polygon in Figure 4 was treated separately (for instance “red1”, “red2” and “red3” rather than just “red”) and all these polygons are further referred to as “strata”.

To maximise the precision of the fish density estimate for the total survey area, survey effort was allocated among strata in such a way that the proportion of the samples in each stratum (n_i/n) was given by

$$n_i/n = \frac{A_i s_i}{\sum_{i=1}^S A_i s_i}$$

where A_i = area (m^2) of stratum i , s_i = standard deviation within stratum i , S = number of strata (Gunderson, 1993). Thus, more sampling effort was allocated to bigger strata and those with a higher within-stratum variance. The selection of stations was carried out randomly in each stratum (given the number of hauls per stratum), and with the constraint that the minimum distance between two nearest stations was less than 10 nm. This ensured that (a) each possible sample point had an equal chance of being selected; and (b) that there was an even coverage of samples throughout the strata (avoiding clustering of samples and concomitant large open spaces without samples).

ICES Subarea VIb, Rockall Haddock survey – Q3

Stratification

The ScoGFS-Q3 Scottish VIb.IBTS is primarily a juvenile haddock survey. After completing the survey in 2009, it was recognised that there was a need to include areas with high haddock densities not covered by the survey. Those high densities were found in deeper waters during the monkfish survey in quarter 2 in the Rockall area. Since apparently some significant parts of the stock were not sampled during the haddock survey, the resulting abundance index were likely to have been biased.

Figure 5 shows the recorded haddock numbers per 30 minutes trawling by size class vs. depth, in the haddock and monkfish surveys in 2009. From the maps with the monkfish survey (Figure 6), it can be seen that there were significant haddock numbers beyond the 200 m isobath, in a few cases, even beyond 300 m. For many age groups in the haddock survey, the 200–240 m depth was clearly not the upper limit of their distribution.

The precision of the survey was increased through stratification. With haddock being caught between 140 and 400 m, it was possible to divide the fished area into depth strata. To keep the density homogenous and the intra-stratum variance low, five strata were selected based on depth. The upper limit of the last stratum was first set to 470 m (Figure 7), but this is likely to be reviewed as the survey progresses.

Allocation of sampling effort

With regard to how to allocate sampling effort between strata, the information from previous surveys were of limited value as the distribution of haddock (of different age groups) at Rockall is not exactly the same every year.

Initially, equal (or almost equal) number of hauls to each stratum were considered. With about 40 hauls per trip (as has been the case in the previous Rockall haddock surveys), it would have been possible to allocate eight hauls to each stratum with five strata. However, it was agreed that there was enough information to avoid allocating the same number of samples to each stratum and that one should use approximate multiples of sampling intensity allocated according to abundance in each stratum. As estimated from the existing survey data and also the Rockall monkfish survey data. Sampling intensity was thus modified with k samples per unit area in low density strata, $k*2$ samples per unit area in medium density strata and $k*3$ in high. The proportion of the samples in each stratum (n_i/n) was given by

$$n_i/n = \frac{A_i m_i}{\sum_{i=1}^S A_i m_i}$$

where A_i = area (m^2) of stratum i , m_i = number samples per unit area within stratum i (with $m_1 = 1$, $m_2 = 2$, $m_3 = 3$, $m_4 = 2$, $m_5 = 1$), S = number of strata.

After considering the data available, it was agreed that:

- Sampling should be split across five depth strata
- Overall sampling total should reflect previous coverage

- Sampling intensity per stratum should reflect the density of fish in each stratum
- Within strata, the samples were chosen at random within strips of equal area. This ensures that (a) each possible sample point has an equal chance of being selected; and (b) that there is an even coverage of samples throughout the strata (avoiding clustering of samples and concomitant large open spaces without samples).

On agreeing the above points, the sampling schedule for the first survey should have been (in 2011):

Strata Depth range (m) number of stations

1	0–140	2
2	140–200	13
3	200–250	11
4	250–350	9
5	350–470	6

Index calculation

Within the MSS Fisheries Management Database (FMD), numbers at length (the length frequencies LF) per haul are standardised to numbers per one hour towing. In previous years, all otoliths from all hauls in a given demersal sampling area were combined to create an age length key (ALK) for that area (Holmes, 2008). With the new design, all otoliths taken within each of the six strata are combined to form an ALK. This ALK is applied to all LFs in the stratum individually to produce age frequencies for each haul. Finally, for each stratum the age frequencies are summed, the values divided by the number of valid hauls and the results multiplied by ten. This procedure can be summarised as

$$CPUE_{i,a} = \frac{\sum_{h=1}^{H_i} \sum_{l=l_{\min}}^{l_{\max}} N_{a,l,h} \times 10}{H_i}$$

where $N_{a,l,h}$ is the number of fish at age a and length l caught during haul h , H_i is the number of valid hauls in stratum i and $CPUE_{i,a}$ is the catch per unit effort of fish at age a in stratum i .

For each age, the age frequency for each stratum is raised by the number of valid hauls in the area. These raised frequencies are then summed and the result divided by the total number of valid hauls in the assessment region. The final index value for each age is given by:

$$I_a = \frac{\sum_{i=1}^S (CPUE_{i,a} \times A_i)}{\sum_{i=1}^S A_i}$$

where A_i = area (m^2) of stratum i and S = number of strata. The same procedure as described above was applied to the ScoGFS-WIBTS-Q1, ScoGFS-WIBTS-Q4 and Rockall haddock survey data in 2011.

References

- Gunderson, D. R. 1993. *Surveys of Fisheries Resources*. John Wiley & Sons, Inc. New York, 248 pp.
- Holmes, S. J. 2008. ROAME MF0170: Alternative Survey Index Estimation. FRS Production of Scottish West Coast Survey Indices. Fisheries Research Services Internal Report No 10/08.
- Shepard, D. 1968. A two-dimensional interpolation function for irregularly-spaced data. *Proceedings of the 1968 ACM National Conference*, 517–524.

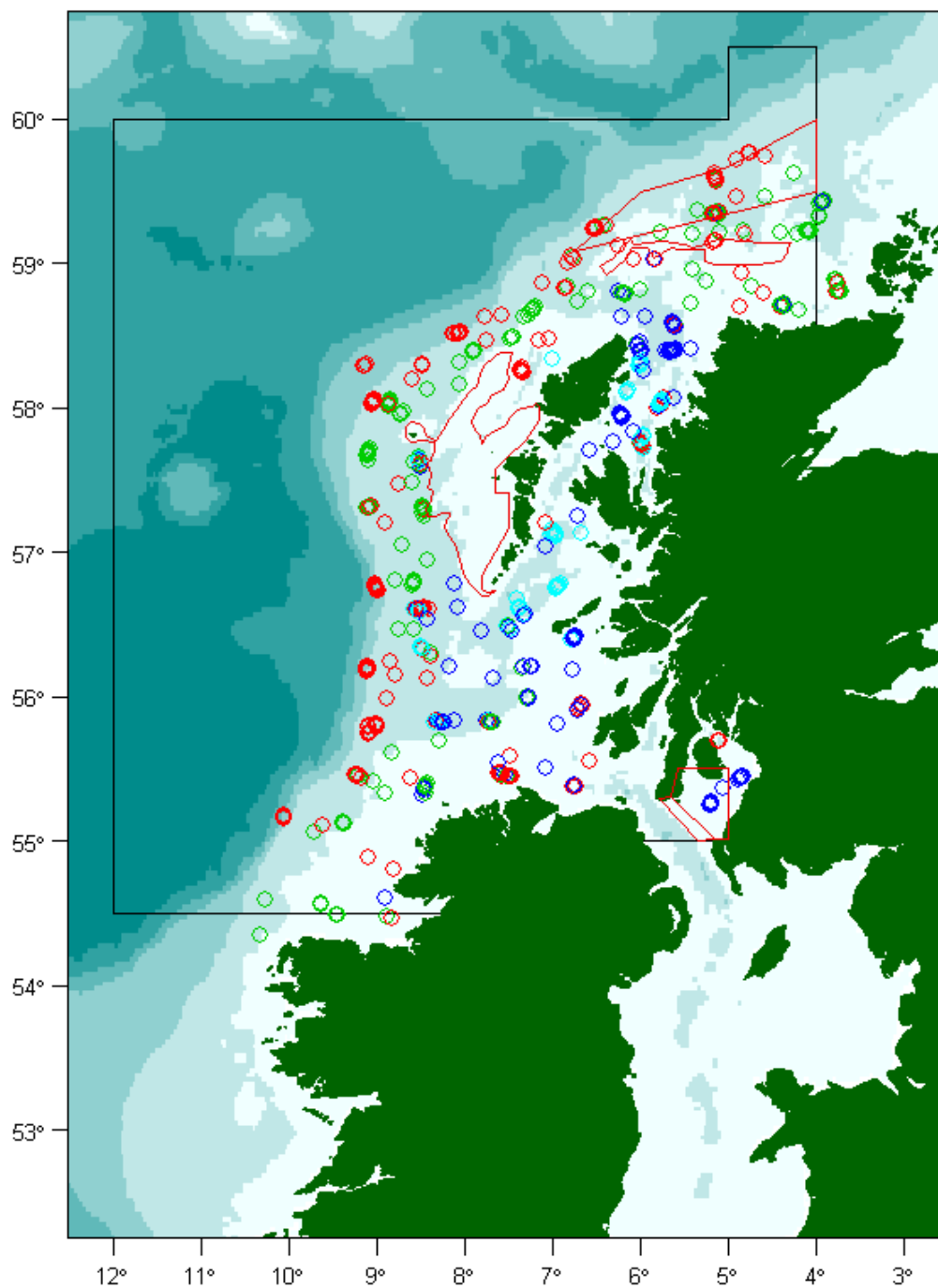


Figure 1. Distribution of hauls in ScoGFS-WIBTS-Q1 in the years 1999–2010 (only hauls within or at the boundaries of Division VIa) and during the 2010 charter survey. All the hauls are grouped into four clusters (red, green, blue and light blue) reflecting the species/size class composition (only the main demersal species: whiting, haddock, hake, cod and saithe). The protected areas are marked with a red line.

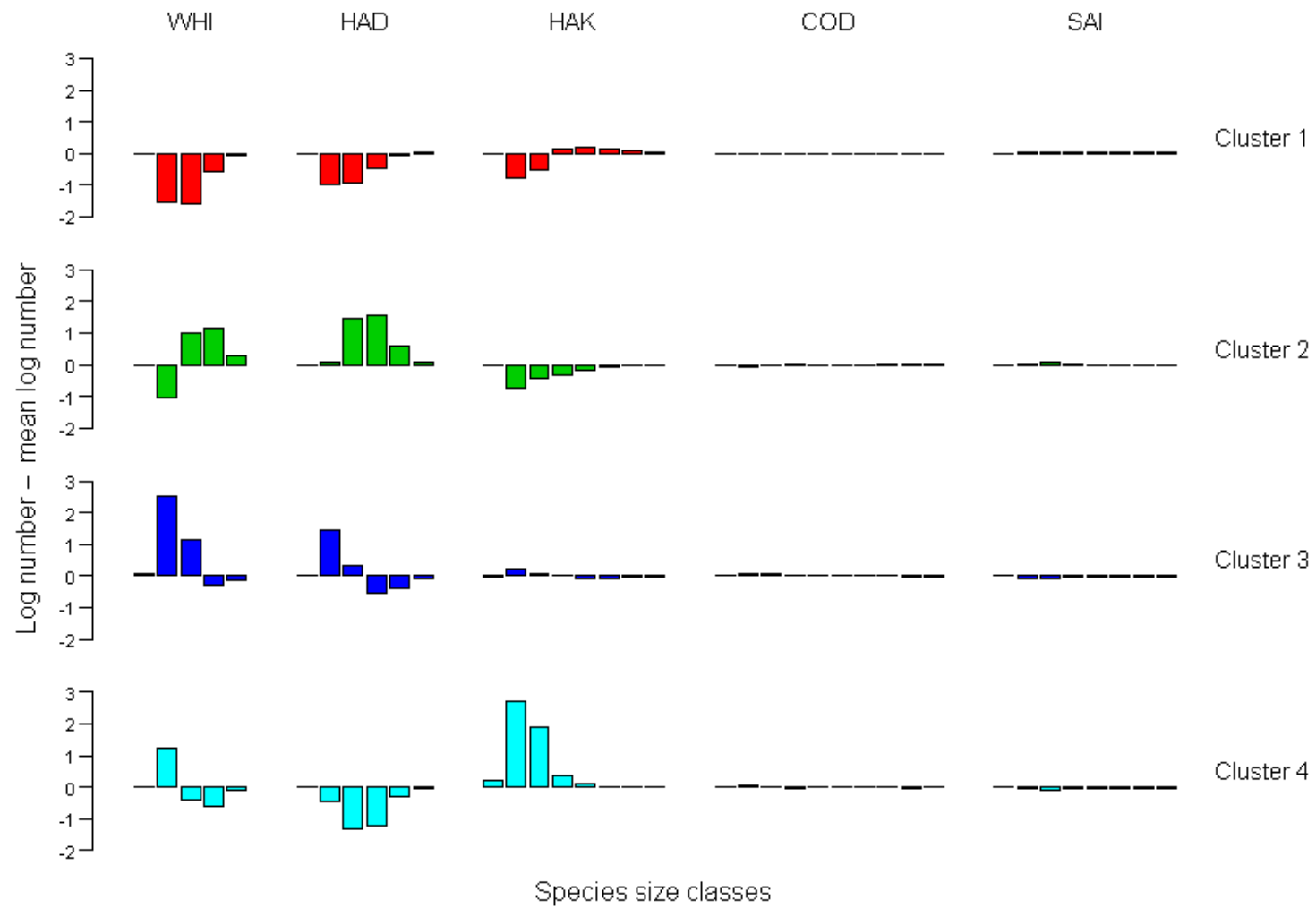


Figure 2. Species/size class abundance by cluster.

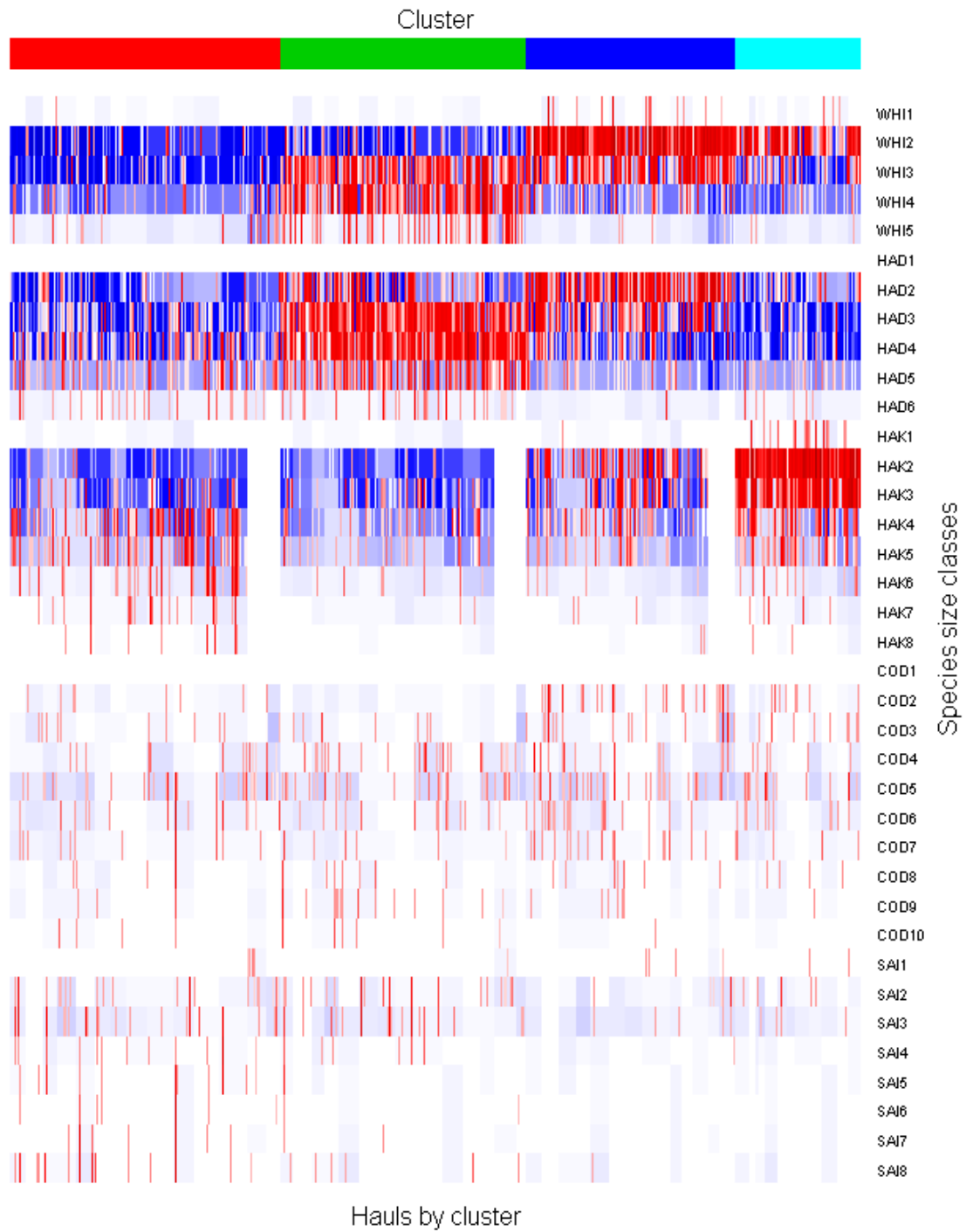


Figure 3. Species/size class abundance by haul and cluster (with low abundances in blue and high abundances in red).

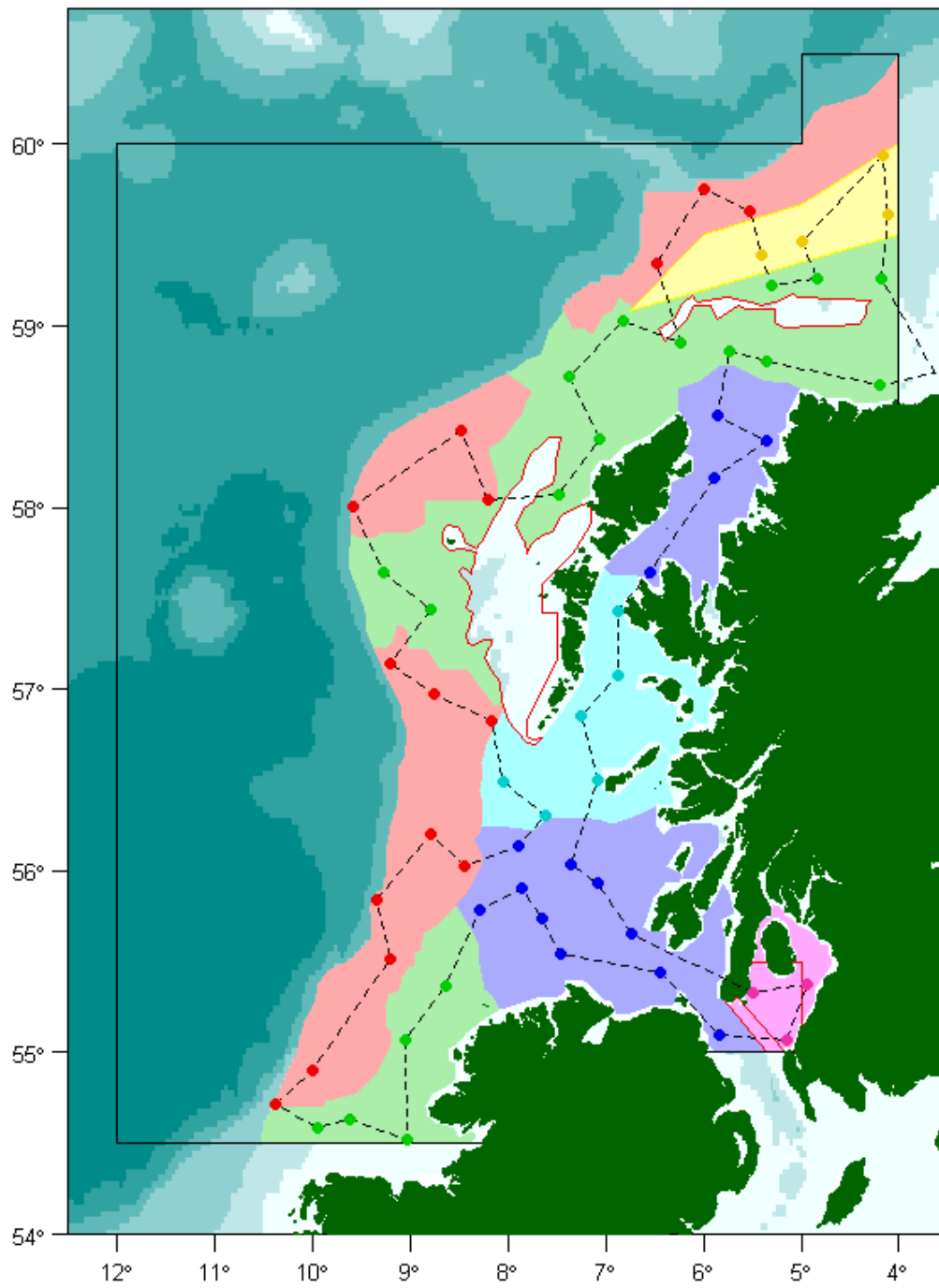


Figure 4. Allocation of sampling effort among strata with the optimised route for ScoGFS-WIBTS-Q1 in 2011.

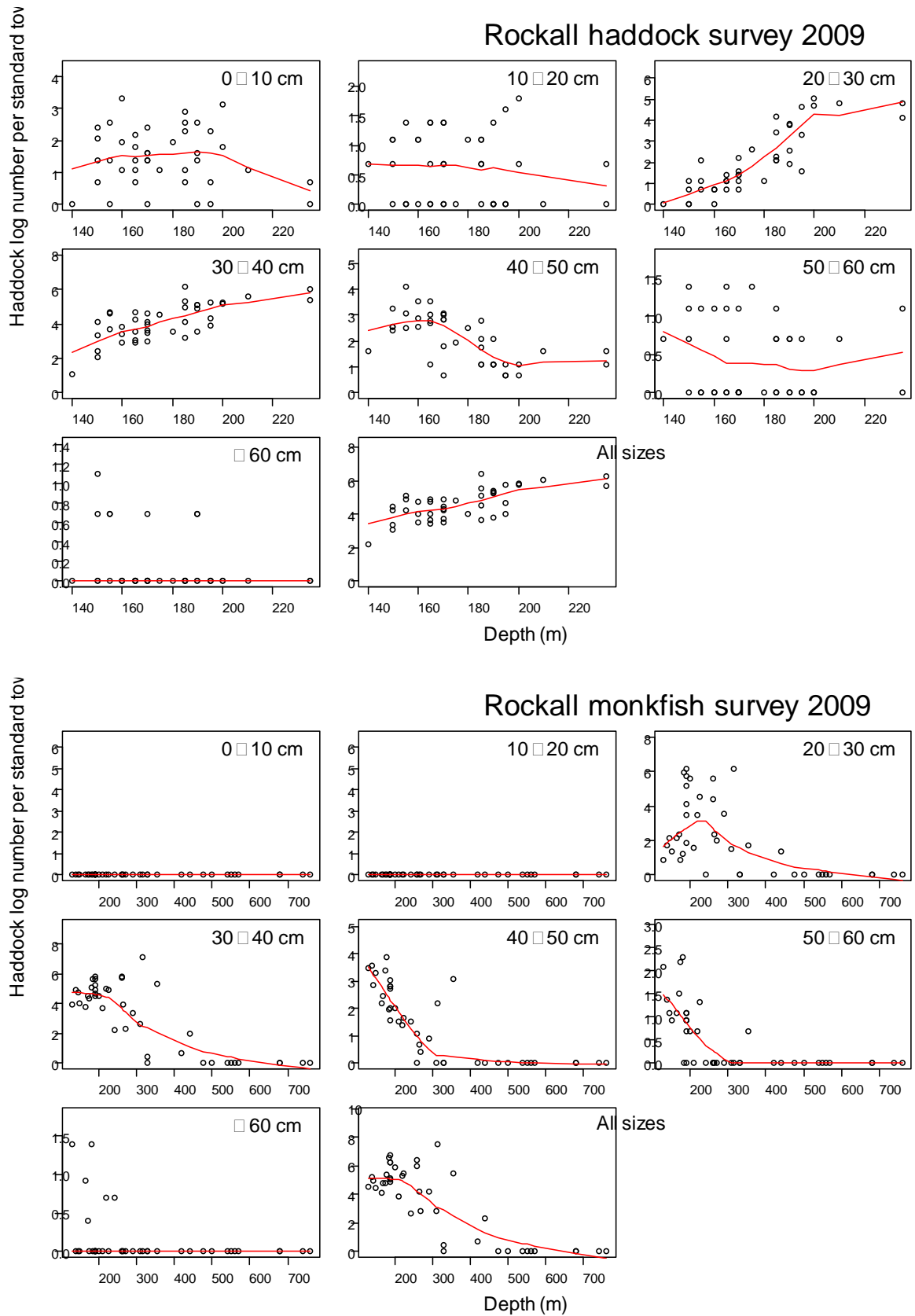


Figure 5. Haddock abundance (number per standard haul of 30 minutes) by size class vs. depth in the Rockall haddock survey (upper panel) and in the Rockall monkfish survey (lower panel) in 2009.

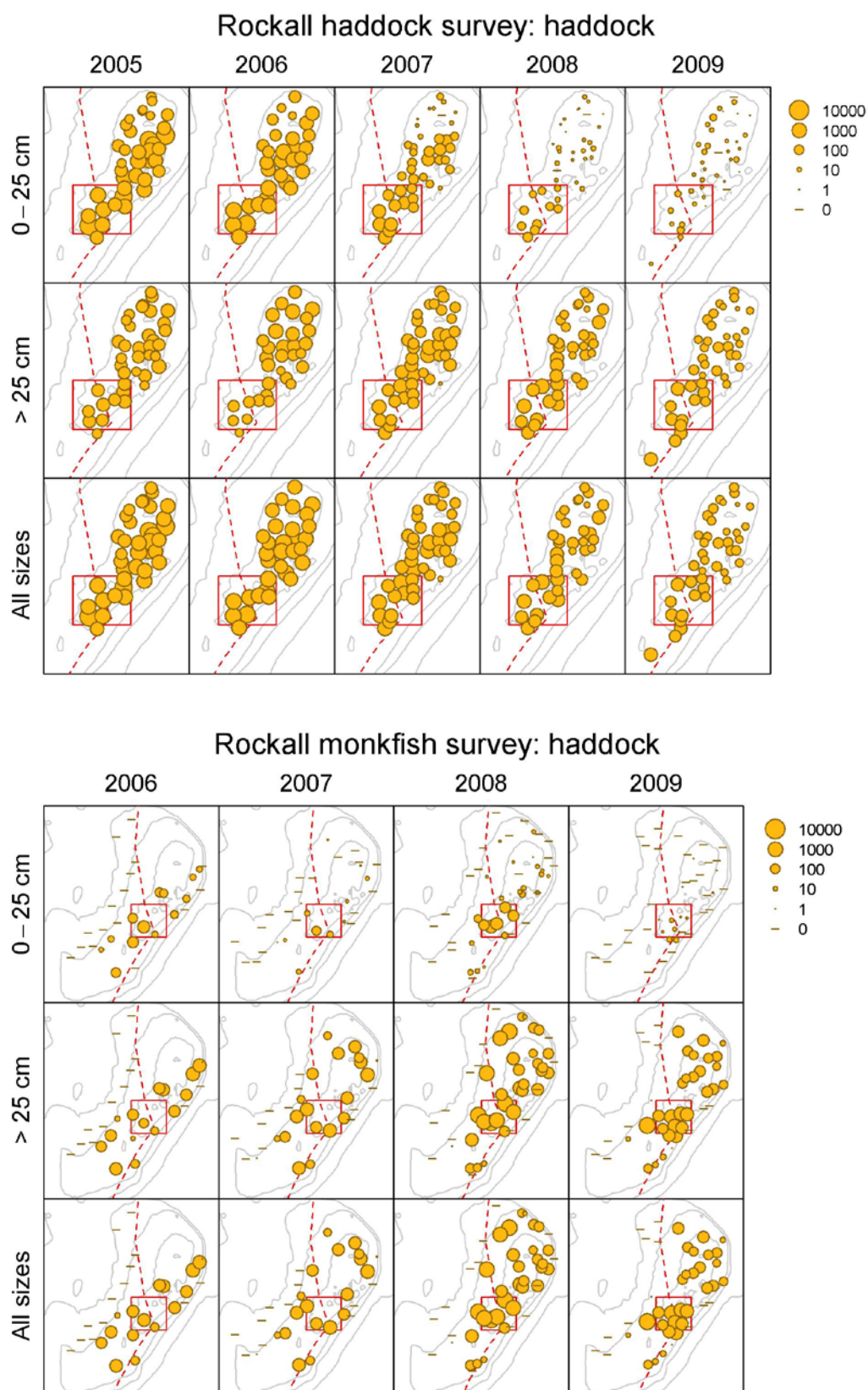


Figure 6. Haddock distribution (number per standard haul of 30 minutes) by size class in the Rockall haddock survey in 2005–2009 (upper panel) and in the Rockall monkfish survey in 2006–2009 (lower panel). The Rockall haddock box is shown as a red rectangle. The EU boundary is marked with a dash line.

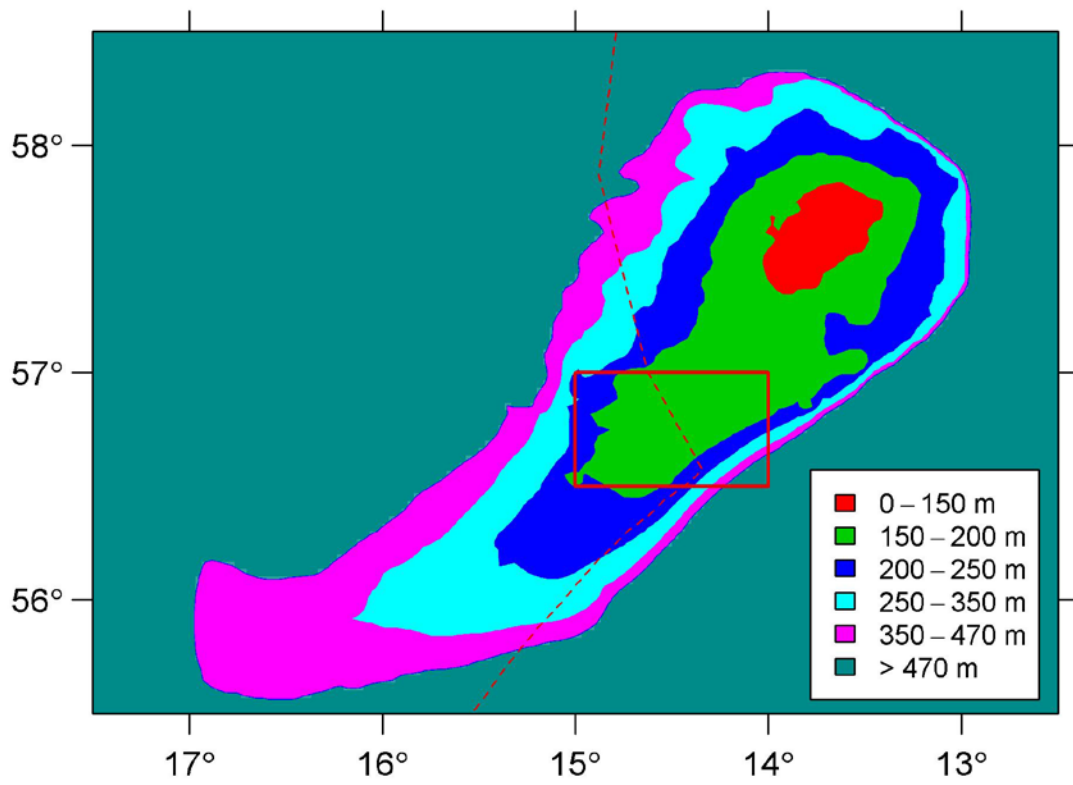


Figure 7. Five strata in the new Rockall survey design.

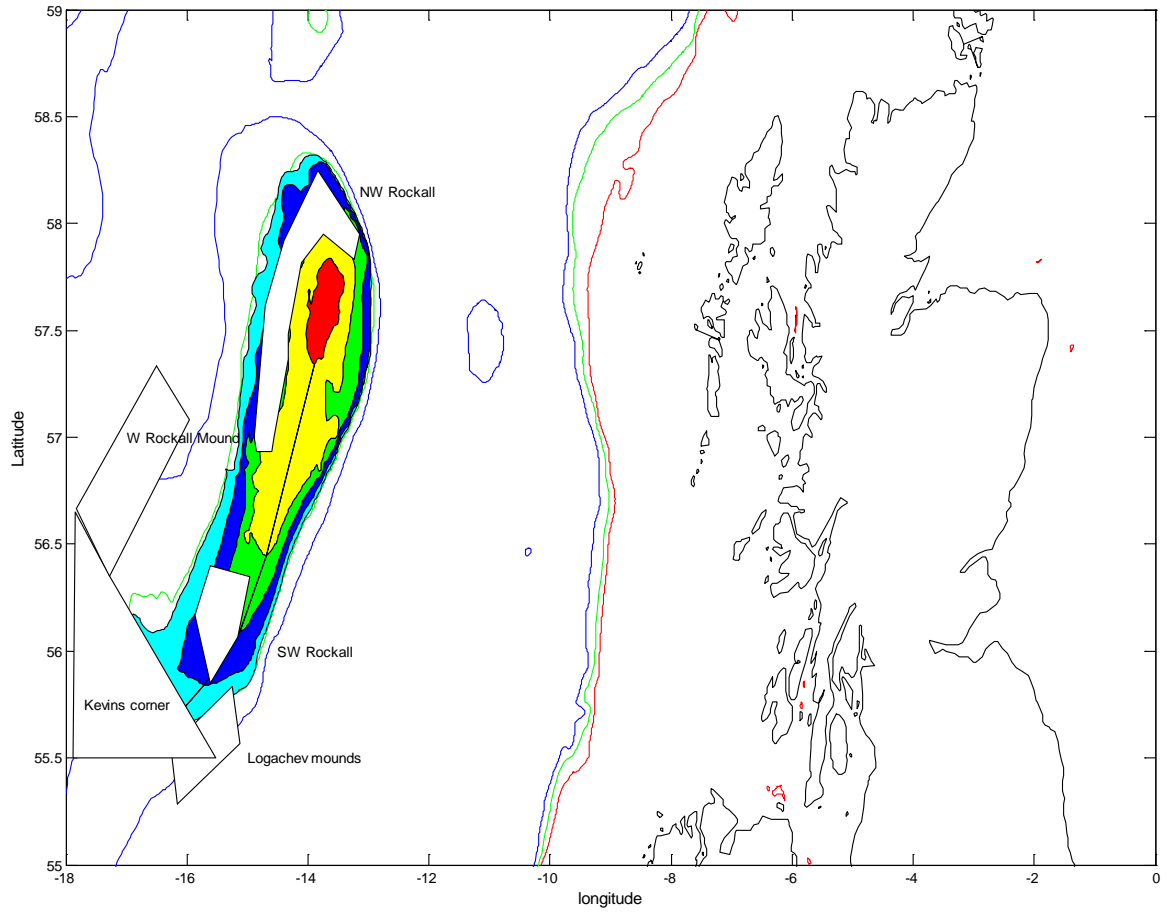


Figure 8. Protected areas on the Rockall Bank.

Catch comparison trials to assess the effect of a rockhopper ground gear on the catches of the Scottish GOV survey trawl.

By

RJ Kynoch, F Burns & A Edridge

Materials & Methods

Sea trials

Two comparative surveys were carried out on Marine Scotland Science (MSS) survey vessel FRV Scotia (LOA 68.6m). This is the standard survey platform used by Scotland to conduct its annual International Bottom Trawl Surveys (IBTS). The first of these was completed during May 2006 and was undertaken exclusively on the Rockall plateau in ICES Subarea VIb. The second survey ran from 23 October until 3 November 2009 with hauls being completed around the Shetland and Orkney Islands in ICES Subarea IVa. Trawl depths encountered during the first comparative survey at Rockall ranged from 137m to 191m and during the second survey the depth range was 69m to 140m. Scanmar acoustic instrumentation was used during every haul to check gear geometry and a self-recording sensor rigged at the midpoint of the ground gear monitored bottom contact. For both surveys towing speed and warp ratios were as per standard survey protocols for Scottish IBTS surveys.

Description of trawl gear

Two similar GOV (Grand Opening vertical) 36/47 trawls supplied by the MSS Netstore were used during both cruises (Figure 1). One trawl was rigged with a 45.7m bobbin ground gear (C rig) which has been the standard groundgear for Scottish surveys covering ICES Areas VIa and VIb since 1985. The ground gear incorporates rubber wheel bobbins in the bosom/quarter sections and then 3 x 5m rubber disc sections out the wingends (Figure 2). The other trawl was rigged with the new rockhopper ground gear (D rig), which incorporates rockhopper disc's along its 46m length (Figure 3). Sweepline and otterboard rig were the same for both trawls (Figure 4). Headline uplift was provided by an "Exocet" kite (0.85m x 0.85m) together with 60 x 200mm diameter plastic floats. Assuming a static uplift of 2.47kg each the floats provide a total buoyancy of 148.2kg. The trawl rigged with C rig (control) was worked from the vessels lower net drum and the other trawl with D rig (test) worked from the upper net drum.

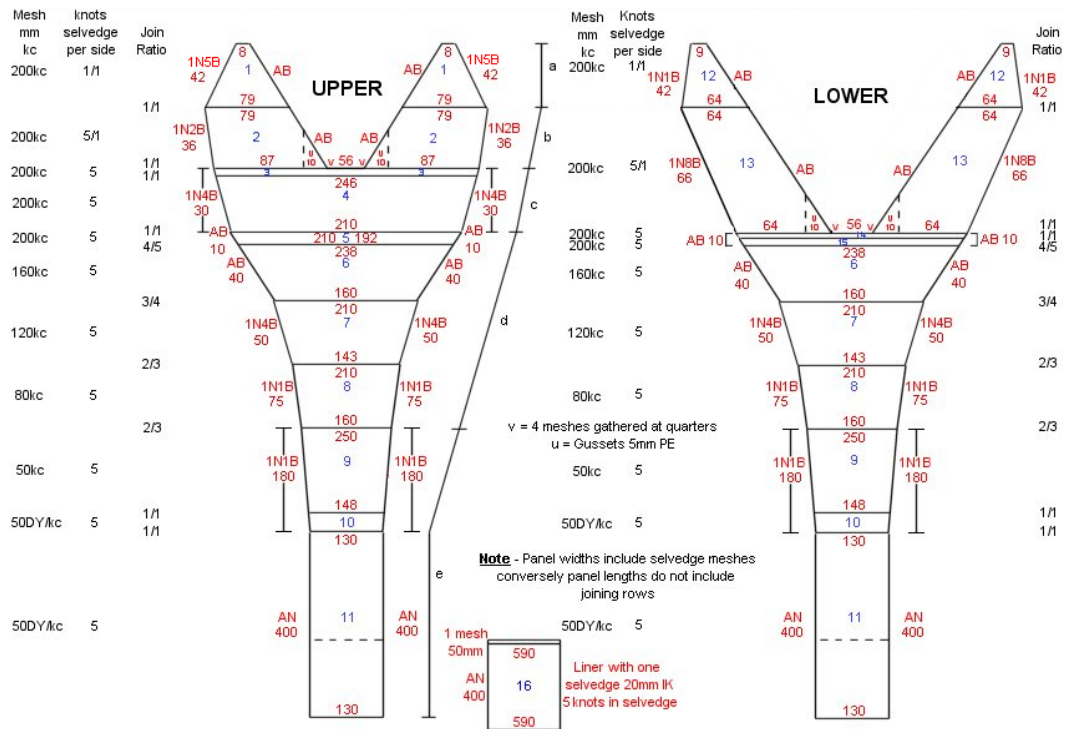


Figure 1 – GOV survey trawl.

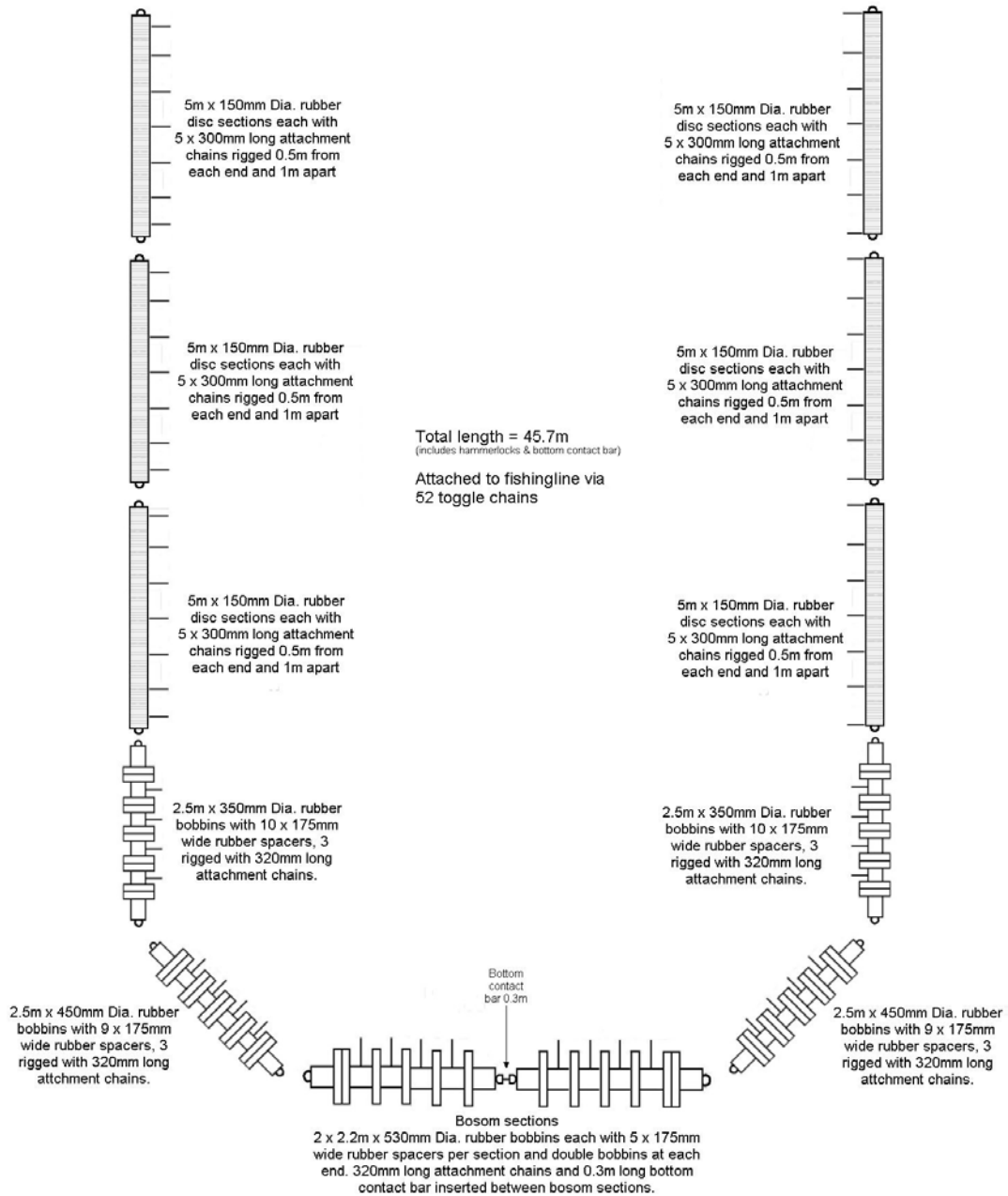


Figure 2 – Bobbin ground gear rig C.

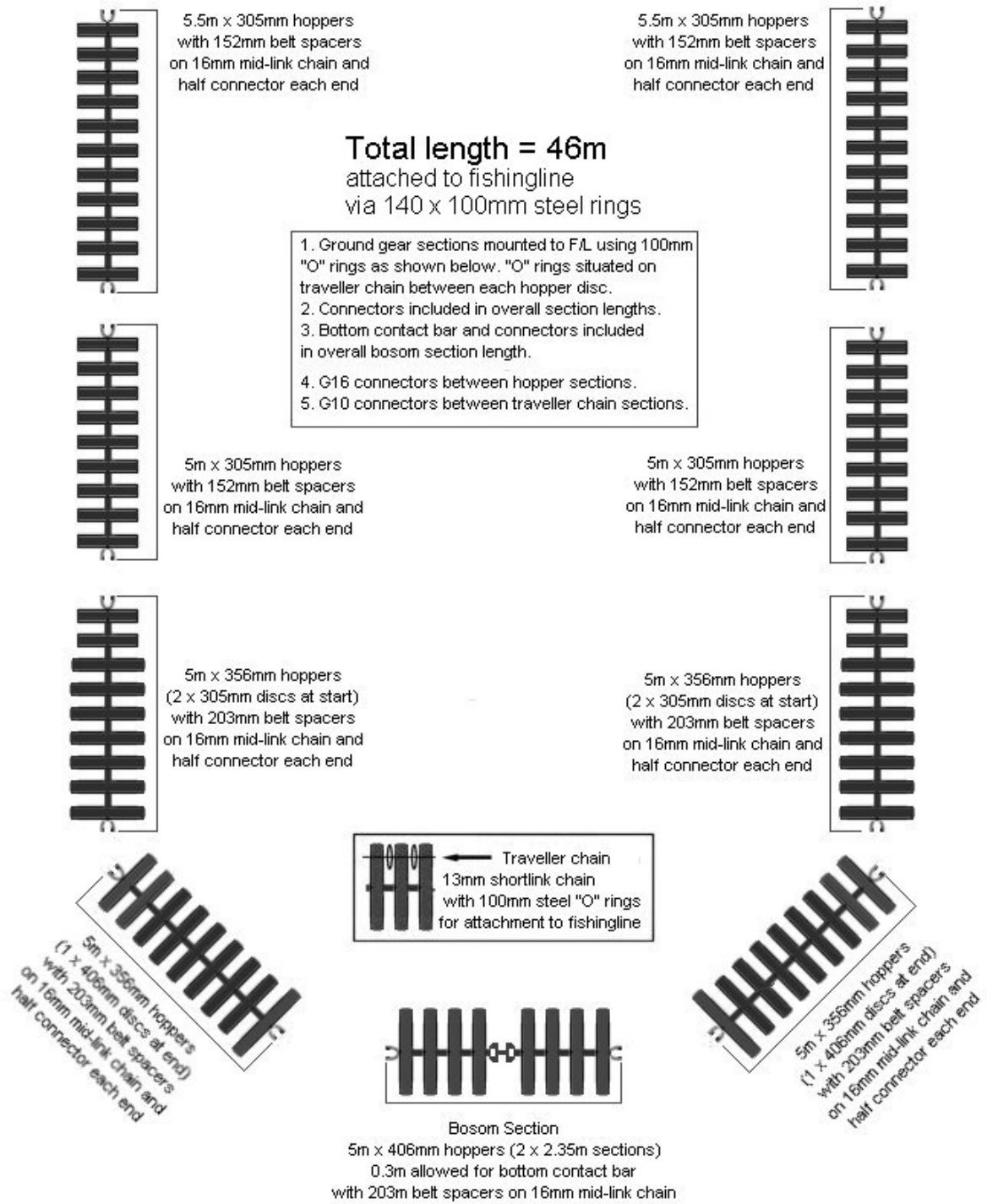


Figure 3 - Rockhopper ground gear rig D.

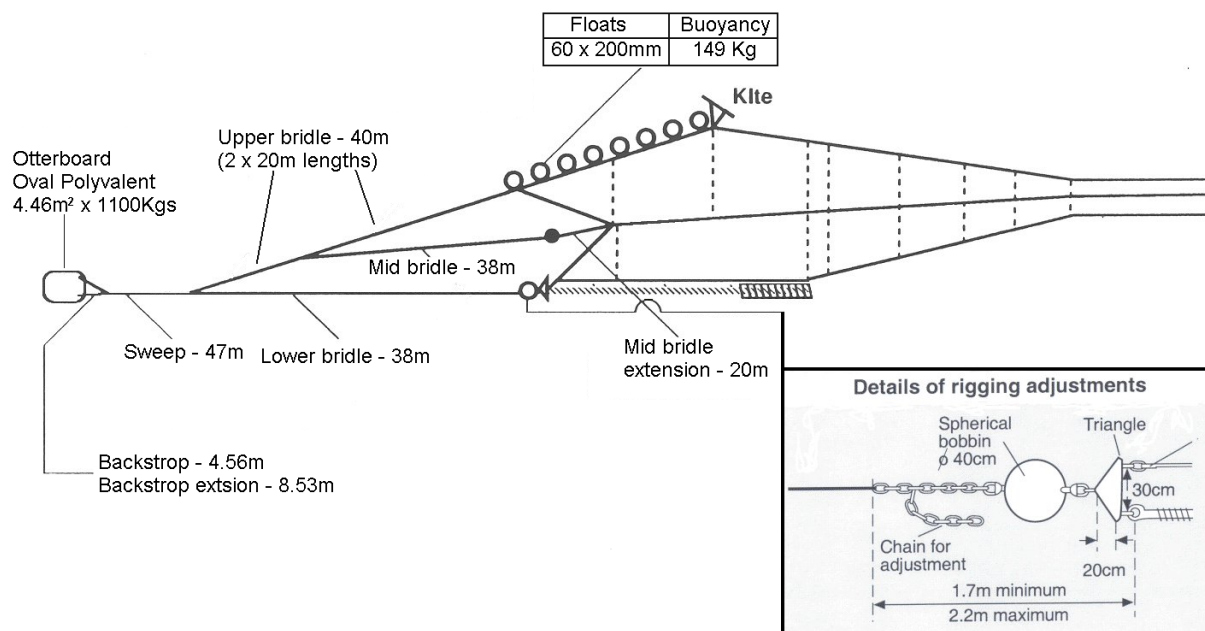


Figure 4 – Otterboard, flotation and sweepline wire rig for D and C gears.

Experimental design

For the first survey at Rockall the haul procedure was the same throughout the trials and consisted of paired hauls of 30 minute duration (as per standard survey protocols). After completion of the first haul the vessel immediately steamed back to the start position (and made the second haul 50-95 minutes from knockout to block-up) down the same fishing track. To minimise bias the order of deployment was alternated so both gears were fished either first or second (CvD or DvC). During the cruise a number of paired hauls were made using the same ground gear (CvC or DvD) to assess potential differences in fish catch rates between the first and second gears due to trawl disturbance.

During the second cruise in 2009 a similar paired haul procedure was followed. The time from ending the first haul and blocking up the second haul ranged from 38 to 98 minutes. Due to the limited number of days and the results obtained from the previous survey only paired hauls were made to test the difference between the two ground gear rigs (CvD and DvC), no hauls were made to test for trawl disturbance.

Catch handling

The catches were handled in the same consistent manner during both surveys. After each haul the total catch was sorted into individual species and then weighed. All species were then measured to the nearest 1.0 cm below. When large catches of a particular species were encountered a random sub-sample was then measured and raised to the total number caught in the codend.

Results

In 2006 a total of 50 valid paired hauls were completed of which 8 pairs were CC, 8 pairs DD, 18 pairs CD and 16 pairs DC. In 2009 there were 21 valid paired hauls completed of which 11 pairs were CD and 10 pairs DC. During both cruises a number of paired hauls had to be excluded due to damage to the trawl rigged with C rig. For clarity the test cases were labelled according to which gear was towed first and then second.

Gear geometry

Similar trawl vertical openings were recorded during both cruises with mean values ranging from 4.4 to 5.4m in 2006 (Tables 1 and 2) and 4.6m to 5.4m in 2009 (Table 3). Wingend and otterboard spreads were consistent between the two gears but otterboard spread was slightly lower for both in 2009 due to the shallower depths encountered compared to the previous survey. Mean speed over the ground in 2006 ranged from 3.5 to 4.1 knots and in 2009 from 3.6 to 4 knots except for one haul when the mean speed was slightly lower at 3.3 knots. As mentioned above during both cruises the C rig proved problematic with a number of hauls being discarded due to its susceptibility to sustaining damage mainly to the lower wing and belly sheet netting. It was noted that most damage had occurred along the netting attached to the 15m rubber-leg sections where it was presumed stones were being scooped into the trawl and then chaffing out through the netting. No damage was sustained during either cruise by the trawl fitted with D rig.

Table 1 – Haul summary for paired hauls during 2006 cruise

Paired haul set	Paired haul set - First haul							Paired haul set - Second haul						
	Ground Gear rig	Mean water depth (m)	Warp length (m)	Mean Headline Height (m)	Mean Wing Spread (m)	Mean Door Spread (m)	Mean Speed Made Good (kits)	Ground gear rig	Mean water depth (m)	Warp length (m)	Mean Headline Height (m)	Mean Wing Spread (m)	Mean Door Spread (m)	Mean Speed Made Good (kits)
1	C	165	525	5.3	18.8	85.4	3.6	C	165	525	5.3	19.9	86.7	3.9
2	C	150	480	5.2	23.3	86.2	3.8	D	150	480	5.0	20.2	84.4	4.1
3	D	170	540	5.1	19.6	85.0	3.5	D	170	540	5.1	19.6	84.7	3.6
4	D	150	450	5.1	19.2	82.6	3.7	C	150	450	N/R	19.7	85.4	3.7
5	C	185	600	5.2	20.3	88.1	3.8	D	185	600	5.1	21.7	86.1	3.8
6	D	191	600	4.8	19.7	84.8	3.8	C	190	600	5.2	19.7	84.8	3.6
7	C	186	600	5.4	22.0	87.0	3.6	C	187	600	5.0	20.4	87.3	3.7
8	C	180	570	5.1	19.5	85.7	3.7	D	182	570	4.9	19.3	84.6	3.8
9	D	178	540	5.0	19.4	85.7	3.9	D	172	540	4.9	20	85.9	3.8
10	D	168	525	5.0	19.5	85.7	3.8	C	168	525	5.3	19.5	87.5	3.8
11	C	174	525	5.1	19.8	88.2	3.9	D	174	525	4.9	21	84.8	3.6
12	D	159	500	5.0	19.8	84.4	3.8	C	159	500	4.9	19.3	86.5	3.9
13	C	153	500	5.0	19.3	86.5	3.8	C	154	500	5.0	20.1	85.0	3.7
14	C	175	550	N/R	19.2	85.6	3.9	D	175	550	4.8	19.2	84.4	3.8
15	D	185	600	4.7	19.3	86.1	3.8	D	185	600	4.9	19.2	85.9	3.8
16	C	159	510	4.9	21.8	87.0	3.9	D	159	510	4.9	19.3	84.4	3.8
17	D	148	510	4.9	18.9	85.1	3.9	C	147	510	5.0	19.5	86.7	3.7
18	C	159	510	N/R	19.7	86.4	3.6	D	160	510	4.7	19	84.3	3.6
19	D	168	510	4.8	19.5	84.9	3.9	C	168	510	4.9	20.1	87.3	3.8
20	C	171	510	4.8	19.3	86.3	3.9	D	174	510	4.8	19.1	84.6	3.9
21	D	181	555	4.8	21.0	85.5	3.9	C	181	555	4.9	19.4	87.8	3.9
22	C	149	510	5.0	19.4	87.1	3.9	D	149	510	5.0	22	83.2	3.8
23	D	170	540	4.4	20.5	85.7	3.7	C	169	540	5.0	19.7	87.3	3.8
24	C	162	510	5.0	19.3	86.8	3.7	C	160	510	5.0	19.3	87.4	3.8
25	C	155	460	5.0	19.1	86.8	3.9	D	155	460	5.0	21.4	83.8	3.9
26	D	143	425	5.0	18.7	82.4	3.8	D	144	425	4.8	18.8	84.9	4.0

Table 2 – Haul summary for paired hauls during 2009 cruise continued

Paired haul set	Paired haul set - First haul							Paired haul set - Second haul						
	Ground Gear rig	Mean water depth (m)	Warp length (m)	Mean Headline Height (m)	Mean Wing Spread (m)	Mean Door Spread (m)	Mean Speed Made Good (kits)	Ground gear rig	Mean water depth (m)	Warp length (m)	Mean Headline Height (m)	Mean Wing Spread (m)	Mean Door Spread (m)	Mean Speed Made Good (kits)
27	D	174	540	4.6	19.6	86.8	4.0	C	177	540	4.9	19.7	88.3	4.0
28	C	153	480	4.8	19.6	85.9	3.8	C	150	480	4.9	20	85.8	3.8
29	C	163	525	4.8	19.5	86.3	3.6	D	163	525	4.7	19.3	85.7	3.6
30	D	156	540	4.6	19.2	86.5	3.9	C	156	540	4.8	19.8	87.4	4.0
31	C	169	540	5.0	20.4	87.2	3.9	D	169	540	4.6	19.6	86.7	4.0
32	D	161	510	4.6	19.4	86.5	4.1	C	161	510	5.1	20.3	84.1	3.7
33	C	187	570	4.9	21.8	86.3	3.8	D	187	570	4.7	21.1	86.2	3.8
34	D	158	510	4.7	19.8	84.2	3.6	D	160	510	4.6	19.6	84.4	3.8
35	D	185	600	4.6	19.8	85.6	3.8	C	184	600	4.8	19.6	85.4	3.8
36	C	175	555	N/R	18.9	84.7	3.7	C	175	555	4.9	18.8	82.6	3.8
37	C	154	500	5.0	19.0	83.9	3.7	D	155	500	4.9	18.9	84.1	3.8
38	D	160	500	4.8	18.7	83.1	3.7	D	160	500	4.8	18.7	83.0	3.8
39	D	165	525	4.8	20.3	85.5	3.7	C	167	525	4.8	19	87.2	3.9
40	C	172	525	5.0	18.9	85.7	3.8	C	171	525	5.0	N/R	85.8	3.8
41	C	166	510	5.0	19.0	85.0	3.9	D	168	510	4.8	N/R	86.1	4.1
42	D	168	510	4.8	20.1	83.6	3.7	D	171	510	4.8	19.3	83.8	3.9
43	D	182	555	4.5	19.6	85.4	3.8	C	182	555	4.8	N/R	85.9	3.9
44	C	154	510	5.1	19.7	86.9	3.9	D	155	510	4.7	20.5	86.4	3.7
45	D	172	540	4.7	20.8	84.8	3.7	D	172	540	4.7	21.7	85.6	3.9
46	D	163	510	5.0	19.7	85.4	3.9	C	163	510	5.2	19.2	87.0	3.7
47	C	152	460	5.1	19.1	85.8	4.1	C	154	460	5.1	19.2	85.6	3.8
48	C	151	460	5.1	19.6	85.2	3.8	D	152	460	5.1	19.9	85.9	3.9
49	D	177	540	4.9	20.5	86.9	3.7	C	177	540	4.8	20.3	88.5	3.9
50	C	140	450	4.9	19.4	86.3	3.9	D	137	450	4.9	19.6	84.8	3.9

Table 3 – Haul summary for paired hauls during 2006 cruise

Paired haul set	Paired haul set - First haul							Paired haul set - Second haul						
	Ground Gear rig	Mean water depth (m)	Warp length (m)	Mean Headline Height (m)	Mean Wing Spread (m)	Mean Door Spread (m)	Mean Speed Made Good (kits)	Ground gear rig	Mean water depth (m)	Warp length (m)	Mean Headline Height (m)	Mean Wing Spread (m)	Mean Door Spread (m)	Mean Speed Made Good (kits)
1	C	114	360	5.1	19.3	82.3	3.7	D	114	360	5.4	18.4	76.3	3.7
2	D	117	365	5.3	19.2	76.8	4.0	C	118	365	4.9	19.4	82.3	3.9
3	C	113	360	5.0	19.0	81.2	3.9	D	113	360	5.3	19.3	76.3	3.7
4	D	108	360	5.2	19.0	77.6	3.6	C	108	360	4.9	19.5	81.8	3.8
5	C	107	360	4.9	19.3	82.0	3.8	D	108	360	5.3	20.9	77.3	3.9
6	D	108	360	5.3	18.6	78.0	3.8	C	109	360	4.9	18.8	82.0	3.8
7	C	108	360	5.1	18.6	78.7	3.7	D	107	360	5.2	19.5	76.3	3.6
8	C	110	365	4.9	18.4	79.0	3.8	D	110	360	5.2	18.7	75.9	3.6
9	D	109	360	5.3	N/R	76.7	3.6	C	112	360	4.6	19.3	83.0	3.7
10	C	111	370	5.0	18.5	78.8	3.7	D	111	370	5.3	18.4	75.1	3.6
11	D	108	365	5.2	19.8	76.7	3.5	C	108	365	4.8	N/R	80.0	3.7
12	D	140	450	5.0	20.4	81.1	3.9	C	140	450	4.9	22.2	85.4	3.8
13	C	130	405	5.0	19.7	83.3	3.7	D	129	405	5.3	19.4	75.7	3.3
14	D	130	390	5.3	19.2	76.7	3.7	C	130	390	5.0	19.1	83.1	3.7
15	D	105	345	5.1	19.5	76.0	3.6	C	106	345	4.9	19.0	79.8	3.6
16	C	105	345	4.8	17.7	78.9	3.7	D	104	345	5.1	18.2	75.0	3.8
17	D	100	345	5.3	19.9	75.6	3.7	C	101	345	4.6	20.1	79.3	3.6
18	C	72	240	4.9	16.4	67.0	3.8	D	75	240	5.1	17.0	62.7	3.7
19	C	69	255	5.2	15.6	64.0	3.5	D	70	255	5.3	16.9	65.5	3.7
20	D	70	240	5.3	17.2	66.6	3.7	C	70	240	5.3	15.9	65.9	3.6
21	C	72	240	5.0	16.7	69.2	3.7	D	72	240	5.0	17.8	74.3	3.6

Catch comparison data

Sufficient numbers of haddock, lemon sole and megrim were encountered in 2006 and haddock and whiting in 2009 for subsequent analysis. Limited numbers of cod were encountered during the 2009 cruise but were not sufficient to allow any final analyses. The catches retained in the codends of the test and control gears were used to estimate the catch rate of test gear D relative to the control gear C. The analysis is described in the Appendix. The data was analysed over a number of stages before a direct comparison could be made between the two ground gears.

In figures 5 to 8 the relative catch rates are shown as the proportion of fish retained in the test gear as compared to the control gear. A value of less than one indicates that the test gear caught fewer fish at that length and a value greater than one indicates more fish were caught in the test gear compared to the control. A dashed line indicates where the relative catch rate did not differ significantly from parity (control), whereas a solid line indicates there is point-wise significance at the 5% level.

The first analysis examined whether the order that the gears were towed had a significant effect. This was achieved using the 2006 CC and DD hauls and tested the second towed gear (test) against the first (control). No significant differences in the relative catch rates (Figure 5) were found when testing for the order a gear was towed for any of the three species; haddock ($p=0.304$), lemon sole ($p=0.735$) or megrim ($p=0.989$).

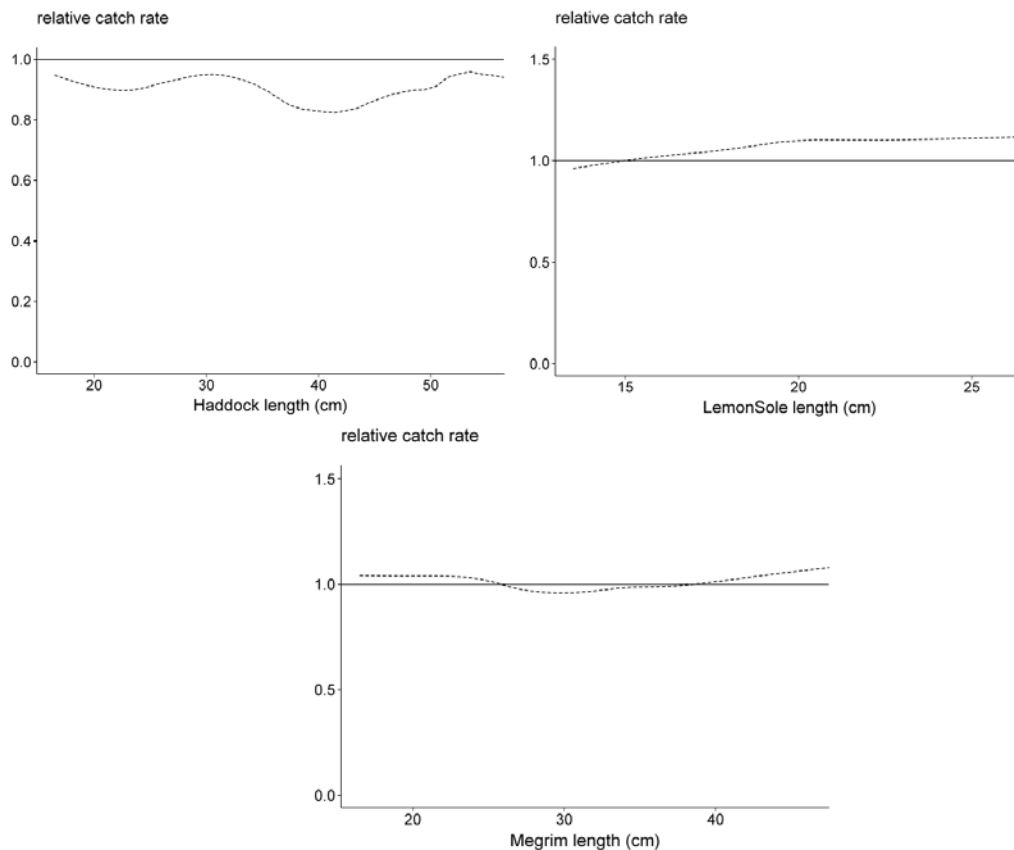


Figure 5: Estimated catch rate for the test gear (second haul) relative to the control gear (first haul) for haddock, lemon sole and megrim during 2006 cruise.

In the absence of a towed order effect the 2006 CD and DC paired hauls were analysed using C as the control and D the test. No significant differences were found in the catch rates (Figure 6) for haddock ($p=0.535$) or lemon sole ($p=0.260$). There was a suggestion that for megrim D caught significantly more fish than C ($p= 0.029$) and this seems to be driven by fish of size $<27\text{cm}$. However, even though there was enough megrim data to meet the minimum requirements for the analysis they were possibly insufficient for drawing a robust conclusion.

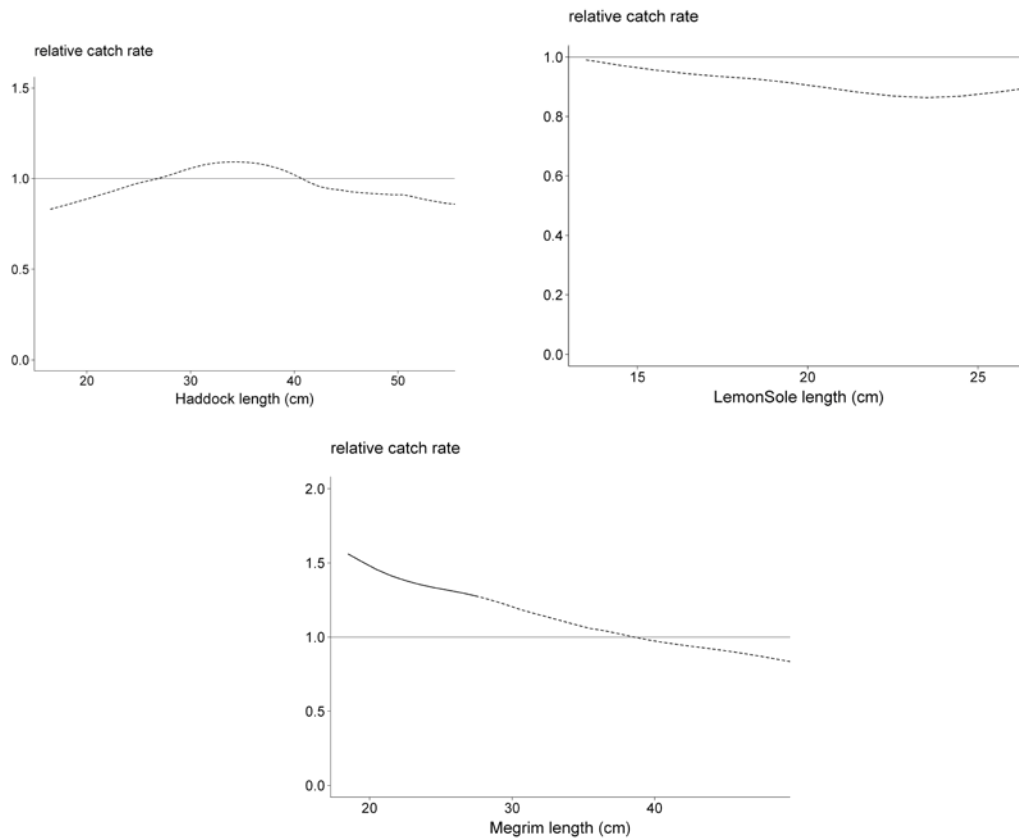


Figure 6: Estimated catch rates of the test gear (D) relative to the control gear (C) for haddock, lemon sole and megrim during the 2006 cruise.

In 2009 with the assumption that there was no significance in which order a gear was towed only CD and DC paired hauls were made. As with the previous analysis gear C was the control and D the test. No significant differences in catch rate (Figure 7) were found for haddock ($p=0.370$) or whiting ($p=0.241$). It should be noted that although the whiting numbers meet the minimum criteria for analysis they are considered weak and the significance shown for fish $>27\text{cm}$ is possible due to this.

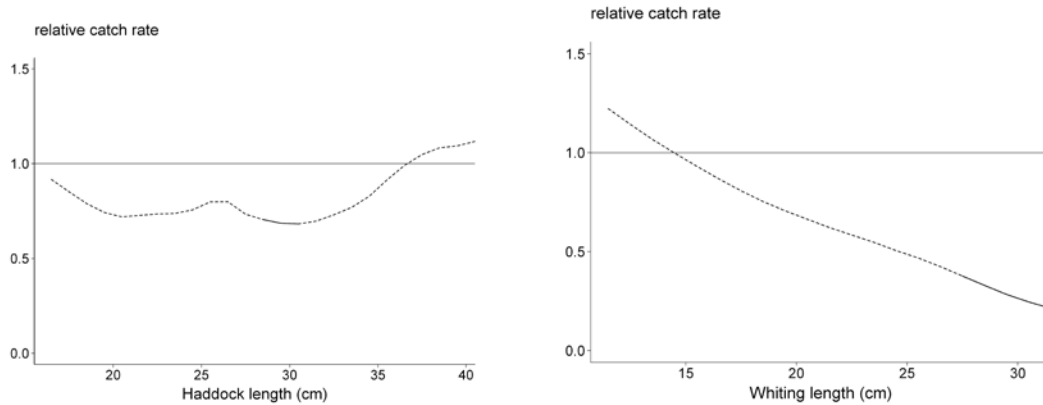


Figure 7: Estimated catch rates of the test gear (D) relative to the control gear (C) for haddock and whiting during the 2009 cruise.

Haddock was the only species where sufficient data from both trials were available, and the possibility of combining these data was investigated in order to provide a more powerful analysis. The possibility of any significant differences between the two trips had to be eliminated prior to combining these data. Two test cases (“Trial 06” and “Trial 09”) were analysed with gear C as the “control” and gear D as the “test”. Gear D in the 2006 trial (D06) did not differ significantly from gear D in the 2009 trial (D09) ($p= 0.098$). Similarly, neither gear D06 nor gear D09 were significantly different from the control gear C ($p=0.748$ and $p=0.668$ respectively).

In the above analysis it was observed that the haddock catches from the two trials had different length distributions, so in order to eliminate the possibility that the analysis might be driven by the extremes of the combined distribution (between 16cm and 53cm), another analysis was performed using the overlapping distributions (between 28cm and 46cm). Similarly this analysis did not reveal any significant differences between the gears D06 and D09 ($p= 0.251$) nor between the control and gears D06 and D09 ($p=0.708$ and $p=0.238$ respectively).

In the absence of a “trip effect” and “length distribution effect” the haddock data from the two trials were combined and the subsequent analysis revealed that there was no significant difference between gears C and D for haddock ($p= 0.249$).

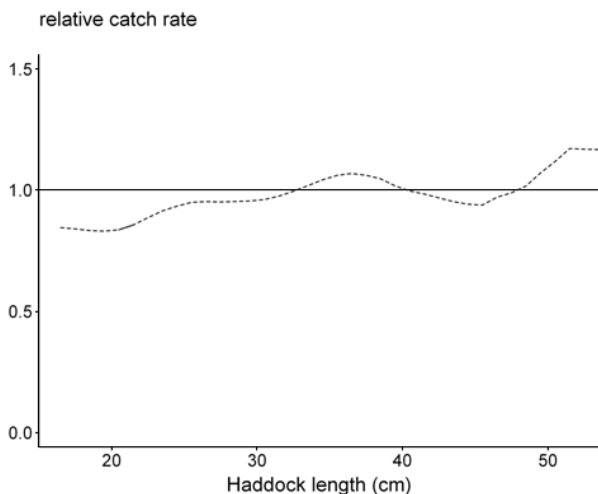


Figure 8: Estimated catch rates of the test gear (D) relative to the control gear (C) for the combined haddock data from the 2006 and 2009 cruises.

Conclusions

The results from the analysis of the 2 comparative trials provide strong evidence that there is no difference in catchability for either haddock or lemon sole between groundgear C and groundgear D. There is also evidence to suggest that this is also the case for whiting although sparsity of data make this assumption less robust. The same level of uncertainty must be applied to the results for megrim data which do appear to show a significant increase in the numbers caught by the test gear (D) compared to the control (C), especially for the smaller individuals. For cod, there were too few observations to attempt any analysis on these data.

The comprehensive change to the designs of the 2 Scottish western VIa IBTS surveys means that much of the initial incentive for completing this analysis is no longer relevant as this fundamental change signals an end to the existing survey time series ending in 2010. However it is still hoped that the analysis can be relevant particularly in providing additional confidence when comparing the historical catch data from both groundgears for selected species.

References

Fryer R.J, Zuur A.F, Graham N, 2003. Using mixed models to combine smooth size selection and catch-comparison curves over hauls. *Canadian Journal of Fisheries and Aquatic Sciences* 60: 448-459.

Appendix

The data for the two trials were analysed using the smoother based methodology of Fryer et al. (2003). The analysis was in three stages:

1. A smoother was used to model the log catch rate of the test gear (Rig D) relative to the control gear (Rig C) for each haul;
2. The fitted smoothers were combined over hauls to estimate the mean log relative catch rate for each gear;
3. Bootstrap hypothesis tests using the statistic T_{max} were used to assess whether the mean log relative catch rates depended on gear, and to compare the mean log relative catch rates to zero (or equivalently the mean relative catch rates to unity).

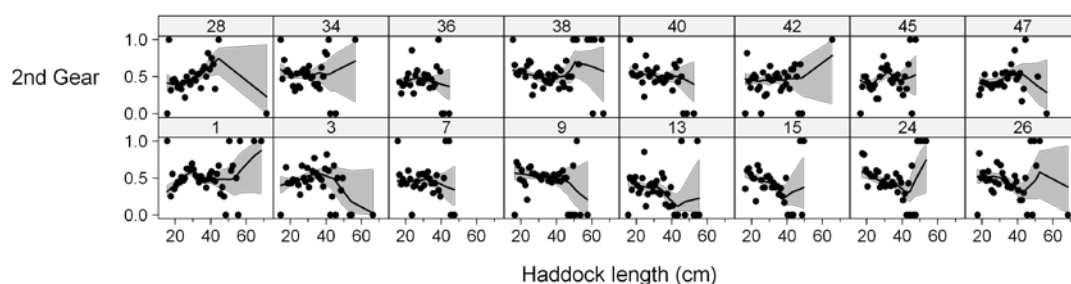
All p-values of pair wise comparisons have been adjusted for the number of comparisons, unless otherwise stated. The analysis was on the logistic scale, but the results have been back-transformed for presentation.

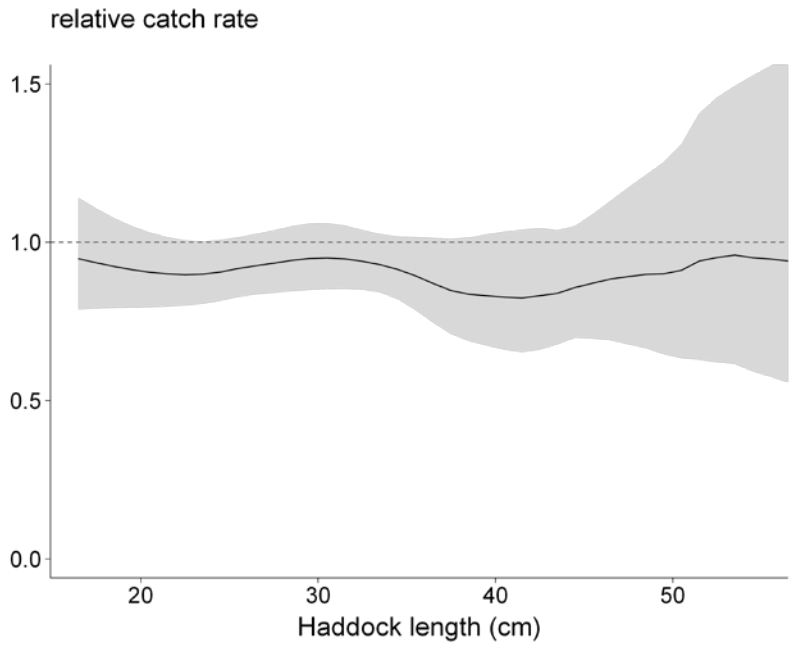
For each stage of the preliminary analysis the first plots show the proportions of fish retained by the test gear (of those retained in both gears) are shown for each species and haul, with the fitted smoothers analysis (solid lines) with pointwise 95% confidence bands (grey shaded areas). The second plot displays the estimated catch rate of the test gear relative to the control gear, with the pointwise 95% confidence bands around the lines (grey shaded areas).

1 – Towing order effect

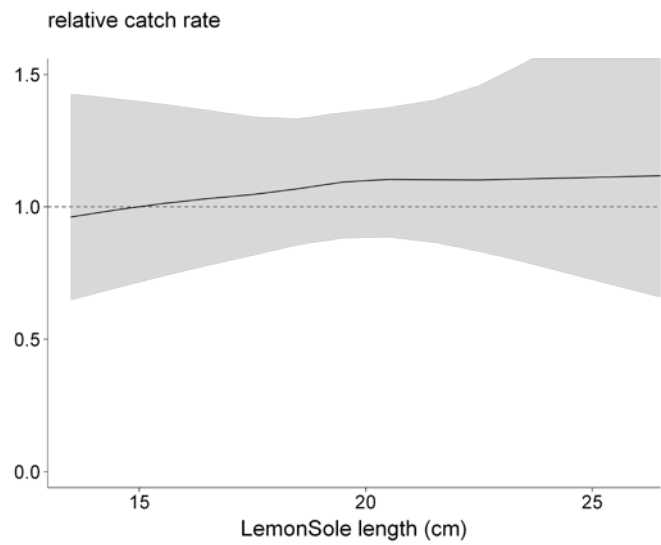
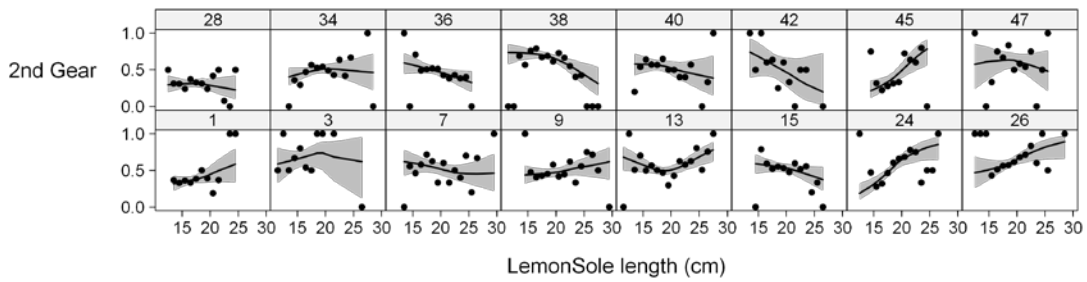
To eliminate the possibility that the order the gears were towed had a significant effect. This was achieved using the 2006 CC and DD hauls and tested the second towed gear (test) against the first (control).

Haddock

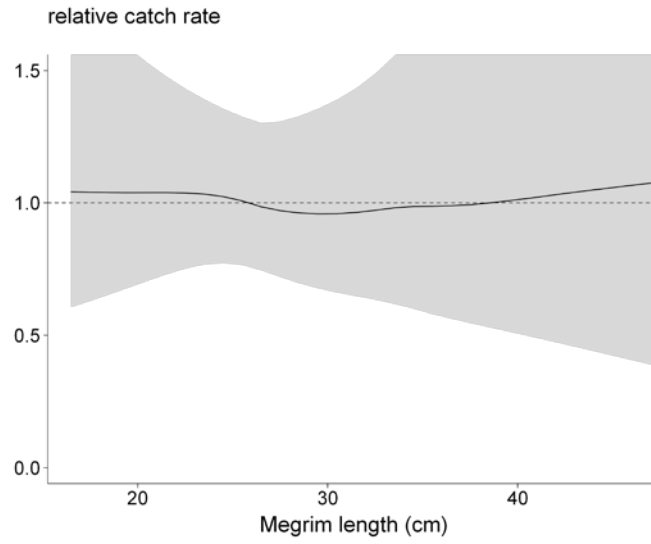
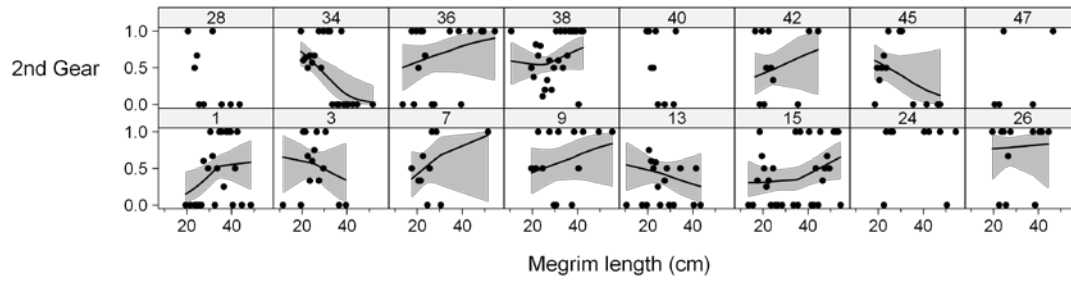




Lemon Sole

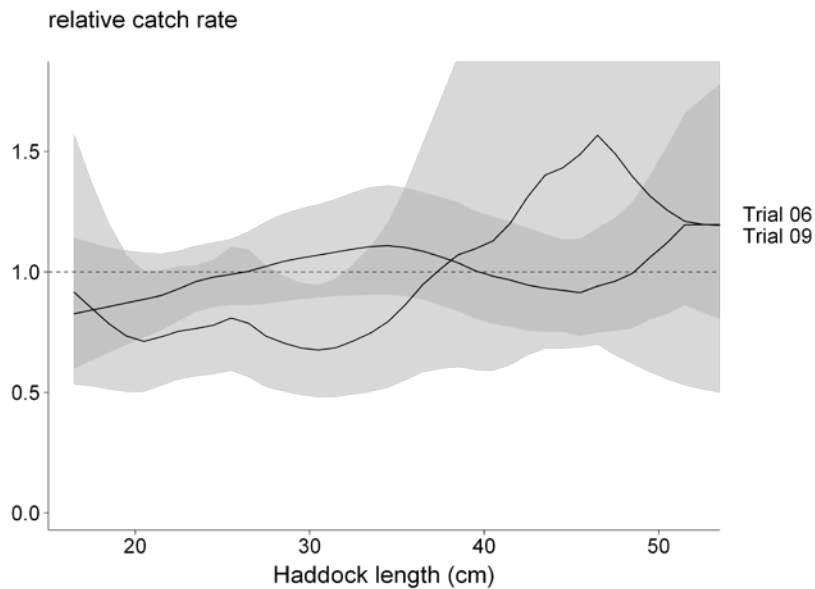
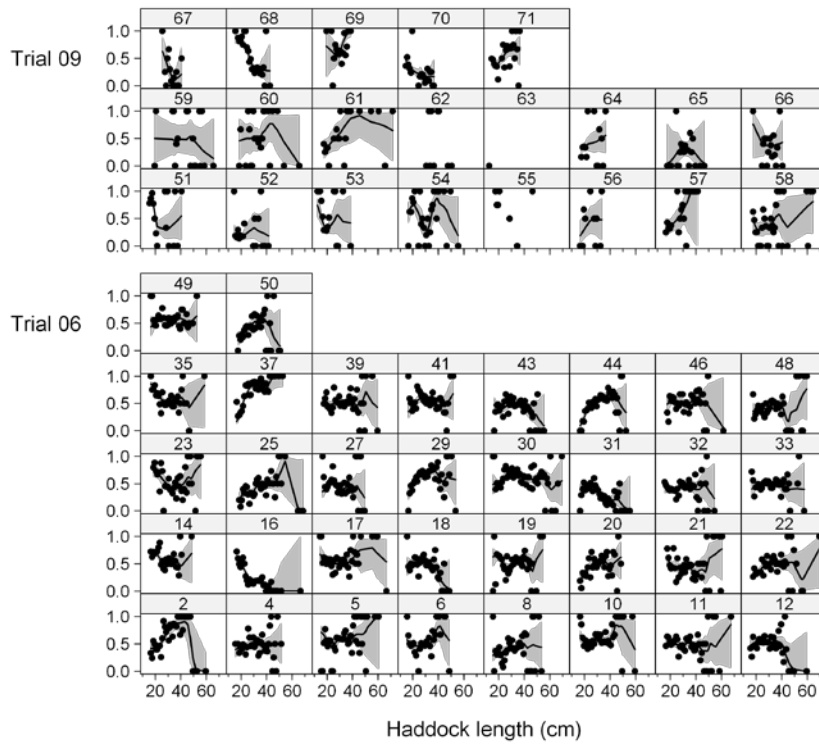


Megrim



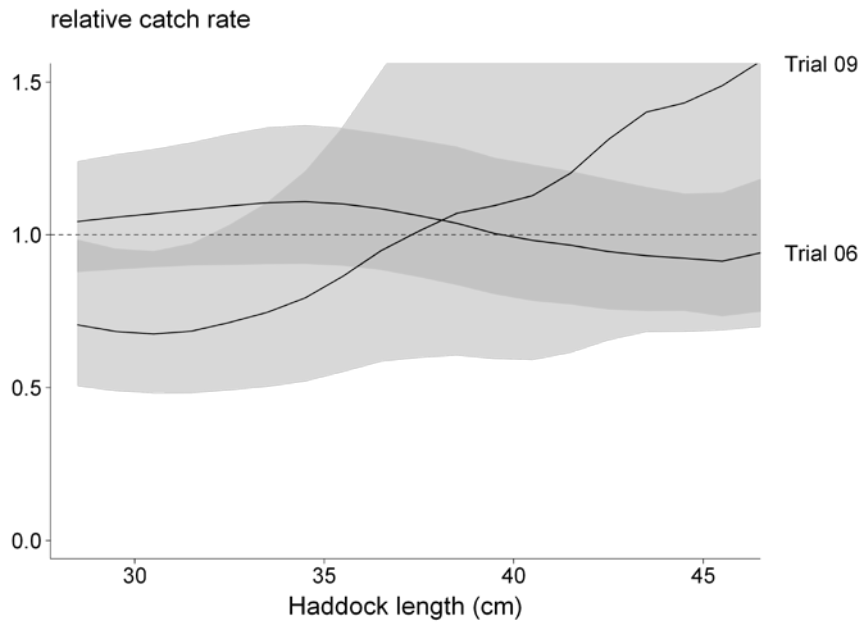
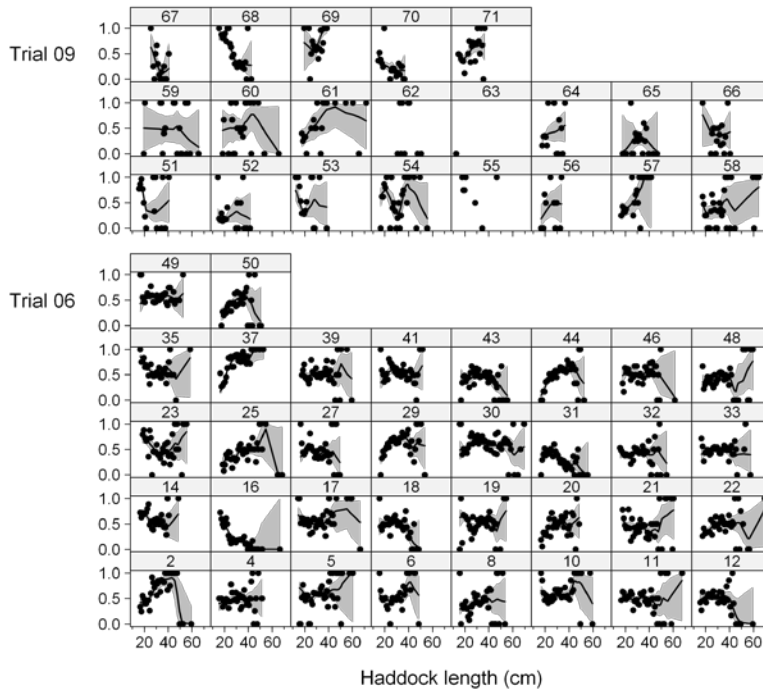
2 – Trip effect and combining haddock data from the two cruises.

To eliminate a cruise effect and therefore enable the haddock data from the 2006 and 2009 cruises to be combined. This was achieved using the CD and DC hauls with the C gear as the control and the D gear as the test.



Because the haddock catches from the two cruises had different length distributions there was a possibility the analysis was being driven by the extremes of the combined distributions (between 16cm and 53cm). To eliminate this possibility a further analysis

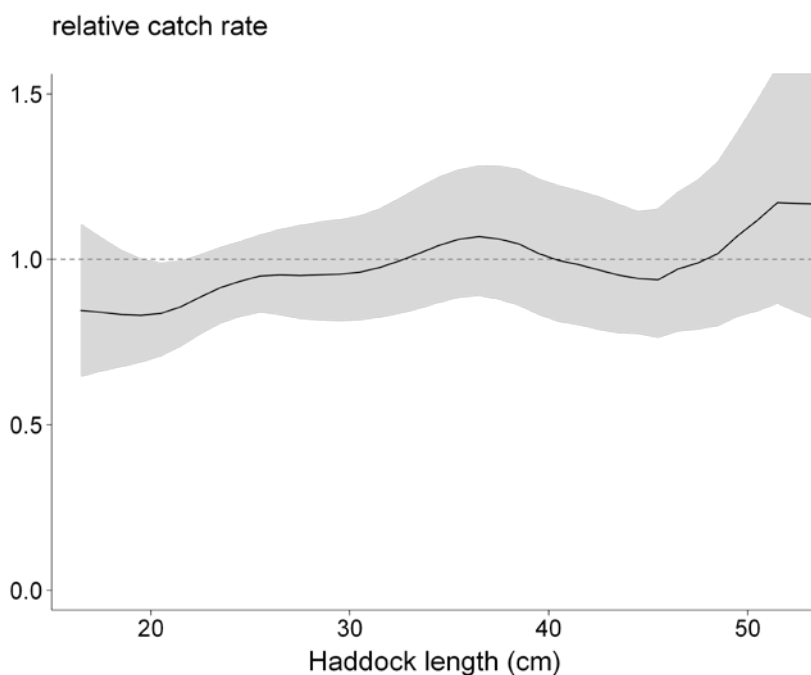
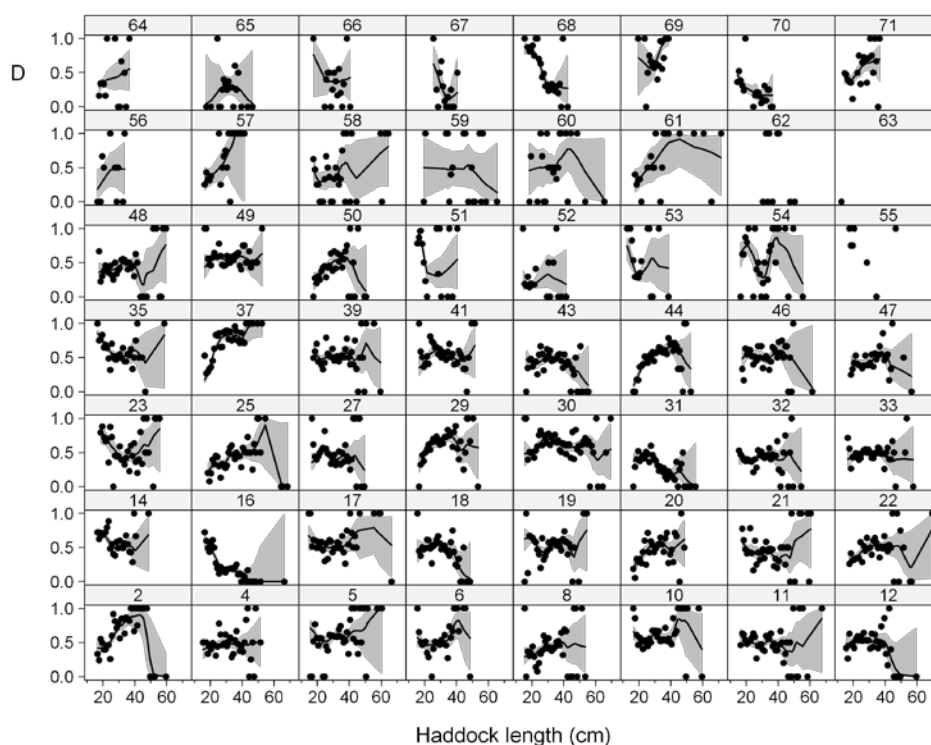
was performed using the overlapping distributions (between 28cm and 46cm). Again this was achieved using the CD and DC hauls with the C gear as the control and the D gear as the test.



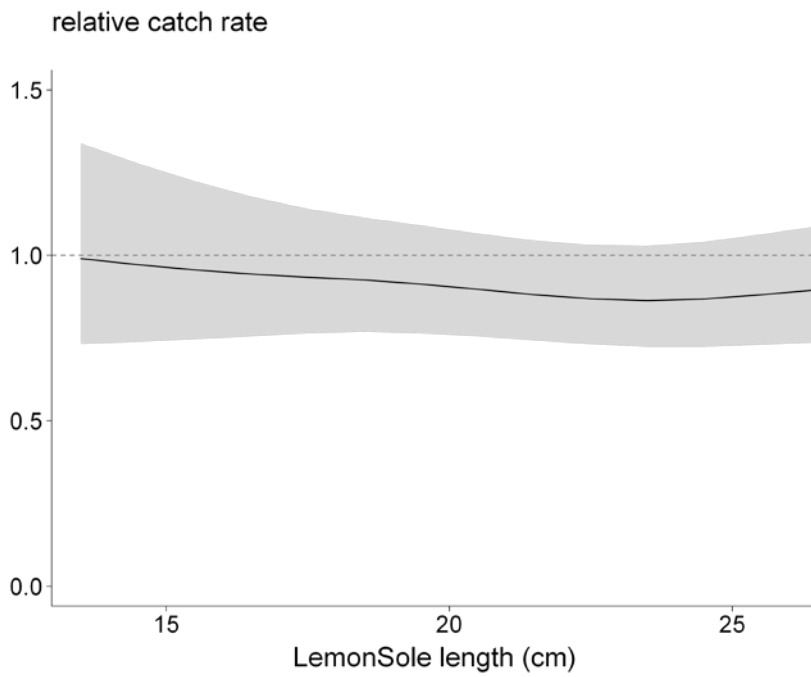
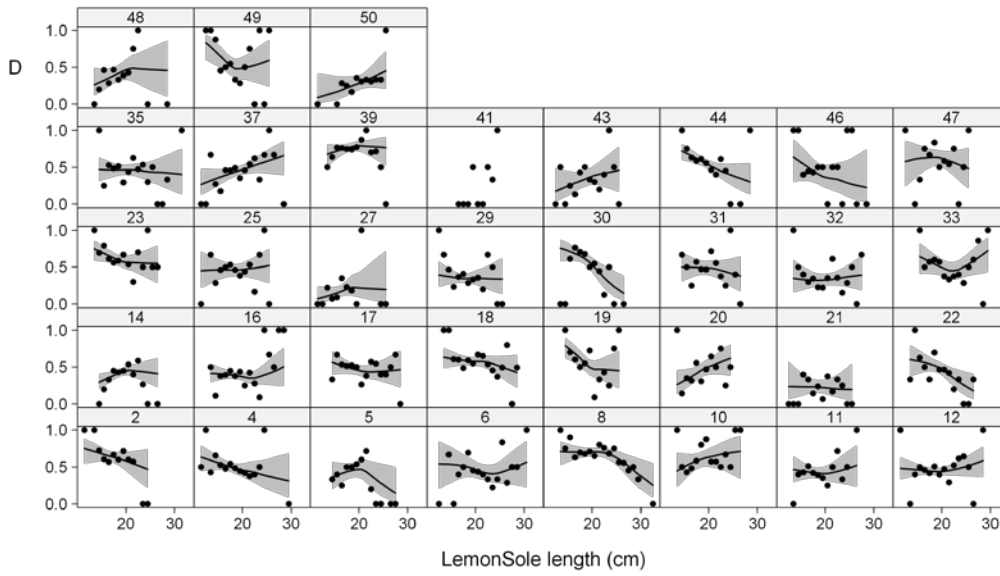
3 – Final analysis for each species from both cruises.

In the absence of a ‘towing-order’ effect for all species and ‘trip-effect’ and ‘distribution-effect’ for haddock the CD and DC hauls were analysed using the C as the control and D as the test.

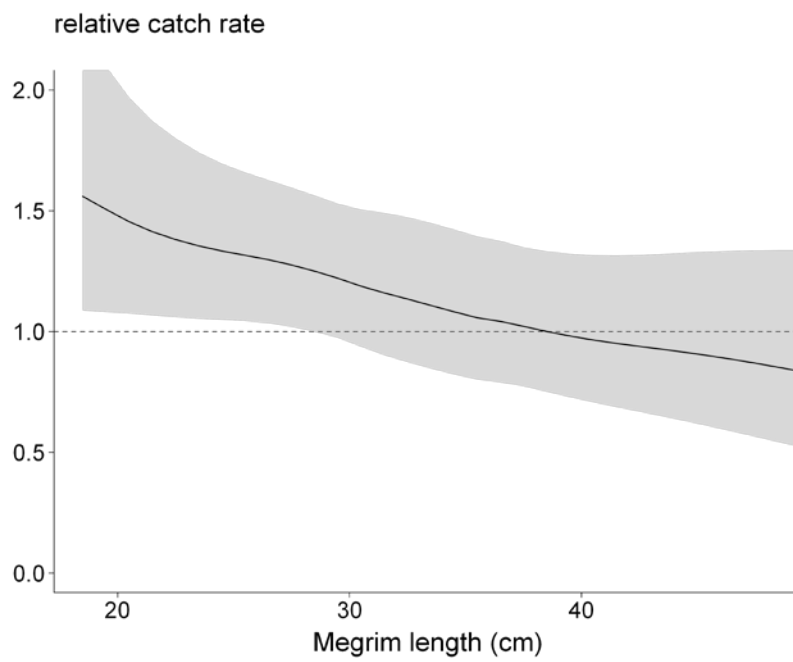
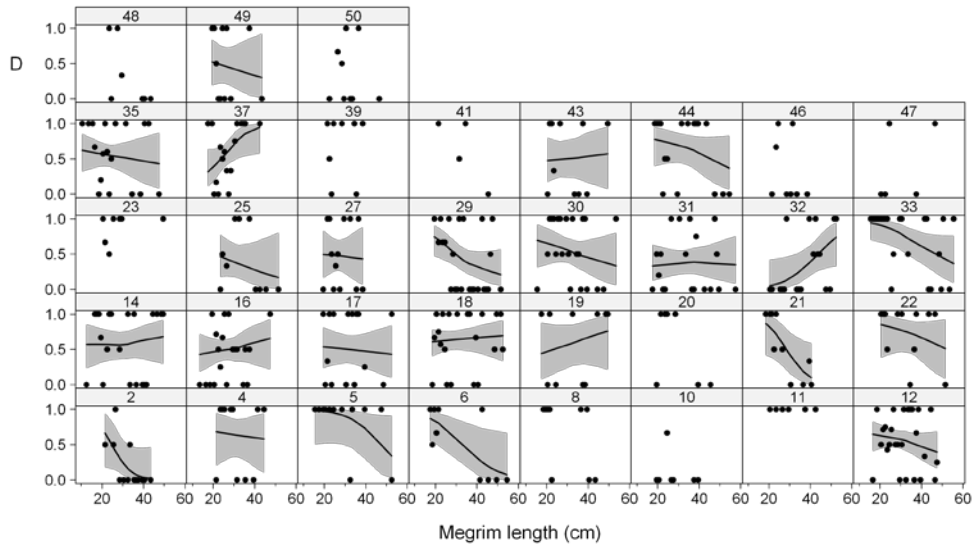
Haddock



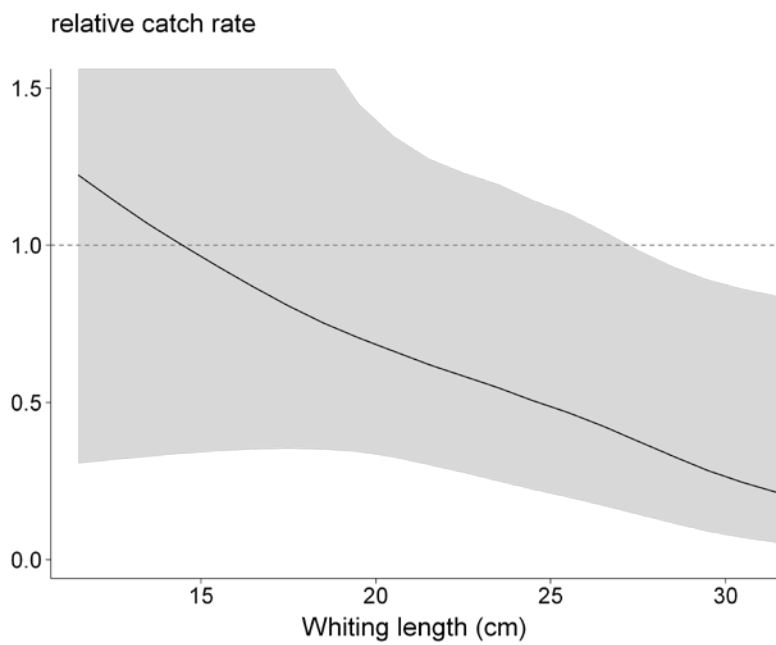
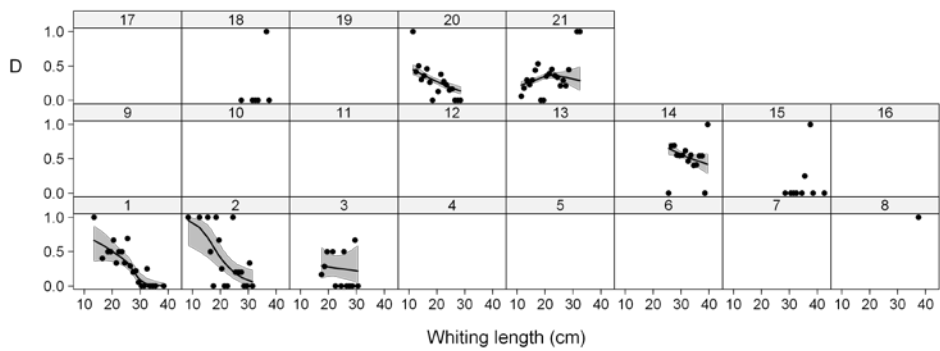
Lemon sole



Megrim



Whiting



ICES IBTS WG 2012
Lorient, 27-30 March

GOV trawl geometry

Comparisons from the Danish and Swedish NS-IBTS in Q3 2011 and Q1 2012 with RV Dana with reference to Scottish and German observations



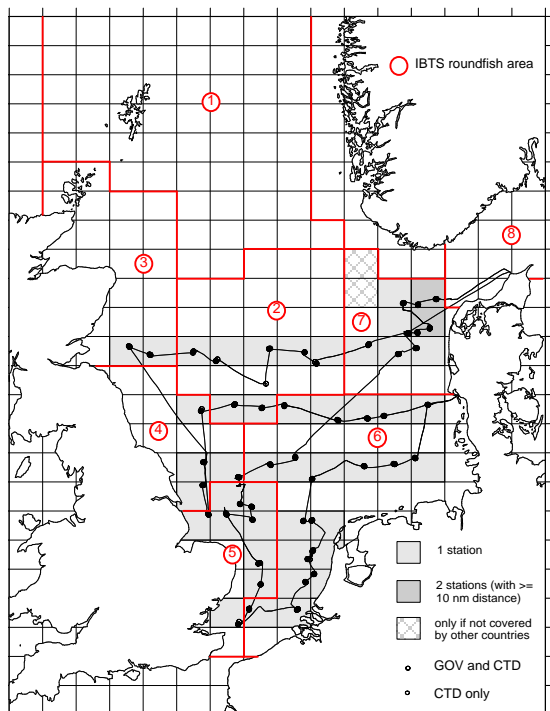
Kai Wieland

DTU Aqua
National Institute of Aquatic Resources



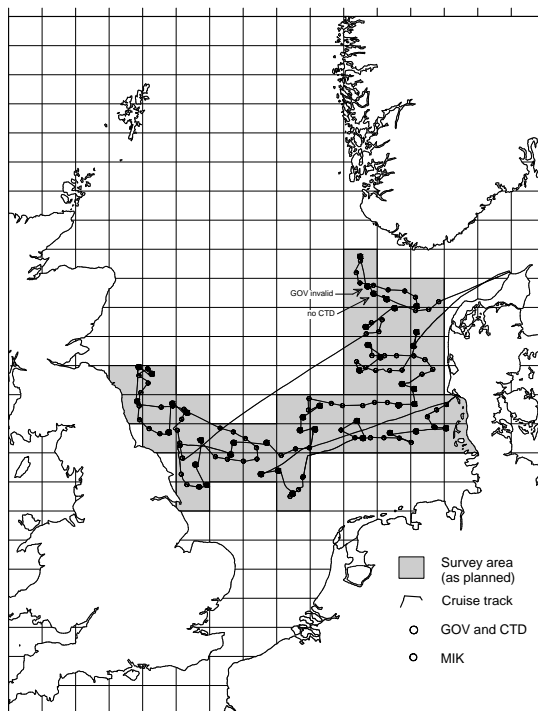
Survey areas

DEN 3Q 2011

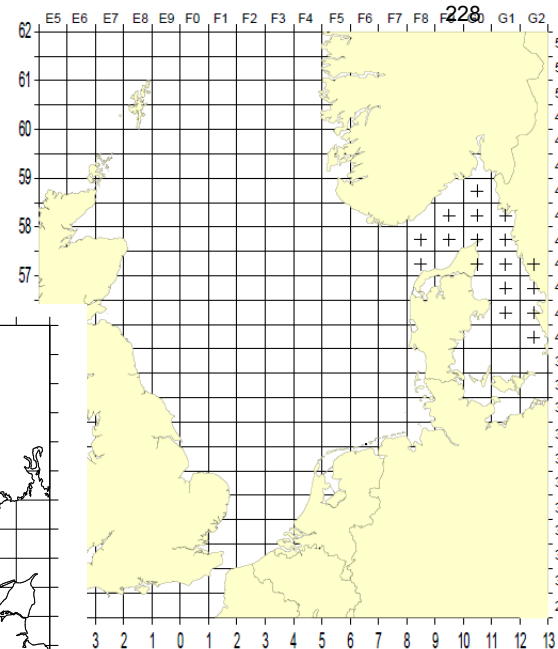


DEN: Survey areas differ between quarters

DEN 1Q 2012



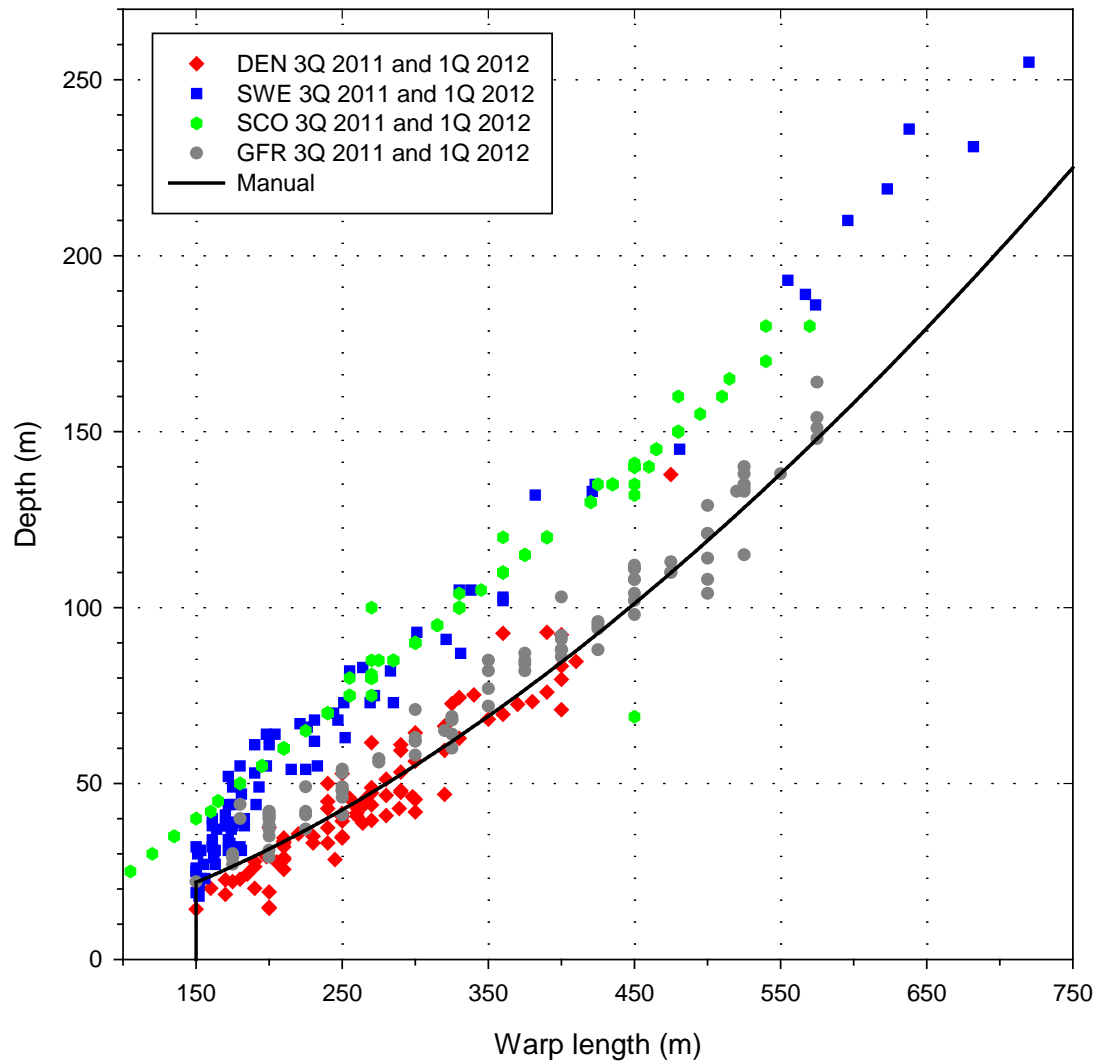
SWE



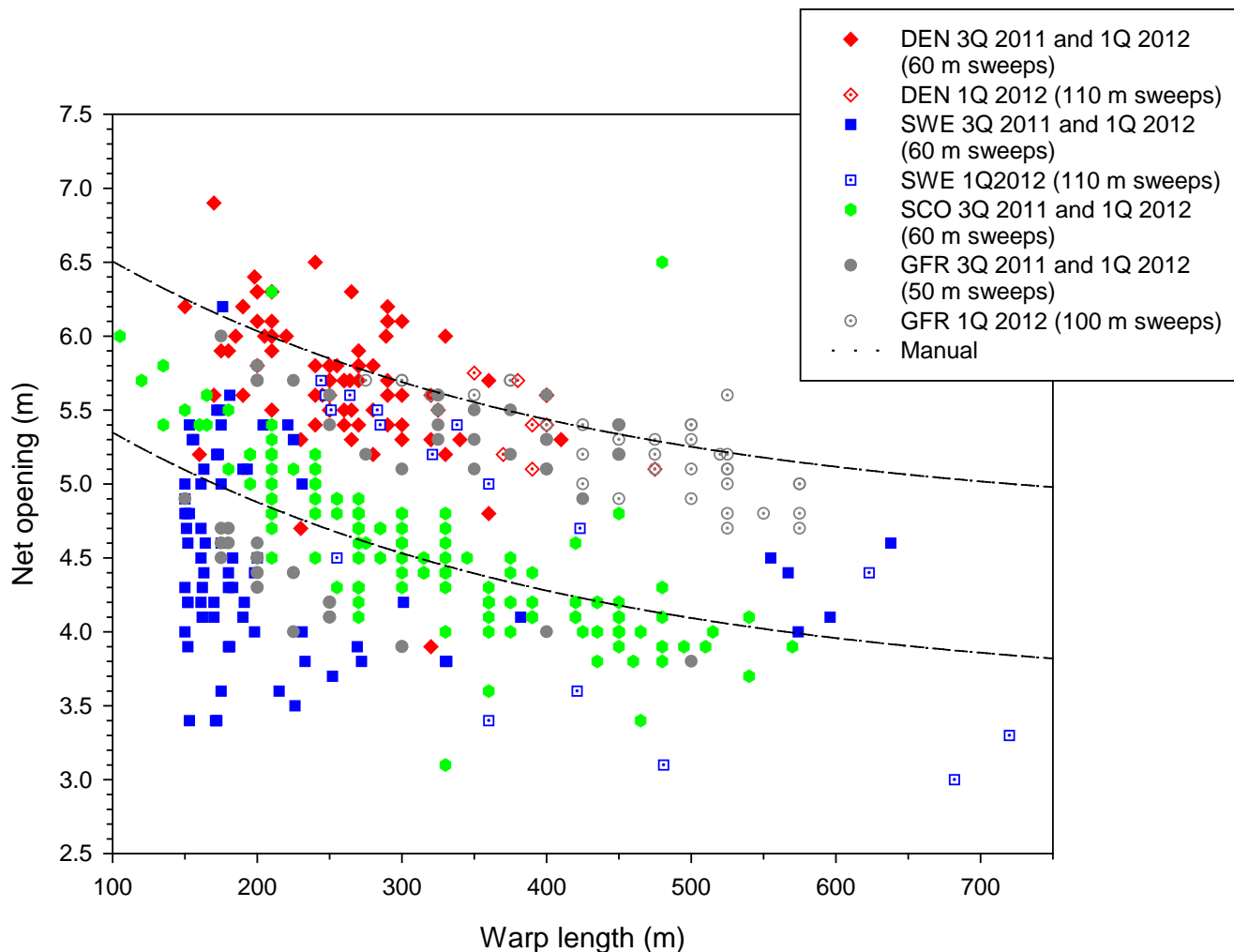
SWE: same survey area in Q1 and Q3, only country in Skagerrak and Kattegat

DEN/SWE: Same vessel in 3Q 2011 and 1Q 2012 (RV Dana) but own trawl and doors, SWE gear lighter than DEN gear (Skipper's impression and specifications in DATRAS)

Warp length and depth



Warp length and Net opening



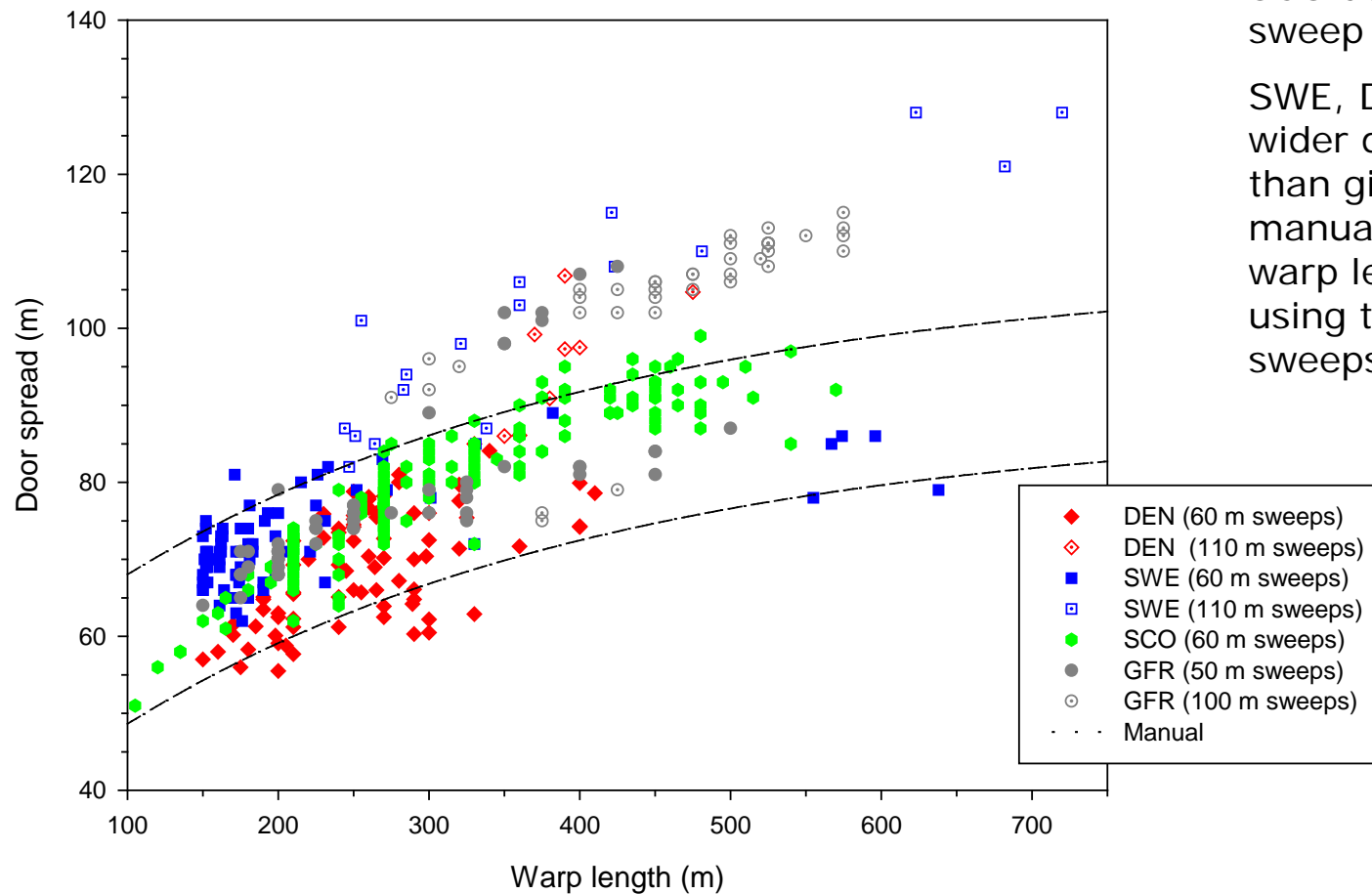
Net opening highly variable (at a given warp length) for all countries

None of the countries within the values given in the manual for the range of warp lengths

SWE: low net opening at short warp length

DEN: relative high net opening at short warp length

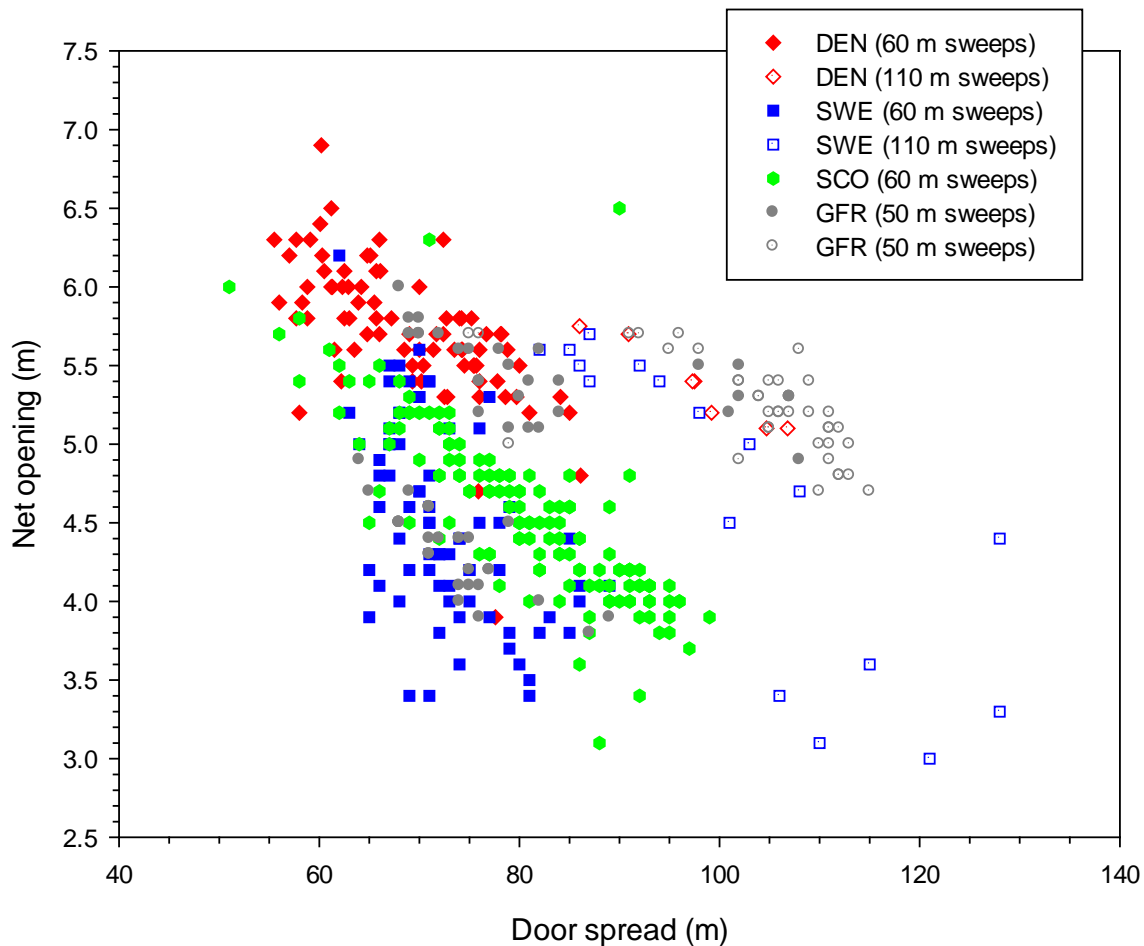
Warp length and Door spread



SCO does not change sweep length in Q1

SWE, DEN and GFR wider door spread than given in the manual at longer warp length when using the longer sweeps (Q1)

Net opening / Door spread

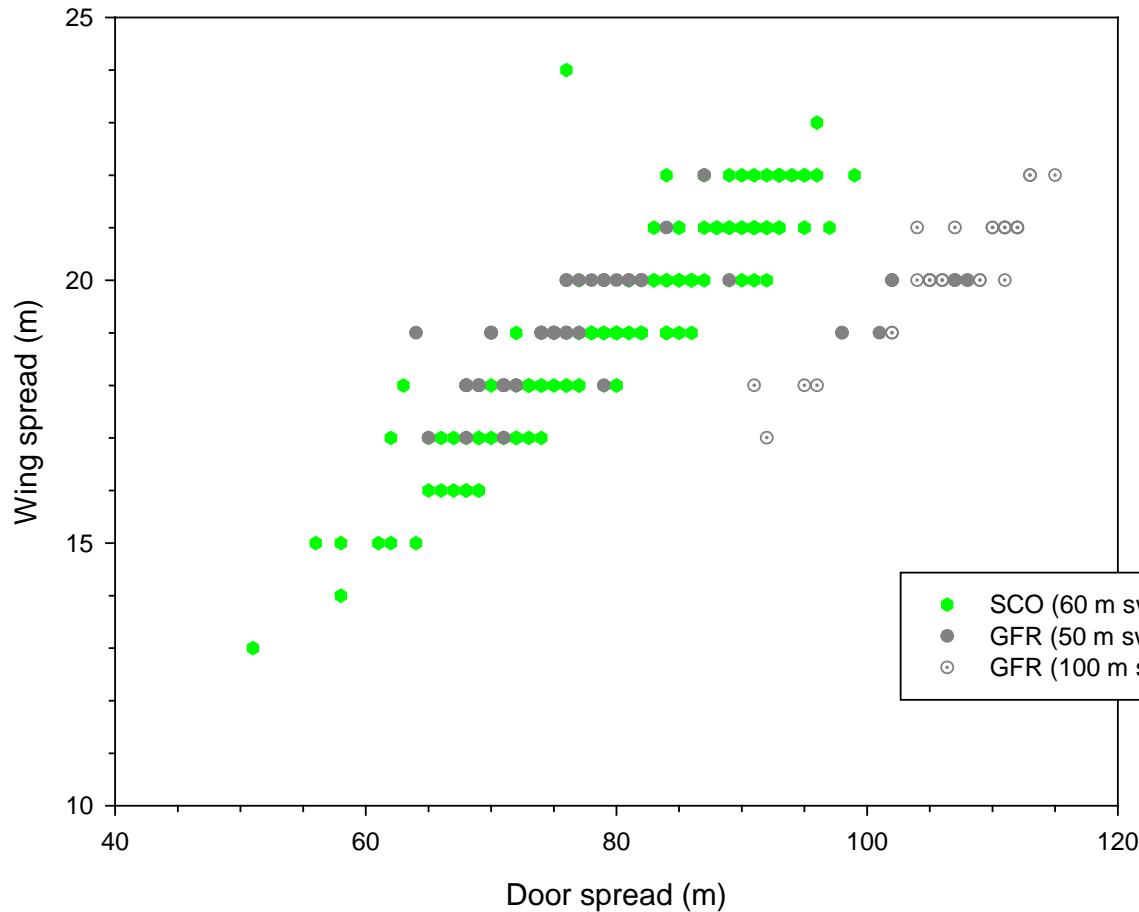


Relationship between door spread and net opening:

- differ between countries
- differ between sweep length



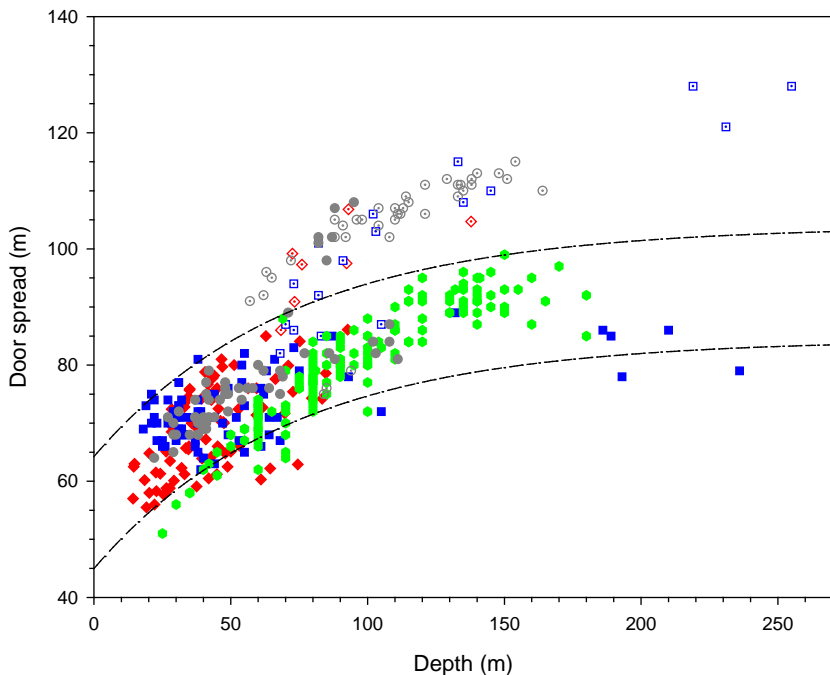
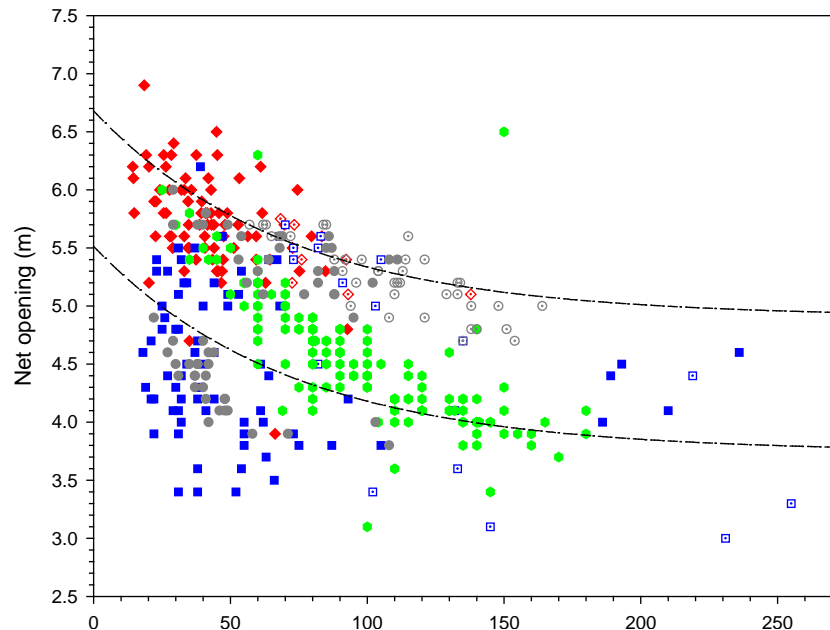
Door spread / Wing spread



DEN and SWE do not measure wing spread (no sensors available on Dana)

Relationship between door spread and wing spread differ considerably between sweep length and less between country

Depth, Net opening and Door spread



- ◆ DEN (60 m sweeps)
- ◇ DEN (110 m sweeps)
- SWE (60 m sweeps)
- SWE (110 m sweeps)
- SCO 3Q 2011 (60 m sweeps)
- GFR (50 m sweeps)
- GFR (100 m sweeps)
- - - Manual

for short sweeps:

DEN (and SCO) could use some longer warp length and shallower depths to bring net opening and door spread within in range given in the manual

SWE (and GFR) may try another kite

for long sweeps:

DEN, GFR and SWE may try shorter warp lengths (as long as bottom contact is ensured)

The considerable differences in the trawl geometry between the countries require adjustment

Conclusions and recommendations for discussion

- No drastic changes because if 'consistency' must be maintained (in particular in respect to the use of IBTS indices for stock assessments)
 - ⇒ use long sweeps at depths > 70 m in Q1 continue / discontinue !?
- Further adjustments in warp length (country specific) should be encouraged to meet the ranges of net opening and door spread given in the manual
- The IBTS WG may investigate whether it is possible to provide indices (for demersal species) based on swept area estimates to accommodate the large difference of door spread at a given depth between countries

Problems:

- Interpolation of missing values (country and year specific, dependent on sweep length)
- Relationship between door and wing spread not available for all countries and years

ICES DATRAS FAQ FOR DATA SUBMITTERS

ICES DATA CENTRE

Version 1, May 2012

ICES Headquarters, Copenhagen

ICES DATRAS FAQ FOR DATA SUBMITTERS

ICES DATA CENTRE



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FAQs for data submitters

Getting started/General questions

What is DATRAS Data Policy?

ICES operate an open access data policy adopted by the ICES Council in 2006. Aggregated data and raw data are freely available to download from the data products page on DATRAS.

To read more about ICES Data Policy, go to <http://www.ices.dk/datacentre/datapolicy.asp>. To read more about DATRAS adoption of data policy, visit <http://datras.ices.dk/Home/Access.aspx#>.

How should my data files be formatted?

DATRAS accepts files formatted as CSV (comma separated values) documents, where records are separated by rows/lines, and fields are separated by commas (,) or semicolons (;). As a decimal separator points (.) should be used.

Structure of files should follow [DATRAS reporting format](#). All fields should be present in the file. No blanks are accepted. In case no information is available for a field, -9 should be reported.

One file should contain all types of records (HH, HL, CA) per year, quarter, country, vessel, gear.

Which units and codes should I use for the data I report?

In the DATRAS menu [Reporting Format](#) one can find descriptions of fields including data units and codes per survey.

How do I get access to DATRAS uploading page?

If you are a new data submitter to DATRAS, write an e-mail to [DATRAS data manager](#) and Chair of the associated ICES Expert Group detailing your submitter status and requesting access to DATRAS.

How to submit my file to DATRAS?

For most of the surveys direct upload by data submitters is now available. Please follow the instructions on the [DATRAS uploading page](#). Please read the document "How to upload data into DATRAS" on the same page.

I get a page error when trying to use DATRAS. What to do?

If you get an error page somewhere in DATRAS, this might mean that one or all of DATRAS web-services failed to function. Please contact [DATRAS administration](#) as soon as possible. Please attach the screenshot from DATRAS to your e-mail.

I've forgot my log-in details. What do I do?

Your log-in information is the same as the one you use to access ICES sharepoint.

If you forgot your GroupNet password, go to <http://www.ices.dk/groupnetpass/> to retrieve the new one.

Who to contact?

If you have questions, please write to the [DATRAS administration](#) or call us on +45 3338 6700.

If your request requires input from experts or further discussion, post it on [DUAP](#).

Submission-related questions

What is the deadline for my submission?

The list of deadlines for the current year can be viewed on [DATRAS documents page](#).

What data quality control do my data pass through?

Before a data file can be uploaded to DATRAS, it passes an extensive quality check provided by the screening utility called DATSU. The results of screening will be displayed on the DATRAS page and will be sent as a PDF report to your mailbox. The screening report can contain some errors and warnings about your data. Most of the errors are critical, and should be corrected. If the file contains critical error(s), further data uploading will be impossible until the errors are corrected. All warnings are non critical, so it is the decision of the data submitter whether to accept these warnings or make further data corrections.

In addition, DATRAS provides outlier graphs based on weight-length relation for species that have these variables reported in CA records. They allow the submitter to spot the outlying weight or length values right away.

I cannot understand what the screening message means. What to do?

For more detailed information about the error/warning please press the question mark in the right column of the screening results table, see example below. If the help-page was not informative enough, contact [DATRAS administrator](#) for further assistance. Don't forget to attach your file and screenshot of DATRAS page displaying the error message.

Line number	Error Description	Severity	Error Value(s)	Error fields	Accept	?
	ITIS TSN species codes are no longer accepted. Please use AphiaID instead.	error	T;3	SpecCodeType;NoOfOccurrence		

I cannot screen or upload my file. I get a message “the survey selected does not include the country present in the file”. I report my country. What is wrong?

There could be several reasons for such a message.

Please check whether:

1. The country code used is as in <http://www.ices.dk/datacentre/reco/reco.asp?sortby=Code&ref=4>
2. If numbers have been formatted with a comma as the decimal-delimiter, change them to decimal points.
3. There may be a problem with your access rights to DATRAS. Contact DATRAS administrator. Include your file and screenshot of DATRAS page with error in your e-mail.

I have uploaded my data file to DATRAS, but I cannot find my data on the download page

You may experience a delay from the time you submit the data until it can be found on the download page. This is because files uploaded to DATRAS are manually updated in the main data warehouse as part of the quality control process.

To check whether the file was successfully uploaded, check your submission on [DATRAS Submission Status](#) page. If your submission with correct upload time is listed there, the upload was successful. If the submission is not on the list, try to upload your file once again, and then contact [DATRAS administration](#).

Update of data on the web-page might take a few days. If the uploaded data need to be urgently available from DATRAS web-page for download, contact [DATRAS administration](#) for assistance.

Can I make a partial re-submission by haul or by record type?

Currently, DATRAS does not facilitate partial re-submissions of any kind. The whole dataset per year, quarter, country, vessel, gear should be re-submitted.

What happens to the existing data when I re-submit my dataset?

When a dataset is re-submitted and the DATRAS data warehouse is updated, the existing data are overwritten and are no longer available. We advise you to always keep a copy of previous submissions.

When I re-submit my data, is it possible to deliver the information about which corrections were made?

At the last stage of uploading there is a box for remarks. In this box data submitters should specify what was changed in the re-submitted data. In the next DATRAS update it will be possible to view submitters' remarks (if any) on the Submission Status page.

Specific issues

How to report Data Type in HH-record, and how does it influence other fields?

Data Type defines the use of data fields reported in HL-record. For information and examples on data type and related fields use please visit [DUAP](#), Background and Working Documents section.

Data Type can be reported as R (raw data reported, sorted catch might be sub-sampled), S (bulk unsorted catch was sub-sampled), C (catch reported as CPUE).

Depending on the data type used, HL data fields will be reported as follows:

DataType R:

TotalNo – report the total number of fish of one species, sex, and category in the given haul;

CatIdentifier – report category within species and sex. The field can be used to categorize fish with different size or weight categories. Categories within one haul, species, sex, can have different sub-factors. The field cannot be reported as 0, use 1 if only one category is present.

NoMeas – report number of fish measured for the given haul or sub-sample, species, and sex.

SubFactor – sub-sampling factor by haul, species, sex, length. Value = or > 1. Make sure that TotalNo = NoMeas x SubFactor

SubWgt – report the total weight of sub-sampled fish reported in NoMeas.

CatCatchWgt – report catch weight of fish per species, sex, and category in the given haul (as in TotalNo).

HLNoAtLngt – report number of fish for this sex of this species, in this category in the haul. Make sure that TotalNo = Sum (HLNoAtLngt) x SubFactor or NoMeas = Sum (HLNoAtLngt).

DataType S:

TotalNo – report the total number of fish of one species, sex, and category in the given haul;

CatIdentifier – report category within species and sex. Categories within one haul, species, sex, can have different sub-factors. The field can not be reported as 0, use 1 if only one category is present.

NoMeas – report number of fish measured for the given haul or sub-sample, species, and sex.

SubFactor – sub-sampling factor by haul, species, sex, length. Value is always > 1. Make sure that TotalNo = NoMeas x SubFactor

SubWgt – report the total weight of sub-sampled fish reported in NoMeas.

CatCatchWgt – report catch weight of fish per species, sex, and category in the given haul (as in TotalNo).

HLNoAtLngt – report number of fish for this sex of this species, in this category in the haul. Make sure that TotalNo = Sum (HLNoAtLngt) or NoMeas = Sum (HLNoAtLngt)..

DataType C:

TotalNo – report the total number of fish of one species and sex in the given haul, raised to 1 hour hauling;

CatIdentifier – report 1.

NoMeas – report number of fish measured for the given haul or sub-sample, species, and sex or report -9.

SubFactor – report 1.

SubWgt – report the total weight of sub-sampled fish reported in NoMeas or report -9.

CatCatchWgt – report the total catch weight per species per haul, raised to one hour of hauling.

HLNoAtLngt – report number of fish for this sex of this species in the haul adjusted to one hour of catching. Make sure that TotalNo = Sum (HLNoAtLngt).

What is CatIdentifier, and how do I use it for my data?

The CatIdentifier is the ID number given to a particular subsampling for species, length and sex.

During the length distribution sampling, when a truly representative subsample cannot be selected, it is necessary to further sort the species into two or more size grades or categories.

That would usually mean that a group of larger (or smaller) fish is sorted away from the rest of the catch of the same species. In further processing, this category of fish would get a different sub-sampling factor than the rest of the catch of the same species in the haul.

Some examples about categorization can be read in the [NS-IBTS survey manual](#) (section “Length composition”)

The correct approach to report categorization to DATRAS is to use the field CatIdentifier. Then one size-group of species would get assigned CatIdentifier = 1, and will have a certain SubFactor reported, while the other size-group of the same species in the haul would get CatIdentifier = 2, and will have another SubFactor reported. There can be reported up to 5 categories per species in one haul.

If no categorizing was made, CatIdentifier should be reported as 1 as follows of that the whole catch was treated as one category.

Which area/position should I report in my file?

There are several places in DATRAS, where area of fishing is reported.

Hauling coordinates and statistical rectangle are reported in HH-record. You can find more information about ICES statistical rectangles on <http://geo.ices.dk/>.

If sampling is made by areas that include depth strata, the strata are reported in the field “Stratum” in HH-record.

In addition, in CA-records area types and area codes are reported according to the method of age sampling (with the prospect on how the survey indices are calculated). Look up <http://www.ices.dk/datacentre/datsu/selrep.asp> for stratum and area codes relevant for your survey.

What should I report in the Ground rope weight field?

This issue is to be discussed during IBTSWG meeting 2012. For other surveys contact your expert group.

What is species validity (SpecVal)?

Species validity is a code that allows DATRAS to sort which data should be used for indices calculation, and which should not. Species validity code is related to the haul validity code in HH-record. If the haul was invalid, or was used for calibration, all species caught in the haul will be not valid for data product calculation (that would be reflected in the SpecVal field). But the data might still be valuable for example. assessment of the age-length distribution of the species in the area or biodiversity studies.

Species codes and species code types.

Please make sure that Species Code and Species Code Type follow the same type –
For TSN codes, Species Code Type should be T;
for Aphia/WoRMS species codes the Species Code Type should be W.

I get an error message when I try to upload my data with TSN species codes.

For now, please overrule the error message and submit the data with TSN species codes. The error is there because DATRAS submissions were supposed to migrate to WoRMS species codes in the spring of 2012. However, not all countries are ready to submit in AphiaID, so for the time being all submissions must be made using TSN codes.

How do I convert my species codes from Aphia to TSN?

Please have a look at the lookup table found on our species query tool page http://datras.ices.dk/Data_products/gryspec.aspx

ICES DATRAS FAQ for Data Submitters

Version Number	Release Date	Note
1	May 8 2012	Initial version, reviewed by ICES Data Centre

**Working Document presented to the IBTSWG
Lorient, 27-30th April 2012.**

Comparisons between Megrim (IVa and VIa) CPUE indices derived from DATRAS exchange data and data received directly from national laboratories.

Norman Graham, Marine Institute, Galway, Ireland

Background

There has been no analytical assessment of megrim in ICES division VI since 2000 and no assessment of megrim in IV has ever been presented. Missing or low age sampling from both VI and IV has hampered the development of an age-disaggregated assessment approach. During WKFLAT (2011, 2012) and WGCSE 2011 work on an age-aggregated dynamic production model has been progressed for this stock and is currently undergoing review through an inter-benchmark process (IBP-MEG, 2012).

Input data for biomass dynamic model

Surplus production methods (Schaefer, 1954; Pella Tomlisson, 1969) offers a potential modelling approach to resolve the issue of data poor classification due to the absence of reliable catch at age data. Surplus production pools the overall positive contributory effects (growth and recruitment) with removals due to mortality into a single production function, thus the stock is considered solely in terms of biomass without regard for differences in age, size of sex structure. Surplus production models are commonly used when only relative biomass indices, either from survey or from commercial fisheries, and landings data are available.

Indices from 6 fishery independent surveys are used (Table 1). These comprise of the Scottish North Sea IBTS survey (IBTSWG, 2011), Scottish quarter 1 (ScoGFS-WIBTS-Q1) and quarter 4 (ScoGFS-WIBTS-Q4) West of Scotland survey and the Scottish (SAMISS-Q2) and Irish (IAMISS-Q2) dedicated anglerfish survey (Table 1) which provides estimates of absolute biomass and abundance (see Reid et al, 2007 for further details), however the survey also catches significant quantities of megrim, but as there are no estimates of catchability, for the purposes of this work, the indices are treated in a relative sense.

The uncertainty surrounding each survey index (observation error) can be estimated within the assessment model or estimated externally and entered into the assessment model as a fixed quantity. Bootstrapping provides estimates of uncertainty but these may be artificially small (unsuitable) to a fixed-station survey design. Stefánsson (1996) provides analytical methods for the estimation of the variance of the delta-gamma method but cautions against the use of those variance forms because of concerns regarding the correct number of degrees of freedom. Ultimately, the uncertainty of the delta-gamma method may best be estimated in a Bayesian framework. For the present analysis the mean delta-gamma CPUE estimates are used (for the IBTS surveys only) and allowed the model to estimate the measurement error of each survey.

Number	Survey	Nationality	Area	Time Series
1	Sco-IBTS-Q3	Scotland	IVa	1987 - 2011
2	Sco-IBTS-Q1	Scotland	IVa	1987 - 2011
3	ScoGFS-WIBTS-Q1	Scotland	VIa	1986-2011
4	ScoGFS-WIBTS-Q4	Scotland	VIa	1986-2011
5	SAMISS-Q2	Scotland	VIa*/IVa	2005-2011
6	IAMISS-Q2	Ireland	VIa*	2005-2011

Table 1. Survey indices used for surplus production model.

*VIa data from IAMISS-Q2 and SAMISS-Q2 combined into a single CPUE estimate with variance

Data Issues surrounding the IBTS survey indices

Initially, the CPUE indices from individual surveys were estimated from the exchange data extracted from DATRAS. Due to missing catch weight data per tow, catch weights were estimated by applying a standard mean weight at length to the numbers caught at length. A number of concerns were raised when comparing the total number of fish recorded and the sum of the length frequencies, used as a quality check before estimating the CPUE indices. As a consequence, it was decided to approach national laboratories to obtain the national survey data and to compare these with the exchange data obtained from DATRAS. Figure 1 shows the bootstrapped CPUE estimates for megrim derived from the DATRAS exchange data (left hand panels) and contrasted with the bootstrapped CPUE estimates derived from the data received from national authorities. Unfortunately, only data from the UK (Scotland) was obtained, but it is clear that there are a number of discrepancies between the two, both in terms of CPUE trends and/or absolute estimates of CPUE (scale).

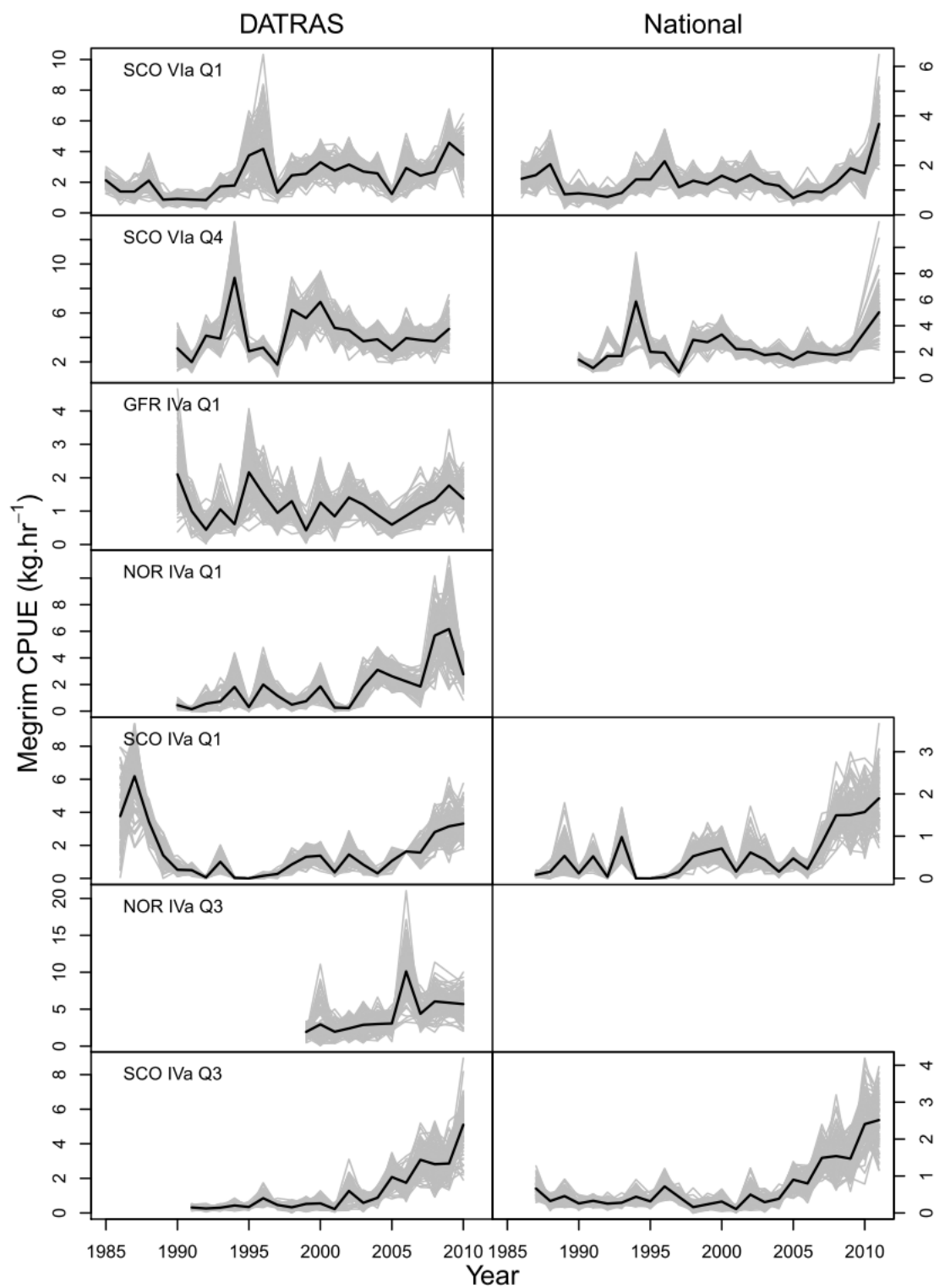


Figure 1. Comparison of bootstrapped CPUE trends derived from DATRAS exchange data and bootstrapped CPUE derived from national (Scottish) data.

It has not been possible at this stage to dig further into the possible causes of these differences, but an initial comparison of two positions from the two data sets suggests (particularly for IVa) that there are a substantial number of hauls given in national data set missing in the DATRAS exchange data (figure 2).

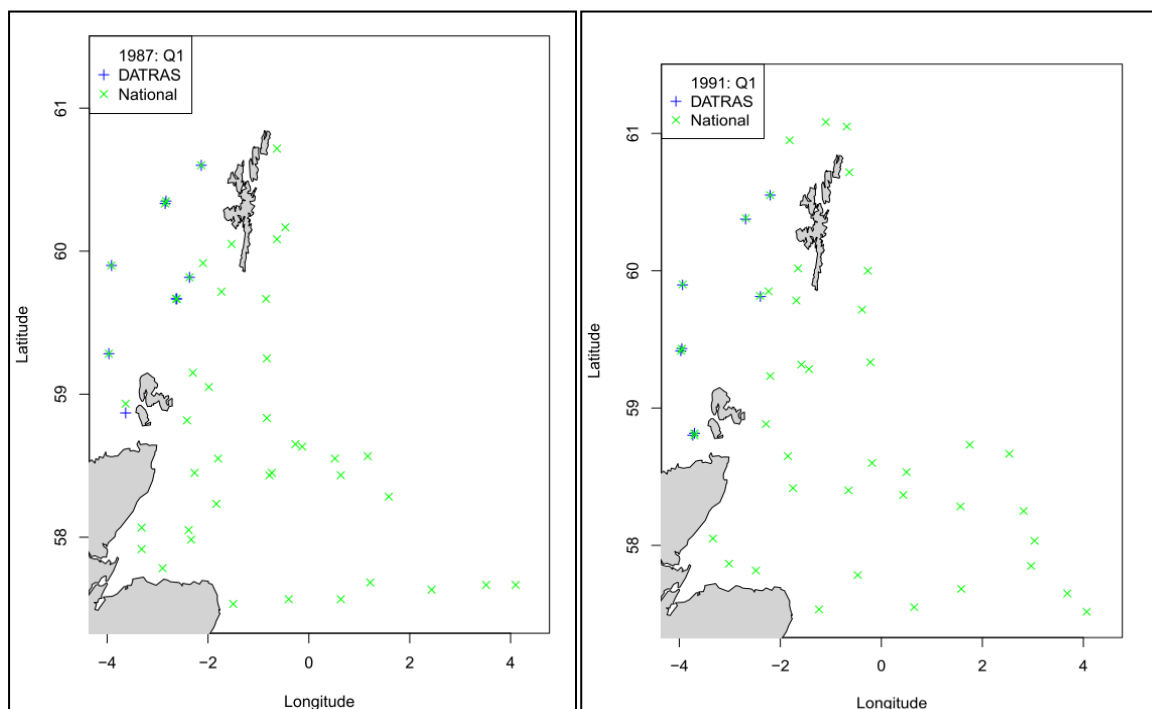


Figure 2. Two examples of missing observations when contrasting data received from national laboratories with those extracted from DATRAS exchange data.

Due to the apparent discrepancies shown in the example above, until such time as these are resolved, it was decided to only use the data obtained from the national laboratories as input into the biomass dynamic model. Obviously, this is a sub-optimal solution for obtaining and selecting input data for the assessment, ideally the data from all useful surveys should be used and that this should be housed and obtained from a central data base i.e. DATRAS

Conclusions

Further analysis and data quality checks may be required to ensure that data being uploaded to DATRAS is the same as data extracted using the DATRAS exchange query. In the case presented here, it is important to identify where and critically, why these discrepancies have occurred and if these are associated with the DATRAS then remedial steps e.g. further QA steps should be considered.



Benthic Macrofaunal Observations Onboard Fish Assessment Research Surveys

Thibaut Nebout⁽¹⁾, Aurélie Foveau ⁽²⁾, Sandrine Vaz⁽³⁾, Nicolas Desroy ⁽²⁾

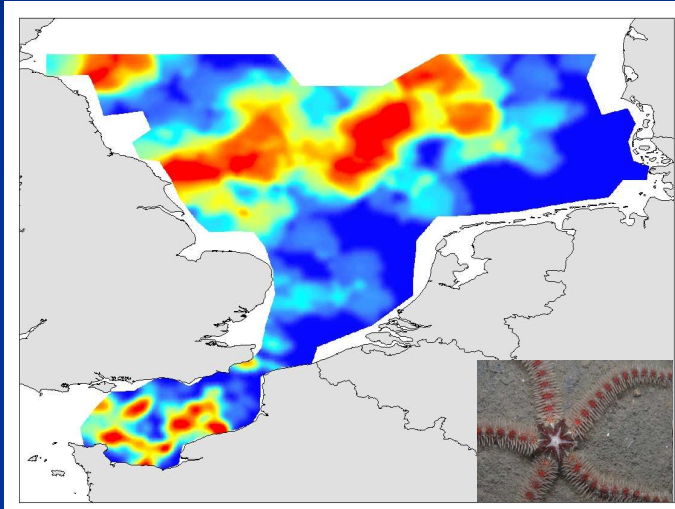
(1) MNHN, CRESCO Dinard (2) Ifremer, CRESCO Dinard (3) Ifremer Boulogne-sur-mer

Lorient, IBTS WG, 29 mars 2012

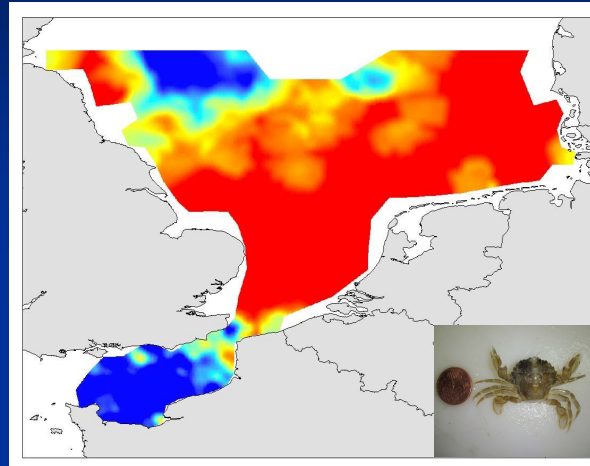
Introduction

- Lack of information on offshore species and assemblages at mesoscales
- The use of fish assessment research survey enables the observation of macrofauna on large geographic areas (trawl vs grab)
- Species collected by trawling represent essentially the sessile part of the macroinvertebrate fauna : the most susceptible to be disturbed by trawling activities

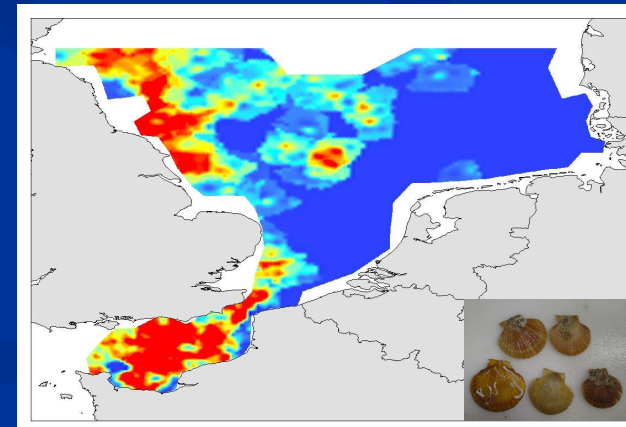
➤ Distribution of macro-epibenthic invertebrates using samples collected during bottom trawl surveys



Distribution of *Ophiotrix fragilis* (a common brittle star)

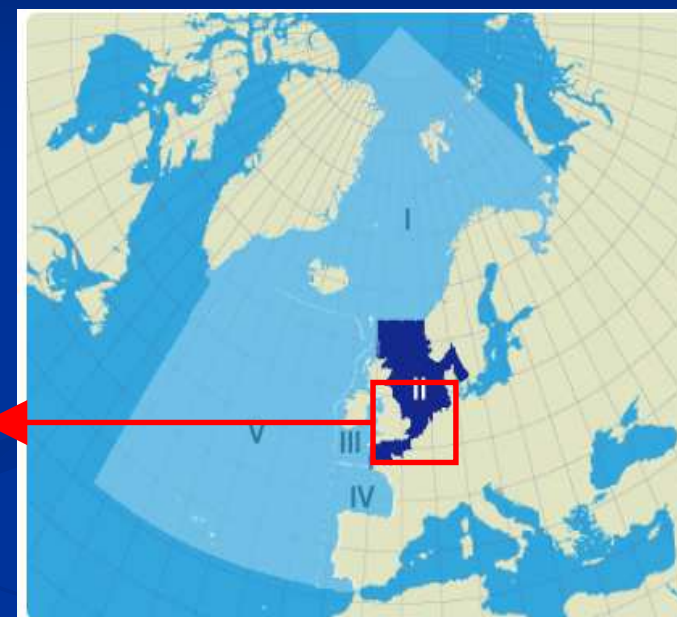
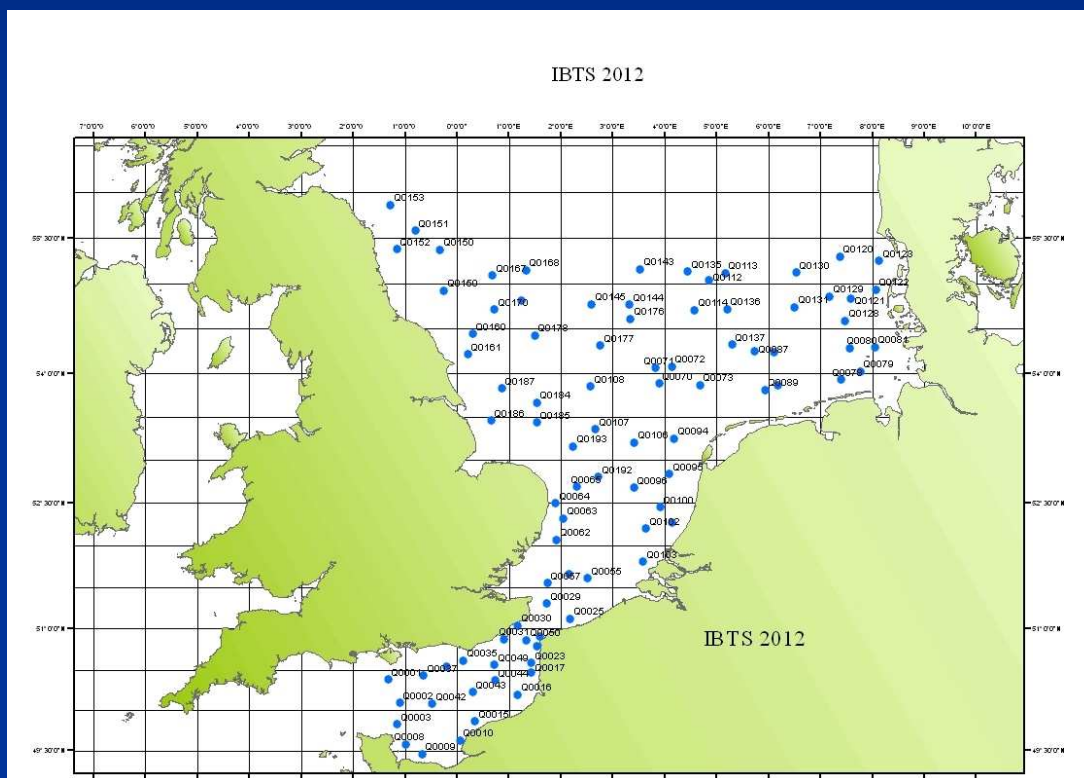


Distribution of *Liocarcinus holsatus* (swimming crab)



Distribution of *Aequipecten opercularis* (Queen scallop)

IBTS - OSPAR Region II



The North East Atlantic

- Region I Eaux Arctiques
- Region II Mer du Nord au sens large
- Region III Mers celtiques
- Region IV Golfe de Gascogne et océaniques
- Region V Atlantique au large

***Region 2: The Greater North Sea is one of the busiest maritime areas. Offshore activities related to the exploitation of oil and gas reserves, and maritime traffic are very important. Two of the world's largest ports are situated on the North Sea coast, and the coastal zone is used intensively for recreation. The Greater North Sea is surrounded by densely populated, highly industrialised countries.

➤ 1 species and 3 habitats threatened and/or declining

TABLE 10.2 OSPAR List of threatened and/or declining species adopted in 2003 (*species added in 2008) and the current key pressures with impacts on the species listed.

Species	Scientific name	Regions where species occurs (○) and has been recognised by OSPAR to be threatened and/or declining (●)					Key pressures
		I	II	III	IV	V	
Ocean quahog	<i>Arctica islandica</i>	○	●	○	○		



TABLE 10.3 OSPAR List of threatened and/or declining habitats adopted in 2003 (*habitats added in 2008) and the current key pressures with impacts on the habitats listed.

Habitat	Regions where habitat occurs (○) and has been recognised by OSPAR to be threatened and/or declining (●)					Key pressures
	I	II	III	IV	V	
Shelf sea habitats						
<i>Modiolus modiolus</i> beds	●	●	●	●		
<i>Sabellaria spinulosa</i> reefs	○	●	●	○	○	
Maerl beds	○	○	●	○	○	
Sea-pen and burrowing megafauna communities	○	●	●	○		



KEY TO TABLES 10.2 AND 10.3: ☀ Climate change; pH↘ pH changes; ☁ Hydrological changes; ☠ Hazardous substances; ⚡ Oil pollution; 🌱 Nutrient and organic enrichment; 🗑 Litter; 🔊 Underwater noise; 🚫 Barriers to species movement; 🚢 Death or injury by ship strikes; 🏗 Siltation rate changes; 🌳 Habitat damage; ✂ Habitat loss; 🦠 Microbial pathogens; 🐙 Introduction of non-indigenous species and translocations; 🚮 Removal of target and non-target species; 🐟 → Predation; 🐟 ✂ Loss of prey species; 🌐 Threats outside the OSPAR area

A- Ocean quahog - *Arctica islandica* (Linnaeus, 1767)

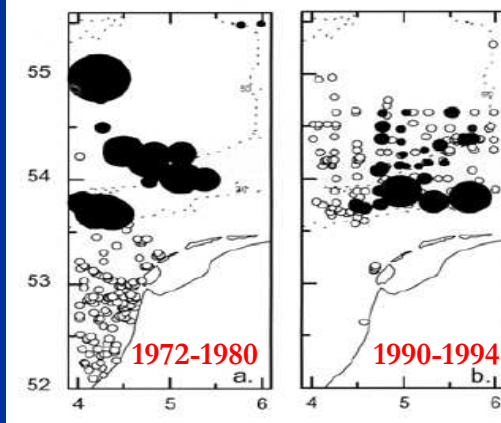


Arctica islandica

- A species in decline

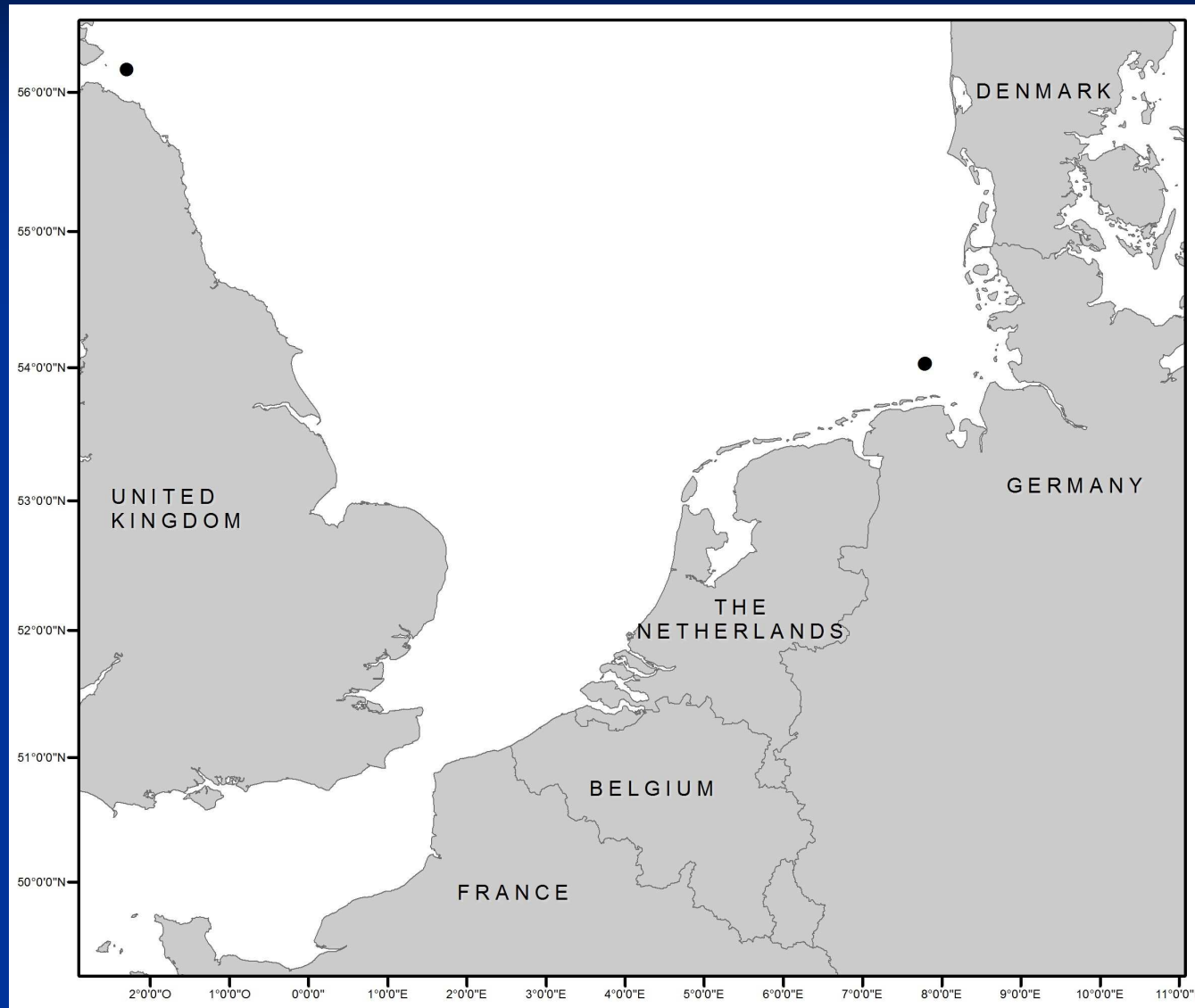


A Comparison of Relative Densities of *A.islandica* in the south-eastern North Sea (Fig. 2.2 from Whitbaard, 1997).



- A sensitive species
- A threatened species

Distribution of *Arctica islandica* from IBTS and CGFS from 2006 to 2012



B- *Modiolus modiolus* beds

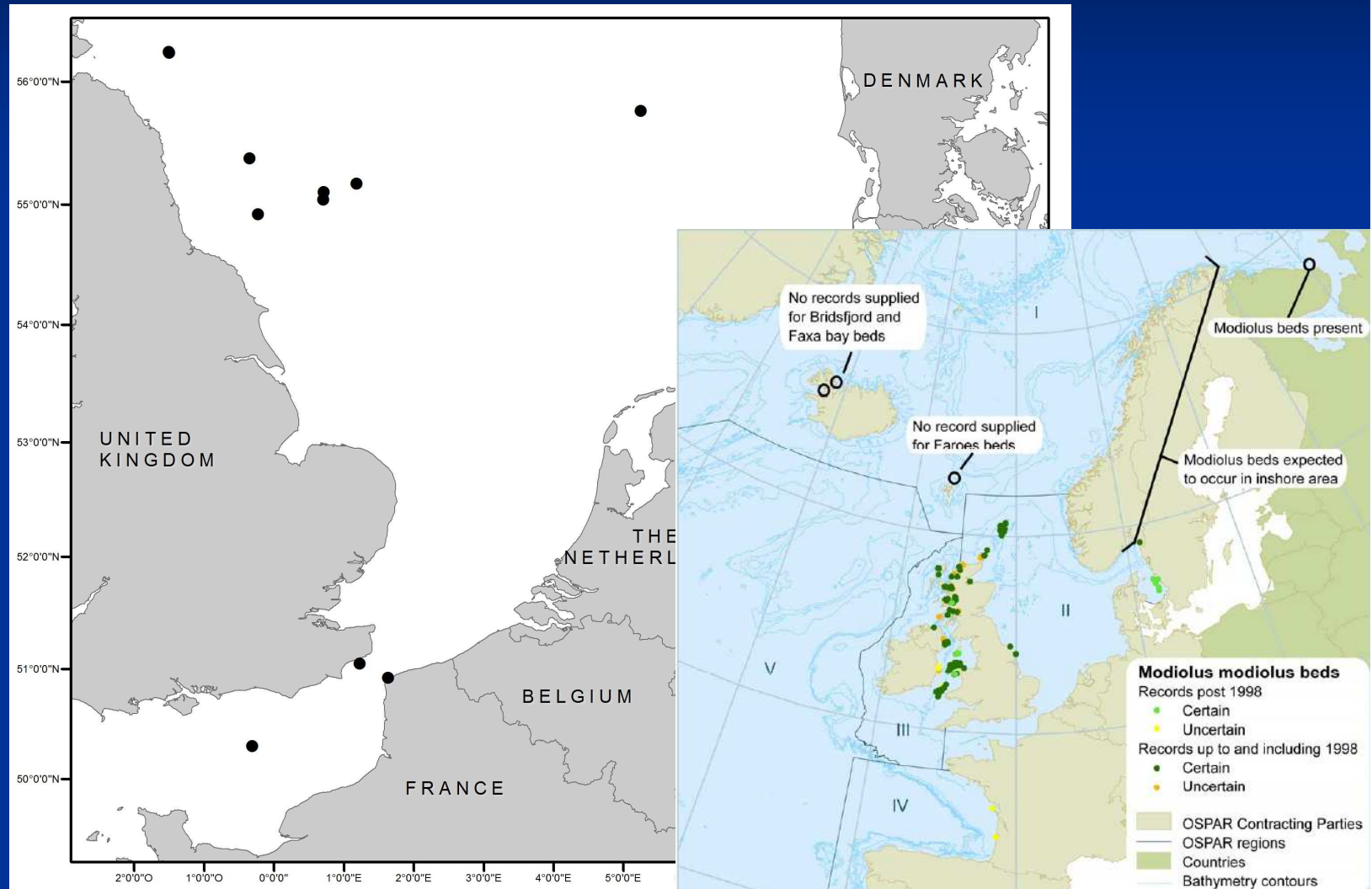


Modiolus modiolus beds

- Low resilience of the habitat
- High sensibility to physical disturbance



Distribution of *M. modiolus* beds from IBTS and CGFS from 2006 to 2012

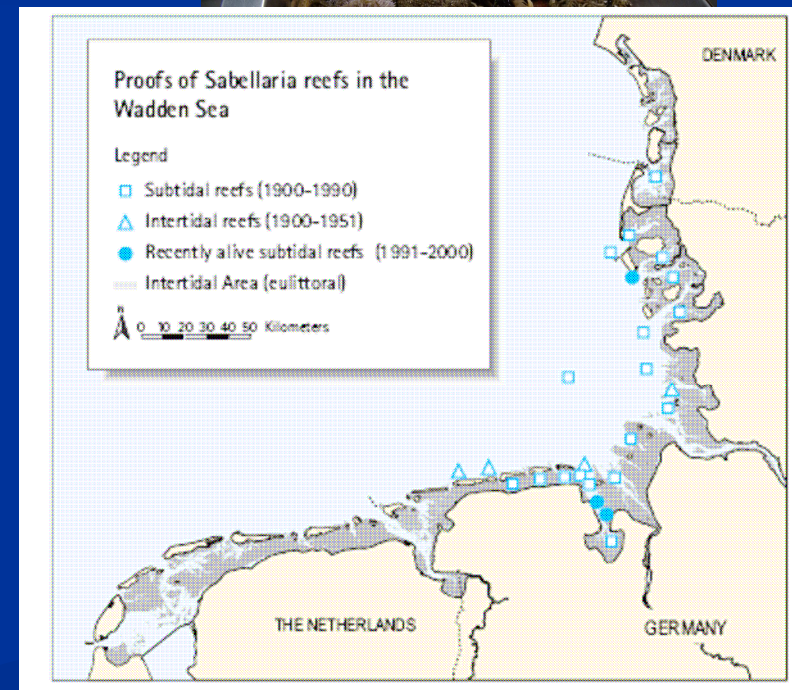


C- *Sabellaria spinulosa* reefs

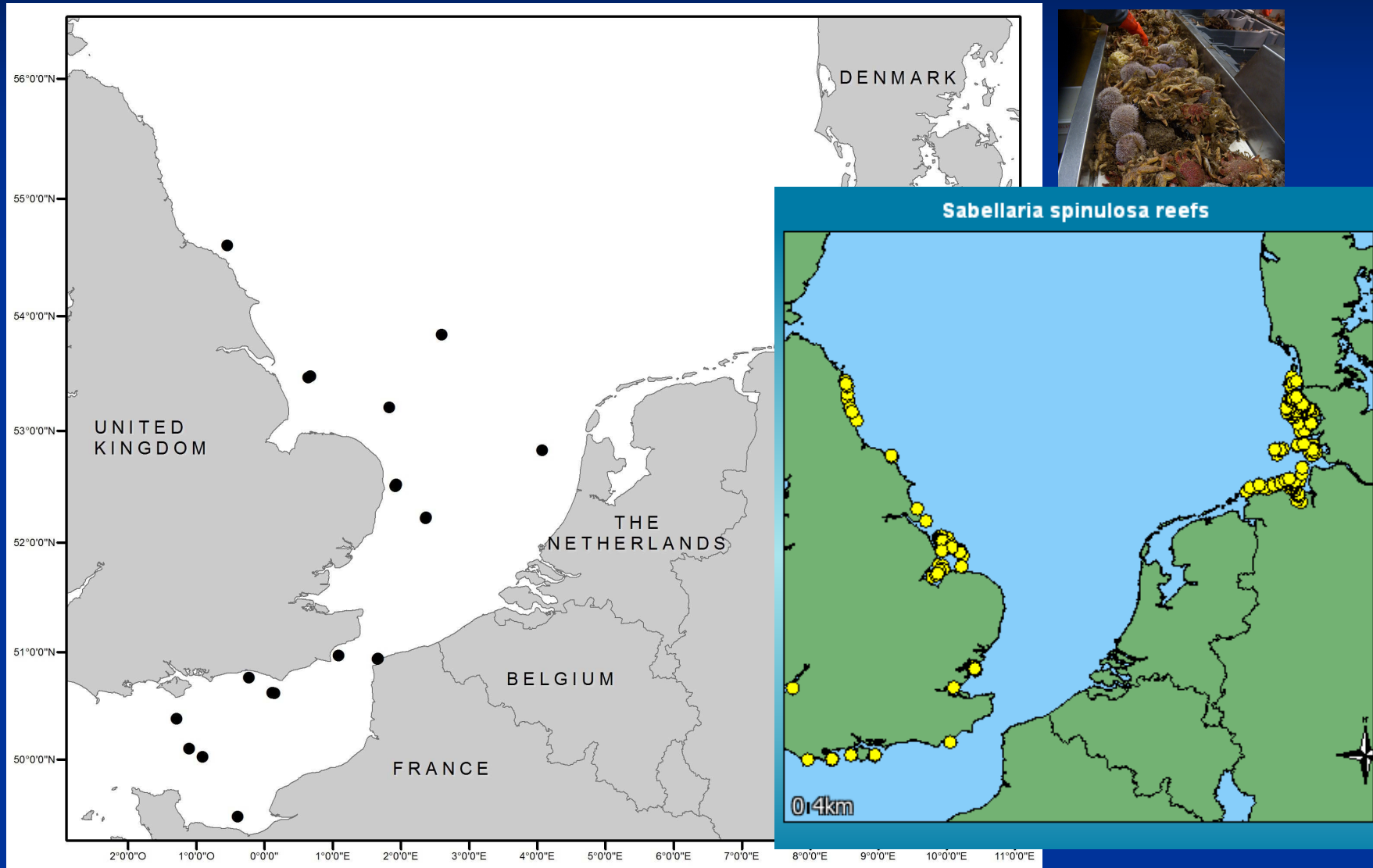


Sabellaria spinulosa reefs

- Ecologically significant
- An habitat in decline
- A rare habitat
- A sensitive habitat
- A threatened habitat

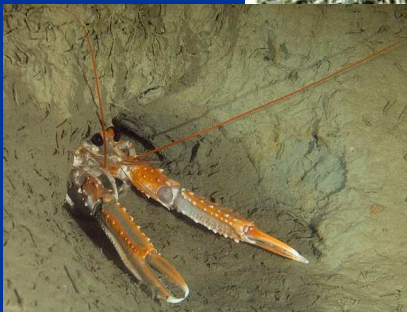


Distribution of *Sabellaria spinulosa* reefs from IBTS and CGFS from 2006 to 2012



D- *Seapen and burrowing megafauna*

Virgularia mirabilis



Pennatula phosphorea

Table 2. Summary of key threats and impacts to sea-pen and burrowing megafauna communities.

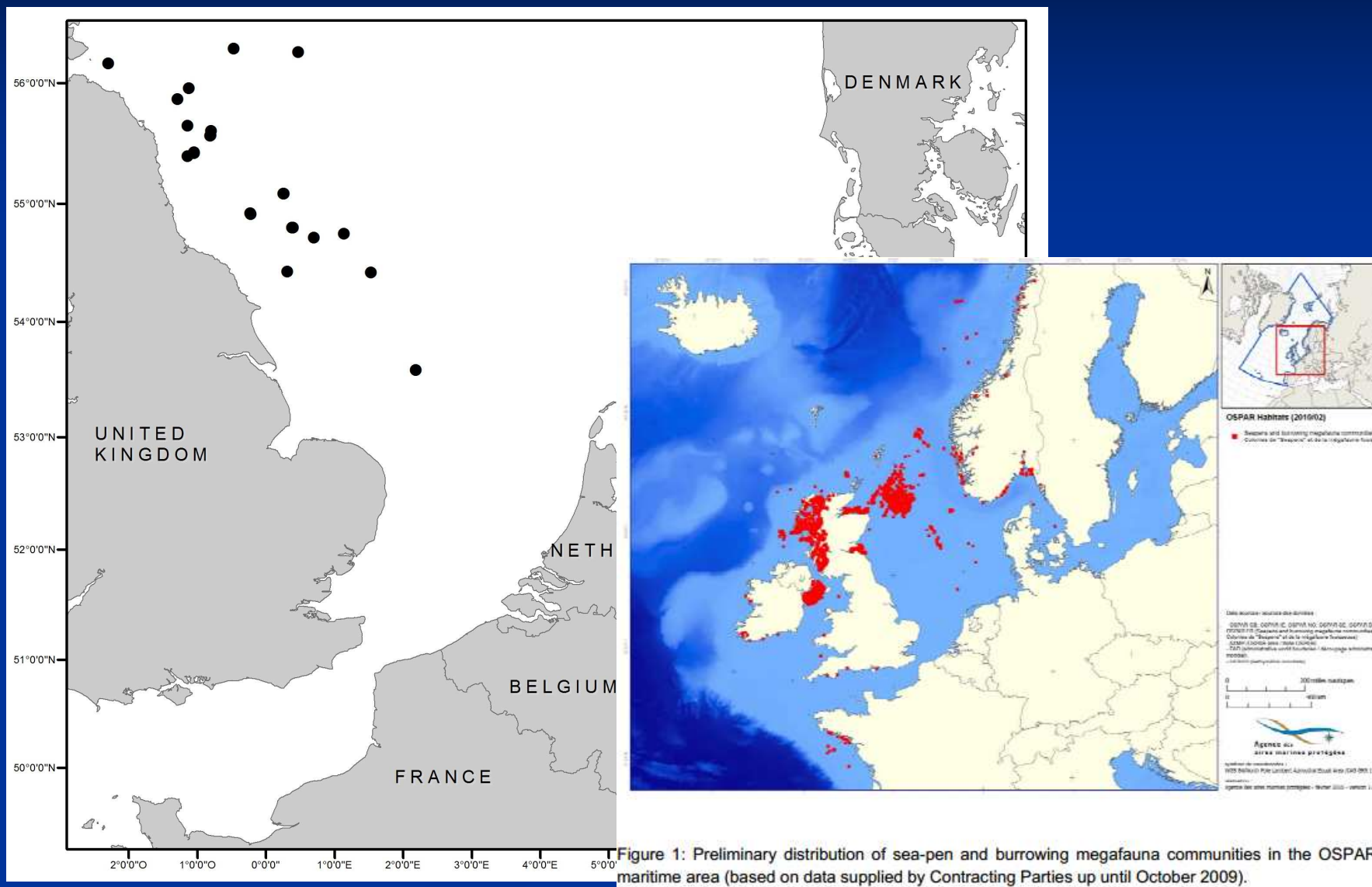
Type of impact	Cause of threat	Comment	Scale of threat
Habitat degradation through nutrient changes	Aquaculture organic pollution	Marine fin-fish farms are often sited within Scottish sea lochs and may have direct effects on mud communities, including smothering and increasing the Biological Oxygen Demand of the mud. Nutrient enrichment leading to eutrophication can have significant but localised detrimental effects.	Low
Habitat alteration through community shifts	Climate change	A change in climate could lead to variable recruitment through changes in mortality rates of early life stages, for example, differences in sea temperature and wind induced wave action might affect the survival of larval <i>Nephrops</i> either directly or by regulating food supply. This threat is largely theoretical at present and not of immediate concern.	Low
Habitat degradation through physical damage	Bottom trawling fisheries	In terms of habitat function, bottom trawling acts by removing some species, rejecting non-commercial species and by damaging the more fragile benthic species. A shift in the benthic community interactions therefore ensues. Bottom trawling has many direct and indirect impacts, the latter of which have a greater impact (Le Loc'h, 2004). The mortality of benthic invertebrates that are removed as trawl bycatch is high but the mortality rates caused by bottom trawling are significantly higher for animals that remain on the seabed (Queiros, 2006). Large, slow-growing species such as sea-pens are particularly vulnerable to trawling disturbance, while smaller individuals and species suffer lower mortality rates (Dinmore et al., 2003). Considering the global benthic community, differential vulnerability to trawling leads to lower biomass and production of communities in heavily trawled areas and a dominance by smaller, faster growing individuals and species (Jennings et al., 2001). Nevertheless, Vergnon and Blanchard 2006 note that megafauna (both <i>Nephrops</i> and other non-commercial crustaceans) do not experience any reduction of their total biomass or abundance in highly exploited sites.	High
Habitat loss or alteration	Infrastructure development (dam construction, coastal development, oil & gas exploitation)	The construction of roads, bridges and barrages may affect the local hydrodynamic and sediment transport regimes of inshore enclosed areas and consequently affect the deep mud substratum. Offshore oil rigs and other oil installations can cause a variety of disturbance effects such as smothering due to disposal of drill cuttings, localised disturbance of sediments due to anchors and rig feet placement and trench digging for pipelines.	Low

- The highest threat is the bottom trawling fisheries

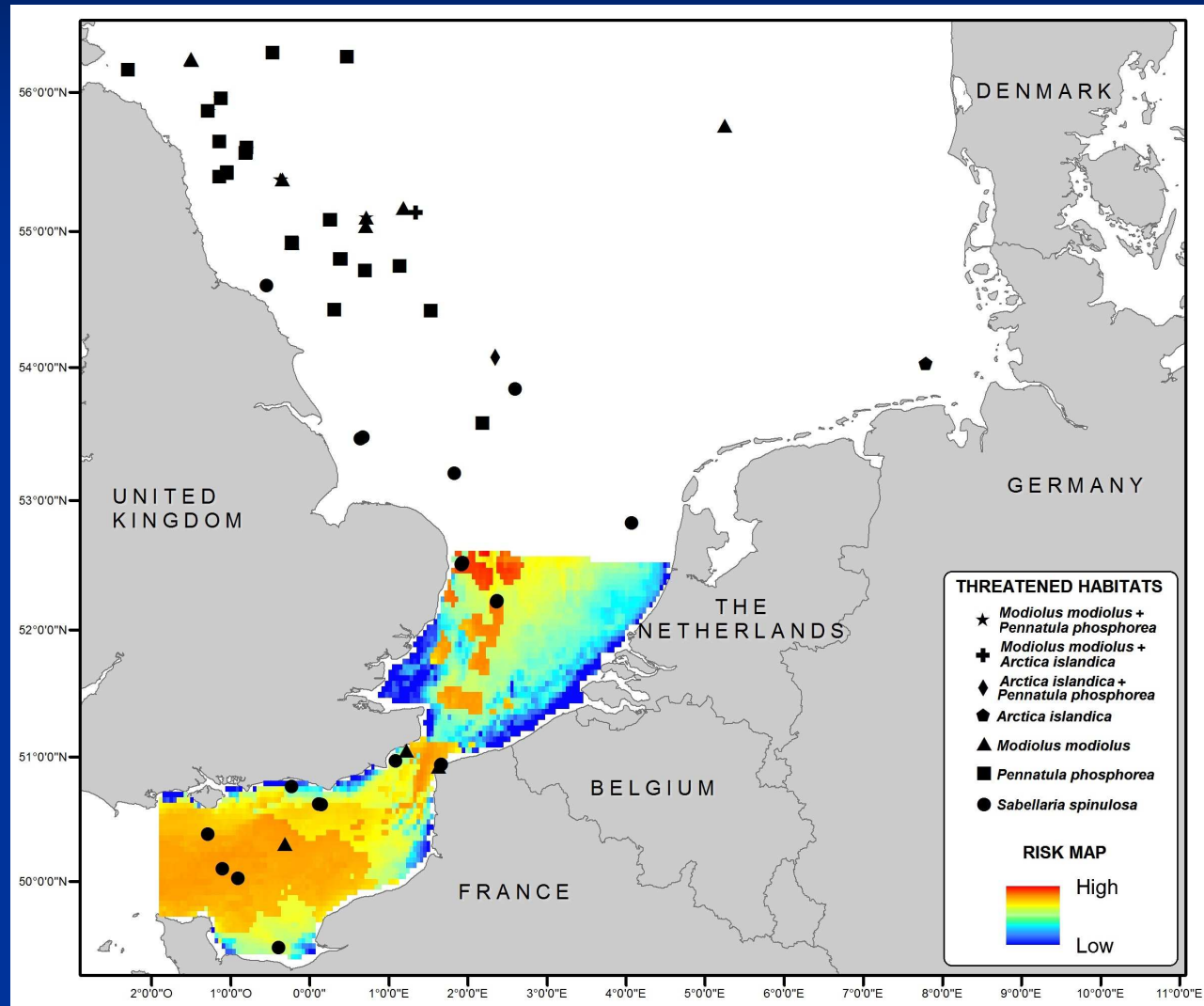
- No detailed mapping of this habitat is available

- Limitations in knowledge

Distribution of *Pennatula phosphorea* from IBTS and CGFS from 2006 to 2012



Distribution of threatened habitats plotted against risk



Conclusion

- This kind of information may be very relevant to **plan future human activities** in the area and to **mitigate potential bottom fishing impacts**
- Use **underwater video** before each bottom trawl haul to avoid the destruction of threatened benthic habitats
- Report our observations to the **OSPAR habitat mapping programme** (OSPARmapping@jncc.gov.uk)

**Thank you for your
attention**

”Bad Hair Day”

Acoustic Survey for Spawning Saithe in the North Sea 1st quarter
2012

Institute of Marine Research

14.02.2012



Introduction

Several attempts have been made to establish fishery independent survey series for saithe in the North Sea. Saithe is spawning in the first quarter and this is an attempt at an acoustic survey targeting spawning aggregations of saithe. It is likely that this is the time of year where the spawning stock is most accessible for a survey (forming spawning aggregations) and we believe that the area covered will be far less than during periods with more intense feeding and feeding migrations.

Area covered

The choice of area coverage was based on logbook information from Norwegian fishermen for the period 2000 to 2011. On the average is well above 90% of the commercial catches taken within the survey area. Fishing further south along the Norwegian deep represents on average 1% of the total. 1st quarter biological samples from the commercial fishery within the survey area have generally a large mean weight indicating that most fishery is targeting spawning aggregations.

Stratification

The survey area has been divided into 6 strata (see Figure 1). S3 and S4 are the strata with the highest proportion of catches followed by S2 and S6. The fishing effort itself is less and more concentrated in a more “narrow strip” and a shorter depth range than in S3 and S4. Strata S1 and S5 contains less fishing effort of a more sporadic nature varying between years. Traditional stratification assumes or utilizes more homogenous populations within the stratum and this may very well hold for population parameters. There is a strong tendency that estimates of fish abundance have a standard deviation proportional to the abundance. This

implies that proportional sampling (density of samples) may be close to optimal in estimating total abundance (index/indices of abundance).

Acoustic transects

Acoustic transects represents an integration over depth and distance and should and the result represents a reduction of the observed three dimensions to a single dimension (embedded in this is the assumption of no measurement error, which will not hold at shallow depths where objects directly in the path of the vessel can avoid detection). The acoustic observations may be biased due to a range of issues including species identification, “dead zone loss” and varying target strength (the average angle the acoustic signal “hits” the target/swimbladder with, may vary). See Figure 2 and Figure 3.

Acoustic settings

See also Hansen, K. and Knudsen, H.P. 2006.

The following should be viewed as guidelines:

Bottom channel 10meters above bottom and use 0.5 meter bottom offset if conditions permits. At depths less than 200 meters the “bottom detection minimum” should be set within the range -40 to -45 dB. At larger depth or in poor weather conditions this threshold could be set as low as -55 dB.

Integration of echo abundance is made using LSSS (Large Scale Survey System).

S_V threshold in LSSS should be -82 dB when storing acoustic records.

Changing SV during scrutiny of echograms is a valuable tool for identifying some species groups. As an example will a threshold of -69 (± 3 dB) be quite effective to mask plankton echo.

The acoustic values should be stored with 10 meter resolution vertically and 1 nm horizontally.

Species groups

Group	Target category
Herring	1
Other pelagics	3
Cod	2
Haddock	2
Haddock	2
Saithe	1
Plankton	3

Trawl stations

Trawl station information is used twice. Firstly to assist in distributing echo abundance between species groups. Secondly as to further characterize and convert echo abundance into numbers of fish. This in combination with trawl samples not being part of a formal survey

design can lead to the introduction of serious bias. On the other hand can relatively large proportions occupy a relatively small area and trawl samples from such areas will be very valuable to characterize the structure of the fish population while this is independent to the overall abundance based on the formal acoustic survey transects.

The number of trawl stations should be higher in areas/strata with the most fish and one should aim for at least 5 trawl station in the strata S2, S3, S4 and S6. Catch rates of saithe are highly variable and one must consider using manual weighting of each station using “good judgement” while considering the acoustic observations. Trawl information can be re-used meaning that trawl stations taken outside a stratum can also be included. For this survey this may be the solution for stratum S1 and S5.

Length distributions

Estimates of length distributions are essential for converting echo abundance into numbers of fish. This information is also used in distributing echo abundance between species so there is a need for length samples of all fish “visible” in the water column. Please note that any prediction of s_A distribution between species based on trawl samples should adjust for length dependent selectivity of the sampling trawl. Smaller fish (like Norway pout) is caught with less efficiency than larger fish and this should be taken in to account and properly adjusted for.

Biological sampling

Indices of abundance (numbers at length) is further characterized based on biological samples (weight, age, sex, maturity stage, spawning checks etc.) and are sampled with a further stratification on length (5 specimen per 5cm length groups of saithe). This implies that any generation of age length keys can't use unweighted information. As a rule of thumb should each single fish observation be given a weighting factor. Weighting factors should add to the corresponding abundance index (by stratum and lengthgroup).

Environmental data

Distributional changes over time (between years) will be an issue and additional information is needed when searching for causal mechanisms. Information from CTD stations is one such source of information. See Figure 4.

References

Hansen, K. og Knudsen, H.P. 2005. Prosedyre for innsamling og bearbeiding av akustikkdata versjon 3.0. Håndbok for innsamling og bearbeiding av akustikkdata. Havforskningsinstituttets kvalitetssystem.

Hansen, K. og Knudsen, H.P. 2006. Instruks for innsamling og bearbeiding av akustikkdata versjon 2.0. Håndbok for innsamling og bearbeiding av akustikkdata. Havforskningsinstituttets kvalitetssystem.

Hansen, K., Knudsen, H.P. og Ona, E. 2006. Instruks for tolking og kvalitetsmerking av akustikkdata versjon 2.0. Håndbok for innsamling og bearbeiding av akustikkdata. Havforskningsinstituttets kvalitetssystem.

Mjanger, H., Hestenes, K., Svendsen, B. V. og Wenneck, T. d. L. 2007. Håndbok for prøvetaking av fisk og krepsdyr. Versjon 3.16, opplag januar 2011. Havforskningsinstituttets kvalitetssystem.

Wenneck, T. d. L., Hestenes, K., Svendsen, B. V. og Else, H. 2010. Prosedyre for håndtering av fisk og krepsdyrdata versjon 2.4.7. Havforskningsinstituttets kvalitetssystem.

Tables

Design	Stratum	Description	Area (nm ²)	Distance between transects (nm)	Length of course tracks (nm)	Direction	Comments
ver. 1 (6/12 nm)	S1	Schiehallion	636.1	12		315°/135°	
	S2	Otter bank	1125.9	6	327	315°/135°	
	S3	Tampen W	1508.2	6	327	315°/135°	
	S4	Tampen N	2039	6		225°/45°	
	S5	Tampen S	2694.8	12	732	225°/45°	
	S6	Tampen E	1176.3	6	248	225°/45°	
1634							
ver. 2 (7/14 nm)	S1	Schiehallion	636.1	14		315°/135°	
	S2	Otter bank	1125.9	7	314	315°/135°	
	S3	Tampen W	1508.2	7	694	315°/135°	
	S4	Tampen N	2039	7	198	315°/135°,225°/45°	
	S5	Tampen S	2694.8	14		315°/135°	
	S6	Tampen E	1176.3	7	211	225°/45°	
1417							

Figures

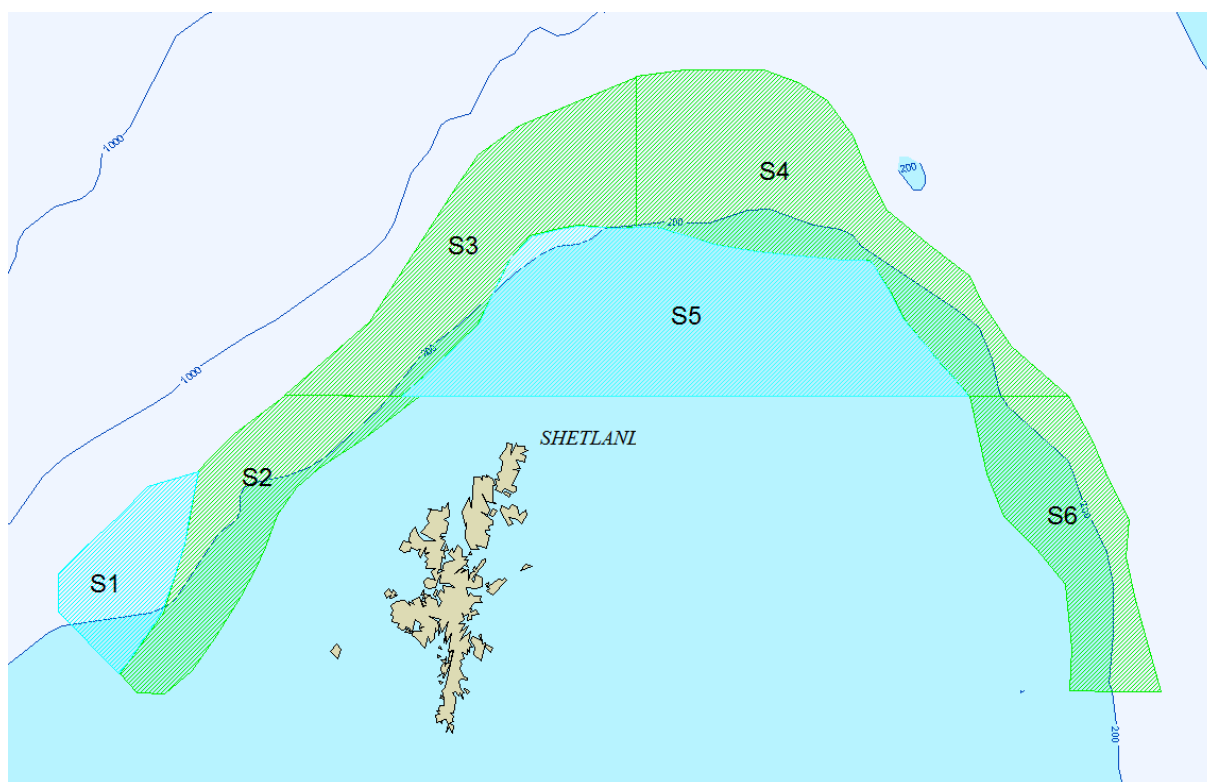


Figure 1 Strata system. Schiehallion, Otter bank, Tampen

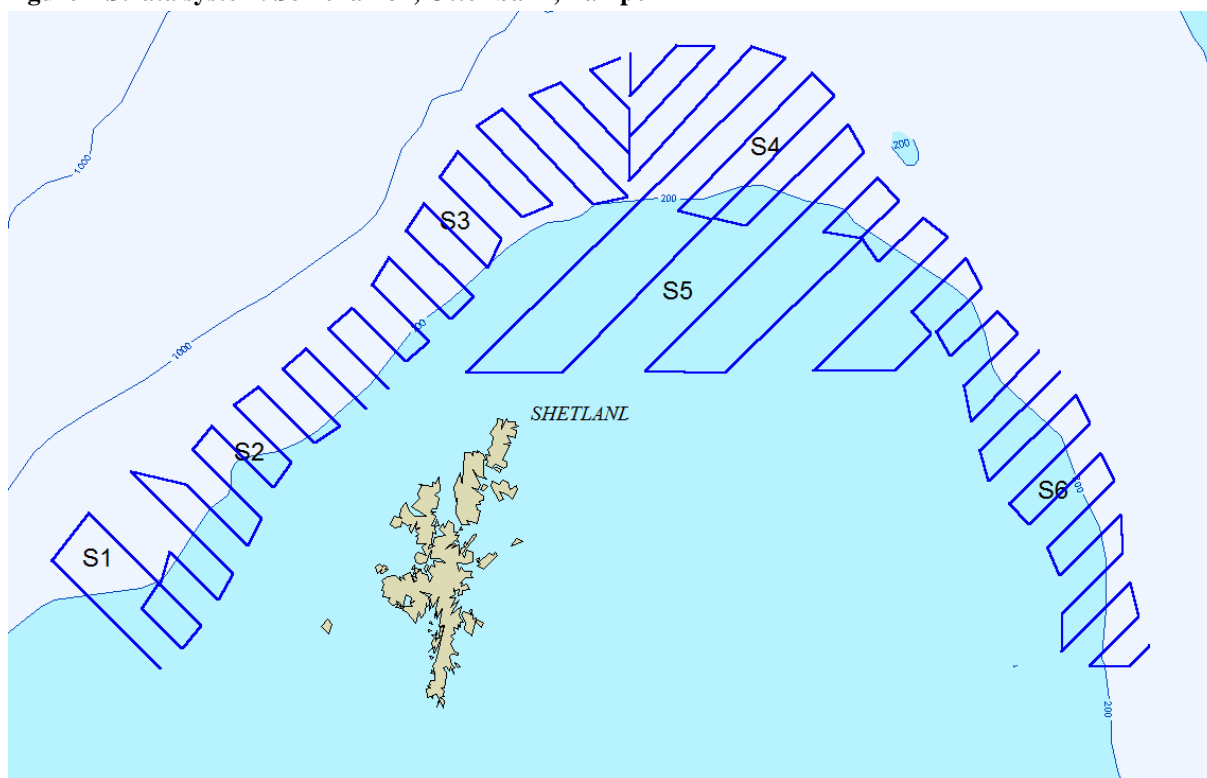


Figure 2 Course tracks: Alternative 1 with parallel transects 6/12nm spacing

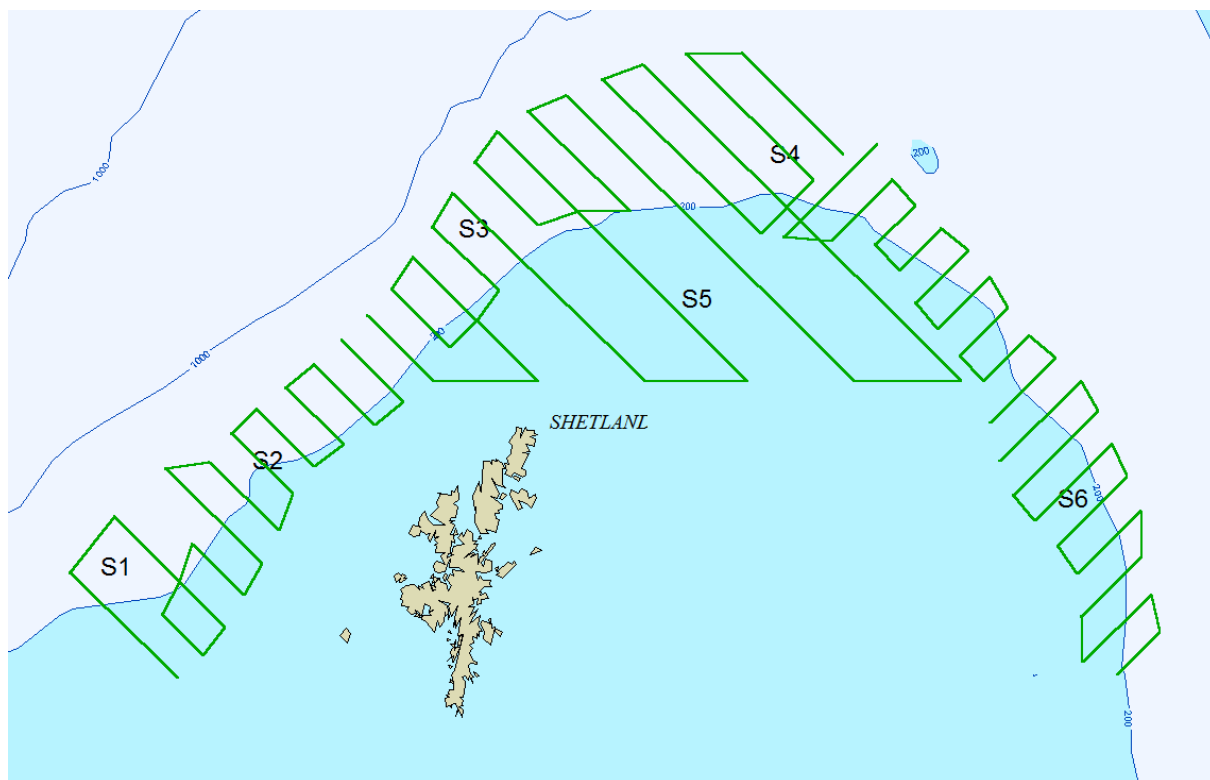


Figure 3 Course tracks: Alternative 2 with parallel transects 7/14nm spacing

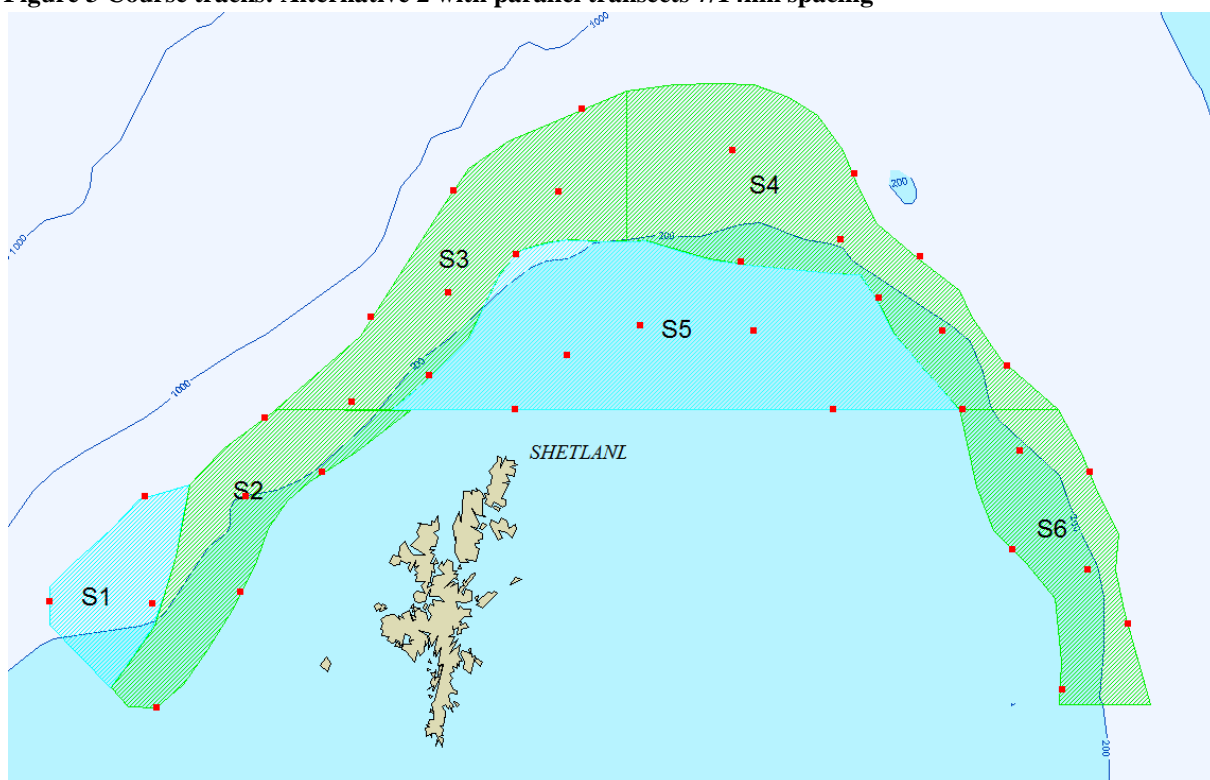


Figure 4 Suggested CTD station for the design with 7/14 nm distance between acoustic transects.

Appendix I

Detailed course tracks version 1 (6/12 nm distance between transects)

Strata 1 & 2:

Point no	Dist	Cum dist	Lat	Lon
----------	------	----------	-----	-----

W 000	0	0	59°59.5161 N	003°14.0186 W
W 001	31.7	31.7	60°21.8619 N	003°59.1724 W
W 002	12.3	43.9	60°31.4539 N	003°43.6816 W
W 003	20.1	64.1	60°17.1843 N	003°14.8975 W
W 004	6.2	70.3	60°11.9498 N	003°21.5991 W
W 005	11.7	82	60°03.6876 N	003°05.0098 W
W 006	6.2	88.2	60°08.5615 N	002°57.2095 W
W 007	11.8	100.1	60°16.8577 N	003°14.2383 W
W 008	7	107.1	60°23.5995 N	003°10.3931 W
W 009	14.1	121.1	60°13.6415 N	002°50.2881 W
W 010	6.4	127.6	60°19.1981 N	002°43.8062 W
W 011	29.4	157	60°39.9764 N	003°26.1035 W
W 012	11.3	168.3	60°37.3372 N	003°03.6914 W
W 013	17.9	186.2	60°24.7392 N	002°37.8735 W
W 014	6.4	192.6	60°30.5347 N	002°32.1606 W
W 015	19.9	212.5	60°44.5724 N	003°00.8350 W
W 016	6.1	218.6	60°49.1852 N	002°52.6227 W
W 017	17.6	236.2	60°36.6770 N	002°27.2168 W
W 018	6.3	242.5	60°41.8328 N	002°19.8010 W
W 019	16.4	258.9	60°53.3854 N	002°43.5864 W
W 020	6.2	265.1	60°57.0430 N	002°33.3142 W
W 021	15.9	281	60°45.7809 N	002°10.2429 W
W 022	6.2	287.3	60°49.1852 N	001°59.5313 W
W 023	16.4	303.7	61°00.8001 N	002°23.4814 W
W 024	6.2	309.9	61°04.8421 N	002°13.8135 W
W 025	17.2	327.1	60°52.6904 N	001°48.7646 W

Strata 3:

Point no	Dist	Cum dist	Lat	Lon
W 000	0	0	60°56.7495 N	001°39.4812 W
W 001	17	17	61°08.8226 N	002°04.3103 W
W 002	6.2	23.2	61°12.9268 N	001°54.6423 W
W 003	15.2	38.4	61°02.1570 N	001°32.4500 W
W 004	6.2	44.6	61°06.1699 N	001°22.7271 W
W 005	16.1	60.8	61°17.5762 N	001°46.4575 W
W 006	6.3	67.1	61°22.8984 N	001°39.4812 W
W 007	17.4	84.5	61°10.6241 N	001°13.7732 W
W 008	6.4	90.8	61°15.0948 N	001°04.3799 W
W 009	18.7	109.6	61°28.2058 N	001°32.2852 W
W 010	6.5	116	61°33.6551 N	001°25.0342 W
W 011	17.9	133.9	61°20.8981 N	000°58.6670 W
W 012	6.5	140.4	61°26.7359 N	000°52.8442 W
W 013	17.1	157.5	61°38.8273 N	001°18.1128 W
W 014	6.1	163.6	61°43.9598 N	001°10.9717 W
W 015	18.1	181.7	61°31.0106 N	000°44.4946 W
W 016	6.7	188.3	61°33.4715 N	000°31.5308 W

W 017	21.3	209.7	61°48.8435 N	001°02.7319 W
W 018	5.9	215.6	61°52.1097 N	000°52.2949 W
W 019	25.7	241.2	61°33.5240 N	000°14.9414 W
W 020	7.1	248.3	61°34.9362 N	000°00.3296 W
W 021	27.7	276.1	61°54.9051 N	000°40.9790 W
W 022	6.5	282.6	61°57.3344 N	000°28.1250 W
W 023	19.2	301.8	61°43.3869 N	000°00.1099 W
W 024	8.5	310.3	61°51.9028 N	000°00.2197 E
W 025	10.9	321.2	61°59.8121 N	000°15.7104 W
W 026	6.2	327.4	62°02.1833 N	000°03.5156 W

Strata 4 & 5:

Point no	Dist	Cum dist	Lat	Lon
W 000	0	0	62°02.9566 N	000°00.8789 E
W 001	8.3	8.3	61°54.6985 N	000°00.4395 E
W 002	13.4	21.7	62°04.6037 N	000°19.7754 E
W 003	7.4	29.1	62°04.3975 N	000°35.5957 E
W 004	24.1	53.2	61°46.8195 N	000°00.4395 E
W 005	8.8	62	61°38.0712 N	000°00.0000 E
W 006	35.7	97.7	62°04.3975 N	000°50.9766 E
W 007	7	104.6	62°02.1325 N	001°05.0391 E
W 008	88.5	193.1	61°00.1080 N	001°07.2363 W
W 009	19.2	212.3	60°59.8953 N	000°27.6855 W
W 010	42.7	255	61°30.5397 N	000°34.2773 E
W 011	6.7	261.7	61°32.2163 N	000°20.6543 E
W 012	37.6	299.4	61°59.2450 N	001°16.0254 E
W 013	6.1	305.5	61°54.9055 N	001°25.2539 E
W 014	33.9	339.4	61°30.7495 N	000°35.1562 E
W 015	6.5	345.8	61°29.2816 N	000°48.3398 E
W 016	28.3	374.1	61°49.1038 N	001°30.9668 E
W 017	6.2	380.4	61°43.6996 N	001°37.5586 E
W 018	61.3	441.7	61°00.3211 N	000°07.0313 E
W 019	15.8	457.5	60°59.8953 N	000°39.5508 E
W 020	38.6	496.1	61°26.7625 N	001°37.1191 E
W 021	7.9	504	61°28.0227 N	001°20.8594 E
W 022	15.1	519.1	61°38.6974 N	001°43.2715 E
W 023	6.2	525.3	61°34.1002 N	001°52.0605 E
W 024	10.4	535.7	61°26.9727 N	001°36.2402 E
W 025	5.9	541.6	61°22.1357 N	001°43.2715 E
W 026	12.5	554	61°30.7495 N	002°02.1680 E
W 027	6.1	560.2	61°26.9727 N	002°12.2754 E
W 028	37.8	598	61°00.3211 N	001°16.4648 E
W 029	16.4	614.4	61°00.3211 N	001°50.3027 E
W 030	10.4	624.8	61°07.7624 N	002°05.2442 E
W 031	5.9	630.6	61°12.2130 N	001°57.3340 E
W 032	15.1	645.7	61°22.7672 N	002°19.7461 E

W 033	6.7	652.4	61°16.8643 N	002°26.3379 E
W 034	12.6	665	61°08.1866 N	002°07.4414 E
W 035	5.6	670.6	61°03.3012 N	002°13.1543 E
W 036	13.1	683.7	61°12.2130 N	002°32.9297 E
W 037	6	689.7	61°07.7624 N	002°41.2793 E
W 038	15	704.7	60°57.3368 N	002°18.8672 E
W 039	7.4	712.1	60°50.0692 N	002°21.9434 E
W 040	19.8	731.9	61°04.3643 N	002°50.0684 E

Strata 6:

Point no	Dist	Cum dist	Lat	Lon
W 000	0	0	61°00.1084 N	002°58.8574 E
W 001	22.8	22.8	60°44.1704 N	002°25.4590 E
W 002	6.5	29.2	60°37.9306 N	002°28.9746 E
W 003	24.9	54.1	60°55.3086 N	003°05.4492 E
W 004	6.4	60.5	60°49.5332 N	003°11.1621 E
W 005	23	83.5	60°33.3993 N	002°37.7637 E
W 006	5.8	89.3	60°29.0742 N	002°45.6738 E
W 007	20.6	109.9	60°43.5258 N	003°15.5566 E
W 008	6.1	116	60°38.1462 N	003°21.2695 E
W 009	19.4	135.4	60°24.3056 N	002°53.5840 E
W 010	6.1	141.5	60°18.6543 N	002°58.4180 E
W 011	17.6	159.2	60°31.0220 N	003°23.9063 E
W 012	7.8	167	60°23.2200 N	003°24.7852 E
W 013	17.6	184.6	60°10.8031 N	002°59.7363 E
W 014	7.9	192.4	60°02.9204 N	002°59.2969 E
W 015	20.1	212.5	60°17.1302 N	003°27.8613 E
W 016	7.2	219.7	60°10.1474 N	003°31.3770 E
W 017	14.3	234	60°00.0661 N	003°11.1621 E
W 018	8.1	242.1	59°59.8464 N	003°27.4219 E
W 019	6.1	248.2	60°04.2363 N	003°35.7715 E

Appendix II

Detailed course tracks version 2 (7/14 nm distance between transects)

Strata 1 & 2:

Point no	Dist	Cum dist	Lat	Lon
W 000	0	0	59°59.4190 N	003°14.4580 W
W 001	31.1	31.1	60°21.0595 N	003°59.2822 W
W 002	14.7	45.8	60°32.6551 N	003°40.8252 W
W 003	18.9	64.8	60°19.2108 N	003°13.7988 W
W 004	7.6	72.3	60°12.5629 N	003°21.0498 W
W 005	11.9	84.2	60°04.1388 N	003°04.1309 W
W 006	7.4	91.6	60°10.0503 N	002°55.1221 W
W 007	13	104.7	60°19.2108 N	003°13.7988 W

W 008	8.2	112.9	60°27.0284 N	003°08.5254 W
W 009	14.9	127.8	60°16.5979 N	002°46.9922 W
W 010	7.4	135.2	60°23.0151 N	002°39.7412 W
W 011	27.6	162.8	60°42.3553 N	003°19.7314 W
W 012	9	171.8	60°43.5376 N	003°01.4942 W
W 013	19.7	191.5	60°29.7356 N	002°32.7100 W
W 014	8.2	199.7	60°37.4036 N	002°26.9971 W
W 015	17.2	216.8	60°49.3311 N	002°52.2656 W
W 016	7	223.9	60°54.2522 N	002°41.9385 W
W 017	16.4	240.2	60°42.7856 N	002°17.9883 W
W 018	7.5	247.8	60°47.2948 N	002°05.6836 W
W 019	16.3	264	60°58.5216 N	002°29.8535 W
W 020	7.4	271.4	61°03.3127 N	002°18.2080 W
W 021	17.2	288.6	60°51.1511 N	001°53.1592 W
W 022	7.5	296.1	60°55.7476 N	001°41.0742 W
W 023	17.5	313.5	61°08.0919 N	002°06.5625 W

Strata 3, 4 & 5 (parts of S4):

Point no	Dist	Cum dist	Lat	Lon
W 000	0	0	61°12.9650 N	001°56.0156 W
W 001	18.6	18.6	60°59.9067 N	001°28.5498 W
W 002	21	39.6	60°59.9067 N	000°45.2637 W
W 003	17.3	57	61°12.0126 N	001°10.9717 W
W 004	7.4	64.4	61°06.7125 N	001°21.7383 W
W 005	16.5	80.8	61°18.2478 N	001°46.1279 W
W 006	7.7	88.5	61°24.5671 N	001°37.1191 W
W 007	17.8	106.2	61°12.0126 N	001°10.9717 W
W 008	7.5	113.8	61°18.0368 N	001°01.5234 W
W 009	18.2	132	61°30.5512 N	001°29.2090 W
W 010	7.7	139.7	61°37.1430 N	001°20.8594 W
W 011	53.2	192.9	61°00.0133 N	000°01.5381 W
W 012	20.7	213.6	60°59.9067 N	000°41.0889 E
W 013	47.8	261.3	61°33.6932 N	000°29.2236 W
W 014	8.1	269.5	61°30.9704 N	000°45.2637 W
W 015	17.6	287	61°43.2947 N	001°11.6309 W
W 016	7.4	294.4	61°49.2189 N	001°02.4023 W
W 017	21.8	316.2	61°33.9022 N	000°29.6631 W
W 018	10.8	327	61°33.5883 N	000°07.0313 W
W 019	28.2	355.2	61°53.2613 N	000°49.6582 W
W 020	8.1	363.2	61°56.3644 N	000°33.8379 W
W 021	80.3	443.5	60°59.9067 N	001°25.6934 E
W 022	21.3	464.8	61°00.1198 N	002°09.6387 E
W 023	88.5	553.3	62°02.3489 N	000°02.1973 W
W 024	8.4	561.7	61°59.3609 N	000°18.8965 W
W 025	43.3	605	61°29.1861 N	000°46.8018 E
W 026	14.9	620	61°39.9605 N	001°08.5547 E

W 027	34.8	654.8	62°04.3061 N	000°15.8203 E
W 028	10.9	665.7	62°04.5119 N	000°39.1113 E
W 029	27.9	693.5	61°44.7516 N	001°20.8594 E

Strata 4 (remaining part):

Point no	Dist	Cum dist	Lat	Lon
W 000	0	0	61°46.7273 N	001°34.7022 E
W 001	25.7	25.7	61°28.6640 N	000°56.2500 E
W 002	9.4	35.1	61°27.8247 N	001°15.8057 E
W 003	17.1	52.2	61°39.9609 N	001°41.0742 E
W 004	7	59.1	61°34.6350 N	001°50.5225 E
W 005	10.9	70	61°27.0895 N	001°34.0430 E
W 006	7	77	61°21.9898 N	001°43.9307 E
W 007	11.7	88.7	61°30.2373 N	002°01.2891 E
W 008	6.9	95.6	61°25.9867 N	002°12.6050 E
W 009	14.8	110.4	61°15.5029 N	001°50.7422 E
W 010	6.9	117.3	61°10.2655 N	002°00.0806 E
W 011	14.6	131.9	61°20.6206 N	002°21.5039 E
W 012	7.1	139	61°14.5518 N	002°29.0845 E
W 013	13.6	152.6	61°04.9609 N	002°09.0894 E
W 014	6.9	159.4	60°59.9071 N	002°18.6475 E
W 015	13.1	172.5	61°09.1000 N	002°37.8735 E
W 016	6.9	179.4	61°04.5884 N	002°48.6401 E
W 017	18.5	197.9	60°51.5798 N	002°21.5039 E

Strata 6:

Point no	Dist	Cum dist	Lat	Lon
W 000	0	0	60°43.8069 N	002°25.4590 E
W 001	23	23	60°59.9608 N	002°59.0771 E
W 002	6.9	29.9	60°53.9325 N	003°06.1084 E
W 003	24	53.9	60°37.0270 N	002°31.2817 E
W 004	6.8	60.7	60°31.7912 N	002°40.0708 E
W 005	22.1	82.8	60°47.2952 N	003°12.1509 E
W 006	7.2	89.9	60°40.7968 N	003°18.3032 E
W 007	20	109.9	60°26.6497 N	002°49.6289 E
W 008	7	116.9	60°20.8968 N	002°57.6489 E
W 009	18.2	135.1	60°33.7903 N	003°23.7964 E
W 010	9.4	144.5	60°24.3724 N	003°24.2359 E
W 011	17.4	161.9	60°12.1813 N	002°59.2969 E
W 012	9.4	171.3	60°02.8233 N	002°59.8462 E
W 013	19.7	190.9	60°16.5983 N	003°28.0811 E
W 014	7.8	198.8	60°09.0123 N	003°31.9263 E
W 015	12.6	211.4	60°00.0788 N	003°14.1284 E

Annex 6: Maps of species distribution in 2011

WARNING: this document is an update to correct the original Annex 6 of the IBTSWG 2012 report that presented maps produced based on a CPUE per Length per haul set of data, which contained duplicate data sets for the North Sea survey. This problem has in the meantime been solved and the corresponding downloads of data from the DATRAS homepage are now cleared of these errors.

Table A.6.1. Species for which distribution maps have been produced, with length split for pre-recruit (0-group) and post-recruit (1+ group) where appropriate. The maps cover all the area encompassed by surveys coordinated within the IBTSWG (North Sea and North-eastern Atlantic Areas).

Scientific	Common	Code	Fig No	Length Split (<cm)
<i>Clupea harengus</i>	Herring	HER	6-7	17.5
<i>Gadus morhua</i>	Atlantic Cod	COD	2-3	23
<i>Galeorhinus galeus</i>	Tope Shark	GAG	32	
<i>Lepidorhombus boscii</i>	Four-Spotted Megrin	LBI	16-17	19
<i>Galeus melastomus</i>	Blackmouthed dogfish	DBM	40	
<i>Lepidorhombus whiffiagonis</i>	Megrin	MEG	14-15	21
<i>Leucoraja naevus</i>	Cuckoo Ray	CUR	30	
<i>Lophius budegassa</i>	Black-bellied Anglerfish	WAF	20-21	20
<i>Lophius piscatorius</i>	Anglerfish (Monk)	MON	18-19	20
<i>Merlangus merlangius</i>	Whiting	WHG	24-25	20
<i>Melanogrammus aeglefinus</i>	Haddock	HAD	4-5	20
<i>Merluccius merluccius</i>	European hake	HKE	8-9	20
<i>Micromesistius poutassou</i>	Blue whiting	WHB	26-27	19
<i>Mustelus asterias</i>	Starry Smooth Hound	SDS	33	
<i>Mustelus mustelus</i>	Smooth Hound	SMH	34	
<i>Nephrops norvegicus</i>	Norway Lobster	NEP	28	
<i>Pleuronectes platessa</i>	European Plaice	PLE	22-23	12
<i>Raja clavata</i>	Thornback ray (Roker)	THR	35	
<i>Raja microocellata</i>	Painted/Small Eyed Ray	PTR	36	
<i>Raja montagui</i>	Spotted Ray	SDR	37	
<i>Raja undulata</i>	Undulate Ray	UNR	38	
<i>Scomber scombrus</i>	European Mackerel	MAC	12-13	24
<i>Scyliorhinus canicula</i>	Lesser Spotted Dogfish	LSD	29	
<i>Scyliorhinus stellaris</i>	Nurse Hound	DGN	39	
<i>Sprattus sprattus</i>	European sprat	SPR	41	
<i>Squalus acanthias</i>	Spurdog	DGS	31	
<i>Trachurus picturatus</i>	Blue Jack Mackerel	JAA	43	
<i>Trachurus trachurus</i>	Horse Mackerel (Scad)	HOM	10-11	15
<i>Trisopterus smarkii</i>	Norway pout	NPO	42	

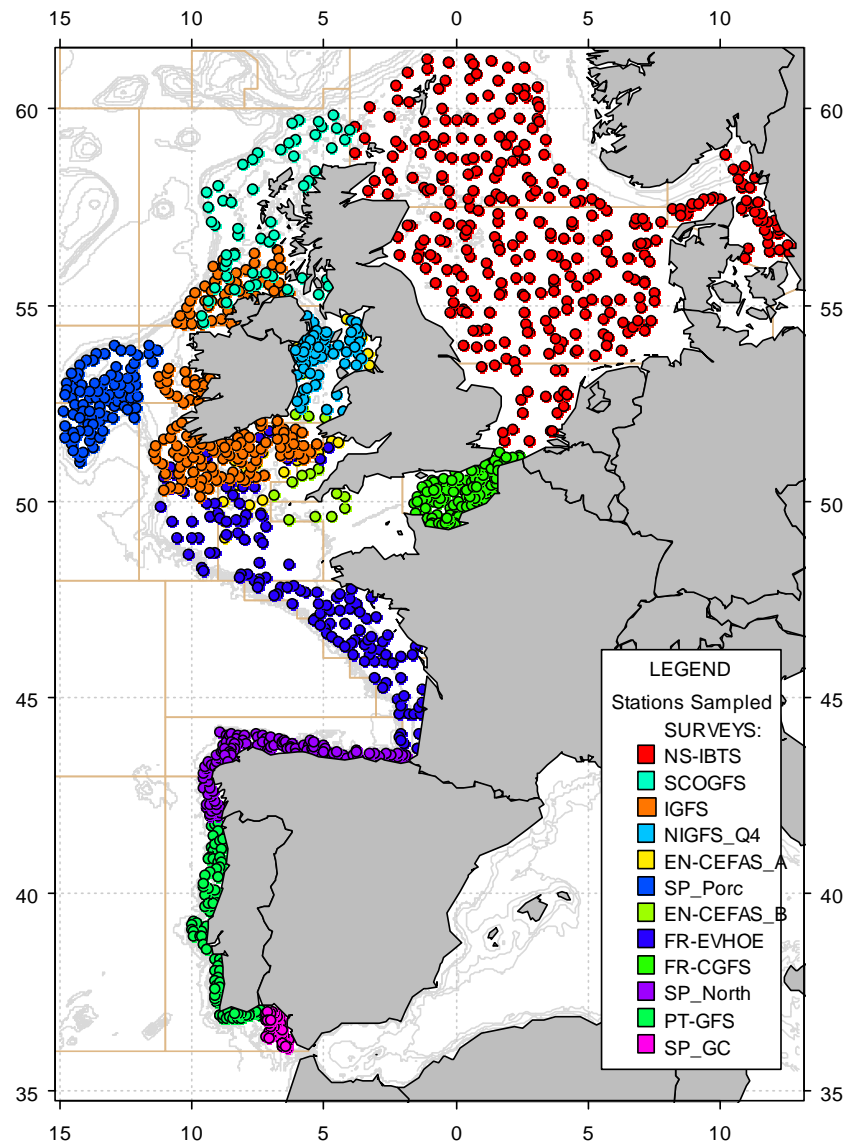


Figure A.6.1. Station positions for the IBTSurveys carried out in the North Eastern Atlantic and North Sea area in summer/autumn of 2011. Quarters 3 and 4.

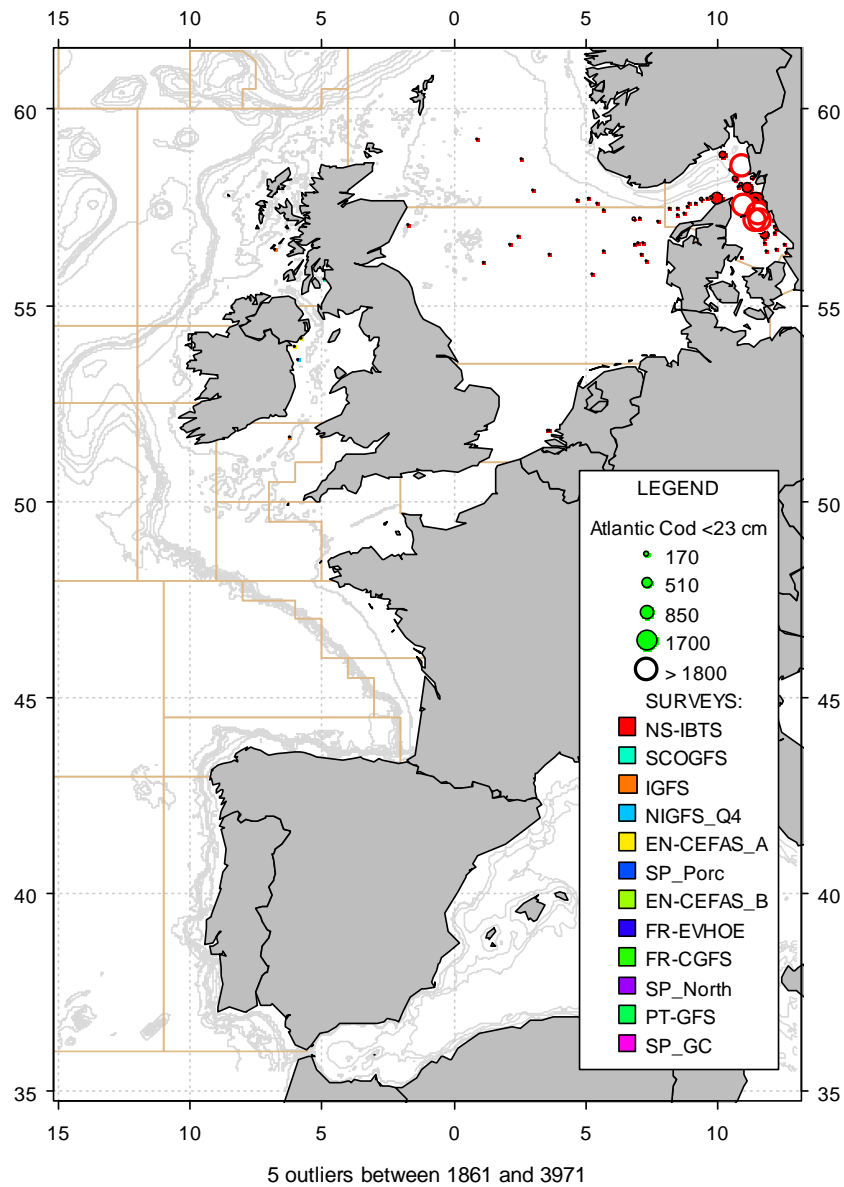


Figure A.6.2. Catches in numbers per hour of 0-group Cod, *Gadus morhua* (<23cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

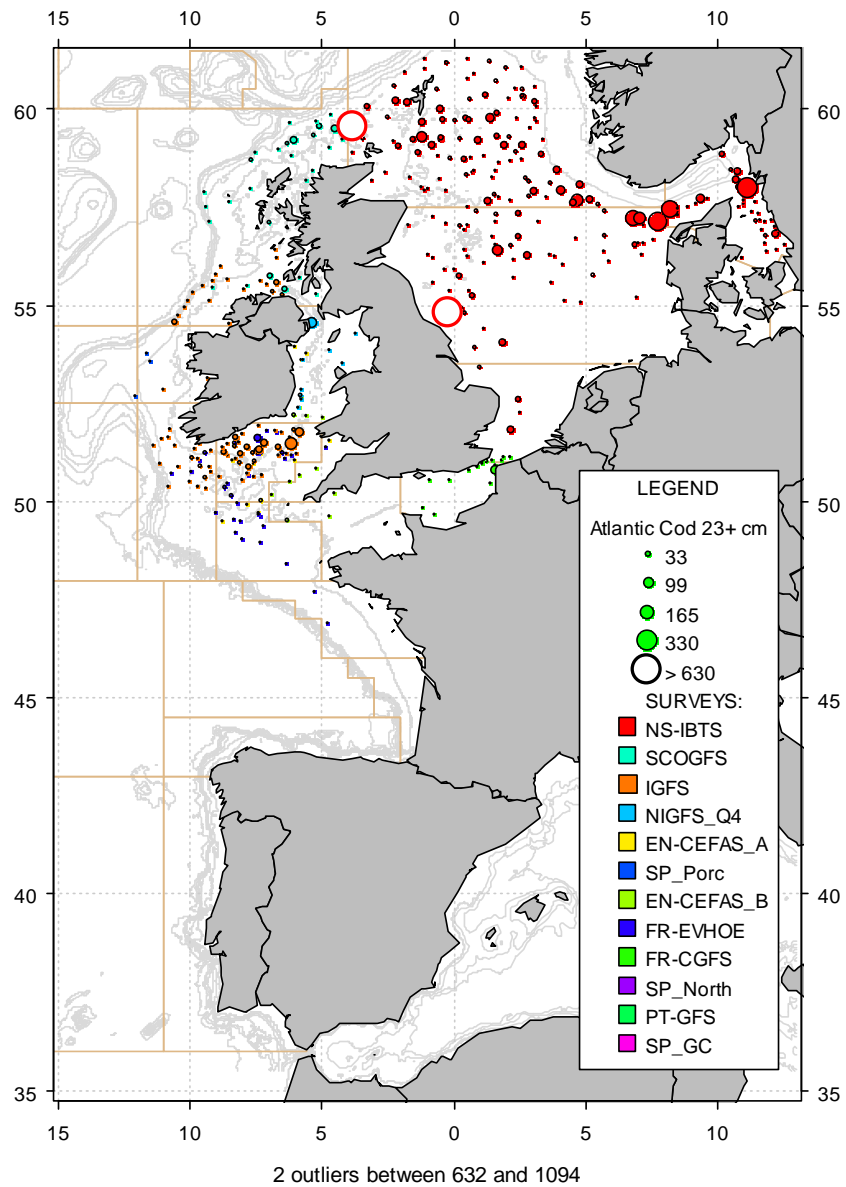


Figure A.6.3. Catches in numbers per hour of 1+ cod, *Gadus morhua* (≥ 23 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

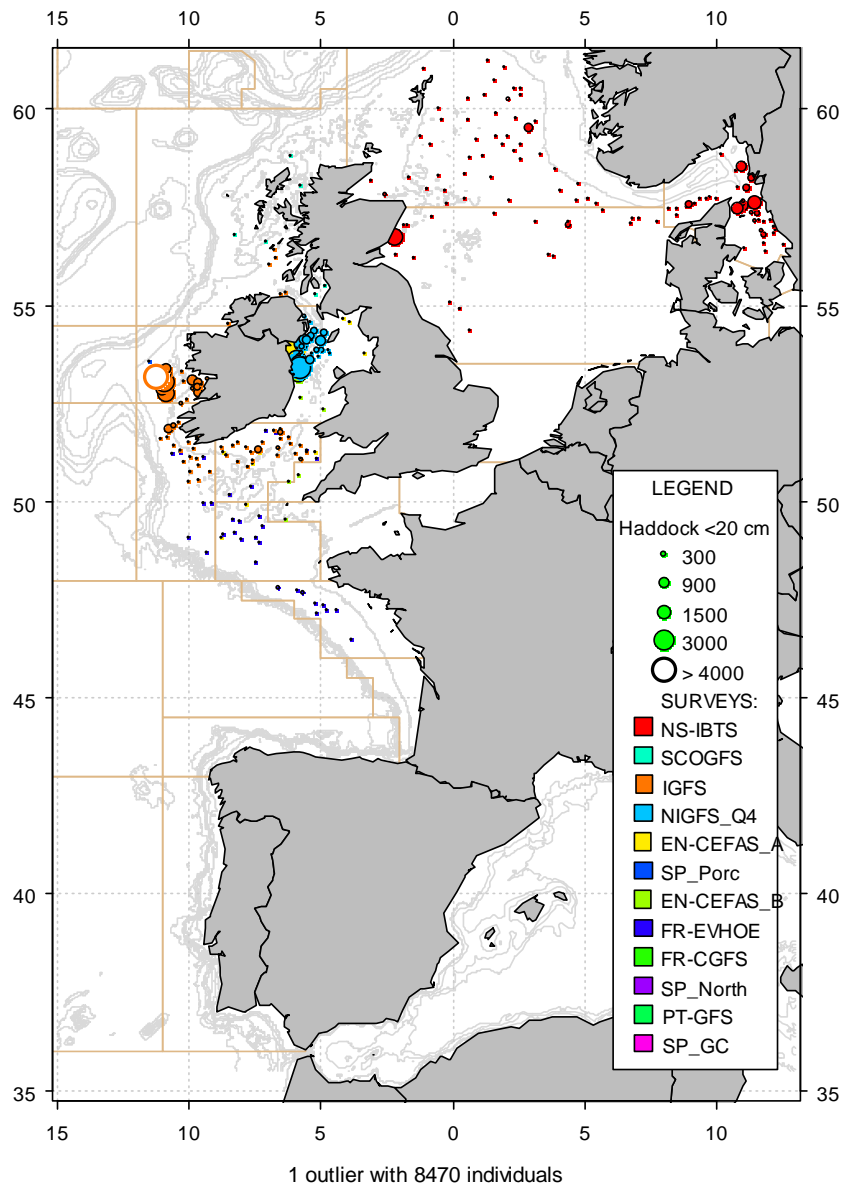


Figure A.6.4. Catches in numbers per hour of 0-group haddock, *Melanogrammus aeglefinus* (<20cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

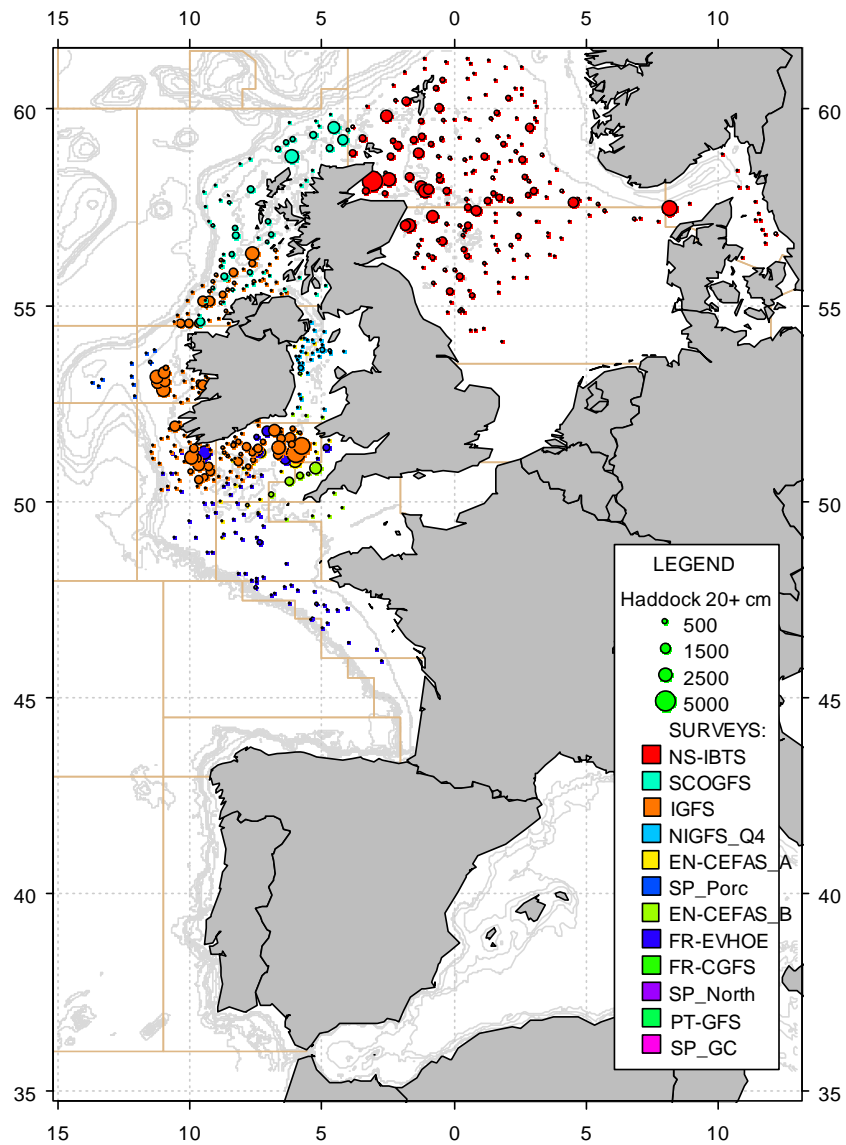


Figure A.6.5. Catches in numbers per hour of 1+ group haddock, *Melanogrammus aeglefinus* ($\geq 20\text{cm}$), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

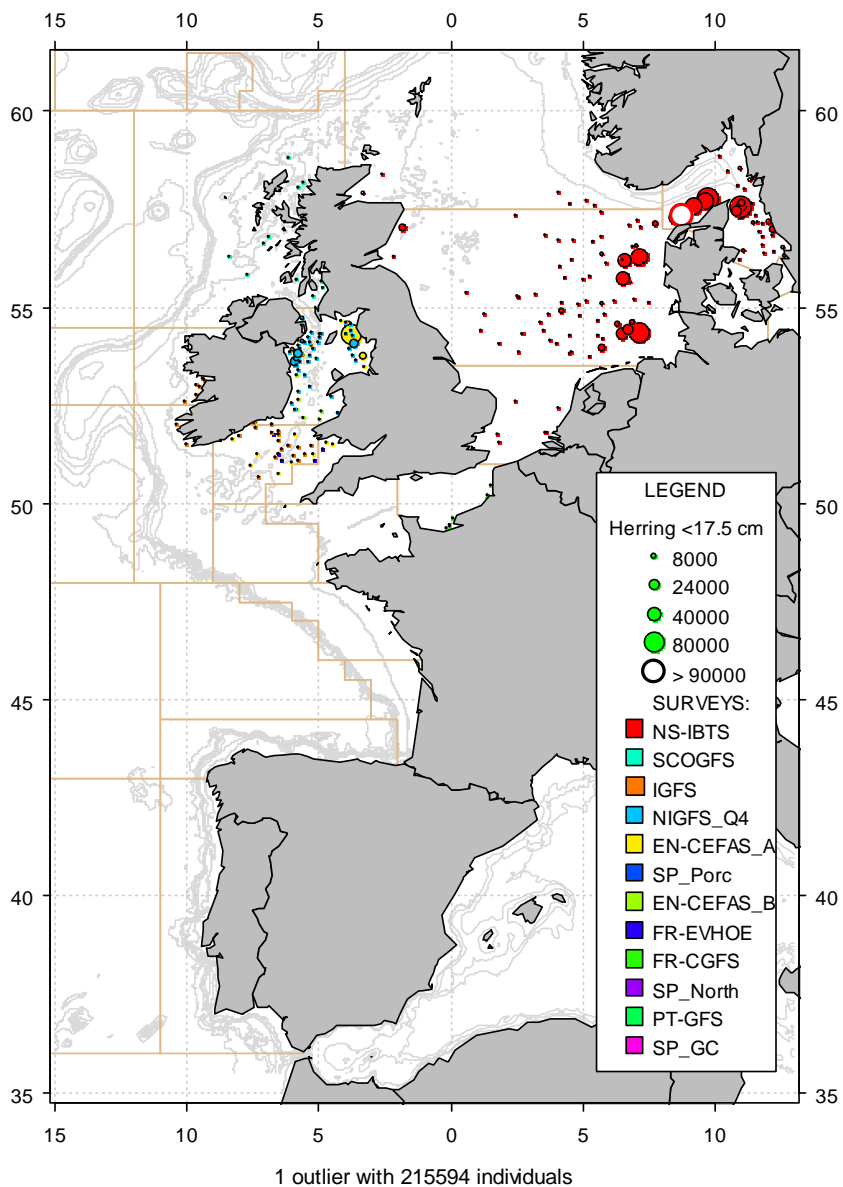


Figure A.6.6. Catches in numbers per hour of 0-group herring, *Clupea harengus* (<17.5 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

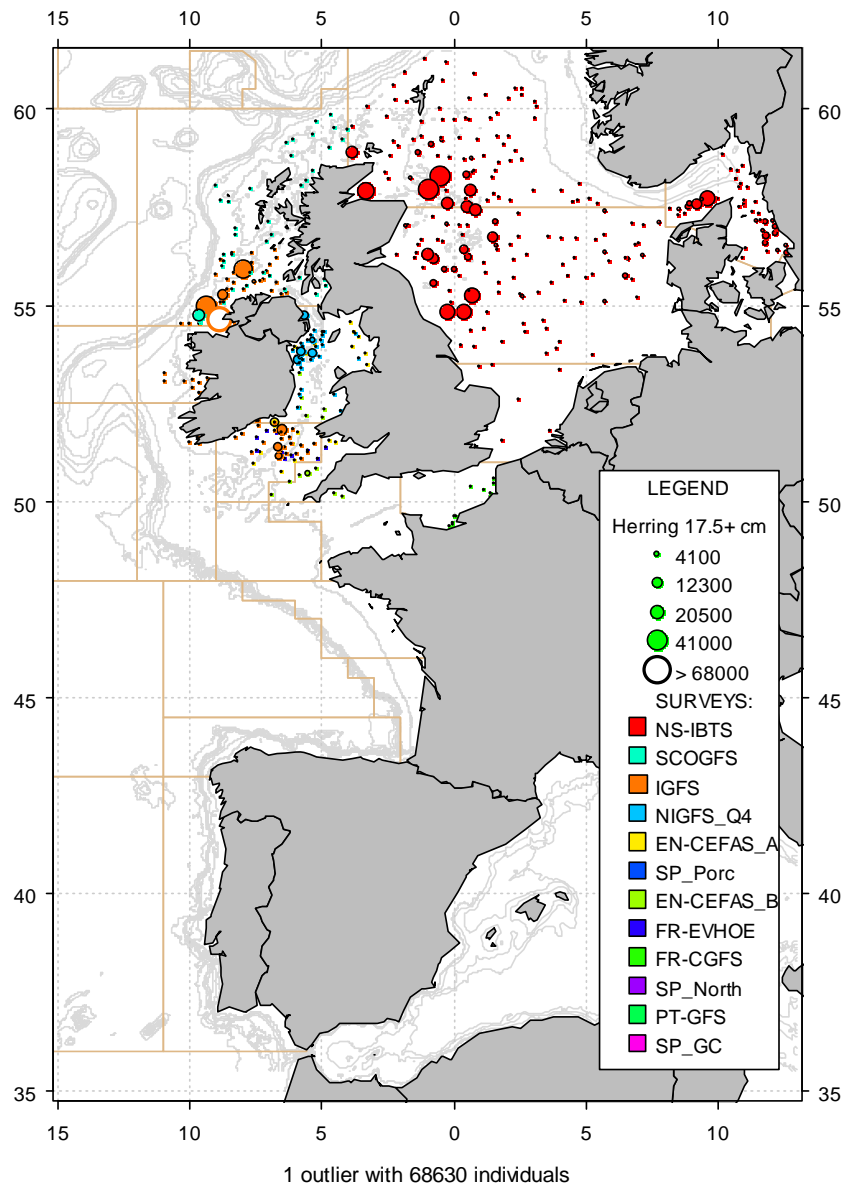


Figure A.6.7. Catches in numbers per hour of 1+ group herring, *Clupea harengus* (≥ 17.5 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

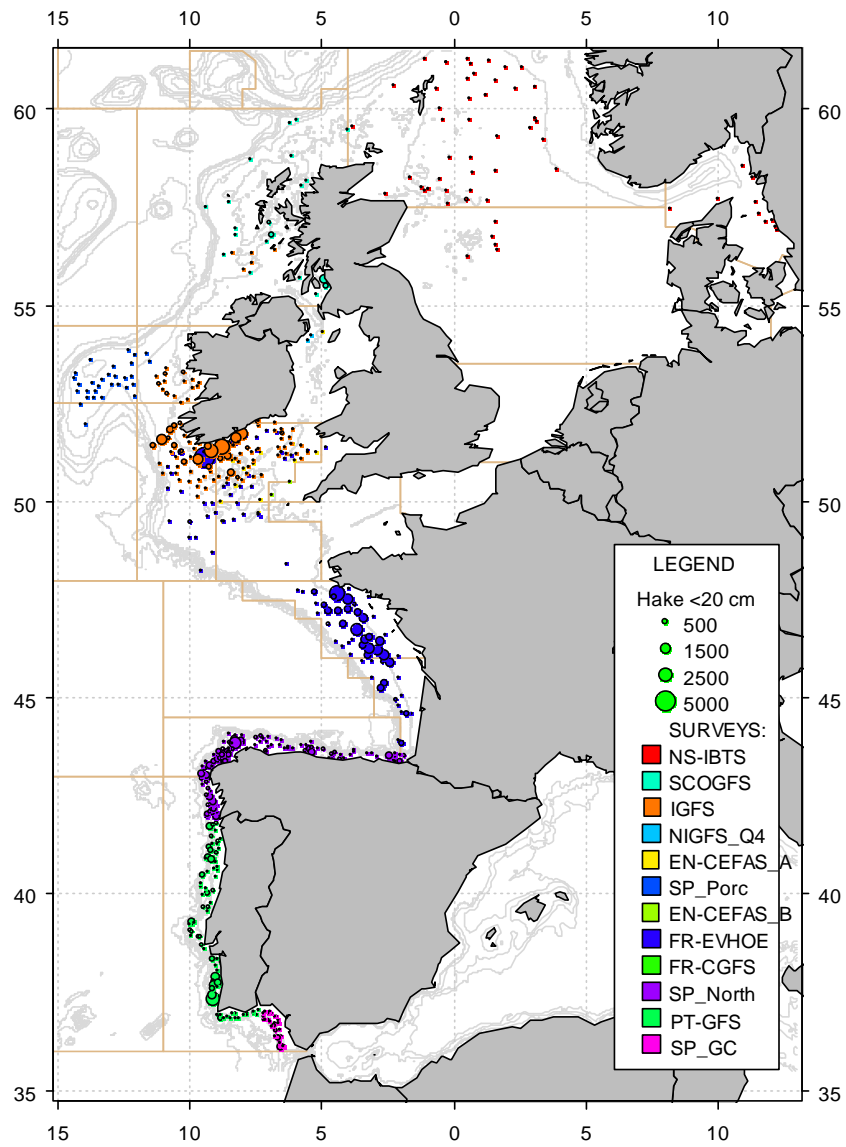


Figure A.6.8. Catches in numbers per hour of 0-group European hake, *Merluccius merluccius* (<20cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

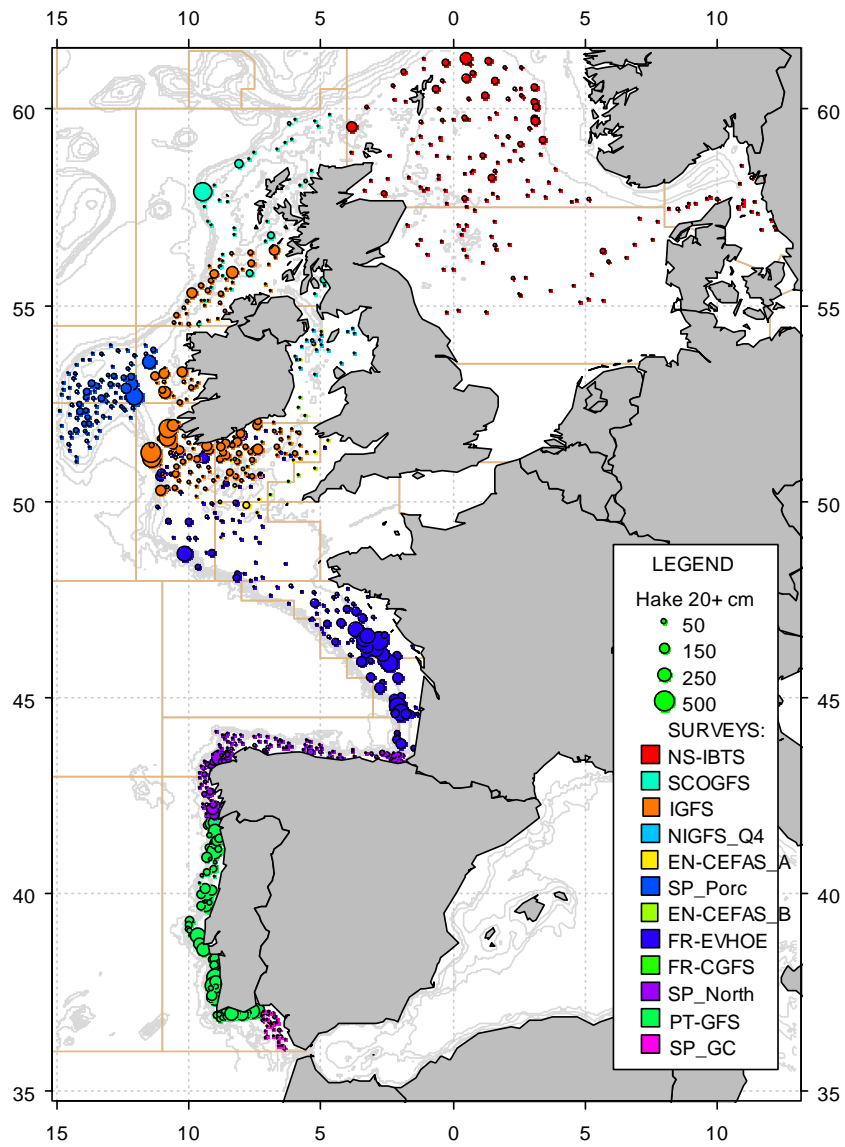


Figure A.6.9. Catches in numbers per hour of 1+ group hake, *Merluccius merluccius* ($\geq 20\text{cm}$), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

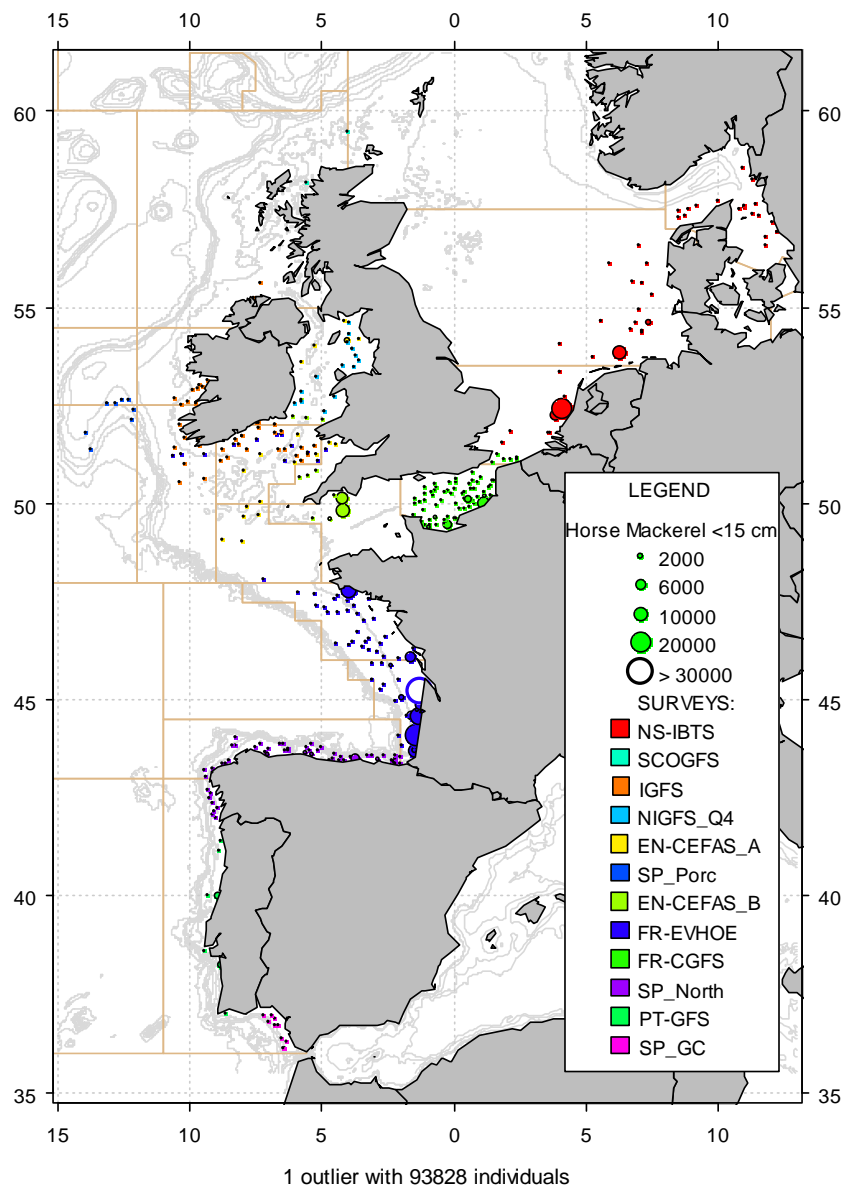


Figure A.6.10. Catches in numbers per hour of 0-group horse mackerel, *Trachurus trachurus* (<15 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

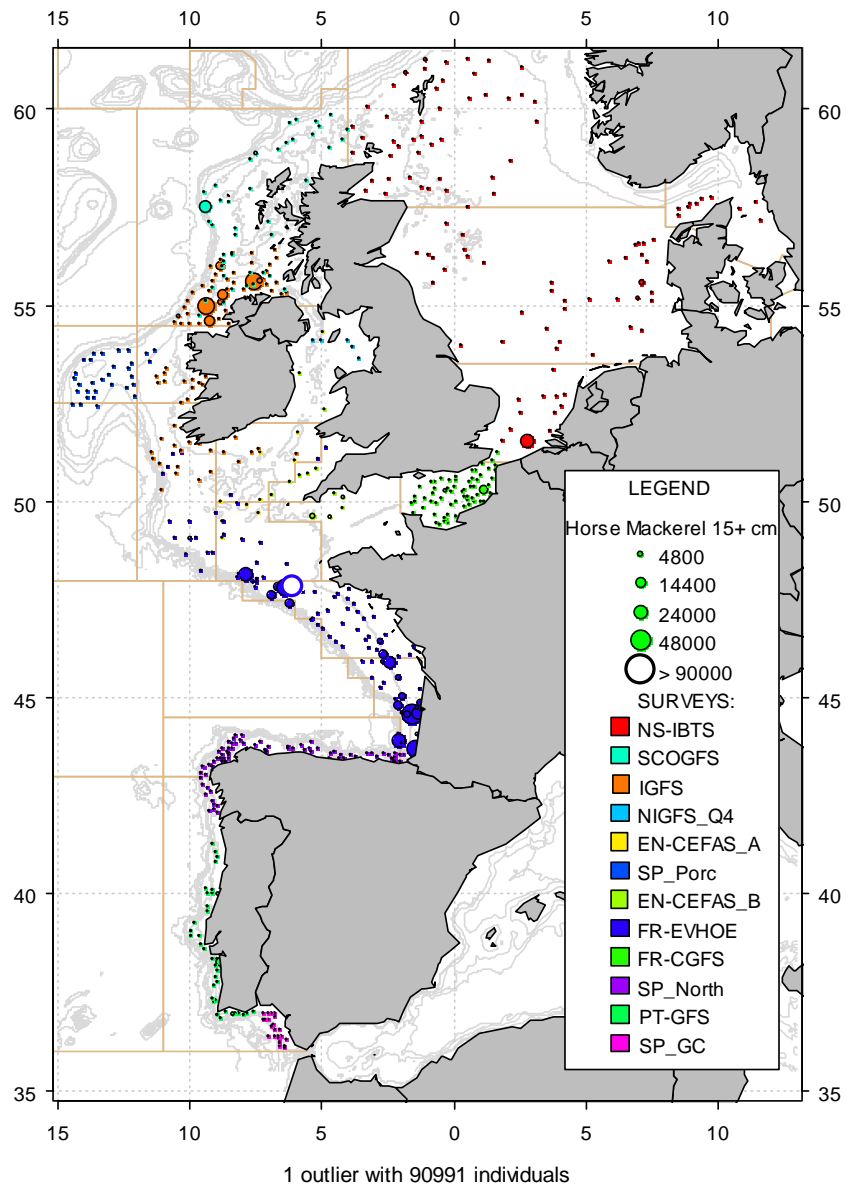


Figure A.6.11. Catches in numbers per hour of 1+ group horse mackerel, *Trachurus trachurus* (≥ 15 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

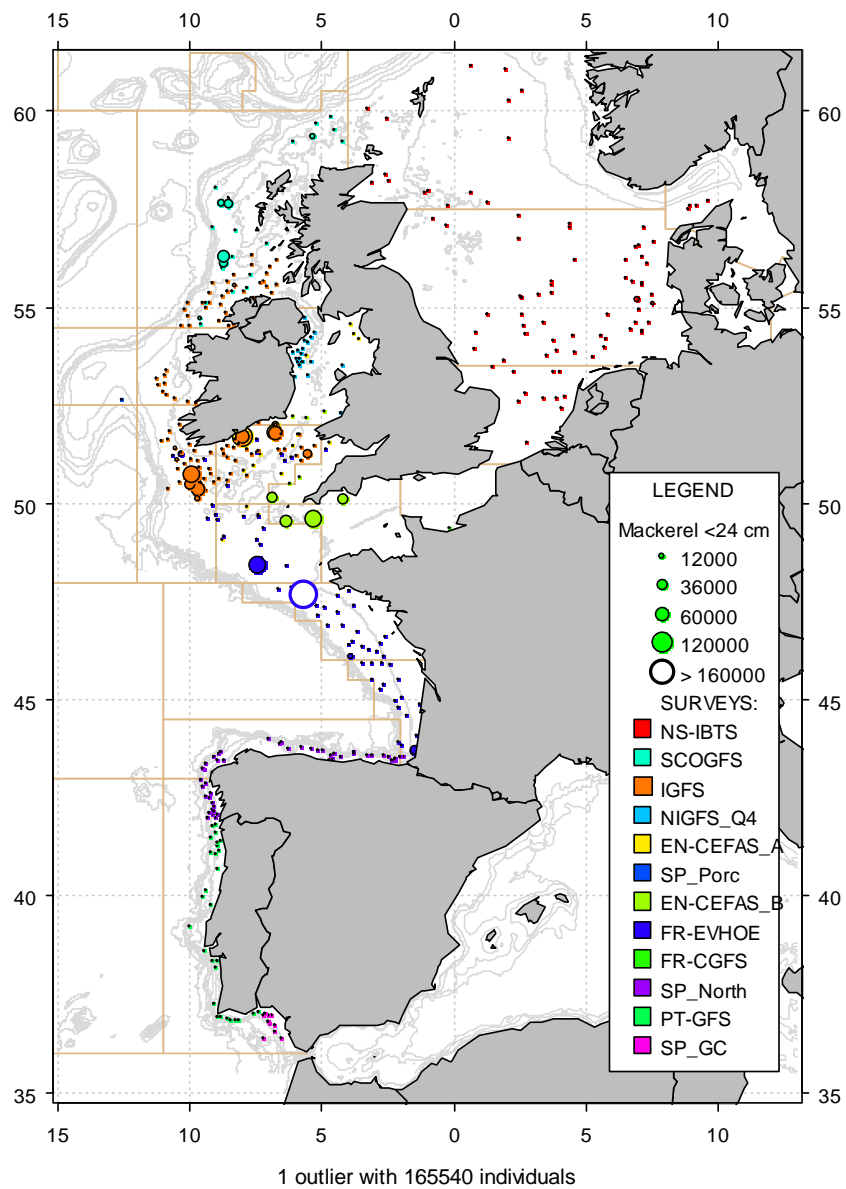


Figure A.6.12. Catches in numbers per hour of 0-group mackerel, *Scomber scombrus* (<24 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

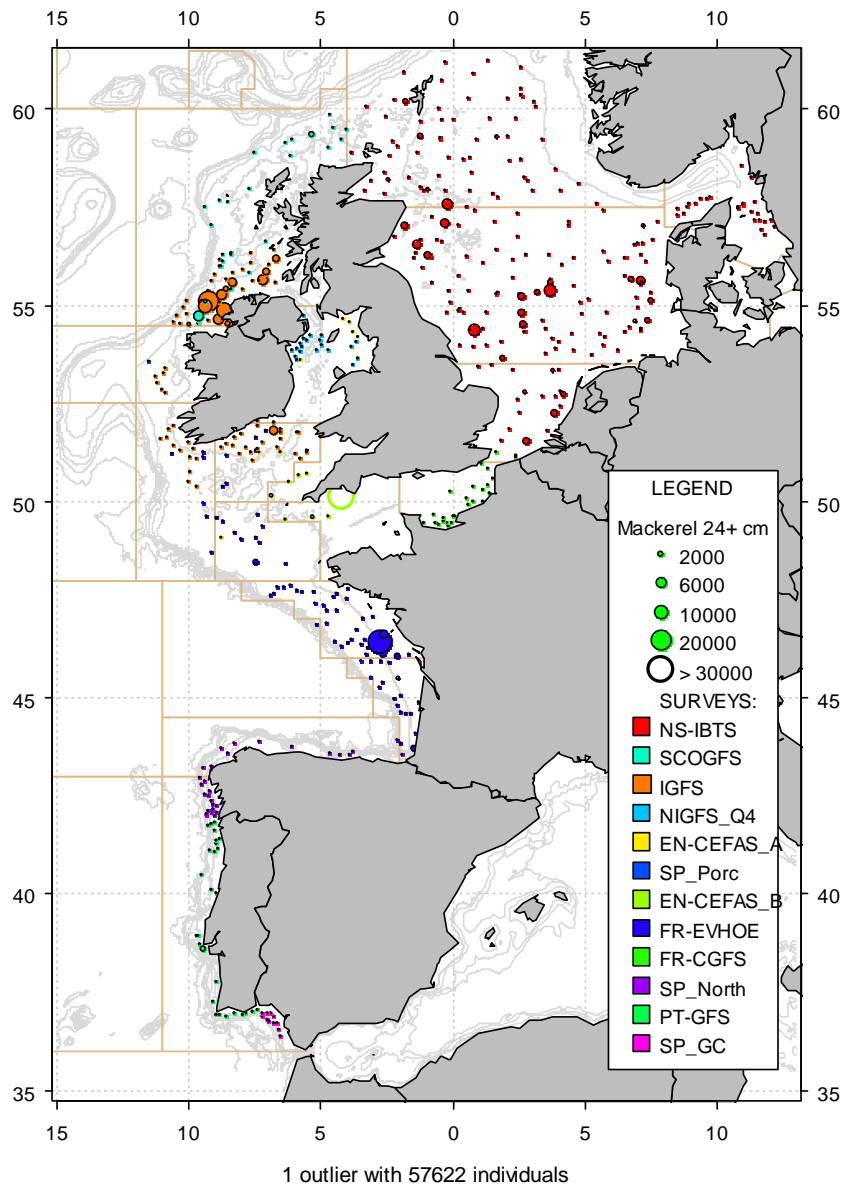


Figure A.6.13. Catches in numbers per hour of 1+ group mackerel, *Scomber scomrus* (≥ 24 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

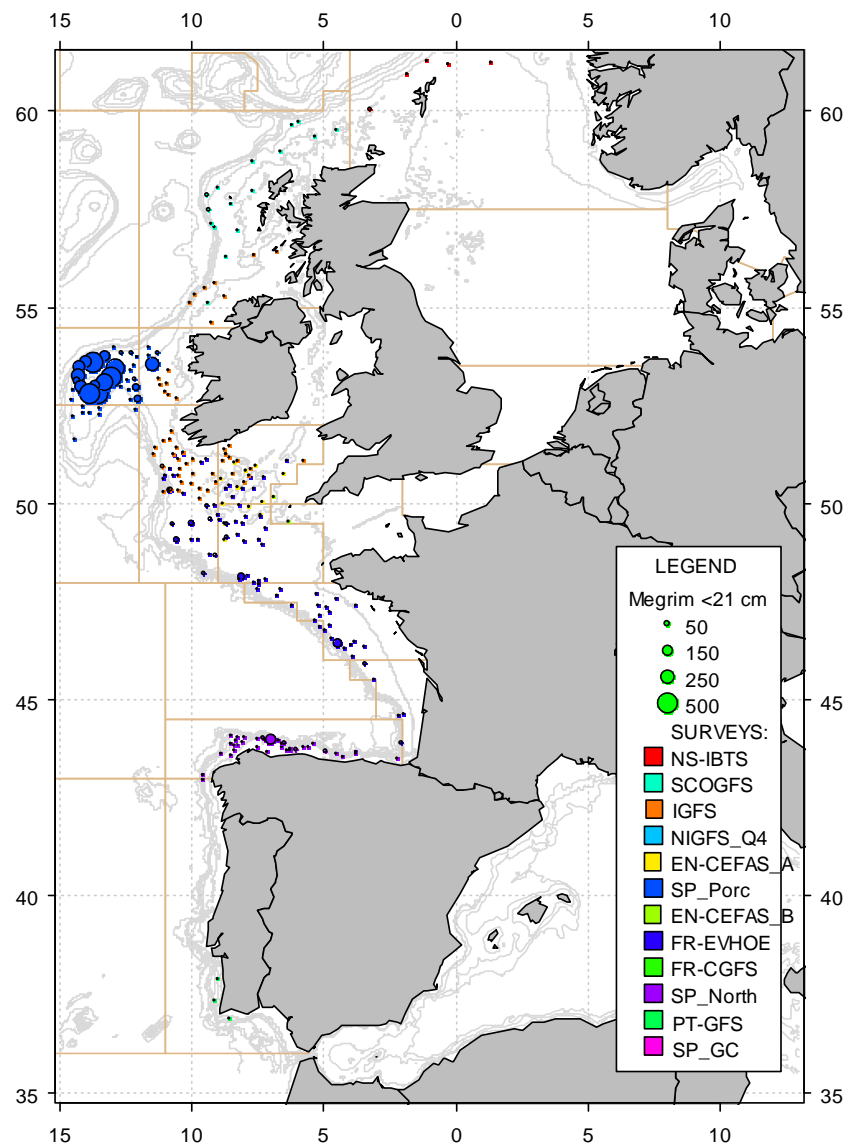


Figure A.6.14. Catches in numbers per hour of megrim recruits, *Lepidorhombus whiffiagonis* (<21 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

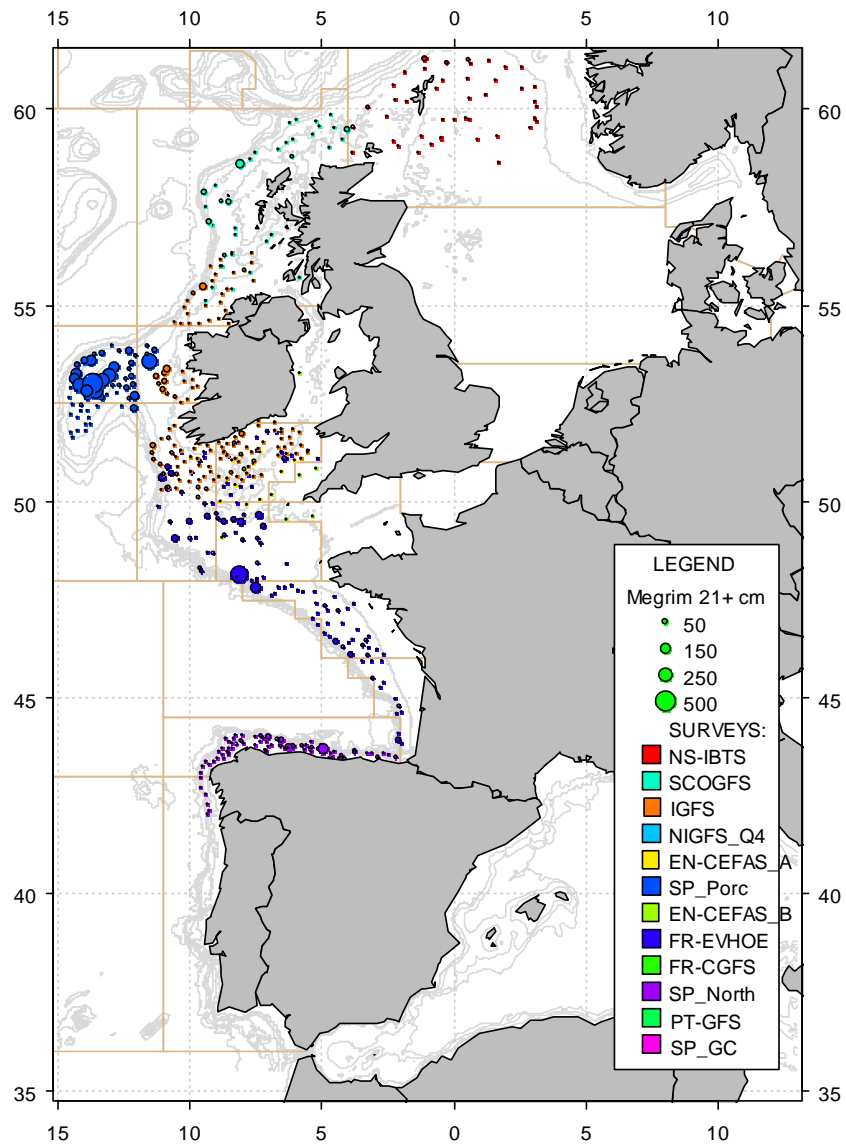


Figure A.6.15. Catches in numbers per hour of 2+ group megrim, *Lepidorhombus whiffiagonis* ($\geq 21\text{cm}$), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

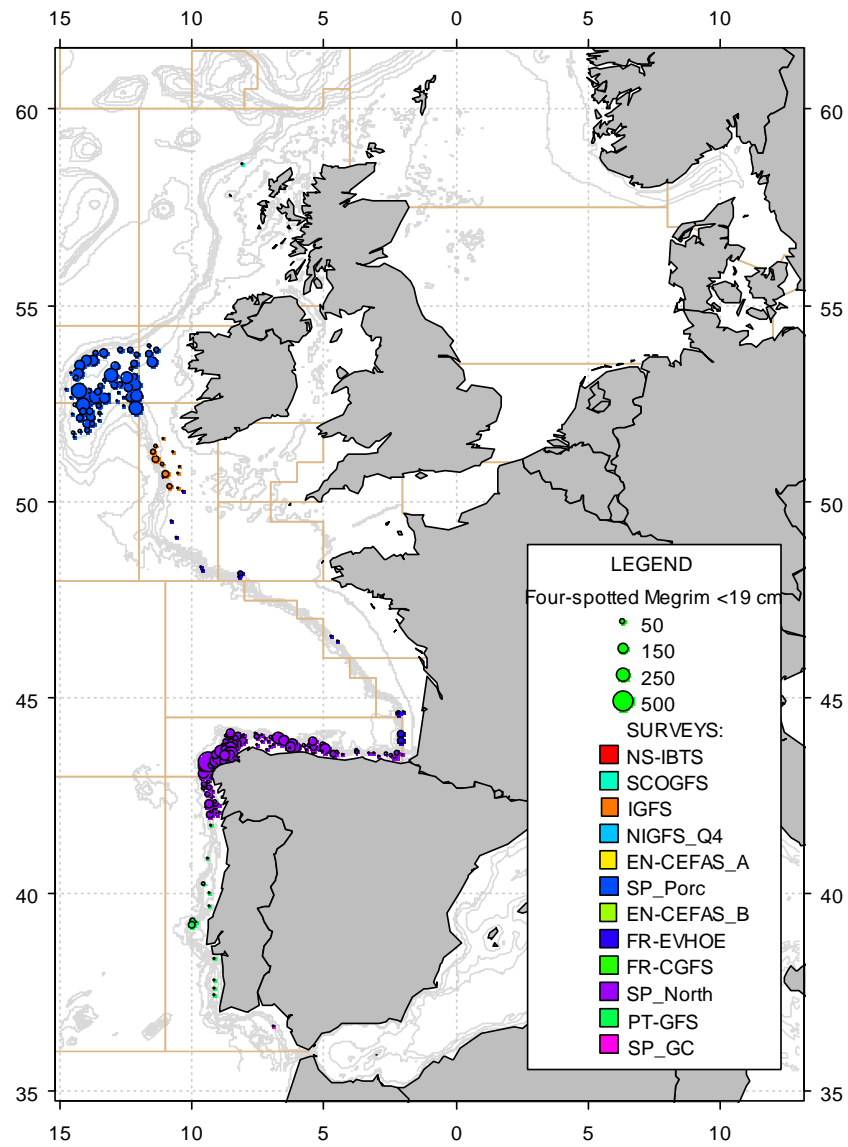


Figure A.6.16. Catches in numbers per hour of recruits of four-spotted megrim, *Lepidorhombus boscii* (<math><19\text{ cm}</math>), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

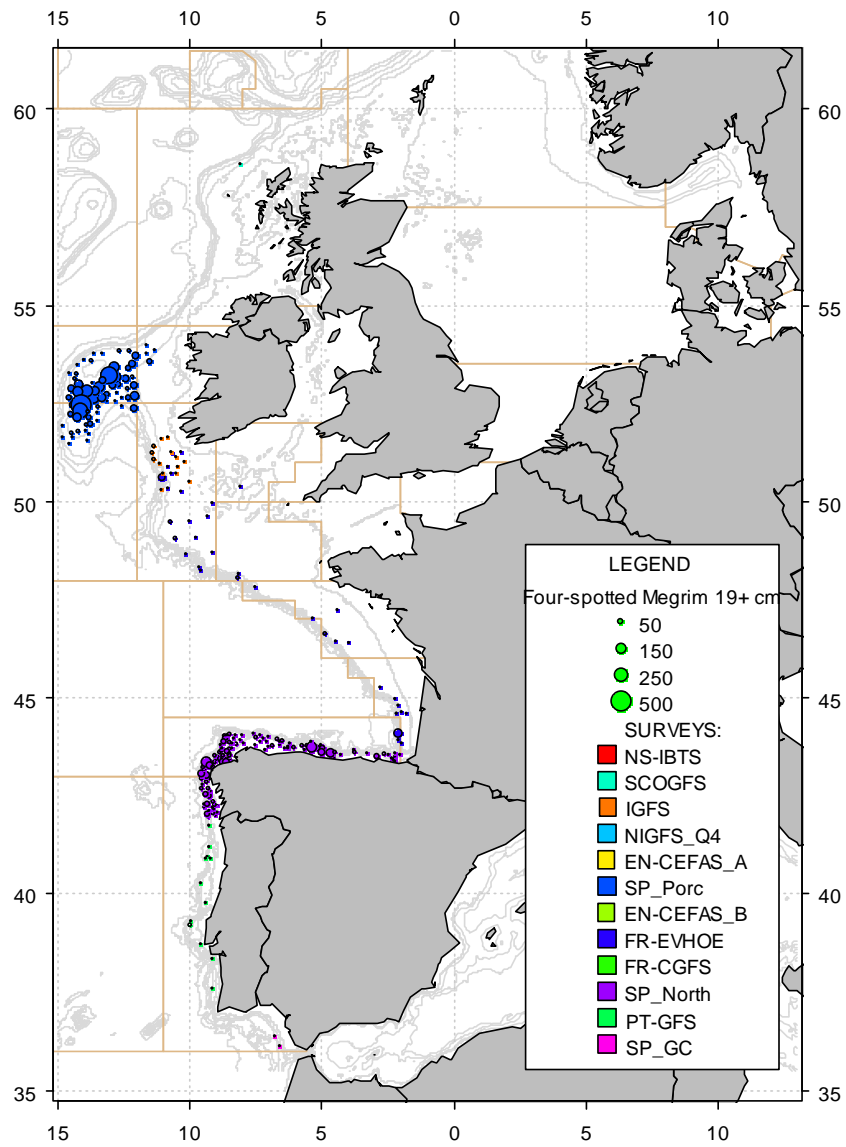


Figure A.6.17. Catches in numbers per hour of 2+ group four-spotted megrim, *Lepidorhombus boscii* (≥ 19 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

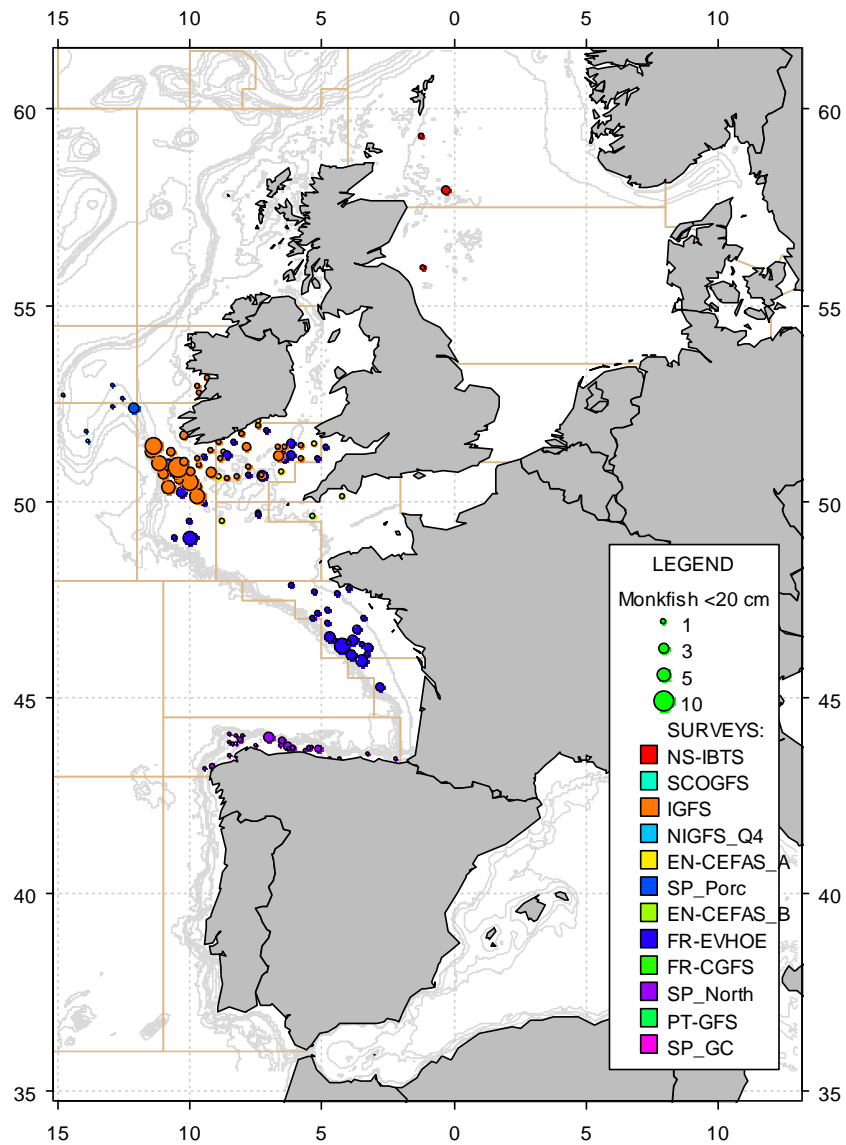


Figure A.6.18. Catches in numbers per hour of 0-group monkfish, *Lophius piscatorius* (<20 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

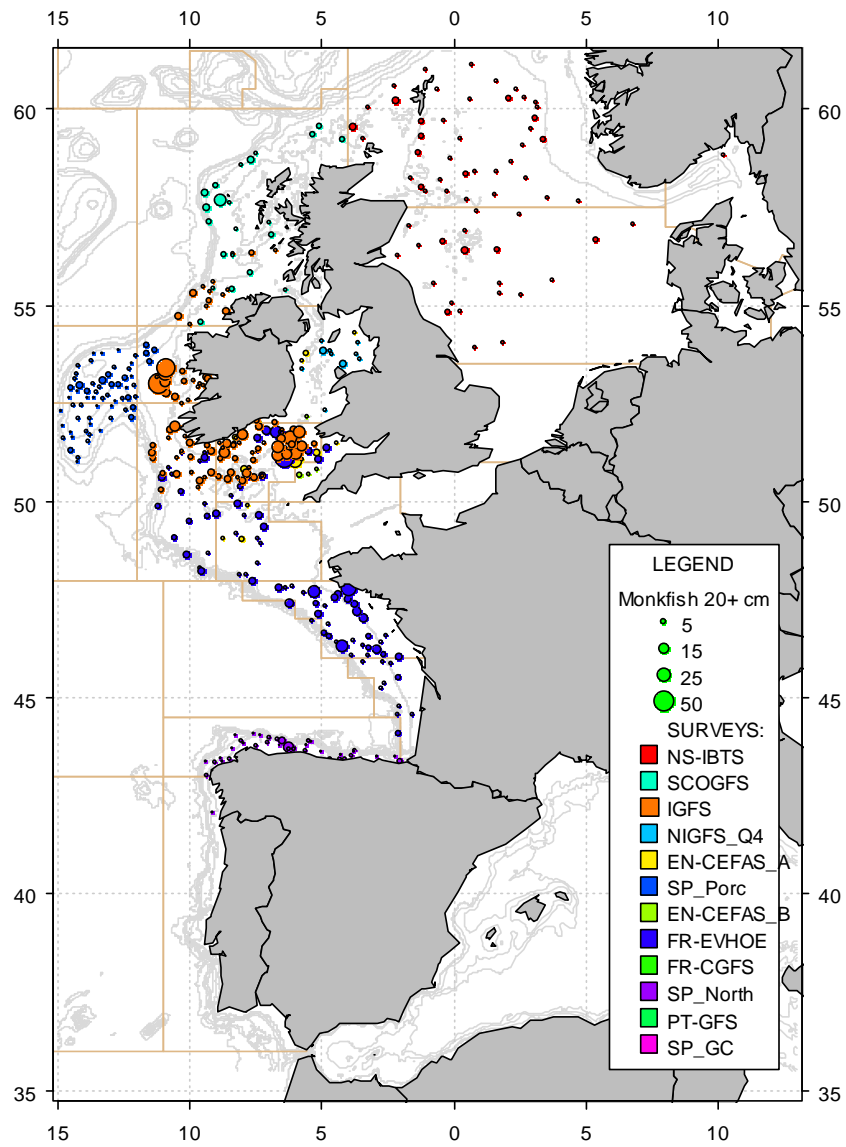


Figure A.6.19. Catches in numbers per hour of 1+ group monkfish, *Lophius piscatorius* (≥ 20 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

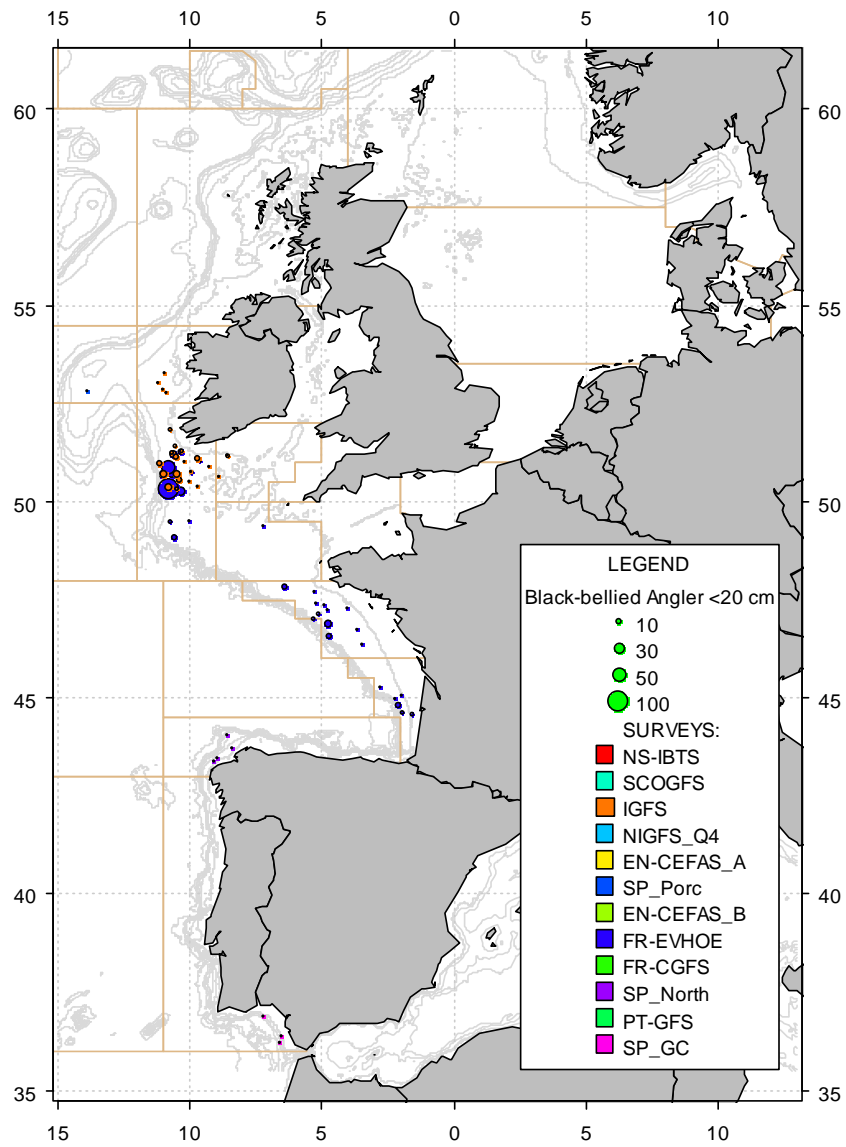


Figure A.6.20. Catches in numbers per hour of 0-group black-bellied anglerfish, *Lophius budegassa* (<math><20\text{ cm}</math>), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

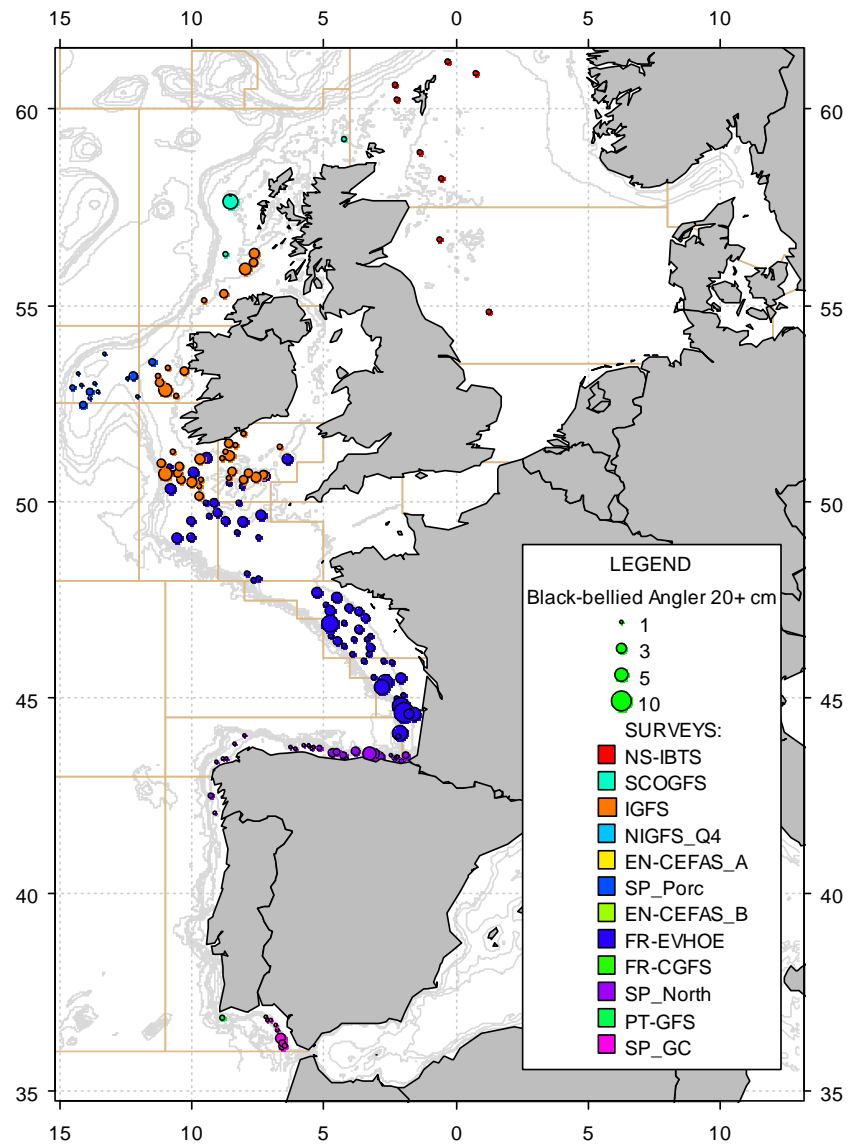


Figure A.6.21. Catches in numbers per hour of 1+ group black-bellied anglerfish, *Lophius budegassa* (≥ 20 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

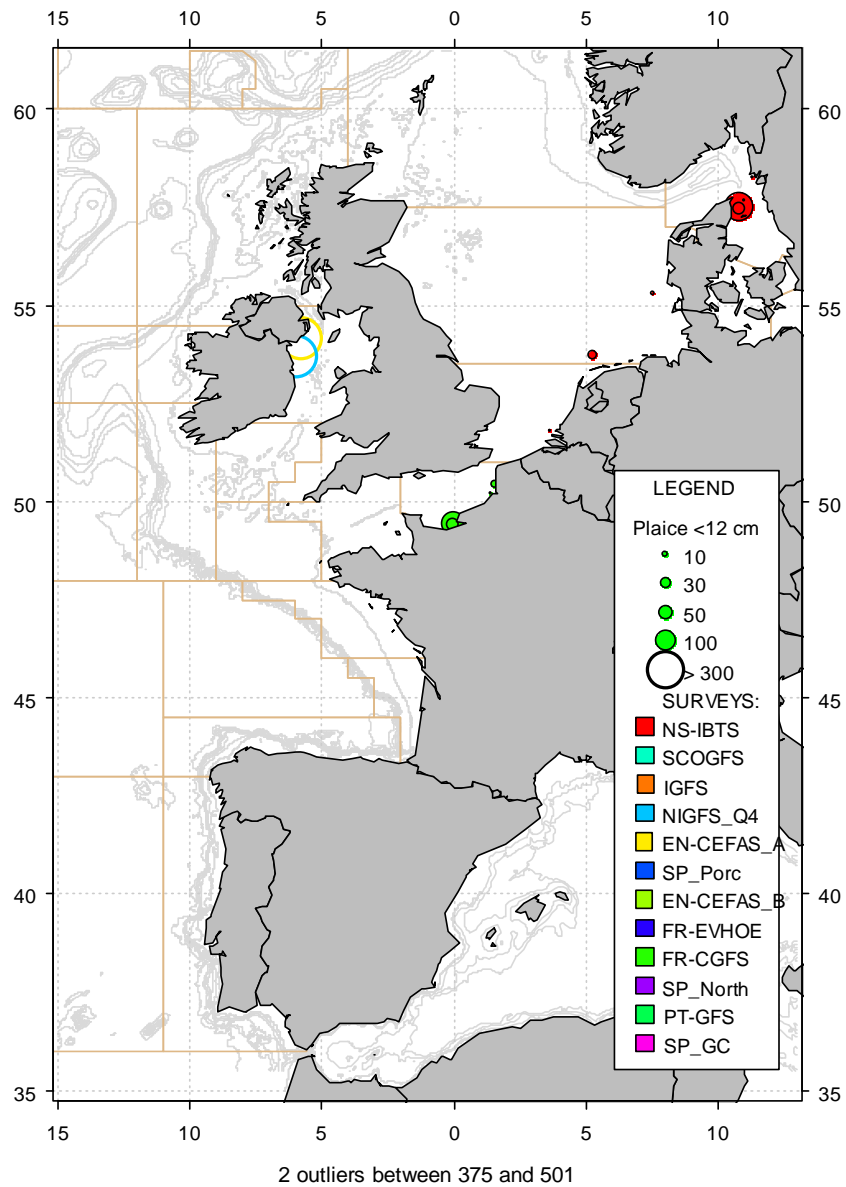


Figure A.6.22. Catches in numbers per hour of 0-group plaice, *Pleuronectes platessa* (<12 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

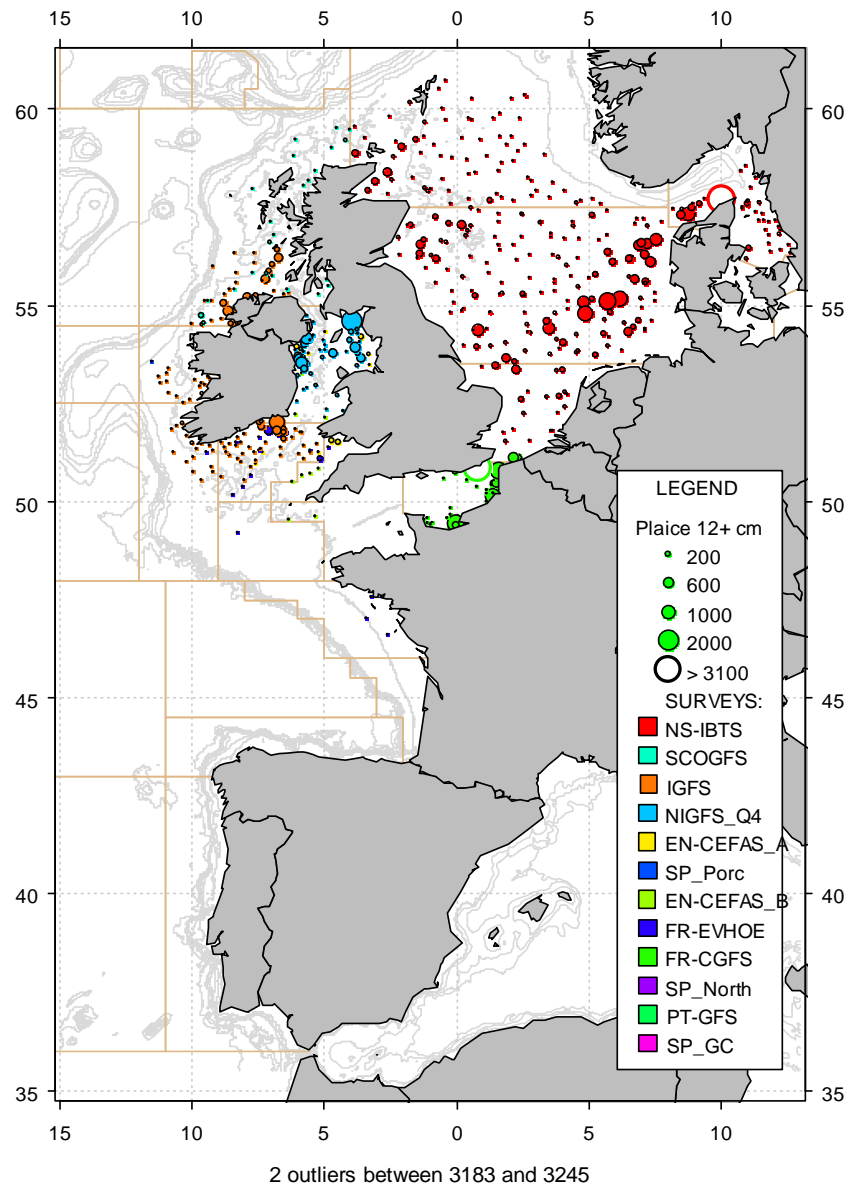


Figure A.6.23. Catches in numbers per hour of 1+ group plaice, *Pleuronectes platessa* (≥ 12 cm), in summer/autumn 2010 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

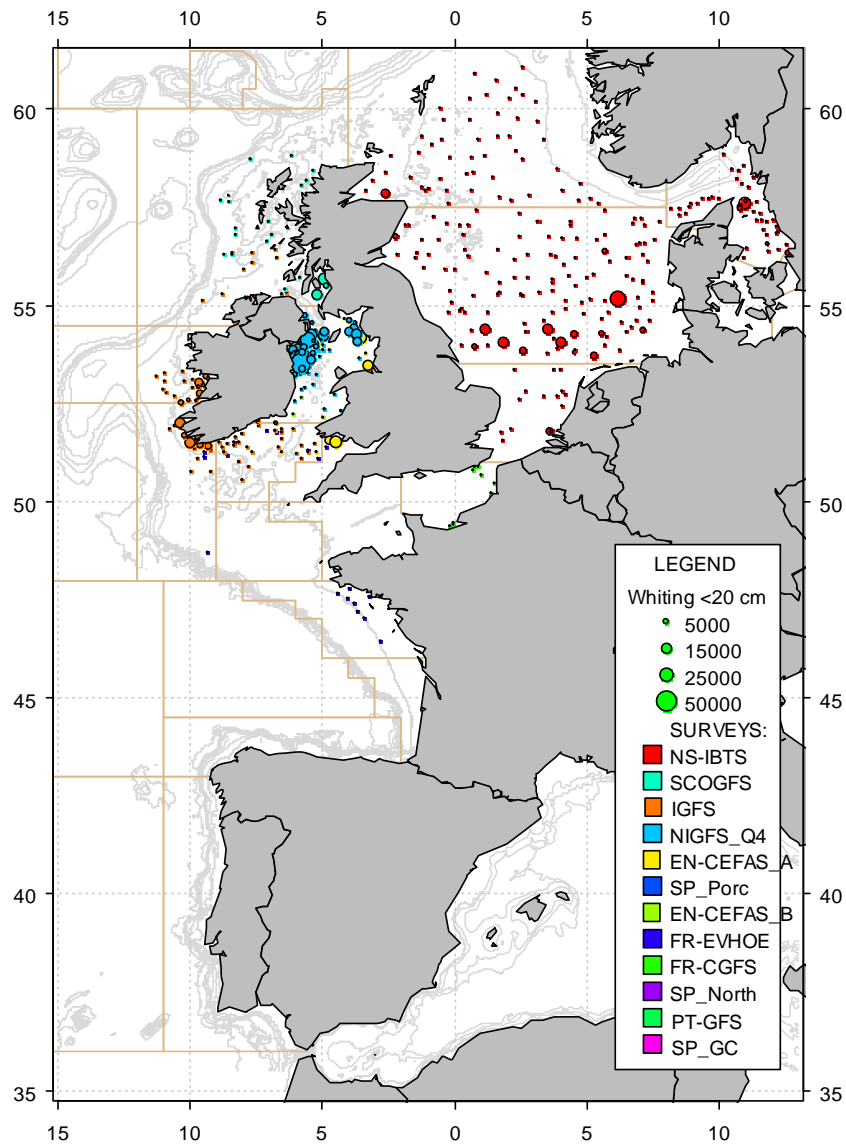


Figure A.6.24. Catches in numbers per hour of 0-group whiting, *Merlangius merlangus* (<20 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

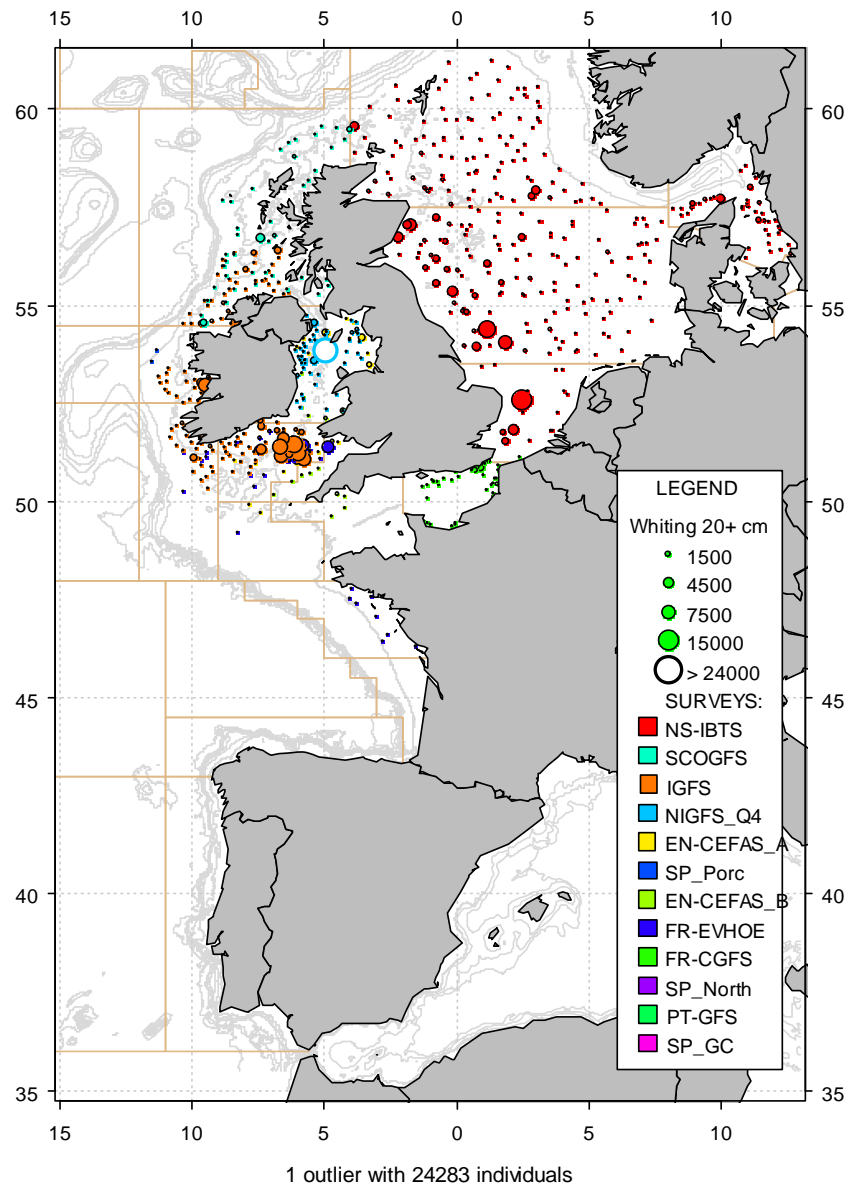


Figure A.6.25. Catches in numbers per hour of 1+ group whiting, *Merlangius merlangus* (≥ 20 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

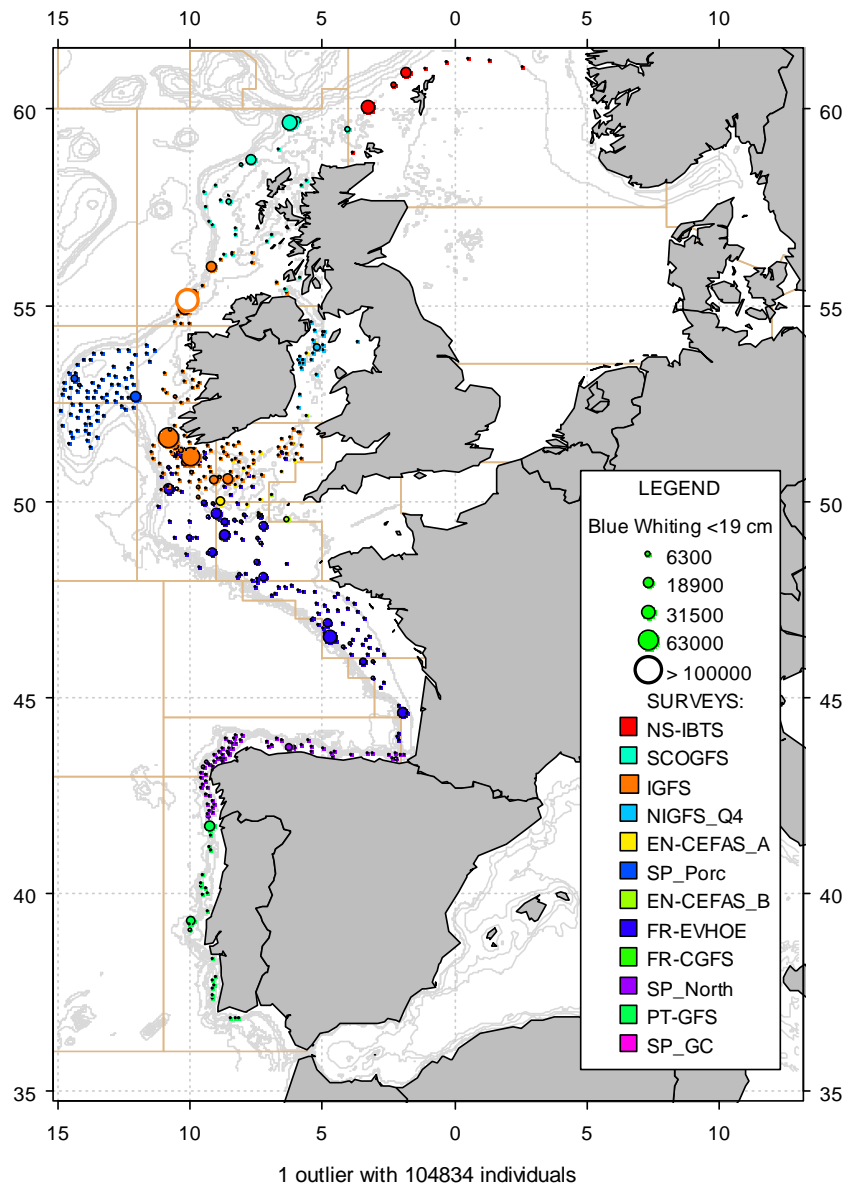


Figure A.6.26. Catches in numbers per hour of 0-group blue whiting, *Micromesistius poutassou* (<19 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

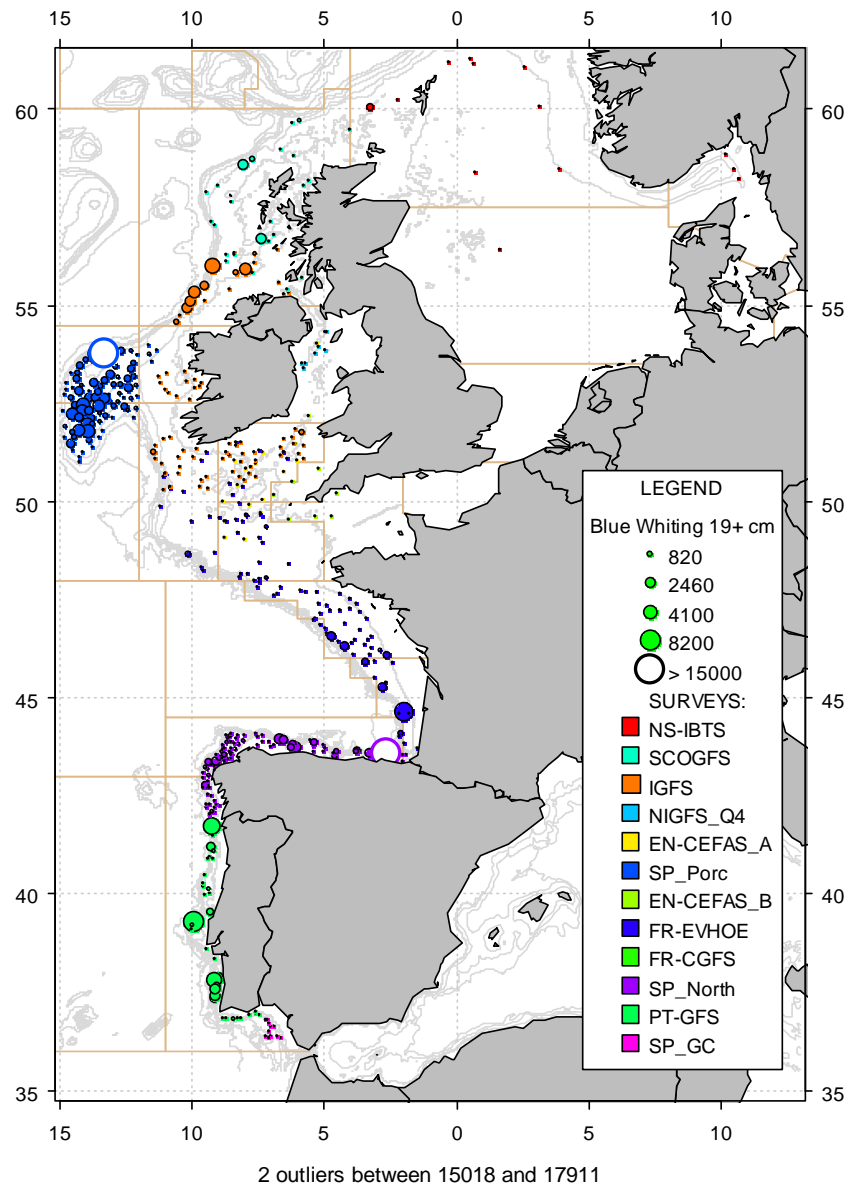


Figure A.6.27. Catches in numbers per hour of 1+ group blue whiting, *Micromesistius poutassou* (≥ 19 cm), in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

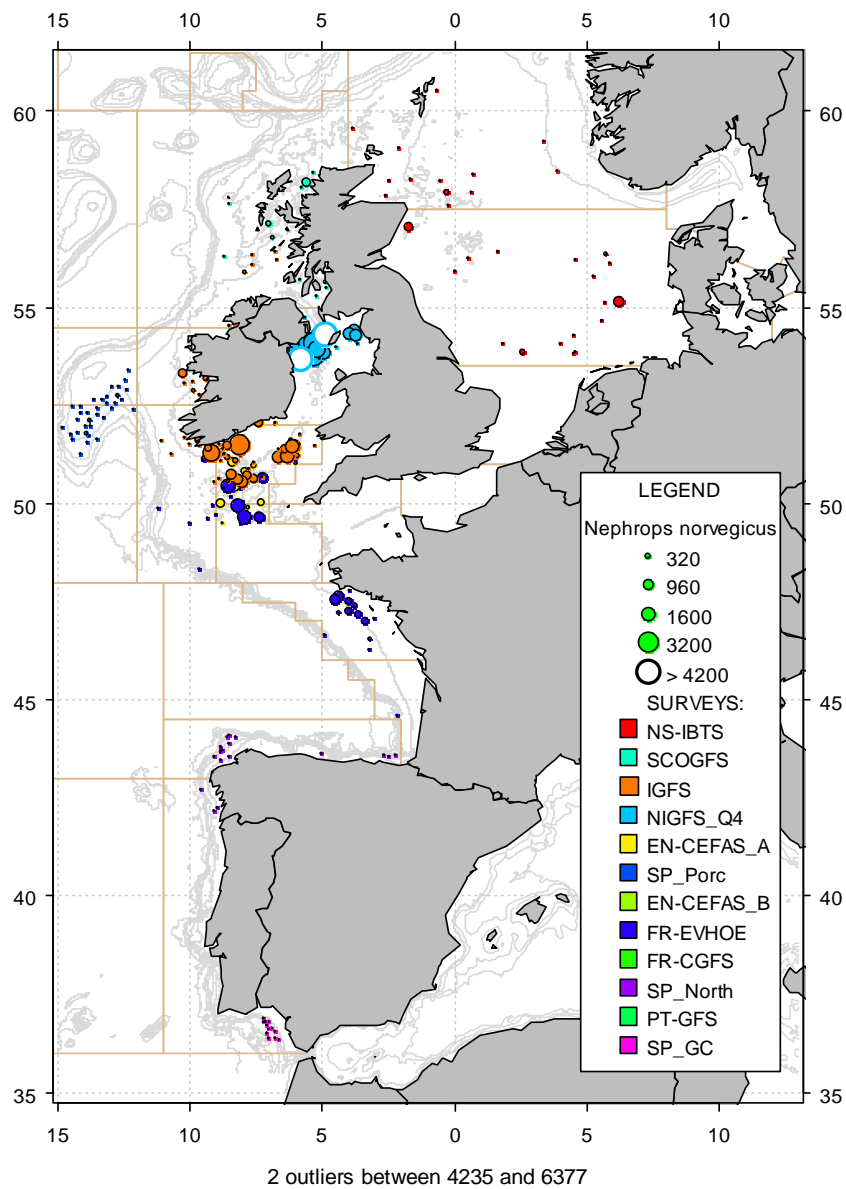


Figure A.6.28. Catches in numbers per hour of Norway lobster, *Nephrops norvegicus*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

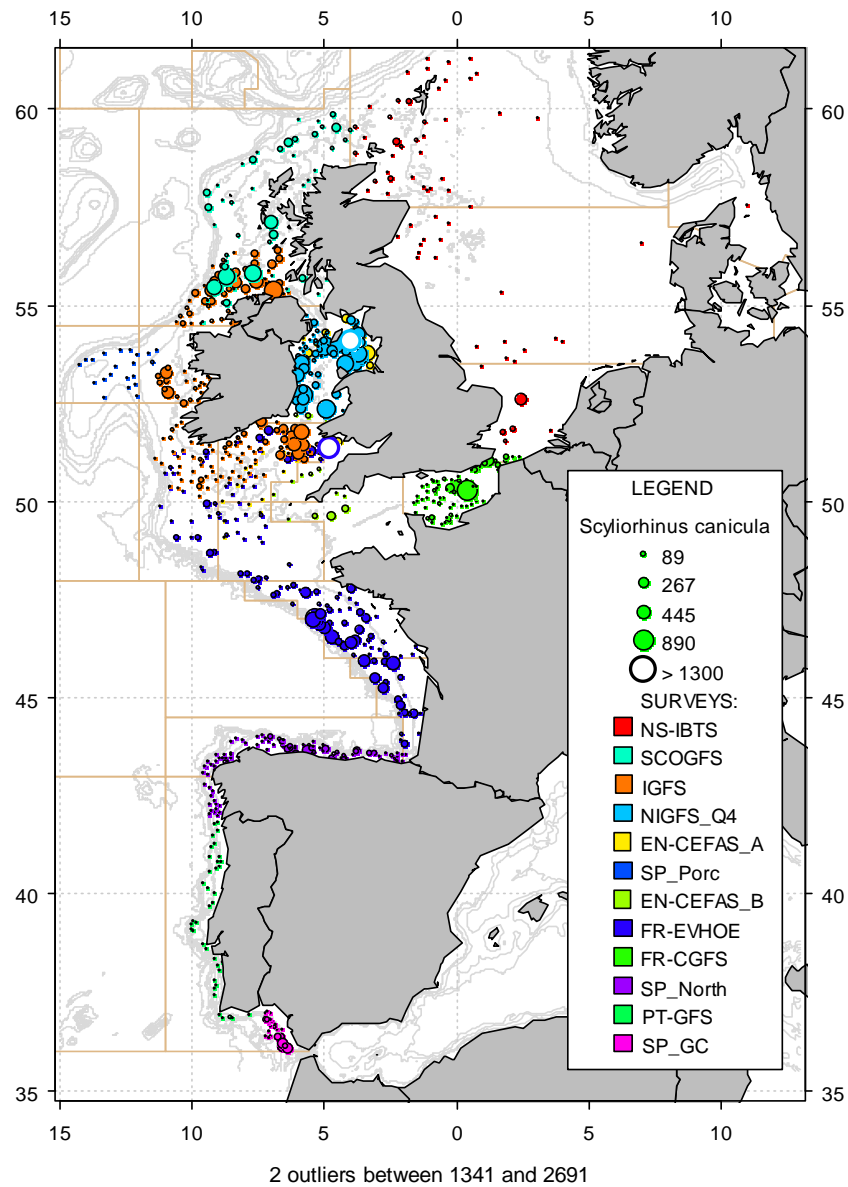


Figure A.6.29. Catches in numbers per hour of lesser spotted dogfish, *Scyliorhinus canicula*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

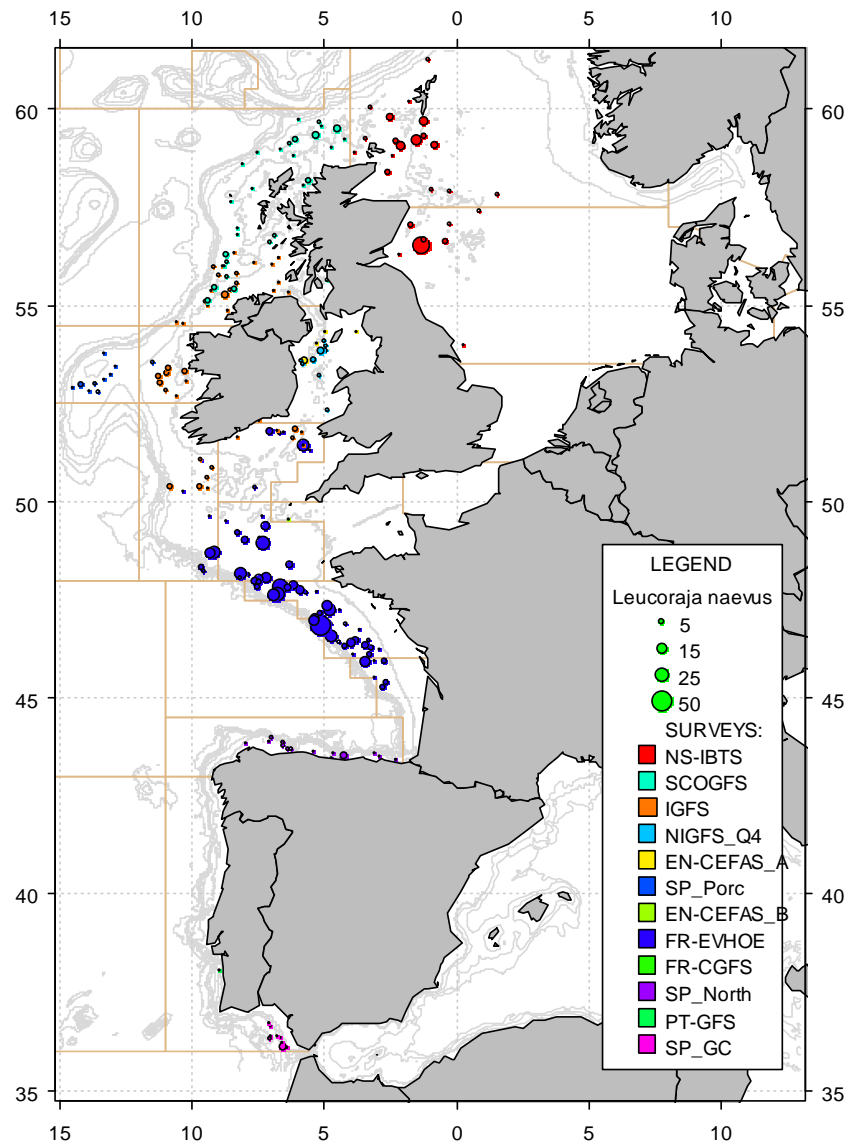


Figure A.6.30. Catches in numbers per hour of cuckoo ray, *Leucoraja naevus*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

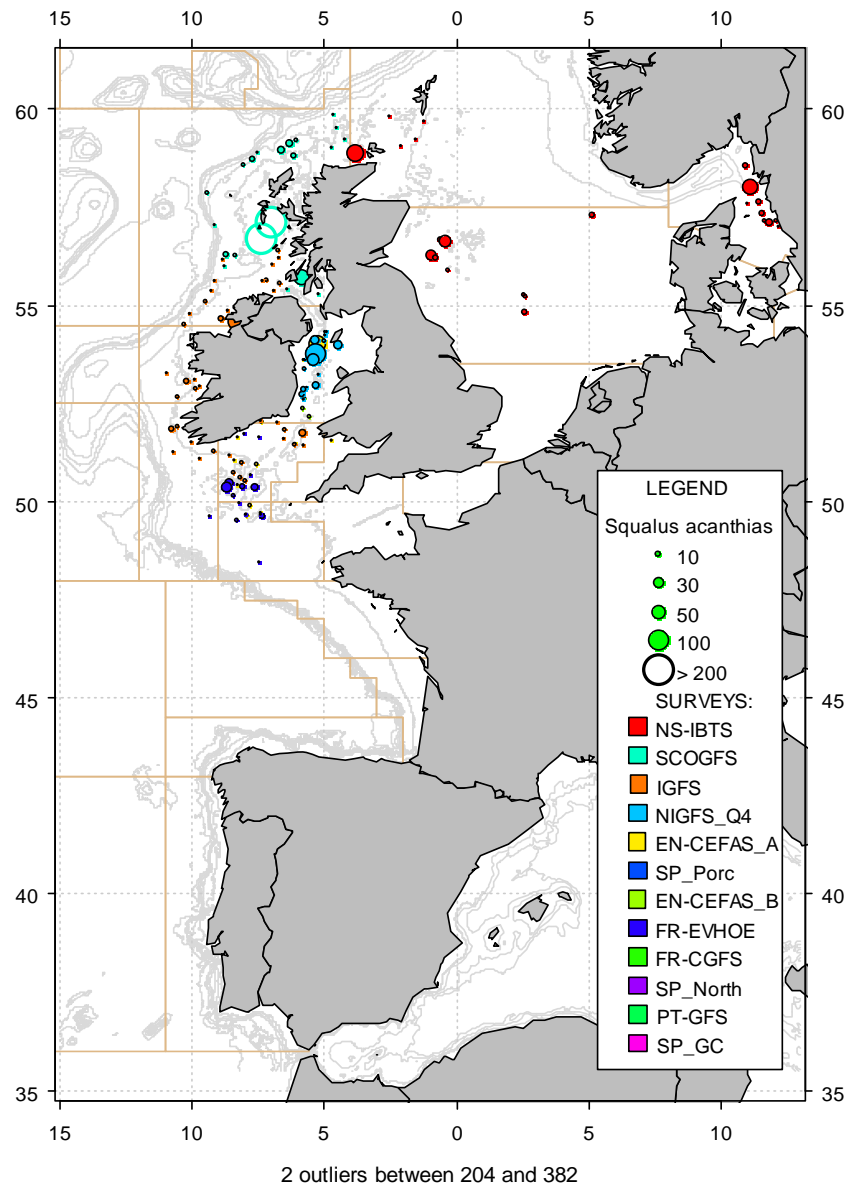


Figure A.6.31. Catches in numbers per hour per hour of spurdog, *Squalus acanthias*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

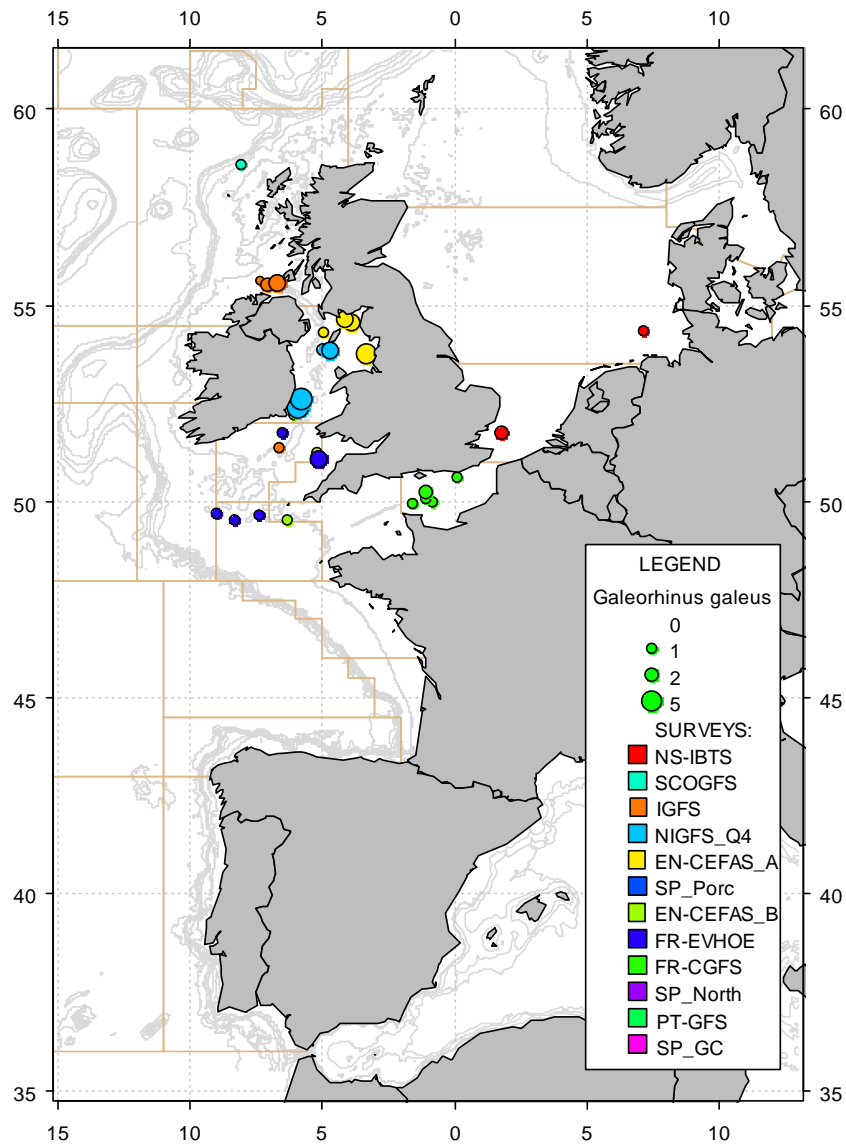


Figure A.6.32. Catches in numbers per hour per hour of tope, *Galeorhinus galeus*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

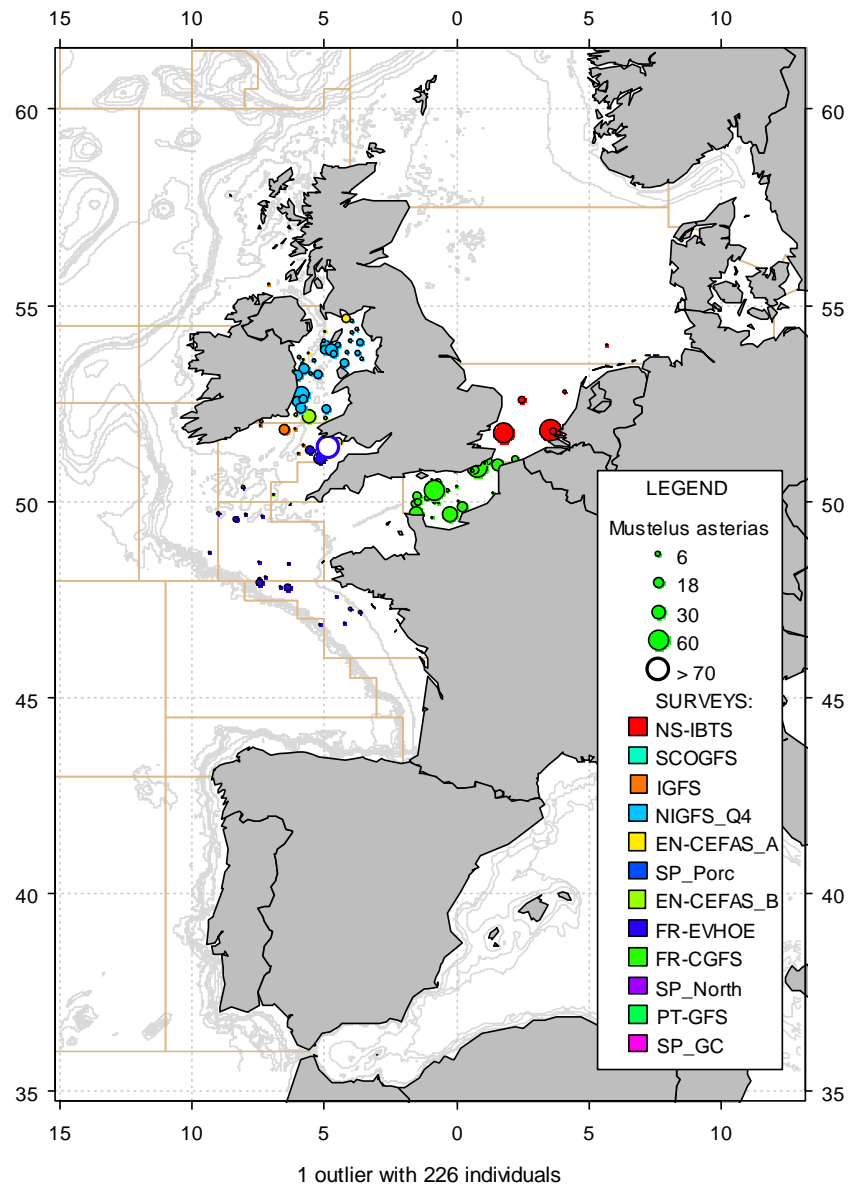


Figure A.6.33. Catches in numbers per hour per hour of smooth hound, *Mustelus asterias*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

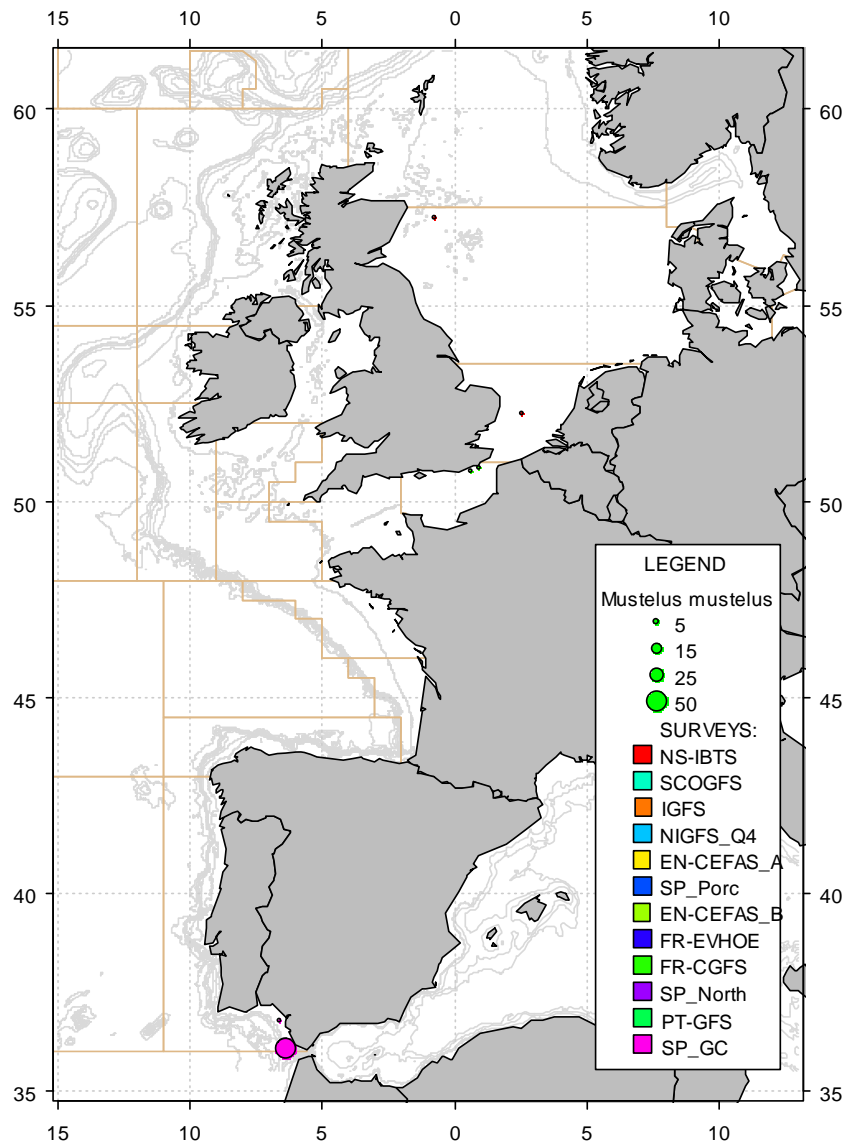


Figure A.6.34. Catches in numbers per hour per hour of smooth hound, *Mustelus mustelus*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

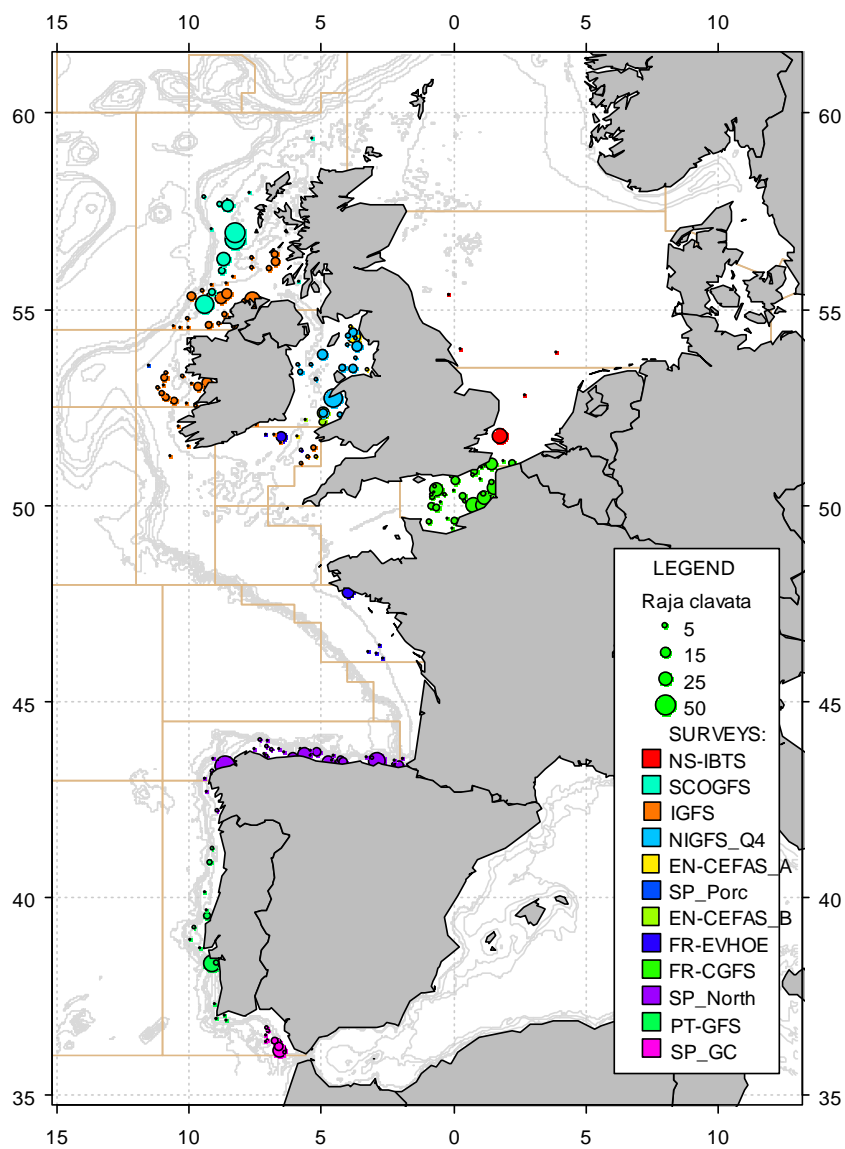


Figure A.6.35. Catches in numbers per hour per hour of thornback ray, *Raja clavata*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

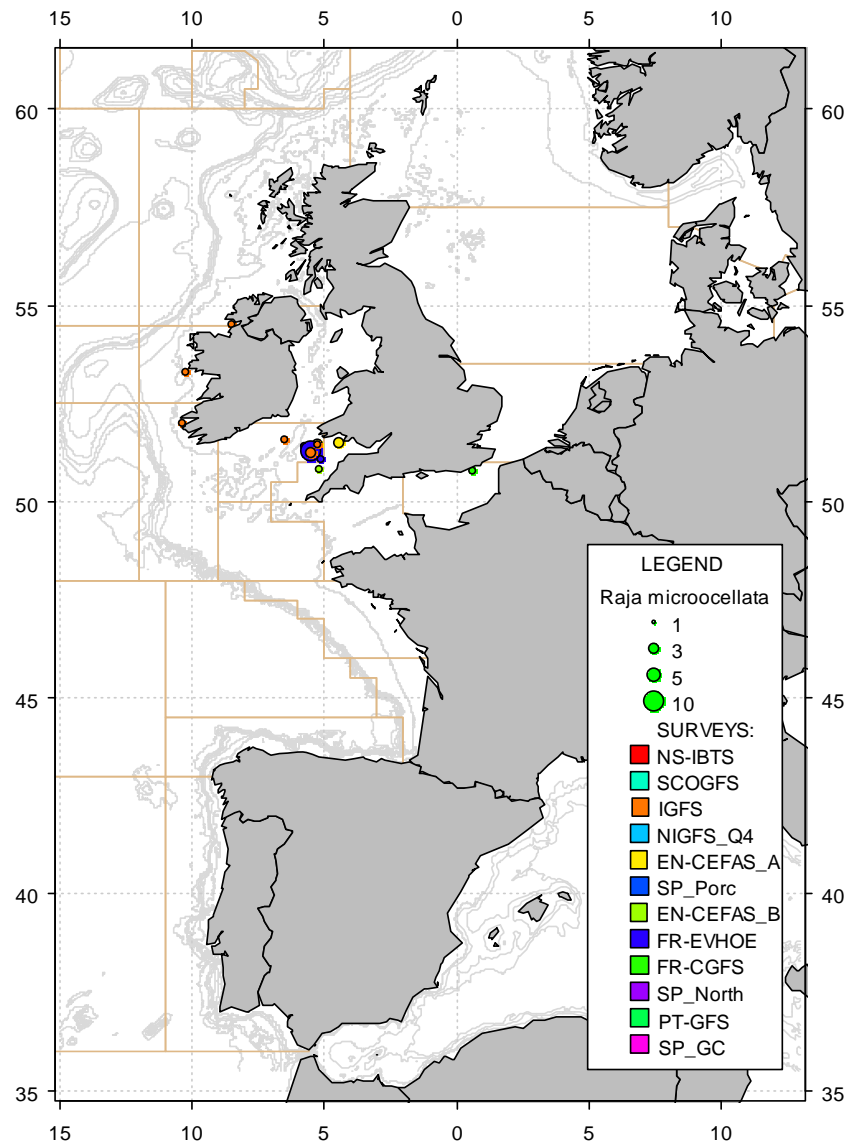


Figure A.6.36. Catches in numbers per hour per hour of small eyed ray, *Raja microocellata*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

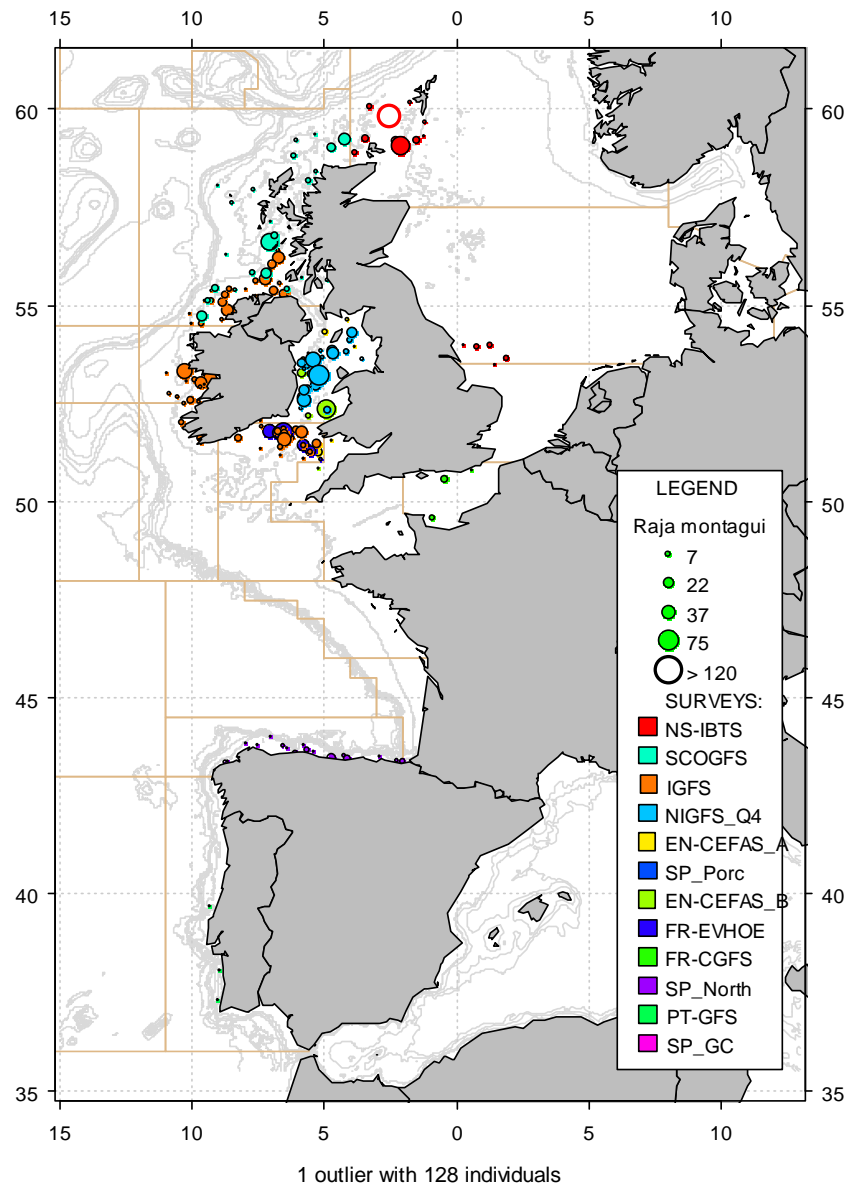


Figure A.6.37. Catches in numbers per hour per hour of spotted ray, *Raja montagui*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

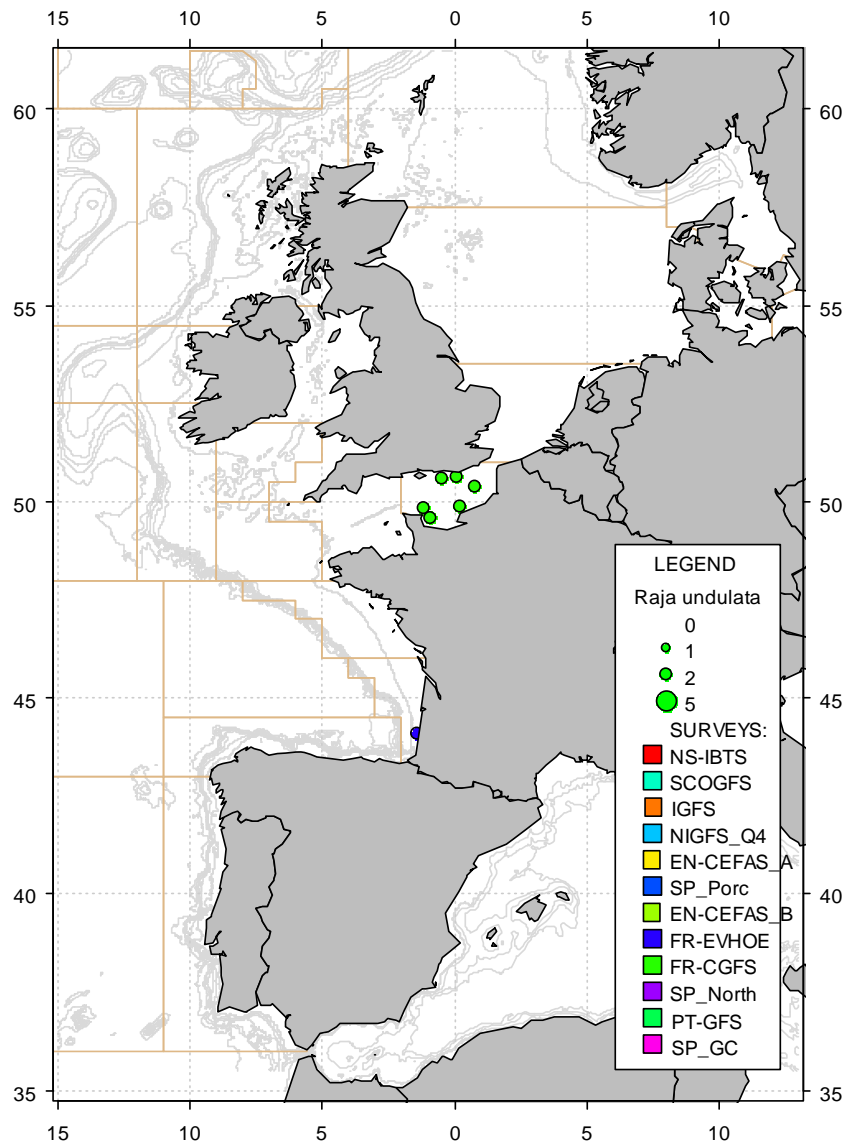


Figure A.6.38. Catches in numbers per hour per hour of undulate ray, *Raja undulata*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

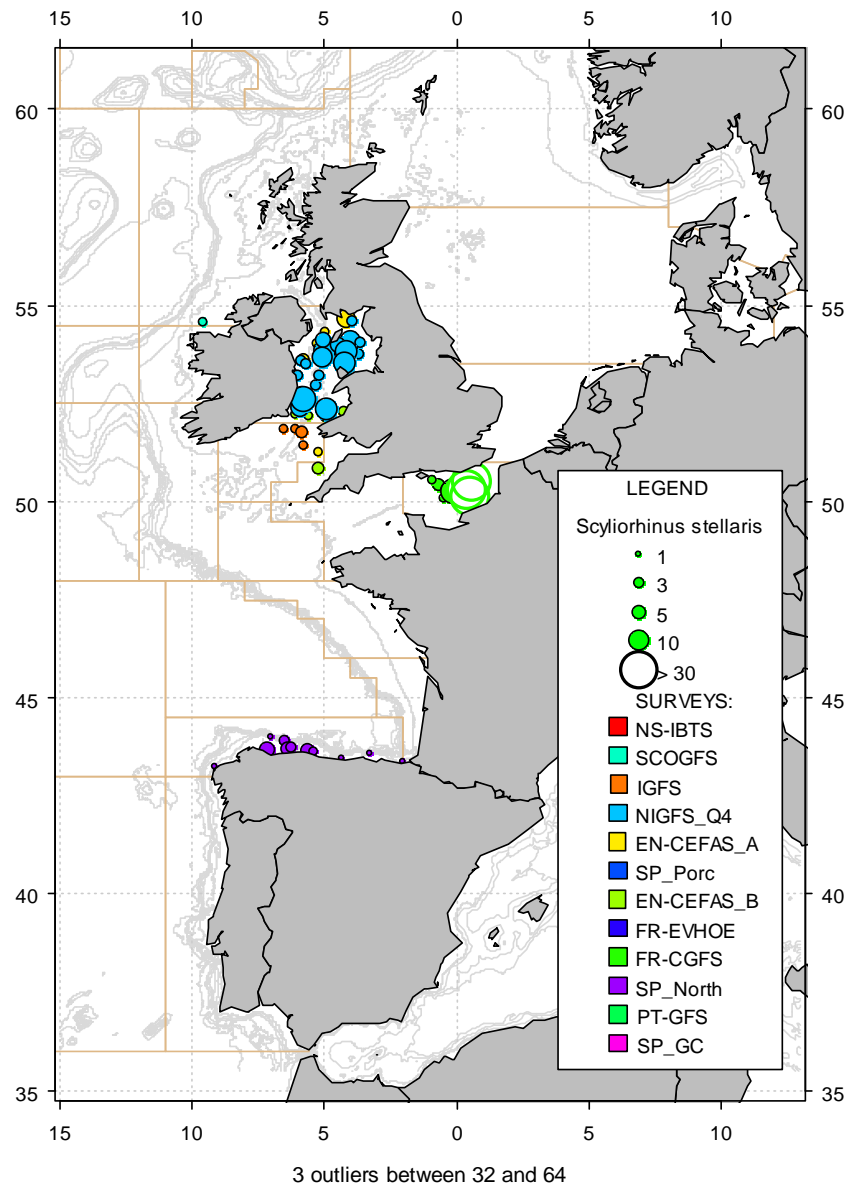


Figure A.6.39. Catches in numbers per hour per hour of nurse hound, *Scyliorhinus stellaris*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

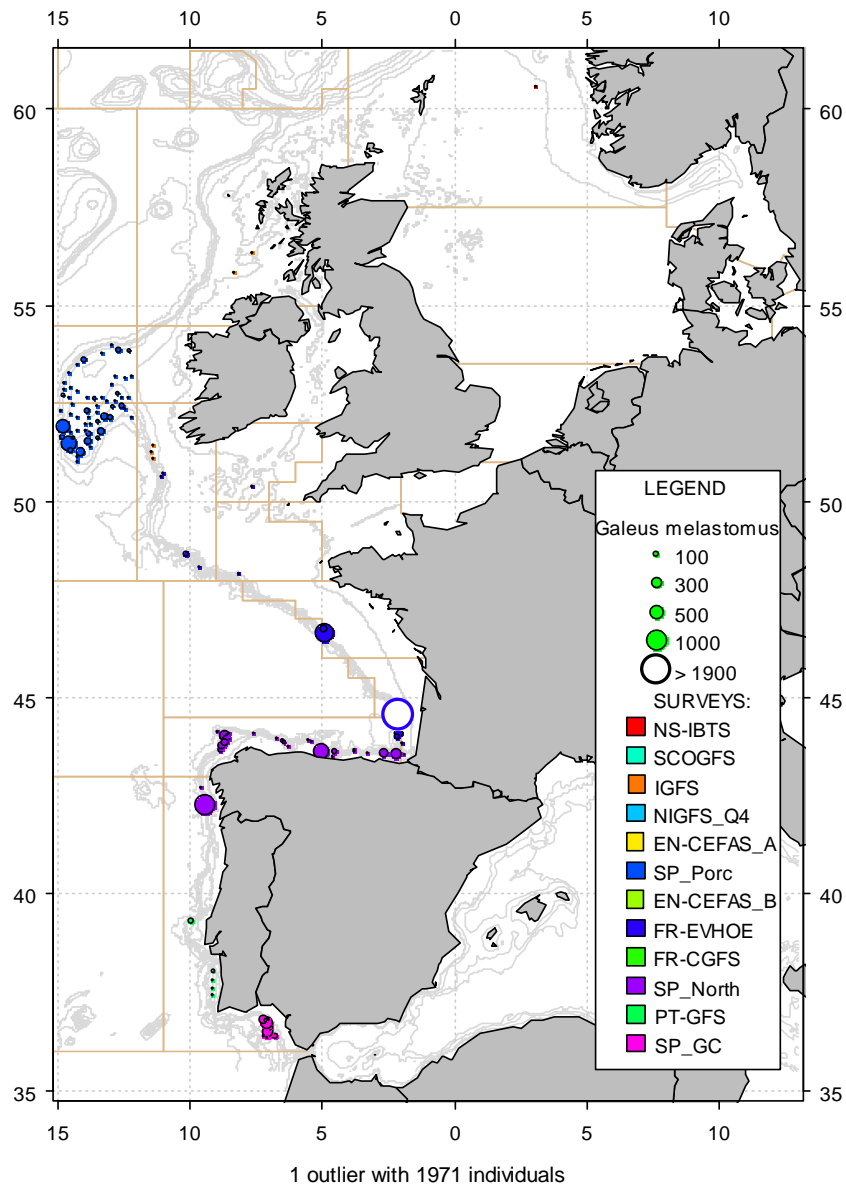


Figure A.640. Catches in numbers per hour per hour of Blackmouthed dogfish, *Galeus melastomus*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

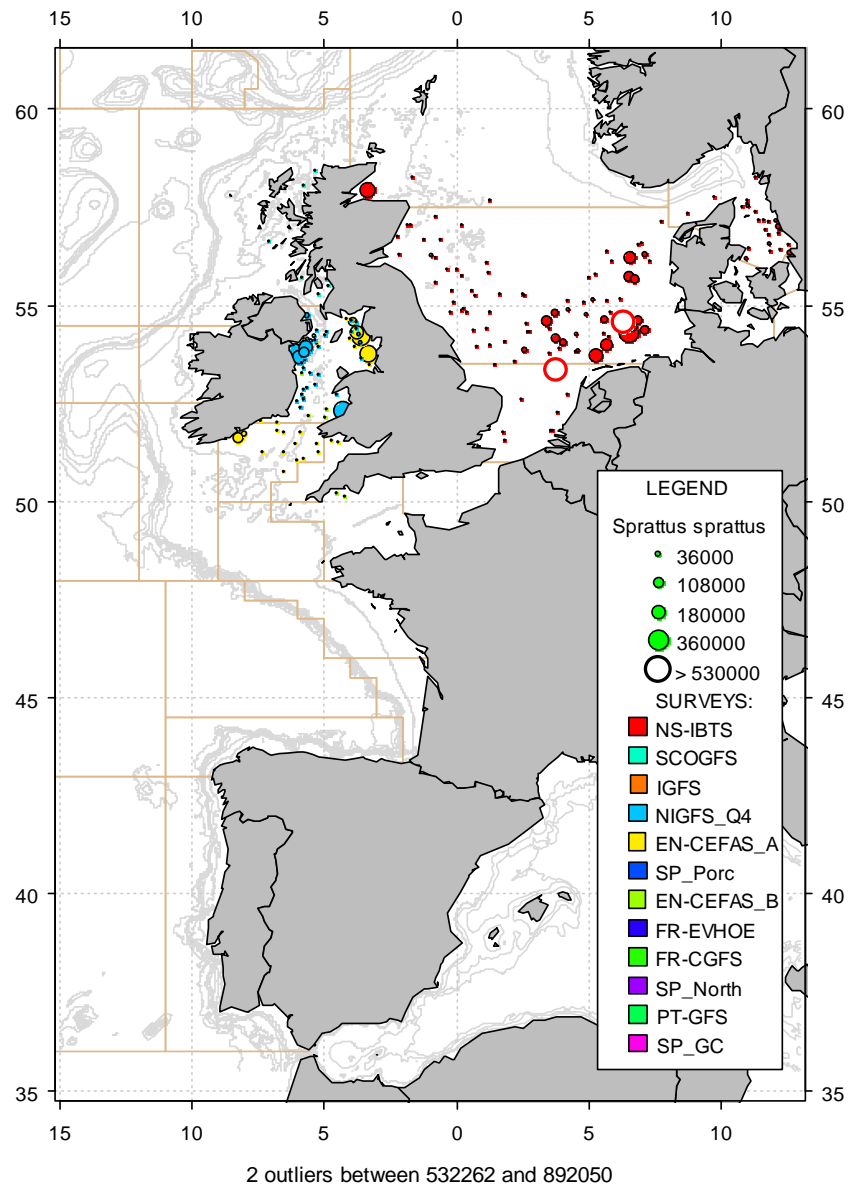


Figure A.6.41. Catches in numbers per hour per hour of European sprat, *Sprattus sprattus*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

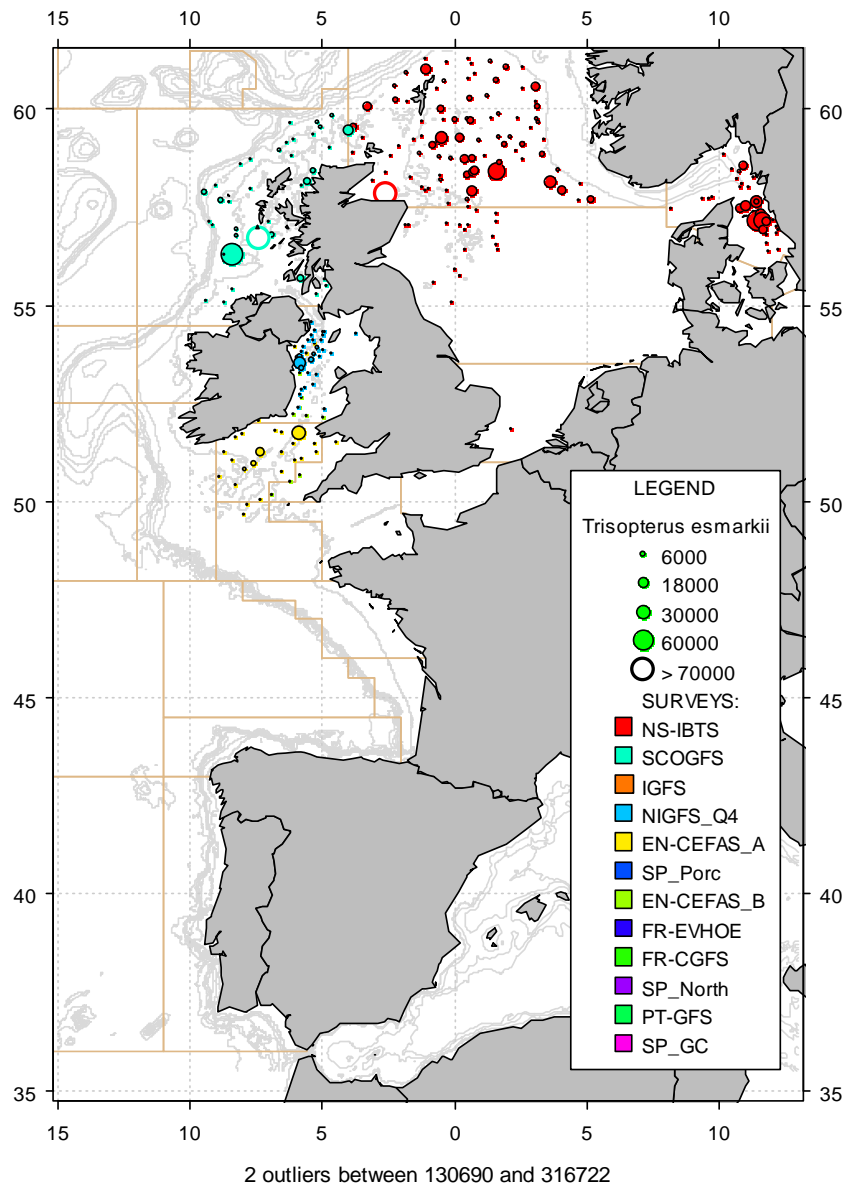


Figure A.642. Catches in numbers per hour per hour of Norway pout, *Trisopterus esmarkii*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

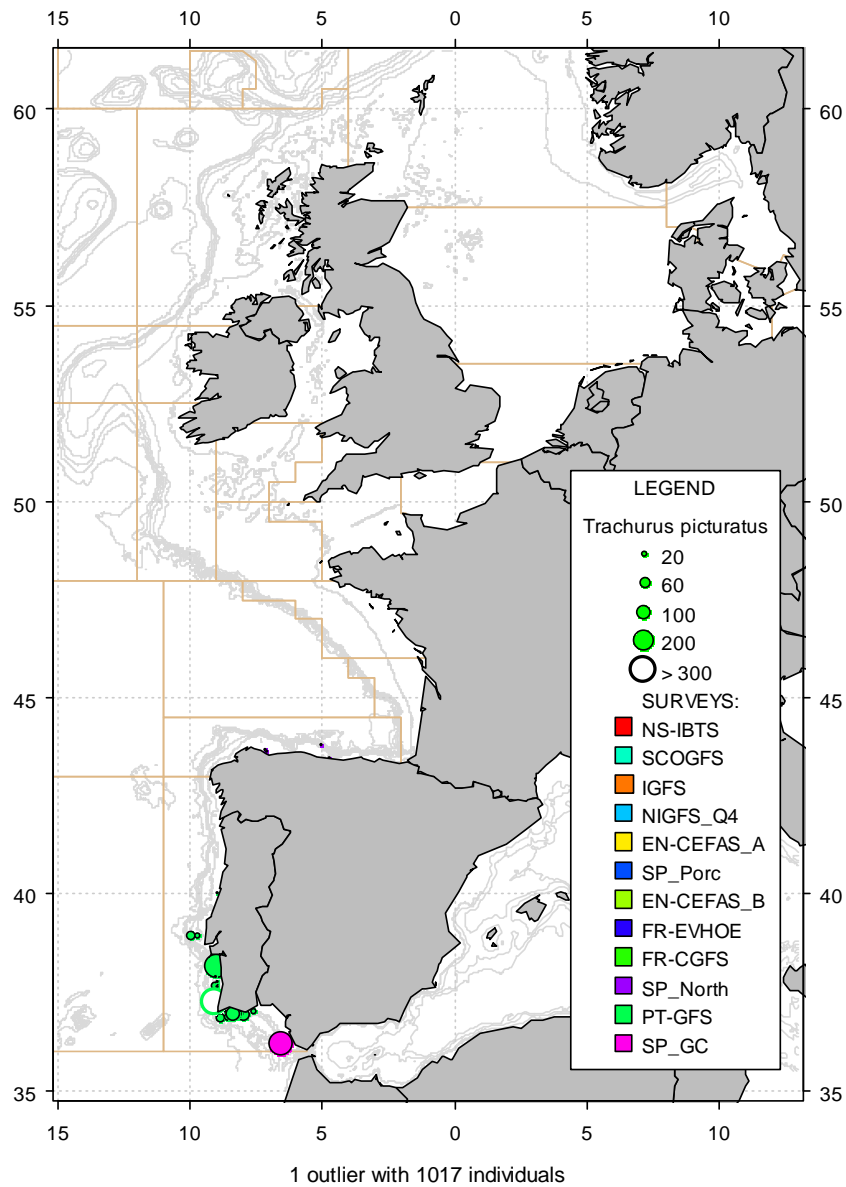


Figure A.643. Catches in numbers per hour per hour of blue jack mackerel, *Trachurus picturatus*, in summer/autumn 2011 IBTSurveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.