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

28 March – 1 April 2011

ICES Headquarters, Copenhagen

ICES International Council for the Exploration of the Sea

CIEM Conseil International pour l'Exploration de la Mer

International Council for the Exploration of the Sea
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Contents

Executive summary

The International Bottom Trawl Working Group (IBTSWG) met in ICES Headquarters, Copenhagen, Denmark, from 28 March to 1 April 2011. There were 21 participants from 12 countries, most of them are involved in designing and conducting bottom trawl surveys, and two participants represented the ICES Secretariat.

The ToRs related with the Strategic Initiative on Area Based Science and Management were not addressed because of the tight agenda with many ToRs, and the reduced of expertise among participants. Besides problems with the data for the analyses of Age structured survey data within the ToR b) have advised to focus on documenting the anomalies encountered in the megrim data downloaded from DATRAS and a short list of simple SOP type checks is being compiled to identify and correct potential errors, especially for key parameters that might affect raising of survey data (see Section 5).

For the rest, all terms of reference have been met; details are given in relevant sections (see Table of Contents). Major developments, achievements and recommendations from the 2011 meeting are summarized below:

Section 3 is dedicated to the review of recommendations from the previous year, has been split in two parts: follow up of the recommendations from IBTSWG in 2010 and answering to recommendations to IBTSWG from other EGs.

Individual surveys coordinated by IBTSWG are presented using a standard reporting format that summarizes the survey design, coverage, aggregated results and samples collected for the target species. Section 4 and the summary tables provide a centralized and accessible overview of specific survey datasets for those using the data. The distribution maps showing the distribution of some target species cover the entire area encompassed by IBTS surveys and are presented as combined results for all areas (see Section 4 and Annex 7). The second half of 2010 has seen the cancellation of Scottish surveys in the western area because of a major breakdown of the research vessel, and 2011 Q1 the replacement of Swedish vessel Argos with the smaller RV "Mimer".

Section 6 deals with gear parameters and their reporting, the issue of inconsistent sweeps lengths between countries and quarters arisen last year, nevertheless the lacking of specific individual measurements of field experiments comparing gear behaviour, led to focus on the rationale behind monitoring trawl geometry to standardize, and the importance of the use of real-time monitoring data to ensure similar gear behaviour.

Section 7 gathers the ToRs d) and e), focused on the quality of the DAtabase of TRAwl Surveys, an issue of major concern for the IBTSWG with the increasing use of the data both for the assessment and within the context of the Marine Strategy Framework Directive. Whereas Sections 8 and 9 deals with the improvements accomplished of the documentation and use of DATRAS and DUAP, mainly taken from the Working documents presented in Annex 5.

Section 10 contains the revision of the IBTS Manuals.

Sections 11 and 12 are both related with the MSFD, discussing the limitations of the IBTS data for some of the MSFD requirements, but also what IBTSurveys can provide to the MSFD and within the frame of integrating the Surveys for the Ecosystem Approach.

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 at ICES Headquarters. Copenhagen, Denmark, 28 March–1 April 2011 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) Review of age-structured survey data as a data quality exercise previous to species scheduled for benchmark assessments using survey based assessment exploratory plots. considering the possible impact of the use of the trawled area as effort estimate;

c) Further examine the quality of gear performance by reviewing and analysing net geometry readings and warp out to depth ratio to evaluate changes and possible trends. evaluate the effects of sweeps length on net geometry;

d) Improve the quality of historical biological data by (i) examination of DATRAS data to identify erroneous records, with a focus on (a) lings: *Molva molva*, *M. dipterygia* and *M. macrophthalma*; and (b) gobies. Gobiidae, and (ii) review national progress in correcting and re-uploading the corrections of the errors found during national and IBTS quality checking;

e) Improve the quality of newly collected biological data by (i) the production and dissemination of identification keys. (ii) the examination of DATRAS data collected during Q3–4 2010/Q1 2011 surveys to identify and correct erroneous HL- and CA-records;

f) Review and provide feedback in relation to the functioning of DUAP during 2010. and the relevant chapter of the report of WGDIM 2010;

g) Review recent updates within DATRAS and prioritize further developments; review and compare the output of DATRAS cpues with age per haul in rectangles;

h) Review and document the IBTS based indices and products downloadable from DATRAS;

i) Develop new recommendations following the report from the SGSTS and related CRRs in respect to issues relevant to IBTS;

j) Review IBTS manuals and consider additional updates;

k) Prepare methods for delivery of the following information to assessment working groups in 2012:

   i) Proportion of fish larger than the mean size of first sexual maturation

   ii) Mean maximum length of fish found in research vessel surveys

   iii) 95th % percentile of the fish length distribution observed

The information should be provided for all major fish stocks covered by the survey.

A complete list of participants who attended the group can be found in Annex 1.

1.2 Adoption of the agenda

The agenda (Annex 2 contains the additional ToRs and the recommendations to IBTSWG from other EGs) was sent to all participants on the 18 March and discussed at the beginning of the meeting. Because of the numerous ToRs and recommendations from other groups to be addressed by the IBTSWG, some of them received attention a few days before the meeting, and decisions on addressing some ToRs and the efforts put into each ToR had to be taken. In view of the scope and functions of the IBTSWG in the coordination of the sampling of data for the assessment and the EAFM, and the expertise of the participants, the priority was set to address the extra-ToRs more related with the data collection and their possible uses and limitations (i.e. ToR k) or l) in Annex 2, and comments on WKCATDAT); whereas other ToRs more related with the use and analysis of the data (ToRs m, n or o in Annex 2), are better set by the users of the data and ecosystem groups (e.g. WGECO, WGINOSE, WGEAWESS).

To address the different ToRs and recommendations, the work was allocated to different subgroups, having later plenary summaries of the discussions and agreements, the main subgroups and subjects dealt within them were:

- MIK and Ichthyoplankton
- DATRAS subgroup: addressed units and index calculations steps
  - DUAP
  - Taxonomy - WoRMS problematic codes
- CATDAT – MSFD
- Manual and gear

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.

The IBTSWG assumed responsibility for coordinating western and southern division surveys in 1994. Initially progress in coordination was slow but in the last few years there has been a marked improvement and whilst data exchange etc. is not at the level of that enjoyed in the North Sea, there is 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 a common database at ICES headquarters, i.e. DATRAS (Database for TRAwl Surveys). The IBTSWG aims to make all data collected during IBTSurveys publicly available through this database. At the same time, the 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 and the development of protocols for prevention of storage of future errors; this year the IBTSWG focused the

DATRAS work in reviewing and improving the documentation provided in DATRAS for the users, trying to clarify to the non-experts users:

a) The information available, fields, units used, structure of DATRAS;
b) Algorithms and protocols in the estimation and how indices are calculated.

Besides also in the DATRAS, there was a proposal from the Data Centre to replace the existing NODC and ITIS species list with the World Register of Marine Species (WoRMS: http://www.marinespecies.org), with the advantage of this being a comprehensive system that also contains higher taxon relations. After this proposal from ICES Data Centre, some problematic species were impeding this change, these problematic species were solved during the IBTSWG, and now after asking WoRMS to solve a few problems, the WoRMS codes will be used as the standard to upload and store data in DATRAS.

In the last few years the IBTSWG has also tried to improve the information provided, especially for the assessment expert groups, by providing detailed individual summary reports with the main results and trends for each individual survey. Also by analysing the follow-up of cohorts for more species relevant to the assessment by using analyses like the SURBA plots, and producing distribution maps to illustrate the distribution of recruits and post-recruits.

This year the revision of the IBTS Manuals has been minor compared to last year's, and has focused mainly in the North Sea Manual, where all the MIK related issues have been have been moved to a separate MIK Manual that will be removed and placed in a new stand-alone manual to be produced, a clarification on the need to record SCANMAR data to analyse for variance and gear performance, and adding a marine litter recording protocol.

Also the data and information that the IBTS surveys can provide for the Ecosystem Approach Fisheries Management and the Marine Strategy Framework Directive, and the limitations of the data for these purposes have been addressed following the requests from ToRs k), l), and m; see Annex 2).

3 Review of IBTSWG 2010 Recommendations

3.1 Recommendations from IBTSWG 2010

3.1.1 Further investigate the suitability of CGFS indices for assessment purposes

The design of the French CGFS survey was presented and discussed during the 2008 meeting of the Working Group (ICES 2008 RMC:02). Concerns were raised about some inconsistencies in indices used in Working Groups assessment. Noting that some prime studies have been carried and published about habitat and fish assemblages in the area covered by the survey, the Working group recommended that a stratification based on the results from these studies should be further investigated and used to compute abundance indices.

Results of a first investigation were presented at the 2009 meeting and discussed. As only whiting was investigated and little improvement to increase precision and year-to-year consistency could be found, the working group recommended more investigations including some other species in order to know if the results obtained on whiting were due to a "species effect" or due to the survey design. A new study including plaice and cod investigating abundance indices trends and evaluating their consis-

tency over years was presented at the IBTS Working Group in 2010 (ICES, 2010 Section 3.3). As reliable and similar trends between the Eastern English Channel and the South of the North Sea, were shown, an analysis using SURBA software (used by WGNSSK working group) was carried out, including data from the whole spatial extent of each survey, to verify the effective consistency of abundance indices trends. These results were presented (see WD 1 in Annex 5) and discussed during the 2011 meeting.

Using different methods and surveys (CGFS and BTS in the Eastern Channel, IBTS Q3 in the Southern North Sea), indices by age were compared for plaice, cod and whiting. Using SURBA software, the spawning biomass for these three species was calculated and gave contrasting results depending on the stratification used in the CGFS. For plaice, BTS and CGFS data were used and similar trends were found for early age classes. The difference in survey seasonality and gear efficiency may explain the differences observed for older age classes but the working group recommend exploring size spectra and age length key from each survey to verify it. Probably due to the usually low occurrence frequency of this species during CGFS survey, inconsistencies were still found in cod data. It was hypothesized that the cod population may sometimes be extending (but not always) in the Channel. The investigation of length spectra from the CGFS and the IVc area from the IBTS Q3 may enable to verify if they belong to the same population. Finally, very similar trends were found for whiting abundances between CGFS and IBTS Q3 data. However, these did not result in similar biomass estimation. It is believed that the whiting population may extend in the Channel and that the CGFS is effectively capturing this fraction of the population but this survey data may not be used in isolation to estimate the total biomass. The working group recommended investigating the length spectra from the CGFS and the IVc area from the IBTS Q3 in order to verify whether they were the same in the Eastern English Channel and in the North Sea. If these investigations show that the whiting and cod population captured by the CGFS and IBTS Q3 are the same, it may be interesting to use spatially overlapping data to inter-calibrate these two surveys and to use the CGFS to extend the IBTS Q3 in the Eastern English Channel to give a more complete picture of these two populations abundance and biomass.

Recommendation about CGFS:

Following the preliminary analyses results presented, the group suggested that the CGFS survey may only partly capture the abundance signal of the whiting and cod probably due to its limited spatial extent. On the condition that a suitable inter-calibration is found and that this survey is carried out in the Q3 rather than Q4, it may be possible to use this survey to extend IBTS Q3 in the Channel. This result also raised the question of the possible usefulness of covering the entire CGFS area (VIId) during the IBTS Q1.

The group noted that there was no groundfish survey in the western English channel (VIIe), mostly due to the difficulty of working in this area with a standard IBTS gear. France is investigating the possibility to evolve its Channel Groundfish Survey to cover both VIIe and VIId with an appropriate bottom trawl, and possibly to extend into IVc and fully integrate the IBTS Q3 survey protocol.

3.1.2 Logging of gear monitoring data

The logging of gear monitoring data has been done in 2010 and 2011 IBTS surveys, and data has been uploaded for countries that have uploaded missing data, neverthe-

less the re-uploading in DATRAS is now fully implemented and the recommendation to review were data for gear parameters in HH records are not available (ICES 2010, Section 9.6 in IBTSWG 2010 report) and re-upload those datasets has also been fulfilled by some Institutes, nevertheless some data mentioned in last year report still have to be provided but this will be done within the new re-uploads needed to fill data that consigned as -9 in several HH fields in DATRAS (See Section 5).

3.1.3 MIK index in DATRAS

This recommendation is addressed Section 3.2.4, together with some recommendations made to IBTSWG dealing with MIK samplings in IBTSurveys. The incorporation of MIK data into DATRAS is under development.

3.1.4 Staff exchange

Two exchanges of staff were carried out during 2010 and 2011 NS Q1, information on these exchanges is presented in Section 4.1.6.4. These reports support 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.

3.1.5 Numbers for Survey Manuals

ICES Secretariat is currently working on a system to file all manuals, even historical. This will be done during this year and revisions of Manuals for 2011 will not be presented as addendum of the Report but issued as stand-alone manuals.

3.1.6 Incorporate SGSTG recommendations

The recommendations proposed in last year IBTSWG have been adopted and updated during the surveys carried out in 2010 Q3 and Q4 and in the first quarter of 2011.

3.1.7 Suppression of surveys from DCF

The survey evaluation by SGRN10-03 (STCEF, 2010) is likely to have no consequences for the surveys that are under the DCF in the short term. However, it should be made clear that it is important to take the feedback into consideration and to develop surveys in order to be able to meet the increasing MSFD requirements in the future.

3.1.8 Participation of Norway on IBTSQ3

After not participating in 2009 Norway decided to reinstate Q3 Survey in 2010 and Norwegian participation, as mentioned in Sections 4.2.2.6, confirming that the Norwegian participation in the IBTS surveys is essential for a suitable coverage of the northern North Sea area.

3.1.9 Changes in DATRAS

The changes in DATRAS and developments are covered in Section 9.1.

3.2 Recommendations to IBTSWG

3.2.1 Collection of marine litter information

Data have been collected in most of the surveys in the North Sea and the Western and Southern areas, and national responsible for MSFD descriptor 10 shall contact survey leaders of IBTS. In the case of Cefas this contact was done before the survey and the spreadsheet/Form used to do the data logging was filled up on all hauls. The form

and the protocol will be used as the standard marine litter data collection procedure in the IBTS surveys.

3.2.2 WGEF: *Dipturus* species

In the case of *Dipturus flossada* and *D. intermedia*, the problem is that these species are not included into WoRMS or ITIS until the status of the species is accepted in WoRMS, so it is not possible to include them in DATRAS as species other than *Dipturus batis* or *Dipturus* sp. It is recommended that when working groups have recommendations for IBTSWG to identify new species it is important presenting the relevant key and contact WoRMS (http://www.marinespecies.org) to include the species in WoRMS list.

3.2.3 WGCEPH: length frequency done by species

Cephalopods are identified and measured by species since 2009 (ICES, 2009: Report IBTSWG 2009 Section 8.5) and are uploaded to DATRAS, although the uploading of some surveys is still on-going, and some countries do not report them as standard species (Spain for the moment only provide data when they are used for assessment purposes, though the process of uploading data from Spain and Portugal is still an ongoing task).

3.2.4 MIK sampling and Ichthyoplankton surveys

The following recommendations of different ICES working groups relate to the MIK sampling during IBTS:

1) **SGSIPS** recommends that the production of tables with survey information to provide insight into the variation between institutes within the different surveys and include these in the survey manual with the intention of providing a basis for the standardization of the surveys. The tables should be provided to SGSIPS prior to the November 2013 meeting.

2) **SGSIPS** recommends that manuals of the different ichthyoplankton surveys should be standardized and regularly updated. These manuals should be produced as stand-alone reports accessible to anyone rather than an annex in the coordination group reports

3) **SGSIPS** recommends that hydrographic measurements are taken with every plankton haul, preferably with a data logger on the net. If this is not possible, hydrographic measurements should be taken on station with a vertical CTD-cast immediately before or after the plankton haul.

4) **SGSIPS** recommends that analyses are carried out to compare IHLS and MIK-net survey data to provide information on the origin of the larvae in the MIK samples.

5) **WGDIM** recommends that data from the MIK samplings is included in DATRAS.

6) **WGEGGS** Recommends to undertake an ichthyoplankton survey every 3 years in conjunction with IBTS and HELA

The recommendations have been discussed during the meeting and the WG concludes the following:

- Ad 1) The proposed table on survey information from all participants has been produced, and is now distributed among participants for them to fill

in information. The final table will be included in the new manual and made available to SGSIPS (see below)

- Ad 2) The manual of the MIK sampling during Q1 IBTS will be updated and supplemented with more details on sampling gear and procedures. A table specifying explicit construction of gears from each participant will be included. The revised manual will be produced as a stand-alone ICES document which can be referred to in the IBTSWG manual for the entire programme.
- Ad 3) The WG agreed that hydrographic measurements should be done preferably by standard vertical CTD cast with each plankton haul. However, acknowledging that for many participants this will not be possible, these measures could also be made using a gear mounted CTD storage probe. To facilitate data storage within DATRAS temperature and salinity data should be provided with other haul data at 3 fixed depths: at 3 m, 20 m and at maximum tow depth. The data are reported along with the biological information given to ICES (database on ichthyoplankton).
- Ad 4) The proposed analysis of stock components of herring larvae in the MIK hauls is currently being carried out at DTU Aqua. This analysis incorporates use of hydrographic drift modelling and also connects the findings of early larvae from the IHLS with the later findings of larvae during 1Q IBTS in the North Sea.
- Ad 5) Initiatives have been taken to transfer the database of MIK hauls to a database at ICES. The data will be included in an ichthyoplankton database which is under development, and the reporting from 2012 onwards will be to this database.
- Ad 6) The WG found that it will not be possible to carry out a supplementary ichthyoplankton survey for fish eggs and smaller larvae during Q1 IBTS at the same sampling intensity as the MIK sampling. However, it might be possible to carry out additional sampling twice a day with a vertical net tows (e.g. with Apstein 1 m or WP-2 net) in the morning prior to the first and in the evening after the last GOV trawl. The processing of such samples would be the responsibility of WGEGGS.

3.2.5 HAWG: recommendation on possibilities of separating between NSAS and WBSS caught in area IIIa and IVa East

In areas IVaE, IIIa and SD 22–24 both NSAS and WBSS appear in catches of herring and thus also in the IBTS catches.

So far, the catches from IBTS have only been split between these two types of herring by the Swedish laboratory and the HAWG have gotten these data directly to estimate a split factor to allocate catches to these two stocks in the areas.

HAWG has recommended that this procedure is adopted by the IBTSWG as a standard. With these views, Sweden and Denmark will organize a course in 2012 and participants form the countries involved in this issue, i.e. Norway, UK, Netherlands and Germany will be trained to distinguish between those two types of spawners.

Details of the course will be discussed at the PGCCDBS in 2012.

3.2.6 Recommendations from WKCOD on extending the index area

These issues have been discussed within the IBTS North Sea coordination and are covered in Section 4.1.6.2.

3.3 References

ICES. 2008. Report of the International Bottom Trawl Survey Working Group (IBTSWG). 31 March - 4 April 2008. Vigo. Spain. ICES CM 2008 RMC:02. 228 pp.

ICES. 2009. Report of the International Bottom Trawl Survey Working Group (IBTSWG). 30 March–3 April 2009. Bergen. Norway. ICES CM 2009/RMC:04; 241 pp

ICES. 2010. Report of the International Bottom Trawl Survey Working Group (IBTSWG). 22 - 26 March 2010. Lisbon, Portugal. ICES CM 2010/SSGEST:06.261 pp.

STECF. 2010. Report of the Sub-Group on Research NeedsSGRN-10-03 Review of needs related to surveys. 4–8 October Brussels. 70 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

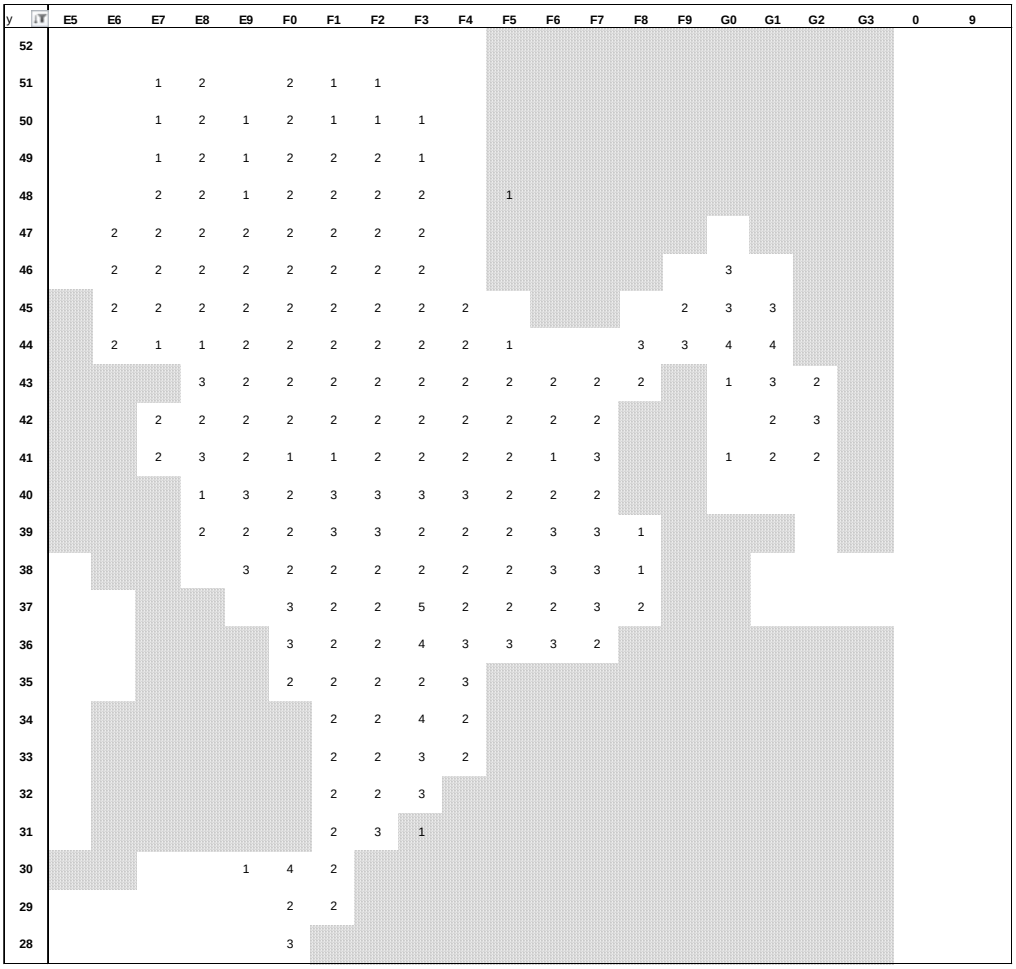
4.1.1 General overview

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 VIId. 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 Kitt). 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 that traditionally has participated in the quarter 1 IBTS was not available in 2011, due to a major refit of the vessel. A smaller vessel was used to take over the GOV hauls in Skagerrak-Kattegat, but the vessel was Seven vessels participated in the quarter 1 survey in 2011: "Mimer" (Sweden), "Dana" (Denmark), "G.O. Sars" (Norway), "Scotia" (Scotland), "Thalassa" (France), "Tridens II" (Netherlands) and "Walther Herwig III" (Germany). The survey covered the period 13 January to 6 March (see Table 4.1.1). In total, 381 GOV and 568 MIK hauls were carried out (see Figure 4.1.1). All rectangles were covered by at least 1 GOV haul. Due to poor weather conditions no MIK hauls were made in two rectangles in the central western North Sea. Although not every rectangle was sampled as planned, the overall cover age of the sampling was good.

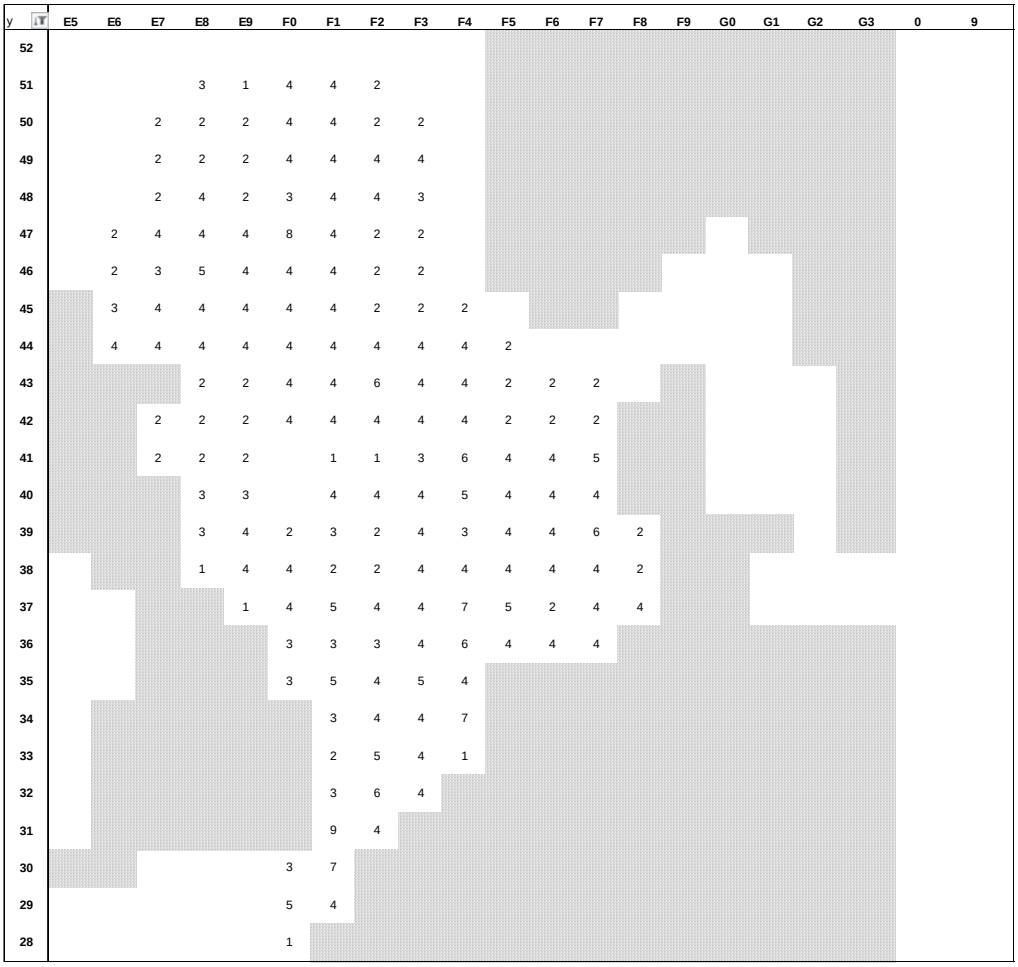
Table 4.1.1. Overview of the surveys performed during the North Sea IBTS Q1 survey in 2011.

Survey:	North Sea IBTS Q1	Dates:	13 January – 06 March 2011
Nation:	Vessel:	Period:	
Denmark	Dana	27 January – 13 February	
France	Thalassa	13 January – 13 February	
Germany	Walther Herwig III	20 January – 17 February	
Netherlands	Tridens	24 January – 25 February	
Norway	G.O. Sars	07 February – 06 March	
Scotland	Scotia 3	26 January – 17 February	
Sweden	Mimer	17 January – 11 February	



y	E5	E6	E7	E8	E9	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	G0	G1	G2	G3	0	9
52																					
51			1	2		2	1	1													
50			1	2	1	2	1	1	1												
49			1	2	1	2	2	2	1												
48			2	2	1	2	2	2	2		1										
47		2	2	2	2	2	2	2	2												
46		2	2	2	2	2	2	2	2							3					
45		2	2	2	2	2	2	2	2	2					2	3	3				
44		2	1	1	2	2	2	2	2	2	1			3	3	4	4				
43				3	2	2	2	2	2	2	2	2	2	2		1	3	2			
42			2	2	2	2	2	2	2	2	2	2	2				2	3			
41			2	3	2	1	1	2	2	2	2	1	3			1	2	2			
40				1	3	2	3	3	3	3	2	2	2								
39				2	2	2	3	3	2	2	2	3	3	1							
38					3	2	2	2	2	2	2	3	3	1							
37						3	2	2	5	2	2	2	3	2							
36						3	2	2	4	3	3	3	2								
35						2	2	2	2	3											
34							2	2	4	2											
33							2	2	3	2											
32							2	2	3												
31							2	3	1												
30					1	4	2														
29						2	2														
28						3															

Figure 4.1.1. Number of hauls per ICES-rectangle with GOV during the North Sea IBTS Q1 2011.



y	E5	E6	E7	E8	E9	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	G0	G1	G2	G3	0	9
52																					
51				3	1	4	4	2													
50			2	2	2	4	4	2	2												
49			2	2	2	4	4	4	4												
48			2	4	2	3	4	4	3												
47		2	4	4	4	8	4	2	2												
46		2	3	5	4	4	4	2	2												
45		3	4	4	4	4	4	2	2	2											
44		4	4	4	4	4	4	4	4	4	2										
43				2	2	4	4	6	4	4	2	2	2								
42			2	2	2	4	4	4	4	4	2	2	2								
41			2	2	2		1	1	3	6	4	4	5								
40				3	3		4	4	4	5	4	4	4								
39				3	4	2	3	2	4	3	4	4	6	2							
38				1	4	4	2	2	4	4	4	4	4	2							
37					1	4	5	4	4	7	5	2	4	4							
36						3	3	3	4	6	4	4	4								
35						3	5	4	5	4											
34							3	4	4	7											
33							2	5	4	1											
32							3	6	4												
31							9	4													
30						3	7														
29						5	4														
28						1															

Figure 4.1.2. Number of hauls per ICES-rectangle with MIK during the North Sea IBTS Q1 2011.

4.1.2 Survey summaries by country

4.1.2.1 Denmark – North Sea Quarter 1 IBTS (IBTS1Q – DEN)

Nation:	Denmark	Vessel:	RV Dana
Survey:	IBTS1Q – DEN 01/11	Dates:	27/01/11 – 13/02/11

Cruise	The IBTS North Sea Q1survey 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, saithe, Norway pout, herring, mackerel, sprat and some other species. Sampling for herring larvae is carried out during night-time
Gear details:	The bottom trawl used is the GOV rigged with groundgear A, whereas groundgear B was used in 3 hauls. Herring larvae are sampled with a MIK-net (Methot Isaacs–Kidd).
Notes from survey (e.g. problems, additional work etc.):	The cruise plan was fulfilled as planned. SCANMAR data were collected during all hauls.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 70 species of fish and shellfish were recorded during the survey.

Table 4.1.2.1.1. 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	37	37	0	0	100 %	
		GOV-B	3	3				
		MIK	80	80				

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

Species	Age	Species	Age
Clupea harengus	800	*Glyptocephalus cynoglossus*	8
Gadus morhua	133	*Scomber scombrus*	5
Melanogrammus aeglefinus	265	*Lophius piscatorius*	7
Merlangius merlangus	562	*Merluccius merluccius*	6
Pollachius virens	0	*Mullus surmuletus*	29
Sprattus sprattus	534	*Psetta maxima*	6
Trisopterus esmarki	125	*Solea solea*	2
Microstomus kitt	91	*Pleuronectes platessa*	561

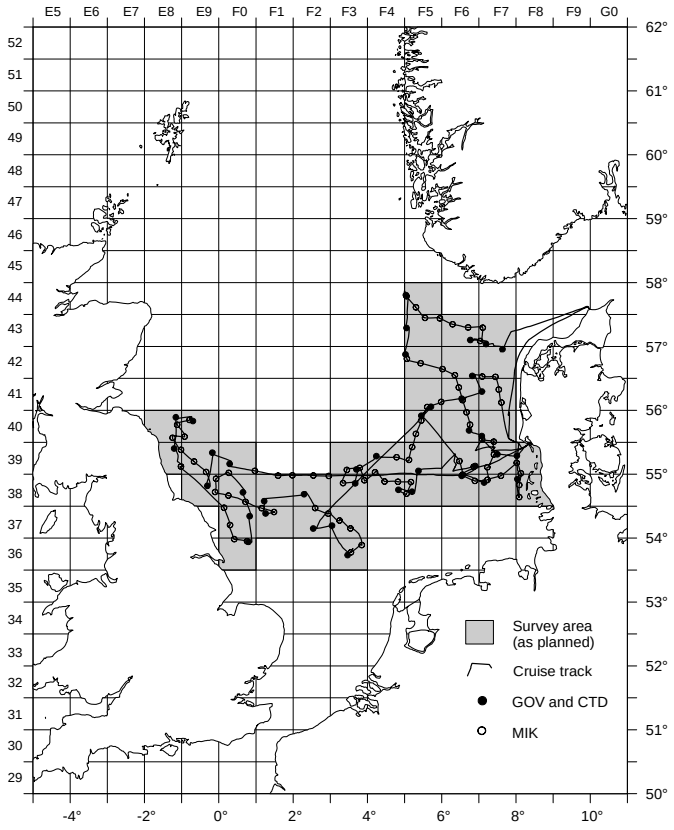


Figure 4.1.2.1.1. Cruise track of Dana during the Q1 IBTS 2011.

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

Nation:	France	Vessel:	Thalassa
Survey:	IBTS1Q – FRA IBTS10	Dates:	13 /01/11 – 13/02/11

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) was carried out during night-time. CTD was deployed at each trawl station and each MIK station 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 SCANMAR door, wing (unavailable for some hauls) and vertical openning sensors. For larvae the standard MIK net is used.
Notes from survey (e.g. problems, additional work etc.):	The Thalassa left Brest (France) on 14 January. There were hydrological stations in the Western Channel under a national project not included in the IBTS area. Then, the Channel (area 10) was covered first with 8 GOV hauls in the survey (at least 1 hauls per square and 3 additional hauls) and 12 MIK stations In the North Sea, 75 GOV hauls and 102 MIK stations were carried out in the areas south of 56°30N. At each trawl and MIK net station, a CTD was deployed (209 for the whole survey) As additional work : - The CUFES device (Continuous Underwater Fish Egg Sampler) was used during the whole survey (day and night) and more than 600 samples were collected. - Samples for zoo- and phytoplankton were collected ("bongo" net (202) and "Niskin" bottle (209)). - Acoustic data were recorded in the English Channel (Echo sounder ER60) and one pelagic haul was carried out on herring schools. - In addition, observers for mammals and birds collected information during the 5 first days in the English Channel. - Wastes were counted and weighted at each trawl stations No problems were encountoured except intensive radio contact with fishers in the area.
Number of fish species recorded and notes on any rare species or unusual catches:	89 species were recorded. Shellfish were also measured and benthic fauna identified at each haul.

Table 4.1.2.2.1. Stations fished during IBTS1Q – FRA.

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished
VIId	ICES squares	GOV	5	5	3	1	100%
VIId		MIK	10	12	2	0	100%
IVb,c		GOV	75	75	0	1	100%
IVb,c		MIK	120	102	0	2	85%
	TOTAL		85/120	85/110	3/2	2/2	

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

Species	Age	Species	Age
Merlangus merlangius	1 610	*Pleuronnectes platessa*	1 373
Gadus morhua	234	*Psetta maxima*	10
Melanogrammus aeglefinus	569	*Scophtalmus rhombus*	3
Trisopterus esmarki	19	*Dicentrarchus labrax*	81
Clupea harengus	486	*Mullus surmuletus*	22
Sprattus sprattus	249	*Pollachius virens*	67
Solea solea	22		

*** Maturity only.**

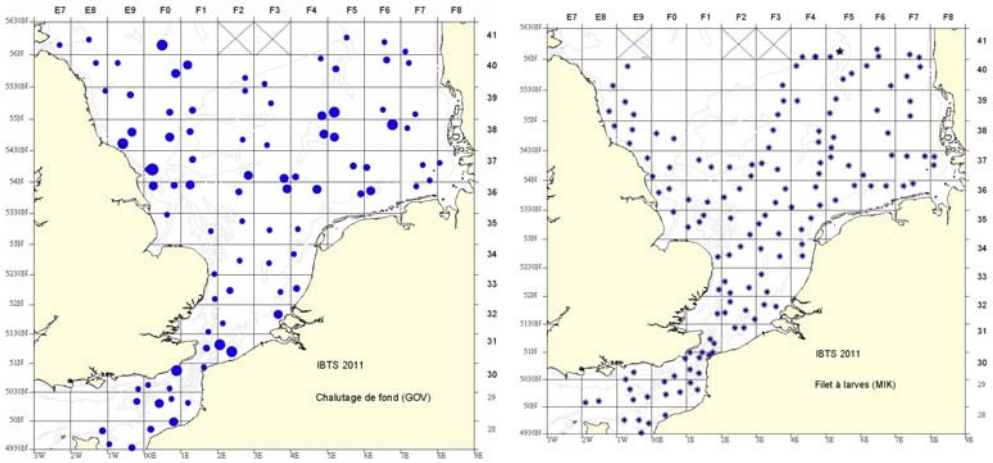


Figure 4.1.2.2.1. "Thalassa" GOV hauls (left) and MIK hauls (right) IBTS-1Q 2011.

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

Nation:	Germany	Vessel:	Walther Herwig III
Survey:	IBTS1Q – GER 341	Dates:	20 January – 17 February 2010

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 (10 rectangles were not fished due to rough weather). The GOV in the standard version was used and 67 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, 62 species of fish were recorded during the survey. One Twaite shad Alosa fallax caught east of Shetlands.

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

ICES Divisions	Strat.	Gear	Tows planned	Valid	Add.	Inv.	stations fished	comments
IV	N/A	Std. GOV	77	67	0	0	87%	
IV	N/A	MIK	154	138	0	0	90%	

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
Clupea harengus	1068	*Trisopterus esmarki*	235
Gadus morhua	328	*Pleuronectes platessa*	304
Melanogrammus aeglefinus	747	** *Merluccius merluccius*	324
Merlangius merlangus	764	** *Molva molva*	104
Pollachius virens	345	* *Lophius piscatorius*	17
Scomber scombrus	221	* *Microstomus kitt*	248
Sprattus sprattus	450	*Psetta maxima*	2

*** Maturity only.**

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

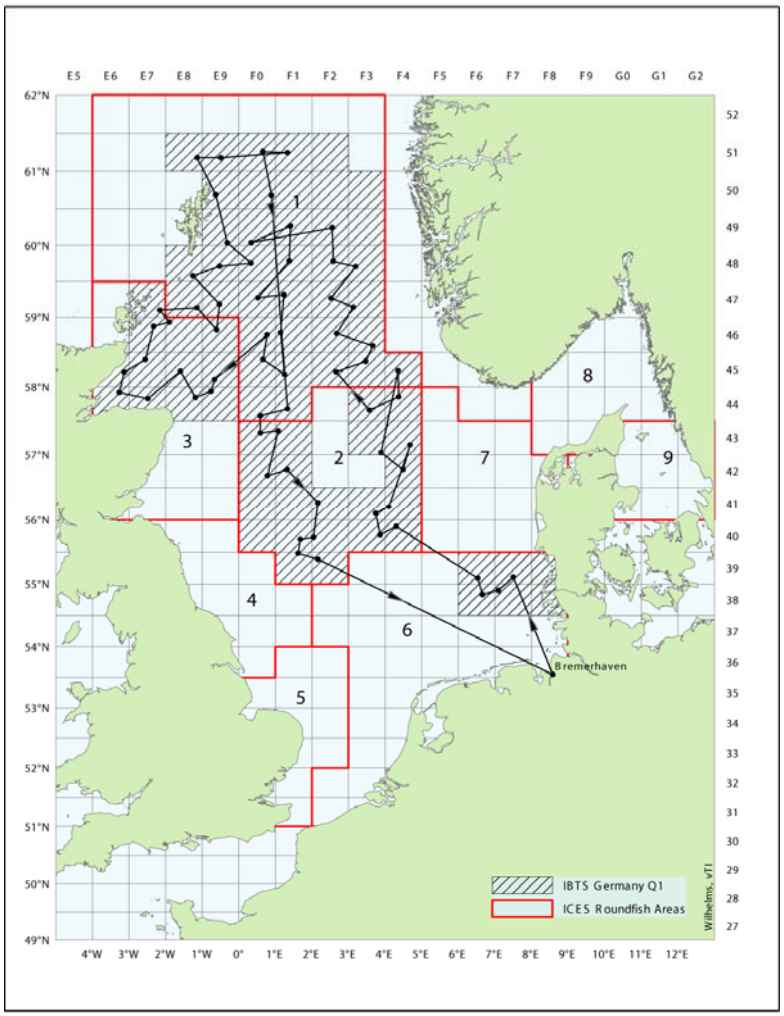


Figure 4.1.2.3.1. Cruise track of Walther Herwig III (cruise 341) during the Q1 IBTS 2011.

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

Nation:	**The Netherlands**	Vessel:	Tridens 2
Survey:	IBTS1Q-NED	Dates:	24/01/11 – 25/02/11

Cruise	The Q1 North Sea survey aims to collect data on the distribution, relative abundance, and biological information of a number of (mainly) commercial fish species in southern and central part of area IV and in the eastern part of VIId. The primary species are cod, haddock, saithe, whiting, Norway pout, sprat, herring, mackerel, and plaice.
Gear details:	IBTS standard GOV 36/47 with groundgear A. SCANMAR door and headline height sensors were used. Headline height sensor positioned above central part of groundrope.
Notes from survey (e.g. problems, additional work etc.):	Since 2007 five additional rectangles in VIId were sampled (both with GOV and MIK). A number of rectangles, mainly on the Dutch EEZ, have been fished more than once.

Number of fish species recorded and notes on any rare species or unusual catches:	One very large catch of 30t of herring was made in the Eastern Channel. In the same area a conger of 192 cm was caught. Compared to earlier years the lack of thornback rays in the southwestern North Sea was remarkable.

Table 4.1.2.4.1. Stations fished.

ICES Divs.	Strat	Gear	Tows planned	Valid	Additional	Inv	% stations fished	comm.
IV	N/A	GOV	49	58	9	1	118	
VIId	N/A	GOV	5	5	0	0	100	
IV	N/A	MIK	98	74	0	0	76	
VIId	N/A	MIK	10	7	0	0	70	
	TOTAL		54/108	63/81	9/0	1/0		

Divs: Divisions; Strat: strata; inv: Invalid; comm.: Comments

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

Species	Age	Species	Age
Clupea harengus	700	*Trisopterus esmarki*	70
Sprattus sprattus	475	*Merluccius merluccius*	4
Gadus morhua	150	*Pleuronectes platessa*	418
Melanogrammus aeglefinus	357	*Solea solea*	5
Merlangius merlangus	988		

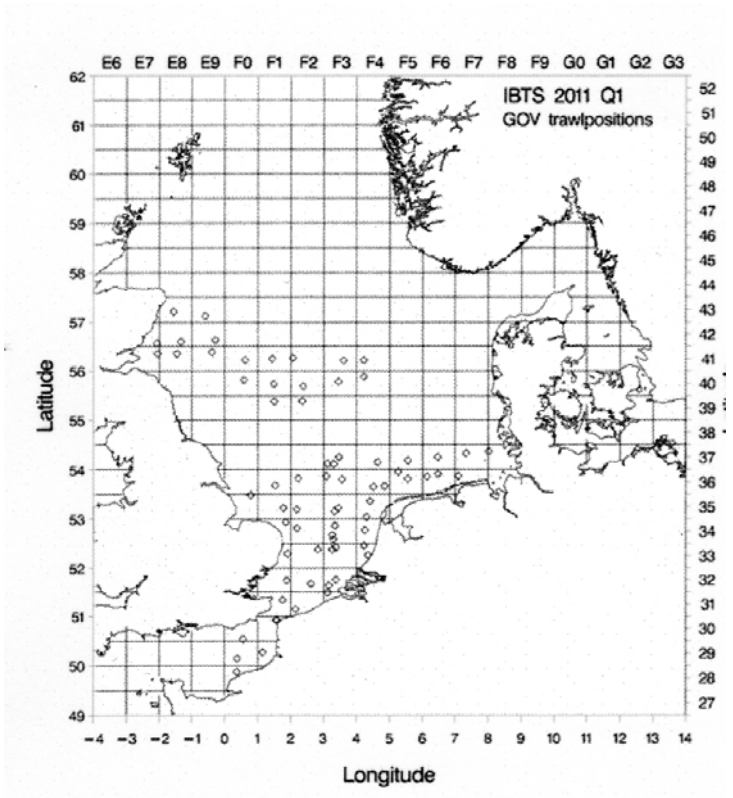


Figure 4.1.2.4.1. GOV trawls carried out on "Tridens II" during the Q1 IBTS 2011.

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

Nation:	Norway	Vessel:	G.O. Sars
Survey:	IBTS 1Q – NOR	Dates:	7/02/11 – 6/03/11

Cruise	The survey was a combination of the IBTS Q 1 and a hydrographical transect where also phytoplankton and zooplankton were sampled. The IBTS Q1 aims to collect data on the distribution and relative abundance and biological information of commercial fish in the North Sea. The primary species are herring, saithe, cod, haddock, whiting, sprat, mackerel, Norway pout and plaice
Gear details:	The trawl used was an 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 trawleye data.
Notes from survey (e.g. problems, additional work etc.):	One hydrographical transect was taken (Utsira-Startpoint), together with a process-study on sources of mortality for fish eggs and larvae.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 56 species of fish (52) and evertebrata (23) were recorded during the survey, among this an Atlantic pomfret (Brama brama). This year, we found no Icthyophonus infected herring.

Table 4.1.2.5.1. Stations fished.

ICES Divs.	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished
IV	N/A	GOV	40	40	1	0	100
		MIK	56	52	2	0	93
	TOTAL		40/56	40/56	0	0	

Divs: divisions; Strat: Strata; inv: Invalid; Comm: Comments

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

Species	Age	Species	Age
Lophius piscatorius	7	*Brama brama*	1
Hippoglossus hippoglossus	1	*Molva molva*	1
Merluccius merluccius	113	*Pleuronectes platessa*	64
Trachurus trachurus	2	*Merlangius merlangus*	395
Clupea harengus	1266	*Pollachius virens*	177
Gadus morhua	146	*Trisopterus esmarki*	151
Melanogrammus aeglefinus	419	*Sprattus sprattus*	36
Scomber scombrus	341		

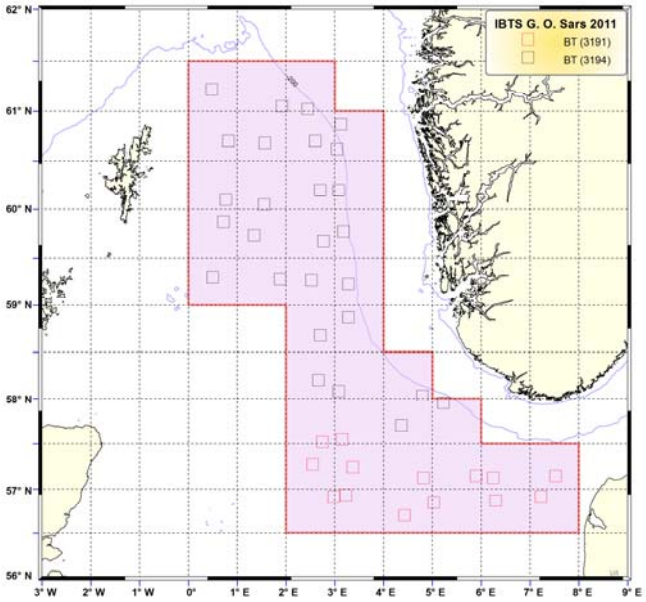


Figure 4.1.2.5.1. "G.O. Sars" trawl stations during IBTS 2011 Q1. The extra station was below 200 m depth, for an acoustic estimate of saithe, and not uploaded as a standard IBTS haul.

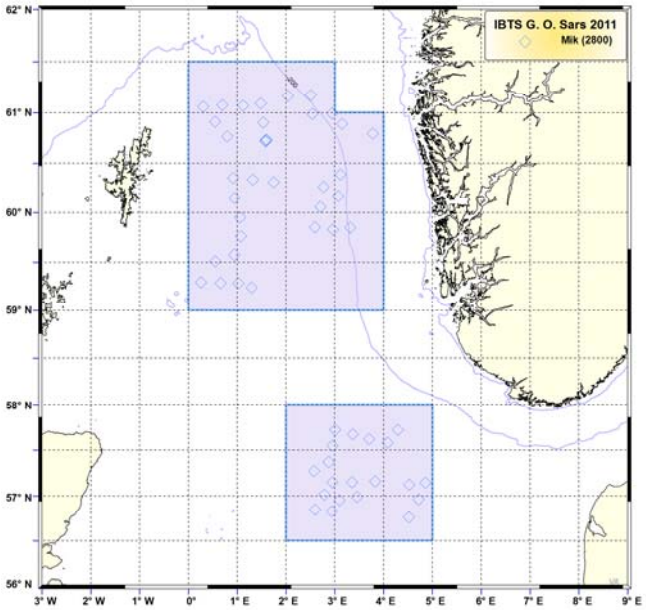


Figure 4.1.2.5.2. MIK sample stations taken during IBTSQ1 2011 by "G.O. Sars".

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

Nation:	Sweden	Vessel:	RV Mimer
Survey:	IBTS1Q – SWE 2/11	Dates:	17 January – 11 February 2011

Cruise	Q1 North Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in IIIa and 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.):	Due to auxiliary engine failure on Argos requiring extensive repairs, the Swedish vessel RV "Mimer" was used. Being a smaller boat and more sensitive to the sea, the cruise could not be carried out as previously planned. Skagerrak (IIIaN) was prioritized and the Sound (SD23) was excluded (the Sound was however fished with a smaller vessel). Larvae trawling using the MIK was abandoned altogether due to limited housing of crew on-board thereby not allowing 24h sailing. Despite complications in changing vessel on short notice, nearly all planned GoV- hauls were realized. In addition to the regular sampling extra sample collections were carried out, as follows: Herring and cod, requested by CEFAS, Lowestoft, England for radioactivity analysis. Moreover, additional samples of plaice were collected for the Swedish Board of Fisheries, as a part of an ongoing project on genetic analyses.
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 4.1.2.6.1. Stations fished.

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	stations fished	comments
IIIa	N/A	GOV	47	43	0	0	91.5 %	
IIIa	N/A	MIK	-	0	-	-	0 %	

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

Species	Age	Species	Age
Clupea harengus	1533	*Trisopterus esmarki*	105
Gadus morhua	433	*Sprattus sprattus*	715
Pollachius virens	14	*Pleuronectes platessa*	513
Melanogrammus aeglefinus	223		

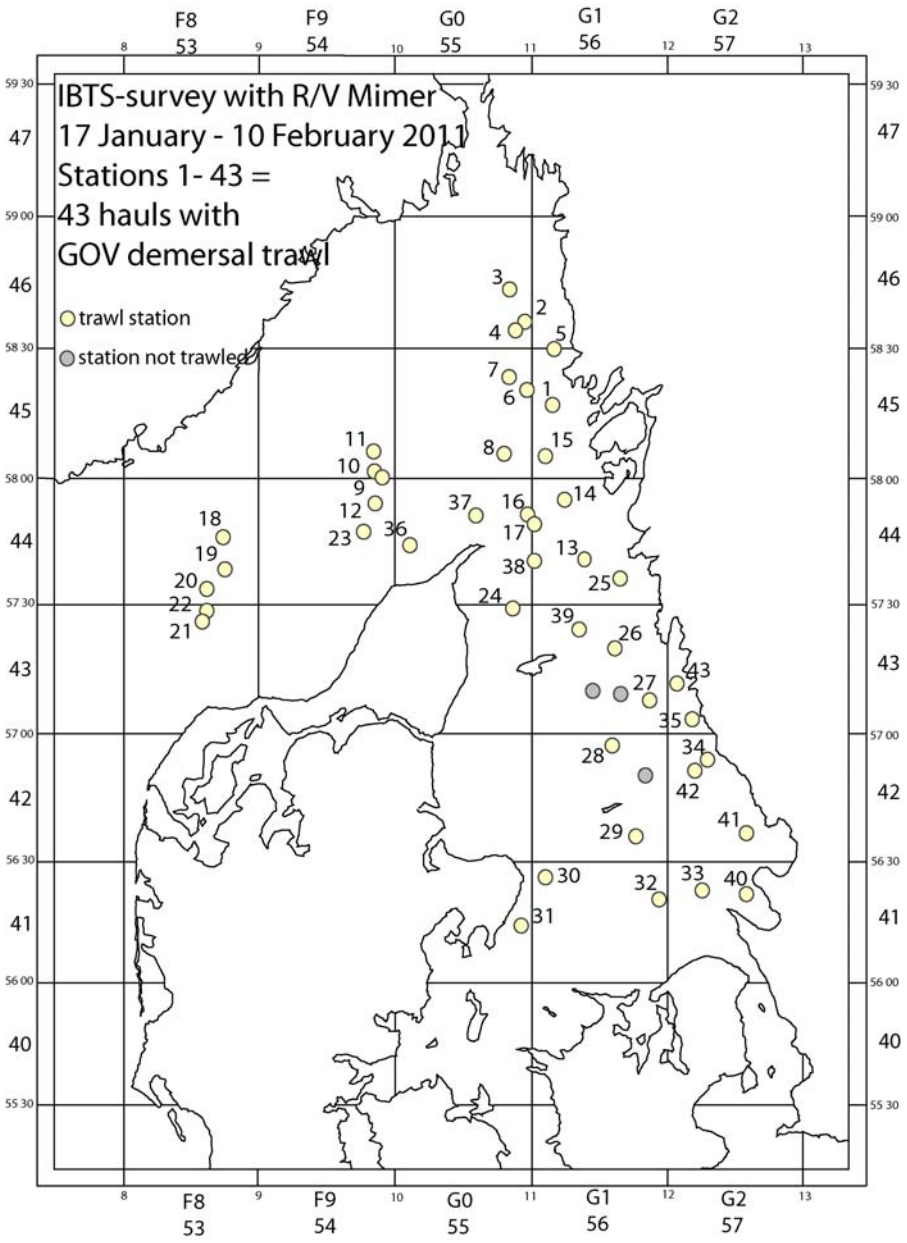


Figure 4.1.2.6.1. Cruise track of RV "Mimer" during the IBTS1Q-SWE 2011.

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

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	IBTS1Q – SCO 0211S	Dates:	26 January – 17 February 2010

Cruise	Q1 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 57.30 N and groundgear A used on all other stations south of 57.30 N.
Notes from survey (e.g. problems, additional work etc.):	With favourable weather conditions for the majority of the cruise Scotia made good progress up until 2 days prior to the end of the survey when we encountered very poor weather and as a result lost both of those days. This loss resulted in Scotia being unable to cover 4 stations to the east of the Shetland Isles. Ship's thermosalinograph was run continuously throughout the cruise. Temperature, salinity and water samples for nutrient analyses were collected at each station. A total of 50 valid hauls was achieved with all allocated stations covered other than stations in statistical rectangles 48E9, 49E9, 50E9 and 51E9. A total of 99 valid MIK tows were completed with 2 undertaken within each statistical rectangle where fishing events occurred. 2 Foul hauls were encountered in rectangles 44F1 and 49E8. SCANMAR and bottom contact sensors were used throughout the cruise to monitor net parameters and performance.
Number of fish species recorded and notes on any rare species or unusual catches:	A total of 75 species were recorded during the survey. Biological data were recorded for a number of species in accordance with the requirements of the EU Data Regulations.

Table 4.1.2.7.1. Stations fished.

ICES Divisions	Strata	Gear	Tows Planned	Valid	Valid with rock-hopper	Additio-nal	Invalid	stations fished	comments
IVa		GOV – A	0	0		0	0	n/a	
IVa		GOV - B	39	35	-	0	2	90 %	
IVb		GOV – A	12	12		0	0	100 %	
IVb		GOV - B	3	3	-	0	0	100 %	
TOTAL			54	50		0	2	93 %	

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

Species	No.	Species	No.
Clupea harengus	589	*Scomber scombrus*	69
Gadus morhua	429	*Chelidonichthys lucerna**	4
Melanogrammus aeglefinus	1009	*Trisopterus esmarki*	277
Merlangius merlangus	875	*Merluccius merluccius**	86
*Pleuronectes platessa**	278	*Spattus sprattus*	220
Pollachius virens	308		

*** Maturity only**

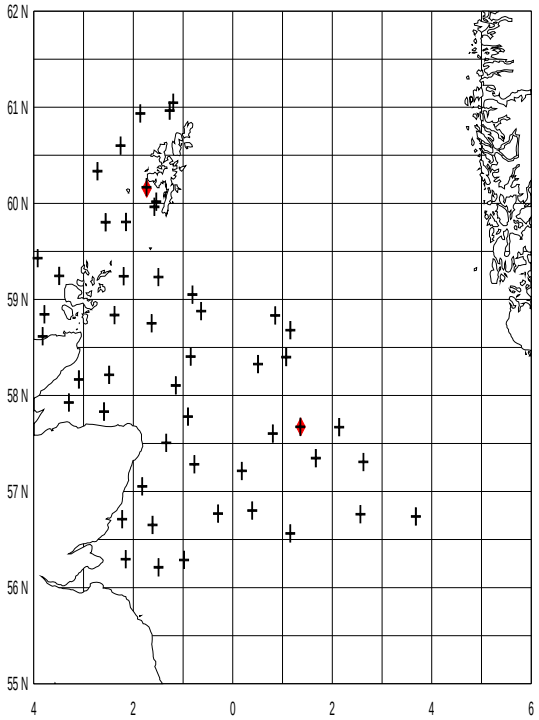


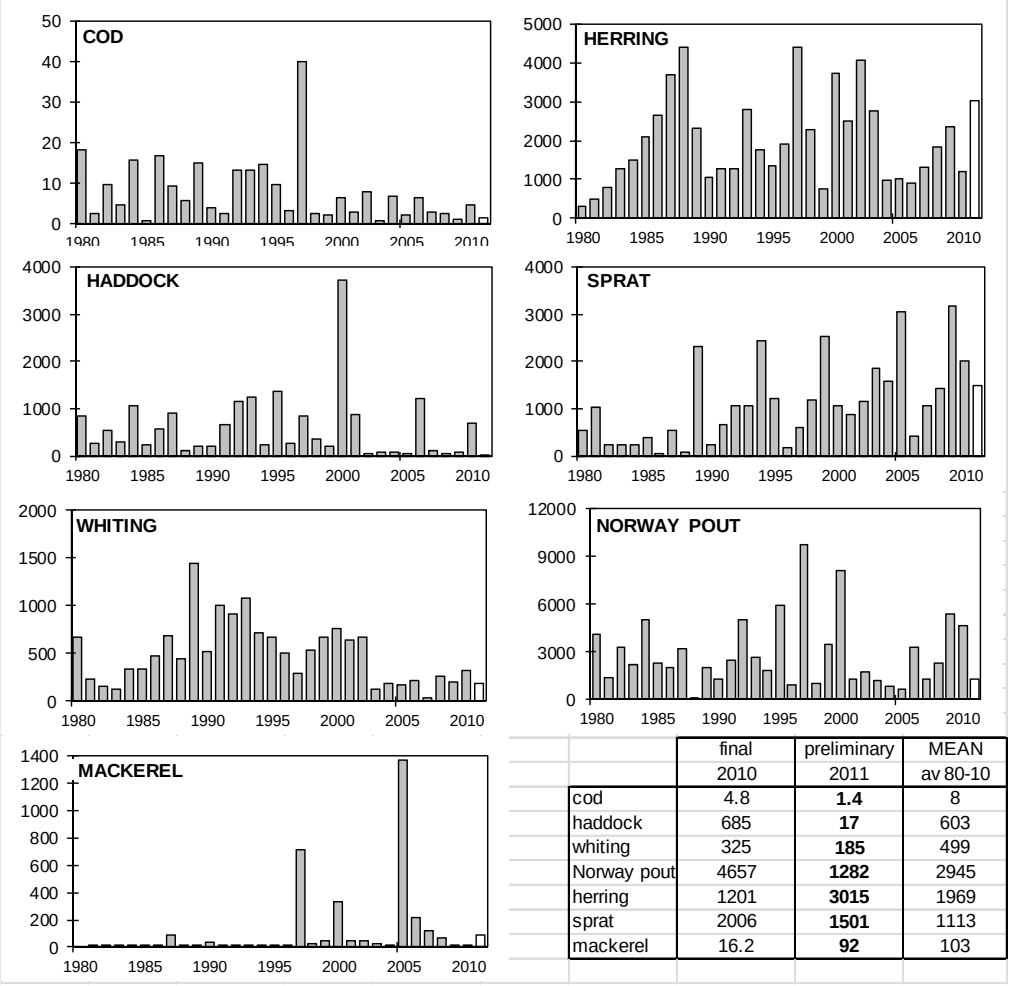
Figure 4.1.2.7.1. Haul locations. 2011 IBTS1Q Scotia (foul hauls in red).

Table 4.1.2.7.3. 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)
Gadus morhua	IV	50	19.4	677.4	27.1
Melanogrammus aeglefinus	IV	50	1139.3	5440.0	217.6
Merlangius merlangus	IV	50	612	1950.8	78.0
Pollachius virens	IV	50	46.7	477.0	19.1
Scomber scombrus	IV	50	25.7	40.7	1.6
Clupea harengus	IV	50	376.8	880.6	35.2
Pleuronectes platessa	IV	50	70.2	257.9	10.3
Trisopterus esmarki	IV	50	2559.2	1829.6	73.2
Sprattus sprattus	IV	50	509.2	82.3	3.3

4.1.3 GOV

The preliminary indices for the recruits of seven commercial species based on the 2011 quarter 1 survey are shown in Figure 4.1.3.1. According to these preliminary results, both herring and sprat showed a year class in 2011 well above the long-term average for the years 1980–2010. The catches of the other species are below average.



	final 2010	preliminary 2011	MEAN av 80-10
cod	4.8	**1.4**	8
haddock	685	**17**	603
whiting	325	**185**	499
Norway pout	4657	**1282**	2945
herring	1201	**3015**	1969
sprat	2006	**1501**	1113
mackerel	16.2	**92**	103

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; Methot Isaacs–Kidd Midwater Trawl) 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 2010 year class is estimated at 77.0. Please note that this year no MIK-hauls were taken in the Skagerrak-Kattegat. The 2011 index is the same as last year (about 70% of the long-term mean) and shows a continuation of the series of relatively poor recruitments starting from the 2002 year class. The 0-ringers caught in 2011 were predominantly found in a dense concentration off the Scottish coast and in the Moray Firth while abundances in southern areas of the North Sea were low. This pattern of distribution differs from the preceding two year classes, where concentrations were seen further from the coast and extended further to the south.

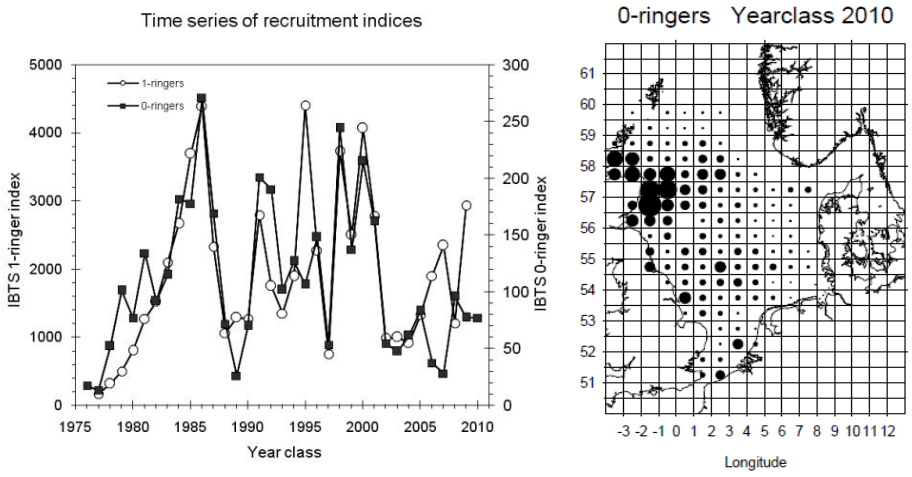


Figure 4.1.4. Distribution of MIK caught herring larvae during the IBTS Q1 2011 (right) and the time-series of herring larvae and 1-ringers since 1976 (left).

4.1.5 Participation in 2012

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.

4.1.6 Other issues

4.1.6.1 Change in coverage by France and Germany

During the meeting it was agreed that from next year onwards France and Germany will swap 6 rectangles in the southeastern North Sea. From 2012 rectangles 40 and 41F5, F6 and F7 will be fished by Germany, and France will fish in rectangles 38 and 39F6, F7 and F8.

4.1.6.2 Extension of the cod standard area

WKCOD (ICES, 2011) and WKROUND (ICES, 2009b) suggested an extension of the index area for cod mainly to include the eastern Skagerrak, the southern North Sea and an area west of Shetland. The IBTSWG does support that an extended index area is used for cod assessments, in particular the extension towards the eastern Skagerrak in order to take changes in the distribution of cod recruits into account. It has, however, to be noted that two of the additional rectangles suggested by WKROUND (ICES, 2009b) are either not sampled (46F9) or are deeper than 200m (45F9, Figure. 4.1.5), which is outside the normal depth range covered by the North Sea IBTS. The inclusion of rectangles west of Shetland is not supported as sampling there has only recently been introduced and has to be considered as exploratory. Similarly, area coverage, in particular in the 3rd quarter, does only allow a limited extension in the southern North Sea. The IBTS WG feels that a cod index area extended by 9 rectangles (45F4, 44F5, 46G0, 45G0, 44G0, 44G1, 33F2, 32F2 and 32F3) would be appropriate for assessment purposes (Figure. 4.1.5), but have not asked the ICES data centre to calculate new indices for the extended area routinely as this can easily be done based on the mean cpue by age per rectangle data provided in DATRAS.

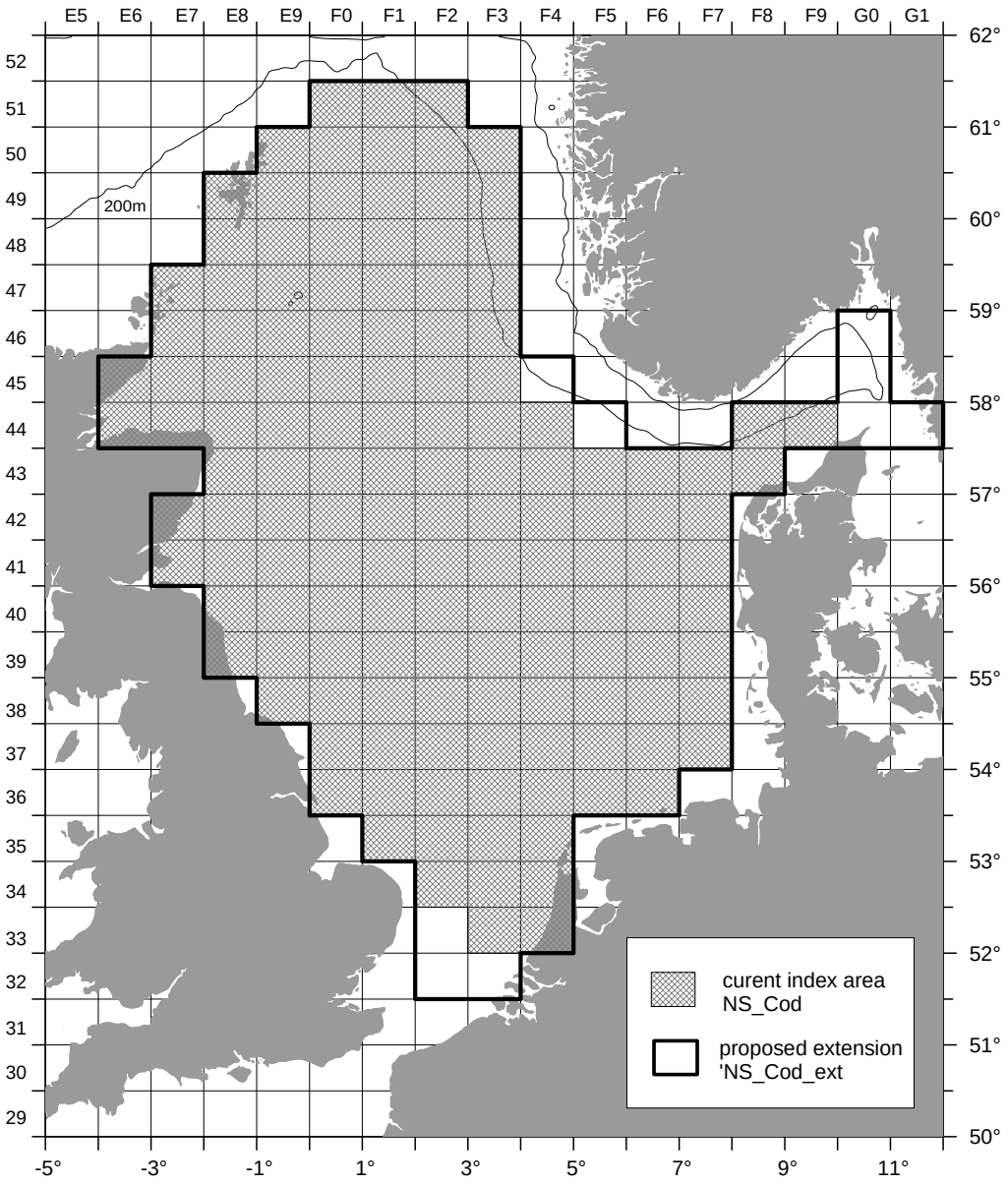


Figure 4.1.6.2. Proposed extension of the area used for the calculation of the North Sea cod index.

4.1.6.3 Biological sampling of additional species

In 2007 the IBTSWG decided to start collecting maturity and age data for megrim, black-bellied angler, anglerfish, hake, lemon sole, red mullet, plaice and turbot in addition to the standard species (cod, haddock, whiting, saithe, Norway pout, mackerel, herring and sprat), based on Table 12.5.1 in the IBTSWG report of 2007 (ICES, 2007). And so it was implemented.

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 IBTWG report 2009 Table 12.2; ICES, 2009a).

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 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.

ICES Division IIIa

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

ICES Sub-area IV and Division VIId

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

4.1.6.4 Staff exchange in 2010

Since several years the IBTS working group recommends that sea-going technical or scientific personnel take part in other countries surveys in order to study trawling and biological sampling procedures on-board ships partaking in internationally coordinated programmes.

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's trawling and biological sampling procedures on-board ships, and may lead to new insights to improve one's own protocol.

During the 2011 Q1 survey Sophy McCully from Cefas participated during two weeks in the French survey on-board "Thalassa", and ICES data officer Anna Osypchuk joined the Dutch survey on-board "Tridens" for one week. A report of the observations of Anna Osypchuk can be found in ICES Inside Out 2011 no. 1: http://www.ices.dk/InSideOut/No1%202011/Insideout2011-No.1.1.pdf .

The observations by Sophy McCully on-board of the "Thalassa" led to the following recommendations:

- A 'Toolbox talk' at start of each survey half.
- Mentoring programme for all new staff – make best use of the most experienced people.
- Try to measure and biologically sample at the same time

- Do not discard catch until all catches and lengths have been entered onto the database
- When subsampling sort more of the catch.
- Scientist in charge to consult with the captain using the IBTS manual as a reference for deploying the gear.

For full details on this UK – French staff exchange see WD 2 in Annex 5.

4.1.7 References

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

ICES. 2007. Report of the International Bottom Trawl Survey Working Group (IBTSWG), 27–30 March 2007, Sète, France. ICES CM 2007/RMC:05. 195 pp.

ICES. 2009a. Report of the International Bottom Trawl Survey Working Group (IBTSWG), 30 March—3 April 2009, Bergen, Norway. ICES CM 2009/RMC:04. 241 pp.

ICES. 2009b. Report of the Benchmark and Data Compilation Workshop for Roundfish (WKROUND). ICES CM 2009/ACOM:32.

ICES. 2011. Report of the Workshop on the Analysis of the Benchmark of Cod in Subarea IV (North Sea), Division VIId (Eastern Channel) and Division IIIa (Skagerrak; WKCOD 2011) ICES CM 2011/ACOM:51.

4.2 Q3 North Sea

4.2.1 General overview

Five vessels participated in the quarter three survey in 2010: Dana (Denmark), Walter Herwig III (German), Argos (Sweden), CEFAS Endeavour (England) and Scotia (Scotland). In all, 333 valid GOV hauls were made, allowing full coverage of the survey area. The North Sea, Skagerrak and Kattegat quarter 3 surveys have now completed 20 years in its coordinated form. Table 4.2.1.1 shows the effort ascribed in the current year. From 2007 a combined index was calculated for cod and Norway pout and used by the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), whilst the remaining indices were calculated by country. Figure 4.2.1.1 shows the distribution of the stations fished in 2010.

WKCOD rejected the combined quarter 3 cod index at their meeting this year. Further work needs to be carried out to resolve the issues they have raised.

Norway participated once again in the quarter 3 survey for which IBTS is very much appreciative of and we hope they can continue in future.

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 2010 and planned number of stations in 2011.

Year		Denmark	Germany	Sweden	Norway	UK England	UK Scotland	Total
2010	Days	27	15	16	16	32	23	129
	Hauls	39	29	47	54	76	88	333
2011	Hauls	46	29	49	54	75	84	337

Table 4.2.1.2. Vessels planed for Q3 in 2011.

Country	Vessel
Denmark	Dana
Germany	Walther Herwig III
Sweden	Unknown
Norway	Johan Hjort
UK England	Endeavour
UK Scotland	Scotia

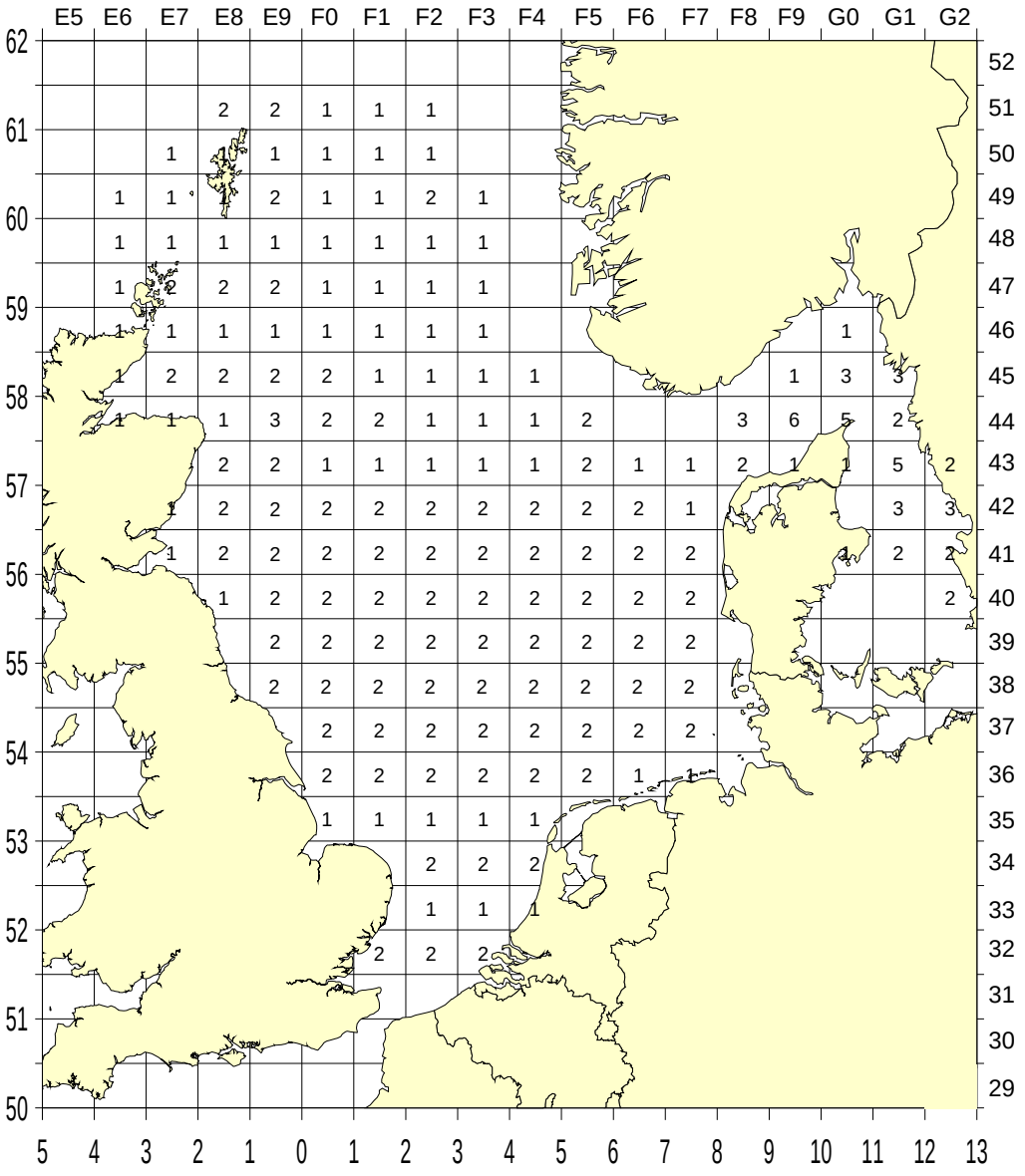


Figure 4.2.1.1 Plot of number of stations fished by rectangle by all participants of the 3rd Quarter IBTS survey 2010.

4.2.2 Survey summaries by country

In 2006, to satisfy a request from WGNSDS, and to standardize the summary reports within this working group report, the survey summaries for all cruises are now provided in a standard form.

4.2.2.1 UK (England and Wales) – North Sea Quarter 3 IBTS (IBTS3Q – ENG)

Nation:	UK (England and Wales)	Vessel:	Cefas Endeavour
Survey:	IBTS3Q – ENG 13/10	Dates:	7 /08/10 – 8/09/10

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. Also attached is the SAIV mini CTD.
Notes from survey (e.g. problems, additional work, etc.):	As well as the usual 75 GOV stations, a further 12 primary stations were fished with a polyethylene GOV. This is the second year of a medium term project to analysis possible differences in catchability between the nylon and poly gears. In addition 75 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 15 additional aims were carried out during the survey, the most significant of which was to carry out a detailed investigation into the extent of low oxygen areas that may occur in the southern North Sea and further understand the processes leading to oxygen depletion over the North Sea as a whole.
Number of fish species re-corded and notes on any rare species or unusual catches:	Overall, 87 species of fish were recorded during the survey. Species of note caught this year during the survey are Sebastes viviparus, Galeus melastomus, Anguilla anguilla, Belone belone, Chimaera monstrosa.

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	1	6	100 %	
IV	N/A	IBTS Q4 poly GOV	-	12	-	-	-	Internal study

Table 4.2.2.1.2. Number of biological samples (age material, *maturity only).

species	number	species	number
Clupea harengus	1040	*Limanda limanda*	425
Gadus morhua	377	*Scomber scombrus*	383
Melanogrammus aeglefinus	1254	*Lophius piscatorius*	21
Merlangius merlangus	1121	*Zeus faber*	9
Pollachius virens	218	*Scophthalmus rhombus*	2
Sprattus sprattus	450	*Chelidonichthys cuculus*	3
Psetta maxima	2	*Mullus surmuletus*	22
Trisopterus esmarki	287		
Microstomus kitt	238	**Leucoraja naevus*	20
Pleuronectes platessa	1059	**Raja clavata*	17
Chelidonichthys lucerna	7	**Raja montagui*	14
Eutrigla gurnardus	185	**Amblyraja radiata*	65

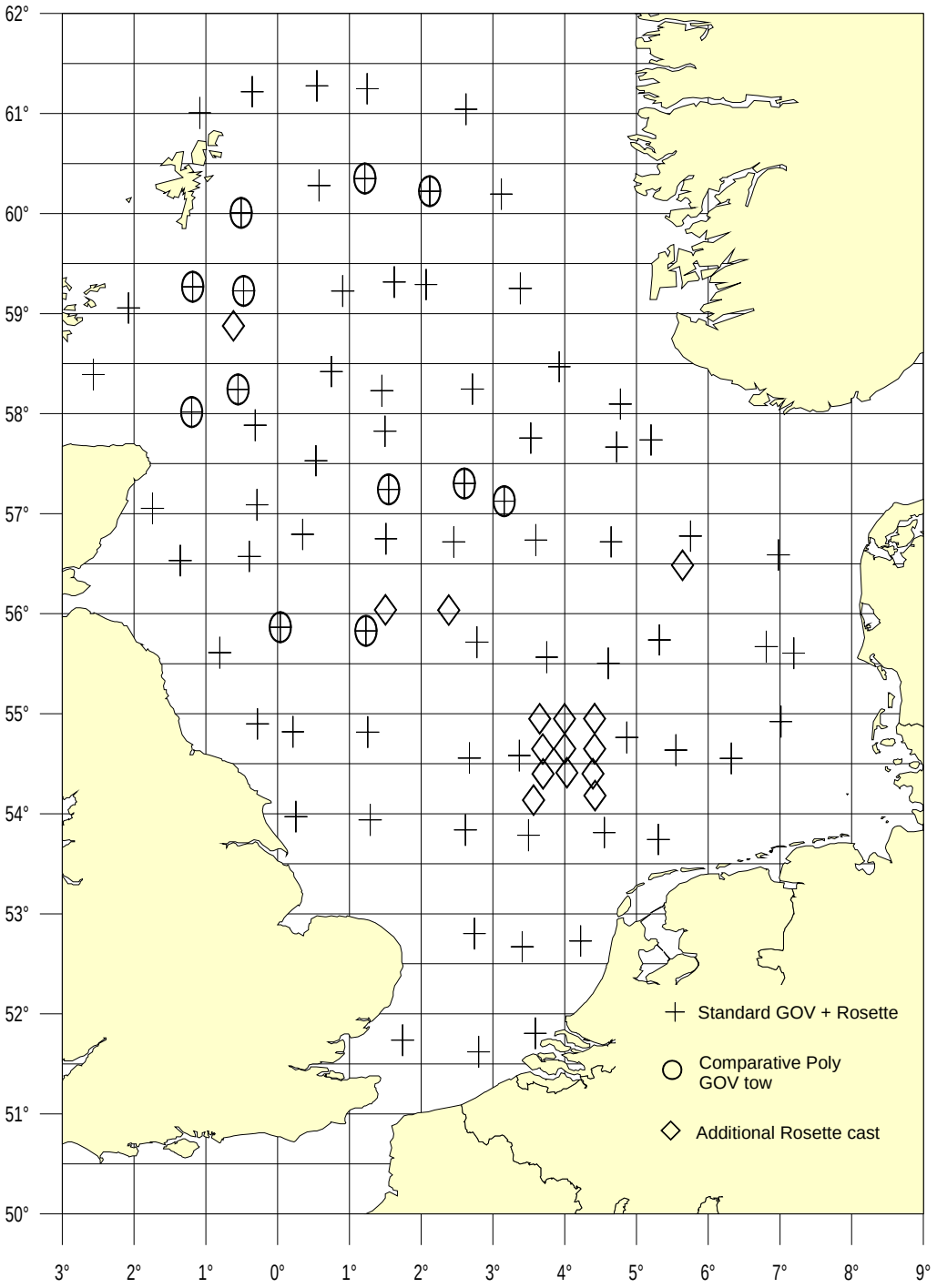


Figure 4.2.2.1. Location of the stations carried out by in CEFAS NS IBTS3Q.

4.2.2.2 Sweden – North Sea Quarter 3 IBTS (IBTS3Q – SWE)

Nation:	Sweden	Vessel:	Argos
Survey:	IBTS3Q – SWE 12/10	Dates:	23/8 – 9/9 2010

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.):	The cruise was fulfilled as planned. In addition to the regular sampling extra sample collections were carried out, as follows: Herring and dab, requested by the Museum of Natural History, Stockholm for contaminant analysis Herring and saithe, requested by CEFAS, Lowestoft, England for radioactivity analysis. Mackerel, requested by the Swedish NFA (National Food Administration) for dioxin analysis. Saithe, requested by the Institute of Marine Research, Tromsø (Norway) for genetic analysis. Moreover, extra samples of plaice were collected for the Swedish Board of Fisheries, as a part of an ongoing project on genetic analyses.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 62 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 planned	Valid	Additional	Invalid	stations fished	comments
IIIa	N/A	GOV	47	47	0	0	100%	
	TOTAL		47	47	0	0	100%	

Table 4.2.2.2.2. Number of biological samples (maturity and age material, *maturity only):

Species	Age	Species	Age
Clupea harengus	1396	*Sprattus sprattus*	787
Gadus morhua	417	*Trisopterus esmarki*	145
Melanogrammus aeglefinus	244	*Merluccius merluccius*	66
Pollachius virens	258	*Pleuronectes platessa*	758
Solea solea	12		

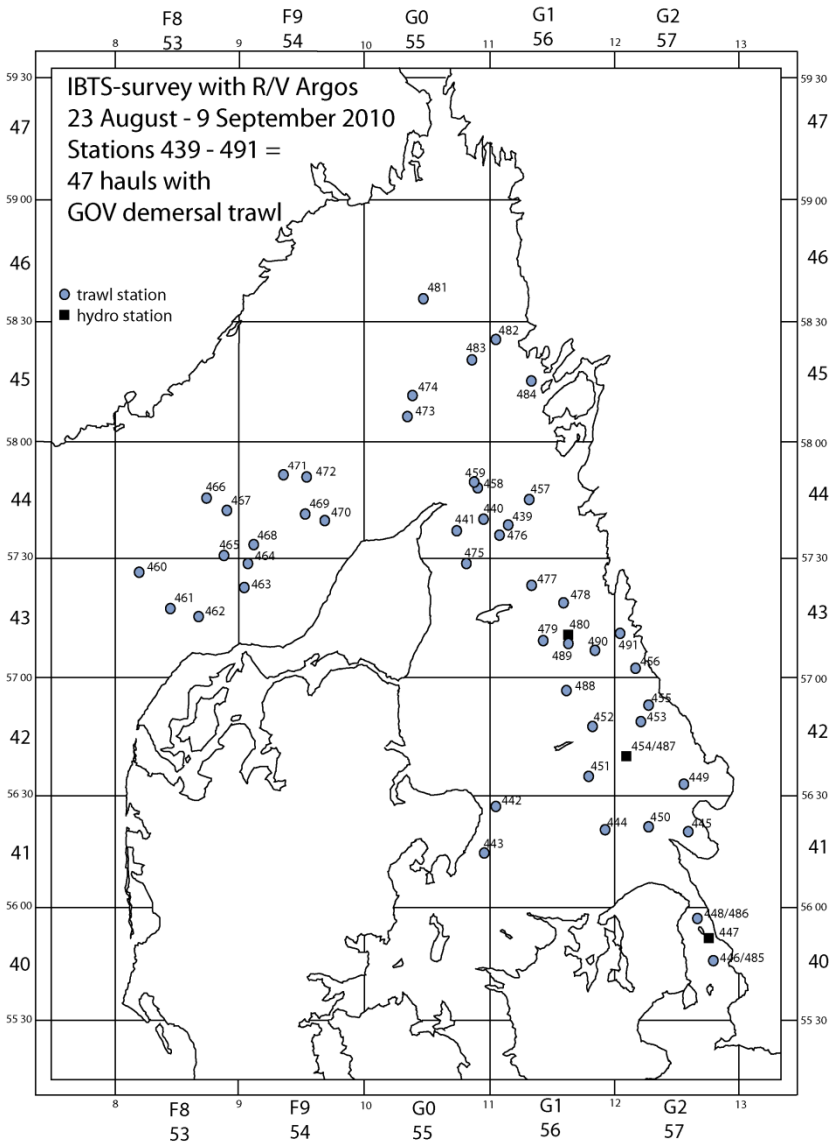


Figure 4.2.2.2. Cruise track of Argos during the IBTS3Q 2010.

4.2.2.3 Germany – North Sea Quarter 3 IBTS (IBTS3Q – GER)

Nation:	Germany	Vessel:	Walther Herwig III
Survey:	IBTS3Q - GER 335	Dates:	19/7 – 17/8 2010

Cruise	This cruise contributed to the Q3 IBTS in the North Sea, and also had the second objective and to monitor the bottom fish fauna and the 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. Abundance and size spectra of all fish species caught are recorded.
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:	Overall, 59 species of fish were recorded during the survey.

Table 4.2.2.3.1. Stations fished (Goal: 30 valid tows per year; originally assigned 36F7 only fished once – 2009).

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	stations fished
IV	N/A	IBTS standard GOV	29	28	0	0	96.5 %

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

Species	Number	Species	Number
Clupea harengus	338	*Sprattus sprattus*	134
[1] *Gadus morhua*	499	*Trisopterus esmarckii*	41
[1] *Melanogrammus aeglefinus*	160	* *Pleuronectes platessa*	607
[1] *Merlangius merlangus*	347	* *Scophthalmus rhombus*	6
* *M icrostomus kitt*	183	* *Lophius budegassa*	1
[1] *Pollachius virens*	104	* *Lophius piscatorius*	28
Sardina pilchardus	29	*Scomber scombrus*	180

*** Only maturity, sex, weight, length (no age).**

[1] Maturity not recorded in Q3.

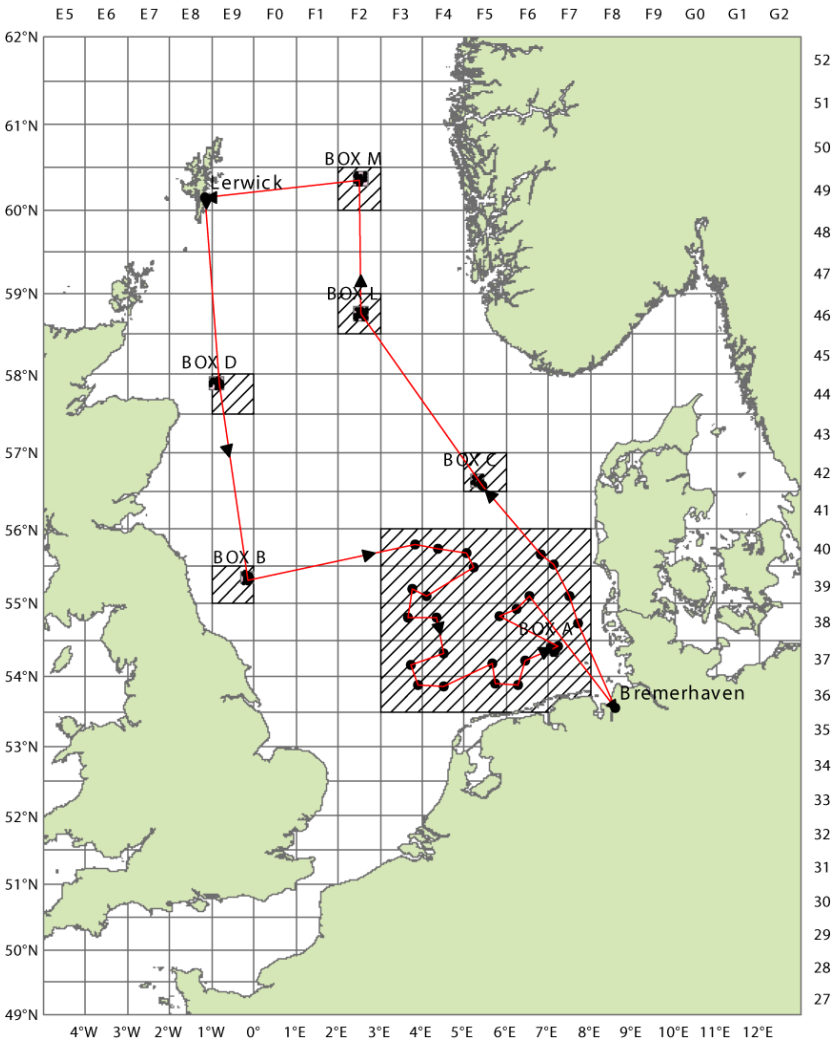


Figure 4.2.2.3. Cruise track of "Walther Herwig III 324", 07/19–08/17/2010, Q3 IBTS and GSBTS (German Small scale Bottom Trawl Survey). Hatched area: ICES rectangles sampled within the IBTS, letters: areas of investigation (Boxes) within the GSBTS.

4.2.2.4 Denmark – North Sea Quarter 3 IBTS (IBTS3Q - DEN)

Nation:	Denmark	Vessel:	Dana
Survey:	IBTS3Q - DEN 06/10	Dates:	10 – 26 August 2010

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, saithe, Norway pout, herring, mackerel, sprat and some other species.
Gear details:	The bottom trawl used is the GOV rigged with groundgear A.
Notes from survey (e.g. problems, additional work etc.):	SCANMAR data were collected during all hauls. The cruise was terminated earlier than scheduled and without completion of the survey area due to technical reasons.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 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	46	40	0	1	90	

Table 4.2.2.4.2. Number of biological samples (age material).

Species	No	Species	No
Clupea harengus	582	*Sprattus sprattus*	525
Gadus morhua	98	*Trisopterus esmarki*	30
Melanogrammus aeglefinus	349	*Microstomus kitt*	4
Merlangius merlangus	705	*Scomber scombrus*	315
Pollachius virens	2	*Merluccius merluccius*	10

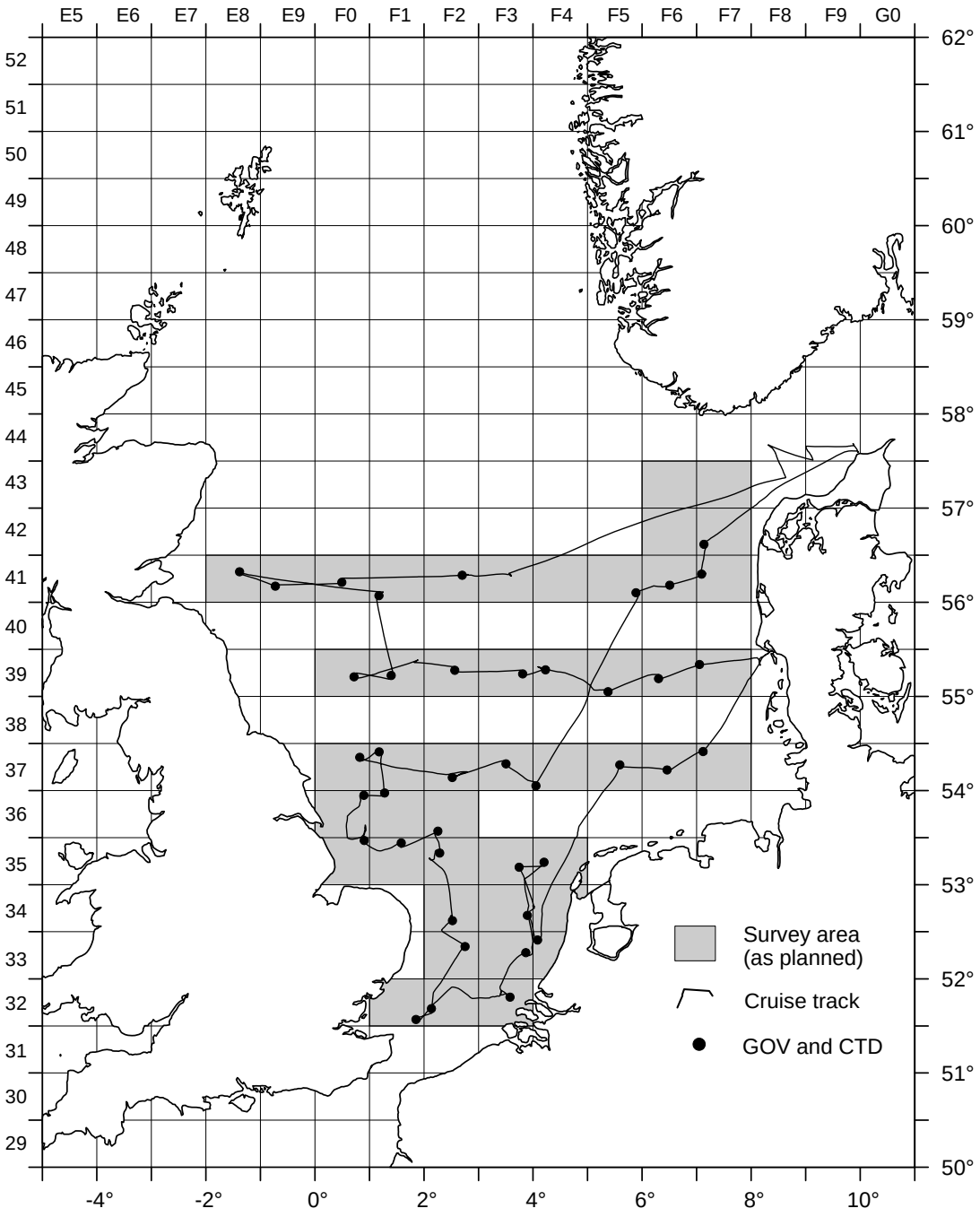


Figure 4.2.2.4. Cruise track and sampling locations for Dana during the IBTS3Q 2010.

4.2.2.5 UK (Scotland) – North Sea Quarter 3 IBTS (IBTS3Q – SCO)

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	IBTS3Q - SCO / 1010S	Dates:	14 /08/10 - 6/09/10

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.)	Scotia suffered from an overheating issue with the forward propulsion motor for the entirety of this cruise and although this impacted marginally on what could be achieved all cruise objectives were met. Samples of low nutrient seawater were collected in the region of statistical rectangle 45F1 DNA samples were preserved in alcohol for IMR Bergen Frozen samples of fish were also collected in order to fulfil requests received from several sources, including: FBU; Marlab IMR Bergen Technical University of Denmark MSc Course, Aberdeen University Aquaculture and Fish Health Branch, Marlab The survey was completed satisfactorily with the standard 84 stations attempted and 83 being valid. Four repeat stations were completed in addition to the programmed survey. The two problematic stations (49E6 and 48E6) were sampled successfully this year. 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.

Number of fish species recorded and notes on any rare species or unusual catches:	A total of 77 different species were observed during the trip with a total catch weight of 36457kgs During the cruise 88 trawling stations were attempted for 87 valid hauls, 4 of these being repeat stations (two in 46E9, 46F1, 44E9). All catch data were processed at sea and on returning to Aberdeen, all otoliths were read and results processed with the sea-going suite of software on return to Aberdeen. Numbers of juvenile cod (0+) were down on last year's numbers but a good number and distribution of 1+ Cod were sampled showing a consistent year class (2009) progressing through to maturity. Distribution of juvenile cod (0+) was hard to comment on as so few fish were caught but the following year class (1+) was widely distributed with concentrations in the central North Sea, East coast of England and in Northern areas around Shetland and Orkney. Numbers of juvenile haddock (0+) showed a decrease on last year and is the lowest indicator for the last 9 years (since 2001). Juvenile haddock (0+) were in higher concentrations in the stations below 57 degrees of latitude and above 55 degrees 30 minutes latitude, with the overall distribution being very different from that of last year. The number of juvenile whiting (0+) showed a continuing decrease on last years figures, with the distribution reflecting the trend shown in the Haddock with a more southerly distribution than that of previous years. After a general upward trend in the numbers of Norway Pout (0+) over the last 10–12 years this year has seen a dramatic drop in recruitment. However this indicator is still significantly higher than those of the early 1990's. Distribution of this species was situated more northerly from that of last year with a continuing trend favouring the Northwestern survey area. Length, weight, sex and maturity data were collected from several species, as defined by WGIBTS. Following recommendations from IBTS and WKMSCHWS, no maturity information was taken for cod, haddock, whiting and saithe.

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	40	39	-	1	1	100%	
IVa		GOV-B	44	44	-	3	0	107%	
	TOTAL		84	83	-	4	1	104%	

Table 4.2.2.5.2. Number of biological samples (age material, *maturity only):

Species	Age	Species	Age
Gadus morhua	577	*Molva molva*	40*
Melanogrammus aeglefinus	1599	*Eutrigla gurnardus*	431*
Merlangius merlangius	1407	*Raja naevus*	24*
Pollachius virens	271	*Raja Radiatta*	66*
Sprattus Sprattus	328	*Raja montagui*	22*
Clupea harengus	1534	*Pleuronectes Platessa*	442*
Scomber scombrus	547	*Microstomus kitt*	397*
Trisopterus esmarki	356	*Chelidonichthys cuculus*	77*
Glyptocephalus cynoglossus	24*	**Total**	8142

4.2.2.6 Norway – North Sea Quarter 3 IBTS (IBTS3Q – NOR)

Nation:	Norway	Vessel:	Johan Hjort
Survey:	IBTS3Q - NOR, NORACU, pollution	Dates:	3th July – 2 August 2010

Cruise	The survey was a combination of the IBTS Q 1 and the HERAS: an acoustic survey to estimate the abundance and distribution of herring and sprat in the northeastern part of the North Sea, between 57°00'and 62° N, and between 2° and 5° E. Also an acoustic index for saithe is estimated. Hydrographical transects, sampling for contanimentions in fish and evertebrata were also conducted during the survey.
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 trawleye data. For the samples for the acoustic estimate also a pelagic trawl was used, and, for sampling haddock and cod in rougher grounds for contamination surveys a Campeln trawl was used.
Notes from survey (e.g. problems, additional work etc.):	
Number of fish species recorded and notes on any rare species or unusual catches:	In the IBTS part of the survey, 54 finfish and 14 evertebrate species were recorded.

Table 4.2.2.6.1. IBTS stations fished.

ICES Division	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished
IV	N/A	GOV	55	45	5 (for contaminants)	0	82

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

Species	Age	Species	Age
Lophius piscatorius	13	*Glyptocephalus cynoglossus*	6
Hippoglossus hippoglossus	1	*Molva molva*	3
Merluccius merluccius	16	*Pleuronectes platessa*	13
Trachurus trachurus	53	*Merlangius merlangus*	424
Clupea harengus	1513	*Pollachius virens*	209
Gadus morhua	406	*Trisopterus esmarkii*	177
Melanogrammus aeglefinus	550	*Trisopterus minutus*	10
Scomber scombrus	356	*Lepidorhombus whiffiagonis*	8
Micromesistius poutassou	48	*Raja clavata*	2

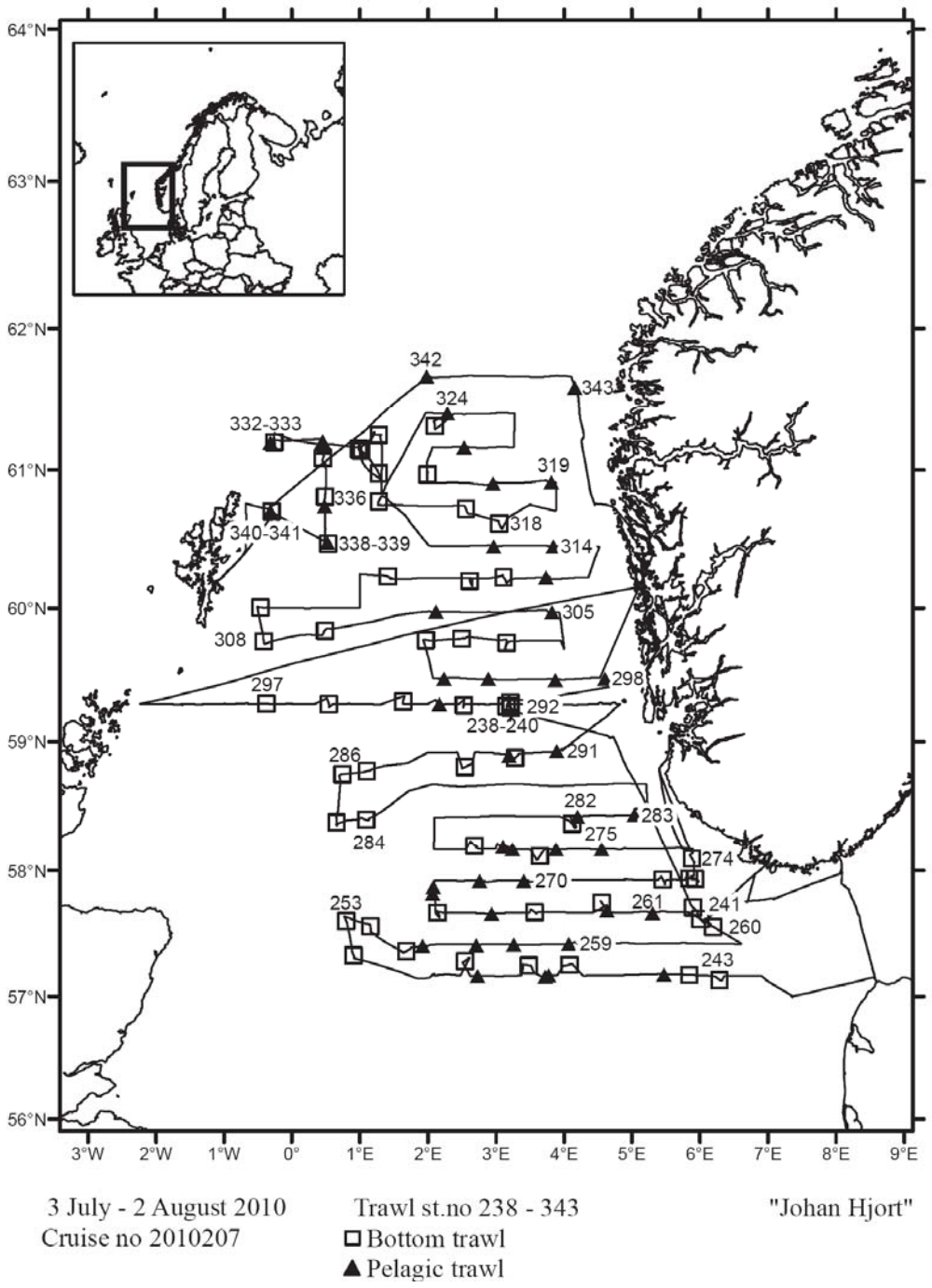


Figure 4.2.2.6. Trawl stations during IBTS3Q 2010. Bottom trawl is the GOV 36/47 with exocet kite.

4.2.3 Results

4.2.3.1 GOV

The combined indices for the 0-group recruits of seven commercial species based on the 2010 quarter 3 surveys are shown in Figure 4.2.3.1. It can be seen from the addition of the 2010 data that Norway pout and sprat continue to be above the long-term mean with all other below. For Norway pout the 2010 data are the third lowest of the entire time-series, for cod it is the second lowest figure for the time-series and for haddock it is the lowest since the time-series began.

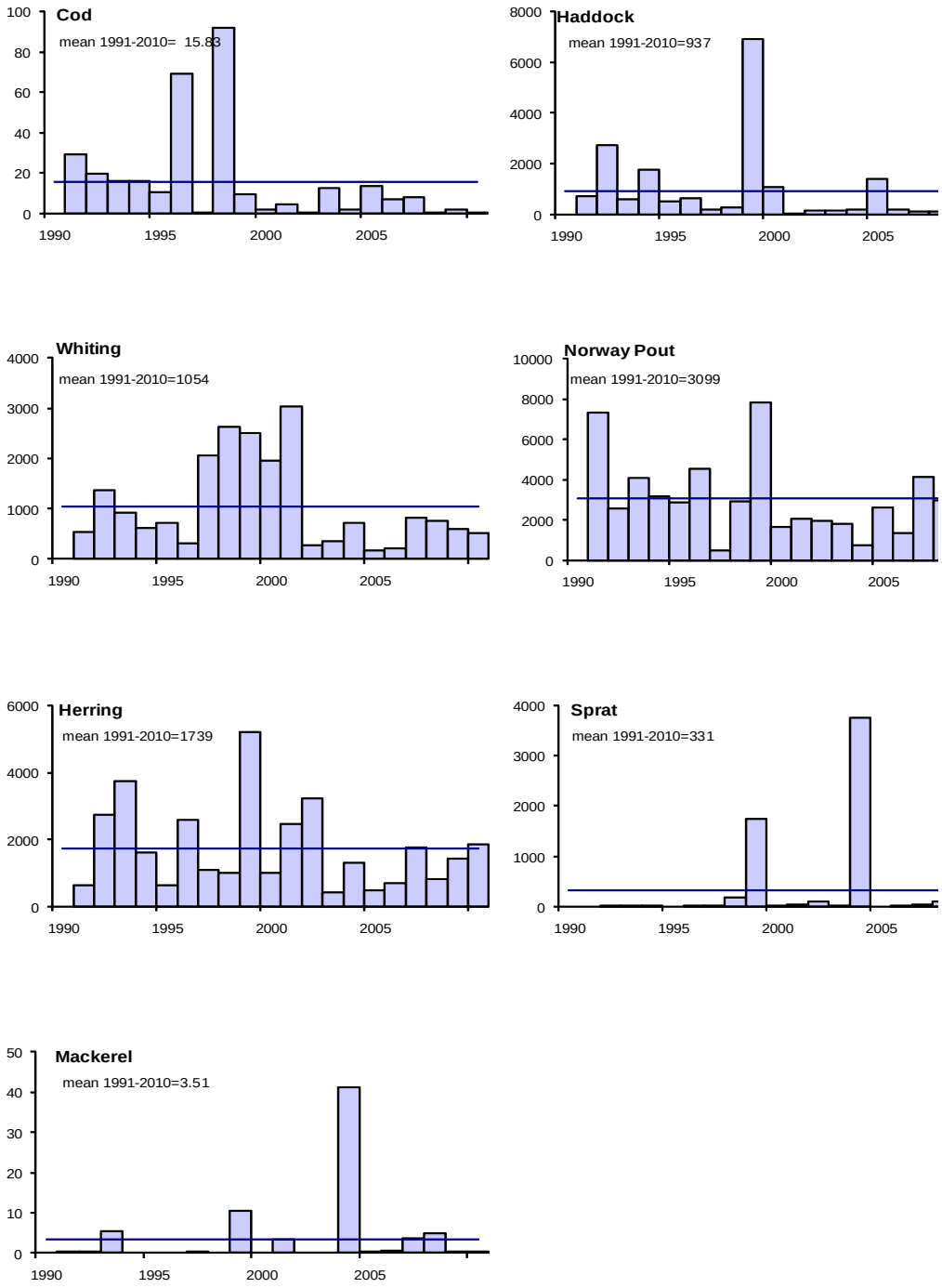


Figure 4.2.3.1 Time-series of indices for 0-group species during the quarter 3 IBTS survey in the North Sea, extracted from DATRAS.

Table 4.2.3.1 gives an overview of the number of biological samples as reported per country in Section 4.1.2.

Table 4.2.3.1. Number of individuals sampled for sex and/or age and maturity.

species	Den	Eng	Ger	Sco	Swe	Nor	total
Target species							
Clupea harengus	582	1040	338	1534	1396	1513	6403
Gadus morhua	98	377	499	577	417	406	2374
Melanogrammus aeglefinus	349	1254	160	1599	244	550	4156
Merlangius merlangus	705	1121	347	1407		424	4004
Pollachius virens	2	218	104	271	258	209	1062
Sprattus sprattus	525	450	134	328	787		2224
Trisopterus esmarki	30	287	41	356	145	177	1036
Scomber scombrus	315	383	180	547		356	1781
Additional species							
Scophtalmus rhombus		2	6				8
Microstomus kitt	4	238	183	397			822
Glyptocephalus cynoglossus				24		6	30
Lophius piscatorius		21	28			13	62
Lophius budegassa		1	1				2
Merluccius merluccius	10					16	26
Mullus surmuletus		22					22
Psetta maxima		2					2
Trachurus trachurus						53	53
Pleuronectes platessa		1059	607	442	758		2866
Solea solea					12		12
Limanda limanda		425					425
Eutrigla gurnardus		185		431			616
Chelidonichthys cuculus		3		77			80
Chelidonichthys lucerna		7					7
Amblyraja radiata		65					65
Dipturus batis		2					2
Raja montagui		14		22			36
Raja clavata		17				2	19
Raja brachyura							
Leucoraja naevus		20		24			44
Zeus faber		9					9
Molva molva		23		40		3	66
Saridina pilchardus			29				29
Micromesistius poutassou						48	48
Lepidorhombus whiffiagonis						8	8
Trisopterus minutus						10	10
Hippoglossus hippoglossus						1	1

4.2.4 Precision estimates

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

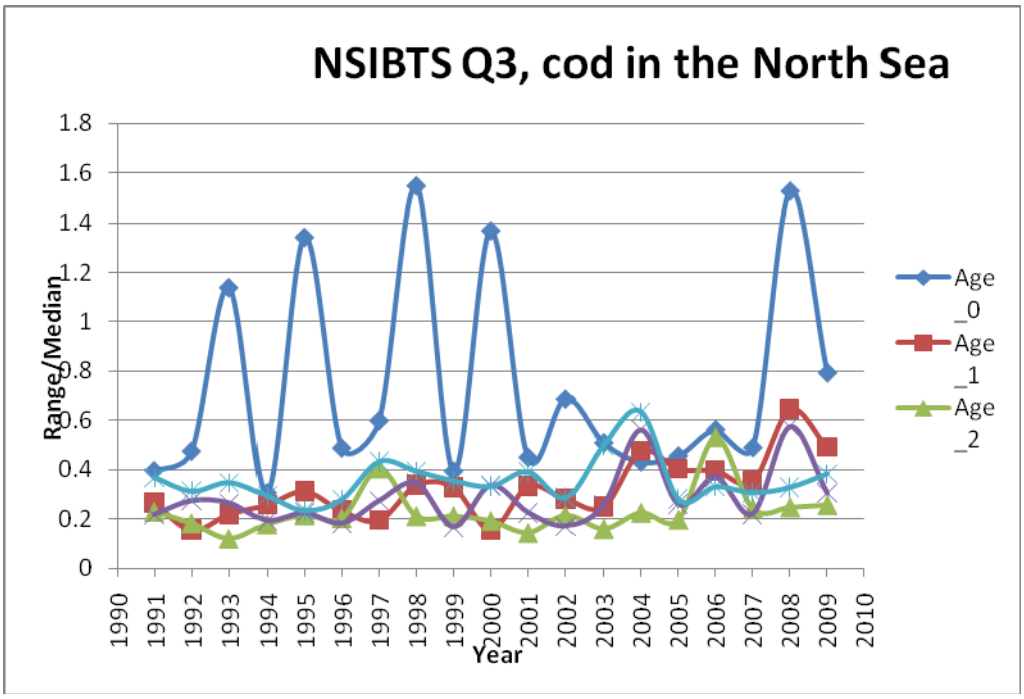
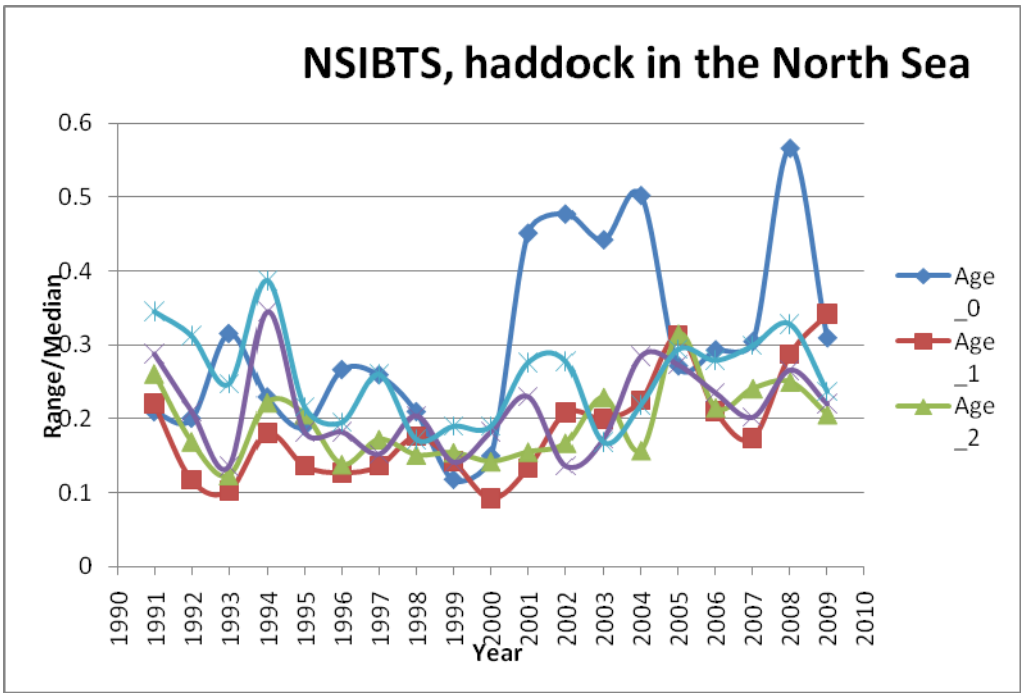


Figure 4.2.4.1.



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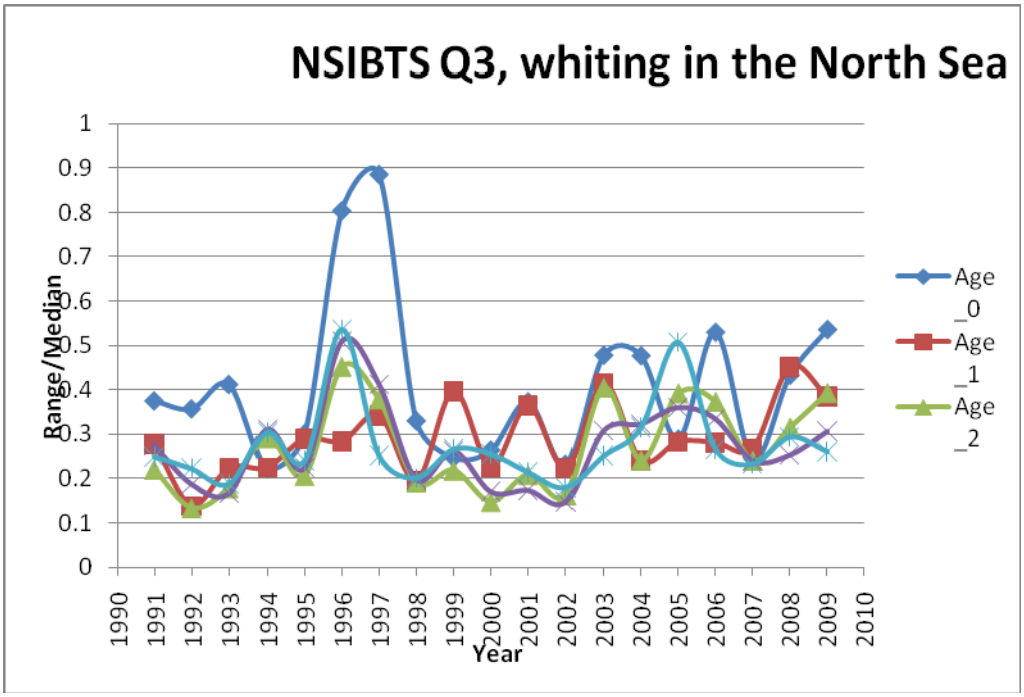

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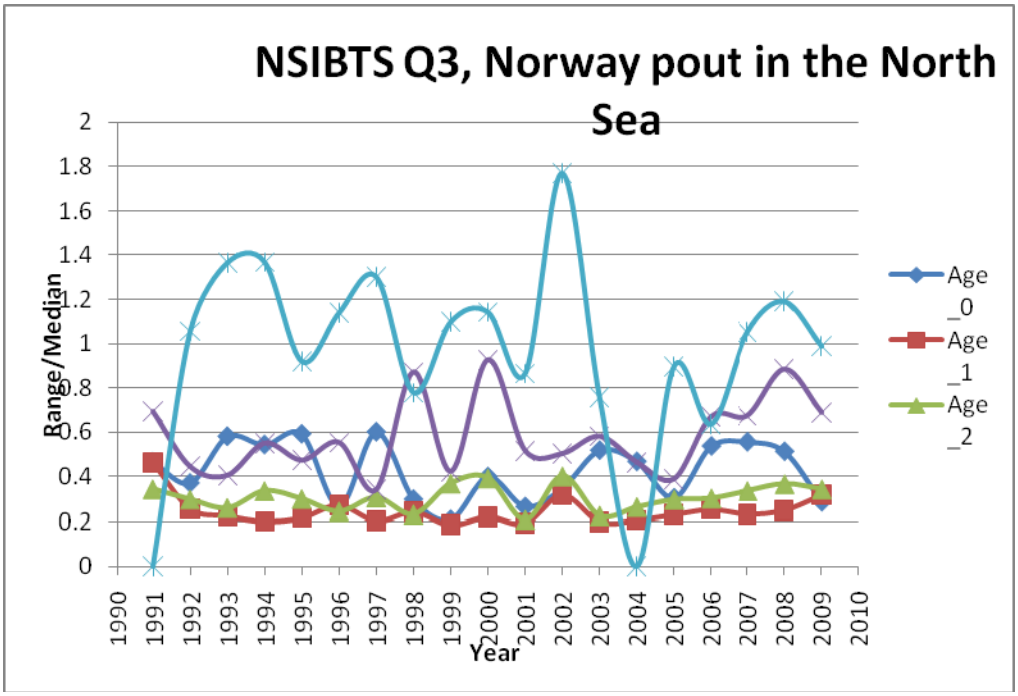

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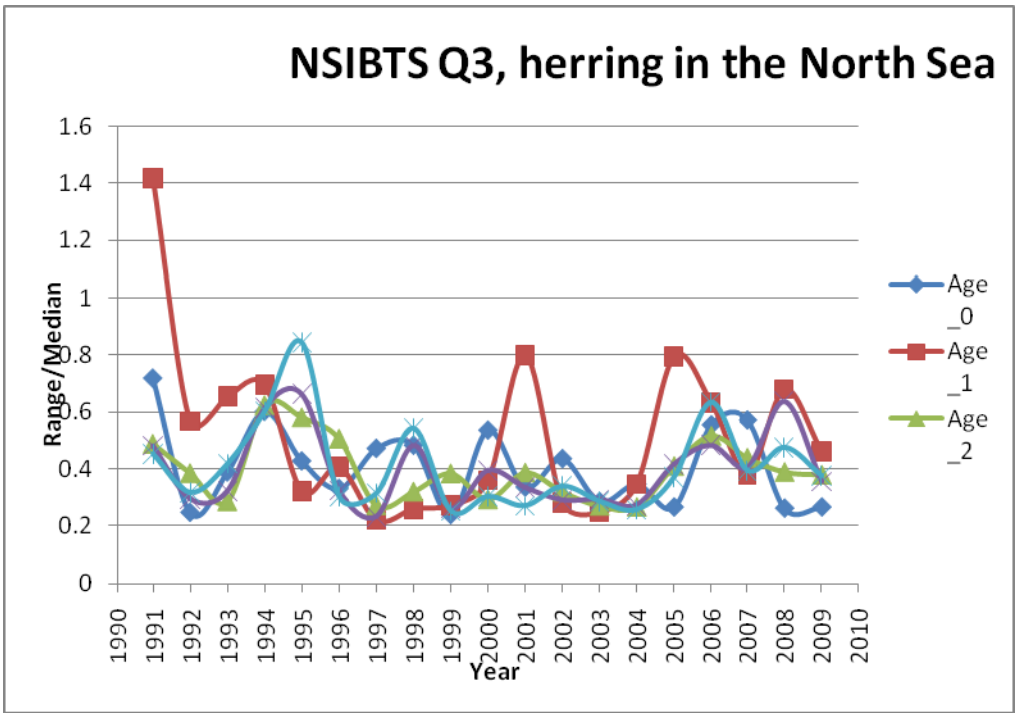
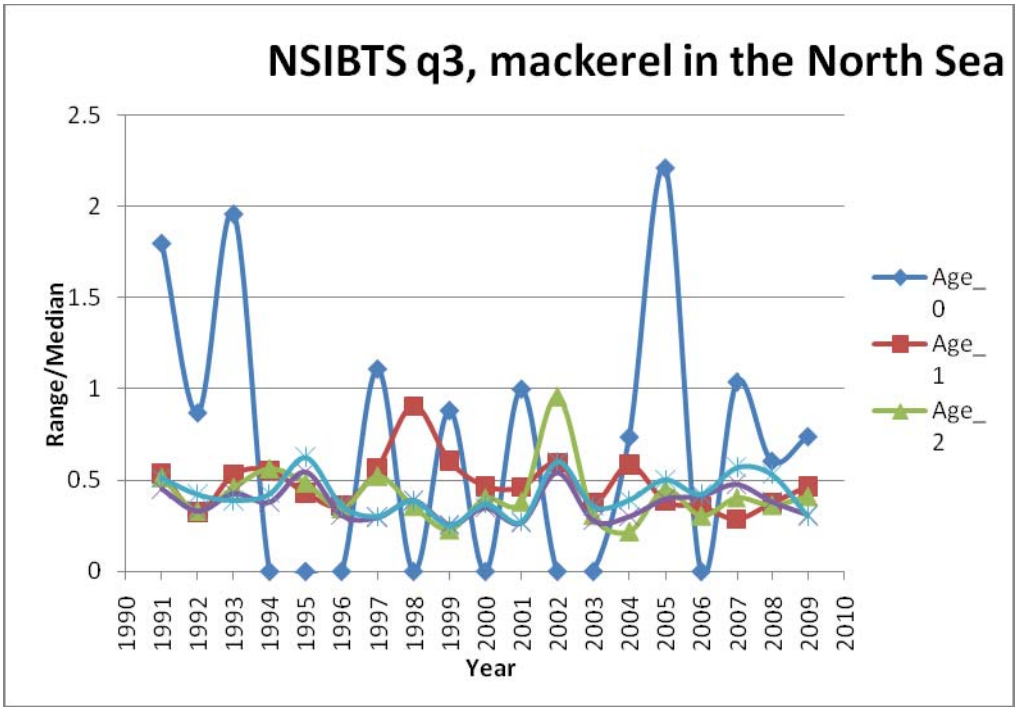


Figure 4.2.4.5.



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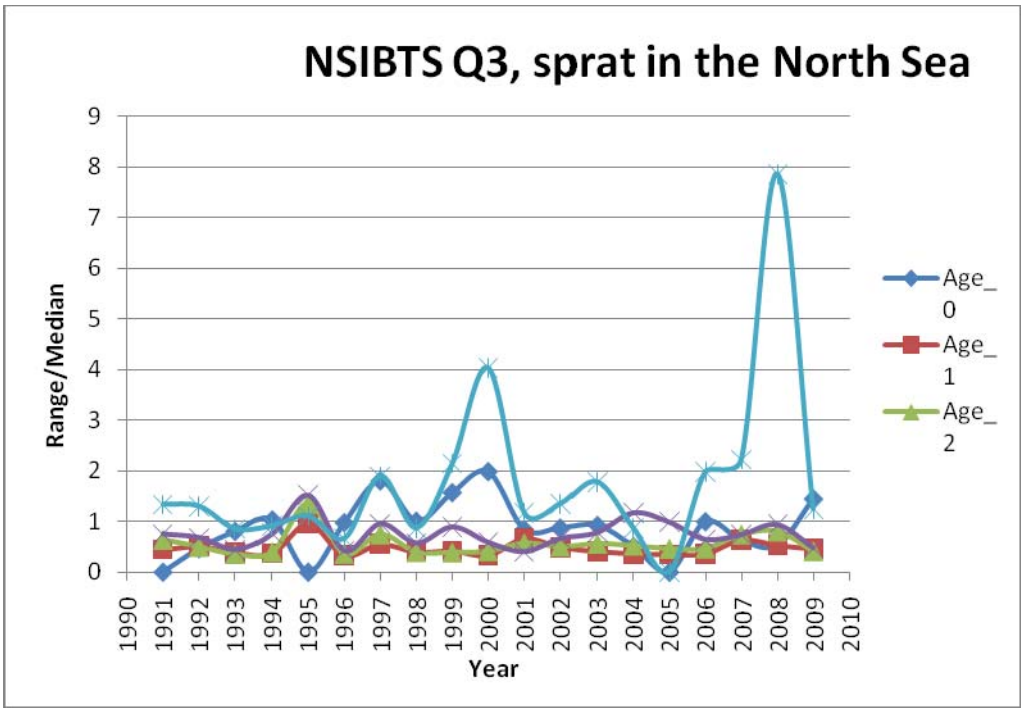


Figure 4.2.4.7.

4.2.5 Participation in 2011

Norway, Denmark, England, Germany, Scotland and Sweden have advised that they will be participating fully in the programme in 2011. The timing of the surveys will be broadly in line with recent years. IBTS strongly recommends that all countries try to have the majority of the 3rd quarter survey in August in order to minimize the variance associated with survey timing.

4.2.6 Other issues

4.2.6.1 Staff exchange in 2010

There is a recommendation from the IBTS working group as well as the SSGESST (SCICOM Steering Group on Ecosystem Surveys Science and Technology) that sea-going 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 programmes.

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. Unfortunately in 2010 no staff exchanges occurred during the quarter 3 surveys.

4.2.6.2 Swedish vessel issue

In early 2011 the Swedish Vessel "Argos" was taken out of commission for an unknown amount of time due to Health and Safety reasons. At this time they are unsure of which vessel they will use for the quarter 3 survey in 2011, however they have assured a commitment to participate.

4.2.6.3 Coordination of the North Sea Q3 Surveys

The coordination of the North Sea Q3 Surveys has been held by Brian Harley, from CEFAS, but due to other commitments he will leave this coordination during 2011, so intersessionally the responsibility of a new responsible for the coordination will be agreed among NS Q3 participants.

4.3 Eastern Atlantic

4.3.1 General overview

In the year, since the March 2010 coordination meting, 12 groundfish surveys have taken place in the ICES NE Atlantic area, two less than the previous year. This brought the overall total number of valid survey hauls to 1036 which was 89 short of the previous year due to the absence of two surveys. The RV "Scotia" suffered mechanical difficulties during 2010 and therefore Marine Scotland was unable to carry out the Q4 west of Scotland Groundfish Survey or the Rockall Survey in 2010. Weather was reported as uncharacteristically stable across all surveys.

As outlined in IBTS 2010 the loss of funding for the Portuguese Q1 survey, combined with the aforementioned Scottish vessel problems, reduced lasts years annual survey haul count by a potential 164 hauls. While the Irish Groundfish overlaps the southern part of the Scottish Groundfish Survey (VIaS) there is no Q4 survey data available for 2010 for the NW Scotland or Rockall. Likewise the Portuguese survey was the only survey in the area during the hake spawning season.

The Q1 Scottish survey (2011) reported good abundance of gadoids for West of Scotland with both cod and whiting significantly above the 10year average. Whiting was also abundant in the Q4 Irish Survey in VIa with 180% increase in number over the five year trend. Pelagics in contrast were low in abundance for Scotland Q1, whereas Northern Ireland reported very good catches in the Irish Sea for herring, south of the Isle of Man.

West of Ireland catches were similar to previous years with a small increase plaice, and to a lesser degree black sole. Further west, the Spanish survey on the Porcupine Bank saw a 200% increase in the catch of *Nephrops* by weight over the five year trend. This equated to a 500% increase in number for the survey. This is coincident with, but unlikely to be totally attributable to, an agreed Nephrops closed area for 3 months along the eastern edge of the bank, started in 2010.

Both the UK and Irish vessels encountered improved catches of cod in the Celtic Sea, with an increase also in haddock for the Irish vessel. Significantly higher levels of plaice were encountered by the IR-GFS2010 for the second year in a row, notably in the area off Cork in and around the closed area for cod.

In general the southern area surveys of Spain and Portugal saw good abundance of hake, horse mackerel and blue whiting with the Q4 Gulf of Cadiz Survey seeing very high catches of blue whiting. The same survey in Q1 reported a 500% increase for the deep water rose shrimp *Parapanaeus longirostris*.

In terms of additional work the usual CTD sampling was undertaken by most Institutes, with sediment sampling, boxcorers, multibeam and towed video being reported by various countries and detailed further below. Ground contact sensors were employed by both Scotland and Ireland over the last year with additional warp to depth ratio trials being carried out by Ireland.

A proposed update to the Scottish west coast survey design was presented during the meeting with the intention to implement this fully for 2011 (see WD 3 in Annex 5). Comprehensive intercalibration exercises have been undertaken, but full analysis was not concluded before the IBTSWG 2011 meeting due in part to exceptional circumstances at the Scottish lab. Therefore the group could not comment conclusively on the significance of these changes. Sections in this and earlier reports may prove of relevance to data users however.

The only calibration reported to the meeting took place between the Northern Ireland and UK groundfish surveys in Q4 of 2010, but results have not been evaluated as yet.

4.3.2 Survey summaries by country

4.3.2.1 UK-Scotland: Western Division Bottom Trawl Survey* – 2010 (ScoGFS-4Q 1110S)

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	ScoGFS-4Q 1310s	Dates:	1 – 23 November 2010

*** Survey cancelled due to major breakdown of research vessel.**

4.3.2.2 UK-Scotland: West of Scotland Rockall Survey** – 2010 (ScoGFS-3Q 1110s)

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	ScoGFS-3Q 1110s	Dates:	10 – 20 September 2010

****Survey cancelled due to major breakdown of research vessel.**

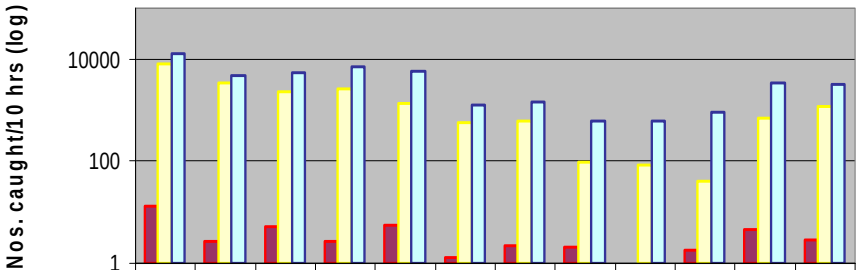
4.3.2.3 UK-Scotland: Western Division Bottom Trawl Survey – 2010 (ScoGFS-1Q 0310s)

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	ScoGFS-3Q 0310s	Dates:	20th February – 12th March 2010

Cruise	Q1 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 area VIa. Age data were collected for Cod, Haddock, Whiting, Saithe, Norway Pout, Herring, Mackerel and Sprat. MIK sampling was undertaken at night to collect abundance and size data on pre-metamorphosed larvae.
Gear details:	The GOV was used throughout the cruise with groundgear "C" (525mm bobbins in the bosom section). The SCANMAR system was used throughout the cruise to monitor headline height, wing spread, door spread and distance covered during each tow. In contrast to previous years a Trawleye sensor was leased in order to trial its effectiveness as a visual indicator for monitoring fish entering the net. In addition a bottom contact sensor was attached to the groundgear for each tow and the data downloaded for further analysis in the laboratory.
Notes from survey (e.g. problems, additional work etc.):	Unseasonably settled weather resulted in calm conditions for the majority of the survey with only 24 hours fishing time being lost to bad weather. A total of 59 valid hauls were achieved with all but one (due to presence of static gear on tow) of the core time-series hauls being attempted. There were two foul hauls. Fishing was generally carried out during the daylight period commencing each day at first light. Seven of the stations were classified as night hauls although two of these were subsequently repeated at the end of the survey during daylight hours. Otoliths from all demersal species were aged at sea with the pelagic species being aged back at the institute. All haul summary data, length frequency and pelagic age data were also punched at sea.

Number of fish species recorded and notes on any rare species or unusual catches:	88 species were caught during the survey for a total catch weight of 31004 kg. The provisional 1-group indices using a length rather than age based delimiter for cod, haddock and whiting are shown in figure 1.

Fig.1 ICES Area 6A Numbers caught per 10 hours fishing Age 1



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	10yr ave
Cod	13	2.7	5.3	2.7	5.7	1.3	2.2	2.1	0.8	1.8	4.6	2.92
Haddock	7936	3421	2339	2650	1397	573	633	99	86	42	706	1195
Whiting	12862	4653	5542	6934	5888	1308	1441	614	593	906	3523	3140

All species displayed a significant increase 2010 compared with the data submitted for 2009 with both cod and whiting now above the 10 year average. A 90% reduction in the catch weight for mackerel was observed in 2010 compared with 2009, with 5.8 tonnes for 2010 being recorded compared to 52 tonnes for 2009. Total weight of herring recorded for the survey also showed a decrease compared to 2009 with 10.2 tonnes for 2010 being recorded compared to 16 tonnes for 2009. Catches of Norway Pout recorded almost a fourfold increase in weight recorded in 2010 with 6.9 tonnes in 2010 compared with 1.8 tonnes in 2009.

Table 4.3.2.3.1. Stations fished (aims: to complete 50 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	stations fished	comments
Via		GOV - C	50	57	7	2	114%	
IVa		GOV - C	2	2	-	-	100%	

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

Species	Age	Species	Age
Gadus morhua	74	*Dipturus batis*	33*
Melanogrammus aeglefinus	715	*Raja brachyura*	2*
Merlangius merlangius	639	*Raja naevus*	67*
Pollachius virens	57	*Raja clavata*	22*
Merluccius merluccius	575*	*Molva molva*	6*
Lepidorhombus whiffiagonis	126*	*Raja montagui*	182*
Lophius piscatorius	31*	*Mustelus mustelus*	10*
Lophius budegassa	10*	*Mustelus asterias*	15*
Clupea harengus	997	*Trisopterus esmarkii*	280
Scomber scombrus	372	*Conger conger*	7*
Solea solea	8*	*Zeus faber*	204*
Lepidorhombus boscii	1*	*Microstomus kitt*	231*
Pollachius pollachius	3*	*Chelidonichthys cuculus*	302*

Species	Age	Species	Age
Mullus surmulletus	3*	*Squalus acanthias*	174*
Brosme brosme	1*	*Glyptocephalus cynoglossus*	4*

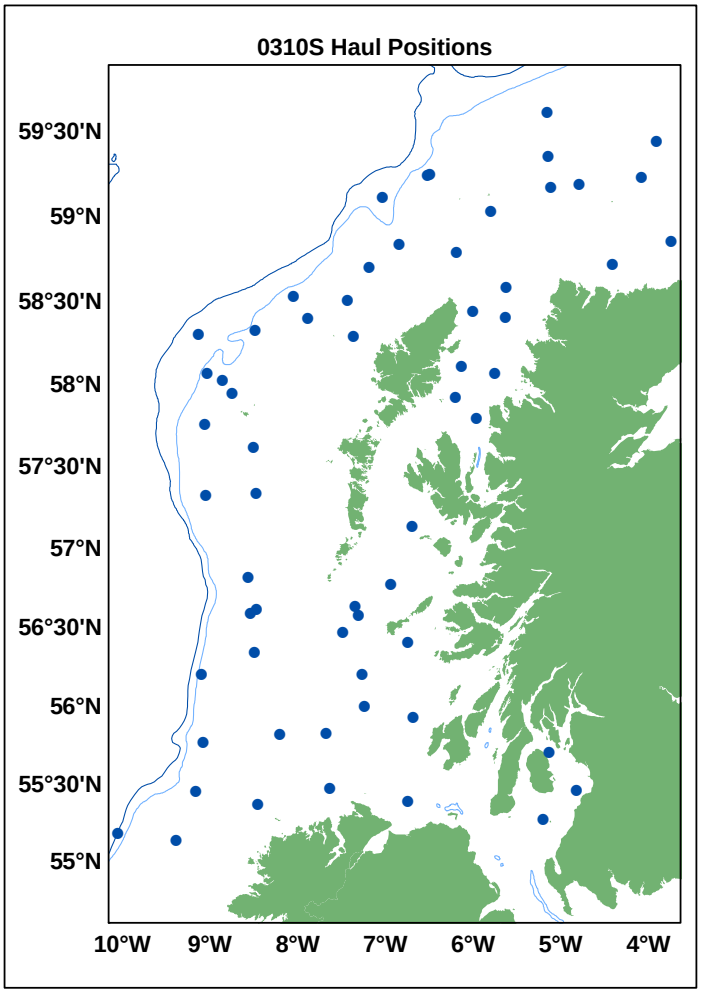


Figure 4.3.2.3. Q1WCSCGFS Trawl Stations.

Table 4.3.2.3.3. ScoGFS-Q1 cpue data for major species:

Species	Strata	Mean no./hr	Mean kgs/hr
Gadus morhua	All	2.46	3.3
Melanogrammus aeglefinus	All	203.17	47.34
Merlangius merlangus	All	393.44	27.68
Merluccius merluccius	All	136.67	21.67
Pollachius virens	All	1.94	4.08
Lepidorhombus whiffiagonus	All	4.91	1.67
Lophius piscatorius	All	1.06	1.92
Pleuronectes platessa	All	26.7	3.97
Microstomus kitt	All	16.95	2.18
Clupea harengus	All	7906.75	349.06
Scomber scombrus	All	2216.64	197.91

4.3.2.4 UK – Northern Ireland: Northern Irish Groundfish Survey 2010 –NIGFS-Mar

Nation:	UK (Northern Ireland)	Vessel:	Corystes
Survey:	NIGFS-Mar 10/10	Dates:	2–26 March 2010

Cruise	Q1 Northern 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. 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, 69 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 4 stations.

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

ICES Divisions	Strata	Gear	Tows Planned	Valid	Additional	Invalid	stations fished	comments
VIIa	All	Rock-hopper	60	60	1	1	103%	
	TOTAL		60	60	1	1	103%	

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

Species	Age and Maturity	Species	Maturity only
Dicentrarchus labrax	1	*Psetta maxima*	5
Gadus morhua	350	*Scophthalmus rhombus*	20
Melanogrammus aeglefinus	713	*Zeus faber*	8
Merlangius merlangus	1288	*Leucoraja naevus* *	14
Merluccius merluccius	41	*Raja brachyura* *	21
Molva molva	4	*Raja clavata* *	53
Pleuronectes platessa	300	*Raja montagui* *	191
Pollachius pollachius	5	*Squalus acanthias*	5

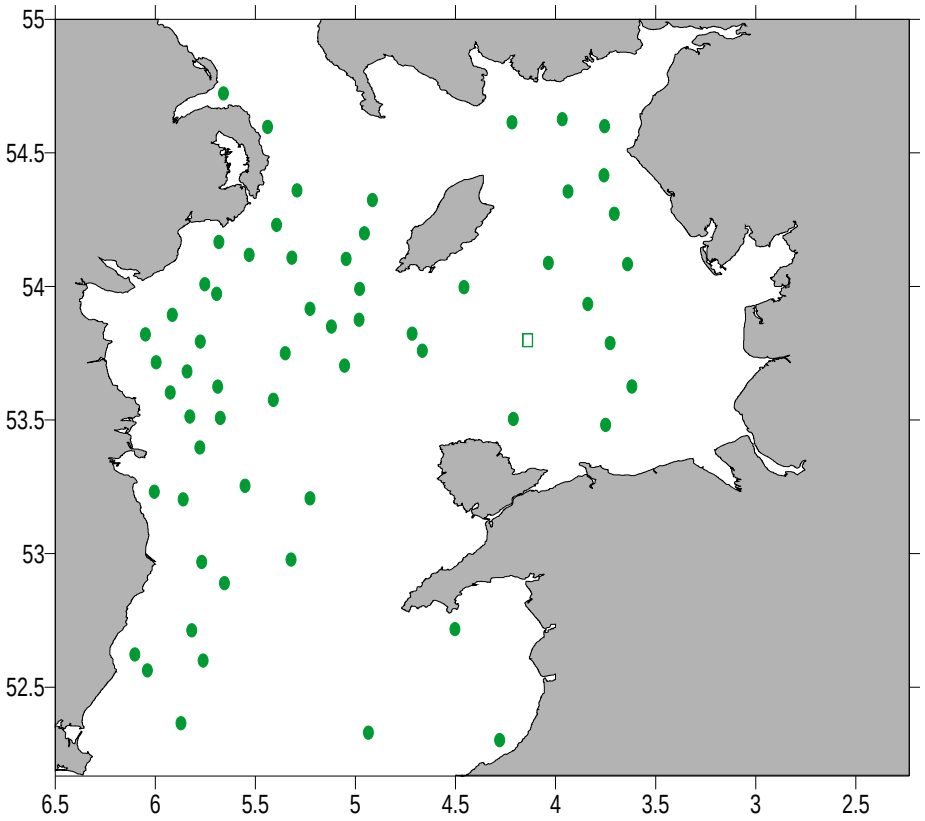


Figure 4.3.2.4. Map of valid survey stations completed during the Northern Irish quarter 1 groundfish survey (filled circles: valid tows; open square: repeat station)

4.3.2.5 UK – Northern Ireland: Northern Irish Groundfish Survey 2010 –NIGFS 4Q

Nation:	UK (Northern Ireland)	Vessel:	RV "Corystes"
Survey:	NIGFS-4Q 41/10	Dates:	04–27 October 2010

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.):	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, 65 species of fish were recorded during the survey. A large haul of spurdog (*Squalus acanthias*) of 900kg (for 20 min tow) was caught off Dublin.

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

ICES Divisions	Strata	Gear	Tows Planned	Valid	Additional	Invalid	% stations fished	comments
VIIa	All	Rock-hopper	60	59	0	0	98	
	TOTAL		60	59	0	0	98	

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

Species	No	Species	No
Clupea harengus	50	*Psetta maxima*	3
Conger conger	1	*Scophthalmus rhombus*	6
Dicentrarchus labrax	4	*Zeus faber*	11
Gadus morhua	140	*Leucoraja naevus* *	8
Melanogrammus aeglefinus	594	*Raja brachyura* *	14
Merlangius merlangus	1235	*Raja clavata* *	75
Merluccius merluccius	12	*Raja montagui* *	218
Molva molva	1	*Squalus acanthias*	150

*** Maturity only.**

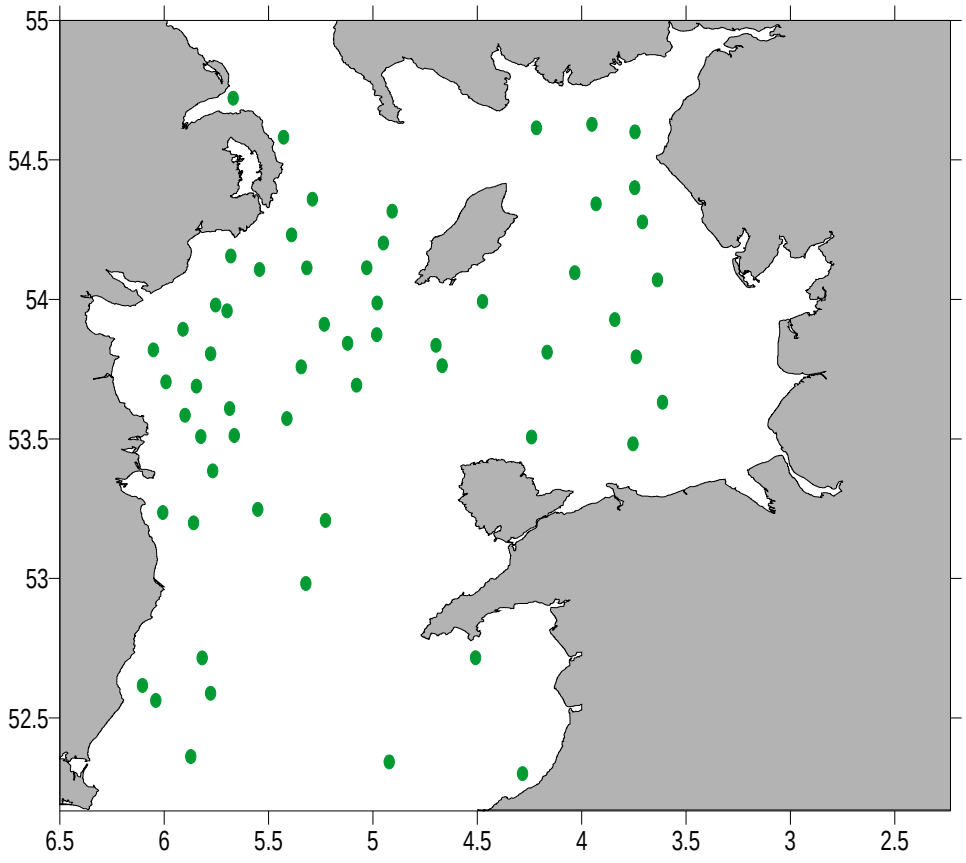


Figure 4.3.2.5. Map of valid survey stations completed during the Northern Irish quarter 4 groundfish survey.

4.3.2.6 Ireland: Irish Groundfish Survey Q4 – IGFS 2010

Nation:	Ireland	Vessel:	Celtic Explorer
Survey:	IGFS-4Q	Dates:	26 September – 5 October (VIa) 15 November – 19 December (VIIb,g,j)

Cruise	The Q4 Irish Groundfish survey aims to collect data on the distribution, relative abundance and biological parameters of commercial fish in VIa south, VIIb and VIIg,j north. The indicess currently utilized by assessment WG's are for haddock, whiting, plaice and sole with survey data provided also for cod, white and black anglerfish, megrim, lemon sole, hake, 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 incoporated 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.):	• Minimal weather disruption in 2010 with only 2 full days lost in VIIg. • VIa continues to be problematic with several historic coastal survey tows inaccessible due to seemingly increasing levels of static gear. • Trawl doors were blasted and re-hung with new "identical" chain, but were tending to be at the lower end of historical observed door spreads on average. Once data were conclusive, back strops were re-adjusted to bring in line with historical average. • Additional work included night-time evaluation of critical warp to depth ratios.
Number of fish species recorded and notes on any rare species or unusual catches:	In 2010, 82 species of fish, 20 elasmobranch, 7 cephalopod and 6 crustacean species were caught and measured. 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. * Feedback from the 2010 becnmark WKFLAT suggests a year affect for IGFS09 plaice in VIIg in addition to the accepted higher abundance. The cause has not been identified as yet , but seems evident in 2010.

Table 4.3.2.6.1. Stations fished (aim to complete 170 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
Via	All	D	45	47	0	5	115	
VIIb,c	All	A	38	39	0	0	103	
VIIg	All	A	46	48	0	2	108	
VIIj	All	A	40	43	0	2	112	
	TOTAL		170	177	0	9	105	

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

Species	No.	Species	No.
Clupea harengus	459	*Lophius budegassa*	186
Gadus morhua	571	*Lophius piscatorius*	424
Melanogrammus aeglefinus	2447	*Molva molva*	142

Species	No.	Species	No.
Merlangius merlangus	1884	*Solea solea*	213
Merluccius merluccius	676	*Scomber scombrus*	934
Micromesistius poutassou	1243	*Trachurus trachurus*	772
Pollachius virens	310	**Raja brachyura*	58
Lepidorhombus whiffiagonis	1400	**Raja clavata*	289
Microstomus kitt	683	**Leucoraja naevus*	193
Pleuronectes platessa	1140	**Raja montagui*	495

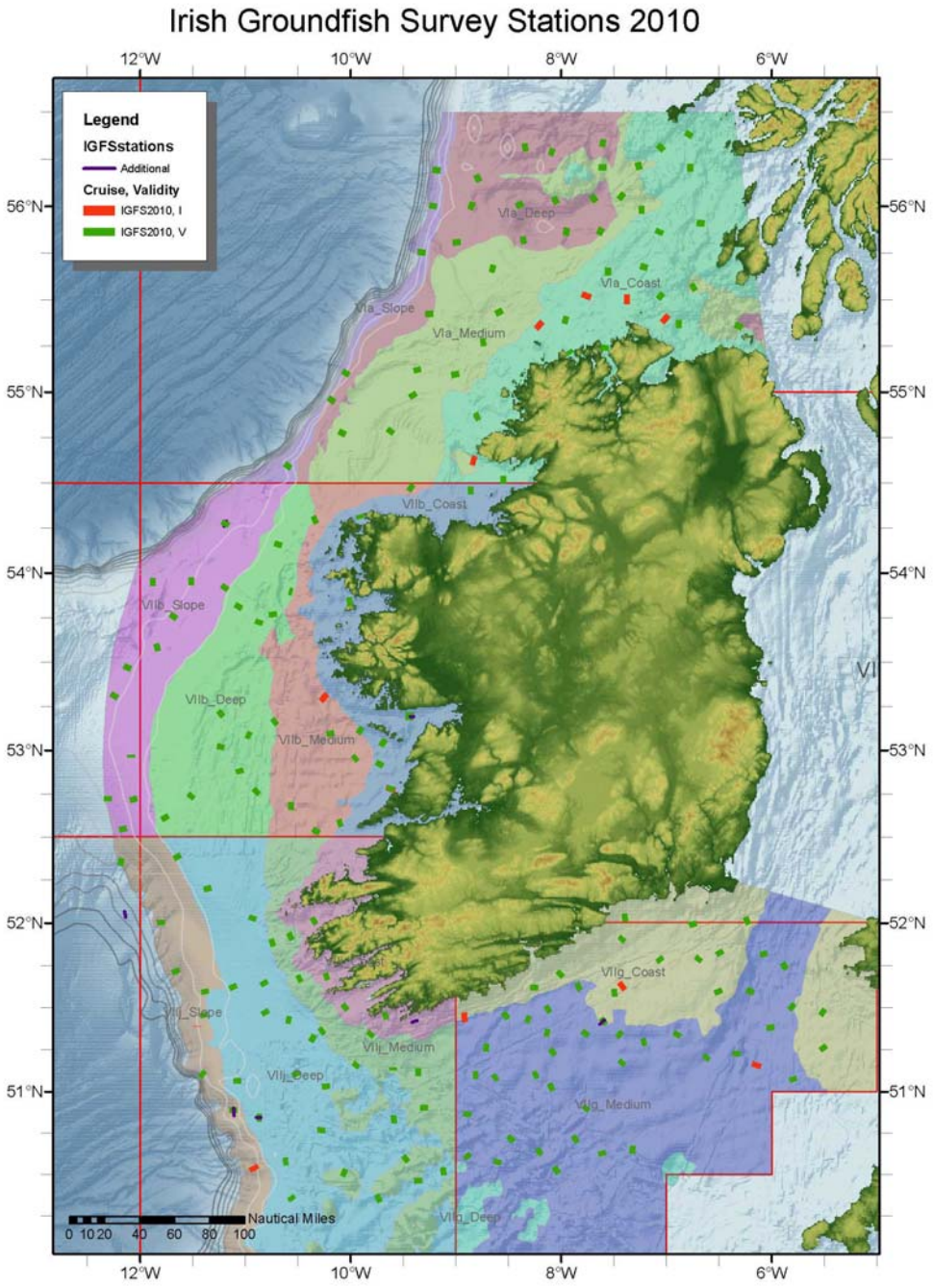


Figure 4.3.2.6. Map of Survey Stations completed by the Irish Groundfish Survey in 2010. Valid = red circles; Invalid = crosses. Survey strata are bounded by feint grey lines relating to the 80m, 120m, 200m and 600m contours respectively with an agreed arbitrary survey limit running north–south in VIIc.

Table 4.3.2.6.3. Biomass and number estimates.

			Biomass index			Number index		
Species	Strata	Valid tows	yi	yi/yi-1	y(i,i-1)/ y(i-2,i-3,i-4)	yi	yi/yi-1	y(i,i-1)/ y(i-2,i-3,i-4)
			kg/Hr	%	%	No/Hr	%	%
Gadus morhua	VIa	47	7.4	246.9	-14.0	5.5	167.0	-27.5
Lepidorhombus whiffiagonis	VIa	47	1.7	104.0	10.6	7.4	109.6	-29.0
Lophius piscatorius	VIa	47	1.4	47.0	-20.3	1.1	126.3	-26.5
Melanogrammus aeglefinus	VIa	47	50.6	125.0	-20.5	176.6	142.4	-13.9
Merlangius merlangus	VIa	47	74.1	194.9	60.5	510.1	67.5	179.5
Merluccius merluccius	VIa	47	36.1	135.2	53.7	100.4	106.9	-43.7
Pleuronectes platessa	VIa	47	13.6	197.7	42.8	99.2	241.7	62.9
Pollachius virens	VIa	47	31.7	368.1	113.6	31.5	419.6	79.1
Solea solea	VIa	47	0.5	179.7	30.6	2.2	159.3	55.0
Gadus morhua	VIIb	39	0.4	174.0	-7.4	0.4	251.1	1.3
Lepidorhombus whiffiagonis	VIIb	39	5.1	64.5	37.6	36.2	59.9	-5.1
Lophius piscatorius	VIIb	39	7.7	178.2	16.0	6.4	234.8	58.8
Melanogrammus aeglefinus	VIIb	39	209.9	88.8	84.4	1750.3	59.0	58.8
Merlangius merlangus	VIIb	39	36.5	60.3	5.4	441.8	26.4	-10.0
Merluccius merluccius	VIIb	39	19.6	36.4	146.0	259.8	131.7	91.0
Pleuronectes platessa	VIIb	39	11.7	74.3	181.6	79.8	80.6	177.6
Pollachius virens	VIIb	39	0.0	52.1	-89.9	0.1	105.5	-92.1
Solea solea	VIIb	39	0.4	35.8	49.5	2.7	44.2	101.9
Gadus morhua	VIIgj	91	6.9	270.4	57.5	8.5	614.0	192.0
Lepidorhombus whiffiagonis	VIIgj	91	4.5	93.1	36.7	26.5	81.7	8.6
Lophius piscatorius	VIIgj	91	6.0	136.5	23.2	5.8	135.1	81.6
Melanogrammus aeglefinus	VIIgj	91	310.8	121.3	297.5	1945.6	43.2	343.2
Merlangius merlangus	VIIgj	91	158.2	104.1	85.9	951.6	74.8	31.9
Merluccius merluccius	VIIgj	91	14.7	37.0	54.3	197.5	111.4	-20.0
Pleuronectes platessa	VIIgj	91	8.6	131.2	177.4	52.6	121.7	235.9
Pollachius virens	VIIgj	91	0.0	NA	NA	0.0	NA	NA
Solea solea	VIIgj	91	0.7	274.4	80.6	2.4	250.3	89.3

Year estimate 2010 (y_i); previous year estimate 2009 (y_{i-1}); average of last two years estimate ($y_{(i,i-1)}$); average of the previous three year estimates 2006–2008 ($y_{(i-2,i-3,i-4)}$). As results for survey trends are ratios they are quite sensitive to stocks with high variance, therefore comparing the 2 yr vs. 5 yr trend is advisable.

***** *Pollachius virens* **has been omitted for VIIg andj due to lack of catch in 2010, 2009 and 2007.**

4.3.2.7 UK – England: Western Groundfish Survey Q4 – EngGFS 4Q 17/10

Nation:	UK (England and Wales)	Vessel:	CEFAS Endeavour
Survey:	EngGFS-4Q 17/10	Dates:	03 November – 04 December 2010

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 cod end 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 whilst en route to the main fishing area. The rock-hopper GOV trawl was used on hard ground stations around the Cornish peninsula then, with good weather in parts of the Celtic Sea, the fine ground stations in the Celtic Sea were fished. Following the completion of these stations, the hard ground stations north of Cornwall were fished with the rock-hopper GOV, prior to the mid-survey change of staff in Cork. After departing Cork, an inshore station off southern Ireland was fished then fine ground stations in the Irish Sea fished (with comparative fishing undertaken with RV "Corystes"). The hard ground stations in St George's Channel were then fished with rock-hopper trawl. Additional work included CTD casts, tag/release programme for various dogfish, collection of tissue samples for genetic studies (brill, turbot and skates) and isotope studies.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 89 species of fish were recorded during the survey, and most of the species caught were relatively common. Unusual fish species caught included specimens of sea trout Salmo trutta, triggerfish Balistes capriscus, tadpole fish Raniceps raninus and a large (122 cm) electric ray Torpedo nobiliana. Cod Gadus morhua were taken in larger numbers in the Celtic Sea than in previous years. Several specimens of common skate Dipturus batis-complex were caught in the Celtic Sea, although few small-eyed ray Raja microocellata were recorded.

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	Additi-onal	Invalid	% stations fished	Comments
VII a	A-C	Standard	12	13	0	0	>100%	
	H	Rock-hopper	14	16	0	1	>100%	
VII e-h	D-E	Standard	19	16+2	0	2	95%	2 hauls with rock-hopper
	F	Standard	14	13	2	1	93%	
	G	Rock-hopper	9	12	0	0	>100%	
TOTAL			68	72	2	3	>100%	

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

Species	Stock	No.	Species	Stock	No.
Gadus morhua	VIIa	48	*Psetta maxima*	-	15
Gadus morhua	VIIe-k	116	*Scophthalmus rhombus*	-	16
M. aeglefinus	VIIa	132	*Lophius budegassa*	-	13
M. aeglefinus	VIIe-k	444	*Lophius piscatorius*	-	73
Merlangius merlangus	VIIa	250	*Mullus surmuletus*	-	5
Merlangius merlangus	VIIe-k	349	*Dicentrarchus labrax*	-	13
Pleuronectes platessa	VII a	418	*Chelidonichthys cuculus*	-	79
Pleuronectes platessa	VII e and VII f-g	269	*Eutrigla gurnardus*	-	149
Solea solea	VII a	11	*Chelidonichthys lucerna*	-	87
Solea solea	VII e and VII f-g	97	*Trigloporus lastoviza*	-	1
Clupea harengus	VII a	180	**Dipturus batis*	-	10
Clupea harengus	Celtic Sea	148	**Leucoraja fullonica*	-	-
Merluccius merluccius	Northern	301	**Leucoraja naevus*	-	26
L. whiffiagonis	VIIb,c,e-k,	308	**Raja brachyura*	-	18
Scomber scombrus	Northern	133	**Raja clavata*	-	165
Molva molva	-	10	**Raja microocellata*	-	9
Conger conger	-	17	**Raja montagui*	-	119
Microstomus kitt	-	198	*Squalus acanthias*	-	136

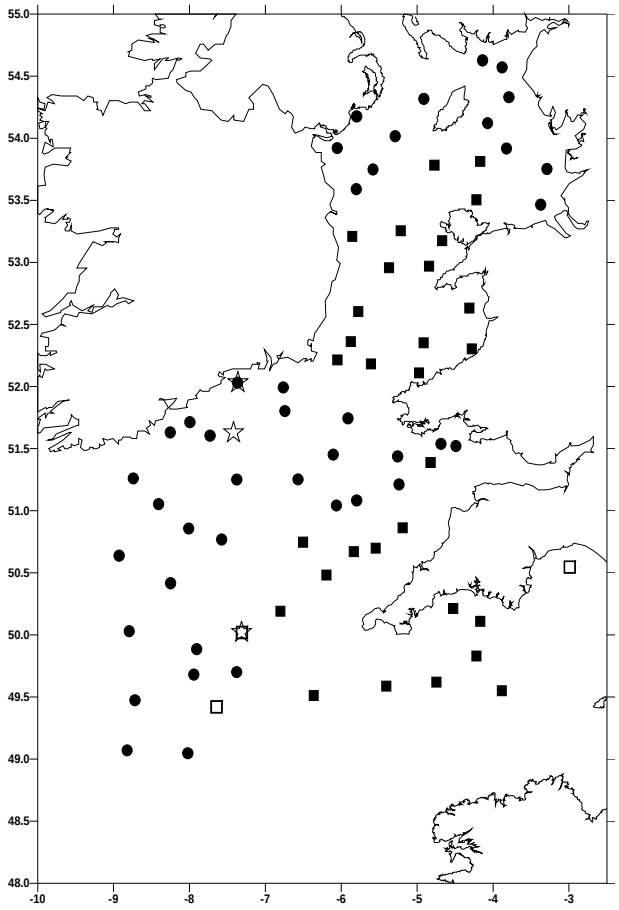


Figure 4.3.2.7. Map of study area showing sites sampled with GOV trawl with rock-hopper groundgear (filled squares: valid tows, open square additional tow) and standard groundgear (filled circles: valid tows; open star: invalid tows).

Table 4.3.2.7.3. UK (Cefas) Groundfish Survey – quarter 4 2010 Biomass and number estimates.

				Biomass index			Number index		
Species	Stock	Tows	Gear	y kg/h	% y/(y-1)	% y/y(1-2)	y n/h	% y/(y-1)	% y/y(1-2)
Gadus morhua	VIIa		Both						
Gadus morhua	VIIe-k		Both						
M. aeglefinus	VIIa		Both						
M. aeglefinus	VIIb-k		Both						
Merlangius merlangus	VIIa		Both						
Merlangius merlangus	VIIe-k		Both						
Merluccius merluccius	VIIe-k		A						
Pleuronectes plattessa	VIIa		A						
Squalus acanthias	NE atlantic		Both						

y=2010, y-1=2009,y(1–2)=average 2008–2009.

4.3.2.8 France: EVHOE Groundfish Survey Q4 – EVHOE 2010

Nation:	France	Vessel:	Thalassa
Survey:	EVHOE 2010	Dates:	18 October – 02 December 2010

Cruise	EVHOE Groundfish survey aims to collect data on the distribution , relative abundance, and biological information of all fish and selected commercial invertebrates in subareas VIIf-j VIIIa,b. The primary species are hake, monkfish, anglerfish, megrim, cod, haddock and whiting; data are also collected for all other demersal and pelagic fish. NKE temperature and salinity data logger used at each trawling position. Sampling design is stratified random
Gear details:	IBTS Standard GOV36/47 with Groundgear (A) but no kite replaced by 6 extra floats. SCANMAR for doors, wings, and vertical net opening sensors
Notes from survey (e.g. problems, additional work etc.):	90 % of the initial proram was achieved: i e. 139 over 154 stations with 137 being valid ; 27 'boxes' of profiles with the SMFH (multi beam echosounders)were realized at night or after trawlings at the end of the day . 3,5 Video transects by the SCAMPI were made, for location of coral reefs; three complete and one interrupted. Sorted Benthos at each trawl station Marine litter recorded at each trawl station. Observers for birds and mammals during all the survey
Number of fish species recorded and notes on any rare species or unusual catches:	167 species were caught

Table 4.3.2.8.1. Stations fished.

ICES Divisions	Strata	Tows planned	Valid	Additional	% stations fished	comments
VII	Cc3	9	7		77.7%	
	Cc4	20	11		55.00%	
	Cc5	3	3		100.00%	
	Cc6	3	4	1	133%	
	Cc7	2	2		100.00%	
+	Cn2	7	6		85.7%	
	Cn3	7	5		71.4%	
	Cs4	20	19		95.00%	
	Cs5	10	9		90.00%	
	Cs6	3	3		100.00%	
	Cs7	2	2		100.00%	
VIII	Gn1	3	2		66.60%	
	Gn2	4	5	1	125.00%	
	Gn3	16	16		100.00%	
	Gn4	21	20		95.20%	
	Gn5	3	3		100.00%	
	Gn6	2	2		100.00%	
	Gn7	2	2		100.00%	
	Gs1	3	3		100.00%	

ICES Divisions	Strata	Tows planned	Valid	Additional	% stations fished	comments
	Gs2	3	3		100.00%	
	Gs3	3	3		100.00%	
	Gs4	3	3		100.00%	
	GS5	2	2		100.00%	
	Gs6	1	2	1	200.00%	
	Gs7	2	2		100.00%	
TOTAL		**154**	**139**	**3**	**90.2%**	

Table 4.3.2.8.2. Number of biological samples (maturity and age material, *age only):

Species	Age	Species	Age
Merluccius merluccius	630	*Lophius piscatorius*	178
Gadus morhua	119	*Solea solea*	73
Melanogrammus aeglefinus	301	*Pleuronectes platessa*	127
Merlangius merlangus	463	*Chelidonichthys cuculus*	206
Lepidorhombus whiffiagonis	370	*Micostomus kitt*	157
Lophius budegassa	108	*Glyptocephalus cynoglossus*	37

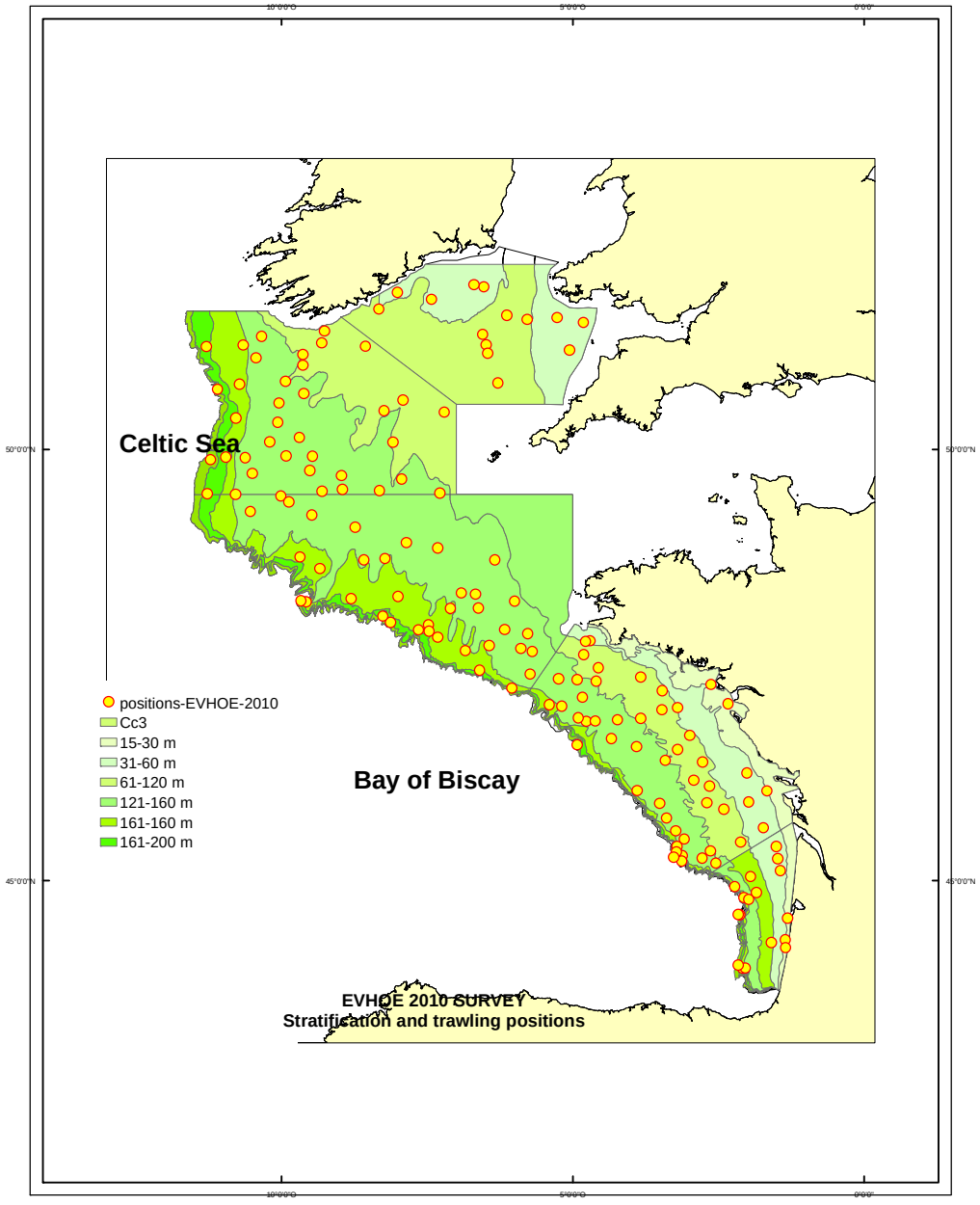


Figure 4.3.2.8. Cruise track of RV "Thalassa" in EVHOE 2010 survey.

4.3.2.9 France: The Channel Groundfish Survey – CGFS10

Nation:	France	Vessel:	Gwen Drez
Survey:	CGFS 10	Dates:	28 September – 27 October 2010

Cruise	The first objective of the Channel Groundfish Survey, carried out every year in October since 1986, is to collect data on the distribution, the relative abundance, and biological information on commercial fish in the Eastern English Channel and the South of the North. The most important species are cod, whiting, plaice and striped red mullet
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. Problems occurred also with the hydrological parameters which were recorded during only 58 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 haul. An increase of the total biomass and abundance was observed mainly for pelagic species this year compared to the mean time-series value.

Table 4.3.2.9.1. Stations fished (aims: to complete 100 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	stations fished	comments
VIId, IVc,		GOV	100	100	6	6	100 %	
	TOTAL		100	100	6	6		

Table 4.3.2.9.2. Number of biological samples (maturity and age material, *maturity only):

Species	Age	Species	Age
Gadus morhua	26	*Pleuronectes platassa*	223
Merlangius merlangus	437	*Mullus surmuletus*	100
Dicentrachus labrax	76		

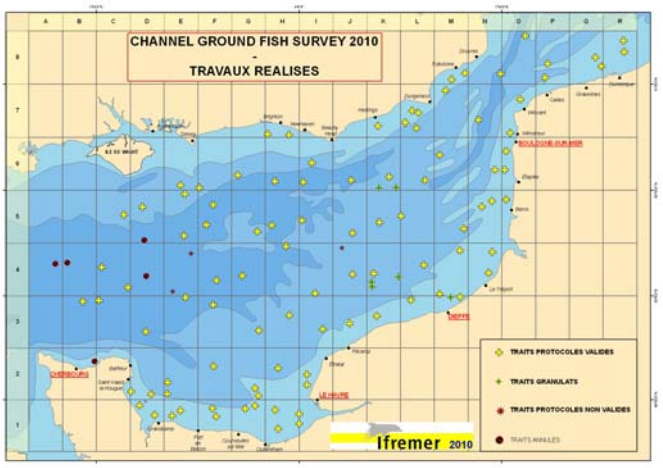


Figure 4.3.2.9. Stations done in CGFS 2010. Quarter 3.

4.3.2.10 Spain: The Porcupine Groundfish Survey Q3 – SP-PGFS (P10)

Nation:	SP (Spain)	Vessel:	Vizconde de Eza
Survey:	SP-PGFS Porcupine 2010	Dates:	06 September – 07 October 2010

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 VIIb-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.):	Additional work undertaken included 95 CTD casts at most trawl stations and in non-trawlable areas to obtain a general image of the hydrography. 17 boxcorer were carried out though only 9 were valid. Two days were lost due to bad weather but all the stations planned were accomplished
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 103 species of fish, 41 crustaceans, 30 molluscs and 26 echinoderms 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 planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	comments
VIIb-k	All	Porcupine baca 39/52	80	80	-	6	2	108%	Also available by depth and geographical strata
	TOTAL		80	80	-	6	2	108%	

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

Species	Age	Species	Age
Merluccius merluccius	842	*M. merluccius* daily growth	18
Lepidorhombus whiffiagonis	681	*Molva molva*	71
Lepidorhombus boscii	332	*Molva macrophthalma*	150
Lophius budegassa	24	*Conger conger*	51
Lophius piscatorius	227	*Merlangius merlangus*	48
Glyptocephalus cynoglossus	309	*Nephrops norvegicus**	764
Helicolenus dactylopterus	200		
Phycis blennoides (not sampled in 2010)			

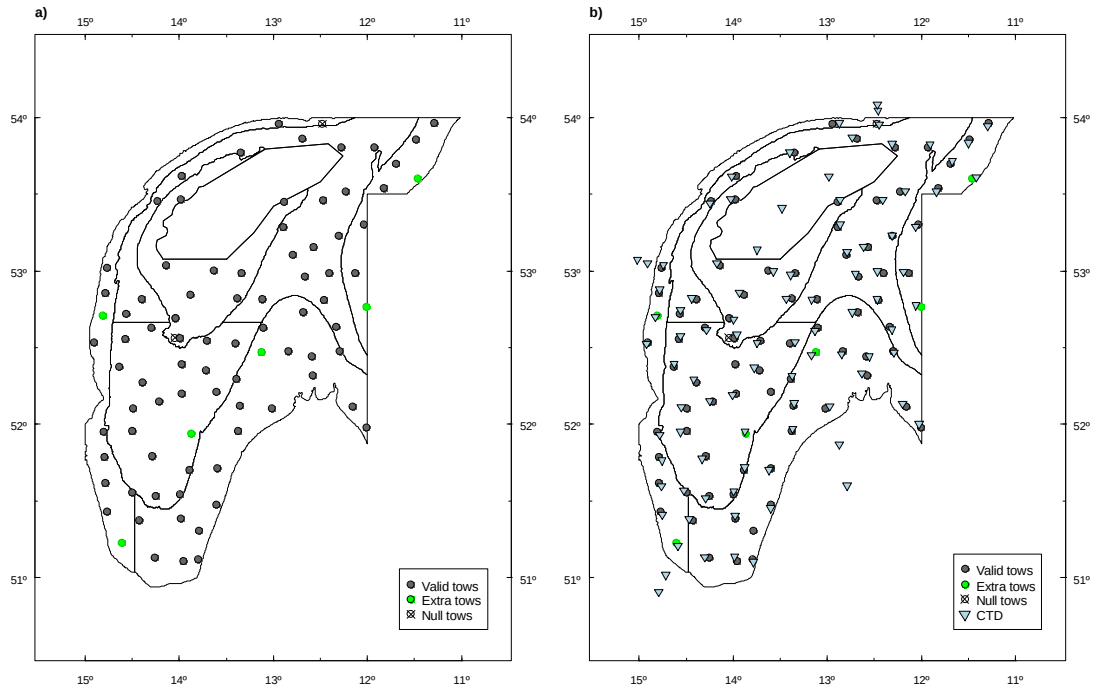


Figure 4.3.2.10. a) Trawl stations in Porcupine 2010 survey, b) CTD stations in relation to trawl stations.

Table 4.3.2.10.3. Biomass and number estimates.

			Biomass index			Number index		
Species	Strata	Valid tows	yi kg/.5hour	yi/yi-1 %	y(i,i-1)/ y(i-2,i-3,i-4) %	yi nº/.5hour	yi/yi-1 %	y(i,i-1)/ y(i-2,i-3,i-4) %
Merluccius merluccius	All	80	36.76	58.9	150.8	42.64	-19.9	57.9
Lepidorhombus boscii	All	80	7.36	26.9	16.1	98.23	42.3	15.1
L. whiffiagonis	All	80	8.52	5.1	29.0	112.56	-1.0	-17.7
Lophius budegassa	All	80	0.39	-35.0	-35.2	0.24	-45.5	-34.6
Lophius piscatorius	All	80	7.08	-7.3	-9.1	2.34	25.1	1.2
M. poutassou	All	80	131.30	-2.1	-34.1	2723.00	2.2	-10.4
Nephrops norvegicus	All	80	1.04	333.3	182.4	33.25	261.4	523.0

y_i, year estimate (2010); y_{i-1}, previous year estimate (2009); $y_{(i,i-1)}$, Average of last two year estimates (2010 and 2009); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2008, 2007 and 2006).

4.3.2.11 Spain: Spanish North Coast Survey – SPGFS N10

Nation:	SP (Spain)	Vessel:	Cornide de Saavedra
Survey:	SPGFS N10	Dates:	16/09/2010 – 18/10/2010

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 also carried out during fishing manoeuvres. Analyses of stomac 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 12 deeper stations between 500 and 700 m. Callibration hauls in the French EEZ could not be carried out due to schedule constrains
Number of fish species recorded and notes on any rare species or unusual catches:	A total of 302 species were captured, 131 fish species, 66 crustaceans, 28 echinoderms, 35 other invertebrates, and 1 algae.

Table 4.3.2.11.1. Stations fished (aims: to complete 115 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	stations fished	comments
VIIIc-IXa	All	Standard baca	115	114	14	-	99%	Also available by depth and geographical strata
	TOTAL		115	114	14	-	99%	

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

Species	Age	Species	Age
Merluccius merluccius tot+daily growth	1354	*Merluccius merluccius* daily growth	
Lepidorhombus whiffiagonis	377	*Trisopterus luscus*	256
Lepidorhombus boscii	462	*Helicolenus dactylopterus*	152
Lophius budegassa	80	*Molva macrophthalma*	138
Lophius piscatorius	205	*Phycis blennoides*	--
Trachurus trachurus	591	*Conger conger*	200
Micromesistius poutassou	NA	*Engraulis encrasicolus*	430
Scomber scombrus	548		

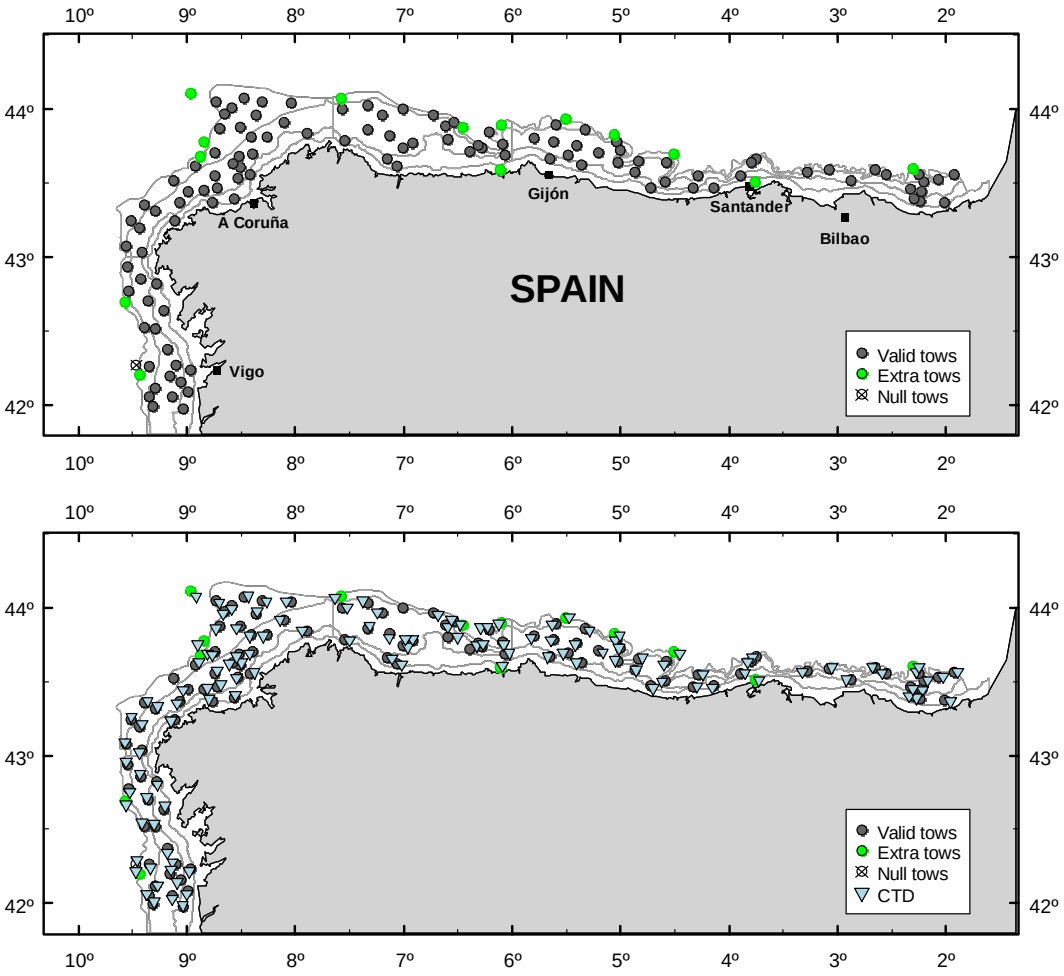


Figure 4.3.2.11. a) Trawl stations in Northern Spanish Shelf 2010 survey, b) CTD stations in relation to trawl stations.

Table 4.3.2.11.3. Biomass and number estimates.

			Biomass index			Number index		
Species	Strata	Valid tows	Yi kg/.5hour	yi/yi-1 %	y(i,i-1)/ y(i-2,i-3,i-4)%	Yi nº/.5hour	yi/yi-1 %	y(i,i-1)/ y(i-2,i-3,i-4)%
Merluccius merluccius	All	114	8.36	-10.2	72.2	201.00	-64.1	137.2
Lepidorhombus boscii	All	114	4.04	2.0	43.0	72.75	37.7	51.0
L. whiffiagonis	All	114	0.89	11.2	-10.4	10.15	143.4	22.2
Lophius budegassa	All	114	0.35	16.7	-51.5	0.53	51.4	-31.2
Lophius piscatorius	All	114	1.29	20.6	-34.2	1.95	2.1	-21.3
M. poutassou	All	114	89.83	33.2	129.4	4120.06	5.7	138.1
Nephrops norvegicus	All	114	0.02	0.0	0.0	0.43	72.0	22.9
Trachurus trachurus	All	114	6.18	-60.3	47	110.17	-79.7	215.5
Scomber scombrus	All	114	3.85	110.4	17.2	49.88	112.2	-15.2

y_i, year estimate (2010); y_{i-1}, previous year estimate (2009); $y_{(i,i-1)}$, Average of last two year estimates (2010 and 2009); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2008, 2007 and 2006).

4.3.2.12 Spain: Spanish Gulf of Cadiz Bottom Trawl Survey Q1 SP-GFS cspr

Nation:	SP (Spain)	Vessel:	Cornide de Saavedra
Survey:	SP-GFS cspr 2010 (ARSA)	Dates:	02 – 11 March 2010

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, 132 species of fish, 61 of crustacean and 40 of mollusca were recorded during the survey.

Table 4.3.2.12.1. Stations fished (aims: to complete 43 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	comments
IXa	All	Standard baca 36/40	43	36				84%	Also available by depth
	TOTAL		43	36				84%	

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

Species	Age	Species	Age
Merluccius merluccius	222	*Loligo vulgaris**	79
*Merluccius merluccius**	717	*Sepia officinalis**	406
*Parapenaeus longirostris**	1434	*Eledone cirrhosa**	3
*Nephrops norvegicus**	130	*Eledone moschata**	314
*Octopus vulgaris**	62		

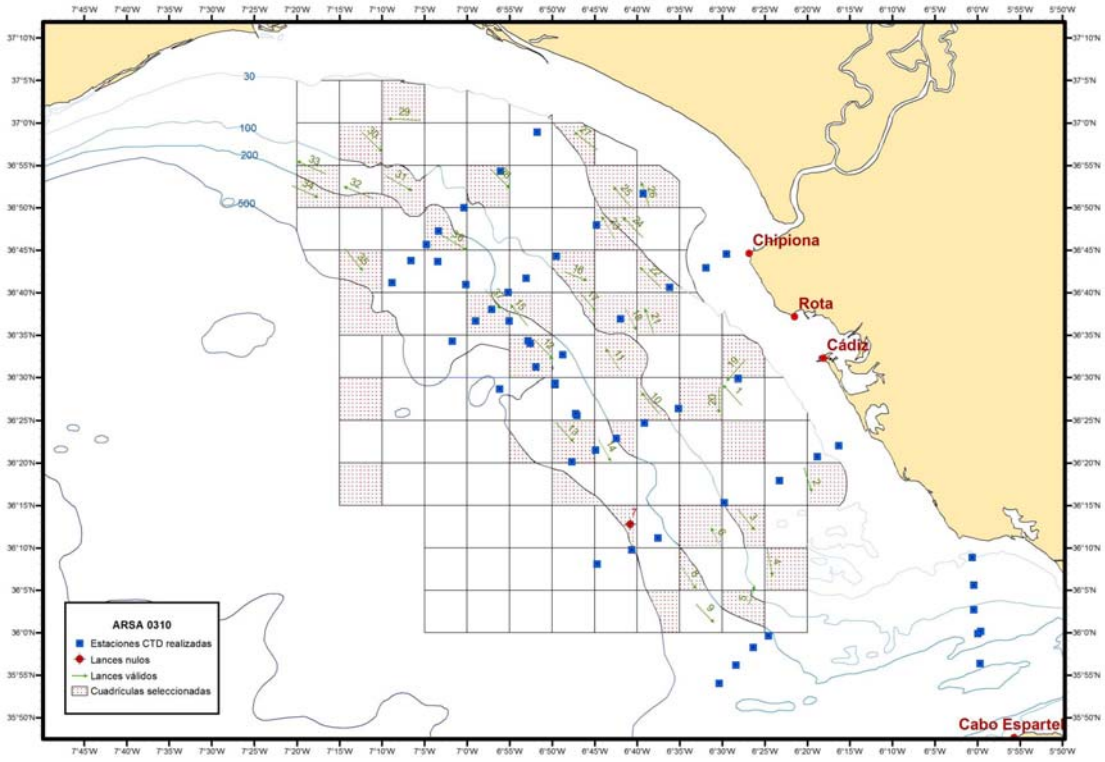


Figure 4.3.2.12. Trawl stations in Gulf of Cadiz Q1 2010 survey.

Table 4.3.2.12.3. Biomass and number estimates.

			Biomass index			Number index		
Species	Strata	Valid tows	Yi kg/hour	yi/yi-1 %	y(i,i-1)/ y(i-2,i-3,i-4) %	Yi no./hour	yi/yi-1 %	y(i,i-1)/ y(i-2,i-3,i-4) %
Merluccius merluccius	ALL	36	6.91	62.96	88.98	119.83	49.09	202.79
M. poutassou	ALL	36	2.24	10540	66.45	41.32	33346	284.73
Nephrops norvegicus	ALL	36	0.18	-12.74	-13.43	5.69	13.14	82.87
Parapenaeus longirostris	ALL	36	1.50	-76.24	388.64	193.28	-85.29	395.44
Octopus vulgaris	ALL	36	1.69	-42.10	-53.91	2.01	-61.80	-20.19
Loligo vulgaris	ALL	36	0.54	26.20	50.37	2.40	67.71	129.11
Sepia officinalis	ALL	36	4.36	469.45	130.38	10.18	553.16	188.97

y_i, year estimate (2010); y_{i-1}, previous year estimate (2009); $y_{(i,i-1)}$, Average of last two year estimates (2010 and 2009); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2008, 2007 and 2006).

4.3.2.13 Spain: Spanish Gulf of Cadiz Bottom Trawl Survey Q4 SP-GFS caut

Nation:	SP (Spain)	Vessel:	Cornide de Saavedra
Survey:	SP-GFS caut GC10	Dates:	6–19 November

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, 139 species of fish, 57 of crustacean and 57 of mollusca were recorded during the survey.

Table 4.3.2.13.1. Stations fished (aim: to complete 45 valid tows per year).

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	comments
IXa	All	Standard baca 36/40	45	44			1	98%	Also available by depth
	TOTAL		45	44			1	98%	

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

Species	Age	Species	Age
Merluccius merluccius	313	*Loligo vulgaris**	472
*Merluccius merluccius**	2023	*Loligo forbesi**	5
*Parapenaeus longirostris**	2957	*Sepia officinalis**	141
*Nephrops novergicus**	364	*Eledone cirrhosa**	36
*Octopus vulgaris**	96	*Eledone moschata**	175

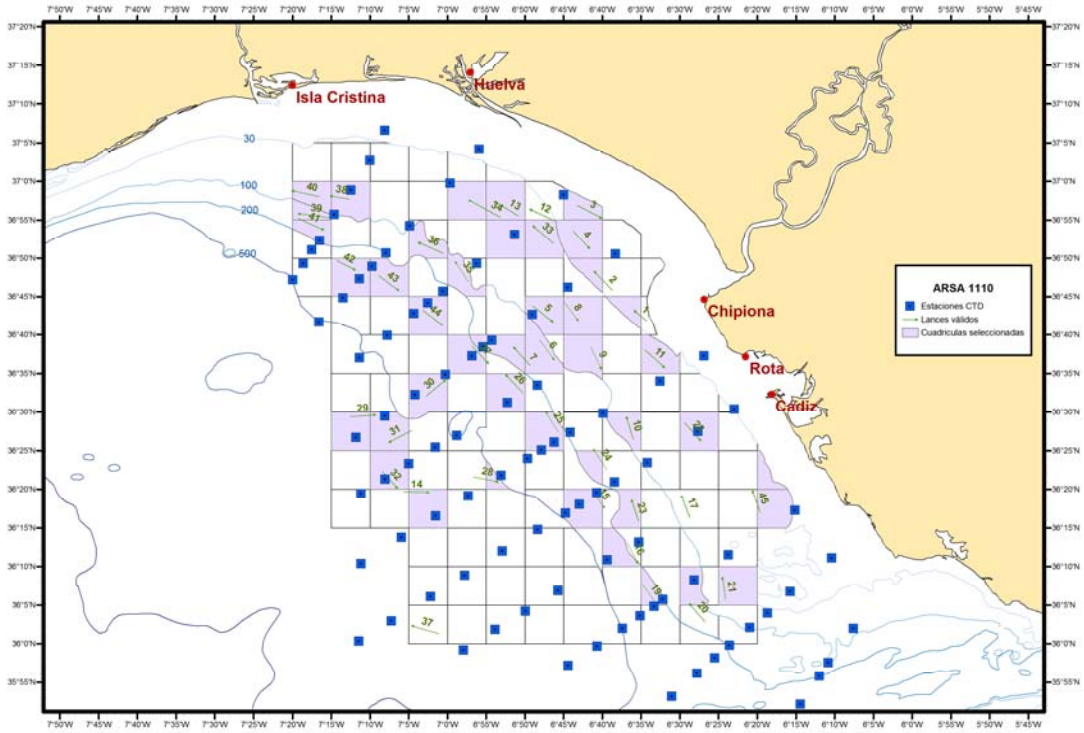


Figure 4.3.2.13. Trawl stations in Gulf of Cadiz Q4 2010 survey.

Table 4.3.2.13.3. Biomass and number estimates.

			Biomass index			Number index		
Species	Strata	Valid tows	Yi kg/hour	yi/yi-1 %	y(i,i-1)/ y(i-2,i-3,i-4) %	Yi no./hour	yi/yi-1 %	y(i,i-1)/ y(i-2,i-3,i-4) %
Merluccius merluccius	ALL	44	5.82	-20.77	21.76	77.67	-36.86	54.60
Micromesistius poutassou	ALL	44	7.57	-32.13	1383.03	310.14	7.47	4362.87
Nephrops norvegicus	ALL	44	0.26	133.73	-50.99	10.61	241.94	39.28
Parapenaeus longirostris	ALL	44	2.81	24.44	10.00	813.03	136.45	93.69
Octopus vulgaris	ALL	44	0.97	-74.61	-0.84	1.85	-69.05	31.93
Loligo vulgaris	ALL	44	1.10	26.68	-44.51	7.68	77.46	40.47
Sepia officinalis	ALL	44	1.39	82.29	-23.35	2.73	16.99	43.65

y_i, year estimate (2010); y_{i-1}, previous year estimate (2009); $y_{(i,i-1)}$, Average of last two year estimates (2010 and 2009); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2008, 2007 and 2006).

4.3.2.14 Portugal: Autumn Groundfish Survey – autumn 2010 P-GFS-oct

Nation:	Portugal	Vessel:	Noruega
Survey:	P-GFS-oct Autumn 2010	Dates:	30 September – 29 October 2010

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.
Area	Portuguese continental waters (Division 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.)	Nine stations could not be performed due to static gears present in the area. Weather disruption was reduced to 4 full days. Temperature was recorded with a CTD (Conductivity, Temperature, Depth) equipment: – 38 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, 89 species of fish, 15 of cephalopods and 26 of crustaceans were recorded during the survey. 27 species of other groups were recorded, e.g. Echinodermata, Cnidarians, Bivalves, Gastropods, Polychaeta, Ascidians and Nudibranchia.

Table 4.3.2.14.1. Stations fished.

ICES Divisions	Strata	Gear	Tows planned	Valid	Invalid	stations fished	comments
IXa	All	NCT	96	87	-	91%	

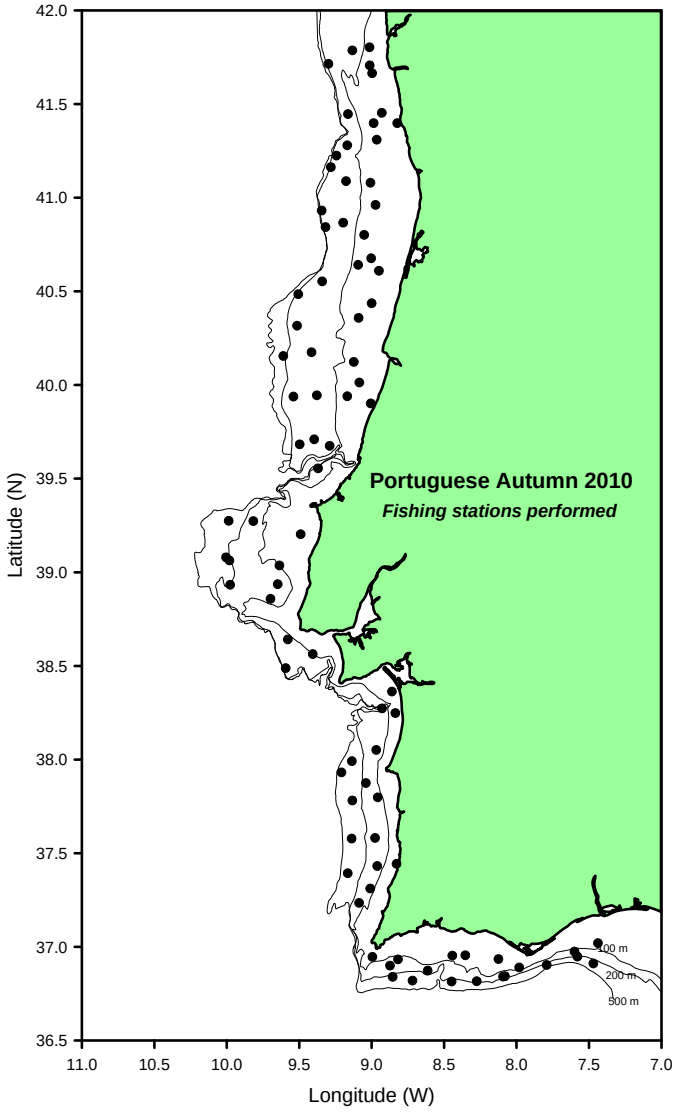


Figure 4.3.2.14. Map showing the stations done during Portuguese Autumn 2010 Survey

Table 4.3.2.14.3. Number of biological samples (maturity and age material).

Species	Samples	Otoliths
Merluccius merluccius	79	≈1400
Trachurus trachurus	24	613
Micromesistius poutassou	22	389
Scomber colias	20	308
Scomber scombrus	23	230
Lophius budegassa	4	4
Lepidorhombus boscii	-	-
Lepidorhombus whiffiagonis	1	1

Table 4.3.2.14.3. Portuguese Groundfish survey – autumn 2010 (4th quarter) Biomass and number estimates.

			Biomass index			Number index		
Species	Strata	Valid tows	Y kg/h	% y/(y-1)	% 2y/y(3-5)	y n/h	% y/(y-1)	% 2y/y(3-5)
Merluccius merluccius	All	87	38,20	-0,03	46,78	417,95	-11,67	66,71
Trachurus trachurus	All	87	27,65	-33,19	103,44	328,99	-82,64	239,86
Trachurus picturatus	All	87	1,65	-81,95	-93,84	19,67	-82,81	-97,66
Micromesistius poutassou	All	87	116,53	7,37	71,18	3854,51	-27,63	126,09
Scomber colias	All	87	3,71	-1,28	-68,52	31,34	-12,58	-76,37
Scomber scombrus	All	87	29,73	-22,78	-4,68	502,31	-5,78	-1,64
Lophius budegassa	All	87	0,11	-	-	0,07	-	-
Lophius piscatorius	All	87	-	-	-	-	-	-
Lepidorhombus boscii	All	87	0,03	-47,35	-60,28	0,25	-44,97	-66,76
L. whiffiagonis	All	87	0,00	-	-	0,01	-	-
Nephrops norvegicus	All	87	0,08	158,55	103,34	1,77	249,78	65,25

y=2010, 2y=average 2009–2010, y(3–5)= average 2006–2008

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	G.CADIZ	
Target species													
Clupea harengus	997	--	--	--	50	459	328	--	--	--	--	--	--
Gadus morhua	74	--	--	350	140	571	164	26	119	--	--	--	--
Lepidorhombus boscii	1*	--	--	--	--	--	--	--	--	332	462	--	-
L. whiffiagonis	126*	--	--	--	--	1400	308	--	370	681	377	--	1
Lophius budegassa	31*	--	--	--	--	186	13	--	108	24	80	--	4
L. piscatorius	10*	--	--	--	--	424	73	--	178	227	205	--	--
Melanogrammus aeglefinus	715	--	--	713	594	2447	576	--	301	--	--	--	--
Merlangius merlangus	639	--	--	1288	1235	1884	599	437	463	48	--	--	--
Merluccius merluccius	575*	--	--	41	12	676	301	--	630	860	1354	313 2023*	≈1400
Pollachius virens	57	--	--	--	--	310	--	--	--	--	--	--	--
Scomber scombrus	372	--	--	--	--	934	133	--	--	--	548	--	230
Sprattus sprattus	--	--	--	--	--	--	--	--	--	--	--	--	--
Trachurus trachurus	--	--	--	--	--	772	--	--	--	--	591	--	613
Trisopterus esmarki	280	--	--	--	--	--	--	--	--	--	--	--	--
Additional species													
Brama brama	--	--	--	--	--	--	--	--	--	--	--	--	--
Chelidonichthys cuculus	302*	--	--	--	--	--	79	--	206	--	--	--	--

	Sco			NIrl		Irl	Eng	Fra			Sp		Pt
	Q1	Q3**	Q4**	Q1	Q4			CGFS	EVHOE	Porc	Nort	G.Cadiz	
Chelidonichthys lucerna	--	--	--	--	--	--	87	--	--	--	--	--	--
Conger conger	7*	--	--	--	1	--	17	--	--	51	200	--	--
Dicentrarchus labrax	--	--	--	1	4	--	13	76	--	--	--	--	--
Engraulis encrasicolus	--	--	--	--	--	--	--	--	--	--	430	--	--
Eutrigla gurnardus	--	--	--	--	--	--	149	--	--	--	--	--	--
Glyptocephalus cynoglossus	4*	--	--	--	--	--	--	--	37	309	--	--	--
Helicolenus dactylopterus	--	--	--	--	--	--	--	--	--	200	152	--	---
Micromesistius poutassou	--	--	--	--	--	1243	--	--	--	--	N.A.	--	389
Microstomus kitt	231*	--	--	--	--	683	198	--	157	--	--	--	--
Molva molva	6*	--	--	4	1	142	10	--	--	71	--	--	--
M. macrophthalma	--	--	--	--	--	--	--	--	--	150	138	--	--
Mullus surmuletus	3*	--	--	--	--	--	5	--	--	--	--	--	--
Phycis blennoides	--	--	--	--	--	--	--	--	--	--	--	--	--
Pleuronectes platessa	--	--	--	300	--	1140	687	223	127	--	--	--	--
Pollachius pollachius	3*	--	--	5	--	--	--	--	--	--	--	--	--
Psetta maxima	--	--	--	5	3	--	15	--	--	--	--	--	--
Scophtalmus rhombus	--	--	--	20	6	--	16	--	--	--	--	--	--
Scomber colias	--	--	--	--	--	--	--	--	--	--	--	--	308
Solea solea	8*	--	--	--	--	213	108	--	73	--	--	--	--
Trigloporus lastoviza	--	--	--	--	--	--	1	--	--	--	--	--	--
Trisopterus luscus	--	--	--	--	--	--	--	--	--	--	--	--	--
Zeus faber	204*	--	--	8	11	--	--	--	--	--	--	--	--
Raja brachiura *	2	--	--	21	14	58	18	--	--	--	--	--	--
Raja clavata *	22	--	--	53	75	289	165	--	--	--	--	--	--
*Raja microocellata**	--	--	--	--	--	--	9	--	--	--	--	--	--
Raja montagui *	182	--	--	191	218	495	119	--	--	--	--	--	--
Dipturus batis *	33	--	--	--	--	--	10	--	--	--	--	--	--
Leucoraja fullonica *	--	--	--	--	--	--	--	--	--	--	--	--	--
Leucoraja naevus *	--	--	--	14	8	193	26	--	--	--	--	--	--
Mustelus mustelus *	10	--	--	--	--	--	--	--	--	--	--	--	--
Mustelus asterias *	15	--	--	--	--	--	--	--	--	--	--	--	--
Squalus acanthias	174*	--	--	5	150	--	136	--	--	--	--	--	--

*** Samples collected for maturity only**

**** Scottish surveys in Rockall, Division VIb ICES, and Western Division Bottom Trawl survey cancelled due to major breakdown of research vessel.**

4.3.4 Participation 2011/2012

Survey	Code	Starting	Ending	Expected hauls (no.)	Intercal.
UK-Scotland Rockall					
UK-Scotland Western (autumn)					
UK-Scotland Western (spring)					
UK-North Ireland (autumn)					
UK-North Ireland (spring)					
UK-North Ireland (intercalibration)					
Ireland – Groundfish Survey VIa	IR-GFS2011	24/09/2011	06/10/2011	45	
Ireland – Groundfish Survey VIIb,g,j	IR-GFS2011	12/11/2011	17/12/2011	125	
UK-England & Wales					
France - EVHOE	EVHOE2011	17/10/2011	01/12/2011	160	
France - Western Channel					
Spain - Porcupine	SPPGFS P11	8/09/11	9/10/11	80	None
Spain - North Coast	SPNGFSN11	31/08/11	2/10/11	116	None
Spain - Gulf of Cádiz (Aut.)	SPG C11	15/11/11	30/11/11	42	None
Spain - Gulf of Cádiz (Spring)	ARSA	21/03/12	02/04/12	42	None
Portugal - Autumn	PGFS-oct 11	28/09/11	27/10/11	96	None

4.4 Combined North Sea and Eastern Atlantic surveys results

4.4.1 Maps of species distribution

Latest survey catches of a number of relevant species in the Northeastern Atlantic and North Sea areas covered by the IBTS (see Table 4.4.1 and Figure 4.4.1) are mapped and given in Annex 7. As part of ongoing efforts to standardize the format and improve the usefulness of reporting for IBTS coordinated surveys, this year, as in last year, all overview maps were produced combining all the areas covered by the IBTSurveys.

The specific surveys in question are the North Sea Quarter 3 (NS) and Northeastern Atlantic Area Quarter 3/4 (NeAtl) surveys. When interpreting these maps, two aspects need to be borne in mind. Moving from the North Sea (NS) to Northeastern Atlantic (NeAtl) Area means also moving from Q3 to Q4 surveys, and second, the trawl gears used in the NeAtl area are more diverse than the single gear GOV used in the NS surveys and therefore literal inter-survey comparisons are more problematic in the NeAtl than intra-survey comparisons over the time-series.

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 Q3 and Northeastern Atlantic Areas Q4).

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

An effort has been made to provide information on “recruits” and post-recruits for the main species, the approach used, as in lasts years, has been to include a length split corresponding to recruits (generally a proxy for 0-group except in megrims, *Lepidorhombus* sp. recruited at-age 1) and post recruits (second length group proxy for 1+ or 2+ group).

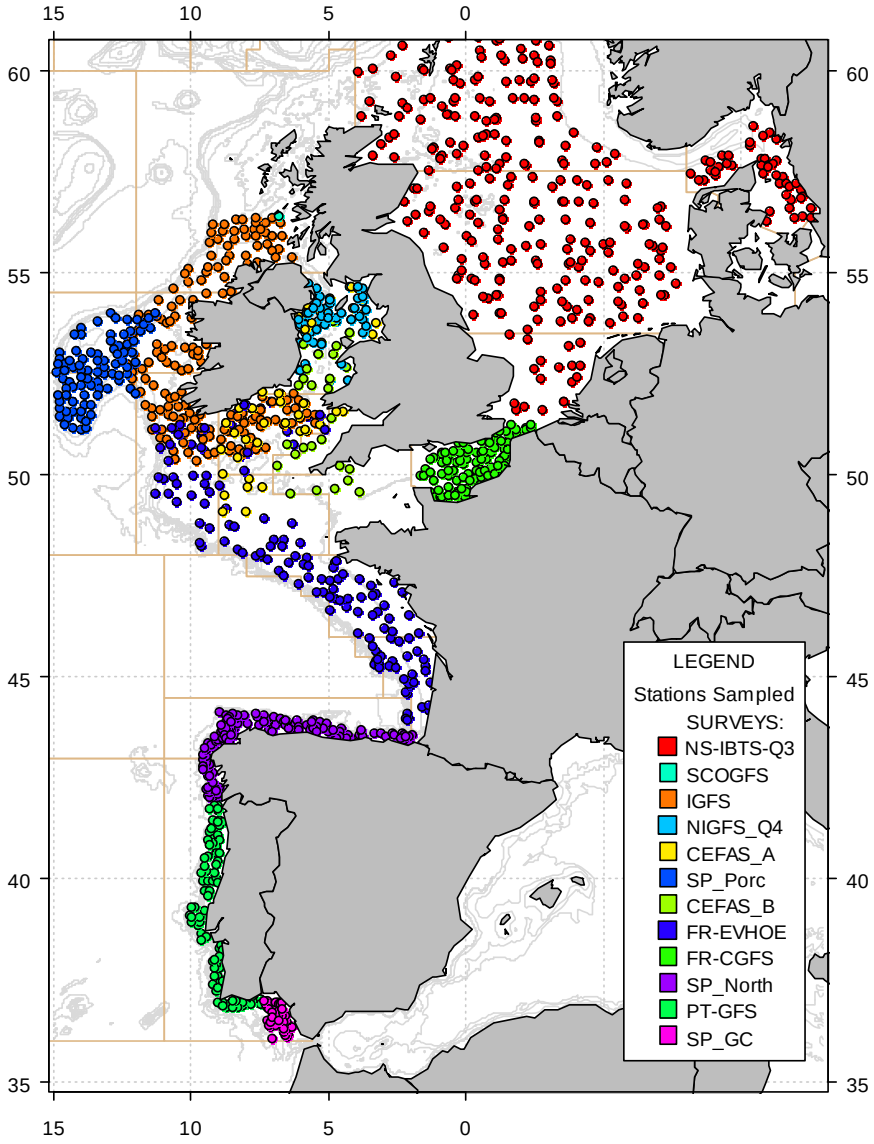


Figure 4.4.1. Station positions for the IBTS Surveys carried out in the Northeastern Atlantic and North Sea area in summer/autumn of 2010.

Maps from 2010 do not contain the hauls from Scottish surveys (Western division and Rockall survey) due to major breakdown of research vessel (see Section 4.3).

5 Age structured survey data. Trawled area (ToR b)

ToR b) Review of age-structured survey data as a data quality exercise previous to species scheduled for benchmark assessments using survey based assessment exploratory plots, considering the possible impact of the use of the trawled area as effort estimate;

5.1 Introduction

A general overview of internal consistency across IBTS haddock indices was presented for both individual national surveys as well as the North Sea combined index. During that exercise availability and reliability of data were flagged as an issue. That said, a recommendation followed to continue with the review process as a channel for survey managers and assessment scientists to communicate relevant background information on survey data quality.

To focus the process it was agreed to follow species identified through the benchmark process which for 2011 resulted in megrim being selected. Again data were difficult to obtain directly and understandably survey managers assume data are available through DATRAS. During initial analysis in spring several further anomalies were identified in the survey data and no progress was made in re-constructing the ALK's produced by DATRAS which was highlighted last year as a significant source of bias in constructing the indices.

Given the initial rate of progress it was decided to concentrate on documenting the anomalies encountered in the megrim data downloaded from DATRAS. There has been productive communication with the DATRAS team in relation to survey data quality issues. A short list of simple SOP type checks is being compiled to enable ongoing monitoring of potential errors, especially for key parameters that might affect the raising of survey data.

A "tentative" megrim dataset for area VIa, VIb and IVa has been constructed and is currently part of the benchmark process within WGCSE. Aged data for megrim has not proved reliable in an assessment context so a surplus production type process is being applied to modelled weight data as individual weights were either not available or reliable. High variance in the data has partly delayed conclusion of the analysis, but a draft document has been circulated and an agreed version will be reported as part of this ToR for 2012. In addition an update on improvements in the quality and checking of survey data held in DATRAS will also be presented within next year ToR d) See Annex 3.

6 Gear performance sweeps length (ToR c)

ToR c) Further examine the quality of gear performance by reviewing and analysing net geometry readings and warp out to depth ratio to evaluate changes and possible trends. evaluate the effects of sweeps length on net geometry;

6.1 Sweeps

6.1.1 Introduction

In the IBTSWG 2010 report it was outlined how vessels contributing to the North Sea IBTS combined indices appear to display significant variation in their relative trawl sensor data held in the ICES survey database (DATRAS). Countries adhering to the depth/warp ratio recommended in the manual achieved a higher door spread and a lower headline height than predicted in the manual and this pattern exacerbates with depth. Conversely, countries using a shorter warp to depth ratio (scope) than suggested can obtain the door spread and headline parameters within the ranges predicted in the IBTS survey manual.

As highlighted in last year report, variation in trawl geometry has two main consequences:

i) An unavoidable alteration of the sampling unit – Swept-Area

ii) A change in the bridle angle or 'Angle of Attack' (Godø, 1994) of the trawl which is key to herding - Catchability

Swept-area is quite precisely measurable and therefore a simple correction can be applied to standardize the unit of effort. While large shifts in survey effort do have implications and are not desirable (Somerton *et al*., 2002, Battaglia *et al*., 2006), moderate correction to survey data for variation in time or distance towed or other effort metric is generally considered routine.

Catchability in contrast involves interactions between fish, sampling gear and the environment is quite complex (Godø *et al*., 1999, Pennington and Godø, 1992, Sissenwine and Bowman, 1978, Von Szalay and Somerton, 2005, Engås, 1994, Pennington and Godø, 1995). Trawl doors and sweeps generally produce sand clouds as they move across the seabed and where these clouds coincide with the bridles angles and extend as far back as the trawl itself they can significantly enhance the herding effect in a correctly set up demersal trawl (Main and Sangster, 1979, Main and Sangster, 1981). Conversely this effect can be lost as geometry changes through design. Catchability is also depth specific (Jacobson *et al*., 2001, Godø and Engås, 1989, Bertrand *et al*., 2002) as well as often species and length specific (Fryer *et al*., 2003, Pennington *et al*., 2002, Munro and Somerton, 2001).

6.1.2 Method

The initial scope of this TOR was to review trawl sensor data for surveys coordinated within the North Sea combined index. These surveys in particular assume as a prerequisite constant catchability (q =1.0). However, discussion during the meeting led to a step back from comparing specific individual measurements to re-focus on the rationale behind monitoring trawl geometry. The ability to monitor trawl geometry in real time is comparatively recent in terms of the history of the IBTS surveys, and is important to ensure the trawl is operating in a predictable and efficient manner, in turn suggesting good ground contact and stable catch efficiency.

While ground contact is not available as a direct measurement for many surveys as yet, bridle angle is relatively straightforward to calculate and directly linked to it. The attack angle is the angle formed between bridles/sweeps and the direction of the tow (Figure 6.1.1.). The method used for calculating the bridle angle uses the sweep + bridle length added to the footrope length to form a right angled triangle, with half the door spread as the base. The sweep length here includes a general measurement for backstrops as provided in the IBTS manual.

Sin α = ½ door spread / (sweep length + footrope length)

(http://www.seafish.org/media/462684/fs40_01_10_bridleangleandwingendspread.pdf)

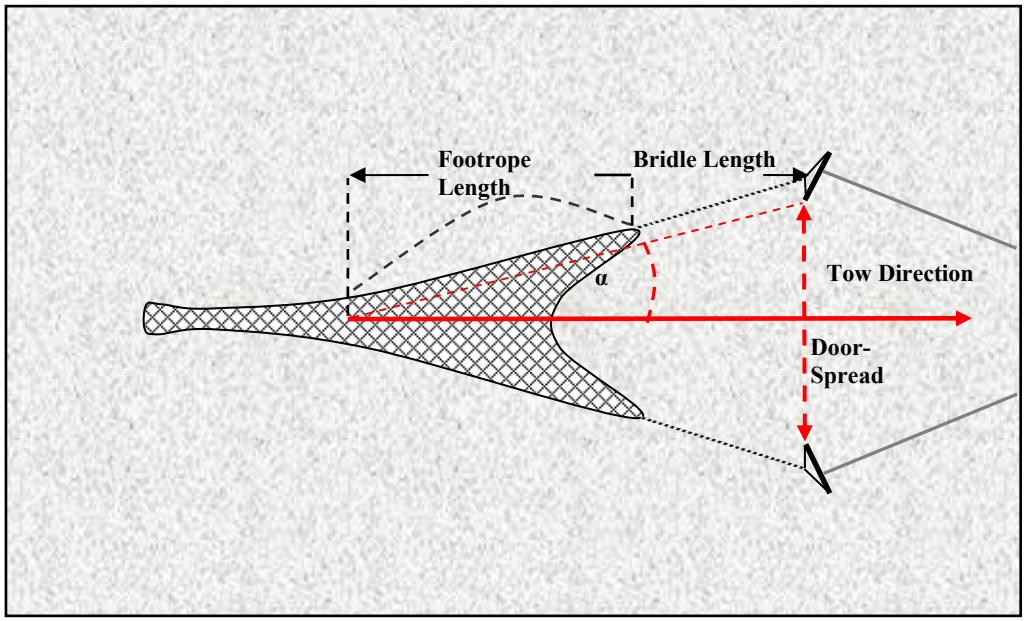


Figure 6.1.1. General otter trawl schematic illustrating the main geometry measurements involved in calculating bridle (Attack) angle.

In the introduction it was reiterated that vessels are having to compromise on recommended scope ratios in the IBTS manual in order to maintain recommended trawl geometry, or vice versa. Scope will be a main driver over bridle angle and therefore calculations were done for a limited depth range (85m ± 5m) to remove the effect of depth while leaving a reasonable amount of comparable data.

Box plots of bridle angle by country at fixed depth are presented in Figure 6.1.2. Mean bridle angle varies between countries and all are higher than the predicted angle at this depth (c.16 deg). The attack angles presented are quite high, but not beyond angles regularly employed in Scandinavia for example (c.30 deg – N. Graham pers. comm.). Calculating angles from the predicted trawl geometry in the IBTS manual gives angles between 15–19 deg. Variation within surveys is reasonably precise however; suggesting year on year catchability is stable.

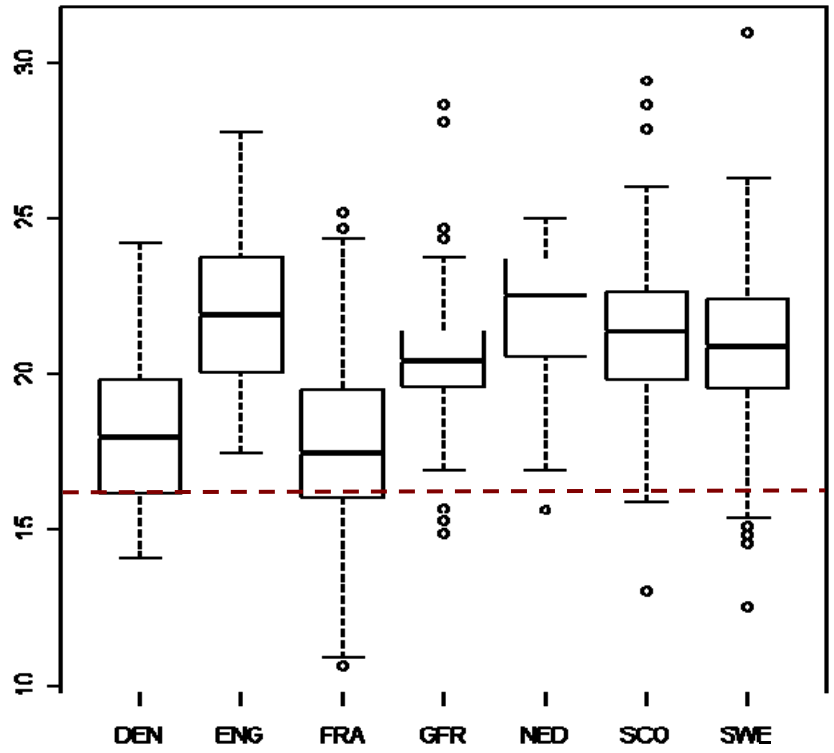


Figure 6.1.2. Box plots of median bridle angle (box mid-line); 25th and 75th percentile (box floor and roof); and potential outliers (beyond the whiskers).

6.1.3 Discussion

The current TOR arose in response to observed variation in bridle length, scope ratio and trawl geometry values in DATRAS and it's likely impact on survey standardization (assumed q=1.0). Observed values are seen to deviate from those predicted in the IBTS manual which were derived historically as a guide. A key report on tests of a model GOV 36/47 at the Danish Institute of Fisheries (Wileman, 1984) also highlights the significant influence of the drag of different trawl construction materials utilized across countries. More significantly it points to a potential difference in trawl door spreading force of -13% to +73% between the doors used on IBTS vessels at the time, from the ones recommended in the manual. It is therefore likely that the guide values in the IBTS manual are not necessarily achievable across all vessel + door + trawl combinations.

Changes in trawl parameters will unequivocally instigate a change in the sampling unit, but this is a simple correction to be made to survey datasets. In contrast, the importance and complexity around catchability make changes to geometry within a standardized survey time-series as difficult to implement as it is to ignore. Calibration will help alleviate the impact of gear changes, but can be a significant undertaking to be conclusive and therefore a degree of pragmatism needs to be applied by the survey manager.

6.1.4 Recommendations

The ToR expanded somewhat during the recent meeting which was constructive, but left limited time for detailed discussion or agreement. However, three aspects are proposed for discussion within the labs intersessionally:

1) The graphs of predicted gear parameters for the GOV in the IBTS manual are likely to be inappropriate for at least some vessels at this point and act as a guide only. This section should be augmented by a general schematic and overview of calculations applicable to maintaining catchability. This will afford survey leaders some flexibility to make adjustments to their vessel-gear configuration if needed, while evaluating and hopefully minimizing changes in trawl efficiency.

2) Should survey leaders feel strongly that, either by temporary accident or historical drift, their survey requires an immediate adjustment in trawl deployment; this obviously needs to be documented by IBTS in the first instance. Where neighbouring or historical survey data are available changes should be presented in that context to provide at least some quantification for IBTS to comment on for subsequent data users. Subsequent surveys should allocate a number of tows for inter- or intra-calibration so that at a reasonable length frequency analysis for index species can be concluded at a minimum.

3) Given the importance of maintaining constant catchability within standardized surveys, and the fact that some inter survey variation may have evolved it is important to try to address the request from WGNSSK for sensitivity analysis. Trawl geometry may be area/vessel specific and therefore clear survey specific information should be available where a vessel is required to be replaced in the short or longer term. The vessel to be used should therefore attempt to replicate the trawl geometry of the historic vessel in as far as is practical, and this is likely to include door adjustments and possibly exchange, as well as scope and other more detailed adjustment.

6.2 Warps

A limited number of gear trials were undertaken during the final leg of Irish Groundfish Survey (IGFS) in quarter 4, 2010. These focused on warp to depth (scope) ratio and were in response to two main issues identified in IBTSWG 2010:

1) A review of IBTS gear geometry data at IBTS 2010 (Tor C), and subsequent discussion of the influence on gear geometry of different warp to depth ratios.

2) Absence of a recommended scope ratio in the IBTS manual beyond 350m depth, common in IBTS western area surveys.

Like many fisheries surveys, those coordinated by IBTSWG rely heavily on the assumption of fixed, or at a minimum, highly controlled catchability so that catch data can be compared across vessels and areas. As a result, fishing gear and procedures need to be documented, agreed and implemented across surveys. To this end the IBTS Manual contains a number of graphs for guidance on expected scope, door to warp and headline to warp ratios (ICES, 2010b) for the GOV 36/47 survey trawl.

Recent review of historical data in the ICES survey database, DATRAS, indicated that the values experienced by vessels in the field differ significantly from the expected

values graphed in the manual (see ICES, 2010a, Section 6 ToR c). Trawl geometry is highly dependent on the ratio of warp to depth and the surveys achieving this recommended scope ratio were unable to achieve the recommended door spread and headline heights. Conversely, vessels reporting the desired trawl geometry had to employ alternative scope ratios.

In addressing the issues of trawl geometry, two related questions arise. First, with developments in trawl and warp materials, vessel power etc., is the historic scope ratio appropriate for the current GOV survey trawl? Second, are the graphs of door spread and headline height in the IBTSWG manual in terms of warp appropriate? If we accept scope may need to evolve to maintain gear geometry at a given depth, and knowing door spread and headline height depends on scope, problems with one variable will unavoidably be reflected in the other two. Therefore, as was discussed in IBTS 2010, if a decision is made to prioritize gear geometry over scope, what indeed is the correct geometry for a given depth if it has been previously given in terms of the dependent variable of scope? In other words, what is the desired trawl geometry?

It is relatively simple in the short term to address standardizing gear geometry by adjusting scope to achieve historic geometry values. However, scope greatly affects ground contact in addition to door spread and thus a change in warp length at a given depth will undoubtedly affect ground contact to some degree and therefore catchability. The objective with the IGFS gear trials was to evaluate the critical scope ratio for the IGFS GOV trawl. This meant establishing the critical point beyond which the trawl would lift off the seabed across the range of depths encountered by the survey.

6.2.1 Methodology

A series of seven tows at a range of depths was undertaken at night, after survey operations were completed for the day. To minimize variability of the drag of the trawl due to spatial differences in catch, the codend was left open. This also limited the additional work to deck crew and scientists.

The trawl was initially shot at a commonly used, generic warp to depth ratio of 3:1 at the time of shooting the gear. Once the trawl had settled warp was incrementally paid out, or hauled back, until the point at which the trawl become unstable and appeared 'light on the ground'. Any further reduction in warp would (and often did) cause the trawl to leave the bottom. Once the lift off point was established, small increments of warp were paid out to obtain a minimum scope value that would ensure stable ground contact and geometry.

Trawl geometry and bottom contact was monitored by remote telemetry using SCANMAR distance, trawlspeed/symmetry, trawlsounder and trawleye sensors. In addition, ground contact was logged for post-processing by a footrope mounted ground contact sensor. Vessel speed was maintained at 4 knots and the trawlspeed sensor monitored to ensure no significant tidal or cross currents acting at the trawl.

6.2.2 Results

Net sensor data were logged for the seven test hauls which ranged in depth from approximately 38m to 760m. Data for headline height and footrope clearance for an example haul are given in Figure 6.2.1. Adjustments to the warp were observed to take from approximately 1–2min, but up to 4–5min to take effect at the trawl, depending on water depth.

To simplify data logging the sequential survey haul numbering was maintained for the test tows hence Haul 150 presented was in fact the second test tow. Haul 150 was initially shot at 3:1 with 525m of warp in 175m water. The trawl had settled on the seabed by approximately 20:05 and the scope at that point was 2.9:1. At 20:10 the warps were hauled back by 50m and the delayed effect on headline can be seen about 3–4min later with an increase of over 1m (Figure 6.2.1).

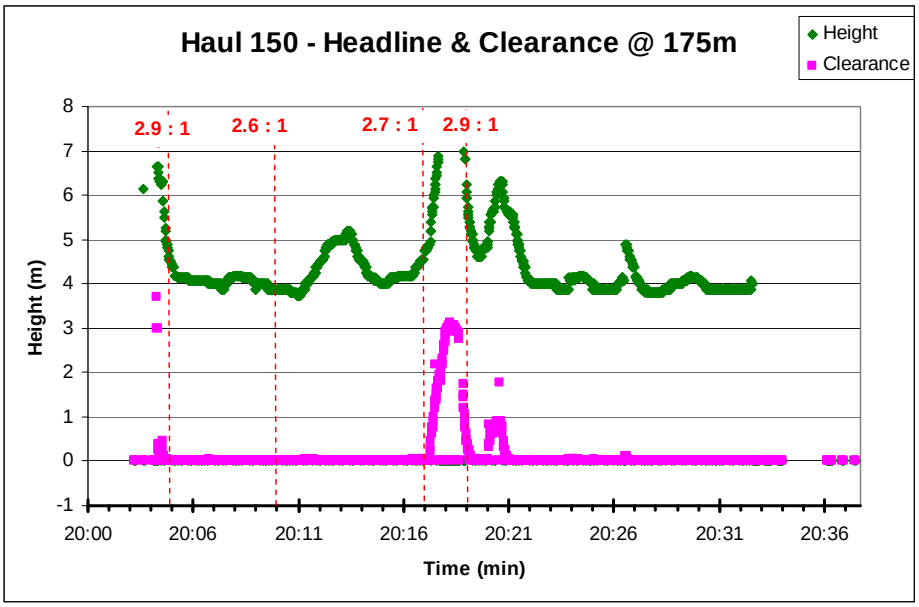


Figure 6.2.1. Plot of headline height (green line) and footrope clearance (purple line) for the second trial tow. Vertical dashed lines indicate the time at which warp was adjusted on the bridge and the scope ratio it would effect.

Initially the gear settled down again, but door spread narrowed continually afterward as the gear presumably dug in and tension increased on the warps (Figure 6.2.2). At 20:17 warp was increased to 500m and given the limited response a further 25m was paid out at 20:19 bringing the scope back to approximately.

2.9:1.

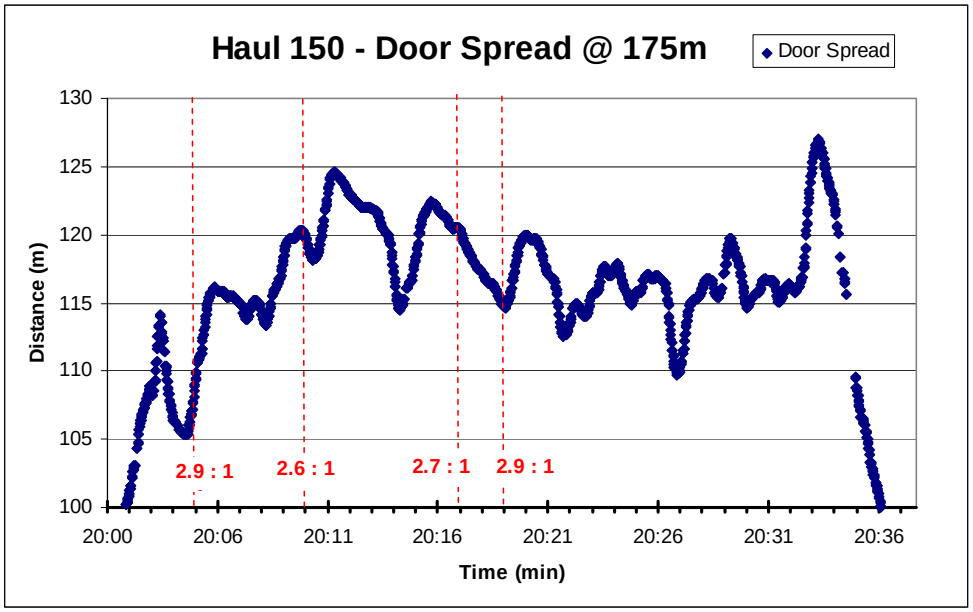


Figure 6.2.2. Plot of door spread (blue solid line) for the second trial tow. Vertical dashed lines indicate the time at which warp was adjusted on the bridge and the scope ratio it would effect.

The GOV settled back on the seabed and showed the characteristic increase in door spread and dip in headline height at 20:20. Apart from the unexplained anomaly at 20:27 the gear remained stable. A further 25m of warp was then added to ensure good contact could be maintained with this warp to depth ratio in more adverse weather or bottom type conditions. The final ratio for this tow was therefore 525m with a door spread of *circa*. 117m. The recommended IBTS scope is 640m with an expected door spread of just less than 90m (+/- c.8m). The expected door spread at the 525m employed is between 76m and 96m.

Figure 6.2.3 gives a summary of the final scope ratio data for the 7 hauls undertaken. Given the small number of data points at this stage the power function fitted trend line gives only a provisional indication of the likely relationship between depth and critical warp length. The important aspect at this initial stage is whether there is a difference in the shape of the curves. This would suggest the potential for proportionately different scopes at a given depth which may have implications for the relative degree of ground contact at different depths. In other words, a warp to depth function that was close to critical in deep water, but deployed significantly more warp than critical in shallow water is likely to ground and perform better under a range of conditions in coastal stations.

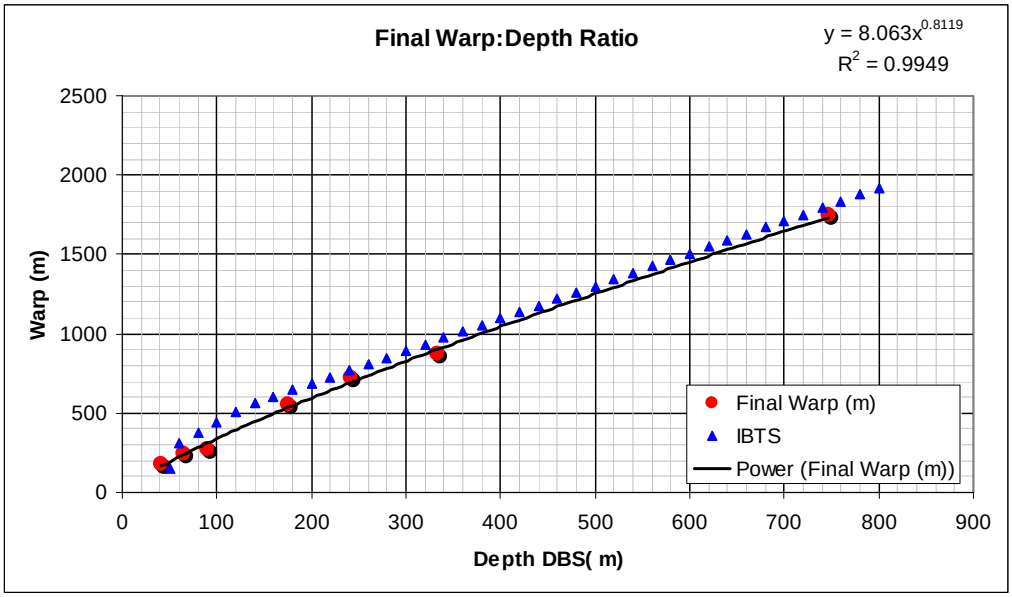


Figure 6.2.3. Summary of the final scope ratio in the 7 hauls performed (red dots correspond to the final warp for each haul).

As a comparison the predicted scope from the trial hauls are compared to the IBTS recommended, as well as historical data from DATRAS for France and Scotland in Table 6.2.1. The differences in the final column suggest a greater difference between recommended and critical scope exists in shallow water than at depth.

Table 6.2.1. Tabulated results of linear trend function passed through IBTS recommended scope ratios, historical data for France and Scotland from DATRAS and the trial haul data from the IGFS2010 (model column). The final column gives the difference in meters between the IBTS and the Model columns.

Depth	IBTS	Ratio	Scotia	Ratio	France	Ratio	Model	Ratio	Diff
80	380	4.8	271	3.4	328	4.1	283	3.5	-97
100	444	4.4	330	3.3	378	3.8	339	3.4	-105
120	503	4.2	388	3.2	427	3.6	393	3.3	-110
140	560	4.0	446	3.2	477	3.4	446	3.2	-114
160	605	3.8	505	3.2	526	3.3	497	3.1	-108
180	646	3.6	563	3.1	576	3.2	546	3.0	-99
200	687	3.4	622	3.1	625	3.1	595	3.0	-91
220	728	3.3	680	3.1	675	3.1	643	2.9	-84
240	769	3.2	738	3.1	724	3.0	690	2.9	-78
260	810	3.1	797	3.1	774	3.0	737	2.8	-73
280	851	3.0	855	3.1	824	2.9	782	2.8	-68
300	892	3.0	914	3.0	873	2.9	827	2.8	-64
320	933	2.9	972	3.0	923	2.9	872	2.7	-61
340	974	2.9	1031	3.0	972	2.9	916	2.7	-58
360	1015	2.8	1089	3.0	1022	2.8	959	2.7	-55
380	1056	2.8	1147	3.0	1071	2.8	1002	2.6	-53
400	1097	2.7	1206	3.0	1121	2.8	1045	2.6	-52
420	1138	2.7	1264	3.0	1170	2.8	1087	2.6	-50
440	1179	2.7	1323	3.0	1220	2.8	1129	2.6	-49

Depth	IBTS	Ratio	Scotia	Ratio	France	Ratio	Model	Ratio	Diff
460	1220	2.7	1381	3.0	1269	2.8	1171	2.5	-49
480	1261	2.6	1440	3.0	1319	2.7	1212	2.5	-49
500	1302	2.6	1498	3.0	1369	2.7	1253	2.5	-49
520	1343	2.6	1556	3.0	1418	2.7	1293	2.5	-49
540	1384	2.6	1615	3.0	1468	2.7	1333	2.5	-50
560	1425	2.5	1673	3.0	1517	2.7	1373	2.5	-51
580	1466	2.5	1732	3.0	1567	2.7	1413	2.4	-53
600	1507	2.5	1790	3.0	1616	2.7	1452	2.4	-54
620	1548	2.5	1848	3.0	1666	2.7	1492	2.4	-56
640	1589	2.5	1907	3.0	1715	2.7	1531	2.4	-58
660	1630	2.5	1965	3.0	1765	2.7	1569	2.4	-60
680	1671	2.5	2024	3.0	1815	2.7	1608	2.4	-63
700	1712	2.4	2082	3.0	1864	2.7	1646	2.4	-65
720	1753	2.4	2141	3.0	1914	2.7	1684	2.3	-68
740	1794	2.4	2199	3.0	1963	2.7	1722	2.3	-72
760	1835	2.4	2257	3.0	2013	2.6	1760	2.3	-75
780	1876	2.4	2316	3.0	2062	2.6	1797	2.3	-78
800	1917	2.4	2374	3.0	2112	2.6	1834	2.3	-82

Graphically the trial data appears not too dissimilar to the IBTS recommended, but in shallower waters this difference increases (Figure 6.2.4). A more formal fitting of models needs to be carried out to be conclusive however. Differences between critical scopes found on the IGFS2010 and other countries historical data does appear significant however. This is both in terms of warp to depth ratio, but of equal importance in the current context is the significant difference between the scopes employed and the door spreads/headline heights expected in the IBTS manual.

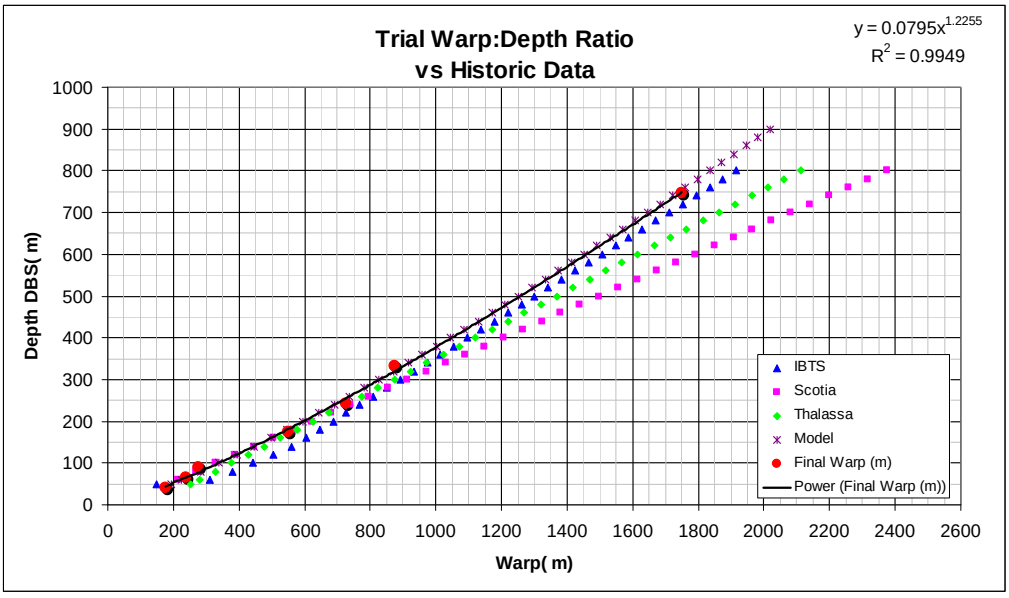


Figure 6.2.4. Plot of linear trends from historic data from France (green diamonds) and Scotland (purple squares). Compared with Recommended IBTS scope (blue triangles) and results of the final warp deployed at the test tows (red circles). The power trend line for the trial data are shown as a solid line.

6.2.3 Discussion

The data presented is limited and comparative data not robustly modelled as yet, but there appears to be clear differences between relationship of warp to depth between vessels, and also between IBTS vessels and that recommended in the manual. In attempting to standardize it is important to know what gear geometry to expect in relation to an independent variable such as depth. The alternative is to adjust scope to produce a historical door spread for example that was itself a function of a scope.

While making changes to existing standardized time-series is difficult, it is important to evaluate any potentially significant sources of bias in survey data and have that information available to survey managers and users of the survey data. If setting up a new survey it would also be important to evaluate the specific characteristics of the vessel and gear to be used, rather than strive for historic target parameters that may not be achievable or compromise an optimal survey design.

Survey data are expensive to collect, increasingly critical to fisheries management and also inherently variable. In moving the issue forward, and as introduced in the section above on bridle angles, it would be useful to evaluate further how current attack angles are varying with depth. Likewise what range of gear parameters to expect for IBTS vessels to maintain a specific bridle angle?

For species with a wide depth range in particular, where catchability may vary significantly over that range, it will be important to evaluate further the issues above. This should help ensure that changes in relative abundance are not confounded with changes in relative catchability due to a temporal shift in distribution. Understanding of the issues around trawl surveys need not necessitate an immediate modification to critical procedures; much can be done by simply helping data users and analytical models predict why data may be behaving in a certain way.

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7 Quality of the Database (ToRs d) and e)

ToR d) Improve the quality of historical biological data by (i) examination of DATRAS data to identify erroneous records, with a focus on (a) lings: Molva molva, M. dipterygia and M. macrophthalma; and (b) gobies. Gobiidae, and (ii) review national progress in correcting and re-uploading the corrections of the errors found during national and IBTS quality checking;

ToR e) Improve the quality of newly collected biological data by (i) the production and dissemination of identification keys. (ii) the examination of DATRAS data collected during Q3–4 2010/Q1 2011 surveys to identify and correct erroneous HL- and CA-records;

7.1 Introduction

Given the concern over the accuracy and consistency of some of the data for taxonomically problematic fish species held in DATRAS (see Daan 2001; ICES 2007–2010; ter Hofstede and Daan, 2008), IBTSWG is continually trying to improve both historical data and establish methods for improving species identification in ongoing surveys.

IBTSWG had the following ToRs with regards data quality issues:

a) Improve the quality of historical biological data by (i) examination of DATRAS data to identify erroneous records, with a focus on (a) lings: *Molva molva, M. dipterygia* and *M. macrophthalma*; and (b) gobies. Gobiidae, and (ii) review national progress in correcting and re-uploading the corrections of the errors found during national and IBTS quality checking;

b) Improve the quality of newly collected biological data by (i) the production and dissemination of identification keys. (ii) the examination of DATRAS data collected during Q3–4 2010/Q1 2011 surveys to identify and correct erroneous HL- and CA-records;

IBTSWG is aware that some laboratories may have corrected some of their national databases, but not yet uploaded the corrected data to DATRAS. Those laboratories that have not yet undertaken detailed quality checks for these case study taxa (and other problematic groups) could usefully refer to Daan (2001) and ICES (2007) for information on other potential errors.

7.2 Survey data for lings (*Molva* spp.)

The European Register of Marine Species currently accepts three species of ling: Common ling *Molva molva* (Linnaeus, 1758), Spanish ling *Molva macrophthalma* (Rafinesque, 1810) and blue ling *Molva dypterygia* (Pennant, 1784). The taxonomic status of the latter two species has been unclear, with Cohen *et al.* (1990) treating them as geographical variants of one species (*M. dypterygia*), and Svetovidov (1986) considering them to be subspecies. Given that many records for these two species are confounded, it is difficult to accurately identify the geographical distributions of the two species, although the larger-bodied blue ling tends to be most abundant in the northern parts of the ICES area (e.g. Subarea VI), and Spanish ling tends to be more commonly encountered in the southern part of the ICES area, with the distributions overlapping.

7.2.1 Records of *Molva* spp. from the North Sea IBTS

Data on ling (1990–2011) were downloaded from DATRAS (22/03/2011). Three nations have recorded blue ling in the North Sea IBTS. Norwegian and English records

are from the northern parts of the North Sea (58.2–61.7°N), and this is within the distribution range of blue ling. There are two French records of blue ling (Q3 1994, and Q1 1995) from latitudes of 52.1–55.5°N, which could usefully be checked.

7.2.2 Records of *Molva* spp. from the Atlantic continental shelf

Data on ling from the wider NE Atlantic were examined spatially. Data from the ALT-IBTS (1997–2010, Q1 and 4), SPPGFS (2001–2010 Q3/4), EVHOE (1997–2007 Q4), North Sea IBTS (1997–2007 all Quarters) and SPNGFS (1997–2007 Q3/4) were examined. Data from these surveys were plotted (Figure 7.1), and clearly highlight that *M. dypterygia* is a more northerly species, occurring mainly in sub-area VI and with occasional records from the deeper parts of IVa and occasional specimens west of Ireland (VIIb–c), where the distributions of the two species overlap. *M. macrophthalmus* is a more southern species and records from the west coast of Ireland (including Porcupine Bank) to the Cantabrian Sea considered valid. The nominal records of *M. dypterygia* from the EVHOE survey should be updated to *M. macrophthalmus*, as also indicated in the WD4 presented by Bertrand *et al.* (2011) See Annex 5. These changes are necessitated by the updated taxonomy of the species, as they were previously considered subspecies.

Records of *M. molva* indicate that the species is widespread on the continental shelf, although the record from the southern North Sea (Denmark, 2005) could usefully be checked.

Data from Portuguese surveys have reported *Molva molva* and *Molva* spp., although only small numbers are taken (<10 specimens of each in the last 20 years).

7.3 Survey data for gobies (Gobiidae)

Numerous species of goby occur in the ICES area (Table 7.1) and although some species are relatively distinctive, other species and genera are small-bodied and difficult to identify accurately.

7.3.1 Records of goby from the North Sea IBTS (Q1 and Q3, 1990–2011)

Data on gobies (Q1 and Q3, 1990–2011) were downloaded from DATRAS (22/03/2011). These data have been analysed by nation (Table 7.2) in order to gauge consistency o in reporting and potential errors.

Denmark: Danish records for gobies have been for either *Pomatoschistus minutus* or Gobiidae. These have often been interchangeable. Data for *Pomatoschistus* would be better reported as genus. Large numbers in 2009 should be checked.

England: Data traditionally reported as Gobiidae. In recent years attempts have been to collect species-level information, except for *Pomatoschistus* (to genus level). Data for *Pomatoschistus* spp. prior to 2008 are currently lacking on DATRAS, as these data could not be uploaded at the time. English surveys have not reported *L. friesii* in the North Sea, although this species has been reported in other national surveys outside the North Sea (Irish Sea beam trawl survey, and the westerly IBTS).

France: Most data recorded at family level. Data for other species (which are large gobies) possibly erroneous, as these data are usually for a small length and the record of *L. friesii* is from 31F2, which would be unusual for a species that inhabits *Nephrops* grounds.

Germany: Gobies often reported as *Pomatoschistus minutus*, although these data may include other *Pomatoschistus* spp.

Netherlands: Data not reported consistently. Many records are for *Pomatoschistus* spp. Records of *Gobius* spp. (Q3, 1991) indicates wrong use of genus (instead of family) as the numbers reported and size range (2–6 cm) would indicate sand gobies (P*omatoschistus* spp.). Large numbers of *Aphia* (2004) could usefully be checked.

Norway: Norwegian surveys have only reported small numbers of gobies in two years. The reasons for the near absence of gobies from this survey are unclear.

Scotland: Contrasting use of *Pomatoschistus minutus* and *P. microps*. Data could usefully be reported as *Pomatoschistus* spp.

Sweden: Contrasting reporting of *Lesueurigobius* and *L. friesii*, although there is one species in this genus in the area. Contrasting reports of *Pomatoschistus* spp. and *P. minutus.* Large catches of *Aphia* (2009–2010) could usefully be checked.

Examinations of length distributions also highlighted a small number of potential errors

Aphia minuta (1–5 cm length range): Although misidentifications (e.g. with *Crystallogobius* or *Pomatoschistus*) is likely, no obvious outliers in terms of size

Buenia jeffreysi (5 cm): Within expected size range

Crystallogobius linearis (3–5 cm): Within expected size range

Gobius cobitis (9 cm): Within length range, but species not expected in the area (England, Q1, 2002).

Gobius niger (4–16 cm): Within expected size range, although some sand gobies may be included in the smaller part of the size range.

Lesueurigobius friesii (3–14 cm): Within expected size range

Pomatoschistus spp. (mostly 2–9 cm): Within expected size range. There are records of *P. minutus* of 19 and 55 cm. These German records (1992, 2000) are considered erroneous.

7.3.2 Records of goby from the EVHOE survey (Q4, 1997–2007)

Several issues regarding gobies in the French survey of the Bay of Biscay and Celtic Sea (Table 7.3) are apparent.

- The sporadic occurrence of *Aphia minuta* in relatively large numbers should be investigated.
- This survey has not reported *Crystallogobius,* although this small goby is caught frequently in English surveys in the Celtic Sea.
- This survey has not reported *Buenia jeffreysi,* although this small goby (which is superficially similar to *Pomatoschistus*, is caught frequently in English surveys in the Celtic Sea.
- *L. friesi* was caught in large numbers for much of the time-series, with far fewer in 1998, which is a cause of concern.
- Three species of *Pomatoschistus* were reported. Whereas *P. minutus* is common in the inshore waters of the area, the nominal records of this species in deeper survey stations likely results from confusion with *Buenia jefferysi* and *P. norvegicus* (which is an offshore species).

7.3.3 Data from Portuguese surveys

Portuguese surveys have reported gobies at either the family or species level, with four species recorded: *Deltentosteus quadrimaculatus, Lesueurigobius friesii, L. sanzoi* and *Pomatoschistus minutus* (Table 7.4).

Four-spotted goby *Deltentosteus quadrimaculatus* was only reported in one year. The genus *Lesueurigobius* is represented by at least two species in Portuguese surveys (*L. friesii* and *L. sanzoi*), although in many years either one species or the other is reported, and it is unclear if these two species are consistently separated accurately.

As with many surveys, *Pomatoschistus minutus* is reported in large numbers, although this will likely include other members of the genus *Pomatoschistus* as well as some other species. The reported size distribution for *P. minutus* includes several records of fish > 9 cm, which could represent other species.

7.3.4 Suggestions for use of goby data and future collection

The data examined for gobies is highly problematic, and this has implications as to the suitability of data on DATRAS for use in studies on the wider fish assemblage, including biodiversity and size spectra, which may be undertaken to inform on the Marine Strategy Framework Directive. Some gobies (e.g. *G. couchi, G. cobitis*) are of conservation importance, and some gobies may be proposed to be included within the biodiversity descriptor. Sand gobies are also a relatively important prey species in inshore areas, and so might be considered for inclusion within foodweb descriptors. However:

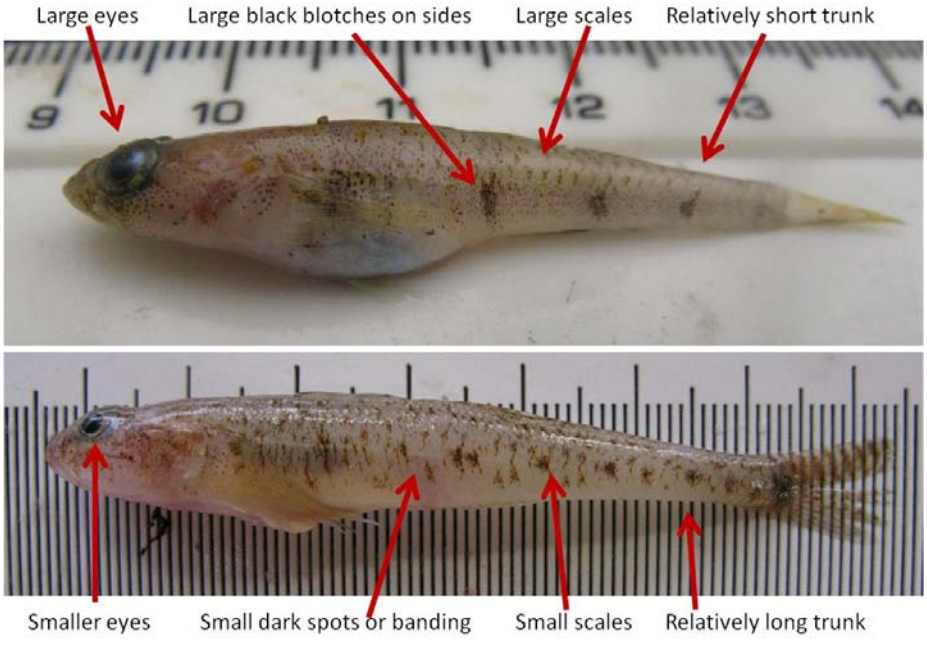
- Gobies are typically small-bodied, and so the GOV trawl is not an appropriate gear for sampling most species effectively. Nevertheless, large numbers of goby can be taken in some areas.
- Catch processing for gobies may be highly variable. Many gobies are small-bodied and/or cryptic species, and it is possible that some trawl catches are processed more thoroughly than others.
- The identification of (some) gobies is notoriously problematic, and not all surveys will have staff with sufficient experience with this group. Hence, data are reported to a variety of taxonomic levels (species, genus and family), and these data are collected inconsistently across both national laboratory and time.
- There is an apparent confusion between genus and family, and many data providers seem to have provided data for '*Gobius* spp.' instead of 'Gobiidae'. These taxonomic levels are not equivalent, and can lead to confusion. It is highly likely that data for sand gobies have erroneously been submitted as *Gobius* spp. instead of Gobiidae.
- Sand gobies of the genus *Pomatoschistus* are particularly problematic, and most data for these species are reported at a combination of species, genus and family level. Species-specific data are not considered to be reliable, as it is beyond the scope of IBTS to be able to confirm the identification of a suite of such similar species, especially when they can be taken in large numbers and catches can include juveniles.
- Fries's goby is distinctive, and should be reported to species level.
- Gobies within the genus *Gobius,* which are typically larger and have a shorter and stouter caudal peduncle than *Pomatoschistus*, should either be reported to species (if appropriate taxonomic expertise is available) or to

genus. Catches of these species are generally low, and national laboratories could consider retaining specimens for subsequent laboratory identification if expertise is not available during the survey.

IBTSWG recommend that in future:

Data for sand gobies of the genus *Pomatoschistus* are submitted to DATRAS at the genus level (TSN =171977), and not as individual species. It should also be noted that those nations fishing on offshore grounds check for the presence of *Buenia jeffreysi* in the samples, as these are often confused with sand gobies. Details on how these species can be separated are indicated below:

JEFFREY'S GOBY *BUENIA JEFFREYSI (TOP)*	SAND GOBY *POMATOSCHISTUS (BOTTOM)*
Snout slightly pointed	Snout slightly blunt
Eyes relatively large and close together	Caudal peduncle longer and narrower
25–30 scales along the body	>35 scales along the body
Row of 5 dark spots on sides	



7.4 Examination of recent DATRAS data (Q3–4, 2010; Q1 2011)

Data for the North Sea (Q3 2010, Q1 2011) were downloaded (30/03/2011) from DATRAS for examination. The species reported and the length ranges were examined for potential errors, although time constraints prevented a full examination of the geographical distributions.

IBTSWG recommend that these potential errors (Table 7.5) are investigated by national laboratories, corrected where appropriate and revised data re-uploaded to DATRAS.

The identified errors also include several instances in which data for a particular species is being uploaded using different TSN codes, and it is recommended that ICES

ensures that only data for the currently valid species names can be uploaded to DATRAS.

7.5 Chances for species identification monitoring and improvement

To assure the quality of species identification, training of personnel is essential. Often, countries carry out an identification workshop at the beginning of the survey to refresh species knowledge.

At IMARES, in both 2010 and 2011, species identification tests and workshops focusing on the fish and larger epifauna caught in demersal trawl surveys were organized for all employees. The main purpose of the workshop was quality assurance of species identification of demersal fish and benthos. The species to be identified were collected during the IBTS and beam trawl surveys and stored in the freezer.

During the 2011 test and workshop 26 (mostly demersal) fish species and 16 frequently found epibenthic species were identified. The species were put on two tables and numbered. For the test, all participants filled out a form, putting the species name to the number on the list. During the test it was not allowed to use any reference material for species identification. Participants were encouraged to mention on their forms distinctive identification criteria when there was potential doubt between two similar-looking species, as a measure for the knowledge of distinctive species characteristics. In a fieldwork situation, it can be expected that reference material available on-board is consulted in such cases.

Before the test, all participants were divided in three categories, based on experience and responsibilities. Their results were compared with the minimum requirements set for the expertise level. Each participant received an e-mail containing the individual test result. Most people matched the criteria set for their expertise level.

The results of the test and workshop in 2011 were in line with the 2010 workshop: the main problematic groups including skates and rays and rocklings.

A full report is available at groupnet.ices.dk/IBTSWG2011 and can also be requested from Ingeborg.deboois@wur.nl.

7.6 Production of identification keys

A draft photographic key covering many of the marine fish occurring around the British Isles was produced intersessionally. Wherever possible, photographs of freshly caught specimens have been used, although for less common species, specimens from museum collections have been photographed. To date this key illustrates approximately 230 species.

A draft PDF of this document will be provided to interested institutes for comment on its utility, but it should be remembered that the key is at a draft stage and it does not cover all the species that occur in the areas covered by IBTSWG.

7.7 References

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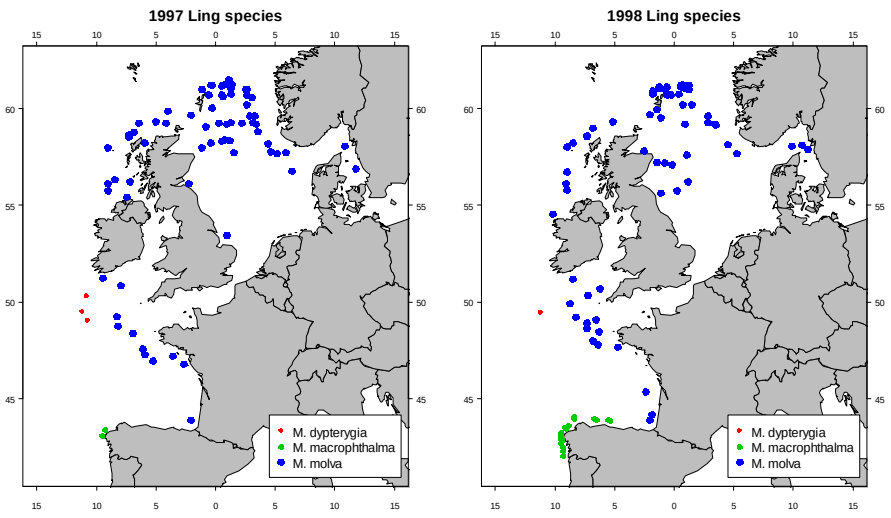

Figure 7.1. Distribution of ling *Molva* spp. in IBTS-coordinated surveys (1997–2010).

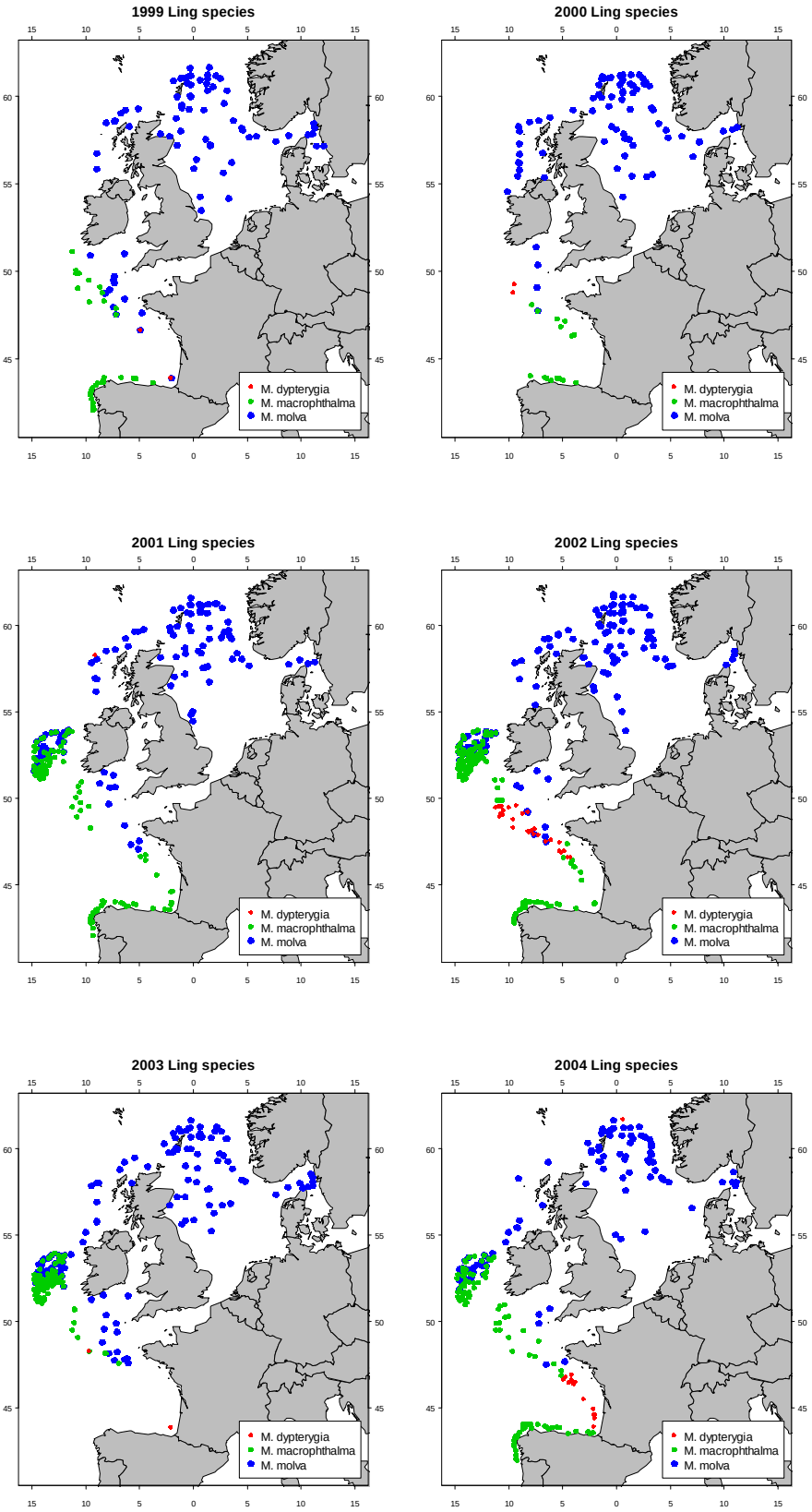

Figure 7.1 (continued). Distribution of ling *Molva* spp. in IBTS-coordinated surveys (1997–2010).

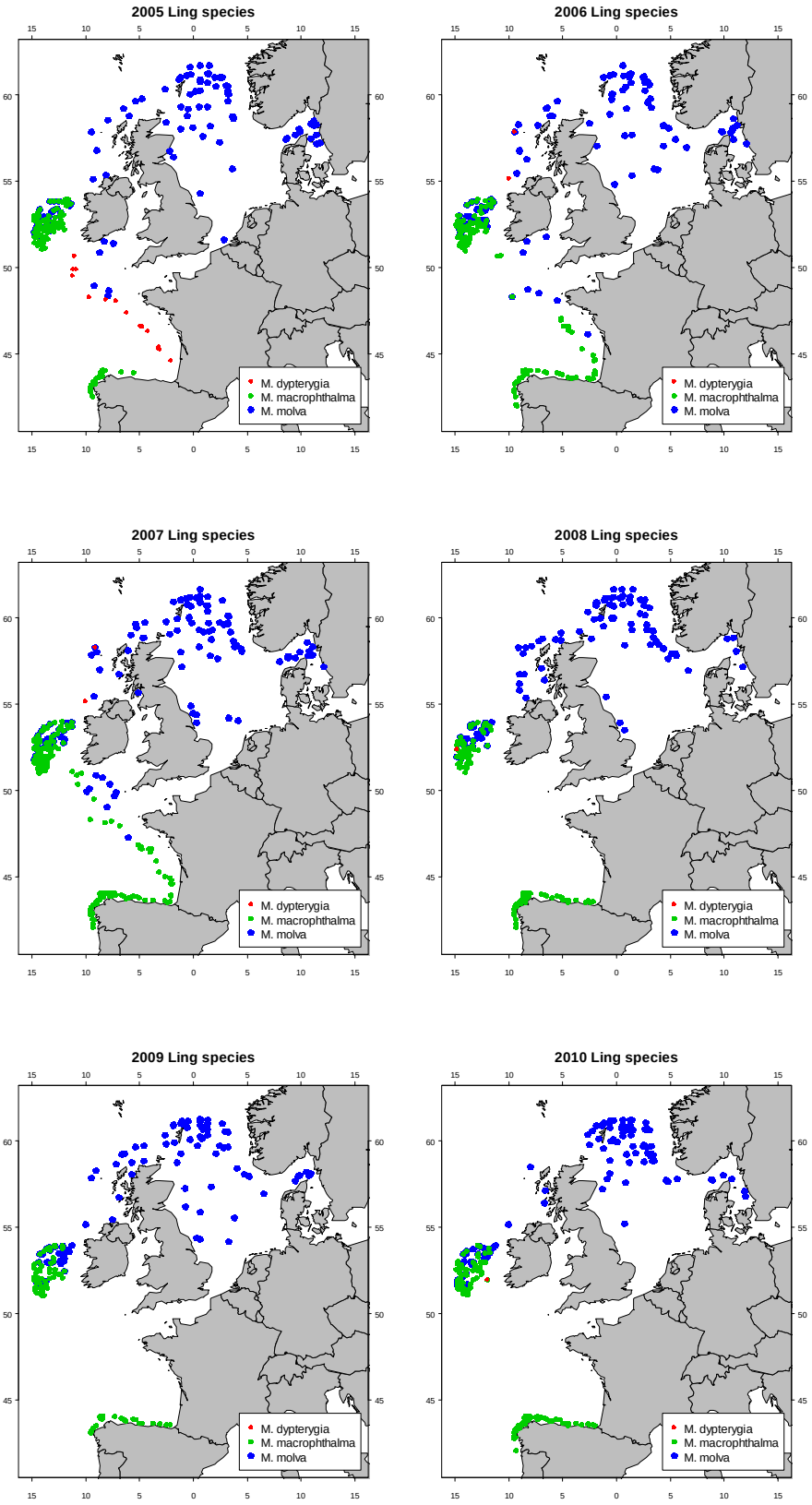

Figure 7.1 (continued). Distribution of ling *Molva* spp. in IBTS-coordinated surveys (1997–2010)

Table 7.1. Taxonomic list of gobies in the ICES area (IV–IXa). Adapted from Miller (1986).

Species name	North Sea IV	Hebridean Sea VI	Irish & Celtic Sea VIIa–c,f–k	English Channel VIId,e	Bay of Biscay VIIIa,b	Cantabrian Sea VIIIc	Gulf of Cadiz and Portuguese waters IXa	Comments
Aphia minuta	*	*	*	*	*	*	*	Recorded in various trawl surveys. Possible confusion with *Crystallogobius*
Buenia jeffreysi	*	*	*	*	?			Recorded in a small number of surveys. Small offshore species often confused with *Pomatoschistus*
Crystallogobius linearis	*	*	*	*	*	*	*	Recorded in various trawl surveys. Possible confusion with *Aphia*
Deltentosteus colonianus							*	Occur in Iberian waters
Deltentosteus quadrimaculatus						*	*	
Gobius auratus						*	*	Larger species of goby. Data often recorded to genus or species level, although data quality questionable. Some species have restricted geographical distributions or occur only in shallow water.
Gobius bucchichi							*	
Gobius cobitis			?	*	*	*	*	
Gobius couchi			*	*				
Gobius cruentatus			*	*	*	*	*	
Gobius gasteveni				*				
Gobius niger	*	*	*	*	*	*	*	
Gobius paganellus	*	*	*	*	*	*	*	
Gobius roulei							*	

Table 7.1 (Cont.) Taxonomic list of gobies in the ICES area (IV–IXa). Adapted from Miller (1986).

	North Sea	Hebridean Sea	Irish & Celtic Sea	English Channel	Bay of Biscay	Cantabrian Sea	Gulf of Cadiz and Portuguese waters	
Gobiusculus flavescens	*	*	*	*	*	*	*	Typically found in shallow inshore waters
Lebetus guilleti	*	*	*	*	?			Small-bodied gobies not typically recorded in surveys
Lebetus scorpioides	*	*	*	*	*			
Lesueurigobius friesii	*	*	*	*	*	*	*	One large species in north of IBTS area (*L. friesii*), which is often found on *Nephrops* grounds. Two smaller species in Iberian waters.
Lesueurigobius sanzoi							*	
Lesueurigobius suerii							*	
Pomatoschistus lozanoi	*	*	*	*	*	*	*	Small and abundant species that are difficult to discriminate.
Pomatoschistus marmoreus							*	
Pomatoschistus microps	*	*	*	*	*	*	*	
Pomatoschistus minutus	*	*	*	*	*	*	*	
Pomatoschistus norvegicus	*	*	*	*	?			
Pomatoschistus pictus	*	*	*	*	*	*	*	
Thorogobius ephippiatus	*	*	*	*	*	*	*	Often found in rocky inshore areas

Table 7.2. Reported catches of goby from North Sea IBTS (1990–2011).

Nation	Quarter	Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Denmark	Q1	*Pomatoschistus minutus*		45	172	-	-	-	350	14	-	-	2	-	660	-	1252	70	-	-	-	-	132
		Gobiidae		-	-	-	3440	425	-	304	-	20	1068	10	-	-	-	-	16	336	22	111	-
	Q3	*Pomatoschistus minutus*									-	3666	14	-	8	6215	8	10	-	-	10	6	
		Gobiidae									13	14	40	-	-	-	-	-	98	60	119125	-	
England	Q3	*Aphia minuta*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58	2	-	-	-	-	
		Buenia jeffreysi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	
		Crystallogobius linearis	-	-	-	-	-	-	-	-	-	-	2	-	56	-	-	-	-	-	-	-	
		Gobius niger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	
		Pomatoschistus minutus	-	-	-	140	-	-	-	-	-	-	-	-	128	-	-	-	-	-	-	-	
		Pomatoschistus spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	2	22	
		Gobiidae	-	9	10	12	10	6	2	211	148	2298	210	98	-	118	-	-	-	-	-	-	
France	Q1	*Gobius niger*						-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-
		Gobius spp.						-	-	-	-	-	-	10	-	46	-	-	-	-	-	-	-
		Lesueurigobius friesii						-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
		Gobiidae						14	345	539	108	12	2	98	208	842	368	686	207	2	44	603	444
Germany	Q1	*Crystallogobius linearis*		-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-
		Gobius spp.		8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pomatoschistus microps		34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pomatoschistus minutus		4	927	436	42	118	2	32	1065	224	68	58	40	42	140	29	18	8	6	8	-
		Pomatoschistus spp.		-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	5
	Q3	*Aphia minuta*			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	
		Pomatoschistus minutus			6	-	-	-	4	####	16	-	2	4	16	86	22	8	8	10	-	4	
Netherlands	Q1	*Aphia minuta*	-	-	-	-	-	-	-	-	-	-	-	-	2	208	70	2	50	12	20	-	-
		Crystallogobius linearis	-	-	-	-	-	-	-	-	2	-	-	2	6	2	12	-	-	-	-	-	-
		Gobius niger	-	-	-	-	-	-	-	2	-	-	-	-	12	-	-	2	-	-	-	-	-
		Gobius spp.	-	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Nation	Quarter	Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
		Lesueurigobius friesii	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
		Pomatoschistus lozanoi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	96	-	-	-	-	35
		Pomatoschistus minutus	-	-	-	-	-	-	-	-	-	-	-	-	-	206	8	3099	38	-	-	-	22
		Pomatoschistus pictus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	124	-	-	-	2	-	2
		Pomatoschistus spp.	468	120	448	3794	1272	278	246	5922	888	464	134	798	2502	3546	2396	36	1144	1208	166	548	15
	Q3	*Aphia minuta*		-	-	-	-	2	-	-													
		Gobius spp.		3200	-	-	-	-	-	-													
		Pomatoschistus spp.		-	16	96	44	56	-	32													
Norway	Q1	*Pomatoschistus minutus*										4			3								

Table 7.2 (continued). Reported catches of goby from North Sea IBTS (1990–2011).

Nation	Quarter	Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Scotland	Q1	*Crystallogobius linearis*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	2	-	-
		Pomatoschistus microps		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72	13	-	-
		Pomatoschistus minutus		-	-	-	-	-	-	-	10	6	3	2	-	2	-	-	98	-	-	-	-
		Gobiidae		4	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	2	-	-	30
	Q3	*Lesueurigobius friesii*										-	-	-	-	-	4	-	2	-	-	-	
		Pomatoschistus microps										-	-	-	12	-	-	-	-	-	-	4	
		Pomatoschistus minutus										2	-	-	-	26	-	-	8	-	-	-	
		Gobiidae										-	-	12	-	-	-	-	-	2	-	-	
Sweden	Q1	*Aphia minuta*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2566	13928	126
		Crystallogobius linearis		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	2	-	-
		Gobius niger		-	-	-	2	-	-	-	-	-	2	-	-	2	-	6	2	10	12	-	-
		Lesueurigobius friesii		-	-	-	-	-	-	6	15	-	14	2	4	12	8	6	118	58	20	12	2
		Lesueurigobius sp.		-	-	-	-	6	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-
		Pomatoschistus minutus		8	-	-	-	-	-	-	-	-	-	-	-	-	2	-	112	-	-	22	20
		Pomatoschistus spp.		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56	56	-	2
		Gobiidae		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-
	Q3	*Aphia minuta*								-	-	-	-	-	-	-	-	-	-	4	4	4	
		Gobius niger								2	-	2	-	8	22	16	47	6	20	36	78	22	
		Lesueurigobius friesii								25	-	113	-	-	10	20	76	62	58	34	72	14	
		Lesueurigobius sp.								-	14	-	-	-	-	-	-	-	-	-	-	-	
		Pomatoschistus minutus								-	-	-	-	-	-	-	-	-	-	-	1802	110	
		Pomatoschistus								-	-	-	-	-	-	-	-	-	87	207	-	-	

Table 7.3. Numbers of goby taken in French EVHOE surveys (1997–2007).

Year	*A. minuta*	*G. niger*	*L. friesii*	*P. lozanoi*	*P. minutus*	*P. norvegicus*	Gobiidae
1997	258		286		7256		
1998		18	6		11205		
1999		10	172		1703		
2000			1289		82		
2001	498	2	261		98		
2002	2	128	319		4731	4	
2003			204		264		127
2004		461	1089		781		
2005			344		346	4	
2006			494	2	398		12
2007	10		360		4		

Table 7.4. Numbers of goby taken in Portuguese surveys (1990–2010).

Year	*Deltentosteus quadrimaculatus*	*Lesueurigobius friesii*	*Lesueurigobius sanzoi*	*Pomatoschistus minutus*	Gobiidae
1990			100	1	
1991			7	17	
1992			58	24	
1993				18	
1994				12	
1995			1	1	
1996				124	
1997				382	
1998				605	124
1999				13	74
2000				18	
2001				25	
2002				1	
2003				32	49
2004	2		34		68
2005			1	2	4
2006				65	5
2007			35	48	171
2008			1	6	58
2009					
2010				3	1

Table 7.5. Actual and potential errors in recent DATRAS data for the North Sea.

Higher group	Species	Length range (mm)		Total numbers caught	Comments	Nation(s)
Petromyzontidae	*Petromyzon marinus*	150	150	2	Verified at meeting	NED
Scyliorhinidae	*Scyliorhinus stellaris*	250	410	26	To be checked	FRA, NOR (Haul 253)
Triakidae	*Mustelus mustelus*	440	1280	73.8065	Uncertain that this species occurs in the area	DEN, SCO
Clupeidae	*Alosa agone*	20	410	30	Incorrect species code	SWE, FRA
Clupeidae	*Alosa fallax*	120	430	39.5609	Small individuals verified at meeting	NED
	Clupea harengus	25	360	3591751	Smallest individuals to be checked?	FRA
Engraulidae	*Engraulis encrasicolus*	40	570	3981.418	Several large 'anchovy'. Probably wrong species code.	SWE (Q1, Haul 32)
Argentinidae	*Argentina silus*	80	280	1480.143	Uncertainty over accuracy of species-specific records	
	Argentina sphyraena	40	290	14459.91	Uncertainty over accuracy of species-specific records	
Lotidae	*Ciliata mustella*	90	240	36	Should be *Cilata mustela*. 24 cm seems large (Stn 76), multiple specimens (20 per/hr at station 87)	FRA
	Gaidropsarus mediterraneus	90	90	2	Record to be checked	GER (Q1, Haul 47)
Syngnathidae	*Entelurus aequerius*	60	130	110.8391	Incorrect spelling. Small individuals should be checked	DEN
	Syngnathus acus	50	160	771	Uncertainty regarding accuracy of small individuals	FRA
Triglidae	*Aspitrigla cuculus*	150	280	49.8065	Species reported in two codes (Valid as *Chelidonichthys cuculus*)	Only GER, SCO using updated species names
	Chelidonichthys cuculus	110	400	1624.345		
	Trigla lucerna	70	570	133.355	Species reported in two codes (Valid as *Chelidonichthys lucernus*)	
	Chelidonichthys lucernus	200	390	70.8571		
Agonidae	*Agonus cataphractus*	30	190	865.6154	19 cm seems quite large	FRA (Q1, Haul 61)
Mullidae	*Mullus barbatus*	100	330	123.7098	Species not in area, should be *Mullus surmuletus*	DEN
Mugilidae	*Mugil cephalus*	530	530	2	Probably a different mugilid. If not validated change record to Mugilidae	DEN (Q3, Haul 21)

Higher group	Species	Length range (mm)		Total numbers caught	Comments	Nation(s)
Zoarcidae	*Lycodes gracilis*	160	160	10	Species recorded in two codes. ERMS recognizes *Lycodes vahlii* Reinhardt, 1831. FishBase recognizes *Lycodes gracilis* Sars, 1867 from the area, with *L. vahlii* in the NW Atlantic. The subspecies *Lycodes vahlii gracilis* is now considered a separate species.	
	Lycodes vahlii	100	220	282		SWE
Stichaeidae	*Lumpenus lumpretaeformis*	280	350	8.1429	Incorrect spelling	ENG, DEN
Trachinidae	*Trachinus vipera*	50	180	7210.409	Incorrect species code	DEN. GER, SCO
Callionymidae	*Callionymus maculatus*	50	210	739.651	Large individuals wrong. Data transposed with *C. lyra* at this station?	SCO (Q3, Haul 84)
Scophthalmidae	*Zeugopterus norvegicus*	90	90	4	Valid as *Phrynorhombus norvegicus*	FRA
Soleidae	*Solea vulgaris*	70	400	107	Incorrect species name	ENG, SWE
Crustacea	*Maja*	1100	1450	4	Should be *Maja brachydactyla*. Wrong units.	FRA
Bivalvia	*Aequipecten opercularis*	50	80	10	Why so few records? Only SCO reporting	
	Pecten maximus	50	1300	28.138	Records of 1200 and 1300cm. Wrong units.	FRA (Q1, Haul 8, 14)
Sepiidae	*Sepia*	50	190	4	*Sepia officinalis*	GER (Haul 47), NED (Haul 51)
Sepiolidae	*Rossia macrosoma*	0	70	29.7308	Shouldn't be measured	DEN. GER
	Sepietta oweniana	10	40	19.5844	Shouldn't be measured	GER
Octopodidae	*Eledone cirrhosa*	30	200	14.9	Shouldn't be measured	DEN, GER
	Loligo subulata	20	120	21356.24	Wrong species code (Valid as *Alloteuthis subulata*)	DEN, GER, NED
	Teuthida	10	50	116	Better taxonomic resolution needed. Unidentified squid likely to either Loliginidae or Ommastrephidae	DEN

8 Review and feedback on DUAP (ToR f)

ToR f) Review and provide feedback in relation to the functioning of DUAP during 2010, and the relevant chapter of the report of WGDIM 2010;

In October 2009, the Datras User Advisory Panel (DUAP) was established as a group under WGDIM. Main task for DUAP is to provide feedback, guidance and advice on the ICES DATRAS system, specifically to include liaison with data submitters and data consumers.

8.1 Participants

DUAP participants consist of data uploaders, data downloaders and end-users of DATRAS data of all surveys that are in DATRAS. There are active (contributing) users of the sharepoint and passive (readers) users.

Since January 2011, the DUAP sharepoint is made publically available. Everyone is allowed to post discussion items to the iscussion board. Members are allowed to approve their own contributions, other people's contributions have to be approved (or could be rejected) by the ICES Data Centre. Contributors receive an e-mail when their e-mail is approved or rejected. Extra columns have been added to the discussion board, the most important being 'Status', which indicates if a discussion is complete or not. Only the ICES Data Centre is allowed to change the status.

About 10 IBTSWG members (mostly uploaders) actively use the DUAP discussion forum. 2 IBTSWG members are passive DUAP users: they read the contributions on the discussion forum and find it useful. 10 IBTSWG members did not use the DUAP sharepoint because they do not use DATRAS data (5) or because they did not know about the discussion forum. They have been added to the membership list.

Data downloaders use the DUAP forum for topics related to downloading data, interpretation of data, questions about data formats specific to the institutes and the ICES Data Centre.

8.2 Evaluation

IBTSWG evaluated the functioning of DUAP and provided some suggestions for improvement. DUAP uses the discussion board at the ICES sharepoint http://groupnet.ices.dk/duap/default.aspx to discuss DATRAS related topics.

Basically, the DUAP discussion board fulfils a need for both uploaders and downloaders. However, some improvements were suggested:

- Users should be able to change the status of their discussions.
- User-friendliness would increase if it would be possible to send an e-mail to the DUAP discussion board which then is posted on the discussion board. It would save time and effort and also solve problems arising when contributors do not use Internet Explorer. However, this is a very time-consuming task for the Data Centre so it is unlikely that this can be carried out.
- It would be worthwhile to designate experts on specific subjects to be able to complete issues. As this is a WG responsibility, so IBTSWG should decide on which topics experts should be assigned.

- In order to increase the information on the DUAP sharepoint, (links to) relevant documents (e.g. old manuals, calculation documents, database model) should be provided on the sharepoint.
- To advertise DUAP, it is recommended to put a link to the sharepoint on the website http://datras.ices.dk/Home/Default.aspx

8.3 Other topics

Within survey working groups, a wish for database changes might come up intersessionally. That should be possible, as long as at least three WG members, including the chair, endorse the change.

It is recommended that ICES Data Centre posts generic e-mail questions from users to the DUAP Discussion board, preferably including the correct answer. This will reduce redundant questions from different uploaders.

To increase the awareness about DUAP, it is recommended to forward the link to the DUAP sharepoint instead of a 'reply to all' in an e-mail discussion.

9 Recent updates in DATRAS and review of outputs and cpue (ToR g and ToR h)

With the work carried out during the group, different DATRAS issues were covered, and these included:

a) The revision of the species codes that needed to be reviewed to finalize the adoption of WoRMS codes as the standard to upload and report species in DATRAS (See WD6 in Annex 5).

b) Recent updates within DATRAS include a thoroughly documentation of units and formats in data downloaded, that will be attached to the products downloaded from DATRAS to document them and will also be available from the DATRAS site (See WD7 in Annex 5).

c) A complete review of the procedures and steps used in DATRAS to calculate the NS IBTS indices (see Annex 6).

These issues cover some of the questions and problems posed in the WD5

9.1 DATRAS updates and developments

ToR g) Review recent updates within DATRAS and prioritize further developments; review and compare the output of DATRAS cpues with age per haul in rectangles;

9.1.1 Updates

Following recommendations of IBTSWG 2010, ICES Data Centre presented the updates and developments in DATRAS.

9.1.1.1 Completed tasks

The automatic upload is ready and used by all NS-IBTS uploaders. It is a very convenient way to (re-)upload data to DATRAS. The national data uploaders are made responsible for the approval of warnings as they have to tick a box per warning. Help for data submitters was developed and implemented in three modules. The first one is the guidelines document "How to upload data into DATRAS" that includes description and screenshots guiding the submitters through the uploading process. The second module is an online help for all errors and warnings accessible through the screening results page. The third module is and an extended description of exchange fields accessible through the DATRAS menu "Reporting Format". IBTSWG was encouraged to give comments in order to improve the descriptions and legal ranges for fields like WindSpeed.

As a further development of the automatic uploading system, submitters are now restricted to submitting files for their countries only. The relevant message is generated when unauthorized upload is attempted.

Submitters now get a message upon re-upload, so they are informed that there is a dataset for the same year, quarter, country, vessel, and gear in the database.

Download of day/night values is implemented for the index ALK and cpue data.

As cpue per length per haul did not show the correct haul numbers, the problem was fixed and now haul numbers in this product refer to the haul numbers in the exchange data.

9.1.1.2 Tasks in progress

The separate download of HH (haul), HL (length) or CA (biological information) records has been developed in the test version of DATRAS. The feature will be implemented in the new DATRAS version.

The backup of the original uploaded .csv file is developed and tested, so indices calculated at a specific moment in time can be reproduced even if the data in DATRAS was updated thereafter. Additionally, an extended history of uploads will be accessible through the Submission Status section in the new DATRAS version. It will include dates of all uploads per survey, country and year, amount of the uploaded records and comments to the submission.

The possibility for partial (re-)uploads was investigated and is possible for partial uploads on a haul basis. Originally there was also a request for partial uploads on a record-type basis (HH, HL or CA separate). However, the current developments of the automatic upload, its speed and the possibility to upload single hauls is sufficient for IBTSWG, so there is no need to further develop partial uploads of separate record-types. Partial upload on a haul basis should be available in the new DATRAS version.

IBTSWG reviewed the document presented by ICES Data Centre (see WD 6 in Annex 5) describing the problematic species names in matching ITIS (TSN) to WoRMS species codes. The outstanding issues were reviewed, and most of them were solved. The remaining questions can be solved by the submitting laboratories. In some cases, WoRMS should be requested to create unaccepted codes/names. So now ICES Data Centre can proceed with adopting WoRMS species codes in DATRAS.

A document with products units and codes was prepared by ICES Data Centre (See WD 7 in Annex 5) and reviewed by the IBTSWG. The revised document will be incorporated into the zip-package that can be downloaded from DATRAS and includes data products with disclaimer.

9.1.2 Future developments

The following request is not yet taken into account: Maintain cpue information in the right units to the mm below.

After an automatic upload is done, ICES Data Centre receives an automatic e-mail. It is recommended that data uploaders receive an e-mail of their own (re-)uploads after a successful upload. This e-mail should contain the file name and the number of HH records, HL records and CA records uploaded.

It was observed that mapping of hydrographic information by HydroStNo does not work between DATRAS and ICES Oceanographic database. It is recommended to check the mapping in both databases and make it work in future.

9.2 Review and compare the output of DATRAS cpues with age per haul in rectangles

This is covered in Section 5 (ToR b).

9.3 Calculation of North Sea IBTS indices

ToR h) Review and document the IBTS based indices and products downloadable from DATRAS;

ICES Data Centre prepared a working document on the calculation of IBTS North Sea indices. The document was reviewed by the working group. The final document can be found in Annex 6 and will be available at datras.ices.dk in due time.

The following comments and recommendations were made by IBTSWG for the supplement procedure (Annex 6.4):

- "The ALK table by species and roundfish area (RFA) is checked for empty cells and for age classes containing less than 25 otoliths". Even if the number of otoliths sampled in the RFA is low, the otoliths are representative for the RFA, and supplements might bias the index. Sometimes few otoliths in the RFA might be more valuable than additional data from neighbouring areas. Recommendation: only supplement ALK with data from neighbouring RFA's when no age/length information is available. If limited age information is available, it is recommended that designated IBTSWG experts advise on the best way forward.
- "If no otoliths were collected then data from neighbouring RFA's are added to the ALK. All ALKs are inspected manually, (….)". The risk of manual inspection is that it might not be possible to reproduce calculations because human choices were made. As ICES Data Centre keeps track of decisions, it is recommended that this information is made available to all IBTSWG members, as it is the responsibility of IBTSWG to check the index information.
- It would be useful to incorporate feedback by IBTSWG members on the supplement procedure in the index calculation process. IBTSWG members would like to see the outcome and the products before the index calculation is finalized. For herring, time schedule might be tight, but for the other species time should be sufficient. It is recommended that ICES Data Centre sends the underlying information (e.g. ALKs) to designated experts in IBTSWG that can check the species- and area-specific information. For this, IBTSWG should identify experts for the North Sea indices. The experts should not slow down the process as the time between data upload, index calculation and some assessment working groups is very limited.

10 Review IBTS Manuals and develop recommendations from SGSTS (ToRs i) and j)

ToR i) Develop new recommendations following the report from the SGSTS and related CRRs in respect to issues relevant to IBTS;

No new outcomes from the SGSTS and CRRs. The Study Group on Survey Trawl Standardisation (SGSTS) was dissolved in 2010 and no CRR can be expected in the near future.

ToR j) Review IBTS manuals and consider additional updates;

The NSIBTS manual is in its eighth revision. Until now all manuals were referenced as annexes to working group reports. This has been found to be cumbersome when the manual needs to be referenced or sued by individuals. From 2011, ICES will create a format to allow survey manuals from all survey working groups, including historic ones, to be referenced as stand-alone documents.

A number of changes have been made to the manual these include;

- The removal of the warp to depth ratio plot for GOV deployment. This has been replaced by text describing the new agreed procedure for deciding the warp to depth ratio for individual vessels.
- The description of the MIK sampling and associated information has been removed completely and a new stand-alone manual will be referenced, once it is completed by an IBTS sub-group.
- Clarification of the need to record SCANMAR data and analyse for variance. This information should be uploaded to DATRAS, once the database has been amended to accept it (no time-scale for this).
- Marine litter recording protocol

Apart from including Marine litter protocol in the Westerly IBTS Manual, no changes have been made on it.

11 Methods for indicators for assessment working groups (ToR k)

ToR k) Prepare methods for delivery of the following information to assessment working groups in 2012

11.1 Introduction

The EC has provided example criteria for assessing progress towards Good Environmental Status (GES) under the Marine Strategy Framework Directive (MSFD) for commercial fish stocks (European Commission, 2010).

Descriptor 3 of the MSFD is to assess whether "*populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock*".

The decision document considers that "*Healthy stocks are characterized by large proportion of old, large individuals. Indicators based on the relative abundance of large fish include:*

- *Proportion of fish larger than the mean size of first sexual maturation (3.3.1)*
- *Mean maximum length across all species found in research vessel surveys (3.3.2)*
- *95th % percentile of the fish length distribution observed in research vessel surveys (3.3.3)"*

In addition to these 'primary indicators', the "*size at first sexual maturation*" may be a 'secondary indicator', as a reduced size at maturity "*may reflect the extent of undesirable genetic effects of exploitation*" (European Commission, 2010).

To facilitate such studies, IBTSWG was asked to:

Prepare methods for delivery of the following information to assessment working groups in 2012:

i) Proportion of fish larger than the mean size of first sexual maturation

ii) Mean maximum length of fish found in research vessel surveys

iii) 95th % percentile of the fish length distribution observed

The information should be provided for all major fish stocks covered by the survey.

11.2 Comments on the proposed indicators

The data required for the suggested indicators are available on either DATRAS and/or from the national laboratories.

There are, however, some important issues that should be considered, in terms of stocks and species, what length at maturity is most appropriate, what should be done for species which may have a pronounced sexual dimorphism in the size at maturity, and species selection.

Until there is clarification and scientific consensus on how such issues are approached, there is little point in IBTSWG preparing methods for the delivery of the data required for such metrics.

It should also be noted that existing surveys were designed originally to inform on the distribution and relative abundance of **juvenile** fish, and providing information on recruitment pulses is an important element of the survey.

Whereas it can be considered important for managers to try to ensure that the full length and age range, sex ratio and maturity stages of fish and shellfish are present in

exploited ecosystems, the proposed metrics may not be useful on informing on this. The process requires further work to select and define indicators and associated reference levels that respond to changes in the populations subject to fishing. Simulation studies are required to ensure that such indicators provide suitable sensitivity in the time-scales required for management and that they are robust to variation in natural processes, such as recruitment variability and regional and seasonal variation in the spatial distribution of juveniles/adults of small and large species.

11.2.1 Stocks and species

Descriptor 3 applies to "*all the stocks covered by Regulation (EC) No 199/2008*", although it should be recognized that stock units/boundaries may not be fully known for all species. This may have implications as to which survey data should be used and how results are interpreted.

11.2.2 Length at maturity

The mean size at first sexual maturation has been suggested for some of the criteria, although there may be a rationale for using the size (or age, if available) at 50% maturity as a more consistent metric.

A single incorrect allocation of an immature fish as mature on any one survey may affect a metric based on the length at first maturity, whereas the length at 50% maturity is based on a more comprehensive range of data, and so will be a more robust indication of the size at which fish are mature.

Such data can be calculated for all stocks for which biological sampling is undertaken.

11.2.3 Sexual dimorphism in body size

Some fish species can have pronounced differences in the size at maturity. If such species have heavily skewed sex ratios in trawl surveys, then this has potential implications for metrics. For example, spurdog often aggregate by sex and size, and females mature at a larger size than males (see Section 11.3.1 for an example).

11.2.4 Recruitment pulses

The proposed indicators often include metrics based on proportions. This will potentially introduce bias due to recruitment pulses. For example, even if there was no change in the relative abundance of the mature stock, a strong recruitment event will reduce the proportion of mature fish. Hence, the proposed metric is affected by environmental conditions and natural stock dynamics (see Section 11.3.2 for an example).

11.2.5 Species to be covered

Whereas indicator 3.3.1 can be applied to the species/stocks of interest, the decision document is less clear for other indicators and 3.3.2 is ambiguous, as it states "*mean maximum length across **all** species found in research vessel surveys*". Is this all commercial species or all species? Is it just finfish or does it include shellfish?

If this is viewed as 'all' fish (commercial and non-commercial), any survey (by nation or year) in which improved taxonomic resolution is available for non-target fish (which are often small-bodied) risks reducing a metric of the "*mean maximum length across all species found in research vessel surveys*" (see Section 11.3.3 for an example).

11.2.6 Large fish

MSFD indicators that inform on "*the relative abundance of large fish*" are required, although there is no clarification of what is meant by a large fish. This has been discussed in the reports of the Working Group on Fish Ecology, and large fish may be viewed as

- All specimens of fish caught that are above a defined length, irrespective of species. Although this is easily calculated, it does mean that a juvenile of a large-bodied species that is below a nominal cut-off is not considered 'large'.
- The relative abundance of all those fish species that are considered 'large' species in the fish assemblage(s) sampled, based on their maximum reported length (L_{max}), irrespective of the lengths observed in the survey that year.
- The largest observed size of each fish species depends on their L_{max}. For example, if a species has an L_{max} of only 10 cm, a specimen of 10 cm is still considered large.

11.2.7 Data quality

IBTSWG has spent considerable efforts highlighting data quality in recent years (see Section 7), and there are incorrect data on DATRAS that are yet to be checked and corrected by national institutes, and the data re-uploaded to DATRAS.

Such errors include incorrect measurement units, the use of multiple taxonomic names for one species, and incorrect species identifications. All these issues will have an impact on the delivery of the data required for these metrics. Extensive data checking and quality assurance would be needed before these data can be used for multispecies fish assemblage studies by scientists not completely familiar with the data.

11.3 Examples of potential limitations and caveats in suggested criteria

11.3.1 Spurdog in the Irish Sea

Biological studies have indicated that male spurdog can start to mature at 55 cm, with 50% maturity at about 59.5 cm (Hickling, 1930). In contrast, female spurdog first mature at about 69 cm, with 50% maturity at 74 cm and 100% maturity at 86 cm (Fahy 1989). Although it is acknowledged that such sexual dimorphism in length at maturity is not as pronounced in other fish species, it may be an issue for the calculation and interpretation of the 'proportion of fish larger than the mean size of first sexual maturity'.

Furthermore, for species which have aggregating behaviours such as spurdog (which aggregate by sex and size), research vessel catches can be sporadic and heavily skewed to one particular life history stage in any one year. Data from the English Q4 IBTS in the Irish and Celtic Seas are used here to highlight an extreme case of highly variable annual data, with 2005 survey data heavily skewed by one large catch of mature females, and 2008 survey data heavily skewed by one large catch of juveniles (Figure 11.1).

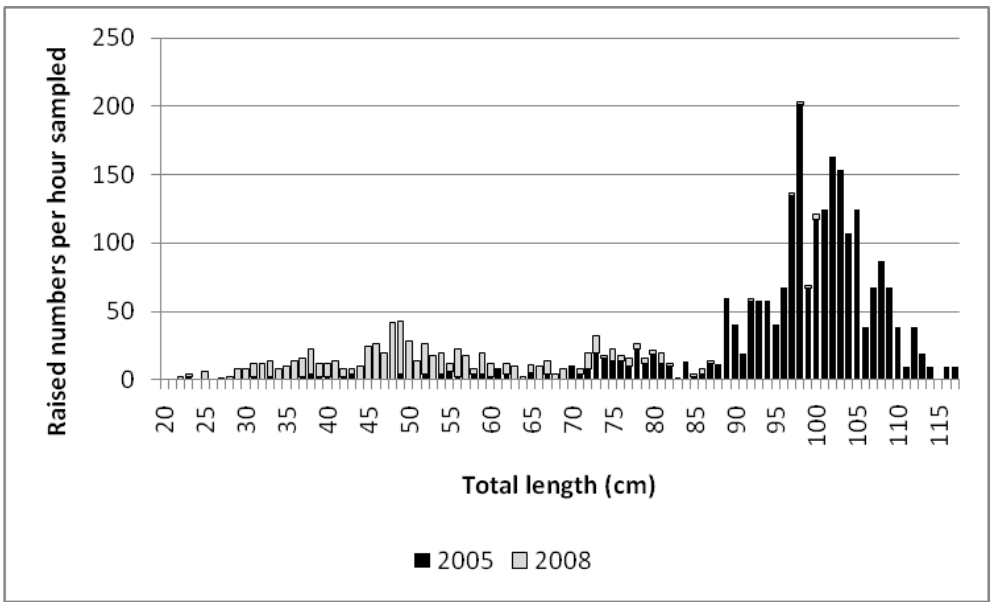

Figure 11.1. Size frequency of spurdog in the Irish and Celtic Seas (2005 and 2008) highlighting an extreme example of a species that aggregates by sex and size. Data for 2005 had a large proportion of individuals above the length of maturity, with data skewed to the other extreme in 2008, when one large catch of juveniles was made. These data highlight the potential variability of survey catches.

11.3.2 Haddock in the North Sea

Preliminary studies were undertaken on data from the Q3 North Sea IBTS to highlight the potential impacts of a strong year class. The raised numbers of fish at length were extracted from DATRAS, and the total numbers of fish <20cm and ≥20 cm calculated. It can be clearly seen that the 1999 year class has a major impact on a proportional ratio, as did the 2005 and 2009 year classes (Figure 11.2). A metric that can be heavily influenced by recruitment pulses (which may be related more to natural environmental conditions than human activities) is not appropriate for informing on the status of older individuals in the stock. Given that data on the catch rates of older fish are available, it would be preferable not to develop proportional indices that are heavily influenced by the catches of recruiting fish.

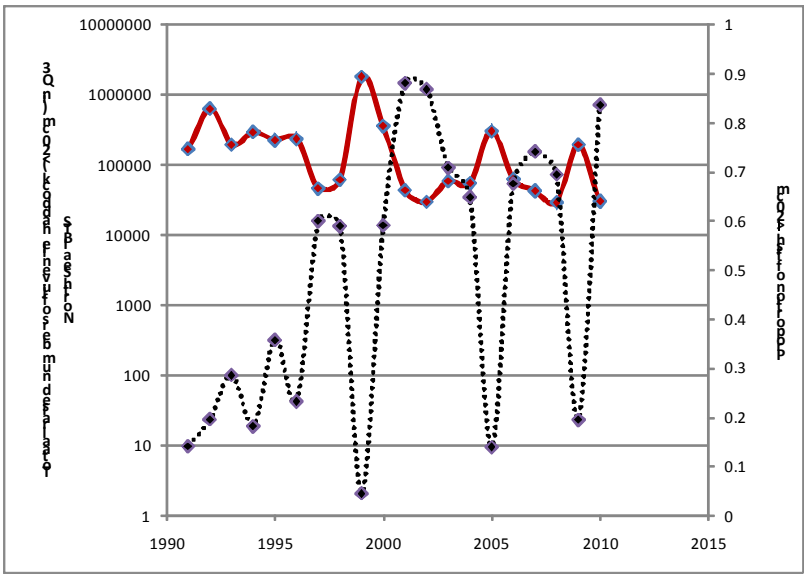

Figure 11.2. Sum of raised numbers of haddock taken in Q3 North Sea IBTS (1991–2010) indicating the numbers of juveniles (<20 cm, solid red line) and the proportion of fish ≥20 cm (dashed black line) indicating how recruitment events will affect proportional metrics.

11.3.3 Mean maximum lengths across all species found in research vessel surveys: A case study of English and Portuguese data

Data from the English westerly groundfish survey (2005–2010) and the Portuguese survey (1990–2010) were examined in order to better understand the practical issues that can be encountered in undertaking such analyses. Data on the largest individual each year per species were calculated ($L_{max\ obs}$), and information on the maximum size of each species collated (L_{max}).

Data on mean $L_{max\ obs}$ and $L_{max\ obs}$ as a proportion of L_{max} were calculated for (a) all species; (b) all commercial species; and (c) all commercial species and those non-commercial species that were found regularly (Figure 11.3). Additional analyses were undertaken for particular groups (e.g. demersal elasmobranchs, gadiforms and flatfish).

Exploratory studies indicated several issues.

- There may be subtle differences in such metrics depending on which species are considered for inclusion;
- If data are converted to a proportion of L_{max}, then there needs to be an agreed, regionally specific list of L_{max};

It should also be recognized that the catches of large fish can be highly variable, and so it is unclear as to whether or not such a metric will yield a consistent metric across surveys within a specified region.

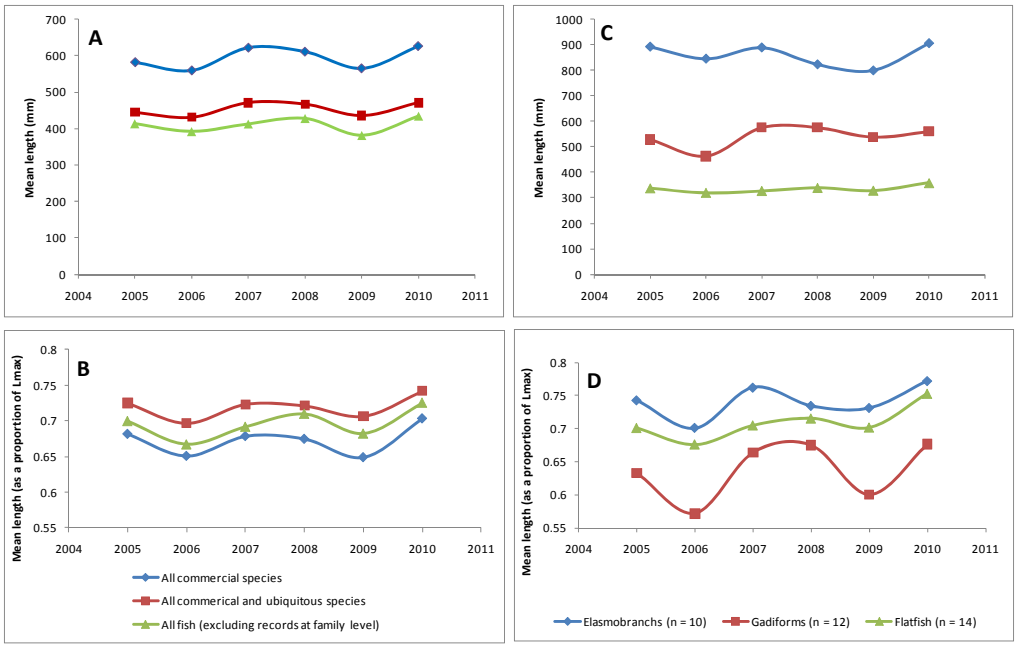

Figure 11.3. Recent trends in the size of fish taken in English Q4 Irish and Celtic Sea survey, indicating (A) the mean maximum length, (B) the mean maximum length after converting the maximum observed length to a proportion of L_{max}. Comparable data are also provided for three taxonomic groups (elasmobranchs, gadiforms and flatfish, C-D). Note: Severe weather restricted sampling in 2006.

Also, there can be subtle differences in these metrics depending on the accuracy of the identification of the catches. The English Q4 IBTS has generally identified all dragonets and gobies to species level. However, some other surveys may have only recorded problematic taxa to the family level at some times during the survey history.

In terms of biodiversity studies, it is often viewed that improved taxonomic resolution is important. If a survey has improved taxonomic resolution then this could influence the mean maximum length for 'all species', as such problematic groups are often small-bodied. For example, if data for dragonets are reported at the genus or family level, then the presence of the most commonly reported species, which is also the largest, confers a large $L_{max\ obs}$, whereas surveys identifying all dragonets will introduce a further two species that are both smaller bodied.

This may be even more pronounced in the case of gobies. Reporting data as Gobiidae can result in a value of $L_{max\ obs} \geq 10$ cm, whereas recording species-specific data for gobies would result in the inclusion of several smaller bodied taxa that will reduce the mean maximum length for all fish in the survey (Table 11.1; Figure 11.4).

Hence, if such a metric is to be used, then survey data will require appropriate pretreatment to standardize the dataset to the most appropriate taxonomic resolution for the time-series. It also highlights that direct comparison between surveys or survey regions may not be possible.

Table 11.1. Time-series of Lmax obs for dragonets and gobies in the English Q4 westerly IBTS at species and family level.

	Maximum observed length					
SPECIES	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Common dragonet *Callionymus lyra*	280	280	280	260	310	290
Spotted dragonet *Callionymus maculatus*	150	140	140	150	160	160
Reticulate dragonet *Callionymus reticulatus*	100	100	120	110	110	90
Callionymidae	280	280	280	260	310	290
Transparent goby *Aphia minuta*		40	50	50		
Crystal goby *Crystallogobius linearis*		40	50	30	20	50
Jeffrey's goby *Buenia jeffreysi*		30	40	50	50	50
Fries's goby *Lesueurigobius friesii*	80	90	90	80	90	90
Sand goby *Pomatoschistus* spp.	80	80	80	80	70	90
Steven's goby *Gobius gasteveni*		100				
Black goby *Gobius niger*	110					
Gobiidae	110	100	90	80	90	90

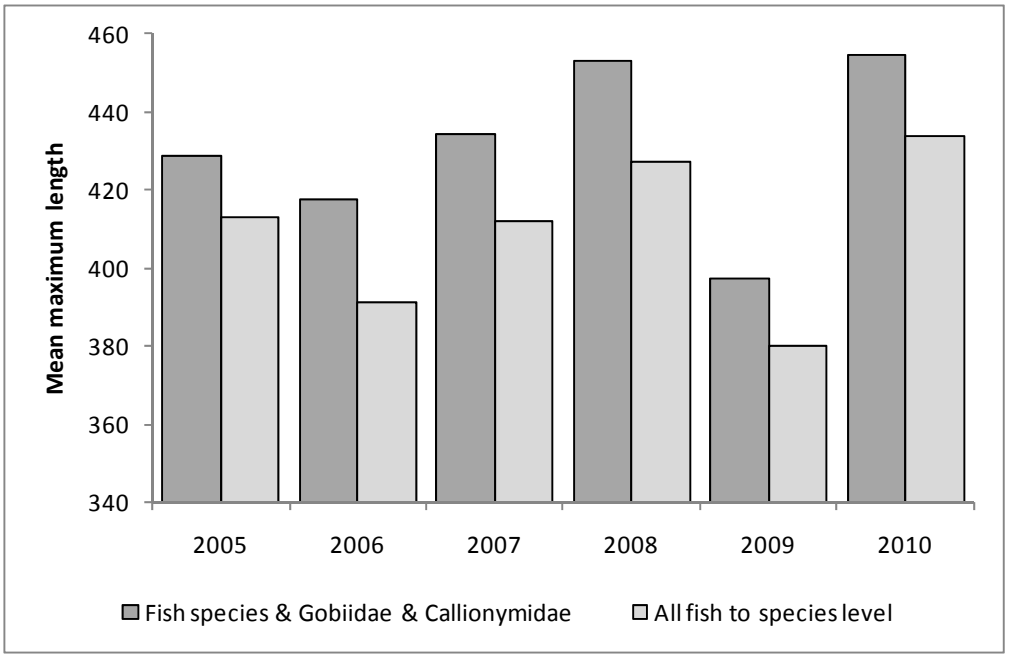

Figure 11.4. Differences in the mean maximum length of all fish when two fish groups are recorded at Family level (dark columns), or when data are reported at species level (whereby the mean maximum size is reduced by ca. 5%). Data from the English westerly Q4 IBTS.

Changes in survey grid may also have implications in such a metric, and so there is a fundamental need for survey scientists to be involved in the interpretation of trends in these metrics.

For example, the Portuguese survey had a change of survey grid in 2005, with fewer stations in deep water. This change in grid resulted in fewer large-bodied species, including elongated frostfish (*Benthodesmus elongates*), long-nosed skate (*Dipturus oxyrinchus*), kitefin shark (*Dalatias licha*), birdbeak dogfish (*Deania calcea*) and gulper shark (*Centrophorus granulosus*). Hence, if the mean maximum length of all species is

plotted over time without considering changes in survey grid (and the corresponding changes in the species assemblages sampled in the survey), then the trend may be mis-interpreted as a decline, as opposed to a step change in 2005 (Figure 11.5).

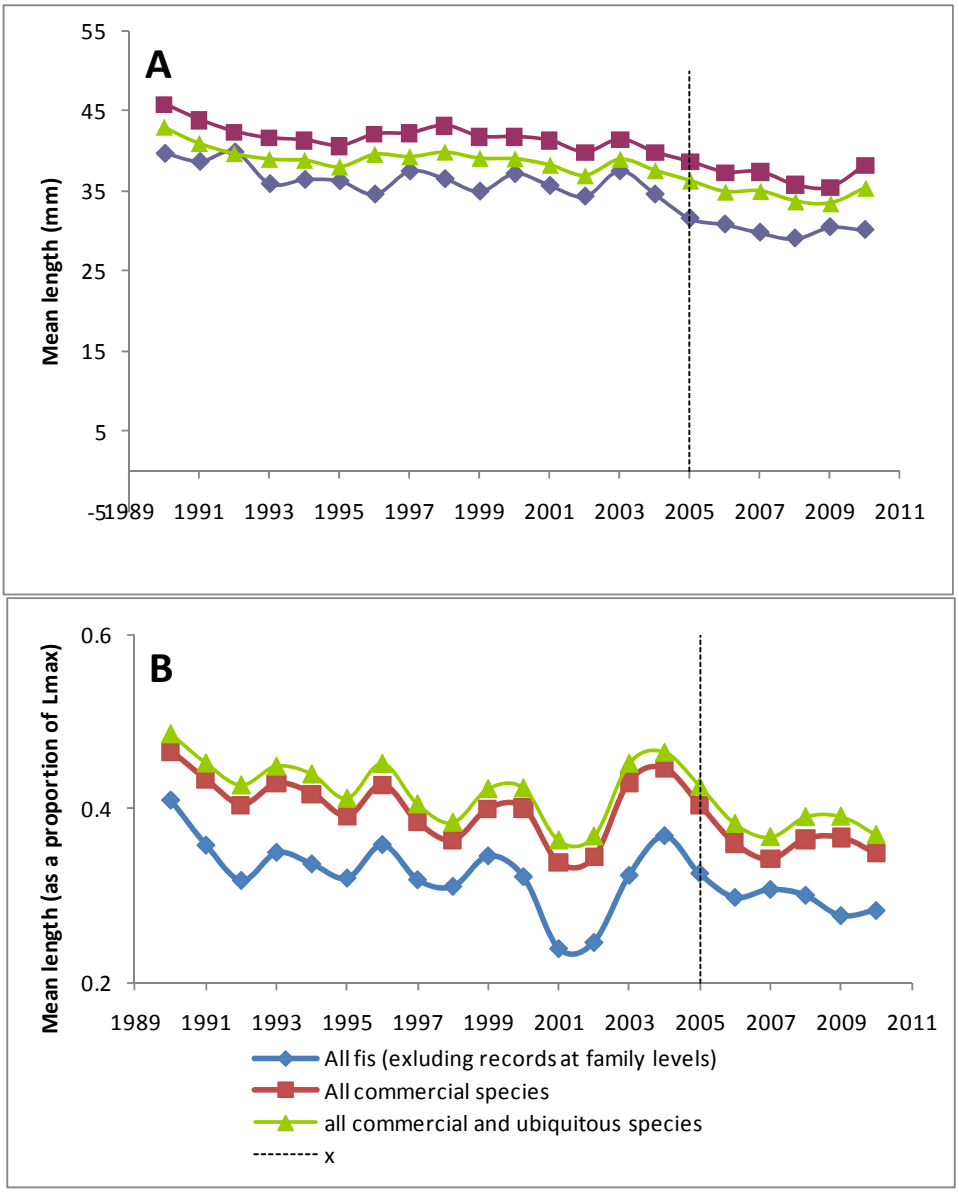

Figure 11.5. Temporal trends in the size of fish taken in the Portuguese groundfish survey (1990–2010), indicating (A) the mean maximum length, (B) the mean maximum length after converting the maximum observed length to a proportion of L_{max}. The survey grid changed in 2005 (dotted line).

11.4 References

European Commission. 2010. Commission Decision of 1 September 2010 on criteria and methodological standards on good environmental status of marine waters.

Fahy, E. 1989. The spurdog, *Squalus acanthias*, fishery in South West Ireland. Irish Fishery Investigations, Series B 32, 22 pp.

Hickling, C. F. 1930. A contribution towards the life-history of the spurdog. Journal of the Marine Biological Association of the United Kingdom 16, 529–576.

12 What products can be provided by the group to determine status for the 11 MSFD descriptors ToR l) and ToR m)

An important part of IBTS work is related to following MFSD descriptors;

1) Biodiversity
2) Non-native species
3) Commercial stocks
4) Foodwebs
5) Habitats and seabed integrity.

In addition to this, from 2011 data on marine litter will also be collected.

In January 2011, the Workshop on Cataloguing Data Requirements for Surveys for the Ecosystem Approach to Fisheries Management (WKCATDAT) produced a table that provides information on the data to be collected, the relevant MSFD descriptor, the type of survey where it can be collected, and the additional requirements before, during and after the survey. IBTSWG reviewed the table and made a number of comments which will help inform WKCATDAT on updating the table.

Some of the comments given by this group are;

- The need for additional resources for data collection during ichthyoplankton surveys might differ for those on fish trawl surveys
- The need for additional laboratory facilities after the survey to analyse samples depends on the lab: a lab might not have any room for more analysis, so this should always be checked.
- Post-survey database developments for new data collection is not taken into account and should be included.

Each individual country will be providing views on what good environmental status (GES) might be for those descriptors, including methods that could be used to determine status. There was no time during the IBTS working group in 2011 to discuss how IBTS could help coordinate or contribute to this.

13 ToRs n) and o) from Strategic Initiative on Area Based Science and Management

As mentioned in Section 2, due to the large number of ToRs and recommendations to address, there was not enough time during the meeting to address these ToRs, and the limited expertise of the IBTSWG members with the SIASM compared with other ToRs, made it advisable to focus the work on the most appropriate ToRs.

14 Other issues

14.1 Atlas of European fishes

An initiative by IMARES (Henk Heessen) and CEFAS (Jim Ellis) was presented on the production of an atlas of the fishes of the northern European shelf. The atlas would be based on data from bottom- and beam trawl surveys, mostly coordinated by IBTSWG, WGBIFS and WGBEAM. The area covered would stretch from the Porcupine Bank in the west to the Baltic in the East, and from Brittany to the Shetlands (16 W – 22 E, 48.30 - 61 N). After a number of introductory chapters on the background of the surveys used, details on biodiversity, fish communities etc., there will be separate accounts on most species caught. Each account will give details on taxonomy, maps showing abundance in case of abundant species, or presence absence for the rarer species, details on depth distribution, length composition and possibly further details on growth, maturity etc. The project is based on national funding. Publication, preferably in the form of a book, is envisaged in 2013. The Working Group strongly supports the proposal and encourages survey coordinators to make their data available for this project.

14.2 Working Group on Improving use of Survey Data for Assessment and Advice (WGISDAA)

During the IBTSWG meeting Colm Lordan, proposed co-chair of the WGISDAA proposed to be established during 2011, presented the ToRs of this group, which is expected to be formed by stock assessment scientists, survey statisticians and survey technologists. The IBTSWG considered some of the WGISDAA ToRs complementary to address some of the problems identified at the IBTSWG, or in recommendations posed to IBTSWG (e.g. sensitivity of the combined indices to variability of the national indices, ways of combining indices of surveys with limited overlap), hence the participation of IBTS members in WGISDAA is recommended, and the adoption of IBTS case studies by this group would be welcomed.

14.3 Review of electronic equipment for data collection

At the request of PGCCDBS, during the group a number of examples of useful electronic equipment to gain better estimates were presented to the IBTSWG. These include the CatchMeter, ScantrolFishmeter, Fishmetrics, Electronic Data Capture System, Voice recognition system, all of them described and shown in PGCCDBS 2011 report (ICES 2011, Section 6). Some of these devices, especially the different types of electronic fishboards, are already used by many of the vessels and surveys, in fact some of the institutes have contributed actively to the development of the devices, while others as the CatchMeter are not considered useful in the case of the IBTSurveys due to the requirement of taking biological samples, while others are considered more apt for sampling in fish markets or other environments. In any case

the value of the information presented and the idea of providing information on manufacturers of these devices is welcomed by the IBTS group.

14.3.1 References

ICES. 2011. Report of the Planning Group on Commercial Catches, Discards and Biological Sampling (PGCCDBS), 7 - 11 February 2011, Vienna, Austria. ICES CM 2011/ACOM: 40. 174 pp.

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:

Additional ToRs from MSFDSG and SIASM:

From MSFDSG: Marine Strategy Directive Framework Steering Group (MSFDSG)

c) Identify elements of the EGs work that may help determine status for the 11 Descriptors set out in the Commission Decision (available at http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:232:0014:0024:EN:PDF;

d) Provide views on what good environmental status (GES) might be for those descriptors, including methods that could be used to determine status

From SIASM: Strategic Initiative on Area Based Science and Management

e) Take note of and comment on the Report of the Workshop on the Science for area-based management: Coastal and Marine Spatial Planning in Practice (WKCMSP) http://www.ices.dk/reports/SSGHIE/2011/WKCMSP11.pdf

f) Provide information that could be used in setting pressure indicators that would complement biodiversity indicators currently being developed by the Strategic Initiative on Biodiversity Advice and Science (SIBAS). Particular consideration should be given to assessing the impacts of very large renewable energy plans with a view to identifying/predicting potentially catastrophic outcomes.

Review of recommendations to IBTSWG: NS and Western and Southern

- **ICES Data centre**: Change of DATRAS species codes from ITIS/TSN to WoRMS.
- **WKMAL**: collection of marine litter information
- **WGCEPH**: length frequency done by species (is it in DATRAS?)
- **WGEF**: *Dipturus* sampled by species: *Dipturus flossada / intermedia – D. nidarosiensis D. oxyrhinchus*
- **WGEF**: information on numbers of viable *Dipturus* egg cases with yolk

Review of recommendations to IBTSWG: North Sea focus

- **WGDIM** (IBTS) MIK sampling, inclusion of MIK samplings in DATRAS.
- **HAWG**: possibilities of separating between NSAS and WBSS caught in area IIIa.
- **WGNSSK**: Adequate statistical sensitivity analyses should be performed to ensure robust raising methods for the IBTS combined indices. "The WG was concerned that the IBTS indices did not appear robust to the hindrance of some nations to conduct their survey, as an International Survey should by definition be independent of the nation conducting it."
- **WKCOD**:

1) Establish a working group on improving use of survey data for assessment and advice (see draft resolution below). It is proposed that the group could evaluate the IBTS Q1/Q3 surveys, accounting for distribution changes, north–south stock structure, and possible catchability differences for different survey components (Draft: WGISDAA)

2) Generate new IBTS Q1 survey, including coastal squares in the south and squares to the west of Shetland (or is it a new index with squares already available?)

- **WKMSSPDF**: Pictures of gonads under microscope in case of disagreement.
- **WGEGGS**: Recommends undertaking an ichthyoplankton survey every 3 years in conjunction with IBTS and HELA
- **WGIPS**: recommends extending the analysis of the IHLS survey every third year to obtain information of ichthyoplankton abundance and distribution.
- **SGSIPS**:

1) Recommends the production of tables with survey information to provide insight into the variation between institutes within the different surveys and include these in the survey manual with the intention of providing a basis for the standardization of the surveys. The tables should be provided to SGSIPS prior to the November 2013 meeting

2) Manuals of the different ichthyoplankton surveys should be standardized and regularly updated. These manuals should be produced as stand-alone reports accessible to anyone rather than an annex in the coordination group reports

3) SGSIPS recommends that hydrographic measurements are taken with every plankton haul, preferably with a data logger on the net. If this is not possible, hydrographic measurements should be taken on station with a vertical CTD-cast immediately before or after the plankton haul.

4) To analyse and compare IHLS and MIK-net survey data to provide information on the origin of the larvae in the MIK samples.

- **PGCCDBS**: Stomach data sampling looking for multispecies interactions in the NS (and Baltic Sea) WGSAM manual (document in the Sharepoint)
- **WGISUR**: Evaluate the prioritized catalogue of data needs for the EAFM developed by WKCATDAT/WGISUR and report to WGISUR on what is currently provided, could be provided but is not currently, and what could be provided with modification. For the latter category please provide details of what these changes would be and any implications.

Working documents and presentations

- Presentations:
  - Atlas of the Fishes of the Northern European Shelf – Henk Heessen
  - Session about electronic devices PGCCDBS –Francesca Vitale.
  - MIK on IBTSWG – Peter Munk.
  - Getting insight in identification skills - presentation of a test and workshop at IMARES – Ingeborg de Boois.
- Working documents (see Annex 5 and Annex 6 for detailed reviews)

- McCully, S. Report of the staff exchange with Ifremer "Thalassa" – Presented by Brian Harley
- Caralp, C. and Coppin, F. Survey index Comparison (CGFS, English BTS and NSIBTS Q3) – Presented by Yves Verin
- Burns, F., Jaworsky, A., Coull, K. And Kynoch, R. Modifications to the Q1 Scottish VIa. IBTS and Q3 Scottish VIb. IBTS. – Presented by Finlay Burns
- O. Berthelé and M.J. Rochet. Problems encountered during the treatment of North-Sea IBTS (1983–2010) data extracted from DATRAS, and potential solutions – Presented by Sandrine Vaz
- Bertrand, J.A., Brind'Amour, A., Coppin, F., léauté, J.-P., Laffargue, P., Lorance, P., Mahé, J.-C., Morin, J., Salaun, M., Sanchez, F., Trenkel., V, and Vérin, Y. Proposal for the use of taxonomic identifications in the Western IBTS (EVHOE) and Eastern English Channel (CGFS) survey data – Presented by Sandrine Vaz
- ICES Data Centre. DATRAS IBTS indices calculations and documenting of data and products. – Presented by Vaishav Soni
- ICES Data Centre. DATRAS Units. – Presented by Anna Osypchuk
- ICES Data Centre. WoRMS problematic codes. – Presented by Anna Osypchuk

Annex 3: IBTSWG terms of reference for the next meeting

The **International Bottom Trawl Survey Working Group** (IBTSWG), chaired by Francisco Velasco, Spain will meet in Lorient, France, from 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) **Sensitivity of abundance indices, ways of alleviating gaps or vessel changes in coordinated surveys**;

d) 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 considering 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.

To facilitate and promote working activities in between annual meetings, countries have committed themselves in plenary to prepare specific ToR's for the next meeting.

Table 1. Overview of the proposed ToR's for 2012 and the countries committed to take the lead in preparing them for next meeting.

ToR	Lead	Tor	Lead
ToR a)	Q1, Q3 and WS Coordinators	ToR d)	Data Centre and Spain, all institutes
ToR b)	Ireland, Scotland	ToR e)	MIK Germany, England, France
ToR c)	Sweden, Ireland	ToR f)	England, All institutes

IBTSWG will report by 25 April 2012 (via SSGESST) for the attention of SCICOM, WGISUR, and ACOM.

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.

Scientific justification	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 firts quarter of the ongoing year. IBTSWG will continue to review feedback and implement modifications, including coordination and implementing new requirements of the EU DCF. b) The inconsistency in changing sweeps at depth using short/long sweeps, poses catchability questions, and the possible effect on the abundance indices is unknown, a combination of field trials and estimation of sweept area indices will be attempted to address the issue. c) Recently, major problems with the vessels have lead to cancellation or change in vessels for some surveys, it is important to evaluate possible ways (pre- and post-survey) of mitigating the impact of these events on the time-series. d) 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. e) 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. 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 and coordinate how to implement the data requirements from the MSFD.
Resource requirements	A four day IBTS meeting. Pre-prepared documents from members. 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.
Linkages to other committees or groups	There are relations with other botttom 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. Also relevant to the Working Group on Ecosystem Effects of Fisheries.
Linkages to other organizations	IOC. GOOS.

Annex 4: Recommendations

To avoid making internal recommendations in the general list of recommendations, but maintain the stress on intersessional coordination tasks, a separate list of IBTS internal recommendations and list of actions has been created after the main list of recommendations.

Recommendation	Adressed to
1. (Section 3.2.2) When submitting taxonomic identification recommendations to IBTS, attach references and check if species are accepted as valid in WoRMS	Assessment EGs (e.g. WGEF, WGCEF, WGNEW..)
2. (Sections 4.1–3) Review and assess the value of individual standard survey summaries included within the report and the trends reported within.	Assessment EGs using IBTS indices (WGHMM, WGCSE, WGNSSK, HAWG..)
3. (Section 10) It is recognized that ICES Secretariat will create a specific reference for the Surveys Manuals, in order to make it a document easily referenced independent of a particular annual report. Major revisions will be referenced as revision XXX, minor updates references as XXX.n	ICES PUBCOM
4. DUAP recommendations (Section 8) 4.a In order to increase the information on the DUAP sharepoint, (links to) relevant documents (e.g. old manuals, calculation documents, da-tabase model) should be provided on the sharepoint. 4.b To advertise DUAP, it is recommended to put a link to the sharepoint on the DATRAS website http://datras.ices.dk/Home/Default.aspx	DUAP ICES data centre
5. DATRAS recomendations (Section 9) 5. a. Confirm the that uploaded data has been successful by sending an e-mail to the uploader 5. b. A lookup table will be created in DATRAS webpage to facilitate up-loaders to check parameters after each upload. An e-mail will be submitted to up-loaders to check this table after upload with special emphasis on checking -9 values. 5. c. It is recommended that ICES Data Centre sends the underlying information (e.g. ALKs) to designated experts in IBTSWG that can check the species- and area-specific information. For this, IBTSWG should identify experts for the North Sea indices. The experts should not slow down the process as the time between data upload, index calculation and some assessment working groups is very limited. 5.d IBTSWG recommends that when doubts about DATRAS data are posed to Data Centre staff, these doubts are pased to IBTSWG or posted to DUAP to support the correct use of DATRAS data.	ICES data centre/DATRAS IBTS North Sea institutes
6. Section 9.1.2 It was observed that mapping of hydrographic information by HydroStNo does not work between DATRAS and ICES Oceanographic database. It is recommended to check the mapping in both databases and make it work in future.	ICES Data Centre (DATRAS/Oceanographic database)
7. Section 3.2.5. Promote and coordinate a course on identification of NSAS and WBSS herring between institutes involved in trawl samplings in ICES divisions IIIa and IVaE	PGCCDBS

List of recommendations and actions for IBTS members institutes

1. Further explore cod, whiting, plaice stock structure and identity in the channel area within CGFS survey by comparing ALKs (IBTSNS Q3 and CGFS)	Ifremer
2. (Section 4) It is recommended that sea-going technical or scientific personnel take part in other countries surveys in order to study trawling and biological sampling procedures on board ships partaking in internationally coordinated programmes.	All institutes organizind bottom trawl surveys
3. (Section 7) IBTSWG recommends that in future genus *Pomatoschistus* are submitted to DATRAS at the Genus level.	All institutes
4. Identification workshops, "Tool-Box talks" and staff mentoring are useful ways to improve data quality within IBTS and are encouraged within or in relation to IBTS surveys.	All institutes
5. IBTSWG recommends that marine litter data are collected in all surveys following the excel spreadsheet submitted by WKMAL (see Section 3.2.1), and data are made available to national representatives of Descriptor 10. An excerpt of the relevant section of the IBTS Manual will be circulated in 2011 before Q3 Surveys	All institutes
6. (Sections 3.1.2 and 5–6) Data uploaded in DATRAS should not contain -9 (missing value) as default for HH (haul-gear) parameters (weather, gear monitoring, doors weight.. etc). When -9 value is detected it should be checked and corrected with the actual value.	DATRAS data uploaders
7. (Section 6) Should survey leaders feel strongly that, either by temporary accident or historical drift, their survey requires an immediate adjustment in trawl deployment; this obviously needs to be documented by IBTS in the first instance. Where neighbouring or historical survey data are available changes should be presented in that context to provide at least some quantification for IBTS to comment on for subsequent data users.	All institutes
8. (Section 8.) DUAP: It would be worthwhile to designate experts on specific subjects to be able to complete issues. As this is a WG responsibility, so IBTSWG should decide on which topics experts should be assigned.	IBTS members
9. (Section 14.2) The participation of IBTS members in the new WGISDAA is recommended to propose case studies and collaborate in their development	IBTS members

Annex 5: Working documents

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. Working Documents 1- were presented to the International Bottom Trawl Survey Working Group (IBTSWG).

WD1: C. Caralp and F. Coppin. 2011. Survey index Comparison (CGFS, English BTS and NSIBTS Q3).

➔ WD1 Caralp and Coppin SurveyIndexComparaison.ppt

WD2: Sophy McCully. 2011. RV "Thalassa" Quarter 1 North Sea IBTS 2011 Staff Exchange Report.

➔ WD 2 McCully Exchange report.pdf

WD3: Finlay Burns, Ken Coull and Rob Kynoch. 2011. Modifications to the Q1 Scottish VIa. IBTS and Q3 Scottish VIb. IBTS.

➔ WD 3 Modifications to Scottish Survey.doc

Working documents 4 and 5 highlight some caveats on the information and documentation previously available from DATRAS. These problems have been the addressed during the last years in the ToRs d) and e), traditionally dedicated to improve the quality of historical and newly collected data. The effort made, especially in 2011, with ToRs d)-e), g) and h), to document DATRAS products and units, calculation procedures, and the use of the WoRMS species codes as the new standard for reporting, has dealt with most of the problems pointed out in these documents, and hopefully solved most of these. In any case the IBTSWG recommended to DATRAS and ICES data centre, that if these types of doubts are posed to DATRAS, these are commented to IBTSWG or posted in DUAP in order to solve them and ensure the correct use of the data.

WD4: J. A. Bertrand, A. Brind'Amour, F. Coppin, J.-P. Léauté, P. Laffargue, P. Lorance, J.-C. Mahé, J. Morin, M. Salaun, F. Sanchez, V. Trenkel, Y. Vérin. 2011. Proposal for the use of taxonomic identifications in the Western IBTS (EVHOE) and Eastern English Channel (CGFS) survey data.

➔ WD 4 Proposal for TaxonomicLevel_IBTSWG2011.doc

WD5: Oliver Berthelé and Marie-Joëlle Rochet. 2011. Problems encountered during the treatment of North-Sea IBTS (1983–2010) data extracted from DATRAS, and potential solutions.

➔ WD 5 DATRAS_NSIBTS_treatment_report.doc

WD6: ICES Data Centre. 2011. WoRMS problematic codes.

➔ WD 6 DATRAS_WoRMS_conditional_match.xlsx

WD7: ICES Data Centre. 2011. DATRAS Units

➔ WD 7 DATRAS_dataproducts_units.docx

WD8: ICES Data Centre. 2011. NS-IBTS indices calculation procedure.

See Annex 6

Survey index comparaison

Claire Caralp – F. Coppin. Ifremer Boulogne sur mer - France

Objective : French CGFS indices improvement

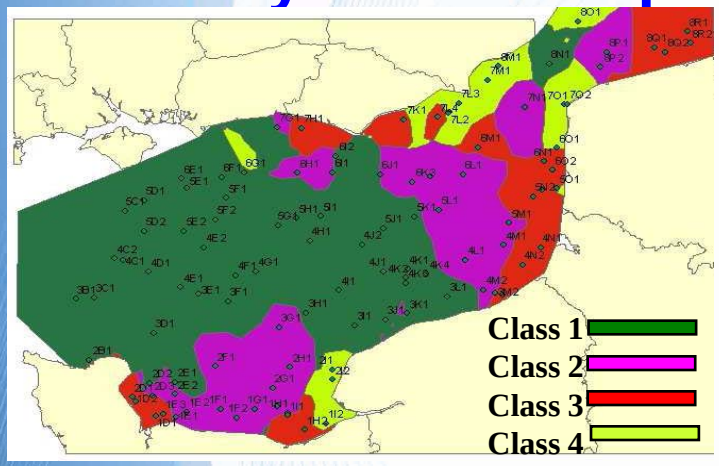
Analysed species : Plaice, cod, whiting

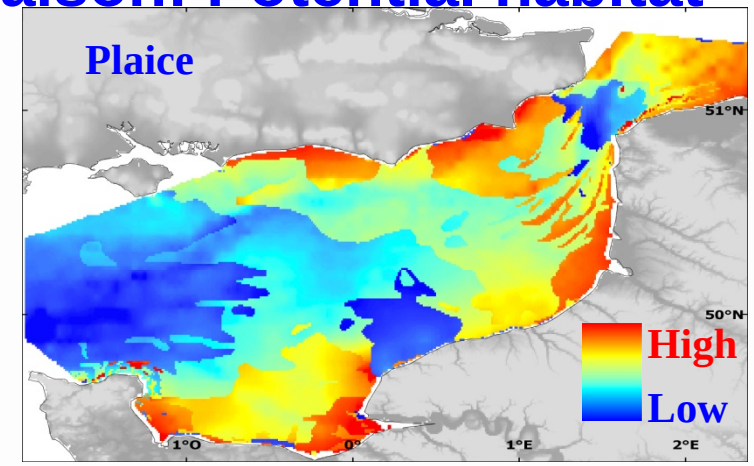
Survey and data used :

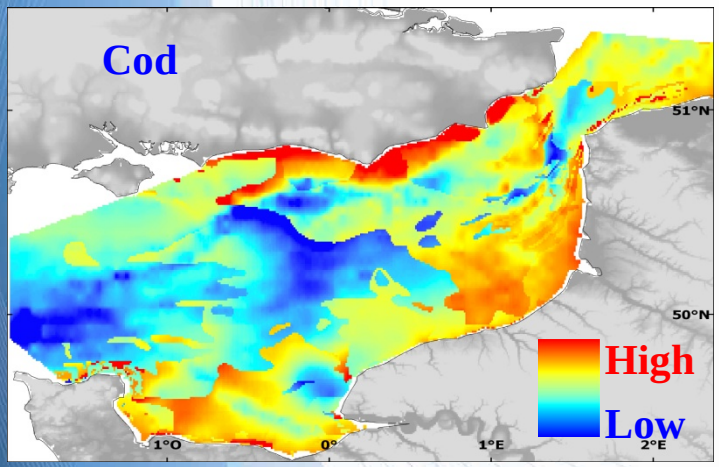
- **French CGFS : calculated indices**
- **English BTS, IBTS Q3 : indices from WGNSSK**

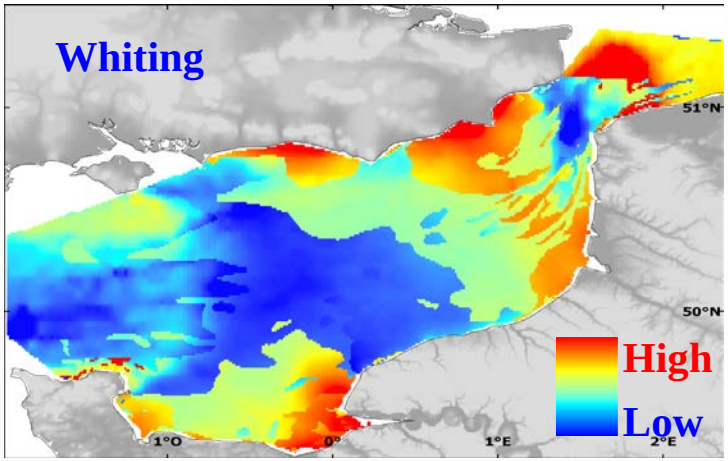
Sofware : SURBA (SURvey Base Analysis)

Survey index comparaison: Potential habitat









Three possible stratifications : ICES Rectangle, all strata of community classification, restricted community classification using potential habitat of target species (classes 3 and 4 only)

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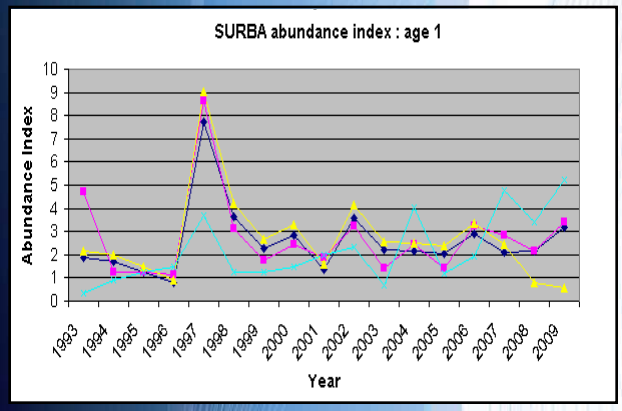
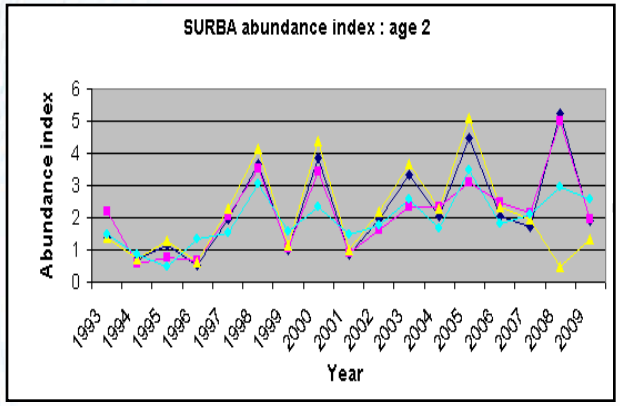
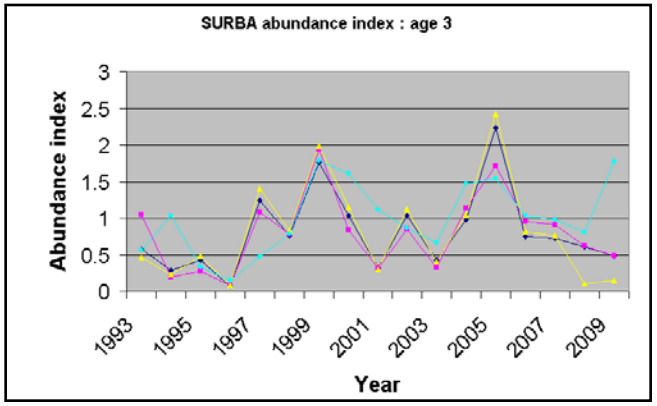
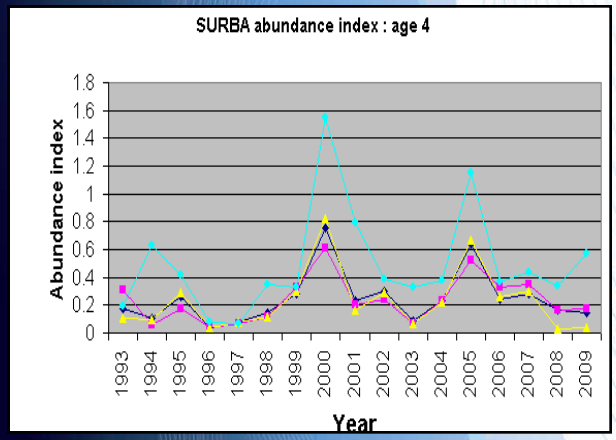
Survey indices comparaison : Plaice

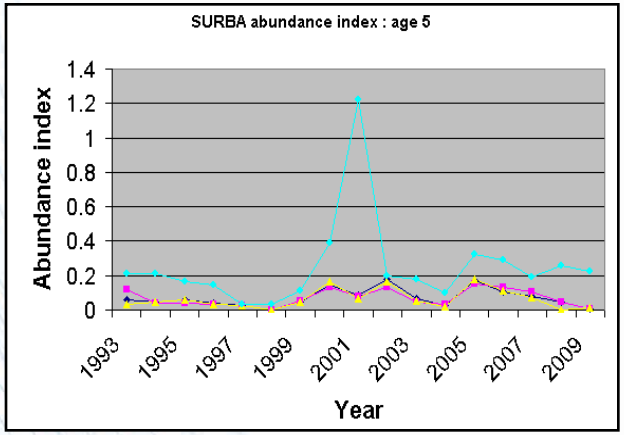
Methodology : Compare French CGFS index using english BTS index and stratification criteria

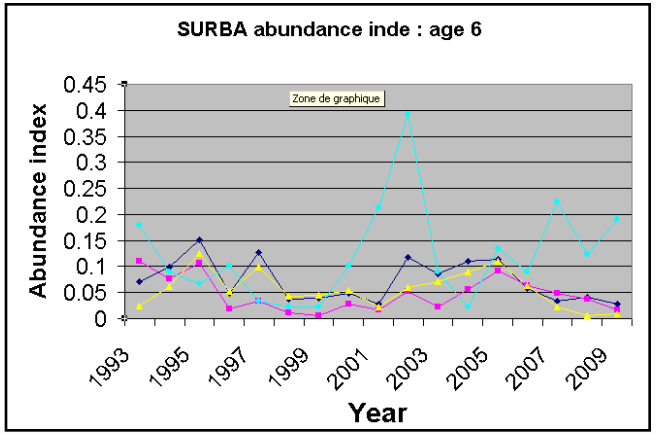












Very similar trend. Better catchability for older individuals in the BTS survey

CGFS all communities
CGFS ICES rectangle
CGFS communities 3 and 4
BTS ICES rectangle

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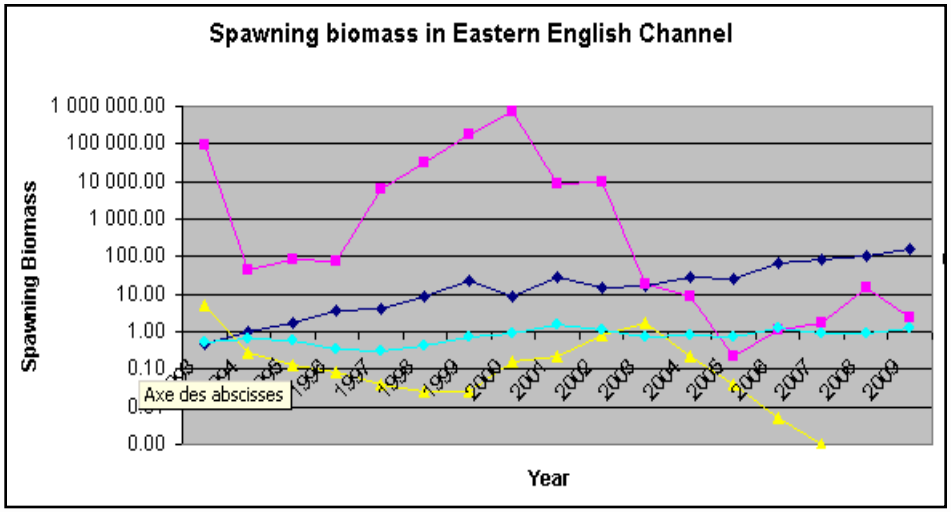
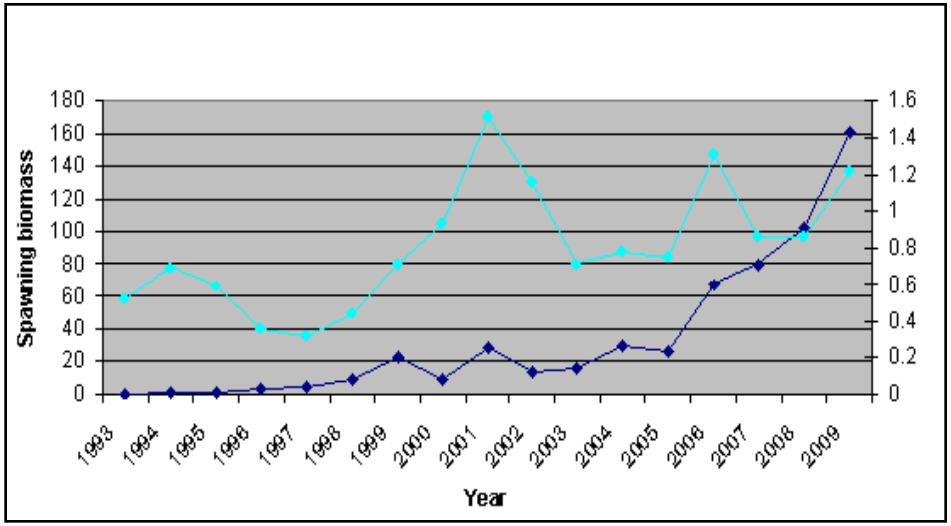
Survey index comparaison : Plaice

High spawning biomass variation for ICES rectangle method -> not recommended to predict the spawning biomass from year to year

Low spawning biomass for communities 3 and 4 method -> Very coastal stratification bad representativeness of adults

Conclusion : BTS and all communities seems to be the method wich give the best stock representativeness





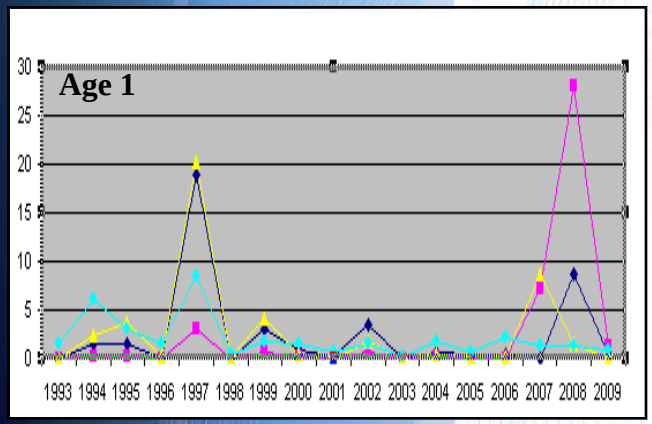
Trends and scales are different. The CGFS all communities method trend is close to the abundance at age 3

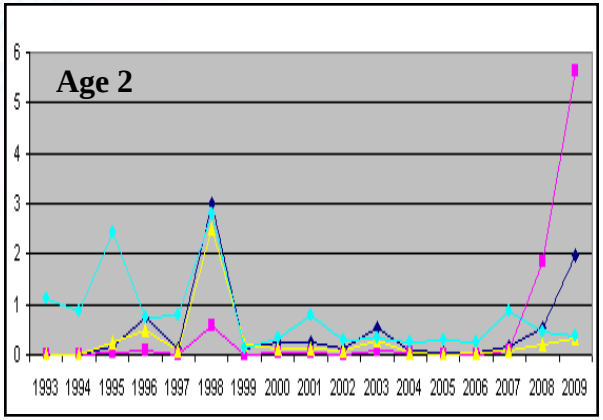
Conclusion : CGFS all community can't be used to evaluate the stock

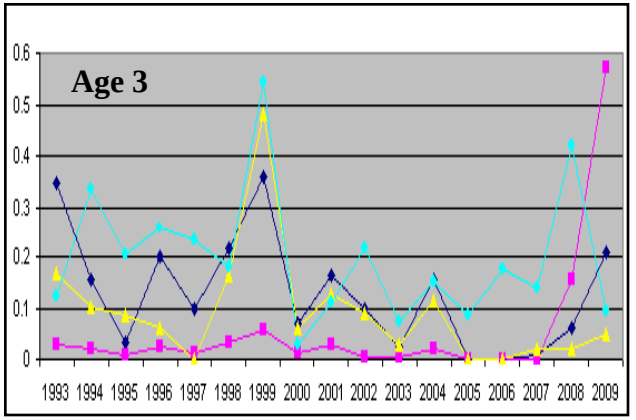
CGFS all communities
CGFS ICES rectangle
CGFS communities 3 and 4
BTS ICES rectangle

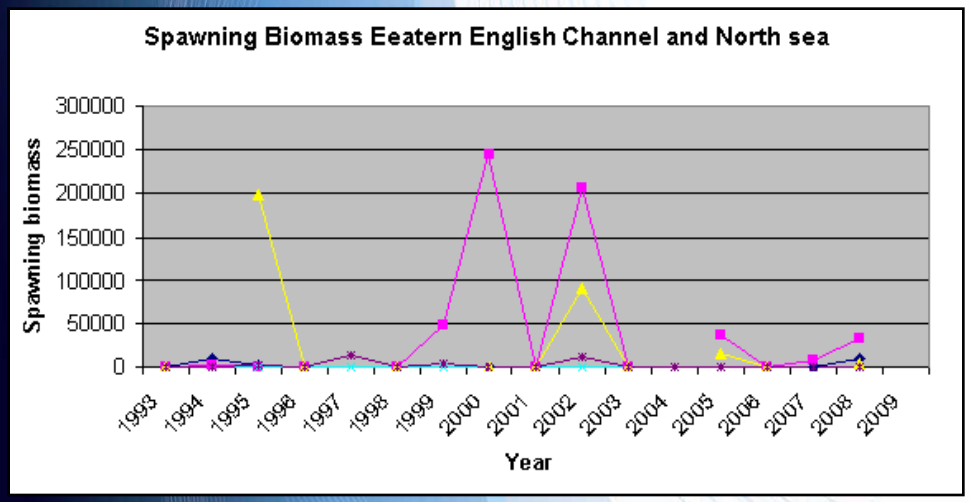
Survey index comparaison : Cod

Methodology : Compare French CGFS indices using english IBTS Q3 index and stratification criteria







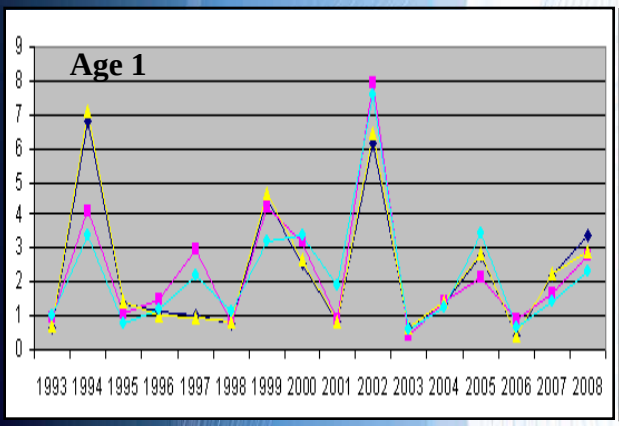


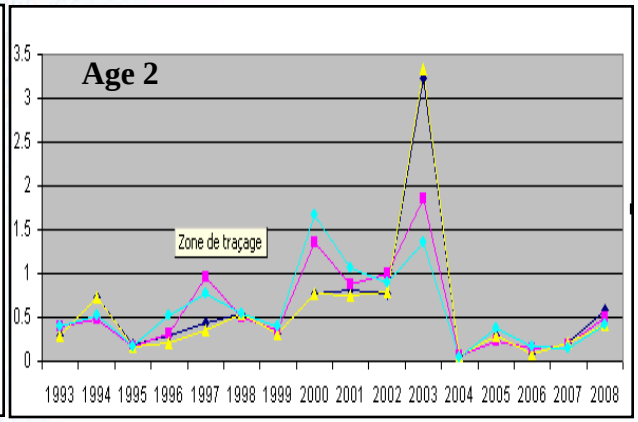
Low abundance with peaks every ten years.

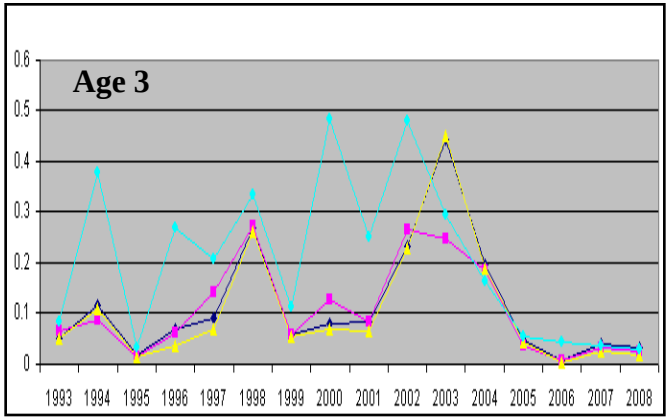
The spawning biomass is very weak for all the methods except for a few years. The observed peaks may correspond to a gravity centre shift of the population either in the studied area or in the adjacent zone. This result is not representative of the spawning biomass present in stock.

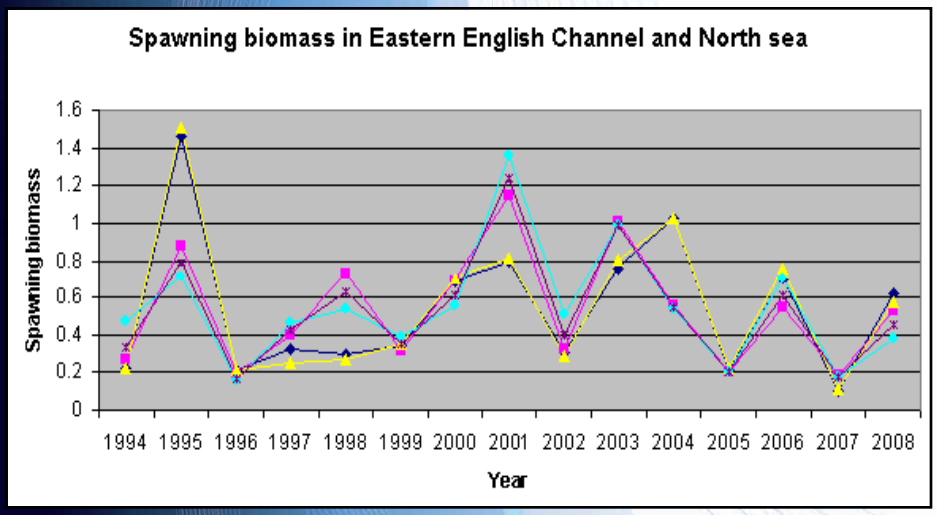
Survey index comparaison : Whiting

Methodology : Compare French CGFS index using english IBTS Q3 index and stratification criteria









Age 1 and 2 trends perfectly similar whatever the method.

Same trends for spawning biomass.

SURBA works in relative value. this result does not mean that the spawning biomass is identical in the Eastern English Channel and in North sea but that the fraction of stock in the Eastern Channel is a constant proportion of that of the North sea stock

CGFS toutes communautés
CGFS rectangle stat
CGFS communautés 3_4
IBTS Q3 rectangle stat
IBTS Q3+CGFS rectangle stat

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Summary and conclusions

Plaice	Lows results	Reliable indices for age 1-2-3.
Cod	No results	Cannot be used for assesment
Whitting	Similar as IBTS Q3	Could be used to complete Ibts Q3 indices.

Perspectives

Verify using length spectra that observed populations are the same:

Plaice (october for CGFS and July in BTS), cefas data?

Cod and Whiting (october for CGFS and September for IBTS)

Restrict the analysis to overlap area between CGFS and IBTS Q3

Check length spectra to verify stock identity

Use this data to intercalibrate these two surveys' indices for Whiting = extend IBTS Q3 into the Eastern Channel

R/V Thalassa Quarter 1 North Sea IBTS 2011 Staff Exchange Report

Sophy McCully[1]

Dates: 29 January to 14 February
Location: English Channel and North Sea
Scientist in Charge: Yves Verin (Ifremer)
Master: Xavier Guilcher

Introduction to the survey:

The IBTS fisheries survey for Quarter 1 of 2011 conducted by Ifremer (France) was carried out between the 13 January to 14 February, in the eastern English Channel and North Sea. As part of this internationally coordinated survey, staff exchanges have been recommended during the ICES Bottom Trawl Survey working group to facilitate the exchange of information, sampling skills and methodologies and to ensure that standard protocols are being interpreted similarly by each country. Following these recommendations, Ifremer invited a member of staff from Cefas (England) to participate in their IBTS North Sea survey (NSIBTS) of 2011. As the scientist in charge (SIC) of the Q3 English NSIBTS survey, I was keen to take up this invite, and to observe how this standard survey is carried out by a different country. Cefas were agreeable to the value of this exchange and thus allowed me to join this survey for the second half, and this report details my findings.

The survey was conducted in three parts with the first departing from Brest to survey the eastern English Channel. The vessel then docked in Boulogne on 19th January for a change of staff, and departed the following day to complete the eastern stations of the North Sea, bordering Denmark, Germany and Netherlands. The vessel docked again in Ijmuiden (Netherlands) on 28 January, departing the following day to complete the survey. It was for this last part that I joined the survey as part of the fisheries team.

The NSIBTS conducted by Ifremer is a multi-disciplinary survey, with operations being carried out 24 hours per day. During daylight hours, the GOV trawl is deployed on average between three to four times per day, with a total of 65 standard stations being fished during the 30 day survey. Each GOV trawl is followed by a CTD cast (to collect temperature, turbidity, light and oxygen data), niskin bottle collection (to collect water samples from 1m for phytoplankton and chlorophyll analysis) and bongo net tow (to sample for zooplankton, Figure 1a). During darkness hours, the MIK net is deployed to collect fish larvae (Figure 1b). Acoustic recordings are made 24 hours a day, at five different frequencies (18, 38, 70, 120 and 200kHz) to analyse pelagic fish schools and compare the patterns with associated catches. Additionally during part one of the survey, marine mammal and seabird observers were onboard collecting sightings, and some underwater camera work was also carried out. During parts two and three, two sets of two young trainee fishermen joined the survey, in order to gain first hand knowledge and experience of how and why these surveys are carried out.

[1] Centre for Environment, Fisheries and Aquaculture Science (Cefas), Pakefield Road, Lowestoft, Suffolk, NR33 0HT. England.

They rotated between all work areas, including sampling the catch in the fishroom, in the hydrobiology lab, on the bridge and also with the engineering department.

The multi-disciplinary survey and 24 hour working makes good use of the vessel time, and as a result a large number of staff are necessary. During parts one and two, between 21 to 24 scientific staff were onboard, with 11 people working in the fishroom. During the final part 19 scientific staff were onboard with nine people manning the fishroom.

During my two weeks onboard I spent some time observing each work area, but my purpose of being onboard was as a scientist in the fishroom, as it is during the English survey, thus this will form the main focus of my report, and as the main purpose of the NSIBTS, it should be given the most consideration with respect to the standardised approach that each participating country should be adopting.

Figure 1: a) Bongo net for zooplankton sampling b) MIK net for fish larvae collection

Fishroom (salle de tri) infrastraucture:

Onboard R/V Thalassa, the fishroom is below deck level and thus sorting and processing the catch is enclosed, whilst onboard the R/V Cefas Endeavour (the English vessel that carries out the Q3 NSIBTS), the fishroom is at deck level with doors opening onto the deck, fish hopper and sorting tables outside (with a head covering). Onboard Thalassa, the fish is dropped down into a large hopper which is channelled into the fishroom. A hatch can then be opened to the required level to allow a steady flow of fish onto a moving conveyor system (Figure 2a). The fish move up the conveyor and drop into an area which allows the catch to be weighed. This automatically stops the flow of fish when around 20 kg of fish are inside. The person in charge of the sampling then takes the accurate weight of this proportion of the catch, and then releases it onto the sorting table (Figure 2b). Once the fish is released onto the sorting table, the person at the head of this controls the speed of the conveyor to facilitate the best sorting. The sorting table holds eight persons (four persons each side), with each having a large crate being side of them for the main component of the catch to be put placed into, and smaller crates in the middle of the table for the less abundant species to be sorted into. Once a crate is full, its position on a ‘rolling rack’ allows for it to be pushed under the sorting table directly onto another conveyor system that moves the crates along to another scale, for the weight by species to be obtained. The crates then pass through this conveyor

onto the scale, with the person in charge taking the weights by species, and then they pass to the end of the fish room where they are taken off the conveyor and stacked by species.

From here, working in teams of two or three, each species is then taken and re-weighed and taken to one of the workbenches where the fish are measured by one or two people, while one person records the lengths onto a paper record sheet. The necessary otolithing is also conducted at the workbenches, and with plastic worktops, cutting can take place directly on the bench. The length and otolith sheets are then taken into the dry lab where the catch records and lengths are entered onto a computer at the end of the station.

Figure 2: a) Conveyor system from hopper to scales b) Sorting table conveyor system

This infrastructure of moving conveyors is in vast contrast to that used by Cefas, with a completely manual method of sorting, with fish being pulled out of the hopper onto the sorting tables by hand, and manually moved along without the aid of conveyors (Figure 3a). The fish are then sorted, with the main species component being pushed through to the end of the table where it is collected into fish baskets. At the end of the sort, the weight of each species is taken, and then brought inside for biological sampling. In contrast the infrastructure used inside the wetlab is fully automated and electronic. Each person works alone at a workstation, placed with a large metal fish holder on the table in front of you, with a measuring board in front of that (Figure 3b). This setup allows the sampler to not have to move from their workstation whilst sampling each species. In front of the metal holder, there is a wall mounted screen and small PC box. This setup records all measurements, maturities, weights and otolith records that the user enters for each species at each station. The workstation also has a cutting board, knives and tweezers to hand for maturity staging and otolithing, and also has a scale connected to the computer, which allows the fish to have its weight taken automatically when an otolith record is required. The parameters are entered onto the PC via an electronic measuring board, which contains microchips inside each length and character on the board. Using an electronic pen when each length is touched, it is automatically read into the computer. The start up screen requires the user to enter which species from which area they are about to process, and also what percentage of the final otolith requirement you would like to furfil

on this station (decided by the deckmaster). Once input, the system automatically calculates whether a fish needs just to be measured or whether it also needs to have otoliths taken. The user wears a headset connected to the computer, and a series of 'beeps' alerts the user to the fact that their pen has read a length, has input a characteristic, and also when an otolith is required. When an otolith is required, the user has the otolith tray already placed onto their workstation by the deckmaster when the fish species is assigned to the person, so the otolith is taken right away and placed into the tray. At the end of each species, the deckmaster comes and removes the otolith tray, provides the user with the next species, and a new otolith tray corresponding to that species.

Once the station is complete, the deckmaster downloads the information from each PC workstation in turn, and stores it on their main computer. At this stage any potential errors are flagged up by the system. Being able to measure, biologically sample and record on your own allows Cefas to staff their fisheries surveys with just six or seven people (including the SIC).

Figure 3: a) fish hopper and sorting table b) workstation with fish bin, and measuring board

Fishroom (salle de tri) fish sampling:

A number of different methods of sampling and processing of the catch were observed:

- The roundfish areas (1-7) are used for all species, whereas for sprat, herring and mackerel Cefas have separate areas, with different otolith schemes.
- Dab, lemon sole, grey gurnards, and hake are not routinely otolithed during this survey.
- The otolith scheme is slightly different, with smaller numbers being taken from smaller fish and larger numbers of otoliths collected from larger fish (8 per cm IBTS protocol minimum is met for all lengths, therefore meeting their otolith targets and often exceeding them for fish of larger lengths). This is in contrast to Cefas' 10 per cm per stratum collection regardless of length.
- Most flatfish under 14/15 cm are not routinely otolithed (some plaice are taken), this is under 10 cm for Cefas.
- The fish that have otoliths collected from them are not weighed individually.
- The rajiids do not have their maturity stages or wing widths collected.
- Flatfish are not sexed prior to weighing.
- Species of smaller proportions are weighed to nearest 5g, not 1g.

- All benthos are sorted into species, counted and weighed, onboard Cefas Endeavour benthos species are just observed as present.
- Very large catches are handled differently. Ifremer approximate weights from timed conveyor dumping, of mostly mono specific species catches exceeding 10 tonnes. Large catches under this weight are weighed and dumped in 20kg batches. Cefas weighs and dumps large species specific catches also, unless too large to bring all onboard (usually in excess of 10 tonnes). These differing methodologies are however the result of very different infrastructures, and both do the best job they can with the equipment available to them.
- Ifremer rarely use a 'species mix', only for sprat and herring from my time onboard, whereas Cefas engage in a lot more use of species mixes. This is primarily because where a large volume of fish requires a mix by Cefas, Ifremer will use a system where fish are weighed and discarded directly, after rare and larger fish are removed, and the proportions of the whole catch applied to the dumped fish to calculate rough weights per species.

Bridge Management and Gear Deployment:

Further considerable differences in the bridge management during gear deployment are also evident. Onboard Thalassa, a very experienced Captain with vast fishing experience is in sole control of gear deployment, when and where to shoot and haul the GOV and in ensuring that it is deployed correctly. He alone decides how much warp to let out, and during the tow, it is his responsibility to monitor the scanmar readings, to ensure the gear is fishing correctly. The SIC is not therefore required to be present on the bridge, however scanmar readings are monitored by the SIC from a computer below the bridge. The amount of warp used does not exactly follow that prescribed by the IBTS warp/depth curve, however, the GOV is fishing on the bottom and stable scanmar readings are always achieved. The IBTS manual states that, 'During the tow it is imperative that net geometry is measured and kept within the acceptable limits', however, in some instances, especially in shallow water, the door spread was observed to be below that recommended by the IBTS manual (for example, in 40 m of water, a door spread of 55 m was achieved, due to the fact that less warp was let out than the depth to warp curve would suggest, approx. 200m, this is at least 5 m less than the minimum door spread recommended). This deviation from protocol could potentially affect catch rates.

In contrast, it is mandatory for the SIC to be present on the bridge for the full deployment and duration of the trawl onboard Cefas Endeavour. No gear will be deployed without this person being present. The SIC makes the decision of how much warp to let out in order to meet the requirements of the scanmar readings preferred by the ICES IBTS working group. The gear is deployed by a fishing skipper (not the captain) with the SIC also watching out for potential fouling of the net. The SIC alone is responsible for monitoring the scanmar readings throughout the tow, and the time duration begins once they are happy with the readings they are giving, they also give the command of when to haul the gear.

Recommendations:

- A 'Toolbox talk' to talk everyone through the fishroom process, from how to sort fish effectively, to categorising, sub-sampling, measuring, maturity staging and otolithing etc would be beneficial. Also mentoring of the inexperienced staff is cruicial, alongside training

them in species ID, recognising maturity stages and how to make cuts to various species in order to collect otoliths.

- Make better use of the person in charge of the fishroom. Have them deciding what species should be left on the sorting table, and thus will comprise the species mix, and letting everyone else know. Also having someone at end of the conveyor after sorting to allocate pair teams, and which species they will be given. This will ensure that less experienced people can the paired with those of more experience allowing more training. This will also ensure that everyone gets to sample a variety of different species, and learn the different styles of cutting for otolithing, and also the various maturity stages associated with a vast number of species.
- Work with one person measuring and otolithing, and one recording, and measure then immediately otolith the fish if the recorder says that length is necessary. If all fish are measured and then they are re-measured to see whether otoliths are necessary, this is a duplication of effort, and takes longer to process a sample.
- Weighing of each otolithed fish would be beneficial, but would require more marine scales onboard.
- Enter otolith records onto a database alongside the catch records and lengths, as a back-up.
- Do not discard catch until all catches **and lengths** have been entered onto the database, this allows any potential errors with lengths appearing to be inaccurate to be verified.
- Having marine scales available with an accuracy to 1g may be particularly beneficial for the in depth benthos sorting undertaken on this survey.
- Consider allowing more of the catch to pass around the sorting table and doing more species mixes for these hauls allowing a larger volume of fish to be pushed through to the end, but ensuring that all other less dominant species are taken out. This will not add any extra time as currently the sorters have to wait between fish 'loads' as weighing the fish to be dumped on the conveyor system is a time consuming process.
- SIC to decide warp ratios in consultation with the captain, and continue to monitor the scanmar readings during the tow, in order to ensure that they are within the limits prescribed by the IBTS manual.

Conclusion:

This cruise demonstrates a fantastic use of the vessel 24 hours a day. The utility of the vessel for hydrological work at night is very effective and does not negatively impact on the primary aim of fishing during the daylight, this research works together harmoniously. Furthermore, the use of the vessel for observers, trainee fishermen and acoustic analysis also adds to the cruise value.

The bridge management and GOV deployment is excellent due to the past fishing experience of the captain. The different style of warp calculations and less dependence on striving to achieve desired scanmar readings is in contrast to methods employed on Endeavour, and perhaps the WGIBTS needs to examine the resultant scanmar data from this survey, to ensure that readings are falling within the protocol of the scanmar curves.

The interactions with Ifremer and the fishing industry, with respect to this cruise are admirable. There were a total of four trainee fishermen onboard, and the day after docking, the SIC presented

provisional data from this survey to local fishermen, politicians and the press, so allowing them to understand the aims and purpose of this survey, and allowing them to ask questions.

In general, the fisheries catch sampling is done effectively on this cruise. However with several people onboard with no or little fisheries experience, more time and care needs to be taken with their training and mentoring to ensure the quality of biological data collected. The operations could benefit from more management in this area. The benthos analysis is very comprehensive and thus adds to the value of the multi-disciplinary aspect of this cruise, however, it must not be at the expense of less time and assistance with respect to the fisheries sampling.

The general management of the cruise needs additional attention to be paid to ensure that inexperienced staff do not negatively affect the standard of these data collected. Also more control over the whole cruise, also in operations such as gear deployment and hydrology would result in a more cohesive and productive cruise, especially with respect to data standards and meeting IBTS protocol.

I would strongly support the value of staff exchanges between IBTS participating countries, and believe that a lot can be gained through the transfer of skills and knowledge, and is crucial in identifying disparity in protocols. I would like to thank the Ifremer staff and crew of RV Thalassa for welcoming me onboard.

Modifications to the Q1 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 rig, 'C'. 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 heralds the start of modified Scottish bottom trawl surveys in both these areas. 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 is considered a rather imprecise method for surveying both these subareas and as such a move towards some sort of random stratified survey design was 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. The first step in the process of modifying the survey design 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 broadly modelled around the rig used by Ireland 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, another feature copied from the Irish rig. This gear has been used during a number of gear trials and has proved robust and reliable throughout. See figure 1.

Wire Sweep Rig

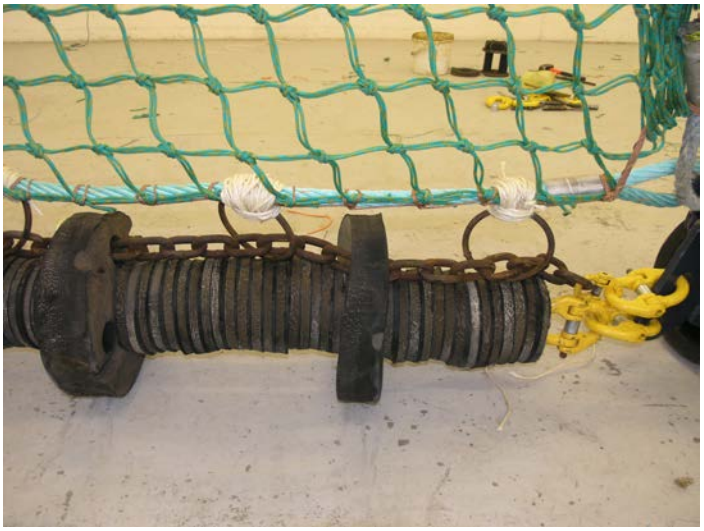
The Rockall survey is conducted exclusively in depths greater than 100m whereas on the Scottish West Coast surveys approximately 80% of tows are made in depths deeper than 80m. Historically, only 60m sweeps were used throughout, during all Scottish western surveys, despite the IBTS recommendation that 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 west coast survey – that also surveys ICES Subarea VIa – 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.

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

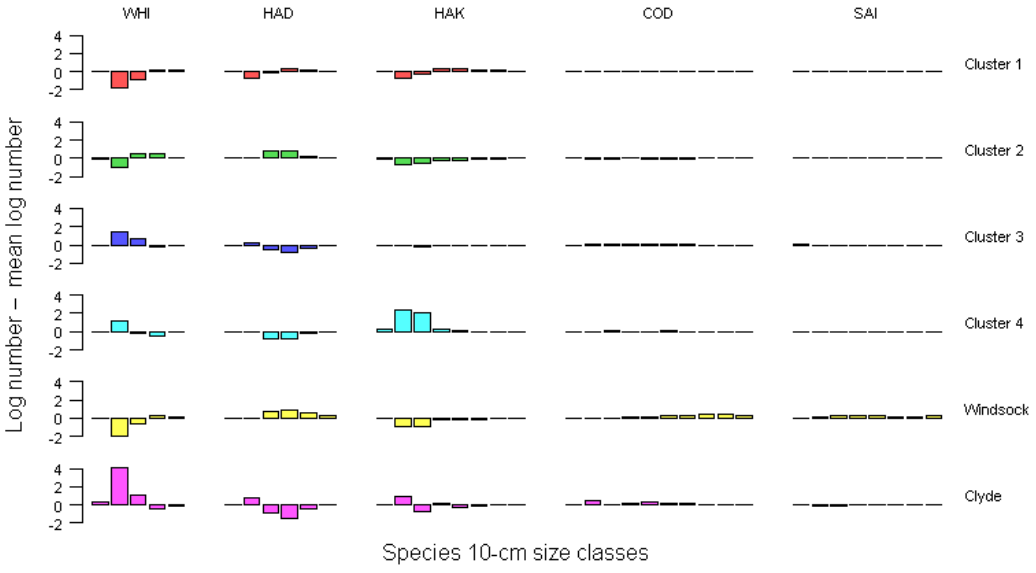


Survey Design – Q1 Scottish VIa. IBTS

The Q1 Scottish VIa.IBTS is primarily a juvenile gadoid survey so when it came to constructing relevant strata for ICES Subarea VIa the focus was on those species for which the survey was principally designed to sample. The target species that were analysed were cod, haddock, whiting, saithe and also hake. A cluster analysis was performed using aggregated data from the previous quarter 1 SCOGFS data 1999 – 2010 as well as the data collected from the dedicated gadoid survey which took place during quarter 1 of 2010 with all data being standardised to nos/hour. This gadoid survey was completed on charter vessels using a non – standard rockhopper gear and was intended to complement the Q1 SCOGFS carried out by Scotia within the same temporal period and geographical area.

K – means clustering of abundance data for the 5 aforementioned species subdivided into 10cm size categories yielded 4 specific clusters (hierarchical clustering also provided the same results). In addition to the 4 clusters highlighted an additional 2 additional strata were added to the analysis. These were the Clyde area and also the windsock which is an area that has been designated as a recovery zone since 2002 and has therefore experienced no mobile gear exploitation during this time. All densities were standardized and are given in relation to the average density for a specific trip for a given species/size group. Thus the bars show where different species/size groups are likely to be more/less abundant than the average for a given survey. See figure 2.

Figure 2.Barplot displaying the species/size structure of each stratum.



A brief description of the 4 clusters as well as the windsock and Clyde:

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

Cluster 2 (green): more fish than in red (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): very similar to Cluster 3, but with much more hake (small/medium) than in other strata.

Windsock (yellow): less small fish (particularly whiting), and slightly more big fish (haddock and cod)

Clyde (pink): much more small fish (particularly whiting, but also haddock and hake), less bigger fish (particularly haddock)

A map displaying these effective geographical strata can be found below in figure 3, together with a colour coded description of each of the strata.

Allocation of sampling effort was distributed in the following way. Each individual polygon was treated as a separate substratum, for instance red1, red 2 and red3 rather than just ‘red’. The following formula was then applied to each of the substrata.

$$n_i / n = A_i s_i / Ó A_i s_i$$

where n_i = number of stations allocated to substratum i , n = total number of stations, A_i = the area of substratum i and s_i = standard deviation of substratum i.

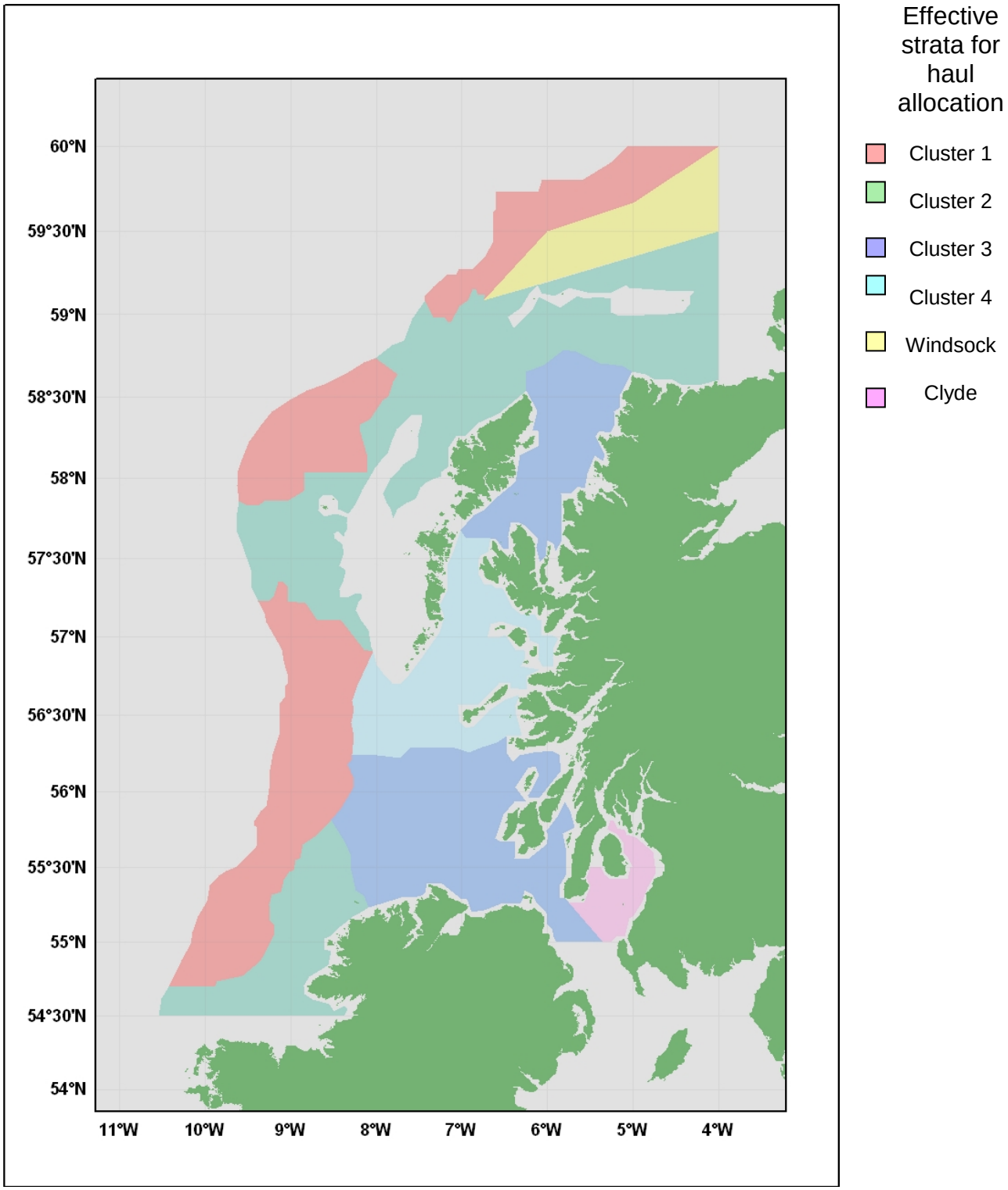
This ensures that more effort is diverted to the substrata that have the largest area and the highest variation. The mean standard deviation across species/size classes was used and the results were translated into a proportion of the total survey effort of 60 hauls. The results are displayed below.

red1	green1	blue1	lightblue	red2	red3	blue2	green2	Clyde	windsock	
2	13	4	6	3	9	10	6	3	4	Total = 60

Within substrata, 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).

Figure 3.



Survey Design – Q3 Scottish VIb. IBTS (Rockall haddock)

The Q3 Scottish VIb.IBTS is primarily a juvenile haddock survey. It was recognised that there was a need to include areas with high haddock densities not covered by the present haddock survey. Those high densities have been found recently in deeper waters during the monkfish survey in the Rockall area. Since apparently some significant parts of the stock are not sampled during the haddock survey, the resulting abundance index may be biased.

Figure 4 shows the recorded haddock numbers per 30 minutes trawling, in the monkfish and haddock surveys in 2008 and 2009. From the maps with the monkfish survey it can be seen that there are significant haddock numbers beyond the 200 m isobath, in a few cases, even beyond 300 m. (Note here that the maps shown in this document are 30 arc-second grids and were imported from the GEBCO website https://www.bodc.ac.uk/data/online_delivery/gebco/)

Figure 5 shows fish densities by age vs. depth in the last two haddock surveys. For many age groups the 200–240 m depth is clearly not the upper limit of their distribution.

The precision of the survey may be increased through stratification. With haddock being caught between 140 and 400 m, it is possible to divide the fished area into depth strata. To keep the density homogenous and the intra-stratum variance low, some 4–5 strata would be required (see fish densities vs. depth in Figure 5). Although four strata seem to be simpler in use, five strata seem to provide more precise indices. For example, the five strata could be: <140m, 140–200m, 200–250m, 250–350m, >350m (Figure 6). The upper limit of the last stratum needs to be established. In the first instance it was agreed that this could be set at 470m but is likely to be reviewed as the survey progresses.

The question remains how to allocate survey effort between strata. The information from previous trips are of limited value as the distribution of haddock (of different age groups) at Rockall is not exactly the same every year (see differences between 2008 and 2009 surveys in Figure 5; this distribution pattern was also different in previous surveys, not shown).

A different (and simpler) approach is to allocate the same (or almost the same) number of hauls to each stratum. With about 40 hauls per trip (as has been the case in the recent Rockall haddock surveys), it would be possible to allocate 8 hauls to each stratum with five strata, or 10 hauls with four strata. However, it was agreed that there was enough information to avoid allocating the same number of samples to each stratum and that we should have multiples of sampling intensity which approximate the multiples of fish density in each stratum as estimated from e.g. the Rockall monk survey. The sampling

intensity could be, for example, n samples per unit area in low density strata; n*2 samples per unit area in medium density strata and n*3 or 4 in high.

After considering the data available it was agreed that:

- Sampling should be split across 5 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 be:

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

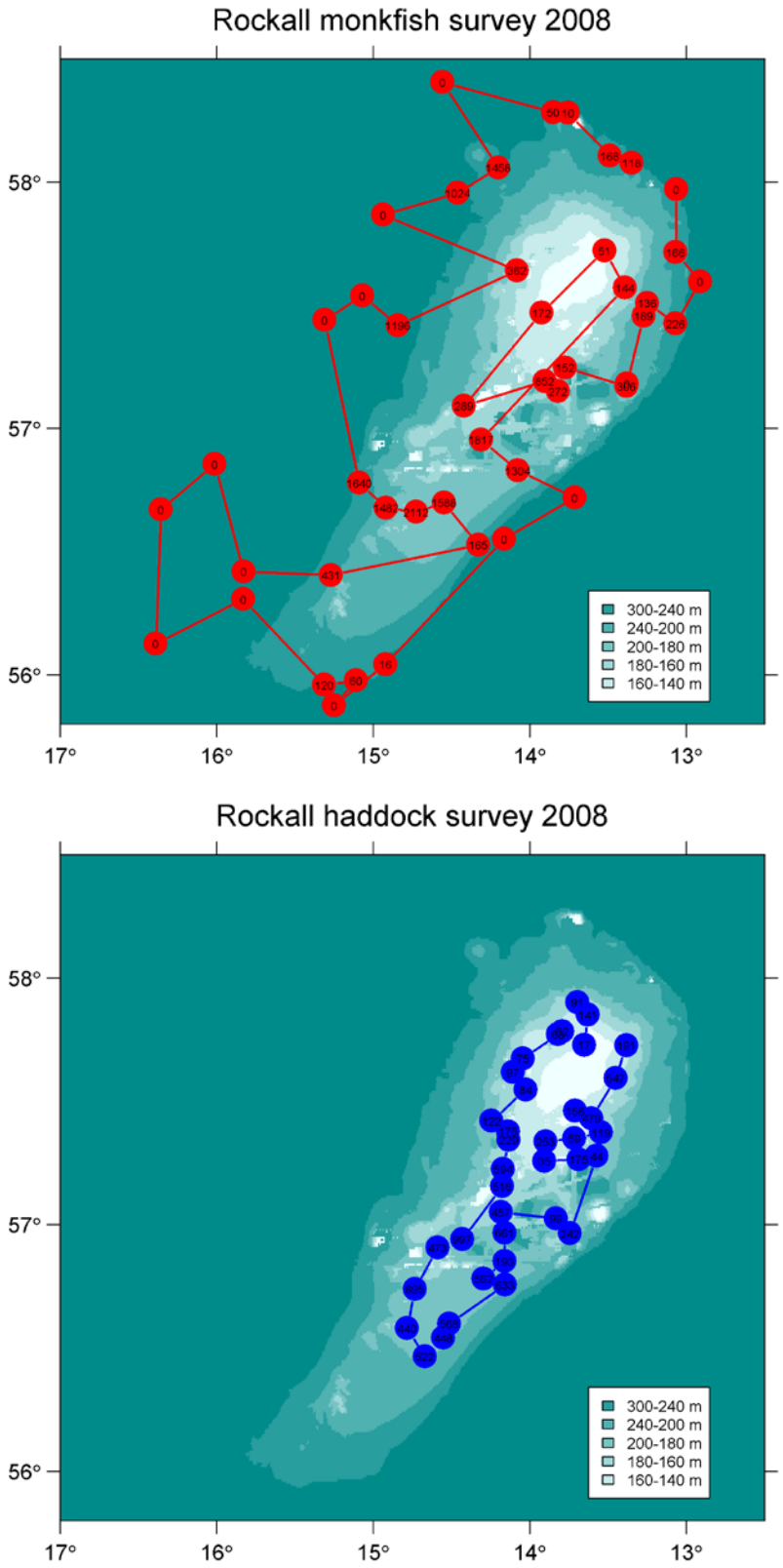


Figure 4. The track of hauls at Rockall during the monkfish and haddock surveys in 2008 and 2009. Number of all haddock (of all ages) per 30 minutes is shown for each haul.

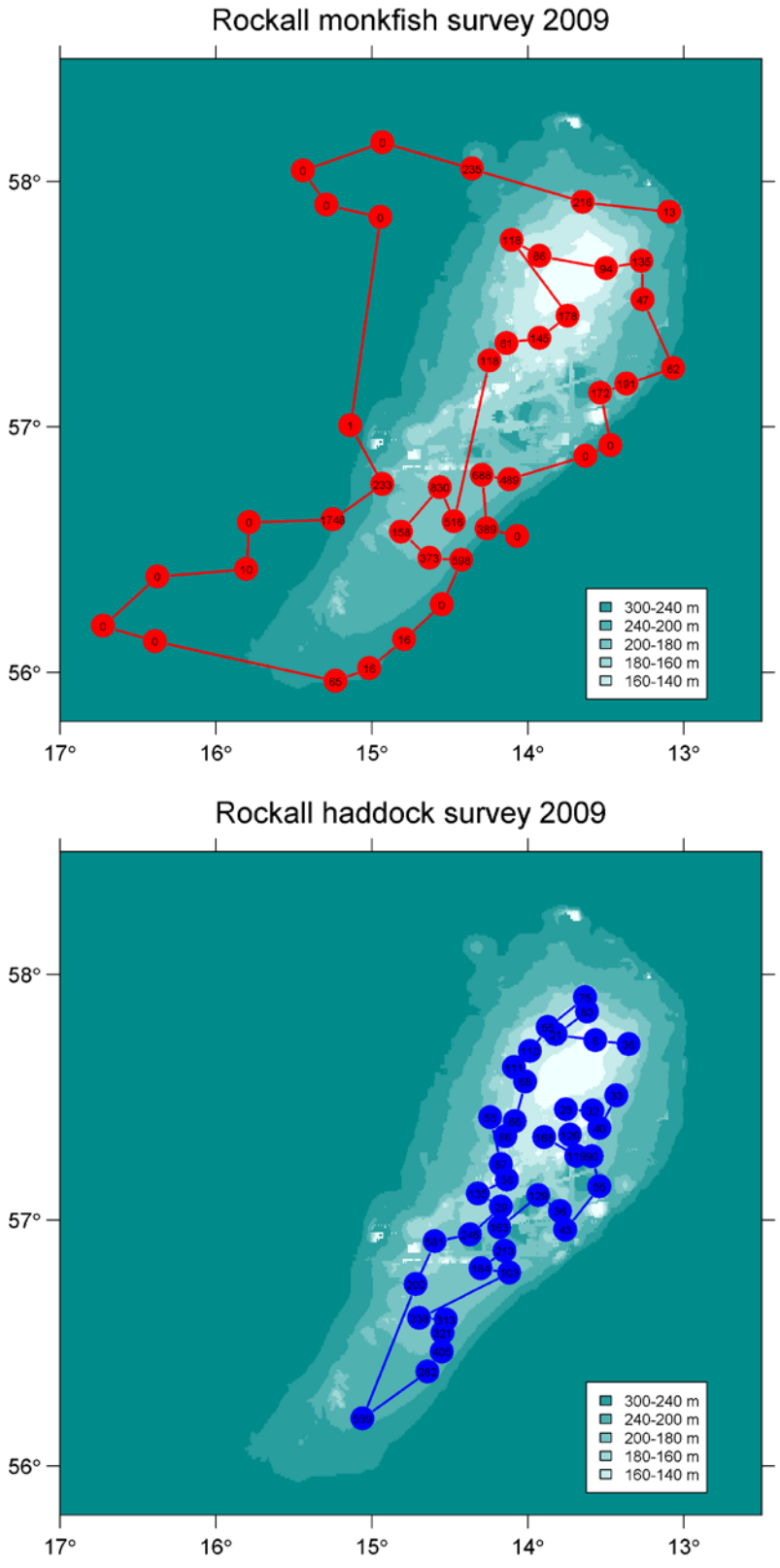


Figure 4. Continued.

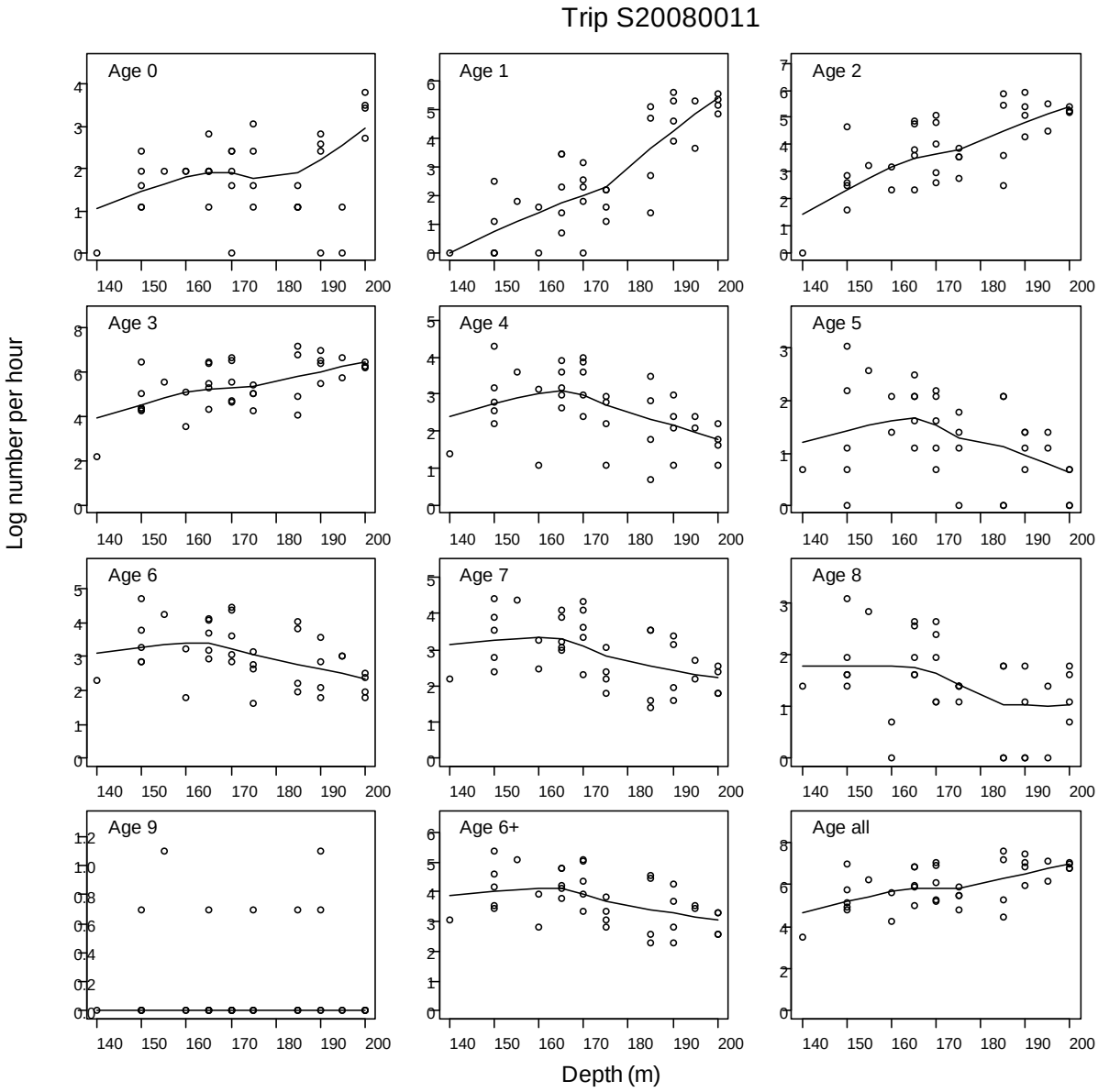


Figure 5. Effect of depth on fish densities based on data from the Rockall haddock surveys in 2008 and 2009.

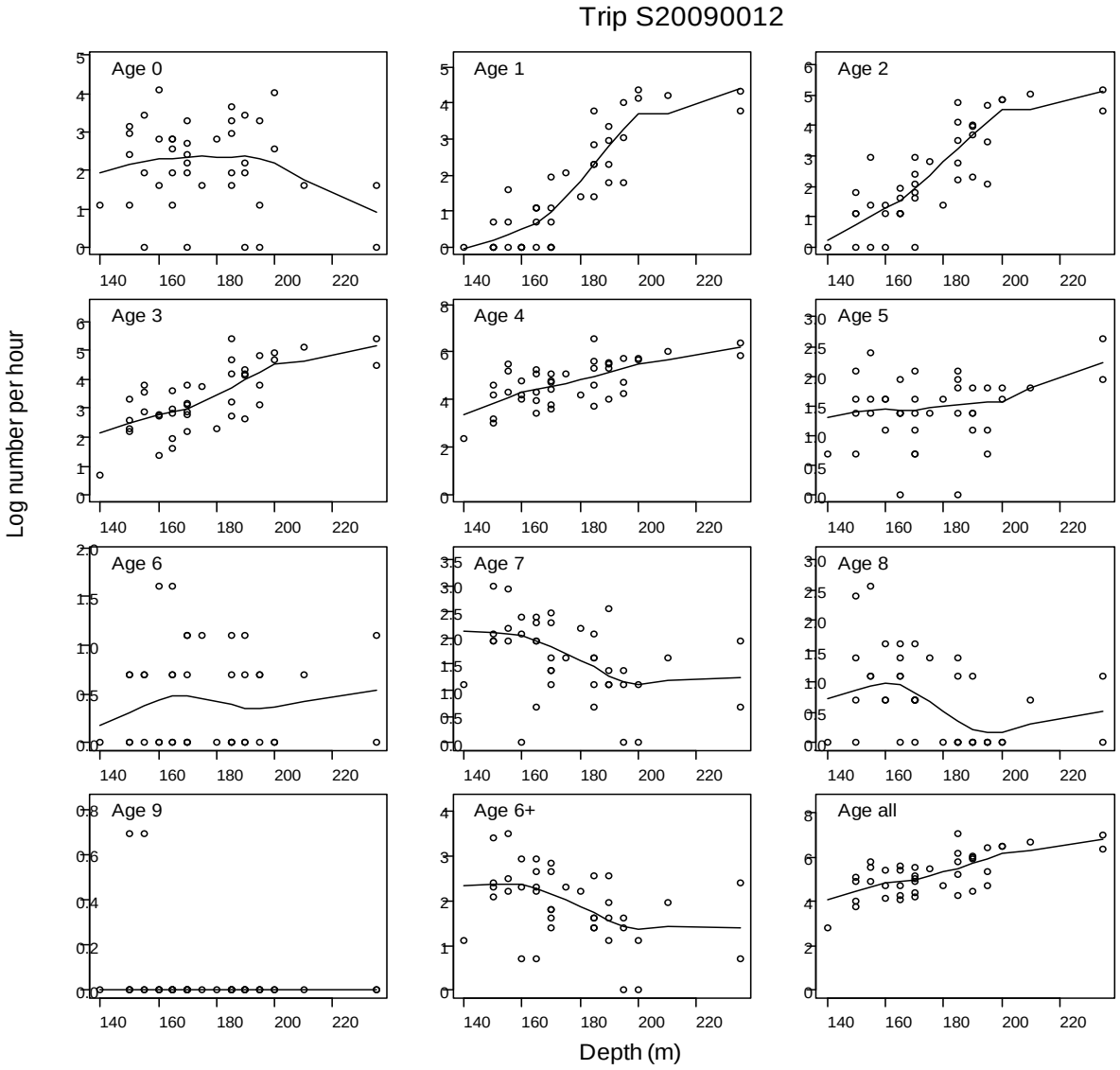


Figure 5. Continued.

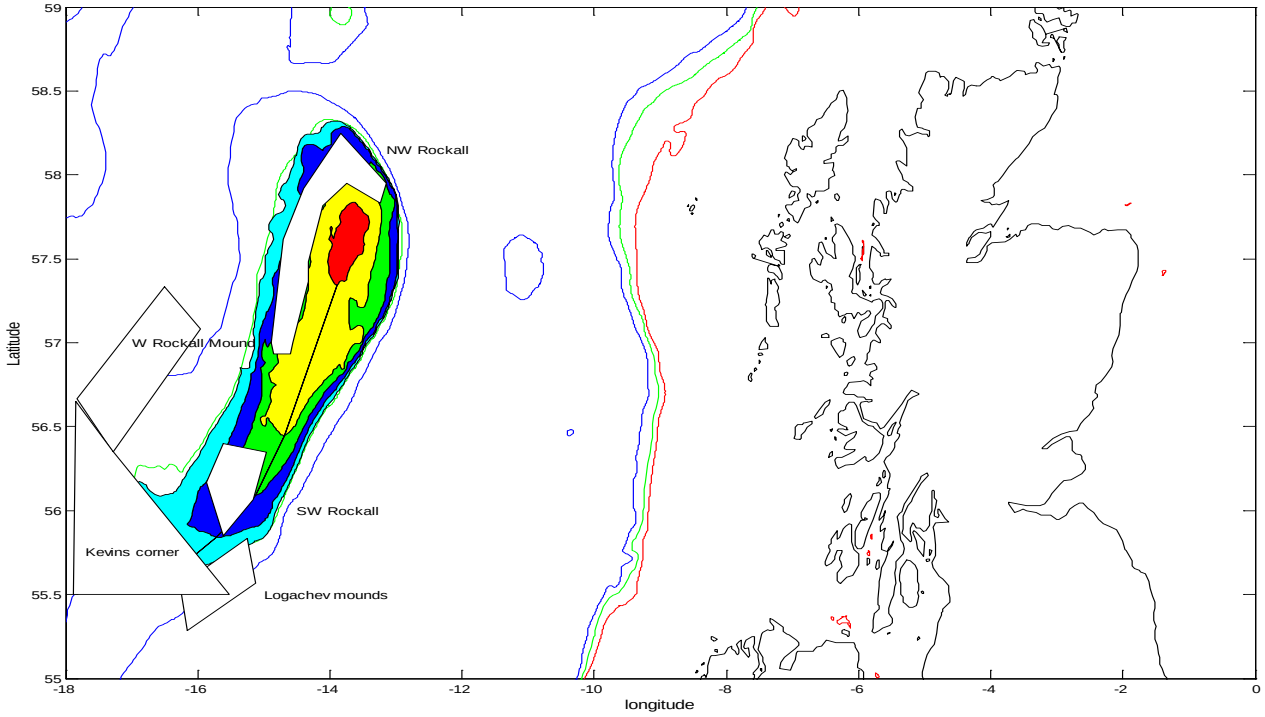


Figure 6. Strata for VIb (Rockall haddock survey).
nb – closed areas on Rockall Plateau are coloured white

Working document IBTSWG
Copenhagen, Denmark, 28 March–1 April 2011

Proposal for the use of taxonomic identifications in the Western IBTS (Evhoe) and Eastern English Channel (CGFS) survey data

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Introduction

Reliable species identification is a challenging task, in particular for certain taxa and can depend on the specialists on board in a given year. Here we identify the records in the CGFS (Eastern English Channel) and the Evhoe (Celtic Sea and Bay of Biscay - Western IBTS) data series, which are likely to be unreliable. We make proposals for removing certain records or using the genus or family level to obtain reliable and interpretable time series. The task has been carried out by a working group gathering scientists involved in the French scientific surveys at sea as well as scientists with expertise in the biology and ecology of the demersal species in the areas covered by the surveys.

In summary, the French working group had two objectives: i) identify potential species identification errors or confusions and ii) identify species which should be excluded from analyses aiming to study long term time trends due to unreliable sampling by the survey gear.

Method

For the analysis the Evhoe series was split into the Celtic Sea and Bay of Biscay. For the three series the records for genii with several species, e.g. *Lophius piscatorius* and *Lophius budegassa*, and the records with both genus and species levels, e.g. *Belone belone* and *Belone*, were then extracted. Species by species it was then considered whether there were any difficulties in species identification. This judgement was based on the expert knowledge of the scientists which were on board of these surveys and general knowledge of the distribution range of each species. Further, changes in the onboard practice in species identification were recorded.

Results

Table 1 lists the species records in the database which are considered doubtful and proposes consistent taxonomic recodings for analysis of the whole series. In certain cases, in particular for meso-pelagic species, which are not well sampled by the GOV bottom trawls, it is recommended to exclude the records from certain analyses.

Table 1. List of taxa currently reported in the English Channel (CGFS) and Western IBTS (Evhoe) DATRAS and their proposed taxonomic recoding or removal.

Taxon stored	Proposed taxonomic use	Comment
Eastern English Channel - CGFS		
Alosa alosa & Alosa fallax	Alosa	identification uncertain
Arnoglossus laterna	Arnoglossus	
Atherina presbyter	Atherina	May include *A. boyeri*
Balistes	Balistes capriscus	Only one species in the area

Taxon stored	Proposed taxonomic use	Comment
Belone belone	Belone	May include *Belone svetovidovi*
Buglossidium	Buglossidium luteum	only one species in the area
Callionymus lyra	Callionymus	identification uncertain
Gaidropsarus mediterraneus & Gaidropsarus vulgaris	Gaidropsarus	identification uncertain
Gobius, Gobius paganellus & Gobius niger	Gobiidae	not well sampled by gear
Hippocampus & Hippocampus hippocampus	Hippocampus hippocampus	Only this species in the area
Hyperoplus, Hyperoplus immaculatus, Hyperoplus lanceolatus & Ammodytes tobianus	*Ammoditidae*	identification uncertain
Loligo	Excluded	Mixture of Loligo forbesi and Loligo vulgaris until 1992
Loligo forbesi		no data before 1993 (identified as Loligo)
Loligo vulgaris		no data before 1993 (identified as Loligo)
Lophius	Lophius piscatorius	Only this species in the area
Pagellus bogaraveo & Pagellus erythrinus	Pagellus	identification uncertain (only rare small individuals were caught)
Palaemon serratus & Palaemon	Excluded	Not well sampled by gear
Pomatoschistus minutus & Pomatoschistus pictus	Excluded	not well sampled by gear (too small)
Sepia	Sepia officinalis	Only this species in the area
Celtic Sea - Evhoe		
Gaidropsarus mediterraneus, Gaidropsarus vulgaris, Gaidropsarus biscayensis & Gaidropsarus macrophthalmus	Gaidropsarus	identification uncertain
Hyperoplus immaculatus & Hyperoplus lanceolatus	*Ammoditidae*	identification uncertain
Liparis & Liparis liparis liparis	Excluded	not well sampled by gear
Maja squinado	Maja brachydactyla	Only Maja brachydactyla in the area M squinado is a Mediterranean species, formerly lumped
Molva dypterygia	Molva macrophthalma	Molva dyperygia absent south of Porcupine
Munida intermedia & Munida rutllanti	Munida	identification uncertain
Mustelus asterias & Mustelus mustelus	Mustelus	No identification to species level from 2009
Myctophum & Myctophum punctatum	Excluded	not well sampled, meso-pelagics
Octopus vulgaris	Octopus	identification uncertain
Polymetme corythaeola	Excluded	not well sampled, meso-pelagics
Pomatoschistus norvegicus	Pomatoschistus	not well sampled by gear
Golfe de Gascogne - Evhoe		
Alosa alosa & Alosa fallax	Alosa	identification uncertain
Ammodytes marinus & Ammodytes tobianus	*Ammoditidae*	identification uncertain

Taxon stored	Proposed taxonomic use	Comment
Argentina silus & Argentina sphyraena	Argentina	identification correct from 1999
Argyropelecus aculeatus, Argyropelecus hemigymnus & Argyropelecus olfersi	Argyropelecus	Mesopelagic, identification uncertain
Arnoglossus imperialis, Arnoglossus laterna & Arnoglossus thori	Arnoglossus	identification uncertain
Balistes	Balistes capriscus	Only this species in the area
Gaidropsarus mediterraneus, Gaidropsarus vulgaris, Gaidropsarus biscayensis & Gaidropsarus macrophthalmus	Gaidropsarus	identification uncertain
Gobius, Gobius paganellus & Gobius niger	Gobiidae	identification uncertain
Hippocampus guttulatus & Hippocampus hippocampus	Hippocampus	identification uncertain
Hyperoplus immaculatus & Hyperoplus lanceolatus	*Ammoditidae*	identification uncertain
Labrus bergylta & Labrus mixtus	Labrus	identification uncertain
Lampanyctus crocodilus & Lampanyctus macdonaldi	Excluded	Mesopelagic, not well sampled
Loligo forbesi & Loligo vulgaris	Loligo	identification uncertain
Lophius & Lophius budegassa	Lophius piscatorius	Small numbers of fish identified as *Lophius* sp. ascribed to the most abundant species, fish identified as Lophius budegassa kept separated
Molva dypterygia	Molva macrophthalma	Molva dyperygia absent south of Porcupine
Munida intermedia & Munida rugosa	Munida	identification uncertain
Mustelus asterias, Mustelus punctulatu & Mustelus mustelus	Mustelus	No identification to species level from 2009
Myctophum & Myctophum punctatum	Excluded	not well sampled, meso-pelagics
Nezumia aequalis & Nezumia sclerorhynchus	Nezumia	identification uncertain
Notoscopelus, Notoscopelus caudispinosus & Notoscopelus kroyeri	Excluded	not well sampled, meso-pelagic species
Octopus vulgaris	Octopus	Uncertain identification
Polymetme corythaeola & Polymetme thaeocoryla	Excluded	not well sampled, meso-pelagic species
Pomatoschistus lozanoi, Pomatoschistus minutus & Pomatoschistus norvegicus	Pomatoschistus	identification uncertain
Scomber japonicus	Scomber colias	Atlantic chub mackerel, formerly S. japonicus now ascribed to S. colias
Solea senegalensis	Excluded	Low numbers in the survey
Syngnathus acus, Syngnathus rostellatus & Syngnathus typhle	Syngnathus	identification uncertain
Trachurus mediterraneus, Trachurus trachurus & Trachurus picturatus	Trachurus	Reliable species identification only in recent years

Problems encountered during the treatment of North-Sea IBTS (1983-2010) data extracted from DATRAS, and potential solutions

Working document for ICES IBTS Working Group, March 2011

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Introduction

At Ifremer we annually extract data from the online database of trawl surveys, in order to calculate population and community metrics (some of which are required by the Data Collection Framework). When doing this we encountered a number of questions and difficulties, which are listed below. The first problem was that we were unable to find a complete, detailed description of the data base fields. The IBTS manual gives instructions about units in some fields, there are some details about coding on the ICES website, but a full text description of the field contents is lacking. We had to request help from ICES staff by email. An example or protocol on how to use the data, especially to reconstruct the original samples, would be very useful.

DATRAS HH file (haul information)

Data filtering

For long term analyses statistical rectangles in the Eastern English Channel are removed as the area covered has been increasing in recent years; similarly the rectangles in the Kategatt are removed and those in the Skagerrak could be (Figure 1). Kategatt:45F2, 46F2, 47F1, 46E6, 50F1, 38F8, 39F8, 37E9, 42F7, 43F5, 35F5, 36F8, 46G1, 40G2, 47E6, Eastern English Channel: 29F1, 29F0, 28F0, 30F1, 30F0, 31F3, 49E7, 50E7, 30E9

The fields ShootLat and ShootLong are used as the geographic position of a haul as HaulLat and HaulLong are missing (–9) in many case (6101 lines for the whole period). This data would have been useful to calculate trawled distance.

Only valid hauls are kept (Field Haulval=V).

Question 1: What does Haulval=P (partially valid) mean, and what can we do with these hauls ? 279 hauls are concerned.

Only hauls with Gear=GOV are kept. (72 hauls with other gear)

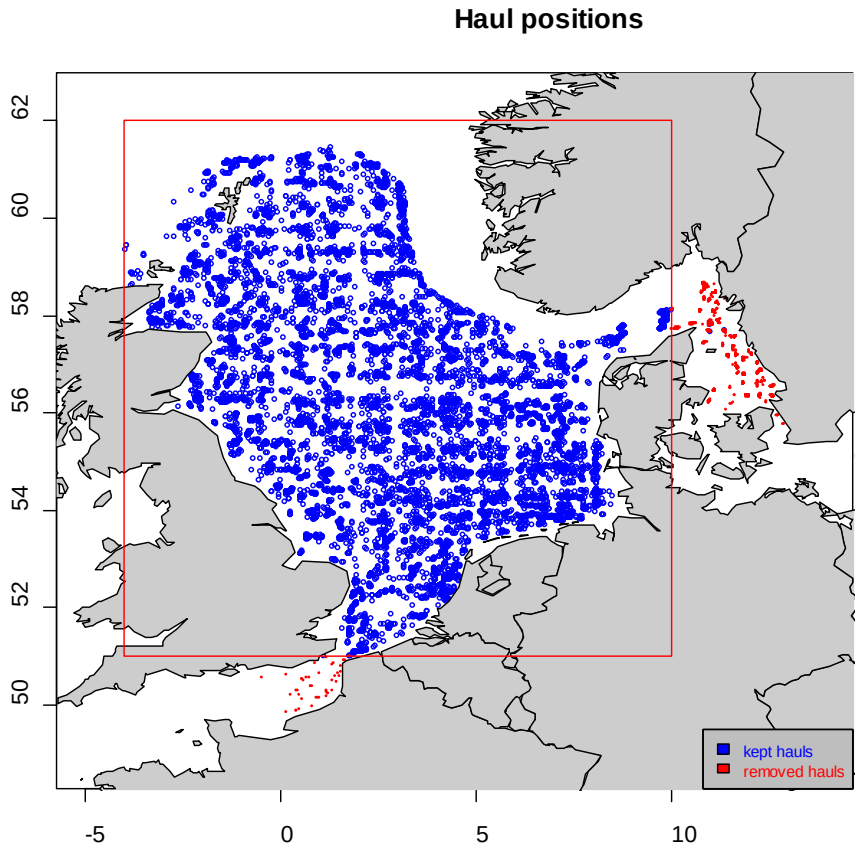


Figure 1. Position of hauls in DATRAS North Sea data base. Hauls in red are situated in the Eastern English Channel and the Kategatt.

Calculation of swept area

When Wingspread is unknown (-9 for 1311 lines): If there are more than 3 lines with a "non-missing-value" for the wingspread of this StatRect, the field was filled with the rectangle mean; else if less than 3 lines within the rectangle, the field was filled with the mean wingspread for the whole North Sea.

Distance calculation: When the fields GroundSpeed and HaulDur are missing (2474 lines for GroundSpeed) and Distance field is missing (–9) or larger than 2 times the standard distance (standard distance should be 3704 meters for a 30 minutes x 4 knots haul), GroundSpeed and HaulDur were filled with standard values (4 knots and 30 minutes) to be able to compute the Distance.

Question 2 : Why are some hauls valid when HaulDur <20 minutes ? What to do with these hauls ?

Some fields units are referring to miles (or knots) and some are in meters, which is not easy to use.

Haul identifyer

To create a unique identification key for hauls, the fields hh$Year, hh$Quarter, hh$Ship, hh$HaulNo are concatenated. When DataType =C (CPUE), it means that the number is per hour (http://www.ices.dk/datacentre/reco/reco.asp?ref=9). So, what does it mean when DataType=C and HaulDur is different from 60 minutes ? How are really calculated the data ?

Suggestion : in downloaded files, the name of the column "**m**onth" should be written "**M**onth" (upcase M) (some softwares like R are case sensitive).

DATRAS HL file (species information)

Species names

To convert the numeric code into latin name :

Species codes changed in 2004. The two lists can be downloaded from ICES website (http://www.ices.dk/datacentre/datsu/selrep.asp)

- Before 2004: http://www.ices.dk/datacentre/datsu/rptSpc.asp?Id=57
- After 2004: http://www.ices.dk/datacentre/datsu/rptSpc.asp?Id=14

Some species codes found in the data are in neither list. The tool "Species query tool" (http://datras.ices.dk/Data_products/qryspec.aspx) can be used to retrieve the appropriate code (species by species). Some species codes are missing (List appended below).

As species codes have changed in 2004, two reference files are needed (one before and one after 2004). Sometimes, in the data, some species codes continued to be used after 2004.

Suggestion 1 : Update reference species list files on ICES website (see species list in annex), including the corrections proposed in the publication below.

Species codes were also corrected following recommendations by (ter Hofstede and Daan, 2008).

Lengths

In a few hauls, we found some strange lengths, due to the LngtCode that was wrong (set to 1 instead of 0, which means that the length unit should have been mm). The LngtCode field was forced to 0.

Suggestion 2: A reference file could be created to describe what maximum size is acceptable for each species.

Weight data are missing in many instances. Besides, using the field description that we received from ICES staff, we never managed to find a consistent way to use them across all records. There seems to be confusion (or at least potential confusion) between fields SubWgt and CatCatchWgt.

Question 3: How can total weight per species per haul be reconstructed from the data?

Instead, weight were generated from length records by the formula: $Weight=Number*a*Size^{b}$.

This required to assemble a complete list of length weight relationships (coefficients a and b) for all North Sea species.

Suggestion 3: Create a standard length-weight coefficient data base for the whole North Sea, for each species.

When no coefficients are available, the coefficients are set to a= .00001 and b=3 (28 species).

Suggestion 4: Provide the list of controls that have been done before the data are made available on the Datras website.

Reference

ter Hofstede, R., and Daan, N. 2008. A proposal for a consistent use of the North Sea IBTS data. ICES CM 2008 / R:25, 6 p.

Appendix : How we replaced missing species codes

Species code found in the data (after being corrected according to the publication) but not in species reference list	Replacement used	Comment
82384	556692	
160876	564149	
161832	161831	
164749	164748	
162315		Valid but not found in species lists
160890	564143	
167316		Valid but not found in species lists
160885	564126	
160888	564134	
160890	564143	
162315		Valid but not found in species lists
166423	551497	
166613		Valid but not found in species lists
167373	644643	
167478		Valid but not found in species lists
170297		Valid but not found in species lists
172748	616195	
172831	616613	
205713		Valid but not found in species lists
564140		Valid but not found in species lists
82356		Valid but not found in species lists
82361		Valid but not found in species lists
98573		Valid but not found in species lists
98744		Valid but not found in species lists

	DATRAS			ITIS		WoRMS					WG's decision	ICES DC	
#	DATRAS ScientificName	Used in	Years of data	TSN	Valid/Invalid	Taxon status	ScientificName	AphiaID	AphiaID_accepted	ScientificName_WoRMS_accepted	Historical data | New data	Comments	notes
1	Alloteuthis subulata	NS-IBTS	2009-2010	82384	invalid	accepted	Alloteuthis subulata	153131	153131	Alloteuthis subulata	ok | follow WoRMS		
2	Alosa fallax	IBTS, BITS, EVHOE	1965-2010	161716	invalid	accepted	Alosa fallax	126415	126415	Alosa fallax	ok | follow WoRMS		
3	Caelorinchus caelorhincus	WC-IBTS, EVHOE	1985-2010	165373	valid	unaccepted	Caelorinchus caelorhincus	126464	398381	Coelorinchus caelorhincus	change name| follow WoRMS		
4	Epinephelus acanthistius	**BTS**	1995-2000	167749	valid	unaccepted	Epinephelus acanthistius	273832	475097	Hyporthodus acanthistius	**change data to Liparis spp (167550 -sea snails**		
5	Hippocampus ramulosus	EVHOE	2002	166498	valid	unaccepted	Hippocampus ramulosus	127381	154776	Hippocampus guttulatus	map | follow WoRMS		
6	Labrus bimaculatus	EVHOE	1997-2005	170738	valid	unaccepted	Labrus bimaculatus	126966	151501	Labrus mixtus	map | follow WoRMS		
7	Liza ramada	NS-IBTS, EVHOE	1997-2010	170376	invalid	accepted	Liza ramada	126980	126980	Liza ramada	ok | follow WoRMS		
8	Liza ramado	n/a	n/a	630328	valid	unaccepted	Liza ramado	273645	126980	Liza ramada	ok | follow WoRMS		
9	Macropipus puber	NS-IBTS	2009	98744	valid	unaccepted	Macropipus puber	154300	107398	Necora puber	change | follow WoRMS		
10	Maia squinado	NS-IBTS, EVHOE	2009, 2004	98573	valid	unaccepted	Maia squinado	535934	107350	Maja squinado	map to Maja brachydactyla Balss, 1922 Aphi	Validity conflicts.	M.squinado is Meditteranian
11	Myoxocephalus quadricornis	NS-IBTS, BITS	1991-2010	167316	valid	unaccepted	Myoxocephalus quadricornis	254529	127208	Triglopsis quadricornis	map | follow WoRMS		
12	Phrynorhombus norvegicus	NS-IBTS	2004, 2010	172831	invalid	accepted	Phrynorhombus norvegicus	127147	127147	Phrynorhombus norvegicus	ok | follow WoRMS		
13	Pycnogonum littorale	NS-IBTS	2005	83665	valid	unaccepted	Pycnogonum littorale	134744	239867	Pycnogonum litorale	**investigate with the submitter**		
14	Raja brachyura	IBTS, BTS, EVHOE	1965-2010	160880	valid	unaccepted	Raja brachyura	105882	271509	Bathyraja brachyurops	stick to Raja		Bathyraja - DW spec. From SouthAmer.
15	Solea vulgaris	IBTS, BITS, BTS, EVHOE	1965-2010	173001	valid	unaccepted	Solea vulgaris	154712	127160	Solea solea	map | follow WoRMS		
16	Zenopsis conchifera	SCO-IBTS	2008	166284	valid	unaccepted	Zenopsis conchifera	159434	127426	Zenopsis conchifer	Worms spelling is right - change		
17	Zeugopterus norvegicus	NS-IBTS	1965-2010	616613	valid	unaccepted	Zeugopterus norvegicus	293018	127147	Phrynorhombus norvegicus	change | follow WoRMS		
18	Centroscymnus crepidater	n/a	n/a	160725	valid	unaccepted	Centroscymnus crepidater	105908	280071	Centroselachus crepidater	| follow WoRMS		
19	Lamprididae	NS-IBTS	1994-1996	615903	valid	unaccepted	Lamprididae	535937	125478	Lampridae	**approach the submitter, so far keep the old**		
20	Phycinae	SCO-IBTS	2009	555704	valid	unaccepted	Phycinae	535936	125475	Phycidae	**investigate**		
21	Syngnathoidei	NS-IBTS	1981-1985	166438	valid	unaccepted	suborder				change to Syngnathidae	WoRMS don't operate with suborders. Should choose order or family.	
22	Sebastes marinus	IBTS	1965-2008	166745	invalid	unaccepted	Sebastes marinus	127253	151324	Sebastes norvegicus	use invalid WoRMS code for historical and fu	ITIS suggests Serranus scriba as the valid name. - not right	
23	Artediellus europaeus	IBTS	1997	167209	invalid	unaccepted	Artediellus europaeus	510123	127193	Artediellus atlanticus	ask lab, re-upload as 167208 |follow WoRMS		
	Artediellus atlanticus	n/a	n/a	167208	valid	accepted	Artediellus atlanticus	127193	127193	Artediellus atlanticus	| follow WoRMS	In WoRMS only A.atlanticus with TSN167208 is valid.	
		n/a	n/a	167210	valid	unaccepted	Artediellus atlanticus europaeus	322894	127193	Artediellus atlanticus	| follow WoRMS		
24	Gasterosteus aculeatus	NS-IBTS	2005	201979	invalid	accepted	Gasterosteus aculeatus williamsoni	293602	293602	Gasterosteus aculeatus williamsoni	change to species | follow WoRMS	DATRAS uses 3 TSN codes for G.aculeatus. 2 of them are sub-species. All codes are valid according to WoRMS. What should be used?	in lakes in Canada
		NS-IBTS	2005-2007	201978	valid	accepted	Gasterosteus aculeatus aculeatus	236462	236462	Gasterosteus aculeatus aculeatus	change to species | follow WoRMS		
		IBTS, BITS, BTS	1965-2010	166365	valid	accepted	Gasterosteus aculeatus	126505	126505	Gasterosteus aculeatus	change to species | follow WoRMS		
25	Stomias boa	n/a	n/a	162292	valid	accepted	Stomias boa	127374	127374	Stomias boa	| follow WoRMS	Currently we use S.boa with TSN162289, which is indeed a subspecies code. What should be used?	
		SCO-IBTS, EVHOE	2006-2010	162289	valid	accepted	Stomias boa ferox	158737	158737	Stomias boa ferox	is subspecies in uploads | follow WoRMS		
26	Ciliata mustella	IBTS, BITS, EVHOE, BTS	1965-2010	164779	invalid	accepted	Ciliata mustela	126448	126448	Ciliata mustela	change to the valid | follow WoRMS	Invalid TSN in DATRAS DB. Can the proposed synonyms be accepted for historical data?	
27	Molva macropthalma	EVHOE	1999-2007	164763	invalid	accepted	Molva macrophthalma	126460	126460	Molva macrophthalma	change to the valid | follow WoRMS		
28	Ritulus ritulus	BITS	1994	163617	invalid	accepted	Rutilus rutilus	154333	154333	Rutilus rutilus	change to the valid | follow WoRMS		
29	Engraulis encrasicolus	IBTS	2009	161832	invalid	accepted	Engraulis encrasicolus	126426	126426	Engraulis encrasicolus	change to the valid | follow WoRMS		
30	Loligo forbesii	IBTS, BTS, EVHOE	1990-2010	82374	valid	accepted	Loligo forbesii	416668	416668	Loligo forbesii	suggestions toWoRMS?	Wait for WoRMS editors to decide which synonym should be used.	
						accepted	Loligo forbesi	140270	140270	Loligo forbesi	**single i is preferrable**		

DATRAS Specification Document

Units in DATRAS Products

Contents

Exchange data

(Product for all species)

Field name	Units/codes description
RecordType	http://www.ices.dk/datacentre/reco/reco.asp?ref=191
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Country	http://www.ices.dk/datacentre/reco/reco.asp?ref=4
Ship	http://www.ices.dk/datacentre/reco/reco.asp?ref=3
Gear	http://www.ices.dk/datacentre/reco/reco.asp?ref=2
SweepLngt	metres
GearExp	http://www.ices.dk/datacentre/reco/reco.asp?ref=97
DoorType	http://www.ices.dk/datacentre/reco/reco.asp?ref=98
StNo	national code
HaulNo	numeric value
Year	calendar year, yyyy
Month	http://www.ices.dk/datacentre/reco/reco.asp?ref=13
Day	calendar day of the month, dd
TimeShot	time, hhmm
Stratum	http://www.ices.dk/datacentre/reco/reco.asp?ref=99
HaulDur	minutes
DayNight	http://www.ices.dk/datacentre/reco/reco.asp?ref=8
ShootLat	Degree.Decimal Degree of latitude
ShootLong	Degree.Decimal Degree of longitude
HaulLat	Degree.Decimal Degree of latitude
HaulLong	Degree.Decimal Degree of longitude
StatRec	http://www.ices.dk/env/refcodes/icear.htm
Depth	metres
HaulVal	http://www.ices.dk/datacentre/reco/reco.asp?ref=1
HydroStNo	national code
StdSpecRecCode	http://www.ices.dk/datacentre/reco/reco.asp?ref=88
BycSpecRecCode	http://www.ices.dk/datacentre/reco/reco.asp?ref=89
DataType	http://www.ices.dk/datacentre/reco/reco.asp?ref=9
Netopening	metres
Rigging	http://www.ices.dk/datacentre/reco/reco.asp?ref=181
Tickler	http://www.ices.dk/datacentre/reco/reco.asp?ref=182
Distance	metres
Warplngt	metres
Warpdia	millimetres
WarpDen	kg per linear meter
DoorSurface	square metres
DoorWgt	kilograms
DoorSpread	metres
WingSpread	metres
Buoyancy	kilograms
KiteDim	square metres
WgtGroundRope	kilograms

TowDir	degrees
GroundSpeed	knots
SpeedWater	knots
SurCurDir	degrees
SurCurSpeed	metres/second
BotCurDir	degrees
BotCurSpeed	metres/second
WindDir	degrees
WindSpeed	metres/second
SwellDir	degrees
SwellHeight	metres
SurTemp	Celsius degrees
BotTemp	Celsius degrees
SurSal	Practical Salinity Units (PSU)
BotSal	Practical Salinity Units (PSU)
ThermoCline	http://www.ices.dk/datacentre/reco/reco.asp?ref=112
ThClineDepth	metres
SpecCodeType	http://www.ices.dk/datacentre/reco/reco.asp?ref=96
SpecCode	http://datras.ices.dk/Data_products/qryspec.aspx
SpecVal	http://www.ices.dk/datacentre/reco/reco.asp?ref=5
TotalNo	number of fish
CatIdentifier	http://www.ices.dk/datacentre/reco/reco.asp?ref=16
NoMeas	number of fish
SubFactor	factor of subsampling
SubWgt	grams
CatCatchWgt	grams
LngtCode	http://www.ices.dk/datacentre/reco/reco.asp?ref=18
LngtClass	if LngtCode is . or 0 - in mm; otherwise - in cm
HLNoAtLngt	number of fish
AreaType	http://www.ices.dk/datacentre/reco/reco.asp?ref=10
AreaCode	Check Related References for AreaType in RECO
Sex	http://www.ices.dk/datacentre/reco/reco.asp?ref=17
Maturity	http://www.ices.dk/datacentre/reco/reco.asp?ref=128
PlusGr	http://www.ices.dk/datacentre/reco/reco.asp?ref=14
Age	years
NoAtALK	number of fish
IndWgt	grams

CPUE per length per haul

(Product for standard and all species)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Ship	http://www.ices.dk/datacentre/reco/reco.asp?ref=3
Gear	http://www.ices.dk/datacentre/reco/reco.asp?ref=2
HaulNo	numeric value
ShootLat	Degree.Decimal Degree of latitude
ShootLon	Degree.Decimal Degree of longitude
DateTime	as mm/dd/yyyy hh:mm(:ss PM/AM)
Depth	metres
Area	http://www.ices.dk/datacentre/reco/reco.asp
Subarea	ICES statistical rectangle
DayNight	http://www.ices.dk/datacentre/reco/reco.asp?ref=8
Species	Latin name
Sex	http://www.ices.dk/datacentre/reco/reco.asp?ref=17
LngtClas	millimetres
CPUE_number_per_hour	catch in numbers per hour

CPUE per length per area

(Product for standard and all species)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Area	http://www.ices.dk/datacentre/reco/reco.asp
Subarea	ICES statistical rectangle
Species	Latin name
Sex	http://www.ices.dk/datacentre/reco/reco.asp?ref=17
LngtClas	millimetres
CPUE_number_per_hour	catch in numbers per hour

CPUE per age per haul

(Product for standard species only)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Ship	http://www.ices.dk/datacentre/reco/reco.asp?ref=3
Gear	http://www.ices.dk/datacentre/reco/reco.asp?ref=2
HaulNo	numeric value
ShootLat	Degree.Decimal Degree of latitude
ShootLon	Degree.Decimal Degree of longitude
DateTime	as mm/dd/yyyy hh:mm(:ss PM/AM)
Depth	metres
Area	http://www.ices.dk/datacentre/reco/reco.asp
Subarea	ICES statistical rectangle
DayNight	http://www.ices.dk/datacentre/reco/reco.asp?ref=8
Species	Latin name
Sex	http://www.ices.dk/datacentre/reco/reco.asp?ref=17
Age_0	catch in numbers per hour
Age_1	catch in numbers per hour
Age_2	catch in numbers per hour
Age_3	catch in numbers per hour
Age_4	catch in numbers per hour
Age_5	catch in numbers per hour
Age_6	catch in numbers per hour
Age_7	catch in numbers per hour
Age_8	catch in numbers per hour
Age_9	catch in numbers per hour
Age_10	catch in numbers per hour

CPUE per length per statrec

(Product for standard and all species)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Area	http://www.ices.dk/datacentre/reco/reco.asp
Subarea	ICES statistical rectangle
Species	Latin name
LngtClas	millimetres
CPUE_number_per_hour	catch in numbers per hour

Mean length per statrec

(Product for standard and all species)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Area	http://www.ices.dk/datacentre/reco/reco.asp
Subarea	ICES statistical rectangle
Species	Latin name
MeanLngt	millimetres

CPUE per age per area

(Product for standard species only)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Area	http://www.ices.dk/datacentre/reco/reco.asp
Species	Latin name
Age_0	catch in numbers per hour
Age_1	catch in numbers per hour
Age_2	catch in numbers per hour
Age_3	catch in numbers per hour
Age_4	catch in numbers per hour
Age_5	catch in numbers per hour
Age_6	catch in numbers per hour
Age_7	catch in numbers per hour
Age_8	catch in numbers per hour
Age_9	catch in numbers per hour
Age_10	catch in numbers per hour

CPUE per age per statrec

(Product for standard species only)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Area	http://www.ices.dk/datacentre/reco/reco.asp
Subarea	ICES statistical rectangle
Species	Latin name
Age_0	catch in numbers per hour
Age_1	catch in numbers per hour
Age_2	catch in numbers per hour
Age_3	catch in numbers per hour
Age_4	catch in numbers per hour
Age_5	catch in numbers per hour
Age_6	catch in numbers per hour
Age_7	catch in numbers per hour
Age_8	catch in numbers per hour
Age_9	catch in numbers per hour
Age_10	catch in numbers per hour

CPUE per area

(Product for standard species only)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Area	http://www.ices.dk/datacentre/reco/reco.asp
Species	Latin name
Sex	http://www.ices.dk/datacentre/reco/reco.asp?ref=17
CPUE_number_per_hour	catch in numbers per hour

CPUE per length and age per area

(Product for standard species only)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Ship	http://www.ices.dk/datacentre/reco/reco.asp?ref=3
Gear	http://www.ices.dk/datacentre/reco/reco.asp?ref=2
HaulNo	numeric value
SubArea	ICES statistical rectangle
Area	http://www.ices.dk/datacentre/reco/reco.asp
DayNight	http://www.ices.dk/datacentre/reco/reco.asp?ref=8
Species	Latin name
Sex	http://www.ices.dk/datacentre/reco/reco.asp?ref=17
LngtCode	http://www.ices.dk/datacentre/reco/reco.asp?ref=18
LngtClas	if LngtCode is . or 0 - in mm; otherwise - in cm
Age_0	catch in numbers per hour
Age_1	catch in numbers per hour
Age_2	catch in numbers per hour
Age_3	catch in numbers per hour
Age_4	catch in numbers per hour
Age_5	catch in numbers per hour
Age_6	catch in numbers per hour
Age_7	catch in numbers per hour
Age_8	catch in numbers per hour
Age_9	catch in numbers per hour
Age_10	catch in numbers per hour
Age_11	catch in numbers per hour
Age_12	catch in numbers per hour
Age_13	catch in numbers per hour
Age_14	catch in numbers per hour
Age_15	catch in numbers per hour

SMALK

(Product for standard and all species)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Species	Latin name
Area	http://www.ices.dk/datacentre/reco/reco.asp
LngtClasMM	millimetres
PlusGr	http://www.ices.dk/datacentre/reco/reco.asp?ref=14
Age	years
Sex	http://www.ices.dk/datacentre/reco/reco.asp?ref=17
Maturity	http://www.ices.dk/datacentre/reco/reco.asp?ref=128
IndividualWeight	grams
NoAtalk	number of fish

ALK

(Product for standard species only)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
Area	http://www.ices.dk/datacentre/reco/reco.asp
SpecCode	TSN code, see http://datras.ices.dk/Data_products/qryspec.aspx
LngtClasMM	millimetres
Age_1	number of fish
Age_2	number of fish
Age_3	number of fish
Age_4	number of fish
Age_5	number of fish
Age_6	number of fish
Age_7	number of fish
Age_8	number of fish
Age_9	number of fish
Age_10	number of fish

Indices

(Product for standard species only)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
SpecCode	TSN code, see http://datras.ices.dk/Data_products/qryspec.aspx
Genus	genus name
Family	species name
IndexArea	http://www.ices.dk/datacentre/reco/reco.asp?ref=162
Sex	http://www.ices.dk/datacentre/reco/reco.asp?ref=17
PlusGr	http://www.ices.dk/datacentre/reco/reco.asp?ref=14
Age_0	Number/hour
Age_1	Number/hour
Age_2	Number/hour
Age_3	Number/hour
Age_4	Number/hour
Age_5	Number/hour
Age_6	Number/hour
Age_7	Number/hour
Age_8	Number/hour
Age_9	Number/hour
Age_10	Number/hour
Age_11	Number/hour
Age_12	Number/hour
Age_13	Number/hour
Age_14	Number/hour
Age_15	Number/hour

Bootstrap data

(Product for standard species only)

Field name	Units/codes description
Survey	http://www.ices.dk/datacentre/reco/reco.asp?ref=102
Year	calendar year, yyyy
Quarter	http://www.ices.dk/datacentre/reco/reco.asp?ref=12
SpecCode	TSN code, see http://datras.ices.dk/Data_products/qryspec.aspx
Genus	genus name
Family	species name
IndexArea	http://www.ices.dk/datacentre/reco/reco.asp?ref=162
Sex	http://www.ices.dk/datacentre/reco/reco.asp?ref=17
PlusGr	http://www.ices.dk/datacentre/reco/reco.asp?ref=14
Age_0	Number/hour
Age_1	Number/hour
Age_2	Number/hour
Age_3	Number/hour
Age_4	Number/hour
Age_5	Number/hour
Age_6	Number/hour
Age_7	Number/hour
Age_8	Number/hour
Age_9	Number/hour
Age_10	Number/hour
Age_11	Number/hour
Age_12	Number/hour
Age_13	Number/hour
Age_14	Number/hour
Age_15	Number/hour

Annex 6: NS-IBTS indices calculation procedure

A6.1 Overview

For IBTS North Sea, the indices are calculated per index area, which are specific for each species. For most species, the indices are calculated as mean number per hour at-age per statistical rectangle then as an average of the statistical rectangles over the index area. For herring, sprat and saithe, the indices at age (no/hour) are calculated using mean over rectangles, weighted for the percentage of area with water depths between 10m-200m and for area 8 and 9 water depths between 10m-250m.

The following rules apply:

- Only valid hauls are taken into account
- When only a few ALK observations are available, additional data of the ALK from neighbouring area is used (see A6.4)
- There is a weighting factor applied for each statistical rectangle (see Annex 6.5) for herring, sprat and saithe
- For herring and sprat only day hauls (based on day/night code) are taken into account (see A6.3)
- As age-group 2 and older herring in area 8 and 9 are considered to be spring spawners and since only an index for autumn spawners should be created, cpue for these are set to zero

For herring two extra indices are calculated to reflect the Downs's herring spawning component juveniles, based on herring up to and including length of 12.5 cm. The first (NS Her1to9) is calculated as described above whereas the second (NS her1to7) assumes that the cpue in RF8 and 9 are zero because the small herring here could be mainly spring spawners.

Basically, the following steps are applied to the raw DATRAS data:

1. cpue per length (l) and age (a; 1 cm group and 0.5 cm for herring and sprat) per haul: sum by year, quarter, statistical rectangle (ST) and divide by total number of hauls (H) in the statistical rectangle in that year and quarter.

$$mCPUE_{ST,a,l} = \frac{\sum_{ST} CPUE_{H,a,l}}{\sum_{ST} H}$$

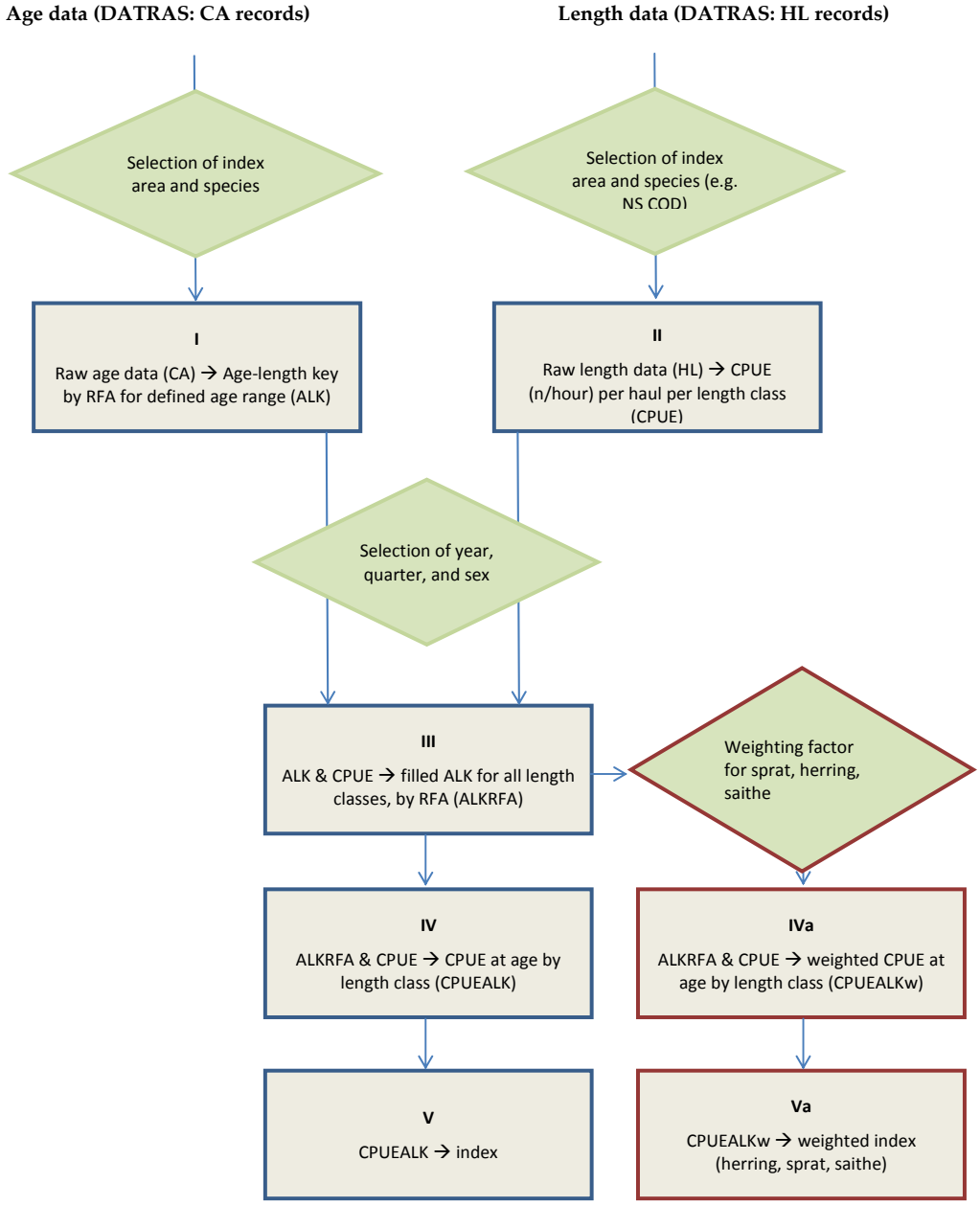
2. Mean cpue by index area: sum of mean cpue per length per age in all fished rectangles in index area (IA) divided by number of fished rectangles in index area:

$$mCPUE_{IA,a,l} = \frac{\sum_{IA} CPUE_{ST,a,l}}{\sum_{IA} ST}$$

3. Indices by age: sum of the cpue by length for a specific age within the index area:

$$mCPUE_{IA,a} = \sum_{l} mCPUE_{IA,a,l}$$

A6.2 Flow diagram from DATRAS Exchange data to year class index, NS-IBTS.



I Raw age data (CA) → Age–length key by RFA for defined age range (ALK)

a. Extraction of raw age at length data from DATRAS for species and index area

b. Calculate age–length key by roundfish area (RFA) by centimetre classes and for herring and sprat by 0.5 cm classes

c. If there is no ALK for a roundfish area, ALK's from neighbouring RFA's are used to fill gaps (see Annex 6.4)

d. Numbers per length class are summed for age groups < plus group. Numbers per length class for ages >= plus group are added to the plus group

II Raw length data (HL) → CPUE (n/hour) per haul per length class (CPUE)

a. Extraction of raw length data from DATRAS for species and index area, including a selection criteria for day/night code (see A6.3); for herring/sprat only day hauls are selected, for the other species all hauls are selected
b. Calculation of number of valid hauls per statistical rectangle
c. Addition of 'zero hauls', i.e. add 0 values for all omitting length classes
d. Raise data from sub sampling to total number per haul by multiplying the number at length with the sub sampling factor
e. Sum number at haul by length class over category and sex
f. If data type is not cpue (C) then NoAthaul=number*(60/HaulDuration)
g. Sum cpue per haul per length for each statistical rectangle per roundfish area

III ALK and cpue → filled ALK for all length classes, by RFA (ALKRFA)

a. Merge ALK and cpue file by year, quarter, RFA, length class
b. If there is no ALK for a length in the cpue file, age information is obtained as follows:
   - If length class (cpue) < minimum length class (ALK), then age=1 for the first quarter and age=0 for all other quarters (see A6.1)
   - If minimum length class (ALK) < length class (cpue) < maximum length (ALK) then age is set to the nearest ALK. If the ALK file contains values at equal distance, a mean is taken from both values (see A6.4)
   - If length class (cpue > maximum length (ALK) age is set to the plus group
c. Merge ALK file with cpue file by year, quarter, length class

IV ALKRFA and CPUE → CPUE at-age by length class (CPUEALK)

a. Merge ALKRFA and CPUE by year, quarter, RFA, length class
b. Sum numbers at length per age per statistical rectangle
c. Sum number of hauls per statistical rectangle
d. Calculate mean CPUE at length per age per statistical rectangle (=result(b)/result(c))

V CPUEALK → index

Va CPUEALKw → indexw

a. Sum CPUE per age by indexarea
b. Sum number of fished statistical rectangles in indexarea
c. Calculate mean CPUE for the indexarea (=result(a)/result(b))

A6.3

Table A6.3. Day-night haul, min-max length and aggregation of ALK and CPUE lookup table for individual index areas

Index area and species	Quarter	Maximum age	ALK Minimum length (mm)	ALK Maximum length (mm)	ALK area level	CPUE area level	Length class aggregation level	Maximum dummy length Class (mm)	Area weighting taken into account	Day/night values taken into account
NS_Cod	1	6	150	900	RFArea	Statistical rectangle	1 cm	1500	no	no
NS_Cod	2	6	70	1100						
NS_Cod	3	6	70	1100						
NS_Cod	4	6	70	1100						
NS_CodCat	1	6	150	900	RFArea	Statistical rectangle	1 cm	1500	no	no
NS_CodCat	3	6	70	1100						
NS_Haddock	1	6	150	600	RFarea	Statistical rectangle	1 cm	800	no	no
NS_ Had-dock	2	6	100	700				1000	no	no
NS_ Had-dock	3	6	100	700						
NS_ Had-dock	4	6	100	700						
NS_Herring	1	5	150	320	RFarea	Statistical rectangle	0.5 cm	500	yes	yes
NS_ Herring	2	5	60	340						
NS_ Herring	3	5	60	340						
NS_ Herring	4	5	60	340						
NS_Her1to9	1	5	60	125	RFarea	Statistical rectangle	0.5 cm	500	yes	yes
NS_Her1to7	1	5	60	125	RFarea	Statistical rectangle	0.5 cm	500	yes	yes
NS_Mackerel	1	6	200	450	RFarea	Statistical rectangle	1 cm	600	no	no
NS_Mackerel	2	6	50	450						
NS_Mackerel	3	6	50	450						
NS_Mackerel	4	6	50	450						
NS_Norway Pout	1	6	100	250	RFarea	Statistical rectangle	1 cm	500	no	no

Index area and species	Quarter	Maximum age	ALK Minimum length (mm)	ALK Maximum length (mm)	ALK area level	CPUE area level	Length class aggregation level	Maximum dummy length Class (mm)	Area weighting taken into account	Day/night values taken into account
NS_ Norway Pout	2	6	50	250						
NS_ Norway Pout	3	6	50	250						
NS_ Norway Pout	4	6	50	250						
NS_Plaice IIIa	1	10	40	600	RFarea	Statistical rectangle	1 cm	800	No	no
NS_Plaice IIIa	3	10	40	600						
NS_Saithe	1	6	250	900	RFarea	Statistical rectangle	1 cm	1200	yes	no
NS_Saithe	2	6	70	1100						
NS_Saithe	3	6	70	1100						
NS_Saithe	4	6	70	1100						
NS_Sprat IIIa	1	6	70	160	RFarea	Statistical rectangle	0.5 cm	300	yes	yes
NS_Sprat IIIa	3	6	70	160						
NS_Sprat IV	1	6	70	160	RFarea	Statistical rectangle	0.5 cm	300	yes	yes
NS_Sprat IV	2	6	45	160						
NS_Sprat IV	3	6	45	160						
NS_Sprat IV	4	6	45	160						
NS_Whiting	1	6	150	450	RFarea	Statistical rectangle	1 cm	650	no	no
NS_ Whiting	2	6	80	500				800		
NS_ Whiting	3	6	80	500						
NS_ Whiting	4	6	80	500						

A6.4 The IBTS ALK supplement procedure

The procedure is as given below:

The ALK table by species and roundfish area (RFA) is checked for empty cells and for age classes containing less than 25 otoliths. If no otoliths were collected then data from neighbouring RFA's are added to the ALK. All ALKs are inspected manually, which is also a quality control procedure where peculiarities are spotted. Often individual outliers or bulks of data not consistent with the rest of data are spotted. These data are then looked into and send back to the country of origin for checking. Manual

inspection of the ALK data are also used to identify omitting data from a country, discovered when there is no or an incomplete ALK for a RFA.

The procedure for supplementary data is described below.

1. The ALK table is compared with the CPUE (number/hour) by species and RF. Special attention is required for situations where the number of otoliths is low, but the CPUE is high. If the ALK data are not sufficient, i.e. spread out over length and ages, additional data are derived from neighbouring ALK's.
2. If there are only a few age groups represented in the ALK or the length range of the ALK is limited a supplement is made from neighbouring RFA's.
3. For some species the number of otoliths is too low to create an ALK by RFA. For saithe and mackerel the age data by quarter are merged and applied to all RFA's.

Suggestion: the procedure might be simplified by deciding that supplements for a given RF are derived from all neighbouring RFs. This would mean that:

RFA1	will be supplemented by data from	RFA2, 3
RFA2	"	RFA1, 3, 4, 6, 7
RFA3	"	RFA1, 2, 4
RFA4	"	RFA2, 3, 5, 6
RFA5	"	RFA4, 6
RFA6	"	RFA2, 4, 5, 7
RFA7	"	RFA2, 6
RFA8	"	RFA7, 9
RFA9	"	RFA8

A6.5

Table A6.5. Weights of the statistical rectangle based on its surface area (10–200 meter in the North Sea and 10–250 meter in the Skagerrak and Kattegat).

StatRec	Weight	StatRec	Weight	StatRec	Weight	StatRec	Weight	StatRec	Weight
31F1	0.6	38F0	1	41F6	1	44F1	1	47G0	0.3
31F2	0.8	38F1	1	41F7	1	44F2	1	47G1	0.02
31F3	0.05	38F2	1	41F8	0.1	44F3	1	48E6	1
32F1	0.8	38F3	1	41G0	0.2	44F4	1	48E7	1
32F2	1	38F4	1	41G1	0.97	44F5	0.9	48E8	0.9
32F3	0.8	38F5	1	41G2	0.53	44F8	0.25	48E9	1
32F4	0.01	38F6	1	42E7	0.4	44F9	0.8	48F0	1
33F1	0.3	38F7	1	42E8	1	44G0	0.94	48F1	1
33F2	1	38F8	0.3	42E9	1	44G1	0.6	48F2	1

StatRec	Weight	StatRec	Weight	StatRec	Weight	StatRec	Weight	StatRec	Weight
33F3	1	39E8	0.5	42F0	1	45E6	0.4	48F3	0.5
33F4	0.4	39E9	1	42F1	1	45E7	1	48G0	0.02
34F1	0.4	39F0	1	42F2	1	45E8	1	49E6	0.8
34F2	1	39F1	1	42F3	1	45E9	1	49E7	1
34F3	1	39F2	1	42F4	1	45F0	1	49E8	0.4
34F4	0.6	39F3	1	42F5	1	45F1	1	49E9	1
35F0	0.8	39F4	1	42F6	1	45F2	1	49F0	1
35F1	1	39F5	1	42F7	1	45F3	1	49F1	1
35F2	1	39F6	1	42F8	0.2	45F4	0.6	49F2	1
35F3	1	39F7	1	42G0	0.32	45F8	0.3	49F3	0.5
35F4	0.9	39F8	0.4	42G1	0.89	45F9	0.02	50E6	0.1
35F5	0.1	40E7	0.04	42G2	0.64	45G0	0.24	50E7	0.6
36F0	0.9	40E8	0.8	43E7	0.03	45G1	0.55	50E8	0.7
36F1	1	40E9	1	43E8	0.9	46E6	0.4	50E9	0.9
36F2	1	40F0	1	43E9	1	46E7	0.9	50F0	1
36F3	1	40F1	1	43F0	1	46E8	1	50F1	1
36F4	1	40F2	1	43F1	1	46E9	1	50F2	1
36F5	1	40F3	1	43F2	1	46F0	1	50F3	0.2
36F6	0.9	40F4	1	43F3	1	46F1	1	51E6	0
36F7	0.4	40F5	1	43F4	1	46F2	1	51E7	0
36F8	0.5	40F6	1	43F5	1	46F3	0.8	51E8	0.5
37E9	0.2	40F7	1	43F6	1	46F9	0.3	51E9	1
37F0	1	40F8	0.1	43F7	1	46G0	0.52	51F0	1
37F1	1	41E6	0.03	43F8	0.94	46G1	0.2	51F1	1
37F2	1	41E7	0.8	43F9	0.41	47E6	0.8	51F2	0.5
37F3	1	41E8	1	43G0	0.21	47E7	0.6	51F3	0
37F4	1	41E9	1	43G1	0.7	47E8	1	52E6	0

StatRec	Weight	StatRec	Weight	StatRec	Weight	StatRec	Weight	StatRec	Weight
37F5	1	41F0	1	43G2	0.3	47E9	1	52E7	0
37F6	1	41F1	1	44E6	0.5	47F0	1	52E8	0
37F7	1	41F2	1	44E7	0.5	47F1	1	52E9	0.1
37F8	0.8	41F3	1	44E8	0.9	47F2	1	52F0	0.2
38E8	0.2	41F4	1	44E9	1	47F3	0.6	52F1	0.5
38E9	0.9	41F5	1	44F0	1	47F9	0.01	52F2	0.1
								52F3	0

A6.6 Procedure to fill information gaps in ALK

	Age	Age	Age	Age	Age
cm	1	2	3	4	5+
5		0	0	0	0
6		0	0	0	0
7		0	0	0	0
8		0	0	0	0
9		0	0	0	0
10	5	2	1	0	0
11	3	7	2	0	0
12					
13	2	8	1	0	0
14	9	2	7	1	8
15					
16					
17					
18					
19					
20					

	Age	Age	Age	Age	Age
cm	1	2	3	4	5+
5	1	0	0	0	0
6	1	0	0	0	0
7	1	0	0	0	0
8	1	0	0	0	0
9	1	0	0	0	0
10	5	2	1	0	0
11	3	7	2	0	0
12	2.5	7.5	1.5	0	0
13	2	8	1	0	0
14	9	2	7	1	8
15	9	2	7	1	8
16	9	2	7	1	8
17	9	2	7	1	8
18	5	2	5.5	3	5
19	1	2	4	5	2
20	1	2	4	5	2

	Age	Age	Age	Age	Age
cm	1	2	3	4	5+
21					
22	1	2	4	5	2
23	2	4	5	6	1
24+	0	0	0	0	1

	Age	Age	Age	Age	Age
cm	1	2	3	4	5+
21	1	2	4	5	2
22	1	2	4	5	2
23	2	4	5	6	1
24+	0	0	0	0	1

A6.7 Calculations done on NS-IBTS data in DATRAS

Calculations in the IBTS database are only referring to the standard species.

Basic concepts and variables

Variable	Significance
A	Index for sampling area
R	Index for statistical rectangle
I	Index for length class
J	Index for age group
H(r)	Number of valid hauls in statistical rectangle [r]
C(r)	Number per hour per haul in statistical rectangle [r]
C(r,i)	Length distribution in rectangle [r]: Number per hour per haul in length class [i] and statistical rectangle [r]
C(r,j)	Age distribution in rectangle [r]: Number per hour per haul in age group [j] and statistical rectangle [r]
C(r,i,j)	Age/length distribution in rectangle [r]: Number per hour per haul in length class [i], age group [j] and statistical rectangle [r]
f(a,i,j)	Age/length key for length class [I] in sampling area [a]: The proportions of fish in length class [i] falling in age group [j]
O(a,i,j)	Number of otoliths sampled in sampling area [a], length class [i] and age group [j]
A	Index for samping area
H(a)	Number of valid hauls in sampling area [a]
C(a)	Number per hour per haul in sampling area [a] (total of all rectangles in the area)
R(a)	Number of rectangles sampled in sampling area [a]
Cr(a)	Mean number per hour per haul in sampling area [a] (mean of rectangles in the area)
C(a,i)	Length distribution in samping area [a]: Number per hour per haul in length class [i] and sampling area [a] (total of all rectangles in the area)
C(a,j)	Age distribution in sampling area [a]: Number per hour per haul in age group [j] and sampling area [a] (total of all rectangles in the area)
Cr(a,j)	Mean distribution in sampling area [a]: Mean number per hour per haul in age group [j] and sampling area [a] (mean of all rectangles in the area)
C(a,i,j)	Age/length distribution in sampling area [a]: Number per hour per haul in length class [i], age group [j] and sampling area [a] (total of all rectangles in the area)

Aggregation of data

Aggregation by area takes place on two levels:

1. Sampling area are groupings of statistical rectangle into wider areas. At present only roundfish area is allowed.
2. The standard area for a particular species is a selection of the statistical rectangle used for computation of abundance index for the species in question. It species depended.

The following formulas describe how to aggregate data on sampling area level. The variables and relationships for aggregation by standard area are entirely parallel with aggregation by sampling area and will therefore not be described.

Number of valid hauls in sampling area:

$$H(a) = \sum_{r \in a} H(r)$$

Number per hour per haul in sampling area:

$$C(a) = \sum_{r \in a} C(r)$$

Number of rectangles sampled in sampling area:

$$R(a) = \sum_{r \in a} 1$$

Mean number per hour per haul in sampling area:

$$Cr(a) = \frac{C(a)}{R(a)}$$

Length distribution in sampling area:

$$C(a,i) = \sum_{r \in a} C(r,i)$$

Age distribution in sampling area:

$$C(a,\, j) = \sum_{r \in a} C(r,\, j)$$

Mean distribution in sampling area:

$$Cr(a,\, j) = \frac{C(a,\, j)}{R(a)}$$

Age/length distribution in sampling area:

$$C(a,i,\, j) = \sum_{r \in a} C(r,i,\, j)$$

Annex 7: Maps of species distribution in 2010

Table A7.1. 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)
Clupea harengus	Herring	HER	6–7	17.5
Gadus morhua	Atlantic Cod	COD	2–3	23
Galeorhinus galeus	Tope Shark	GAG	32	
Lepidorhombus boscii	Four-Spotted Megrim	LBI	16–17	19
Lepidorhombus whiffiagonis	Megrim	MEG	14–15	21
Leucoraja naevus	Cuckoo Ray	CUR	30	
Lophius budegassa	Black-bellied Anglerfish	WAF	20–21	20
Lophius piscatorius	Anglerfish (Monk)	MON	18–19	20
Merlangus merlangius	Whiting	WHG	24–25	20
Melanogrammus aeglefinus	Haddock	HAD	4–5	20
Merluccius merluccius	European hake	HKE	8–9	20
Micromesistius poutassou	Blue whiting	WHB	26–27	19
Mustelus asterias	Starry Smooth Hound	SDS	33	
Mustelus mustelus	Smooth Hound	SMH	34	
Nephrops norvegicus	Norway Lobster	NEP	28	
Pleuronectes platessa	European Plaice	PLE	22–23	12
Raja clavata	Thornback ray (Roker)	THR	35	
Raja microocellata	Painted/Small Eyed Ray	PTR	36	
Raja montagui	Spotted Ray	SDR	37	
Raja undulata	Undulate Ray	UNR	38	
Scomber scombrus	European Mackerel	MAC	12–13	24
Scyliorhinus canicula	Lesser Spotted Dogfish	LSD	29	
Scyliorhnus stellaris	Nurse Hound	DGN	39	
Sprattus sprattus	European sprat	SPR	40	
Squalus acanthias	Spurdog	DGS	31	
Trachurus picturatus	Blue Jack Mackerel	JAA	41	
Trachurus trachurus	Horse Mackerel (Scad)	HOM	10–11	15

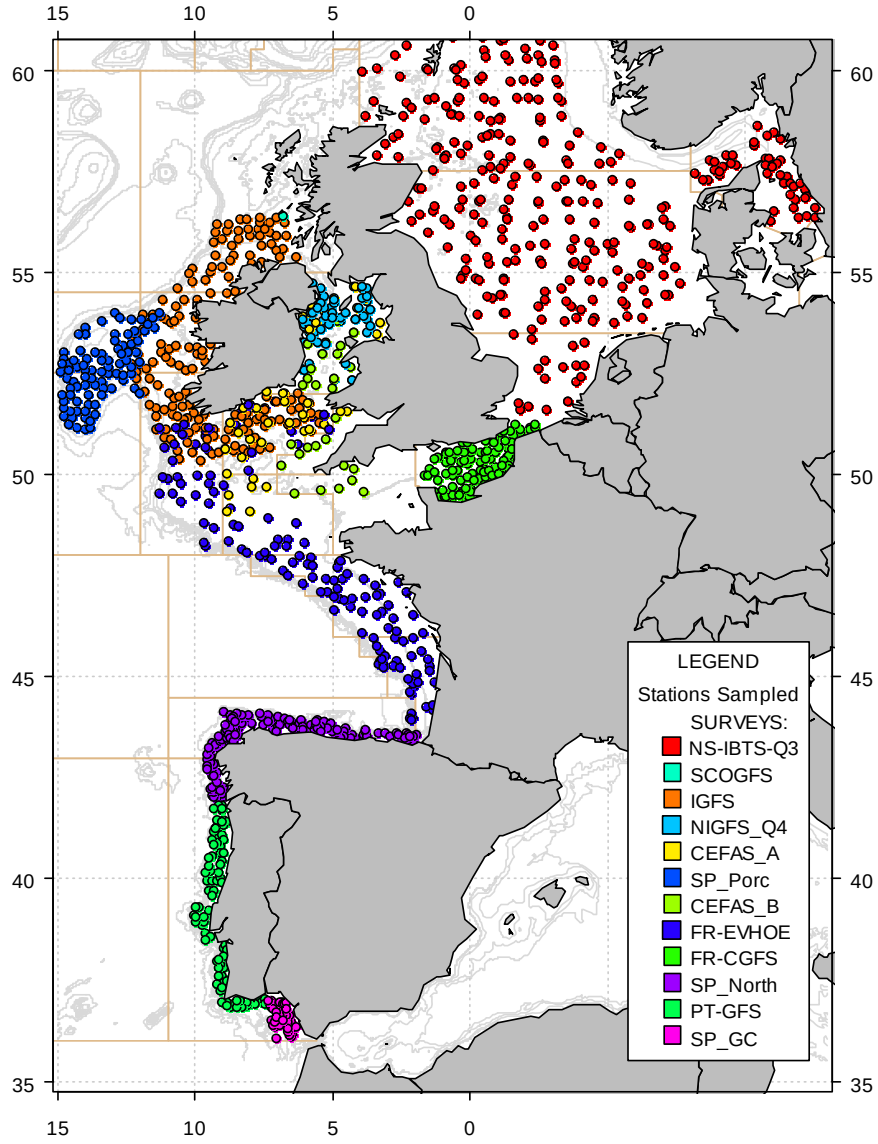


Figure A7.1. Station positions for the IBTS Surveys carried out in the Northeastern Atlantic and North Sea area in summer/autumn of 2010. Quarters 3 and 4

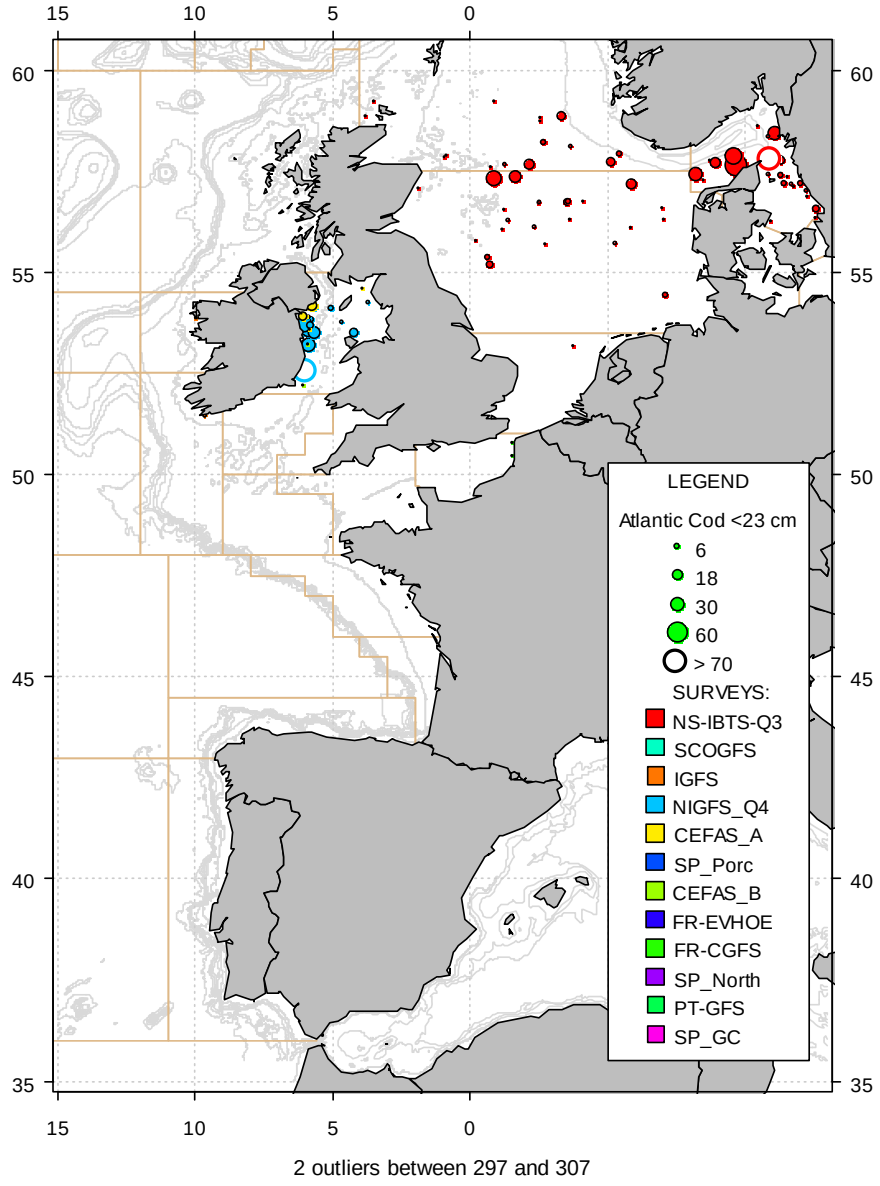


Figure A7.2. Catches in numbers per hour of 0-group Cod, *Gadus morhua* (<23cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

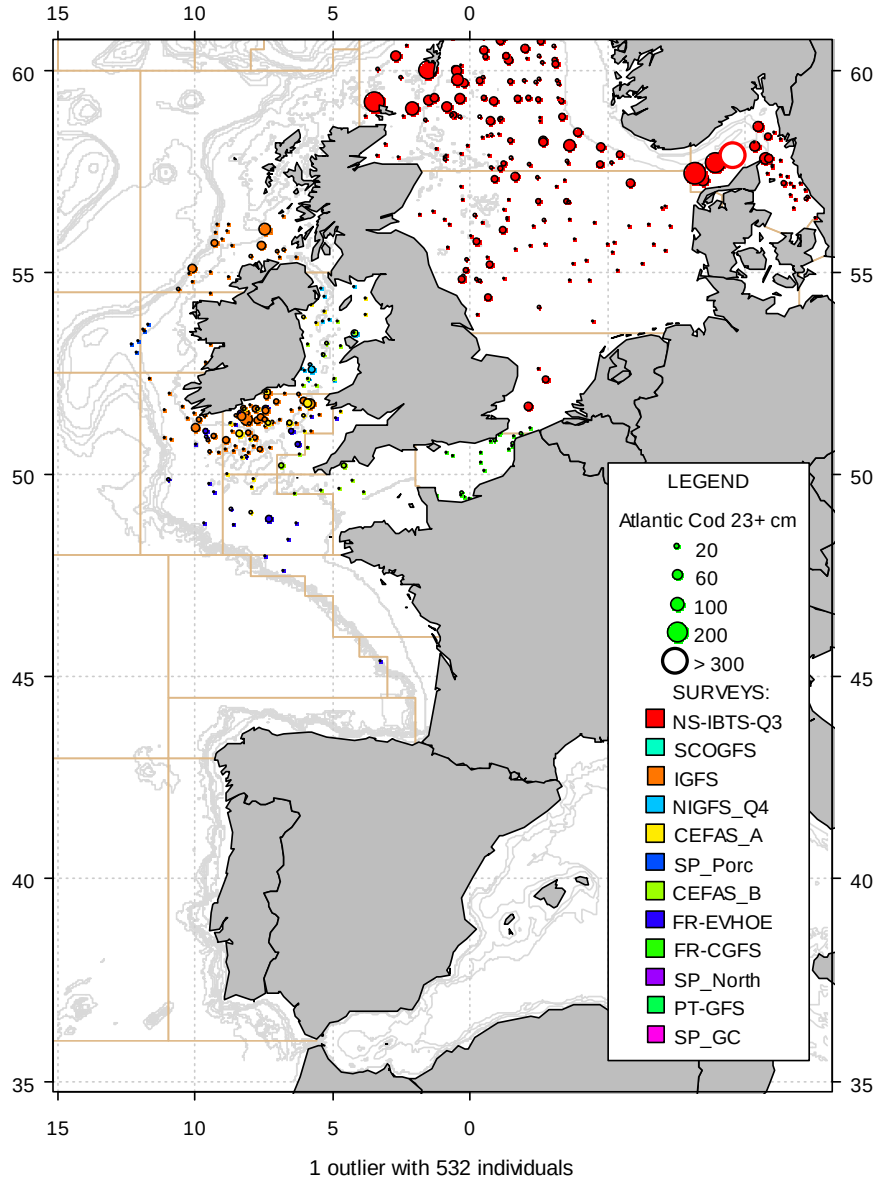


Figure A7.3. Catches in numbers per hour of 1+ cod, *Gadus morhua* (≥23cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

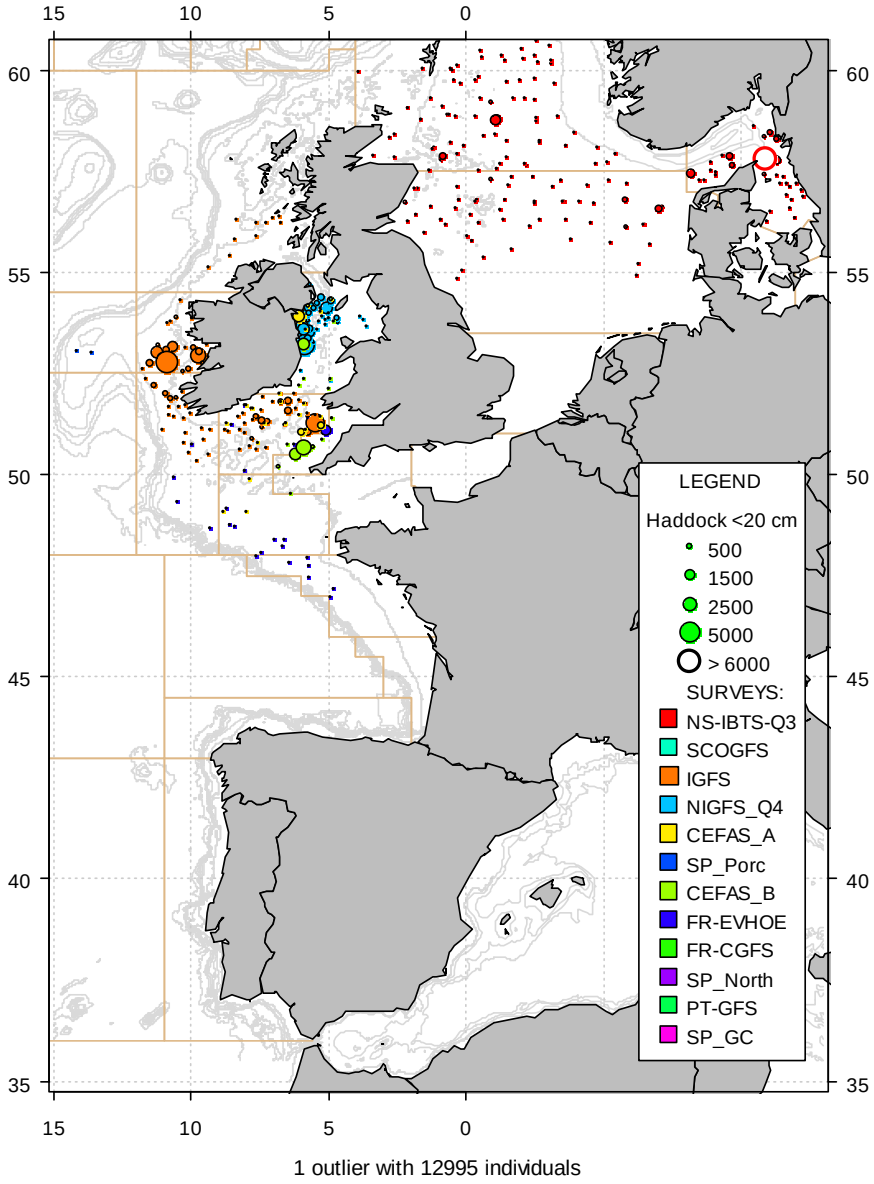


Figure A7.4. Catches in numbers per hour of 0-group haddock, *Melanogrammus aeglefinus* (<20cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

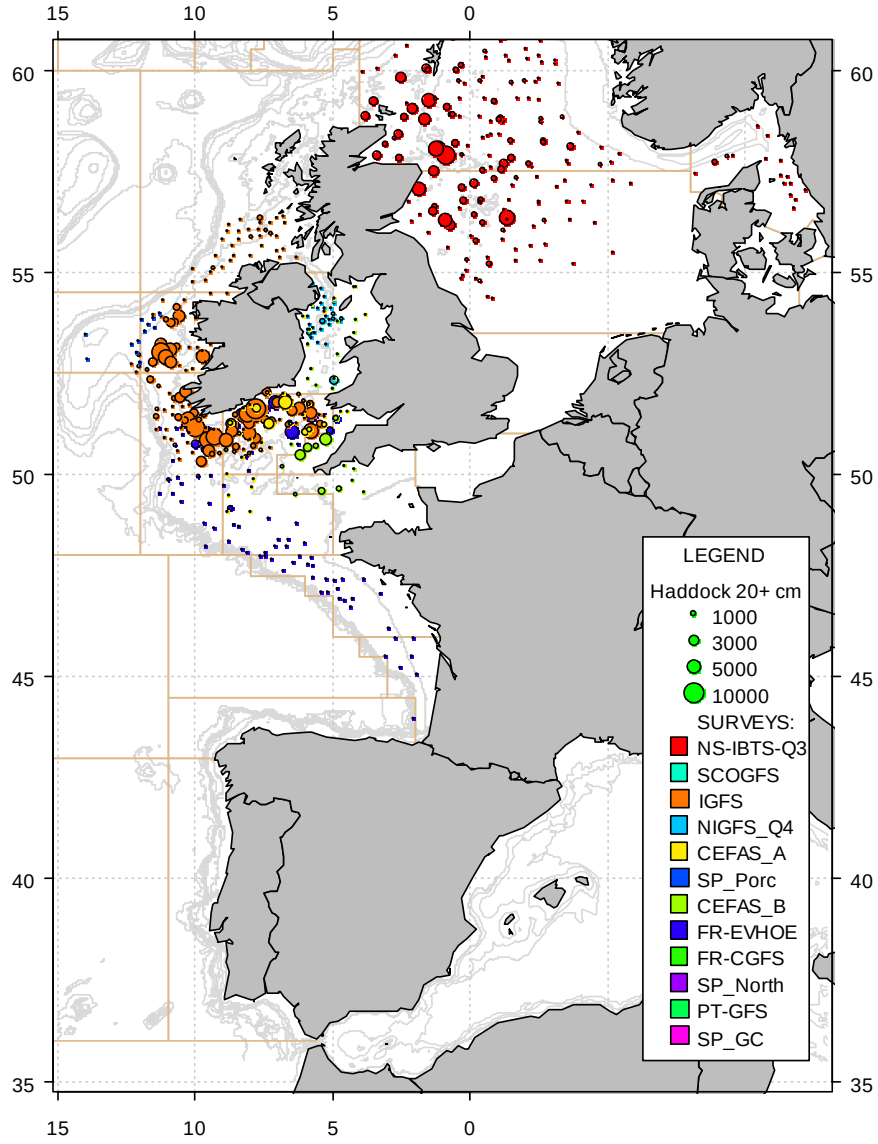


Figure A7.5. Catches in numbers per hour of 1+ group haddock, *Melanogrammus aeglefinus* (≥20cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

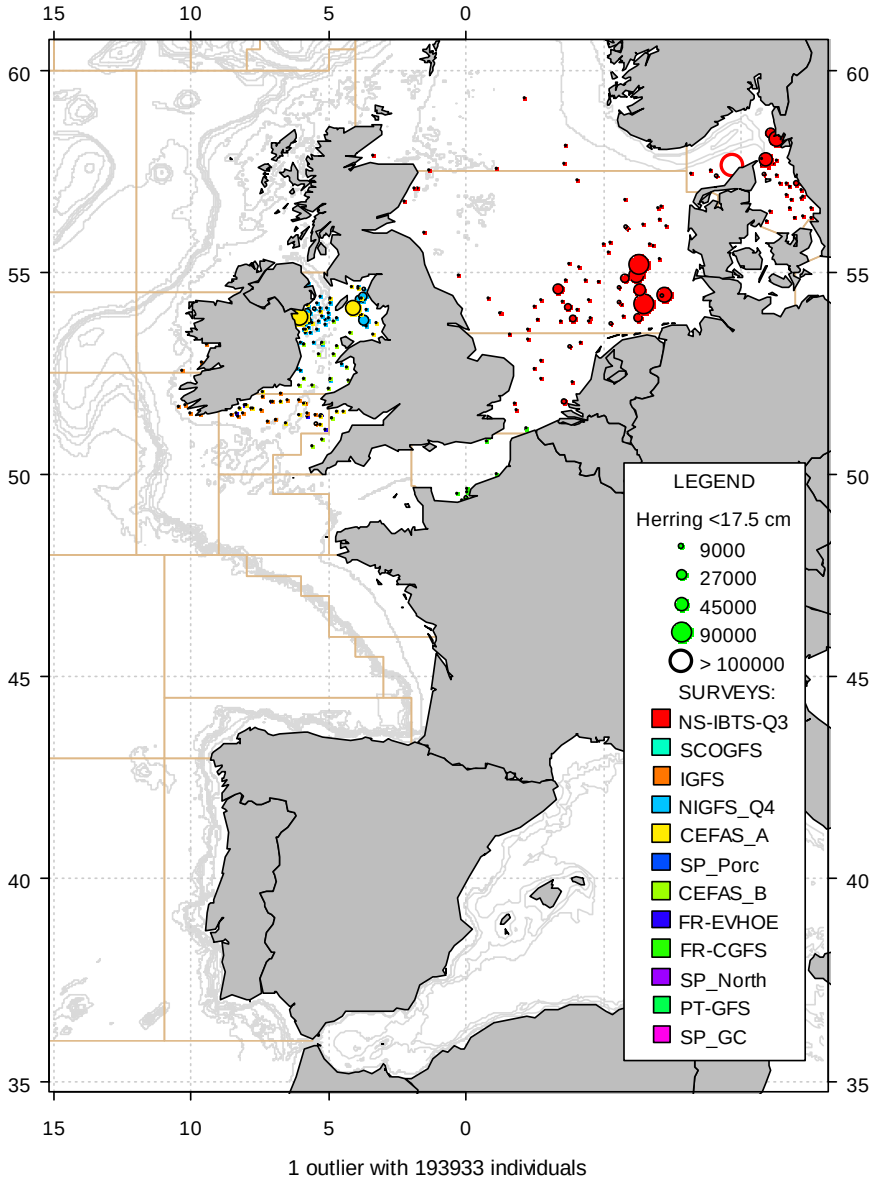


Figure A7.6. Catches in numbers per hour of 0-group herring, *Clupea harengus* (<17.5 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

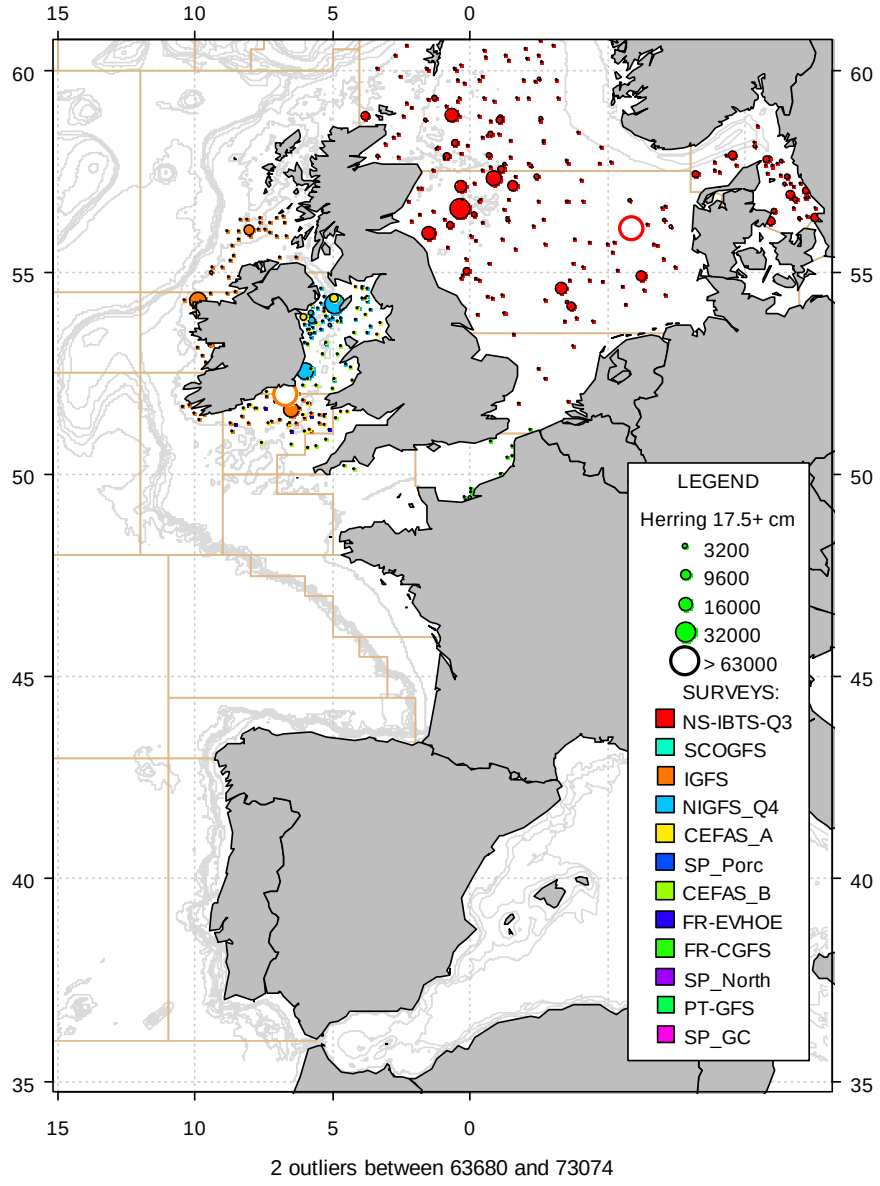


Figure A7.7. Catches in numbers per hour of 1+ group herring, *Clupea harengus* (≥17.5 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

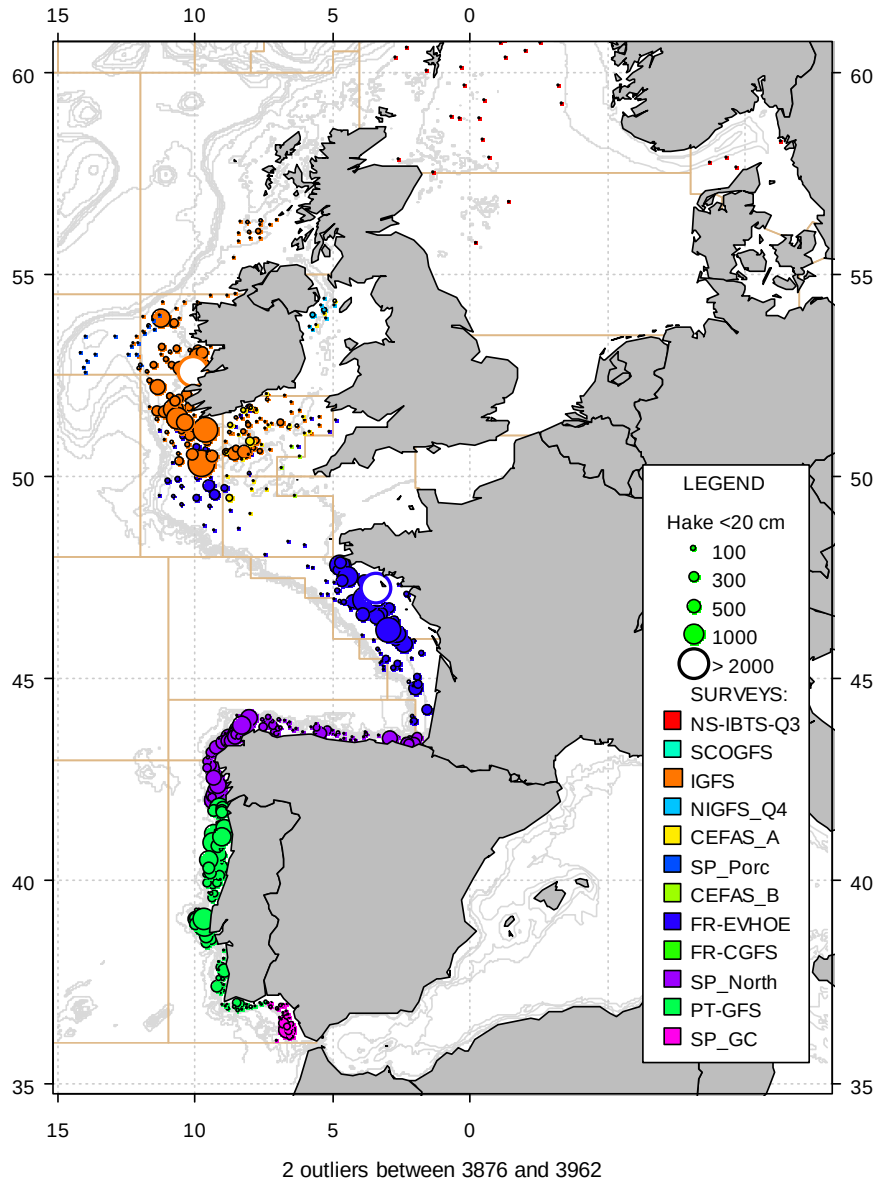


Figure A7.8. Catches in numbers per hour of 0-group Europan hake, *Merluccius merluccius* (<20cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

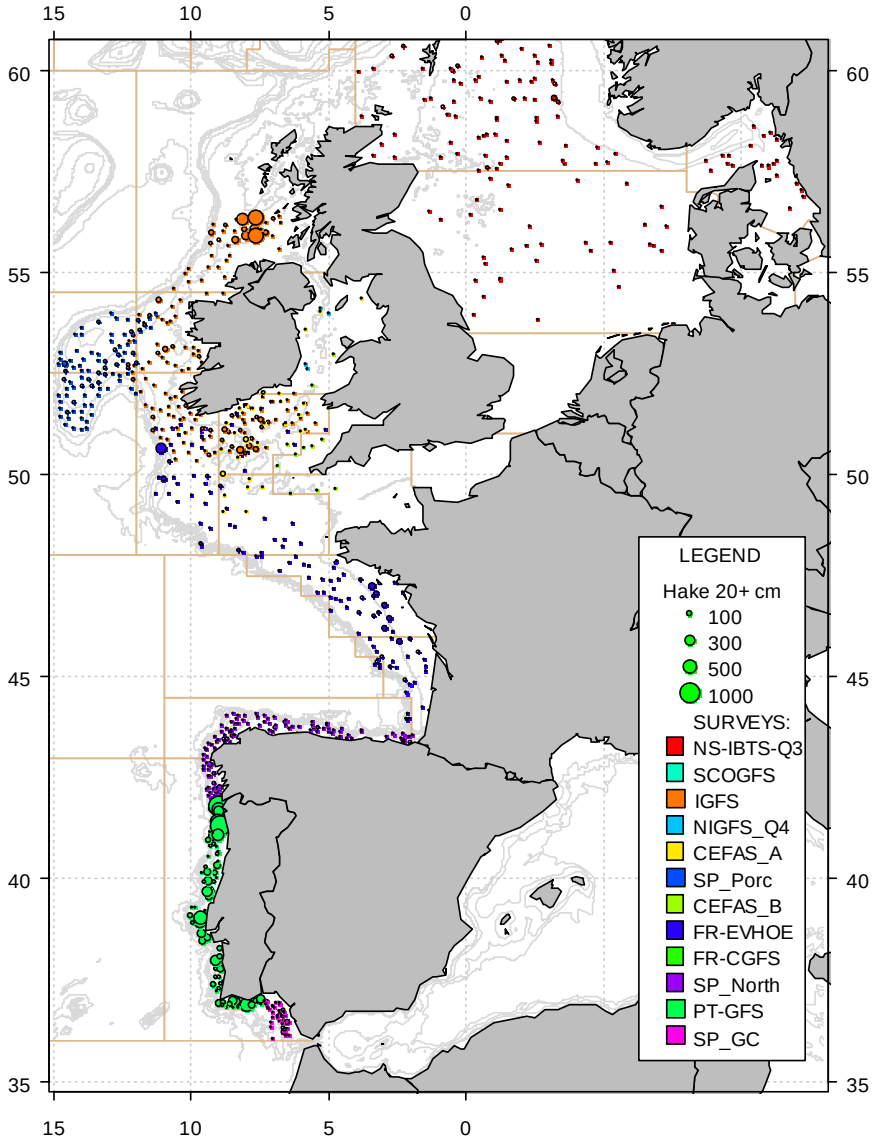


Figure A7.9. Catches in numbers per hour of 1+ group hake, *Merluccius merluccius* (≥20cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

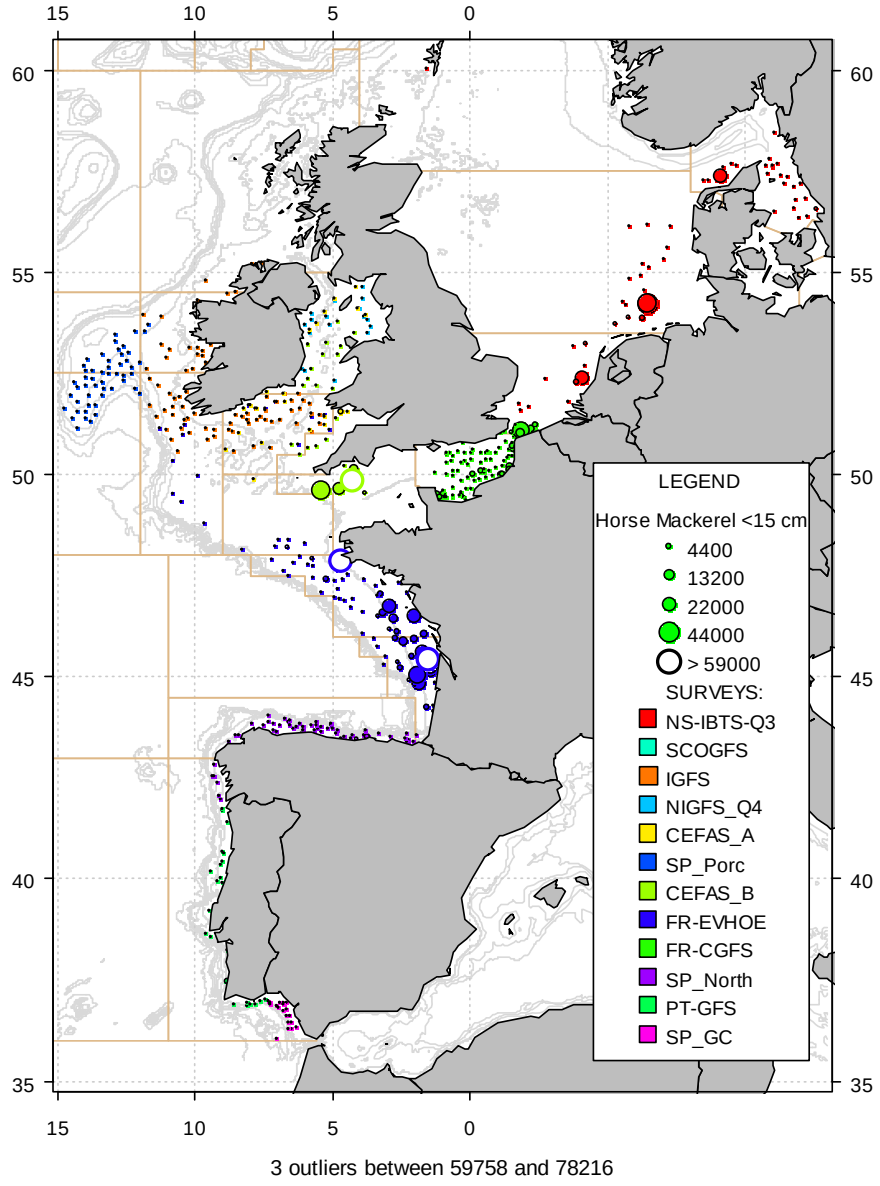


Figure A7.10. Catches in numbers per hour of 0-group horse mackerel, T*rachurus trachurus* (<15 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

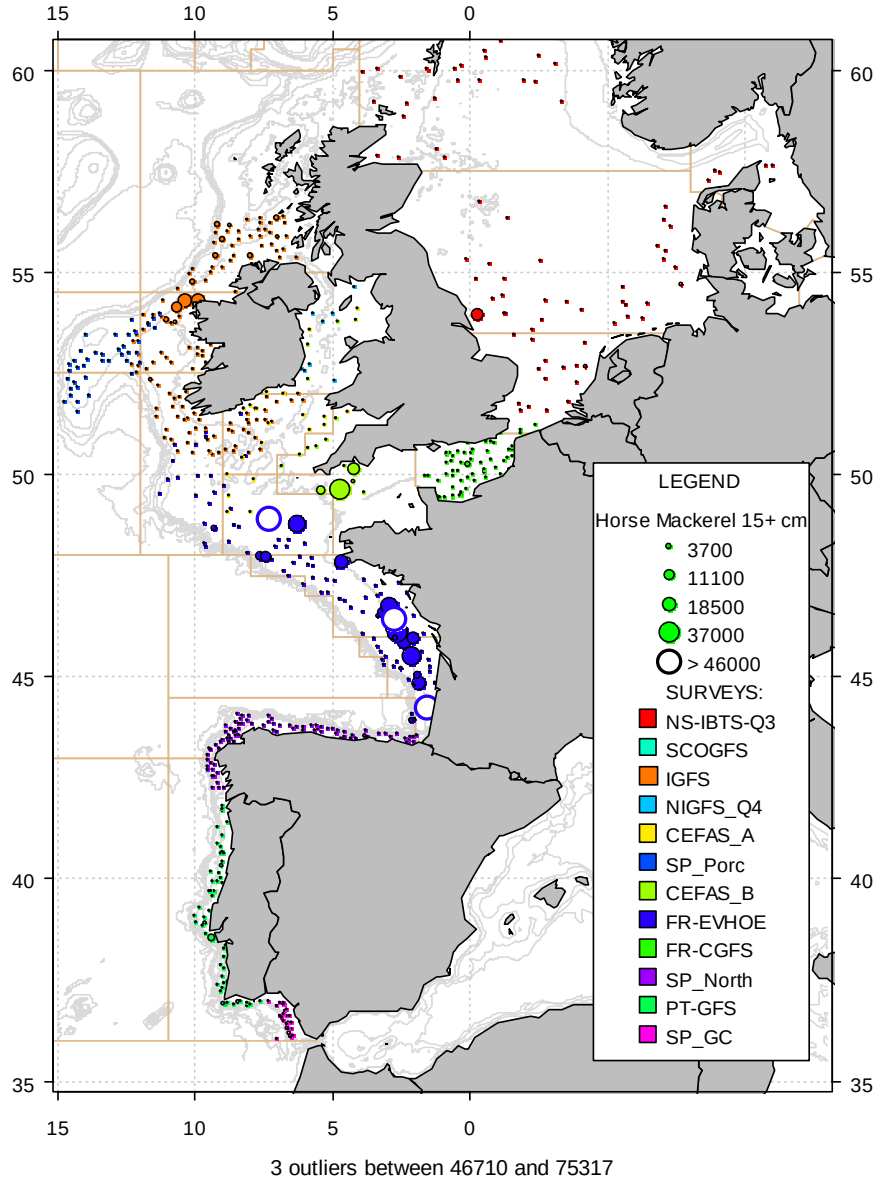


Figure A7.11. Catches in numbers per hour of 1+ group horse mackerel, *Trachurus trachurus* (≥ 15 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

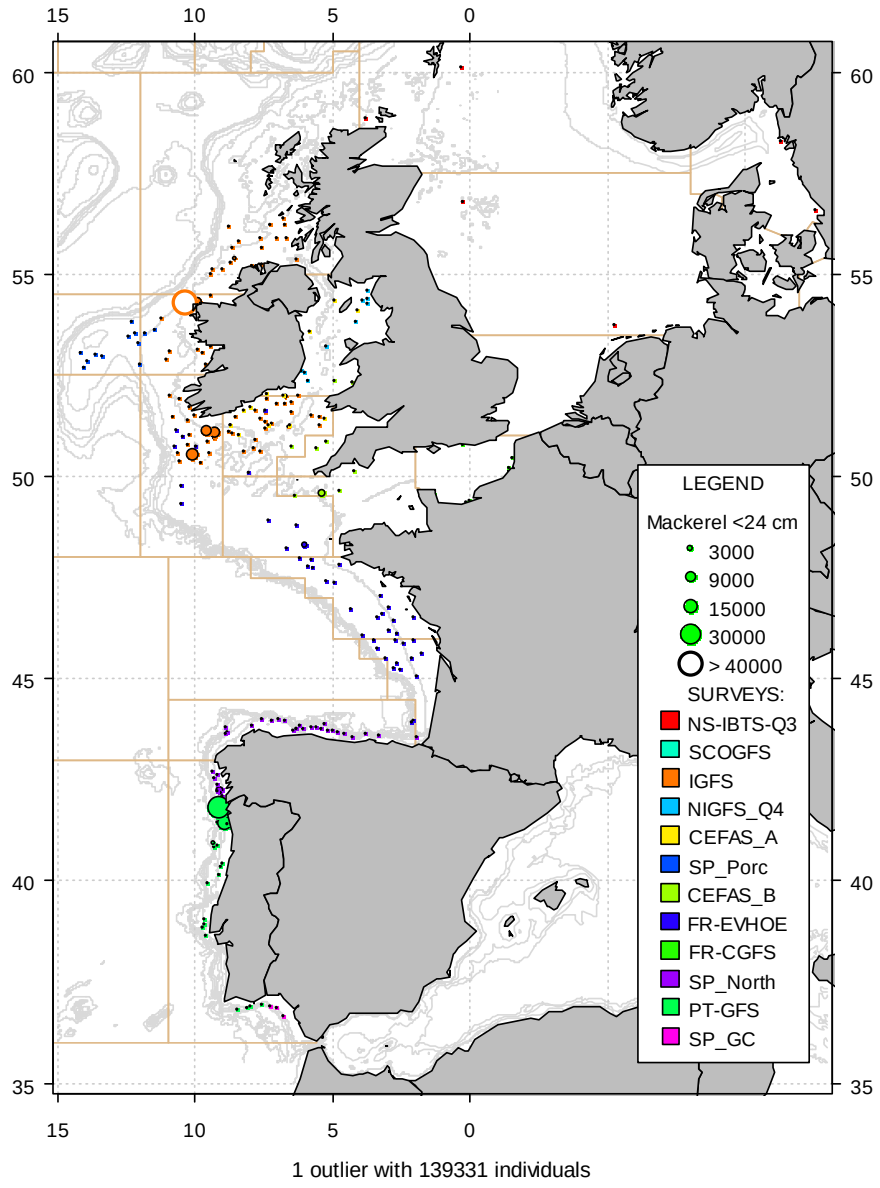


Figure A7.12. Catches in numbers per hour of 0-group mackerel, *Scomber scombrus* (<24 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

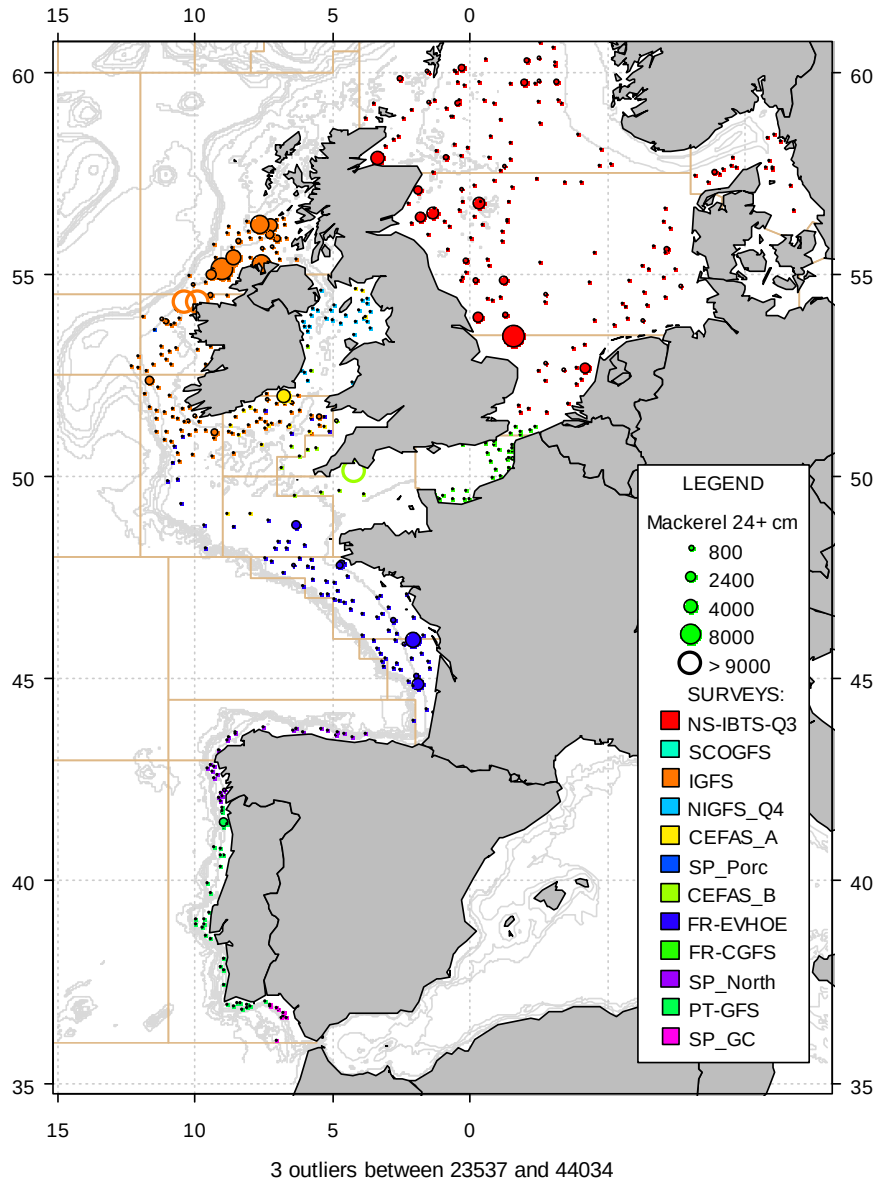


Figure A7.13. Catches in numbers per hour of 1+ group mackerel, *Scomber scomrus* (≥24 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

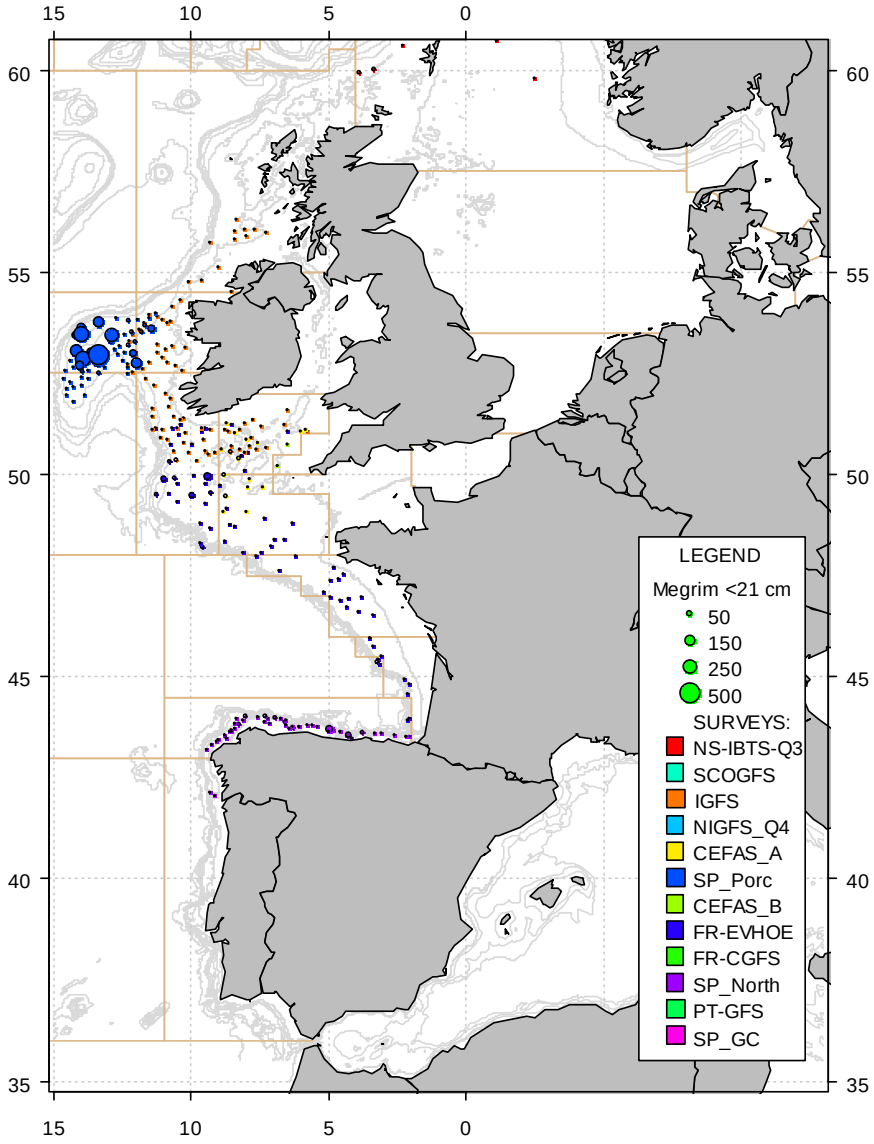


Figure A7.14. Catches in numbers per hour of megrim recruits, *Lepidorhombus whiffiagonis* (<21 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

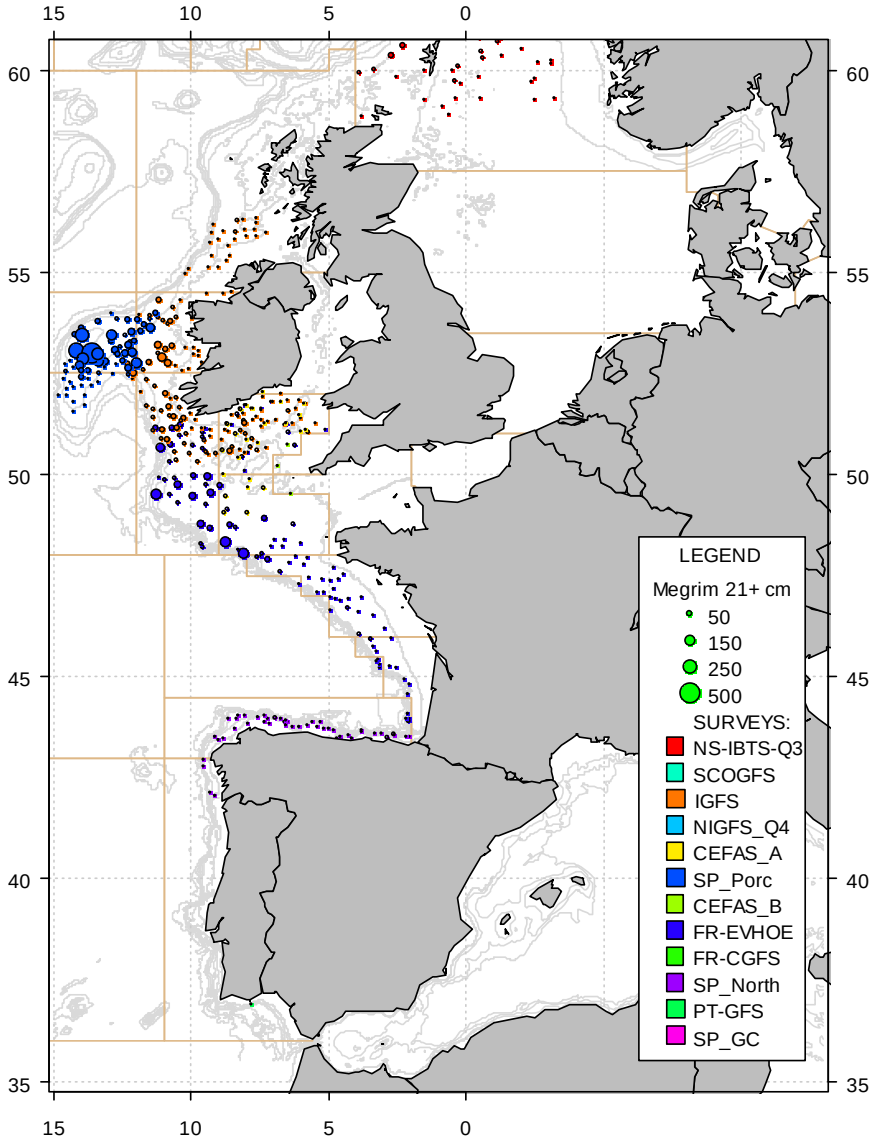


Figure A7.15. Catches in numbers per hour of 2+ group megrim, *Lepidorhombus whiffiagonis* (≥21cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

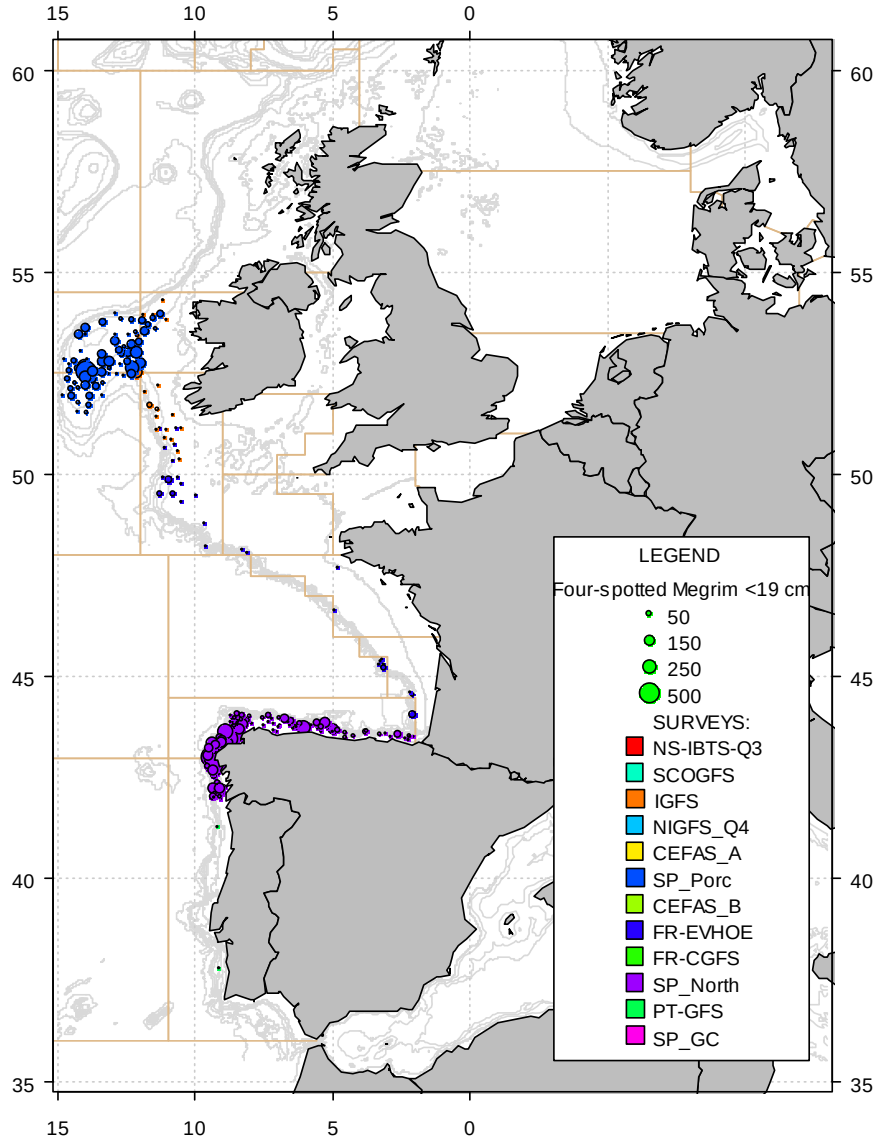


Figure A7.16. Catches in numbers per hour of recruits of four-spotted megrim, *Lepidorhombus boscii* (<19 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

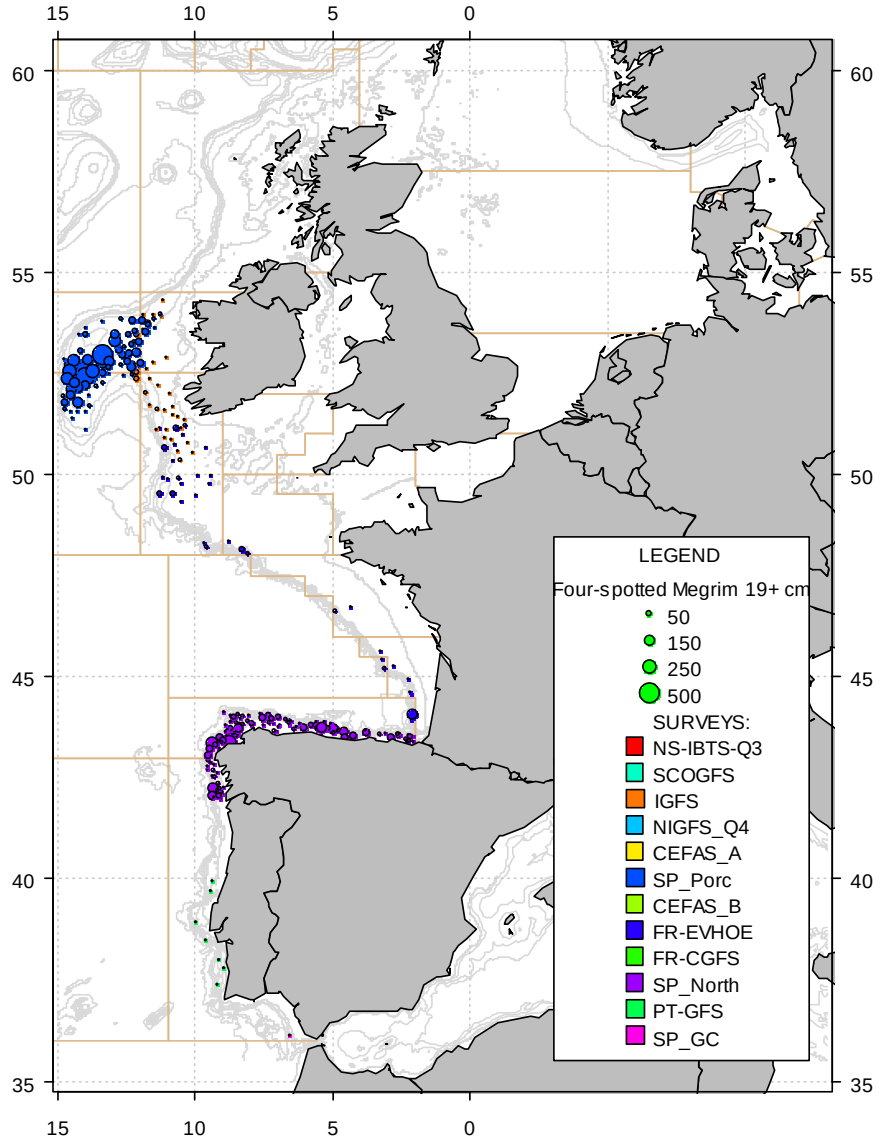


Figure A7.17. Catches in numbers per hour of 2+ group four-spotted megrim, *Lepidorhombus boscii* (≥19 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

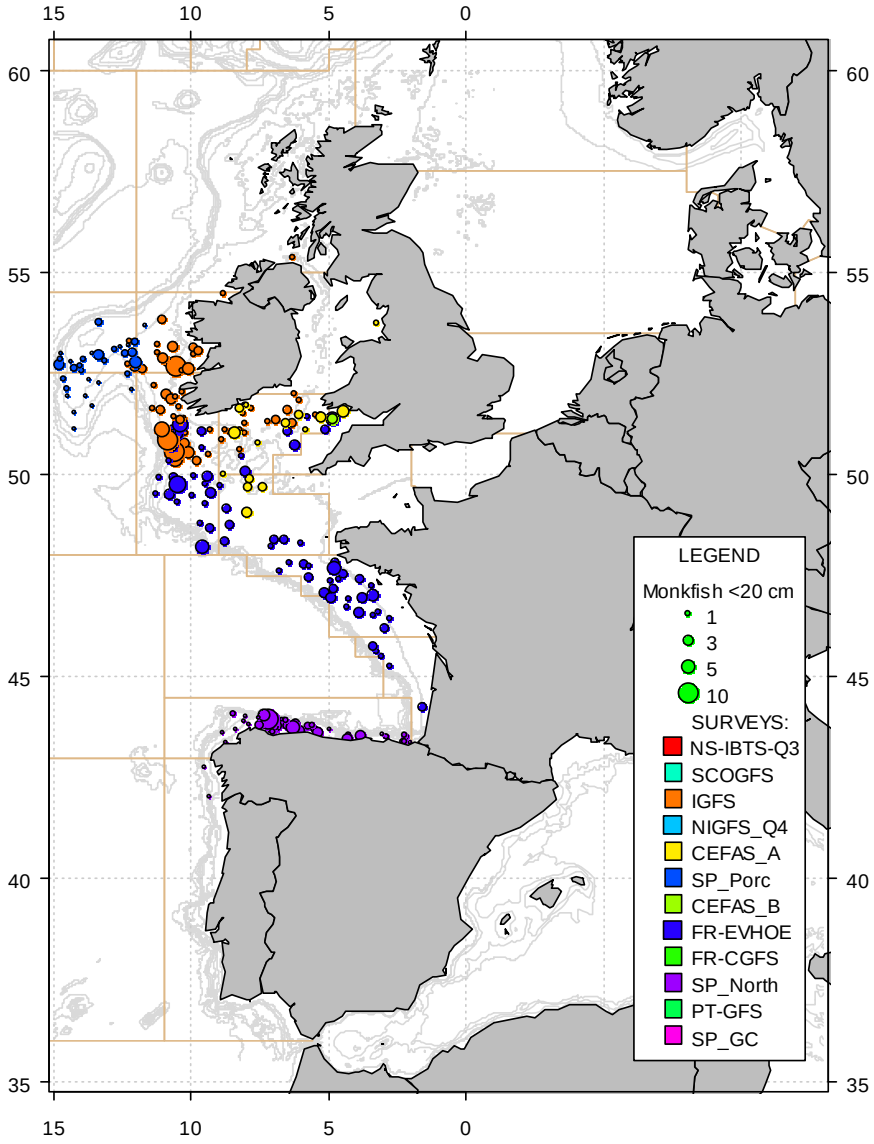


Figure A7.18. Catches in numbers per hour of 0-group monkfish, *Lophius piscatorius* (<20 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

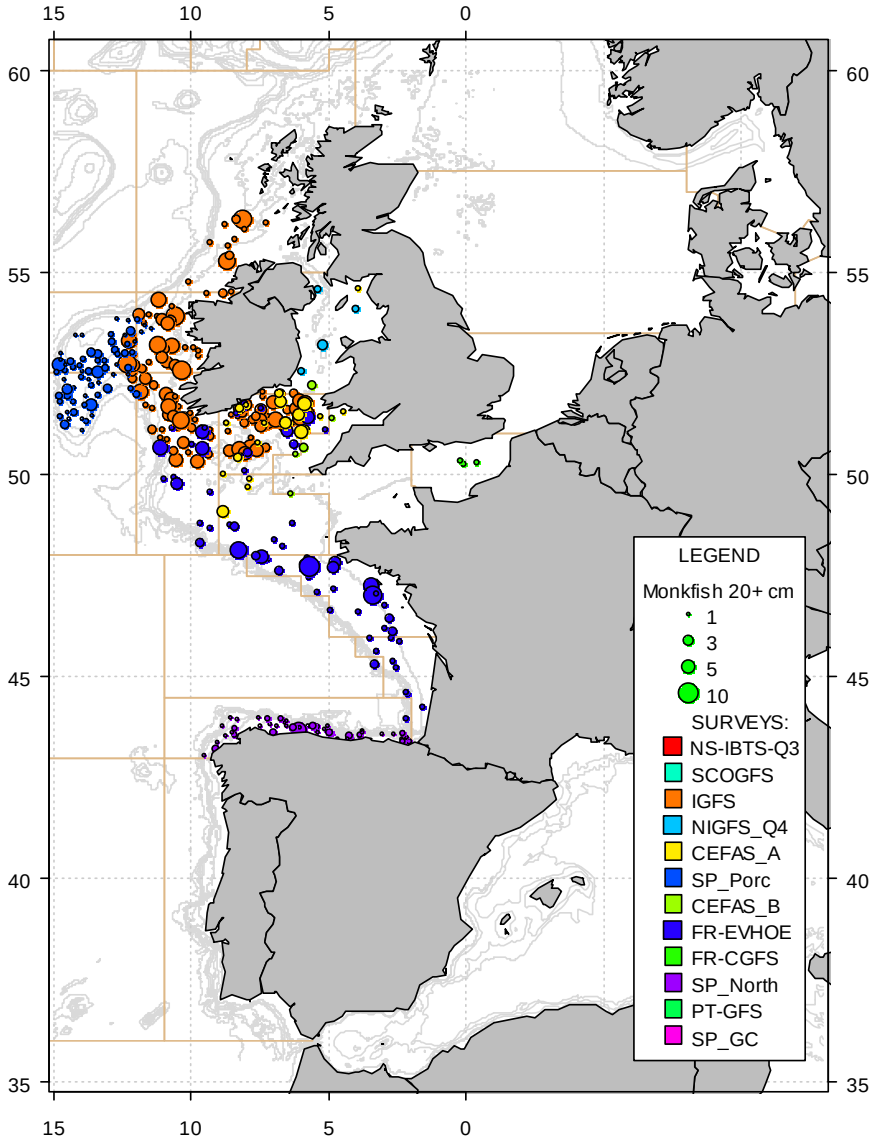


Figure A7.19. Catches in numbers per hour of 1+ group monkfish, *Lophius piscatorius* (≥20 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

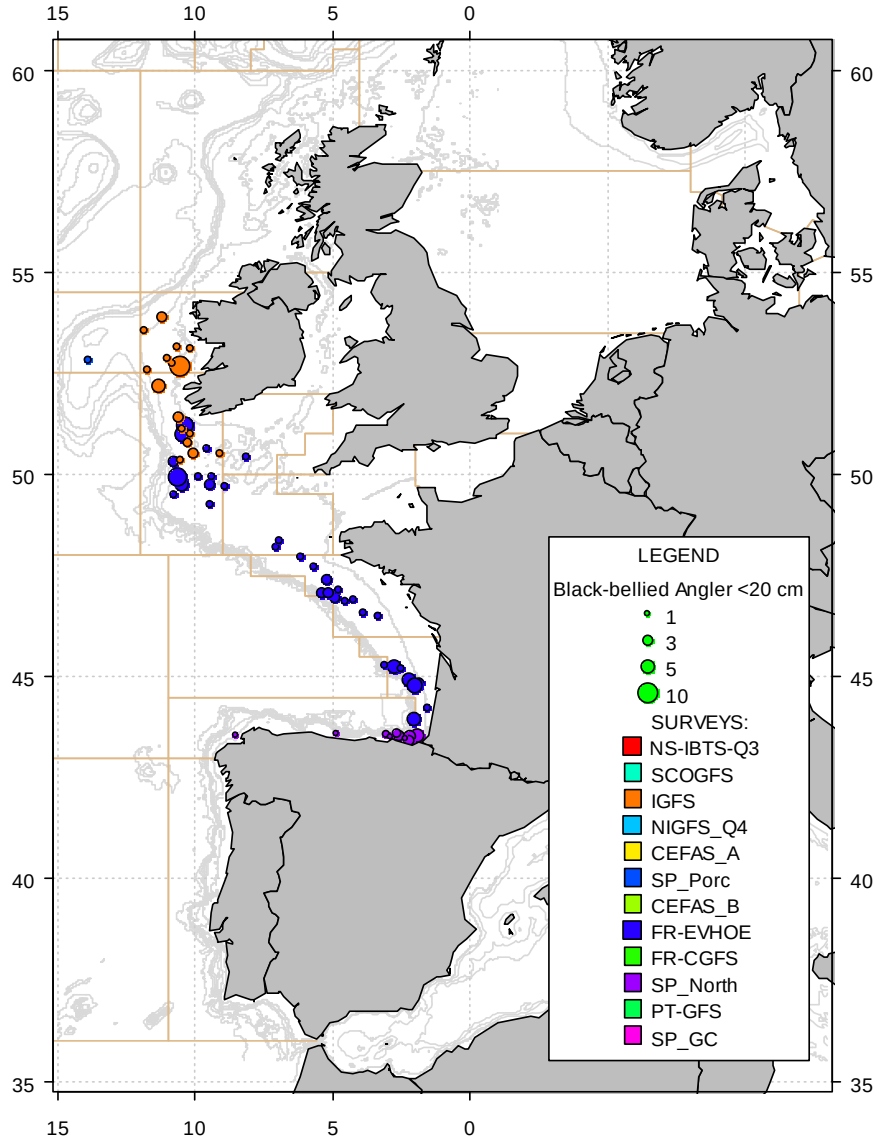


Figure A7.20. Catches in numbers per hour of 0-group black-bellied anglerfish, *Lophius budegassa* (<20 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

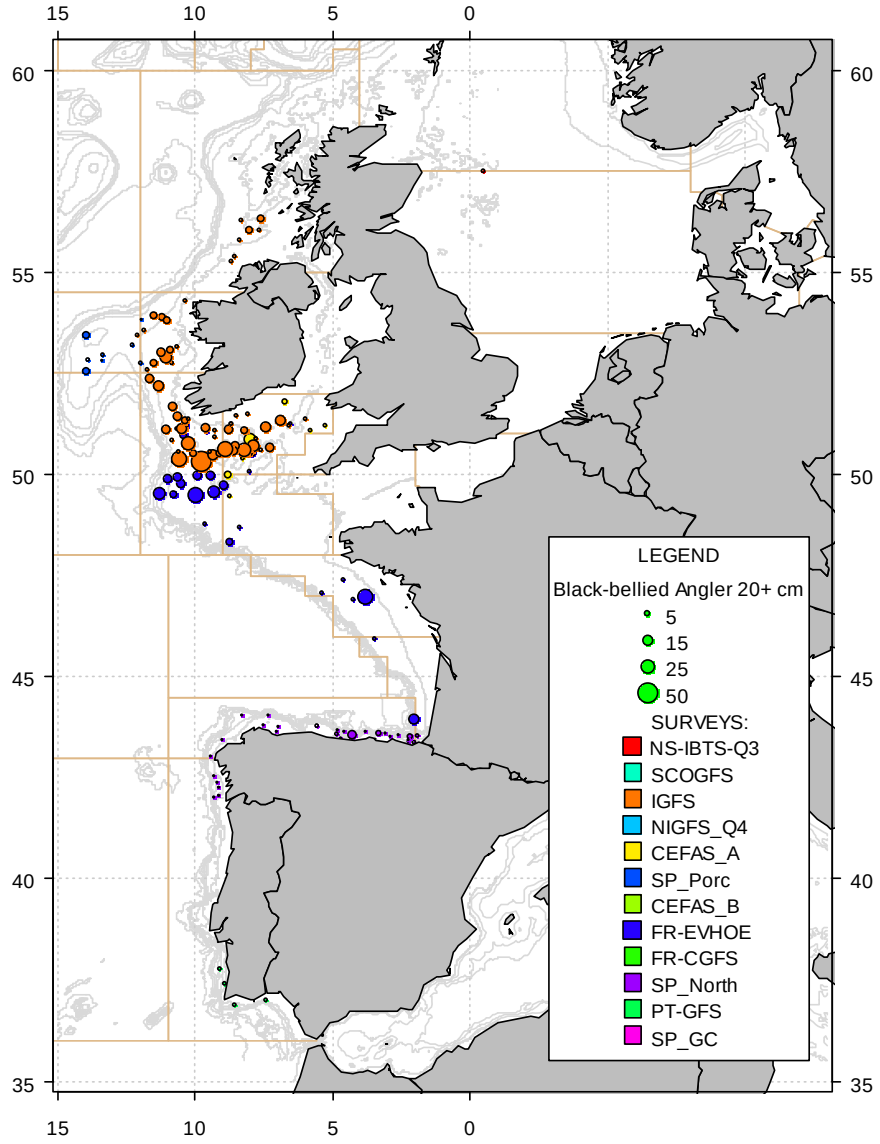


Figure A7.21. Catches in numbers per hour of 1+ group black-bellied anglerfish, *Lophius budegassa* (≥20 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

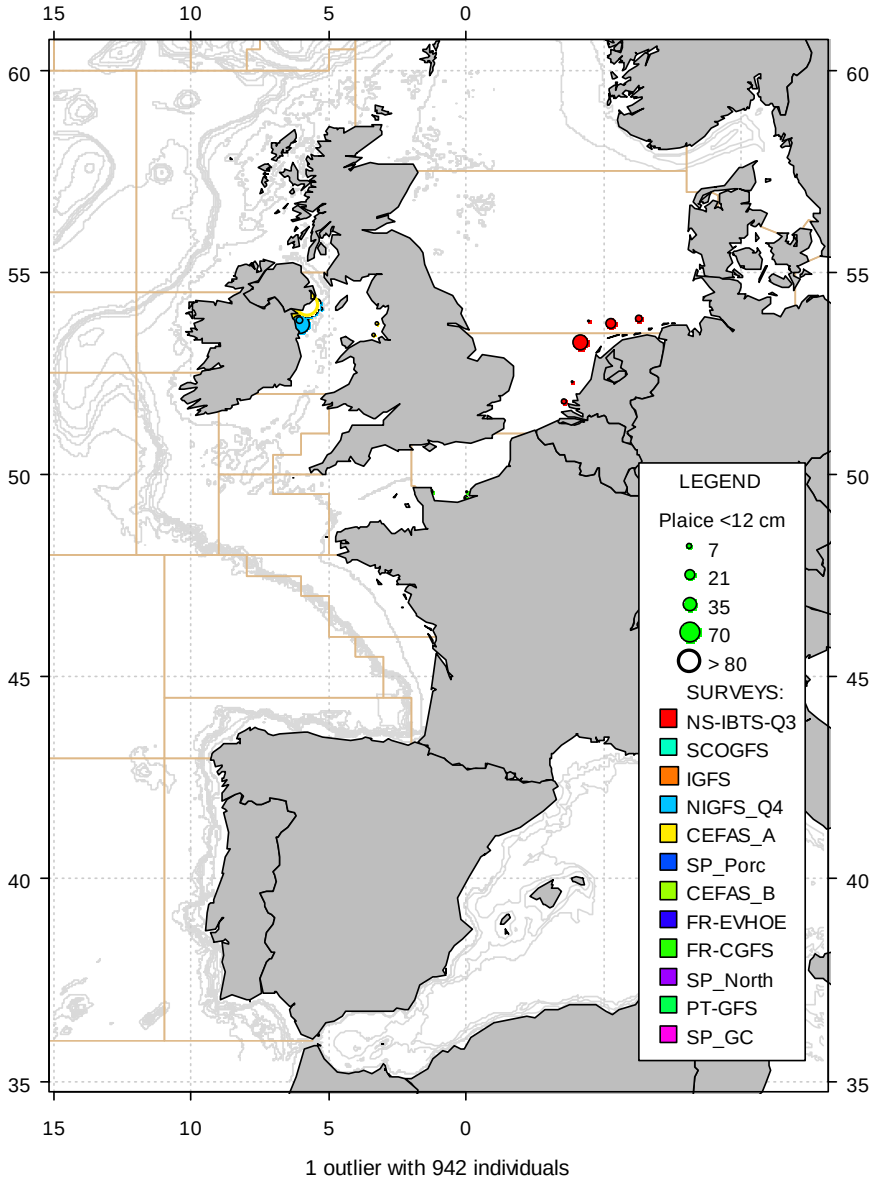


Figure A7.22. Catches in numbers per hour of 0-group plaice, *Pleuronectes platessa* (<12 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

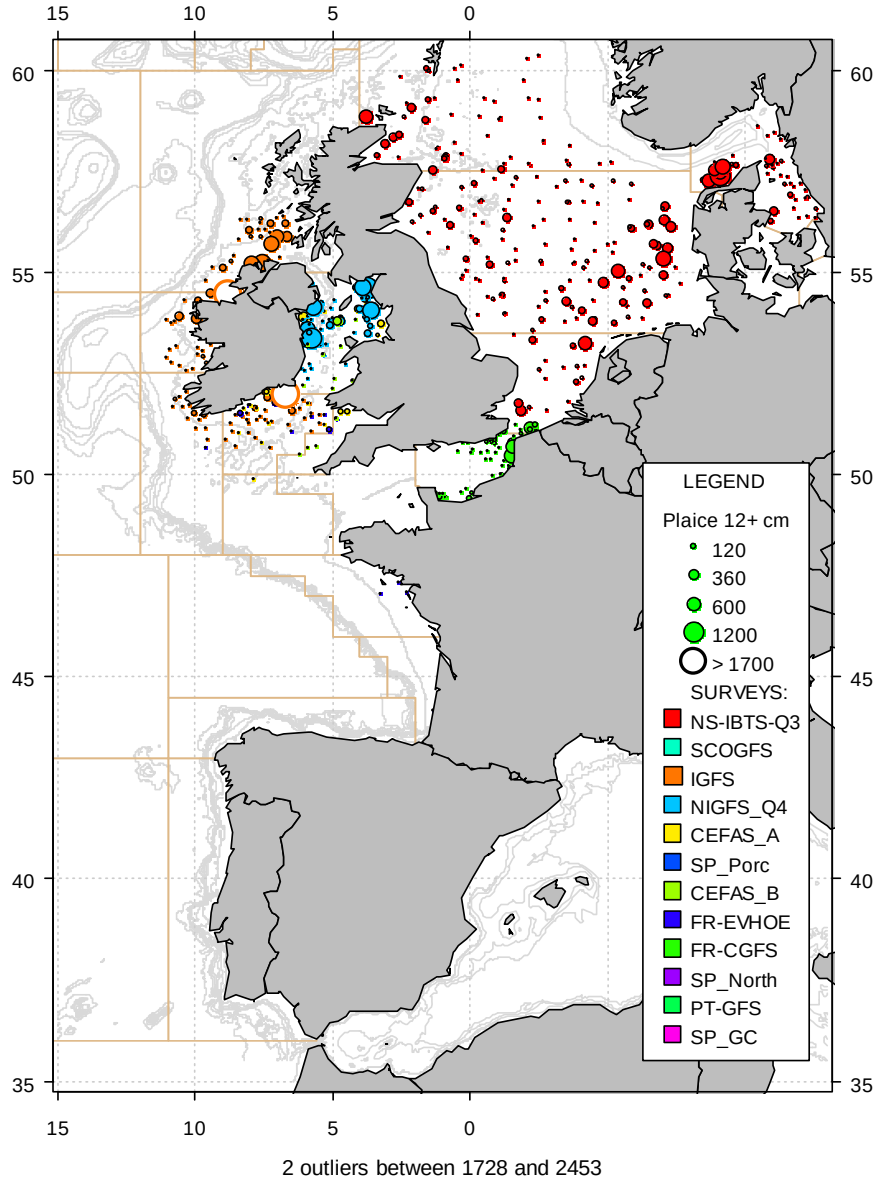


Figure A7.23. Catches in numbers per hour of 1+ group plaice, *Pleuronectes platessa* (≥12 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

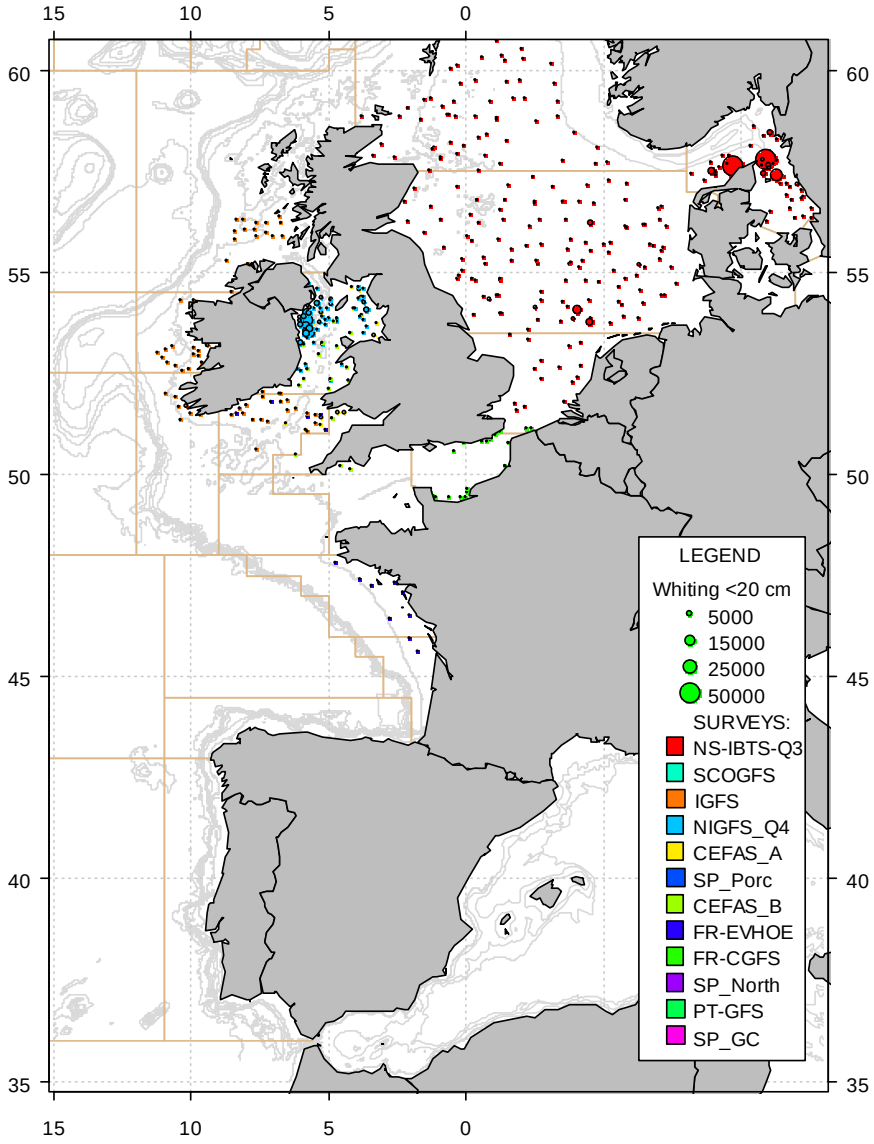


Figure A7.24. Catches in numbers per hour of 0-group whiting, *Merlangius merlangus* (<20 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

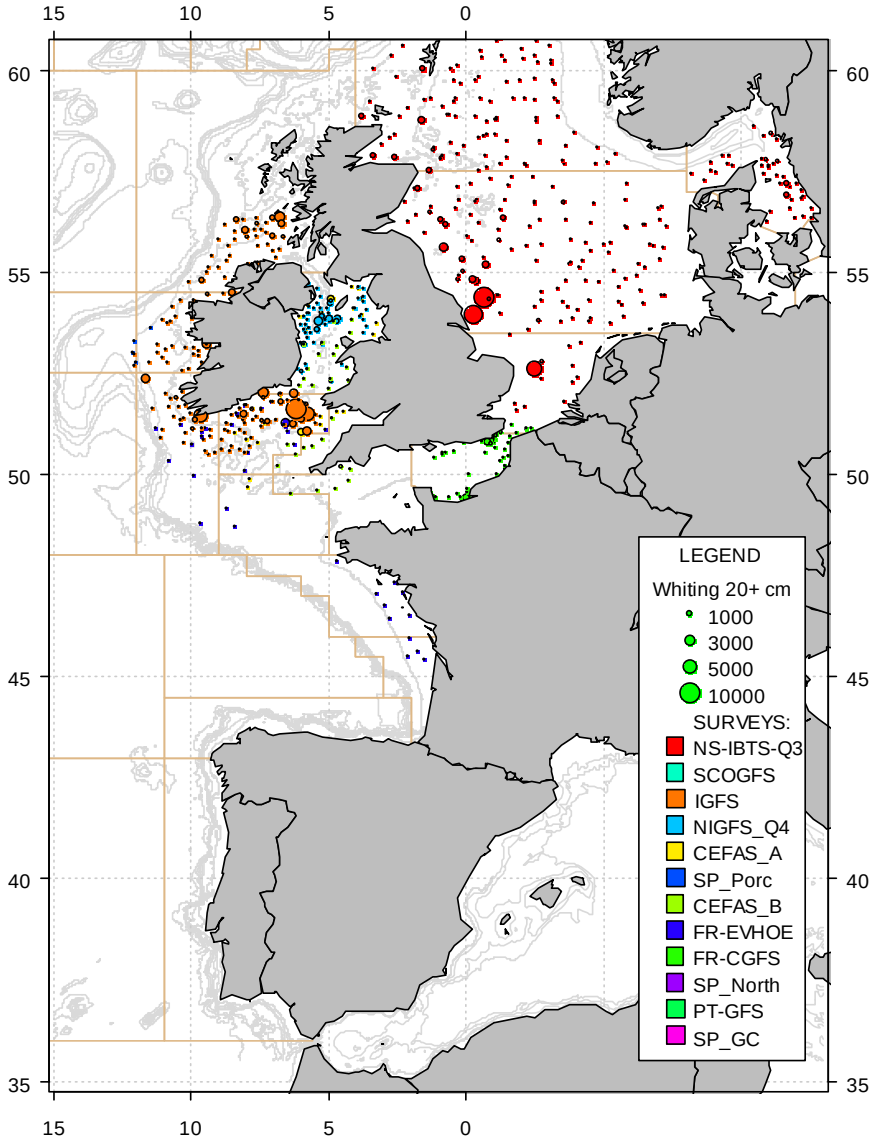


Figure A7.25. Catches in numbers per hour of 1+ group whiting, *Merlangius merlangus* (≥20 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

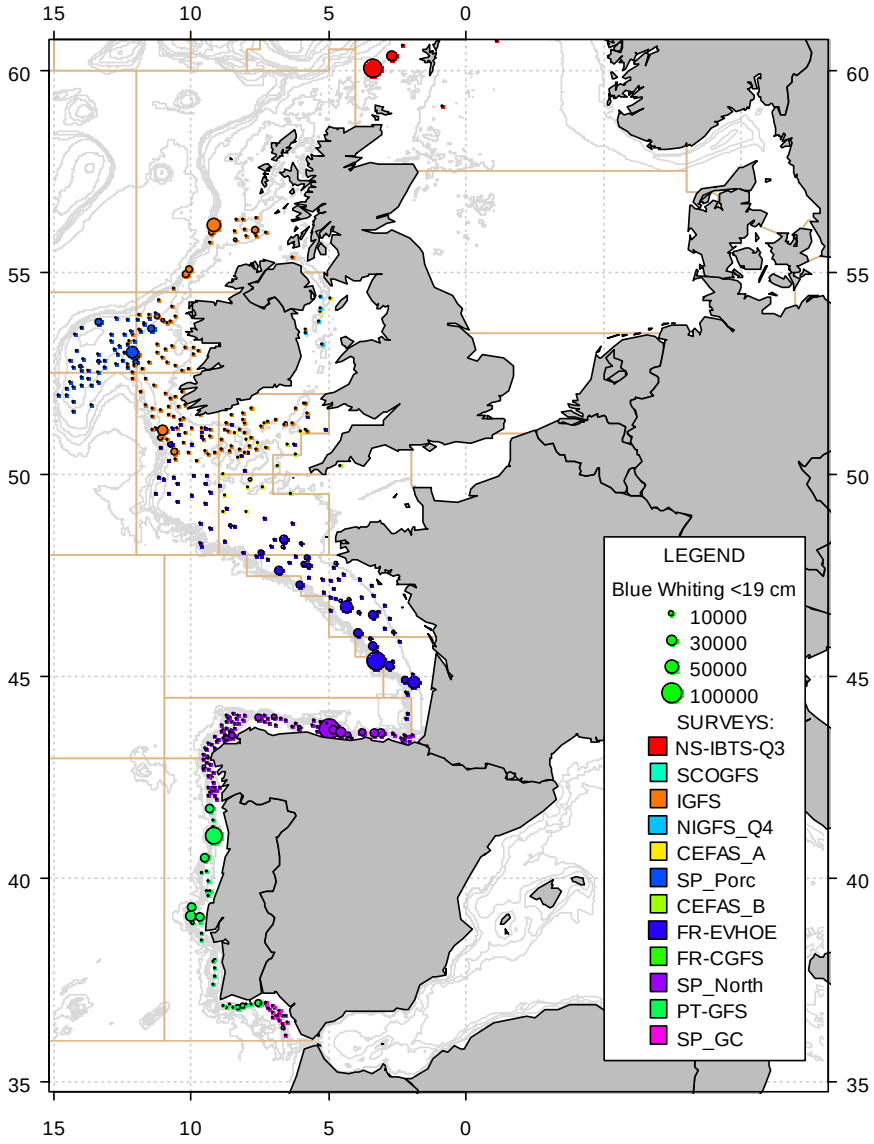


Figure A7.26. Catches in numbers per hour of 0-group blue whiting, *Micromesistius poutassou* (<19 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

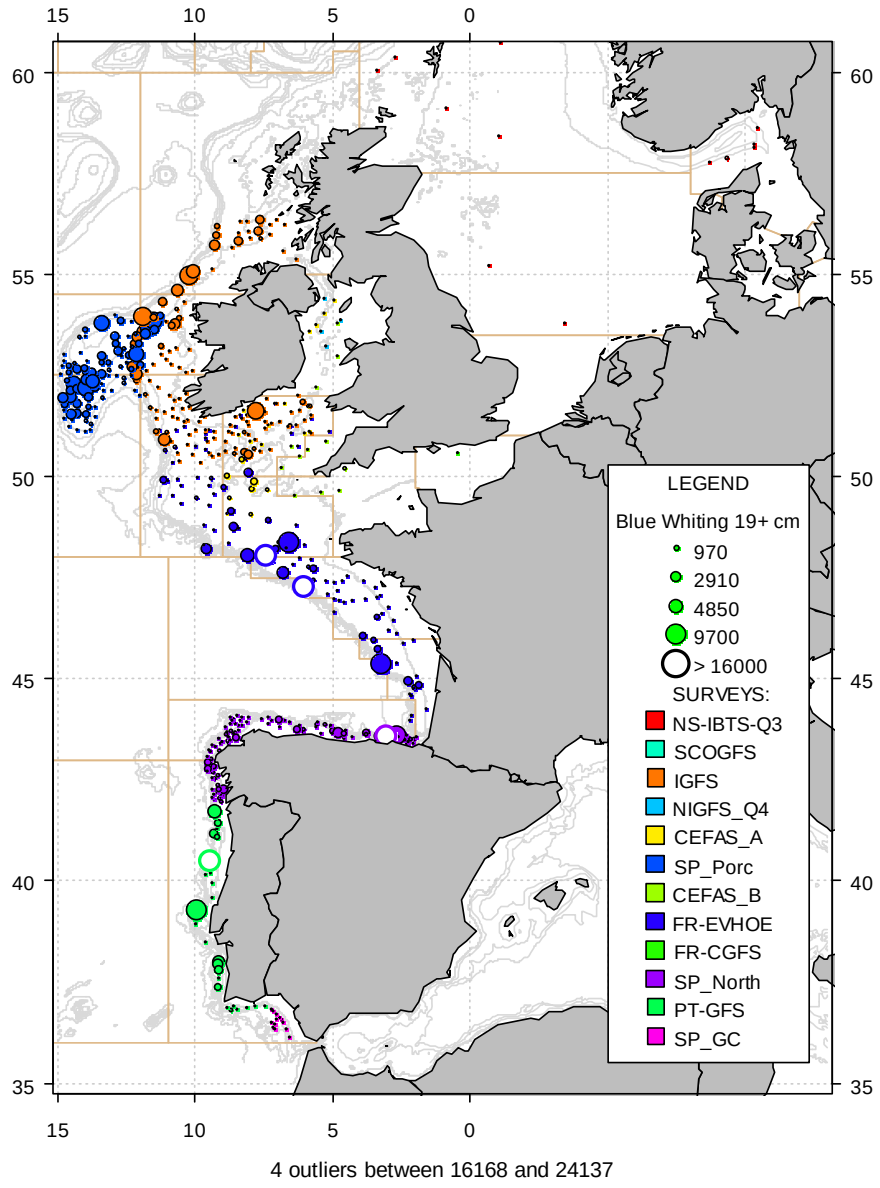


Figure A7.27. Catches in numbers per hour of 1+ group blue whiting, *Micromesistius poutassou* (≥19 cm), in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

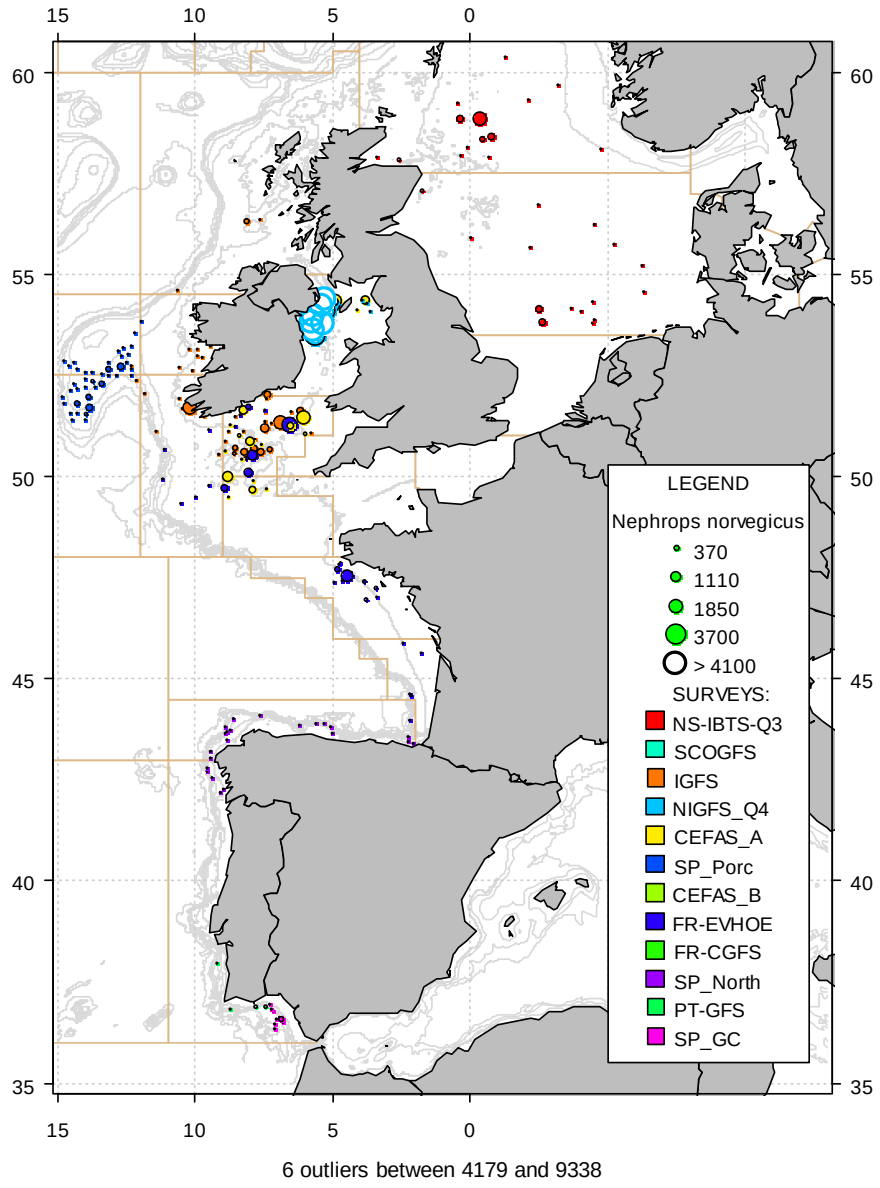


Figure A7.28. Catches in numbers per hour of Norway lobster, *Nephrops norvegicus*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

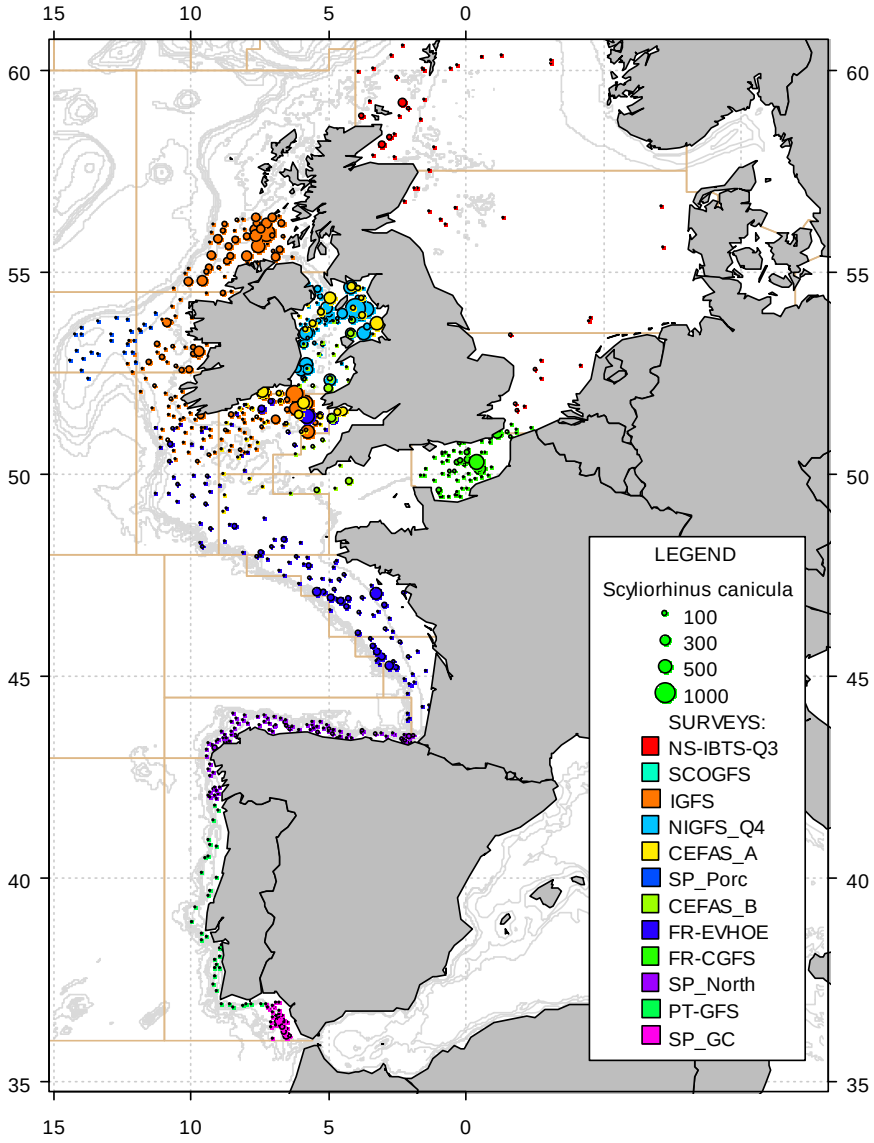


Figure A7.29. Catches in numbers per hour of lesser spotted dogfish, *Scyliorhinus canicula*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

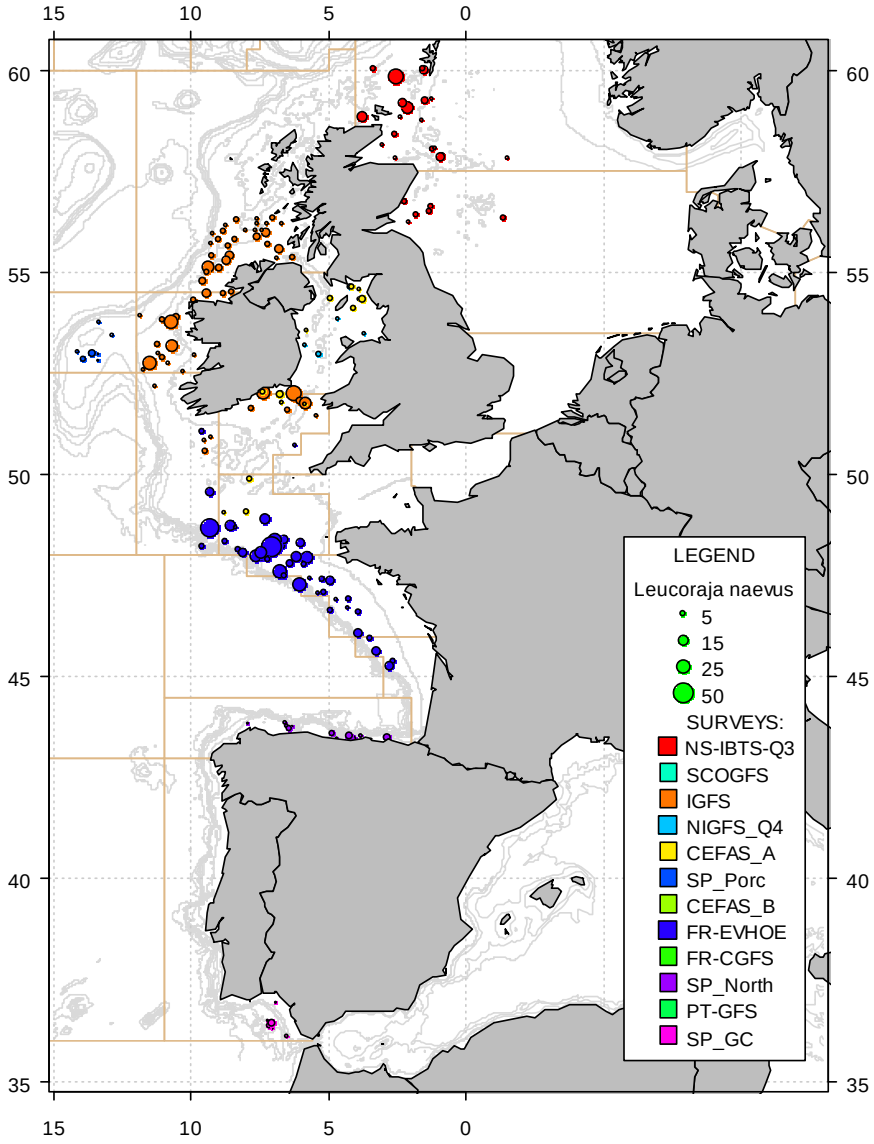


Figure A7.30. Catches in numbers per hour of cuckoo ray, *Leucoraja naevus*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

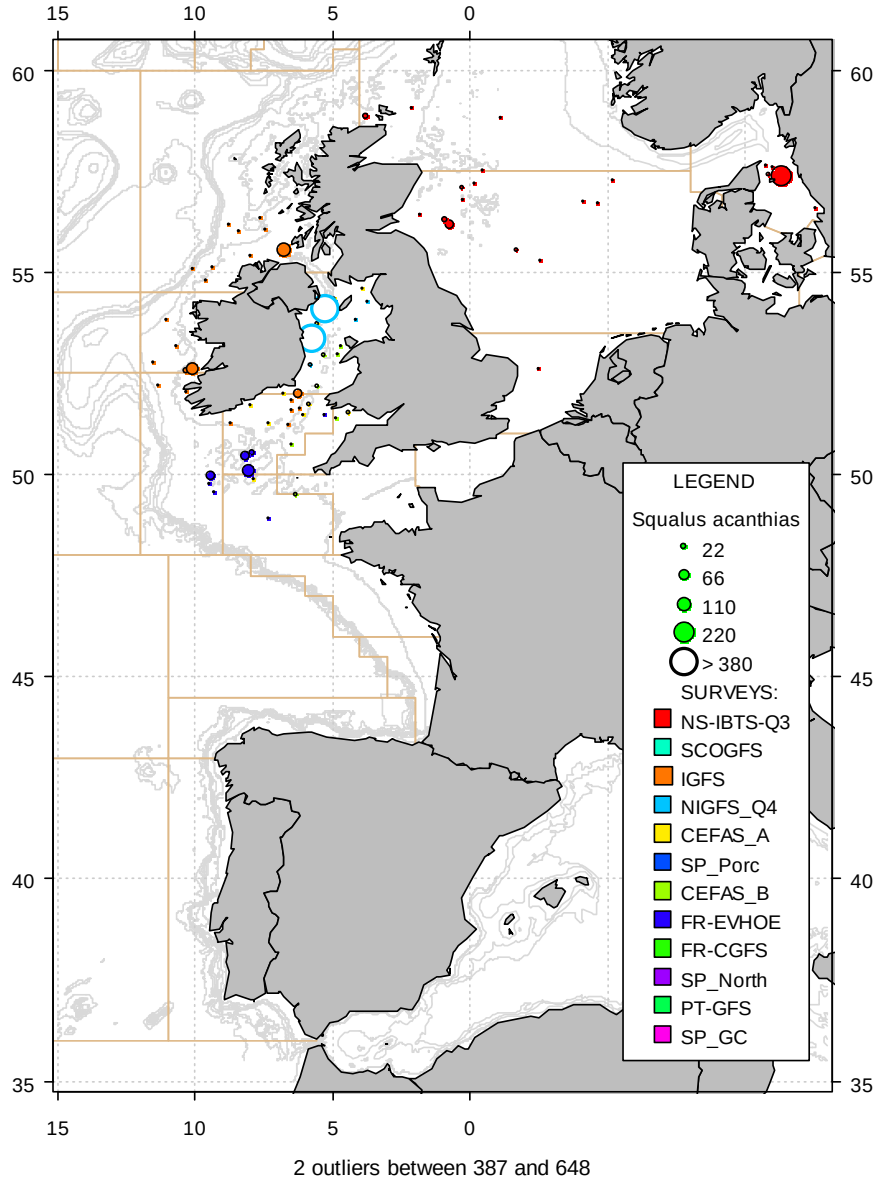


Figure A7.31. Catches in numbers per hour per hour of spurdog, *Squalus acanthias*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

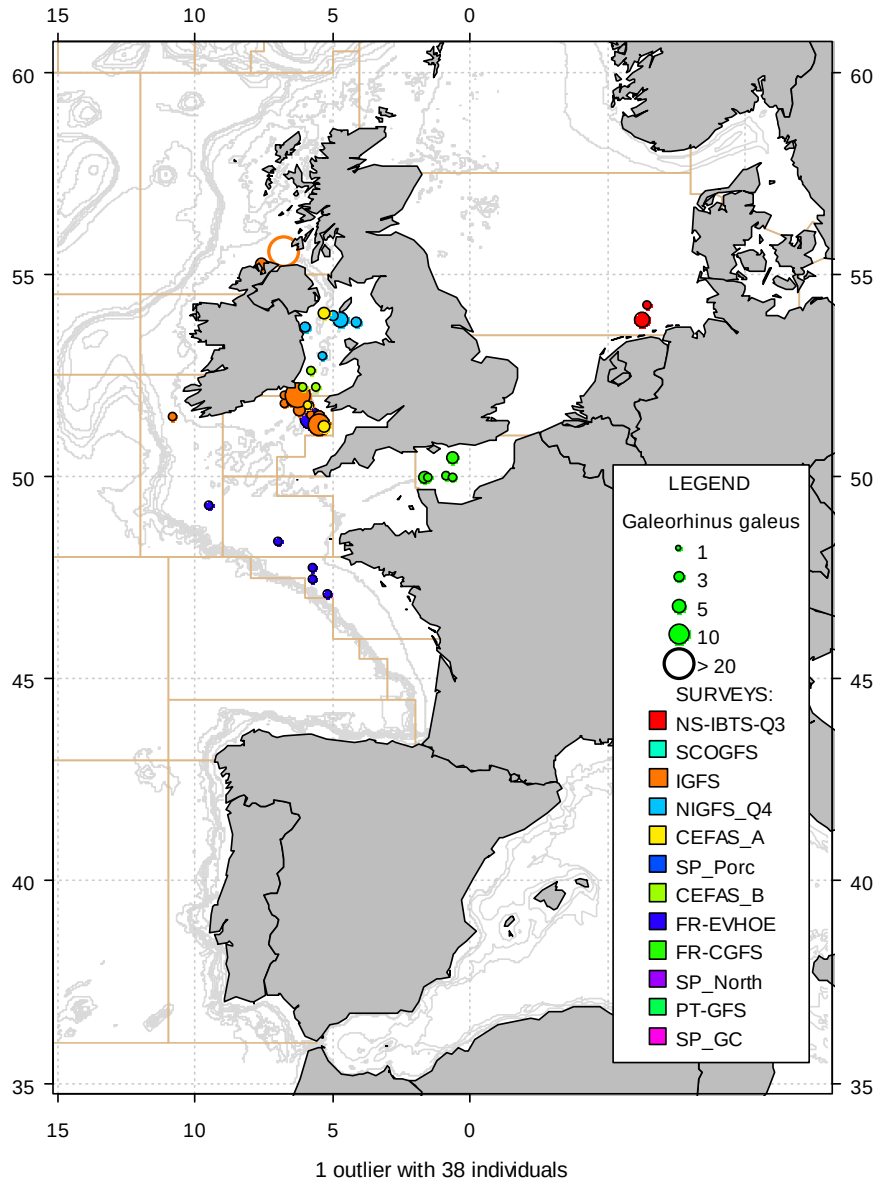


Figure A7.32. Catches in numbers per hour per hour of tope, *Galeorhinus galeus*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

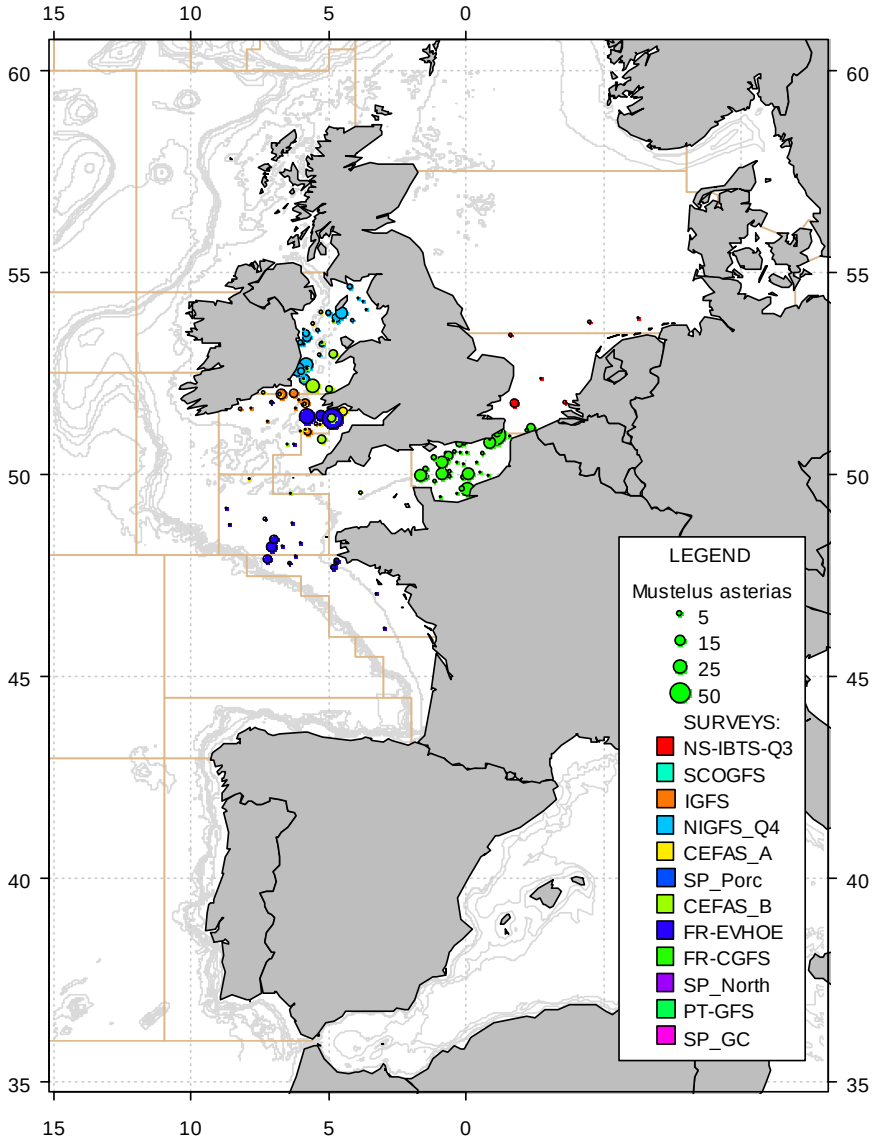


Figure A7.33. Catches in numbers per hour per hour of smooth hound, *Mustelus asterias*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

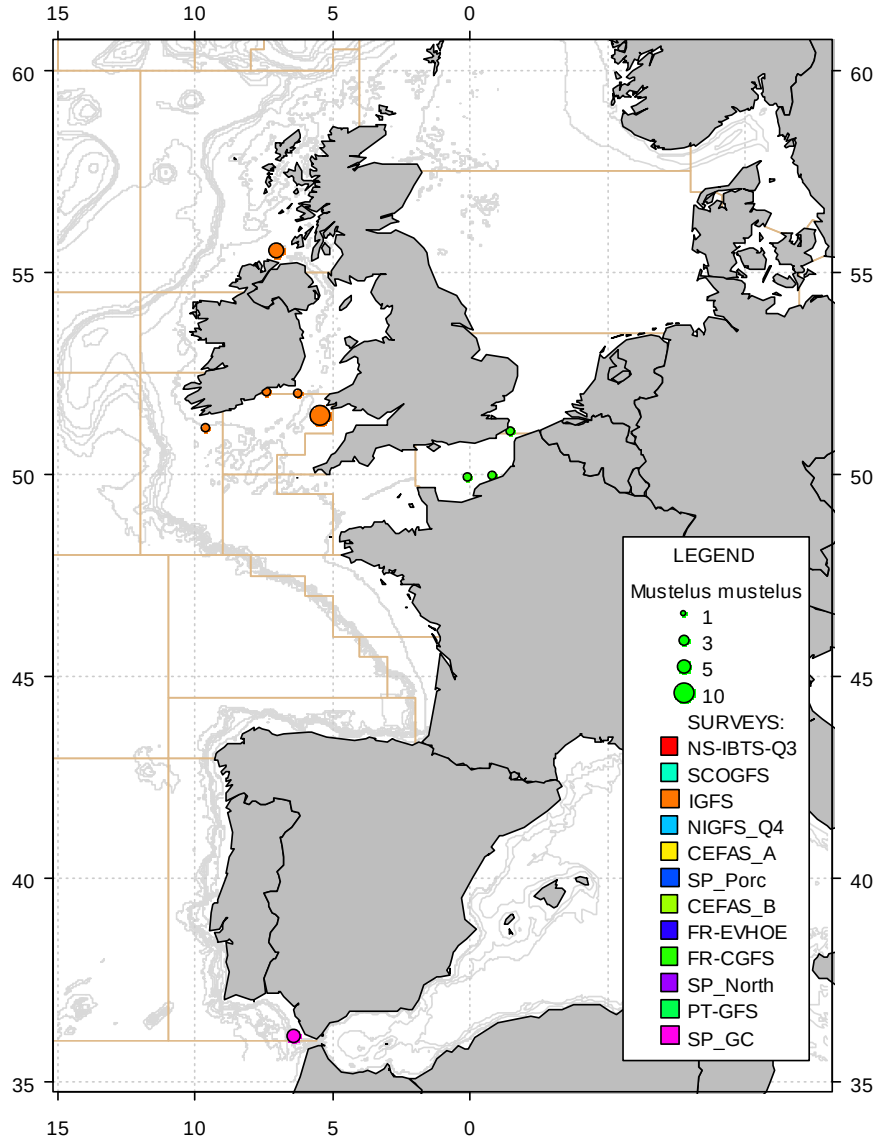


Figure A7.34. Catches in numbers per hour per hour of smooth hound, *Mustelus mustelus*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

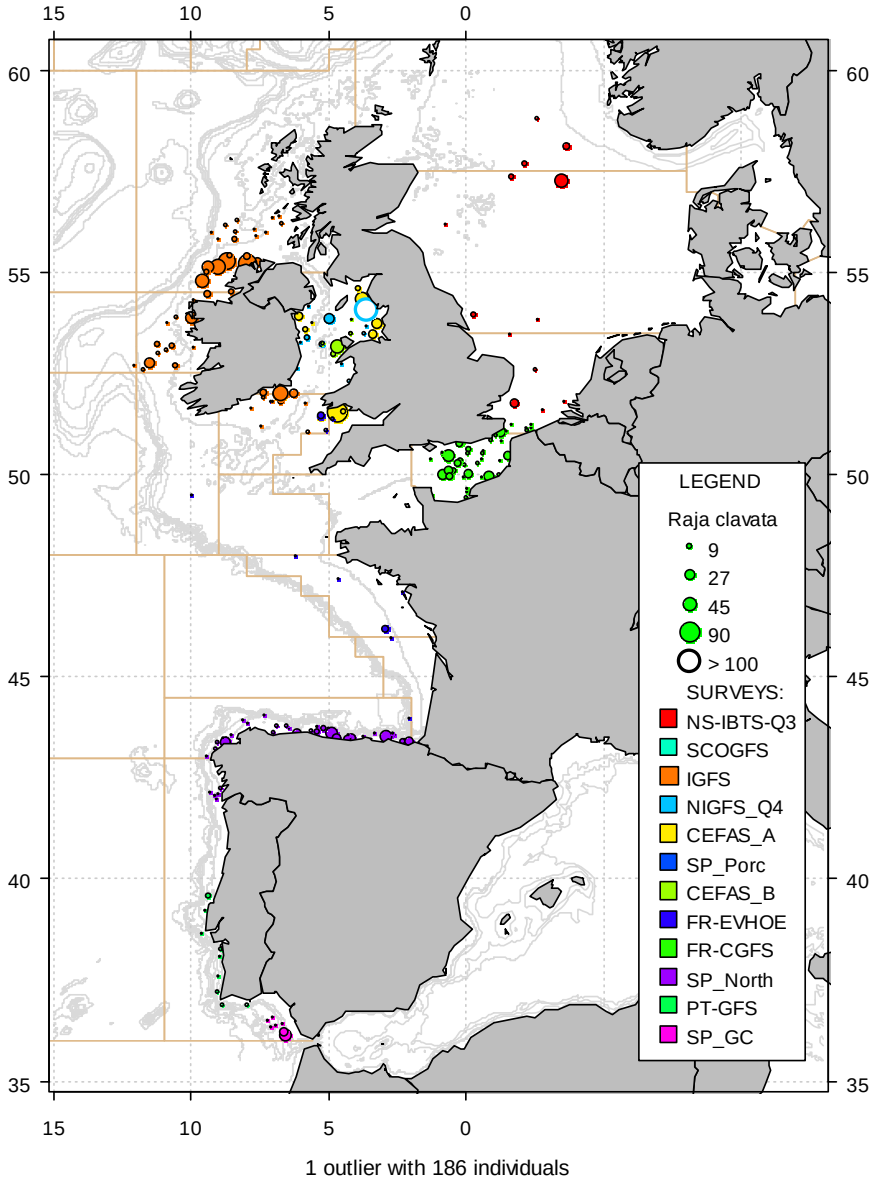


Figure A7.35. Catches in numbers per hour per hour of thornback ray, *Raja clavata*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

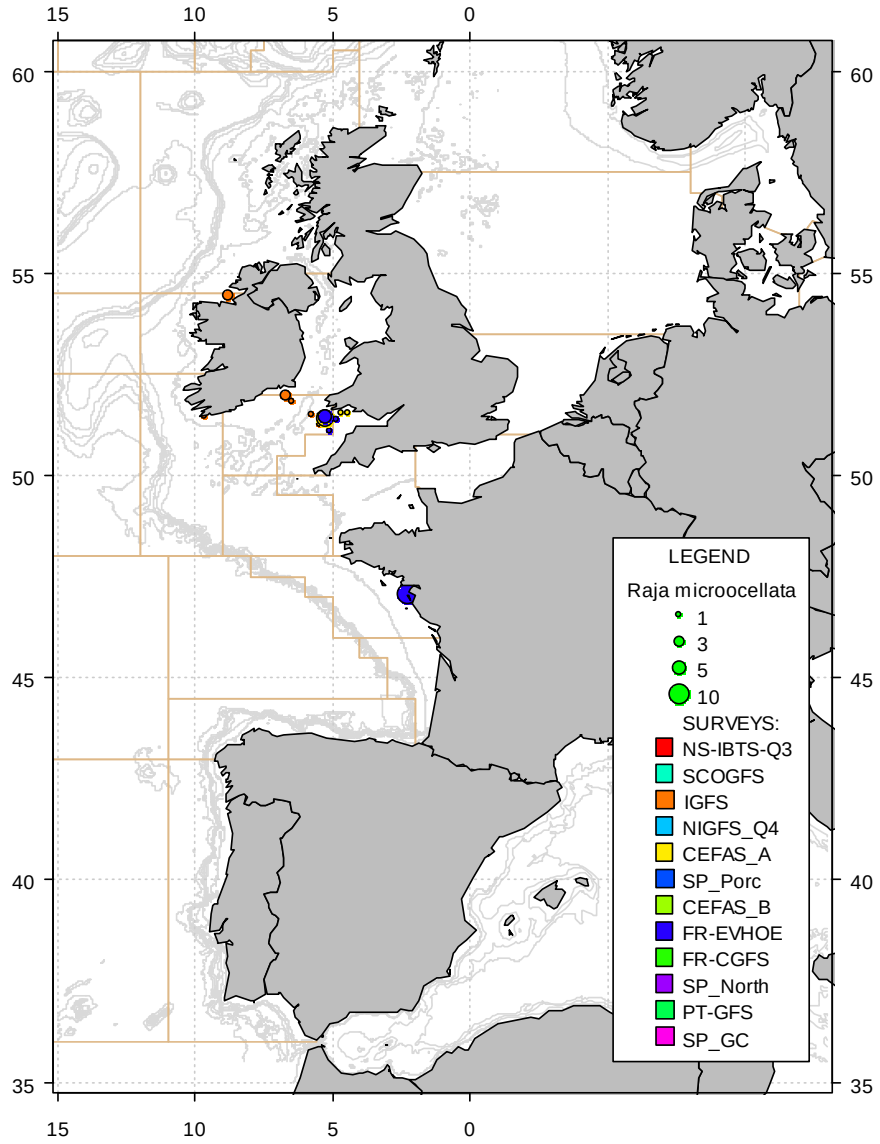


Figure A7.36. Catches in numbers per hour per hour of small eyed ray, *Raja microocellata*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

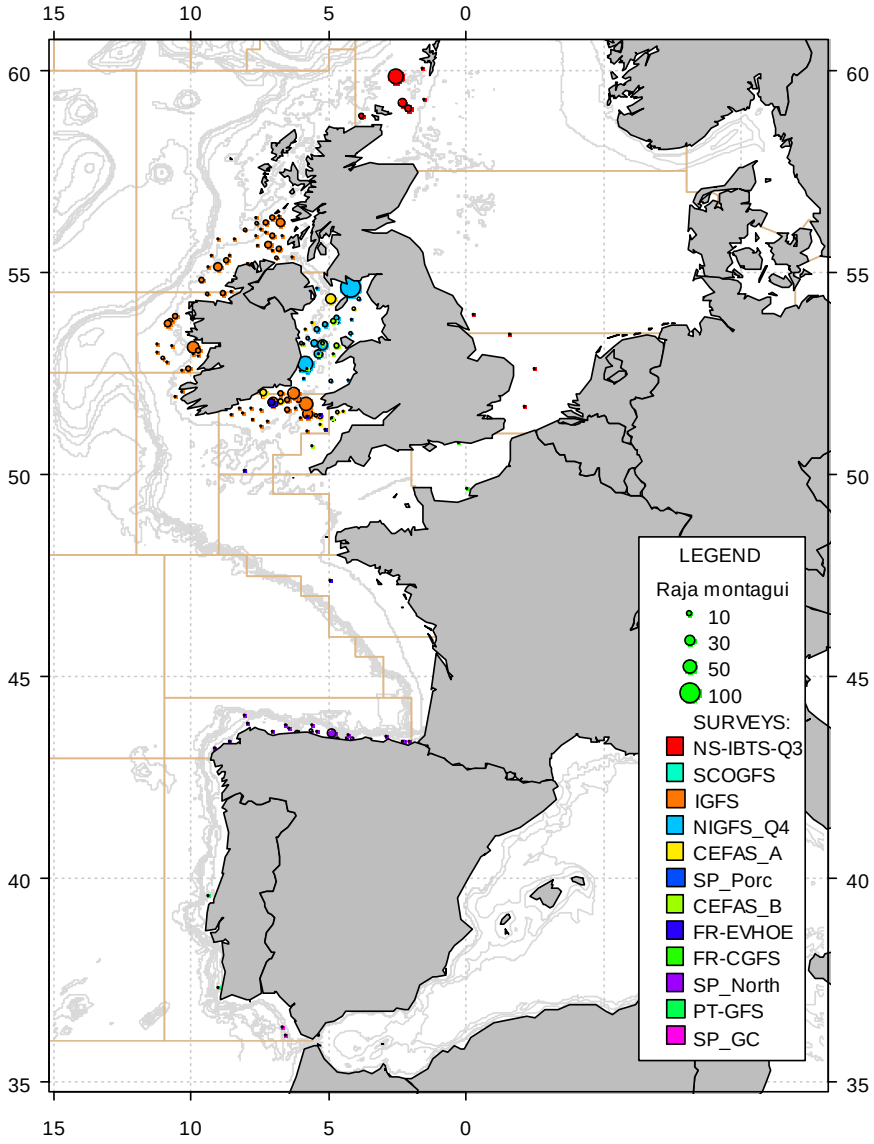


Figure A7.37. Catches in numbers per hour per hour of spotted ray, *Raja montagui*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

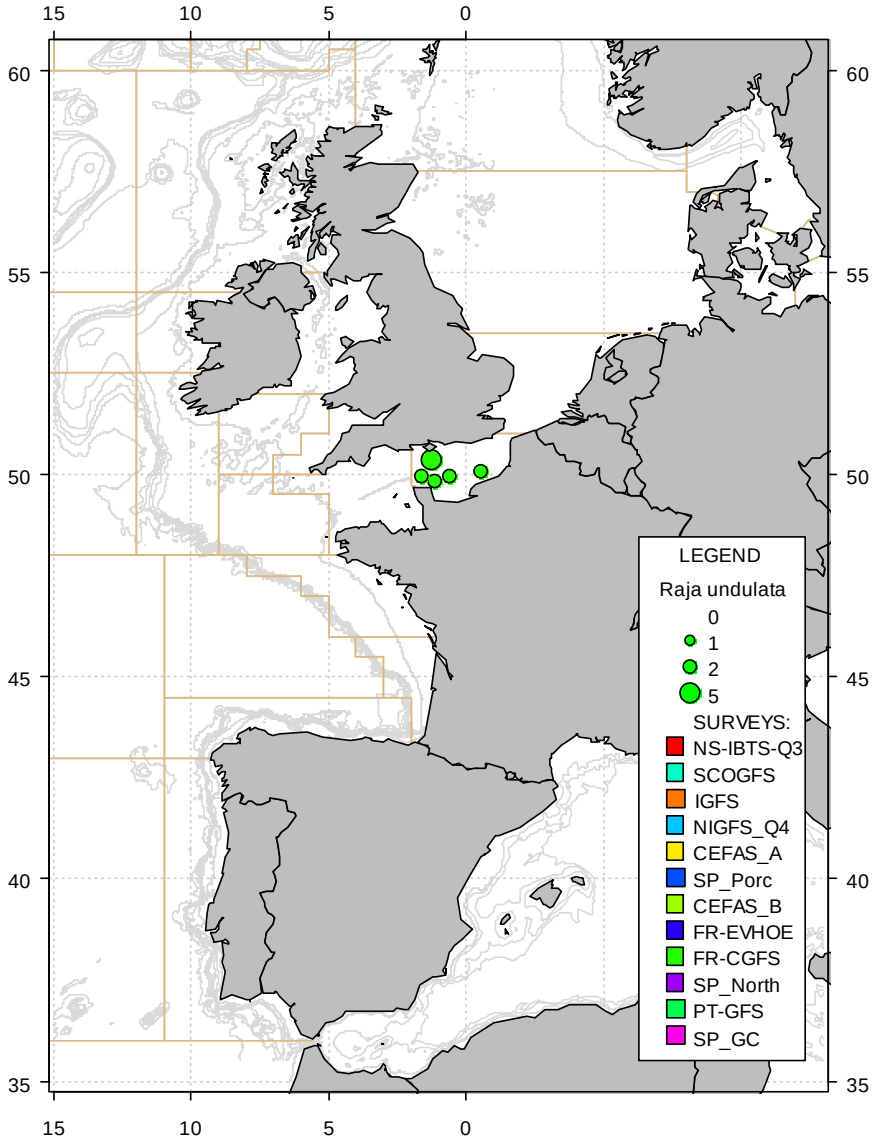


Figure A7.38. Catches in numbers per hour per hour of undulate ray, *Raja undulata*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

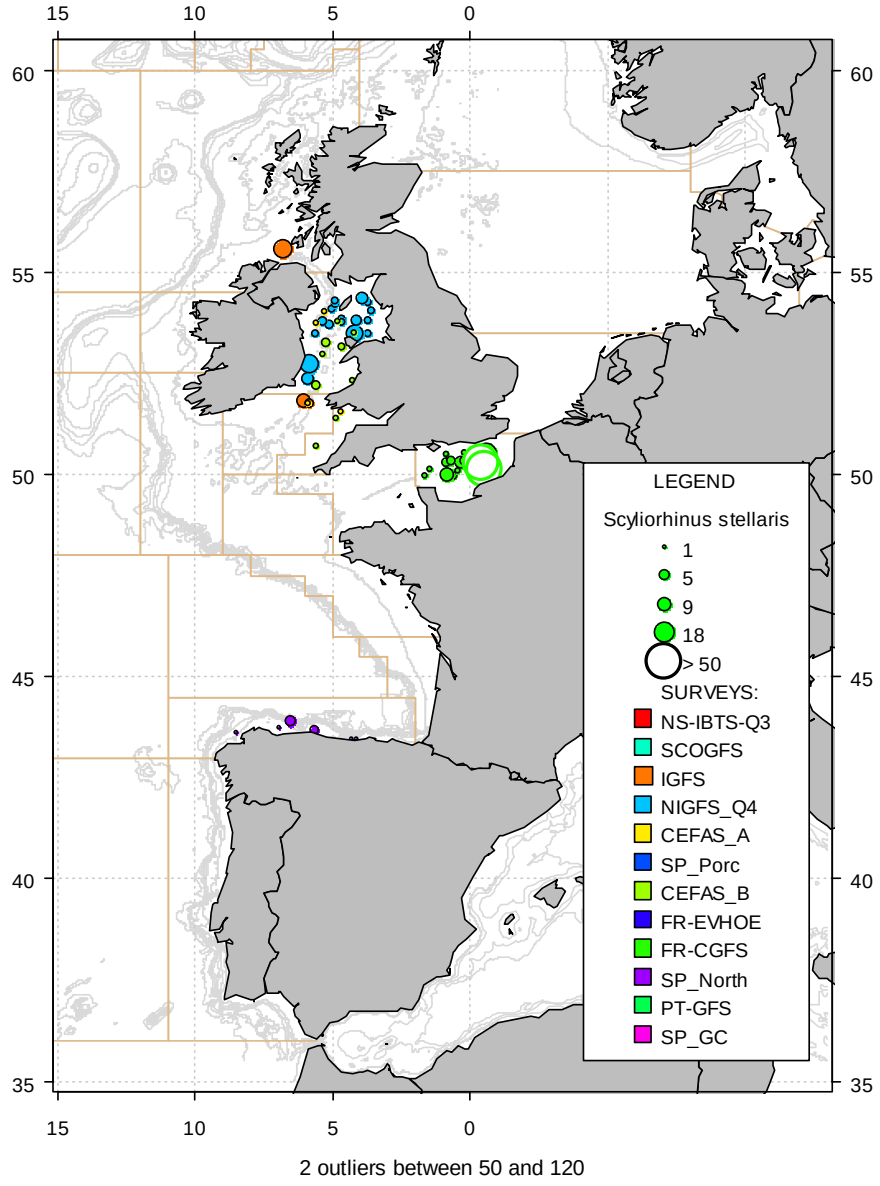


Figure A7.39. Catches in numbers per hour per hour of nurse hound, *Scyliorhinus stellaris*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

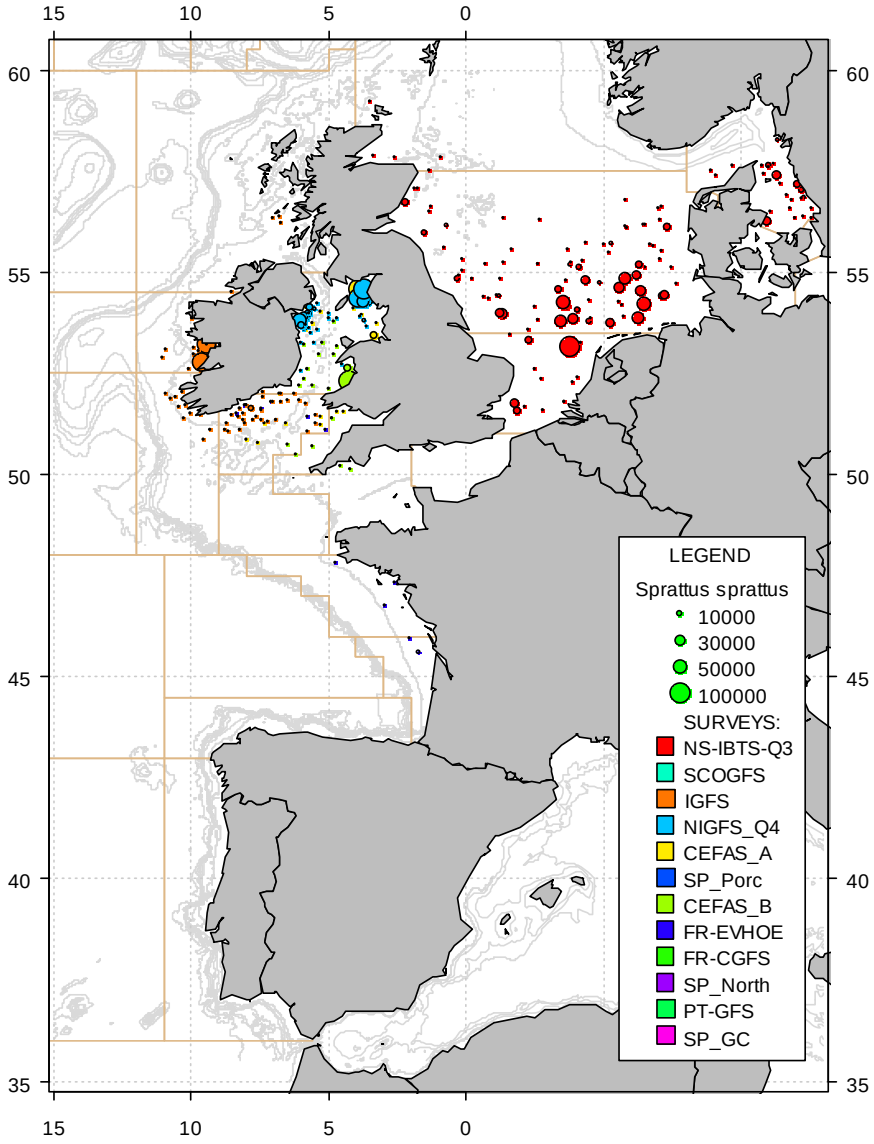


Figure A7.40. Catches in numbers per hour per hour of European sprat, *Sprattus sprattus*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

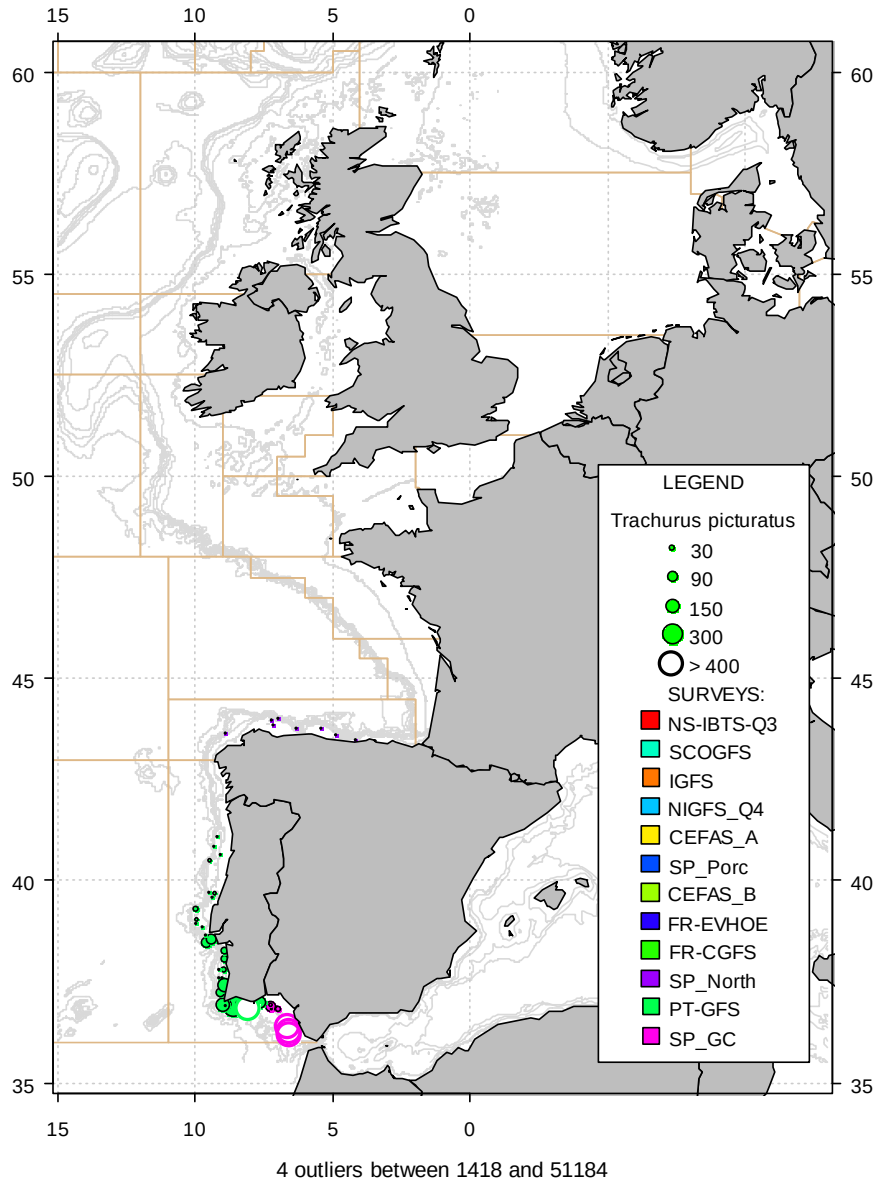


Figure A7.41. Catches in numbers per hour per hour of blue jack mackerel, *Trachurus picturatus*, in summer/autumn 2010 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.