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

22–26 March 2010

Lisbon, Portugal

ICES International Council for the Exploration of the Sea

CIEM Conseil International pour l'Exploration de la Mer

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Conseil International pour l'Exploration de la Mer

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IBTS

INTERNATIONAL-BOTTOM-TRAWL-SURVEY

Executive summary

The International Bottom Trawl Working Group (IBTSWG) met in Lisbon, Portugal, from 22 to 26 March 2010. There were 21 participants from 13 countries, all of whom are involved in designing and conducting bottom trawl surveys, and one participant represented by correspondence the ICES Secretariat.

All terms of reference have been met, details are given in relevant sections (see Table of Contents). Major developments, achievements and recommendations from the 2010 meeting are given below:

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 centralised 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).

Age structured data provided by the IBTSWG, has been provisionally reviewed to study their internal consistency, the results presented in Section 5 are restricted to haddock as a case study. Some problems in the data are also highlighted as is further work to follow on from this.

In terms of standardisation, it is crucial that net geometry, closely related to catchability, remains as constant as possible. Section 6 deals with gear parameters and their reporting, the issue of inconsistent sweeps lengths between countries and quarters has arisen as an important drawback for standardization and has also promoted further work required for the future.

Sections 7, 8 and 9 deal mainly with quality of the data stored in DATRAS, performing data checks to the historical data and to the data recently uploaded, and how to improve the upload procedures for data in DATRAS, a key task given the public accessibility of the data in particular.

Section 10 presents and recommends the adoption of some of the findings of the SGSTG report, future recommendations from the report and expected CRRs will be discussed in subsequent meetings.

Section 11 presents new revisions of the IBTS main manual (Revision VIII) and the "IBTS Manual for the Northeastern Atlantic area", improving the documentation of survey protocols and updating the changes implemented (e.g. those adopted from the SGSTG). The manuals adopted at the meeting will appear either as independent references, or linked to 2010 IBTSWG report.

Provision of data on litter collected during IBTS Surveys and the capacity to carry out standardized sampling was reviewed, marine litter being one of the descriptors of Good Environmental Status in the EU Marine Strategy Framework Directive and is addressed in Section 12.1. Further guidance is sought to clarify effective participation in the monitoring programs under development.

1 Terms of Reference and participation

The International Bottom Trawl Survey Working Group (IBTSWG), chaired by Francisco Velasco*, Spain will meet in Lisbon, Portugal, 22–26 March 2010 to:

a) Coordinate, report and plan for the next twelve months North Sea and North-Eastern Atlantic surveys, including appropriate field sampling in accordance to the EU Data Collection Regulation.

b) Review of age-structured survey data as a quality exercise for indicated species using survey based assessment exploratory plots (standard SURBA output);

c) Further examine the quality of gear performance by (i) reviewing the reporting procedures, and (ii) analyse net geometry readings and warp out to depth ratio to evaluate changes;

d) Improve the quality of historical biological data by (i) examination of DATRAS data to identify erroneous records, with a focus on (a) *Amblyraja radiata-Raja clavata*; (b) argentines; (c) topknots and (d) rocklings, and (ii) review national progress in improving quality of historical IBTS data;

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 2009/Q1 2010 surveys to identify and correct erroneous HL- and CA-records;

f) Review recent updates within DATRAS and prioritize further developments;

g) Agree upon the implementation of the outcomes from the SGSTS in respect to issues relevant to IBTS;

h) Revise the IBTS manuals intersessionally and agree.

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

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. Currently, the IBTSWG is looking at the detection and correction of errors in the historical data; the development of protocols for prevention of storage of future errors; and correcting past mistakes. This will eventually result in one large, integrated and quality checked database.

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 analyzing the follow-up of cohorts for more species relevant for 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 IBTSWG produced a more detailed report on haddock data in Q3-Q4 IBTS surveys, highlighting some problems that will also contribute to a better quality of the data as well as the way the data are stored in DATRAS. Future work along these lines will follow for the main benchmark assessments for species relevant from the IBTS surveys, if found beneficial.

With the aim to improve standardization and document protocols and work carried out on surveys, a new version of the two IBTS Manuals have been compiled and finalized during the 2010 IBTSWG meeting. The "Manual for the International Bottom Trawl Surveys" and the "Manual for the International Bottom Trawl Surveys in the Northeastern Atlantic Area" are attached as annexes of this report, including detailed information on the surveys and updates produced since the last revisions in 2005 and 2002 respectively. It has been decided that each year proposed updates and revisions to the manuals will be presented to the group, who then will decide if the new editions are appropriate.

3 Review of IBTSWG 2009 recommendations

3.1 Establishment of a DATRAS User Group

The IBTSWG recommends the establishment of a DATRAS User Group to evaluate the functionality of the DATRAS database, to provide feedback by data submitters and data users, to suggest updates of the system where needed, and to prioritize future developments.

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. This work will be completed intersessionally with progress reported at WGDIM annual meeting. The group members discuss via http://groupnet.ices.dk/duap/default.aspx. Membership of the group is open for all DATRAS users (upload and download, all surveys present or planned to be in DATRAS). DUAP is coordinated by Ingeborg de Boois, Netherlands (ingeborg.deboois@wur.nl). The coordinator reports to WGDIM.

IBTSWG will in 2011 evaluate the functioning of the DUAP and provide feedback on the DUAP chapter in the WGDIM2010 report.

3.2 Maturity staging of 4 gadoid species

Following the implementation of the collection of maturity data on cod, haddock, whiting and saithe using the new 6 stage scale since 2009 onwards.

There have been some problems with countries/surveys not having a clear 6-stages' identification key, and hence some countries are still getting and reporting the maturity data in 4 stage scales. Nevertheless within the DUAP there has been a recommendation to include an extra field in DATRAS to record the scale used, and as proposed in 2009 IBTSWG report, data will be reported as -9, 61, 62, 63… 66 in the case of the six stage maturity scale, and -9, 1, 2, 3 and 4 for the 4 stage maturity scale, to avoid misinterpretations of different scales. This protocol will be used to implement other new maturity scales for other species following the results and recommendations from the workshops on sexual maturity staging for other species.

3.3 Further investigate the suitability of CGFS indices for assessment purposes

The IBTSWG recommends that the use of the CGFSurvey for accommodating assessment working groups with abundance indices of several species should be further investigated to determine whether the design of CGFS is suitable for supplying robust stock indices.

Following the results on whiting presented in 2009 (ICES CM 2009/RMC:04), different methods to estimate the abundance indices for several species (cod, whiting and plaice) by combining the results of CGFS and the IBTS Q-3 in the North Sea were presented to the Working Group (see WD 4 in Annex 4). The methods compared were:

- The standard ICES estimation method (mean per ICES rectangle);
- Estimates using a stratification based on four fish-assemblages:
  - Using all the assemblages for each species,
  - Using only the preferred assemblages for each species,
- Combining the CGFS and the North Sea IBTS Q-3 in the area closer to the Eastern Channel.

The results of the studies carried out show the same inconsistencies between the ICES rectangles method and the fish assemblages for individual species, not showing significant changes in the comparison. Neither the combination of indices CGFS and NS-IBTS Q3 improves the consistency of the indices.

The group discussed that the area covered, could be part of a migration corridor between the North Sea and the Celtic Sea being a mixture of different populations in different moments. From this perspective the working group recommends to investigate the possibility of a stock mixture between the North Sea and the Celtic Sea area, and study possible options to cover the whole Channel area.

3.4 Flagging of data with non-standard gear from Denmark and England NS-Q1 and NS-Q3

Non - standard gear deployment was performed by Denmark in NS - Q1 2009 (Section 4.1.1) and NS - Q1 2008 (Section 4.2.1), and by England in NS - Q3 2007 (Section 7.2), therefore, the IBTSWG recommends that the stations in question are flagged in DATRAS as "non standard"

Currently there is no overview of flags used in DATRAS, and ICES Data centre is preparing a download process that includes also the flags so they can be checked and a detailed list of hauls flagged or not-flagged could be produced and checked. A list of recommendations and suggested improvements in DATRAS has been produced (see Section 9 and specific recommendations table in Annex 3) and they will be dealt during 2010 and discussed within DUAP.

3.5 IBTS North Sea Q1 and Q3 coordination to ensure overlap

In order to guarantee good overlap in the timing of the surveys, the IBTSWG recommends that all countries make every effort to perform most of their survey time during the specified target month, i.e. February for the Q1 survey and August for the Q3 survey.

This recommendation has been implemented, IBTS North Sea in 2009 (Q3) and 2010 (Q1) have been carried out within the scheduled dates and overlap between the different countries has been adequate.

3.6 Participation of Norway on IBTS North Sea Q3

The IBTSWG encourages Norway to continue their participation in the North Sea IBTS Q3.

Norway did not participate in the 2009 North Sea IBTS survey in Q3, so although the full survey area was covered, some rectangles, which in the past were fished by at least two countries, were fished by only one in 2009. The impact to the combined index is not known at this time as the NSSKWG has yet to meet. However, given the working document presented at last year's meeting (Parker-Humphreys, 2009 WD), we may expect an impact.

Nevertheless during the meeting the news that Norway had decided to reinstated Q3 Survey for 2010 was presented. The IBTSWG highly appreciates this news, and once again emphasises its view that the Norwegian participation in the IBTS surveys is essential for a suitable coverage of the northern North Sea area.

3.7 Submission of gear parameter data in DATRAS

Explorations of the available gear data in DATRAS revealed that there are too many empty fields in the database. All countries need to check whether they have submitted their gear parameter data.

Data regarding gear parameters have been uploaded in DATRAS by different institutes during 2009/10. Nevertheless, some problems persist regarding data consistency and the quality check of the data before uploading still exist for some institutes/surveys, see Section 9.6 for the revision performed during the group.

The importance of these data are stressed again in Sections 6 and 10 of this report, while in the revision of the IBTS manual more detailed protocols for the standard recording these parameters during the hauls are included. These should include recording at least vertical opening and door spread, every 30 seconds and reporting the central values to DATRAS in HH records (see Section 9.6 of the report).

3.8 Checking of Data quality and submission of corrections to DATRAS

i) All national institutes should examine the potential errors reported in Section 8, correct their national data where appropriate, submit the corrected data to DATRAS, and report progress to IBTSWG in 2010.

ii) All IBTS pay particular attention to the identification of dragonets and flatfish so that contemporary data can act as a suitable baseline with which to compare historical data.

Checking of data is being performed by most of the institutes, although the process of uploading data proceeds at different speeds, and in some cases data checking is being performed before data are actually uploaded. Nevertheless doubts on the procedures and results of re-uploading data are not clear and need further clarification from the Data Centre regarding the possibilities of re-uploading: (i) a whole data set, (ii) haul data set, or (iii) just the actual records corrected. Besides the need to implement backups of the original data uploaded is considered essential.

3.9 Biological sampling of additional species required by the Data Collection Framework

The IBTSWG recommends that all national institutes implement the biological sampling of additional species according to the sampling design given in Section 12.

Tables summarizing the sampling performed during 2009 and 2010 (IBTS NS Q1) have been produced and included in the report (see results sections on the coordination Section 4: i.e. 4.1.3, 4.2.3 and 4.3.3). These tables provide an overview of the progress done in the sampling.

3.10 Suppression of surveys

The IBTSWG agrees that *Portuguese Winter Groundfish Survey, Irish Q1 and Northern Ireland Q1 have excluded from funding by the EU. The IBTSWG recommends that these surveys should be reinstated and asks RCM - NEA for its approval.*

The funding by the EU of the Portuguese, Ireland, UK-Northern Ireland and Gulf of Cádiz Q1 surveys have not being reinstated during 2009. As result both: Portuguese winter and Irish Q1 surveys have not been performed neither in 2009 nor in 2010. On the other hand Northern Ireland Q1, and the Spanish Survey on the Gulf of Cádiz in Q1 (also excluded from funding) were carried out, but are facing budget problems to continue in the future thus causing the interruption of the time-series of these surveys.

All these surveys: a) have been under the remit of IBTSWG; b) submit or are committed to upload the survey data sets to DATRAS; c) are fundamental for collecting maturity data for the DCF, and d) provide input for assessment of different species (i.e. Southern Hake or Irish Sea cod, both on recovery plan). Therefore since these

surveys meet the original eligibility criteria for DCF funding that was set out by the SGRN 07–01 review, the IBTSWG recommends again that the surveys should be reinstated.

3.11 Reporting of non-fish species to DATRAS

The IBTSWG recommends that all national institutes will report the catches of the non-fish species given in Table 6.4.1 in the IBTSWG report 2007 from 2008 onwards.

This recommendation has been implemented, although still there are some problems with cephalopods identification. Besides some countries are in process of uploading their survey datasets. And, as it was recognized in the IBTSWG 2009 report, it is fundamental that data reported to DATRAS follow a rigorous quality assurance and reporting procedures are in place and have been approved by IBTSWG, so as to ensure that data are of high quality.

4 North Sea and Eastern Atlantic Surveys (ToR a)

ToR a) coordinate, report, and plan for the next twelve months North Sea and North-Eastern Atlantic surveys, including appropriate field sampling in accordance to the EU Data Collection Regulation, and refine the standard reporting format.

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 and IV and VIId. During day-time a bottom trawl is used. This is the GOV (Grand Ouverture Verticale), with ground gear A or B. A CTD was deployed at most trawl stations to collect temperature and salinity profiles. During night-time herring larvae are sampled with a MIK-net (Methot Isaac Kidd). Age data were collected for cod, haddock, whiting, saithe, Norway pout, herring, mackerel, and sprat, and a number of additional species (see information provided per country).

Seven vessels participated in the quarter 1 survey in 2010: "Argos" (Sweden), "Dana" (Denmark), "G.O. Sars" (Norway), "Scotia" (Scotland), "Thalassa" (France), "Tridens II" (Netherlands) and "Walther Herwig III" (Germany). The survey covered the period 16 January to 1 March (see Table 4.1.1). In total, 389 GOV and 569 MIK hauls were carried out (see Figure 4.1.1). All rectangles were covered, by at least 1 GOV haul and 2 MIK hauls. Although not every rectangle was sampled as planned, the overall coverage of the sampling was good.

Table 4.1.1. Overview of the surveys performed during the North Sea IBTS Q1 survey in 2010.

SURVEY:	NORTH SEA IBTS Q1	DATES:	13 JANUARY – 26 FEBRUARY 2010
NATION:	VESSEL:		PERIOD:
Denmark	Dana		5 February – 21 February
France	Thalassa		13 January – 19 February
Germany	Walther Herwig III		22 January – 18 February
Netherlands	Tridens		25 January – 25 February
Norway	G.O. Sars		4 February – 26 February
Scotland	Scotia 3		27 January – 17 February
Sweden	Argos		25 January – 11 February

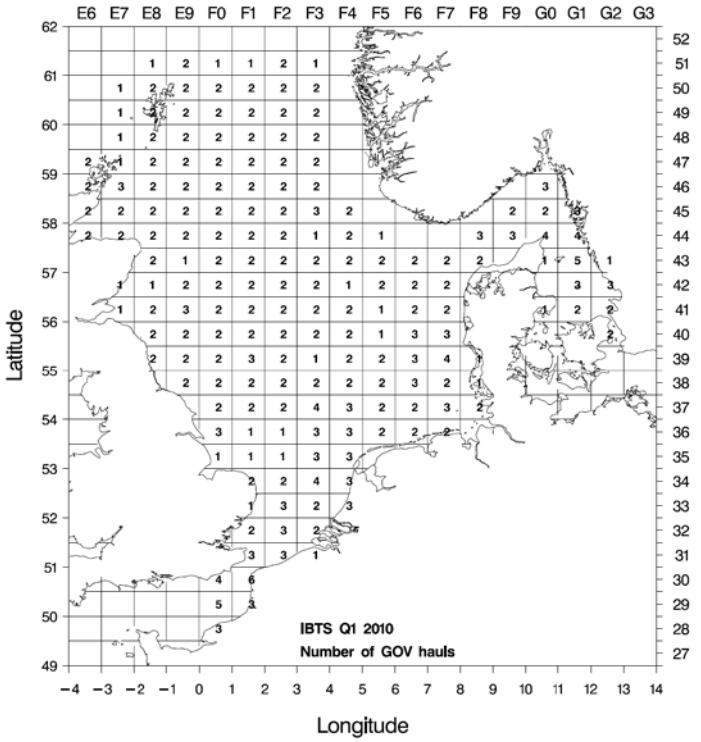


Figure 4.1.1. Number of hauls per ICES-rectangle with GOV during the North Sea IBTS Q1 2010.

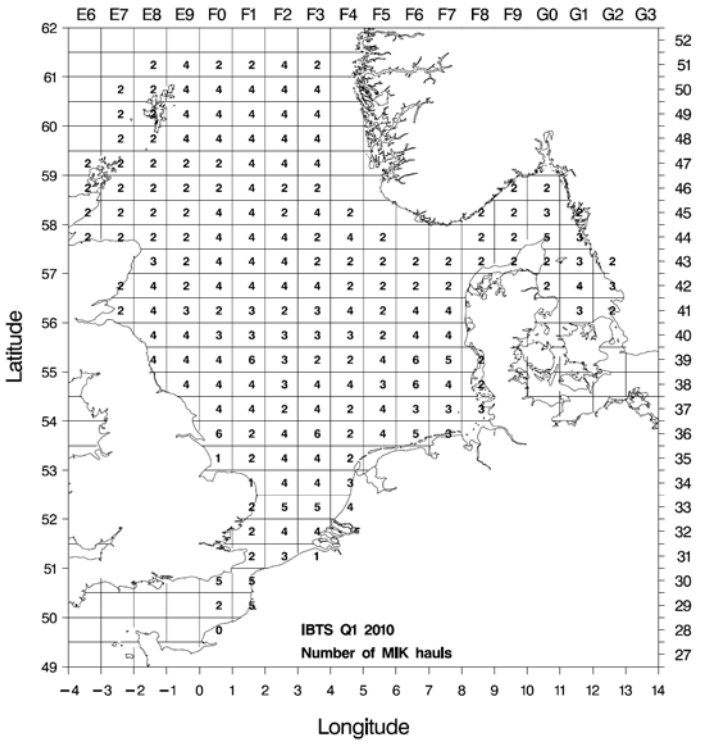


Figure 4.1.2. Number of hauls per ICES-rectangle with MIK during the North Sea IBTS Q1 2010.

4.1.2 Survey summaries by country

4.1.2.1 Denmark – North Sea Quarter 1 IBTS

NATION:	DENMARK	VESSEL:	RV DANA
Survey:	01/10	Dates:	5 – 21 February 2010

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, while groundgear B was used in 3 hauls. Herring larvae are sampled with a MIK-net (Methot Isaac 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 were recorded during the survey.

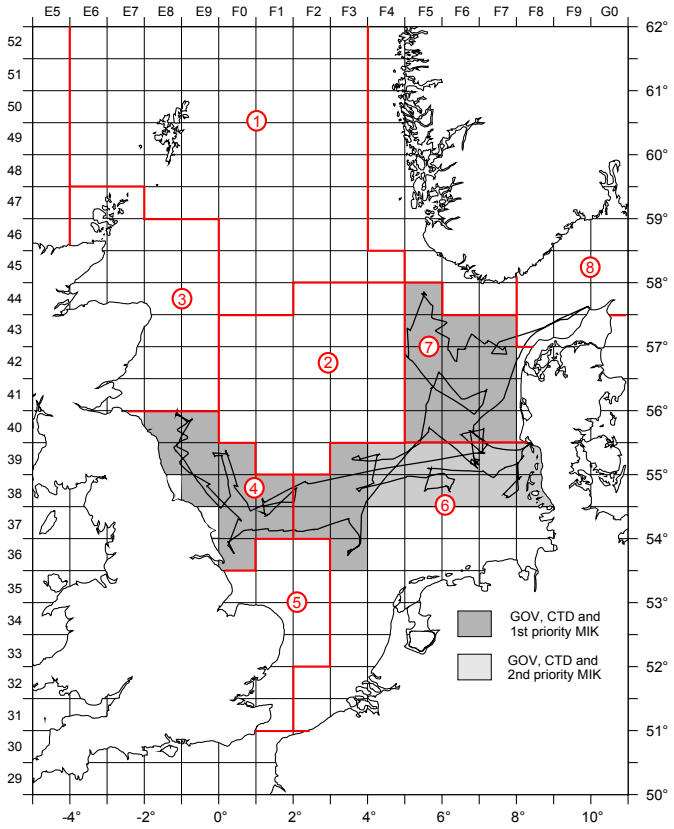
Stations fished

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
IV	N/A	GOV	37	37	1	1	100	
		GOV-B	3	3				
		MIK	80	80				

3 additional GOV with non-standard rigging (StNo 93, 94, and 97 in HH records, canvas type kite instead of Exocet kite).

Number of biological samples (maturity and age material)

Species	Age	Species	Age
Clupea harengus	756	*Glyptocephalus cynoglossus*	7
Gadus morhua	362	*Scomber scombrus*	2
Melanogrammus aeglefinus	346	*Lophius piscatorius*	4
Merlangius merlangus	643	*Merluccius merluccius*	13
Pollachius virens	18	*Mullus surmuletus*	38
Sprattus sprattus	586	*Psetta maxima*	9
Scophhtalmus rhombus	1	*Trachurus trachurus*	75
Trisopterus esmarki	205	*Pleuronectes platessa*	594
Microstomus kitt	159	*Solea solea*	5
Pollachius pollachius	3		



Cruise track of Dana during the Q1 IBTS 2010.

4.1.2.2 France – North Sea Quarter 1 IBTS

NATION:	FRANCE	VESSEL:	THALASSA
Survey:	IBTS10	Dates:	13 January – 19 February 2010

Cruise	Participation in the North Sea IBTS Q1 survey. France sampled the southern part of the North Sea and the Eastern English Channel. Sampling for herring larvae (MIK) were carried out during night time. CTD was deployed at each trawl station and each MIK stations to collect temperature and salinity profiles. Age data were collected for the main species.
Gear details:	The gear used is the IBTS standard GOV 36/47 with ground gear A, Exocet kite and with Scanmar door, wing (unavailable for some hauls) and vertical opening sensors. For larvae the standard MIK net is used.
Notes from survey (e.g. problems, additional work etc.):	The "Thalassa" left Brest (France) the 14th of January. There were 5 additional days for another national project not included in the IBTS survey and during which additional works were carried out in the Western Channel. Then, within the IBTS program, the English Channel was covered first with 15 GOV hauls in the survey area 10 (at least 2 hauls per square and 5 additional hauls) and 8 MIK stations at the end of the survey. In the North Sea, 77 GOV hauls and 117 MIK were carried out in the areas south of 56°30 N. At each trawl and MIK net station, a CTD was deployed (176 for the whole survey) As additional work : • The CUFES device (Continuous Underwater Fish Egg Sampler) was used during all the survey (day and night) in the English Channel and the North sea and 1 348 samples were collected. • Samples for zoo and phytoplankton were collected ("bongo" net (196) and "Niskin" bottle (216)). • Acoustic data were recorded in the English Channel (mono- and multibeam echo sounders) and 3 pelagic hauls were deployed on herring schools. • In addition, observers for mammals and birds collected information during the 10 first days in the English Channel. • Wastes were counted and weighted at each trawl station Problems encountered: The MIK net was lost at the beginning of the survey, and replaced ten days later. It was not possible to carry out all MIK stations in the English Channel and only 8 were made at the end of the survey.
Number of fish species recorded and notes on any rare species or unusual catches:	107 species were recorded. Shellfish were also measured and benthic fauna identified at each haul

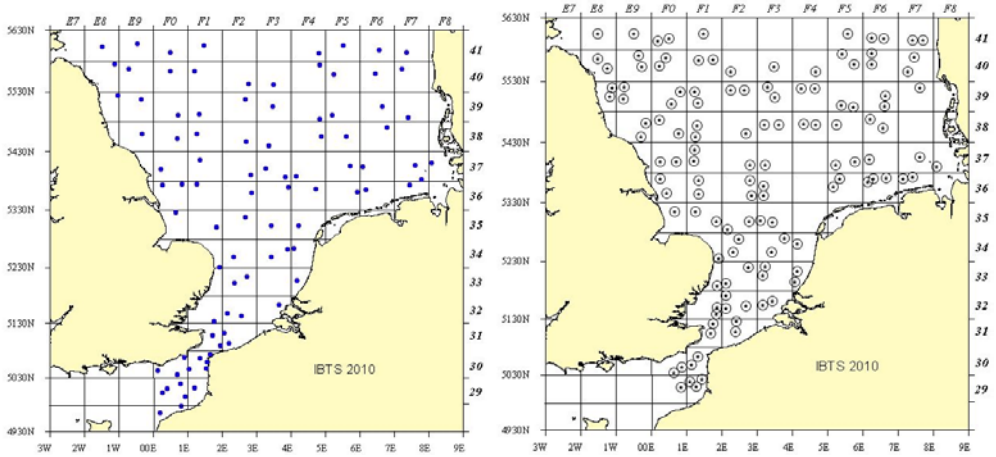
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIId	ICES squares	GOV	10	10	5	0	100%	
VIId		MIK	15	8			50%	
IVb,c		GOV	75	75	3	2	100%	
IVb,c		MIK	120	117				
	TOTAL		85/135	85/125	3			

Number of biological samples (maturity and age material)

Species	Age	Species	Age
Merlangus merlangius	1474	*Gadus morhua*	306
Melanogrammus aeglefinus	125	*Pleuronnectes platessa*	1475
Trisopterus esmarki	72	*Mullus surmuletus*	3
Clupea harengus	490	*Solea solea*	1
Sprattus sprattus	250		

*** Maturity only.**



"Thalassa" GOV hauls (left) and MIK hauls (right) IBTS 2010-q1.

4.1.2.3 Germany – North Sea Quarter 1 IBTS Germany – North Sea Quarter 1 IBTS

NATION:	GERMANY	VESSEL:	WALTHER HERWIG III
Survey:	330	Dates:	22 January – 18 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 ground gear 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, 74 were fished (3 rectangles not fished due to rough weather). The GOV in the standard version was used and 74 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, 66 species of fish were recorded during the survey.

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	74	0	0	96%	
IV	N/A	MIK	154	154	0	0	100%	

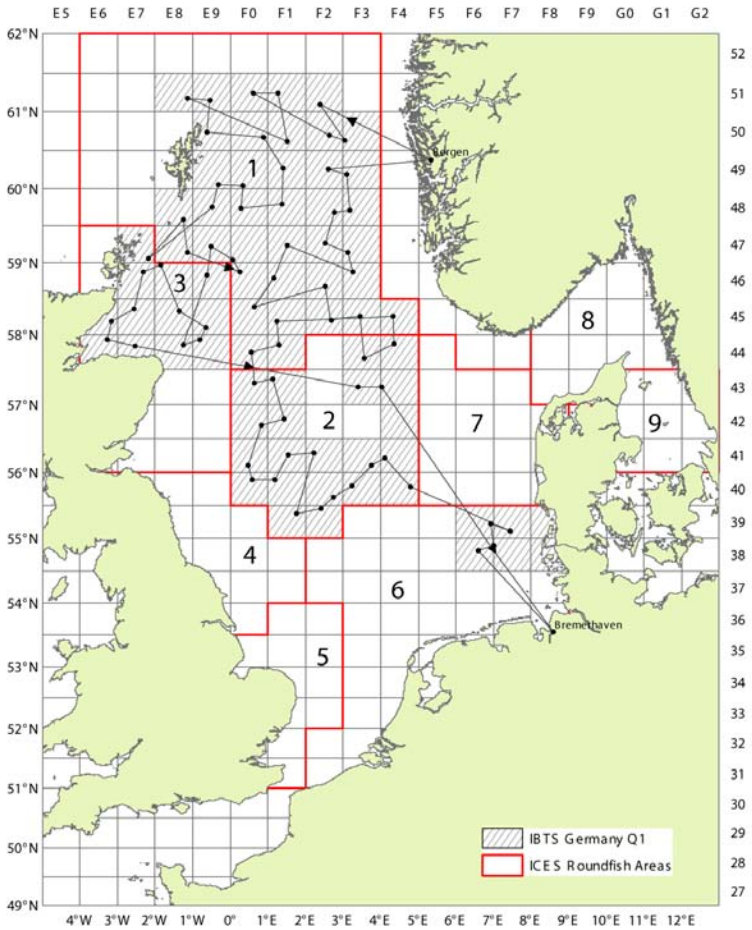
Strat: strata; Add: Additional tows; inv: Invalid

Number of biological samples (maturity and age material)

Species	Age	Species	Age
Clupea harengus	998	** *Merluccius merluccius*	201
Gadus morhua	349	** *Aspitrigla cuculus*	50
Melanogrammus aeglefinus	877	** *Zeus faber*	6
Merlangius merlangus	820	* *Lophius budegassa*	1
Pollachius virens	264	* *Lophius piscatorius*	15
Scomber scombrus	308 in prep.	* *Micromesistius poutassou*	10
Sprattus sprattus	470	* *Microstomus kitt*	206
Trisopterus ermarki	301	* *Psetta maxima*	4
Pleuronectes platessa	305	* *Scophthalmus rhombus*	1
**Limanda limanda*	545		

*** Maturity only.**

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



Cruise track of Walther Herwig III (cruise 330) during the Q1 IBTS 2010.

4.1.2.4 Netherlands – North Sea Quarter 1 IBTS

Nation:	**The Netherlands**	Vessel:	Tridens 2
Survey:	IBTS Q1	Dates:	25 January – 25 February 2010

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 ground gear 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. During week 6 the entire MIK-gear was lost. Fishing in weeks 7 and 8 was therefore carried out with an alternative ring of diameter 1.85 m, and without recording current velocity.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 67 species or species-groups of fish (including elasmobranchs) were recorded during the survey. A rare large catch of red gurnard *Aspitrigla cuculus* occurred in the western North Sea near the Scottish coast.

Stations fished

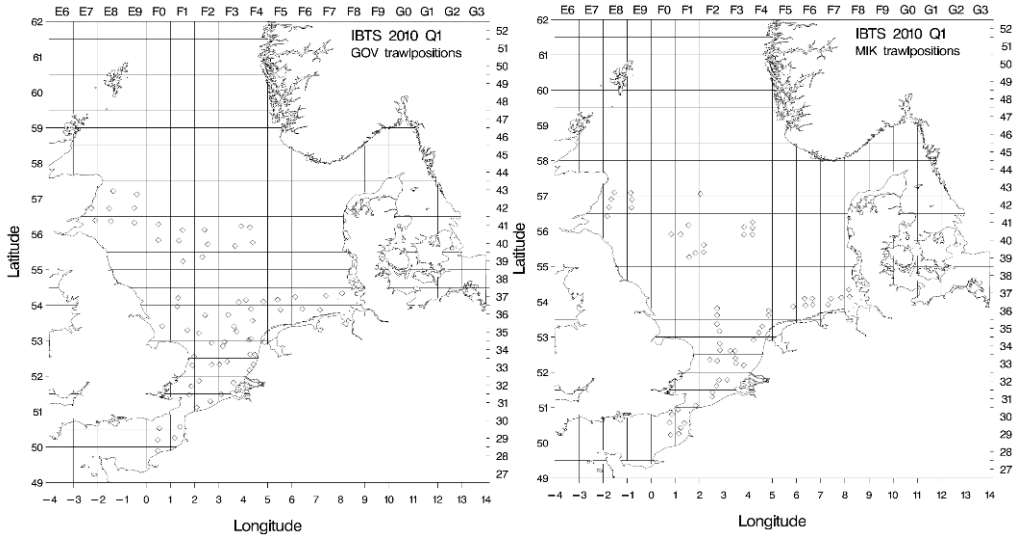
ICES Divs.	Strat	Gear	Tows planned	Valid	Additional	Inv	% stations fished	comm.
IV	N/A	GOV	49	61	12	1	124	
VIId	N/A	GOV	5	5	0	0	100	
IV	N/A	MIK	98	54	0	0	55	
VIId	N/A	MIK	10	7	0	0	70	
	TOTAL		54/108	66/61	12/0	1/0	100	

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

Number of biological samples (maturity and age material)

Species	Age	Species	Age
Clupea harengus	435	*Trisopterus esmarki*	137
Sprattus sprattus	375	*Mullus surmuletus*	8
Scomber scombrus	25	*Solea solea*	5
Gadus morhua	252	*Eutrigla gurnardus*	244
Melanogrammus aeglefinus	330	*Pleuronectes platessa*	403
Merlangius merlangus	809		

*** Maturity only**



Cruise track of Tridens during the Q1 IBTS 2010.

4.1.2.5 Norway – North Sea Quarter 1 IBTS

NATION:	NORWAY	VESSEL:	G.O. SARS
Survey:	IBTS Q1	Dates:	4 February – 26 February 2010

Cruise	The survey was a combination of the IBTS quarter 1 and two hydrographical transects where also phytoplankton and zooplankton were sampled. The IBTS Q1 aims to collect data on the distribution and relative abundance and biological information of commercial fish in area IV. The primary species are herring, saithe, cod, haddock, whiting, sprat, mackerel, Norway pout and plaice.
Gear details:	IBTS standard GOV 36/47 with ground gear A, the Exocet kite, with Scanmar sensors. The bottom panel of the trawl was made with PE. The sensors logged door distance, depth and angle, wing distance, headline height and trawleye data.
Notes from survey (e.g. problems, additional work etc.):	Two hydrographical transect were done, together with one 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 (47) and invertebrate (9) were recorded during the survey, among this a *Zeus faber*. In two stations, large number of icthyophonus infected herring were found (see Figure 2).

Stations fished

ICES DIVS.	STRAT	TOWS PLANNED	VALID	ADDITIONAL	INV	% STATIONS FISHED	COMM.
IV	N/A	40	38	0	0	100	
		56	56	0	0	100	
	TOTAL	38/56	38/56	0	0	100	

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

Number of biological samples (maturity and age material)

SPECIES	AGE	SPECIES	AGE
Clupea harengus	316	*Pollachius virens*	147
Gadus morhua	82	*Trisopterus esmarki*	55
Melanogrammus aeglefinus	219	*Sprattus sprattus*	6
Scomber scombrus	69	*Merlangius merlangus*	149

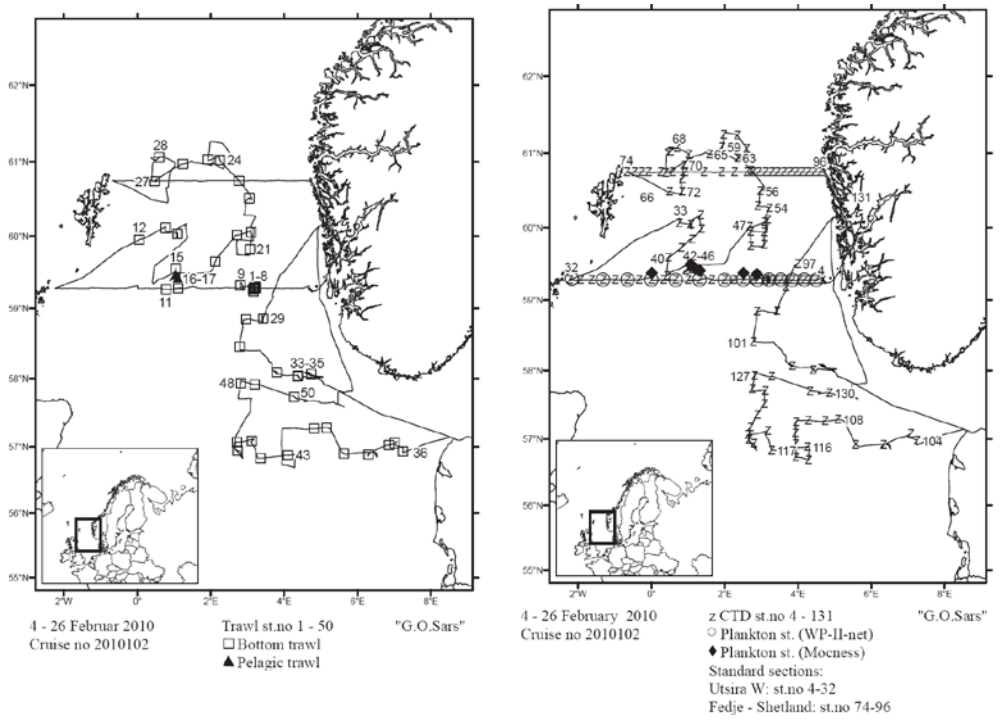


Figure 1. Left: Trawl stations during IBTS 2010 Q1. Bottom trawl is the GOV 36/47 with exocet kite. Stations 1–7 were part of the testing of different trawlnets. The pelagic trawl "Harstadtral" was used during the process study. Right: CTD stations, plankton net hauls and hydroacoustic transect stations.

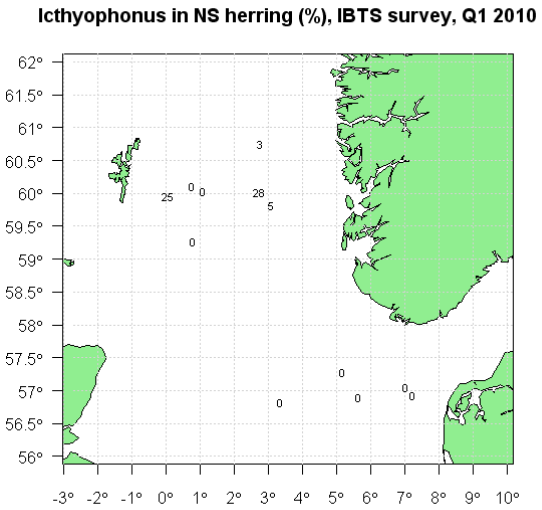


Figure 2. Percentage of herring infected with icthyophonus at stations where herring was part of the catch during IBTS Q1 for G.O.Sars.

4.1.2.6 Sweden – North Sea Quarter 1 IBTS

NATION:	SWEDEN	VESSEL:	ARGOS
Survey:	2/10	Dates:	25 January – 11 February 2010

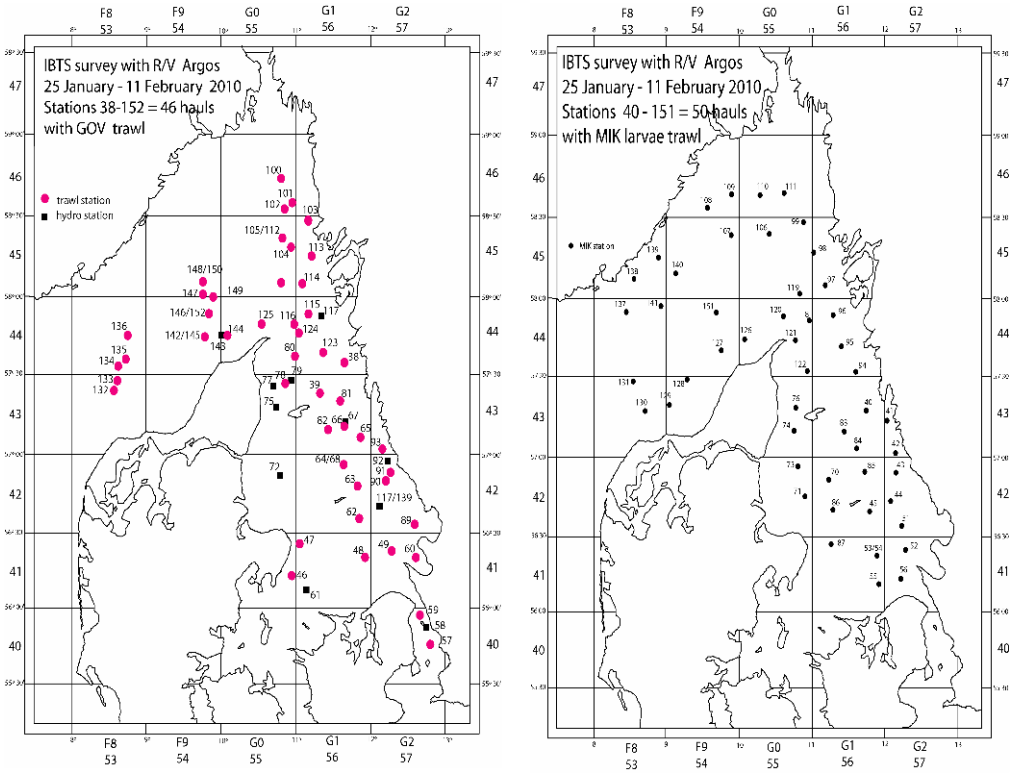
Cruise	Q1 North Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in IIIa. The primary species for GOV trawling are cod, haddock, sprat, herring, Norway pout, hake, plaice, sole and saithe. The aim of the MIK trawl survey is mainly to catch North Sea autumn spawning herring larvae.
Gear details:	IBTS standard GOV 36/47 with ground gear A, Exocet kite with Scanmar door, bottom contact, trawl eye and headline height sensors. Daylight hauls at bottom. Methot Isaac Kidd (MIK) midwater ring trawl. Dark light oblique hauls.
Notes from survey (e.g. problems, additional work etc.):	The ice coverage was unusually high this year in the Skagerrak, Kattegat and Sound as never occurred since 1996. Therefore one station in the Kattegat was not towed due to the ice hinder. Moreover, a serious engine problem occurred the last week of the survey and Argos was at the dock for one day in order to be repaired. As a consequence one station could not be towed.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 56 species of fish were recorded during the survey.

Stations fished

ICES	DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
IIIa		N/A	GOV	48	46	0	0	96	
IIIa		N/A	MIK	-	50	-	-	100	

Number of biological samples (maturity and age material)

SPECIES	AGE	SPECIES	AGE
Clupea harengus	1390	*Trisopterus esmarki*	141
Gadus morhua	824	*Sprattus sprattus*	580
Pollachius virens	35	*Pleuronectes platessa*	783
Melanogrammus aeglefinus	286	*Glyptocephalus cynoglossus*	Not yet analysed
Solea solea	32		



Cruise track of Argos during the Q1 IBTS 2010.

4.1.2.7 UK (Scotland) – North Sea Quarter 1 IBTS

NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	0210s (IBTS Quarter 1)	Dates:	27 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 north east 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, no significant weather related problems were encountered. Scotia did however experience substantial gear damage resulting in 4 'foul' hauls during the survey, with 3 of these occurring on historically 'clean' grounds. Ship's thermosalinigraph was run continuously throughout the cruise. Temperature, salinity and water samples for nutrient analyses were collected at each station. A total of 52 valid hauls was achieved with all allocated stations covered other than the station in stat rect 43E9, where gear damage occurred. A total of 99 valid MIK tows were completed with a minimum of 2 undertaken within each statistical rectangle where fishing events occurred. 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 69 species were recorded during the survey. Biological data was recorded for a number of species in accordance with the requirements of the EU Data Regulations.

Stations fished

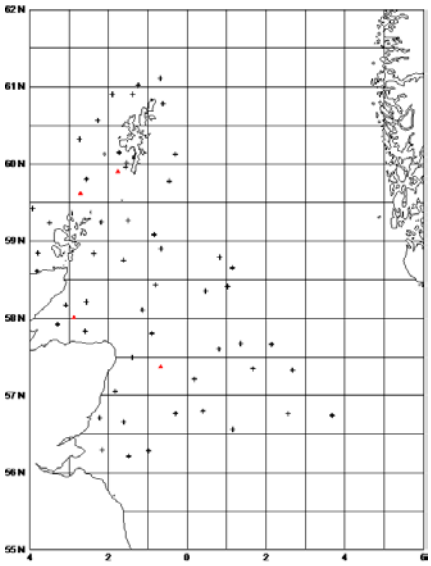
ICES DIVS.	STRAT	GEAR	TOWS PLANNED	VALID	VALID WITH ROCKHOP.	ADDITIONAL	INV.	%STATIONS FISHED	COMM.
IVa		GOV-B	30	30	-	2	0	100	
IVa		GOV-A	2	2				100	
IVb		GOV-A	15	15				100	
IVb		GOV-B	3	3	-	0	0	100	
TOT.			50/104	52/109	-	2	0	104	

Divs: Divisions; Strat: strata; Rockhop: Rock hopper; Inv: invalid; Comm: comments

Number of biological samples (maturity and age material)

Species	Age	Species	Age
Clupea harengus	374	* *Merluccius merluccius*	213
Gadus morhua	216	* *Zeus faber*	4
Melanogrammus aeglefinus	1023	* *Amblyraja radiata*	22
Merlangius merlangus	704	* *Raja montagui*	58
Pollachius virens	21	* *Dipturus batis*	5
Scomber scombrus	20	* *Raja fullonica*	1
Trisopterus esmarki	337	* *Raja brachyura*	7
Sprattus sprattus	Not yet analysed	* *Leucoraja naevus*	35
* *Chelidonichthys cuculus*	145	* *Pleuronectes platessa*	277

*** Maturity only**



Cruise track of Scotia during the Q1 IBTS 2010 (foul hauls in red).

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	52	8.83	188.44	7.33
Melanogrammus aeglefinus	IV	52	1581.67	4010.71	156.06
Merlangius merlangus	IV	52	397.86	1272.79	49.52
Pollachius virens	IV	52	0.82	64.41	2.51
Scomber scombrus	IV	52	1.01	6.45	0.25
Clupea harengus	IV	52	192.76	255.36	9.94
Pleuronectes platessa	IV	52	59.77	192.23	7.48
Trisopterus esmarki	IV	52	12777.51	5566.88	216.61
Sprattus sprattus	IV	52	114.55	39.79	1.55

4.1.3 Results

4.1.3.1 GOV

The preliminary indices for the recruits of seven commercial species based on the 2010 quarter 1 survey are shown in Figure 4.1.3.1. According to these preliminary results, sprat and Norway pout showed a year class in 2010 well above the long-term average for the years 1980–2009. The index for 1-group haddock was just above average. The catches of the other species are below average, though for cod, whiting and mackerel catches were higher than in the preceding years.

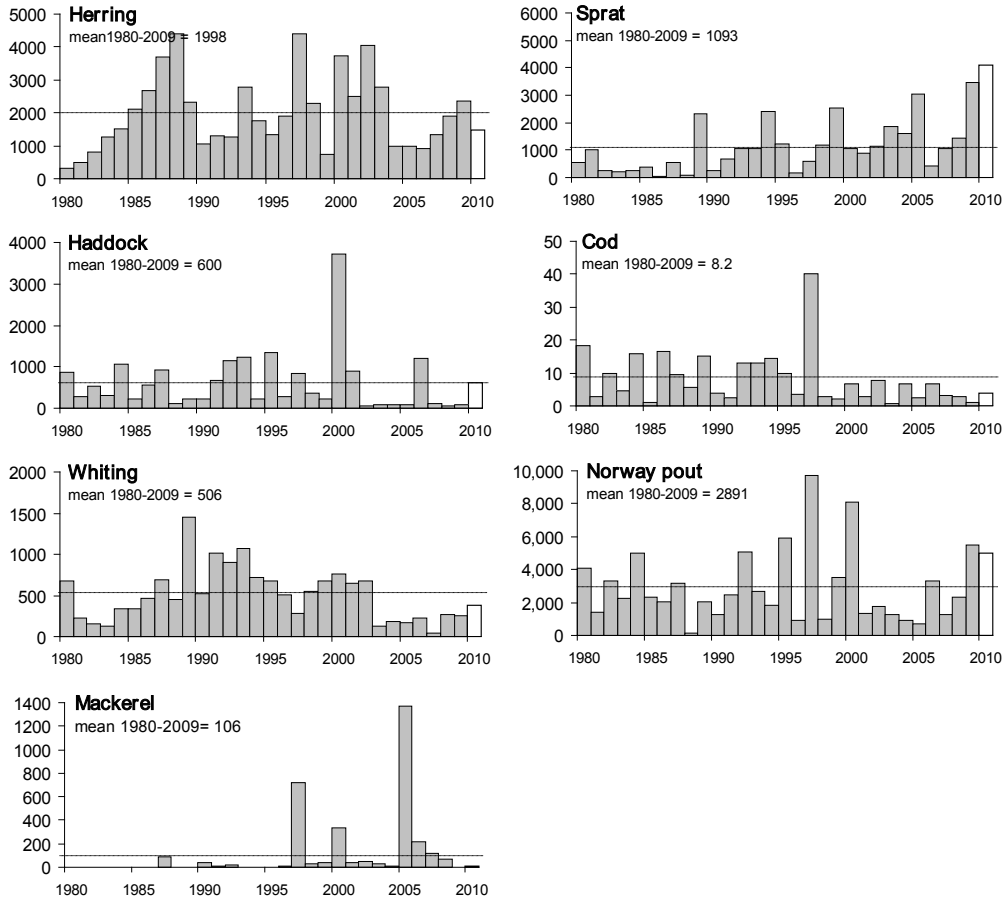


Figure 4.1.3.1. Time series of indices for 1-group (1-ring) herring, sprat, haddock, cod, whiting, Norway pout, and mackerel caught during the quarter 1 IBTS survey in the North Sea, Skagerrak and Kattegat. Indices for the last year are preliminary, and based on a length split of the catches.

4.1.3.2 Biological samples

Table 4.1.3.1 gives an overview of the number of biological samples as reported per country in Section 4.1.2

Table 4.1.3.1. Number of individuals sampled for maturity and/or age (ip=in preparation, not analysed yet).

SPECIES	DEN	FRA	GER	NED	NOR	SWE	SCO	TOTAL
Target species								
Clupea harengus	756	490	998	435	316	1390	374	4759
Gadus morhua	362	306	352	252	82	824	216	2394
Melanogrammus aeglefinus	346	125	876	330	219	286	1023	3205
Merlangius merlangus	643	1474	820	809	149		704	4599
Pollachius virens	18		269		147	35	21	490
Sprattus sprattus	586	250	ip	375	6	580	ip	1797
Trisopterus esmarki	205	72	301	137	55	141	337	1248
Scomber scombrus	2		ip	25	69	32	20	148
Additional species								
Scophtalmus rhombus	1		1					2
Microstomus kitt	159		206					365
Pollachius pollachius	3							3
Glyptocephalus cynoglossus	7					ip		7
Lophius piscatorius	4		15					19
Merluccius merluccius	13		201				213	427
Mullus surmuletus	38	3		8				49
Psetta maxima	9							9
Trachurus trachurus	75							75
Pleuronectes platessa	594	1475	322	403		783	277	3854
Solea solea	5	1		5				11
Limanda limanda			545					545
Micromesistius poutassou		10					10	
Aspitrigla cuculus			50				4	54
Zeus faber			6					6
Lophius budegassa			1					1
Eutrigla gurnardus				244				244
Amblyraja radiata							22	22
Raja montagui							58	58
Dipturus batis							5	5
Raja fullonica							1	1
Raja brachyura							7	7
Leucoraja naevus							35	35

4.1.3.3 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 stock. This year's IBTS-0 index is based on

550 depth-integrated hauls with the ring-net. Index values are calculated as described in the WG report of 1996 (ICES 1996/ACFM:10). The new index value of 0-ringer abundance of the 2009 year class is estimated at 77.1, which is about 70% of the long term mean, and indicates a continuation of the series of relatively poor recruitments starting from the 2002 year class. The 0-ringers which are included in the index were predominantly distributed in the central-southern areas of the North Sea (Figure 4.1.3.2). A large concentration was found south of the Dogger Bank, while no herring larvae were seen in the Skagerrak/Kattegat.

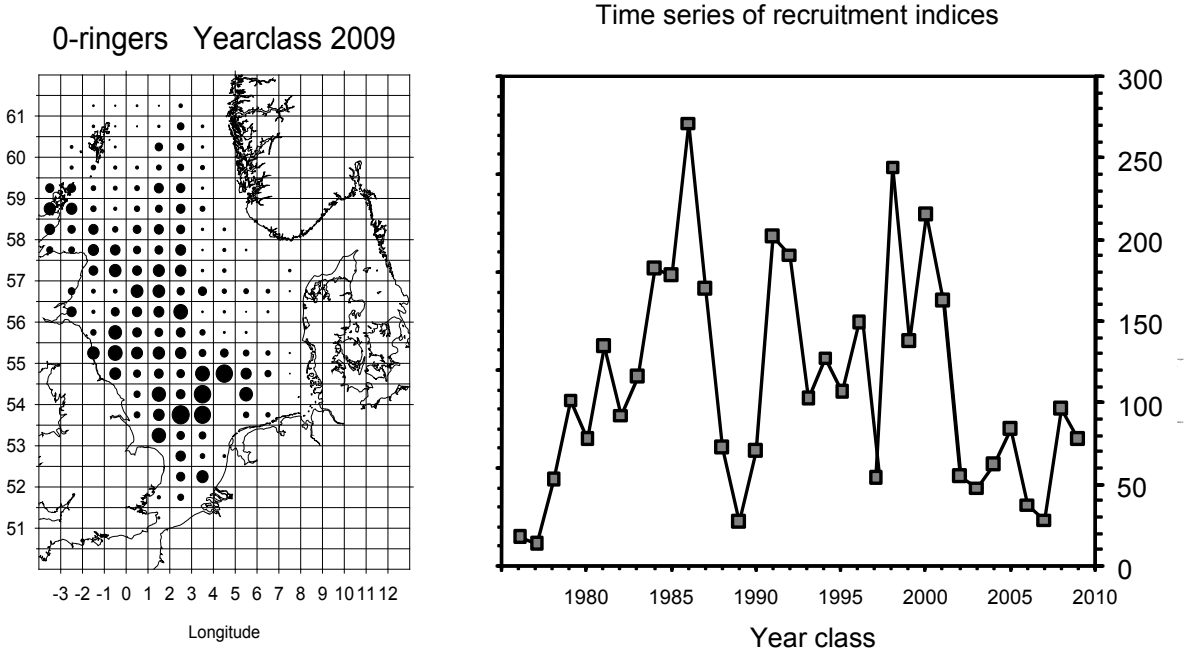


Figure 4.1.3.2. Distribution of MIK caught herring larvae during the IBTS Q1 2010 (left) and the time series of herring larvae since 1976 (right).

4.1.4 Participation in 2010

The ships time available for the quarter 1 survey in 2010 is expected to be as usual as described in the manual, with an aim to carry out the survey in the month of February.

4.1.5 Other issues

4.1.5.1 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

amongst the participating countries. The sampling scheme agreed upon by the participants of the first quarter North Sea IBTS is given in Table 4.1.5.1.

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.

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

Table 4.1.5.1. 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			

Table 4.1.5.2 shows the required and actual number of individual fish that was sampled during the first quarter North Sea IBTS, and the (estimated) total catch per species. It appears not possible to meet fully to the requirements of the RCM by using solely the opportunity of the IBTS (see e.g. *Mullus surmulatus*). It is therefore advisable to explore the use of market sampling programs that fall under the DCF as well.

Furthermore, it is noted that not all institutes are capable of aging the certain collected species. The IBTSWG recommends to RCM_NSEA to establish an exchange program for reading otoliths between countries. Information on expertise of all institutes on age reading can be found in the 2009 report of PGCCDBS (ICES, 2009b).

Table 4.1.5.2. Number of biological sampling of additional species during the NS-IBTS Q1 according to scheme.

ICES Division IIIa

Species (Engl.)	Species (Latin)	A/S/W/Mat		sampled in 2010	caught in 2010
Witch flounder	*Glyptocephalus cynoglossus*	T		in prep	115
Plaice	*Pleuronectes platessa*	Y		783	2273
Sole	*Solea solea*	Y		0	0
Hake	*Merluccius merluccius*	Y		0	88

ICES Sub-area IV and Division VIId

Species (Engl.)	Species (Latin)	A/S/W/Mat	RCM num	sampled in 2010	caught in 2010
Red gurnard	*Chelidonichthys cuculus*	T	100	54	387
Witch flounder	*Glyptocephalus cynoglossus*	T	100	7	36
Sole	*Solea solea*	Y	5570	11	5
John Dory	*Zeus faber*	T	10	6	17
Hake	*Merluccius merluccius*	Y	800/550	427	851
Striped red mullet	*Mullus surmuletus*	T	600/200	49	110
Plaice	*Pleuronectes platessa*	Y	9550	3071	13862
Spotted ray	*Raja montagui*	T		58	133
Cuckoo ray	*Leucoraja naevus*	T		35	65
Starry ray	*Amblyraja radiata*	T		22	178

4.1.5.2 Storage of MIK data

The current procedure for calculating the herring larvae index from MIK-data is that each country individually sends its data to the member of the Herring Assessment Working Group (HAWG) who is in charge of the calculation (i.e. P. Munk, Denmark). The HAWG is fully in charge of producing the index and makes the decisions on data corrections and data in- or exclusions. This matter has been discussed during the IBTSWG 2010 meeting, since it was noted for the 2010 MIK-data, the HAWG took decisions on both the exclusion of the data (example 1, see below), and the correction of the data (example 2, see below). Individual members of the IBTSWG were consulted, but not involved in the decision making.

The reasoning for the exclusions and corrections are not written in the HAWG-report, nor is it clear what exactly has been performed. Furthermore, the data are currently not stored in freely accessible database, but locally at DTU-Aqua. Lacking both the information and the direct access to the data makes it impossible for the IBTSWG to judge the procedure for calculating the MIK-index of herring larvae.

The IBTSWG would like to take its responsibility for their data, and therefore wishes to be involved in the calculation of the herring larvae index in the future. Therefore, the IBTSWG recommends the HAWG to involve the IBTSWG from 2011 onwards in the process of the calculation of the index for herring larvae based on MIK-data. Furthermore, the IBTSWG would like to use DATRAS as the common database for storage of the MIK-data, and therefore recommends ICES to facilitate this from 2011 onwards.

Example 1: Exclusion of MIK-data

The HAWG has decided to exclude the 2010 MIK-data from "Tridens" from the calculation of the herring larvae index.

The reason for this was given by correspondence between the person responsible for collecting the data (C. van Damme, IMARES) and the person responsible for calculating the index (P. Munk, DTU-Aqua) as follows:

Munk: "A comparison of distance (based on flow) and duration, leads to ships speed of 7–10 knots! If the ship has been sailing at speed in the order you mention (5–6 knots) the catches are unlikely to be reliable. There would have been a strong standing wave in front of the gear. Biased catches are also apparent when comparing your catches with other participants when

in same rectangles. Netherlands are systematically (much) lower, even when assuming a more moderate haul distance. Hence, regrettably we will have to exclude these data from the indices calculation."

Example 2: Corrections of the MIK-data

Another issue concerning the MIK-data from 2010 was that France was unable to determine the clupeid larvae at a species level. The HAWG however decided to use the data, see correspondence between the person responsible for collecting the data (Y. Verin, IFREMER) and the person responsible for calculating the index (P. Munk, DTU-Aqua) below. However it is not reported in the HAWG-report in what way the data are used.

Verin: "It is of course planned to maintain the usual sampling scheme in the area covered by the Thalassa (Eastern Channel and Southern North Sea) and to sort out clupeoids larvae during the survey . But, we will not be able to determine the species without the support of an expert in ichtyoplankton. So, at the end of the survey, we could only provide the information below :

- *Geographical information (positions, depth) for each station and filtered volumes*
- *numbers of clupeoids (mixed herring, sprat and sardines) for each stations.*
- *if useful : larval length measurements."*

Munk: "Concerning the lack of species separation between clupeoids during the French 2010 MIK sampling. This is of course unfortunate, but I believe that if we have length information, we will be able to evaluate each sample for potential "contamination" with non-herrings. And decide upon whether the given sample shall be included in index calculations or not. Hence, if possible, I would like lengths to be included in the data available at the HAWG meeting."

4.1.5.3 Staff exchange in 2009

There is a recommendation from the IBTS working group 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 perso n-nel 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.

Ingeborg de Boois from IMARES, the Netherlands had the opportunity to join the Swedish vessel RV "Argos" in January 2009 during the 1st quarter IBTS survey. These following minutes focus on the differences in the sampling procedures between the Dutch IBTS (Tridens II) and the Swedish (Argos), and her experiences are reported below.

Report of the International exchange IBTS, 26–30 January 2009 on Argos

Countries:	Netherlands → Sweden
Vessel:	RV Argos
Observer:	Ingeborg de Boois (IMARES)
Dates:	26–30 January 2009

This short report shows the similarities and differences between the Dutch IBTS (Tridens II) and the Swedish (Argos), meant to be descriptive. Some differences are due to the facilities on board, some are due to the catch size and some are just different. Possible (dis)advantages of a method are in the comment field.

In general, the North Sea IBTS participants aim for coherence and consistency in collecting data by standardizing the sampling methods and protocols.

Similarities, e.g.:

- Using a GOV
- Fishing for 30 minutes
- CTD measurement on every station
- Sub-sampling for large catches is allowed
- Additional programs are carried out
- Measuring species to the cm below, herring and sprat to 0.5 cm below
- MIK samples sorted on board

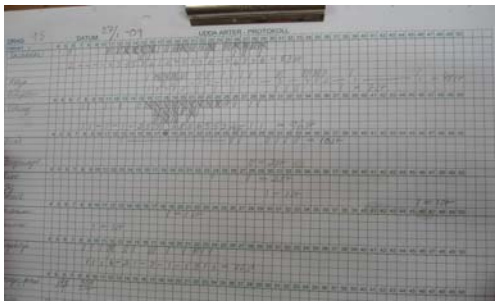
Differences:

	ARGOS	TRIDENS II	COMMENT
Gear	A bottom sensor is adapted to the net	No bottom sensor	
CTD	CTD sample might be taken later on the day on a fishing station	CTD always taken immediately after fishing	
CTD	Hydrographic sampling is done by hydrographic experts	CTD sample is done by IMARES personnel	Having hydrographic expertise on board means more possibilities for hydrographic data (like oxygen content)
CTD	CTD measurement is done from a platform	CTD measurement is done by letting a cable down from a small winch	
Subsampling catch	Parts of the catch are treated differently. Species fractions are back-calculated in an Excel spreadsheet.	The catch is handled in one way: at the start the cruise leader decides what to take out and what not. The sorted catch is x1, the unsorted might be subsampled afterwards.	Complicated subsampling means it is difficult to understand the way of back-calculating the catch. For that, only one or two people on board will be able to do it.
Subsampling species	By weight	By fraction (sometimes weight)	When subsampling by fraction you have to check regularly if the person subsampling is creating equal fractions.
Subsampling species	Measuring minimal 50, but often more than 100 specimen	Measuring 50–100 specimen	
Sorting benthos	Not sorted, other than Cephalopods, Nephrops and large crab species	To the lowest possible taxonomic level	

	ARGOS	TRIDENS II	COMMENT
Weighing catch per species	Before measuring	After measuring (weight of the measured subsample)	Weighing before measuring means that there is a chance on wrongly identified species in the sample. The procedure to correct this mistake is time-consuming
Otolith sampling	Measuring to the cm below for other species than herring and sprat	Measuring to the mm for all species (including herring and sprat)	
Otolith sampling-herring and sprat	By length class taken to the lab to take out the otoliths later	Otoliths taken out on board	
Personnel	Fiskeriverket: 1 cruise leader, 7 people in fishlab, 2 MIK Other institute: 2 hydrographers	IMARES: 4 or 5 people (depending on the week), sometimes volunteers or students for extra work.	
MIK timing	All night	20.00–24.00	
MIK procedure	No assistance on the deck	Crew assists on the deck when setting and hauling the net	
Data input	First on paper, then into the database on board	Length measurements, directly into the computer, otolith sampling first on paper. Files checked in the lab and added to the database	
Bridge data	Registered by the cruise leader	Registered by the ship's crew (automatically downloaded from the ship's log by pushing a button)	

What did I take home?

- Some very practical things, e.g. the gloves used on board Argos, the sieve in the sink, a small cupboard (with a heater inside) to put the gloves in.
- A lot of impressions how the IBTS is carried out in Sweden (see above)
- A very nice experience thanks to friendly researchers and crew



Suggestions to IBTSWG:

- It would be relevant to have a profile of an oblique MIK haul in the manual so skippers can see what the profile has to look like.

Advice to people doing an international exchange:

- Send someone with an idea of the survey carried out
- Send someone with an overview of different surveys and knowledge on the standard procedures in his/her own country
- Send someone who knows the English and scientific names of most fish species in the survey.
- Take a camera with you! Nothing will be more effective than pictures and short films to show at home. An advantage is that the people you visit normally forget to make pictures of their work on board, so if you share the pictures, everyone is happy with it.
- Try to keep in contact with your own lab during the cruise, in case you have questions.
- Important things to ask before you leave your country/planning your trip:
  - Where can you find the ship and how can you get there?
  - Boarding time and time of arrival in port after the trip
  - Facilities on board (bed clothing, boots, oil skin, working inside or outside, safety gear, gloves, gym, sauna, etc.)
  - What do you have to take on board?
- Important things when arriving on board:
  - What are the safety regulations?
  - Are there any forbidden areas on the ship?
- Important things to realise:
  - Contacts between crew and researchers might be different from the contacts on your own vessels.

- The roles on board might vary compared to what you are used to. A cruise leader is a cruise leader, but the things someone is doing might vary from what you are used to.
- If not on an exchange on a UK vessel: it might happen that not everyone speaks English on board. Even if people speak English, if you are the only foreigner on board, you might expect people talk in their own language when falling into routine.

4.1.6 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. 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. 2009b. Report of the Planning Group on commercial Catches, Discards and Biological Sampling (PGCCDBS), 2–6 March 2009, Montpellier, France. ICES CM 2009\ACOM:39. 160 pp.

4.2 Q3 North Sea

4.2.1 General overview

Five vessels participated in the quarter three survey in 2009: Dana (Denmark), Walter Herwig III (German), Argos (Sweden), CEFAS Endeavour (England) and Scotia (Scotland). In all, 283 valid GOV hauls were made, allowing full coverage of the survey area. The North Sea, Skagerrak and Kattegat quarter 3 surveys have now completed 19 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 2009.

Norway did not participate in the 2009 surveys, so although the full survey area was covered, some rectangles, which in the past were fished by at least two countries, were fished by only one. The impact to the combined index is not known at this time as the NSSKWG has yet to meet. However, given the working document presented at last year's meeting (Parker-Humphreys, 2009 WD), we may expect an impact. The IBTSWG highly appreciates the news presented during the meeting that Norway has decided to reinstate the Q3 survey for 2010, and once again emphasises its view that the Norwegian participation in the IBTS surveys is essential for a suitable coverage of the northern North Sea area.

From 2010 clear tow information will be 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 2009.

Year		Denmark	Germany	Sweden	UK England	UK Scotland	Total
2009	Days	21	15	16	32	24	108
	Hauls	50	30	47	75	82	284

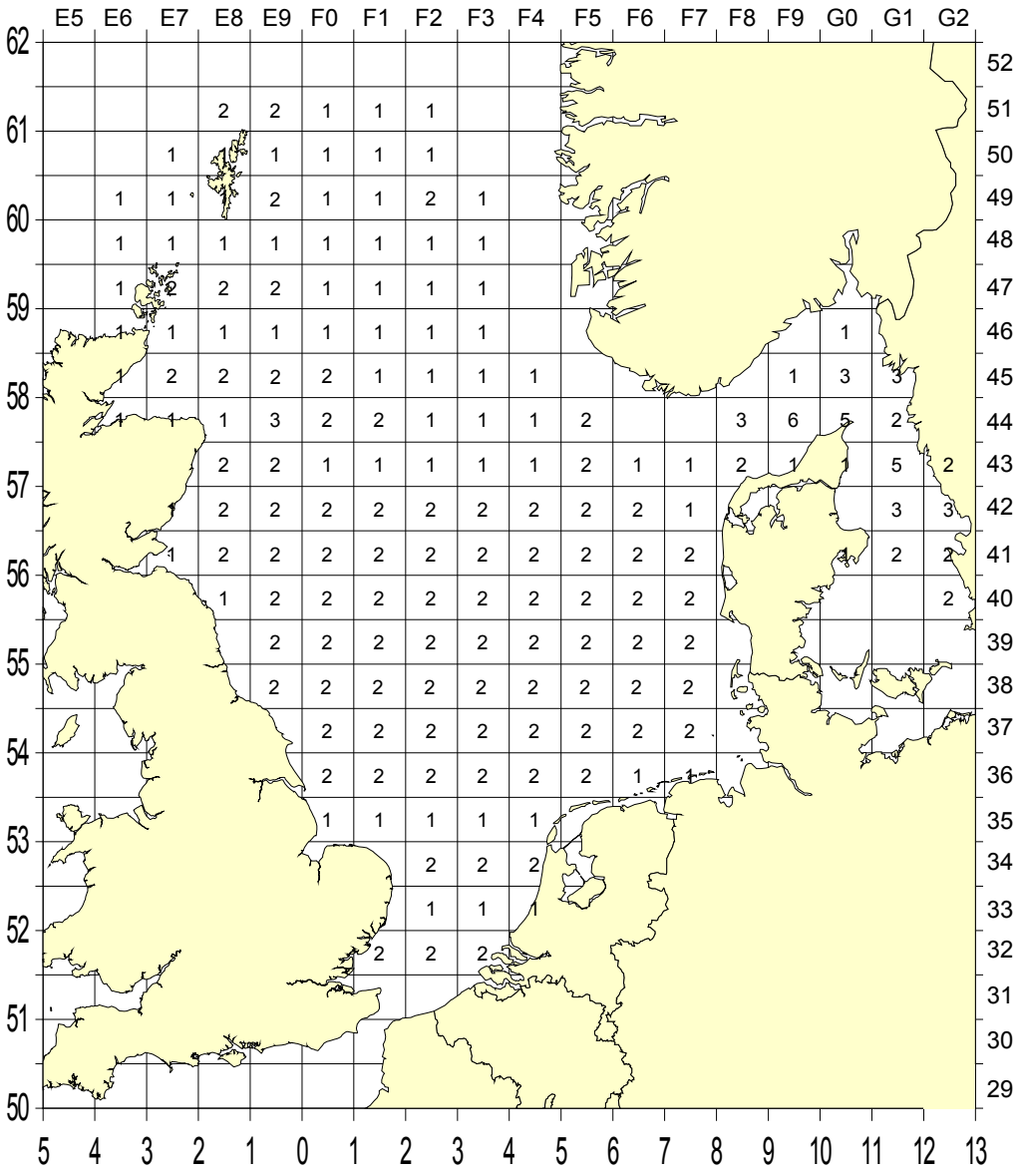


Figure 4.2.1.1. Plot of number of stations fished by rectangle by all participants of the 3rd Quarter IBTS survey 2009.

4.2.2 Survey summaries by country

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

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

NATION:	UK (ENGLAND AND WALES)	VESSEL:	CEFAS ENDEAVOUR
Survey:	15/08	Dates:	5 August – 7 September 2009

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 ground gear 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 15 primary stations were fished with a polyethylene GOV. This is the start of a medium term project to analysis possible differences in catchability between the nylon and poly gears. Cefas is unable to source the nylon GOV so in the future it will be necessary to change over to the poly. So far this data has not been analysed. In addition 75 valid CTD casts were carried out to collect high quality environmental data.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 80 species of fish were recorded during the survey. Species of note caught this year during the survey are *Sebastes viviparus, Hippoglossus hippoglossus, and Alosa fallax*.

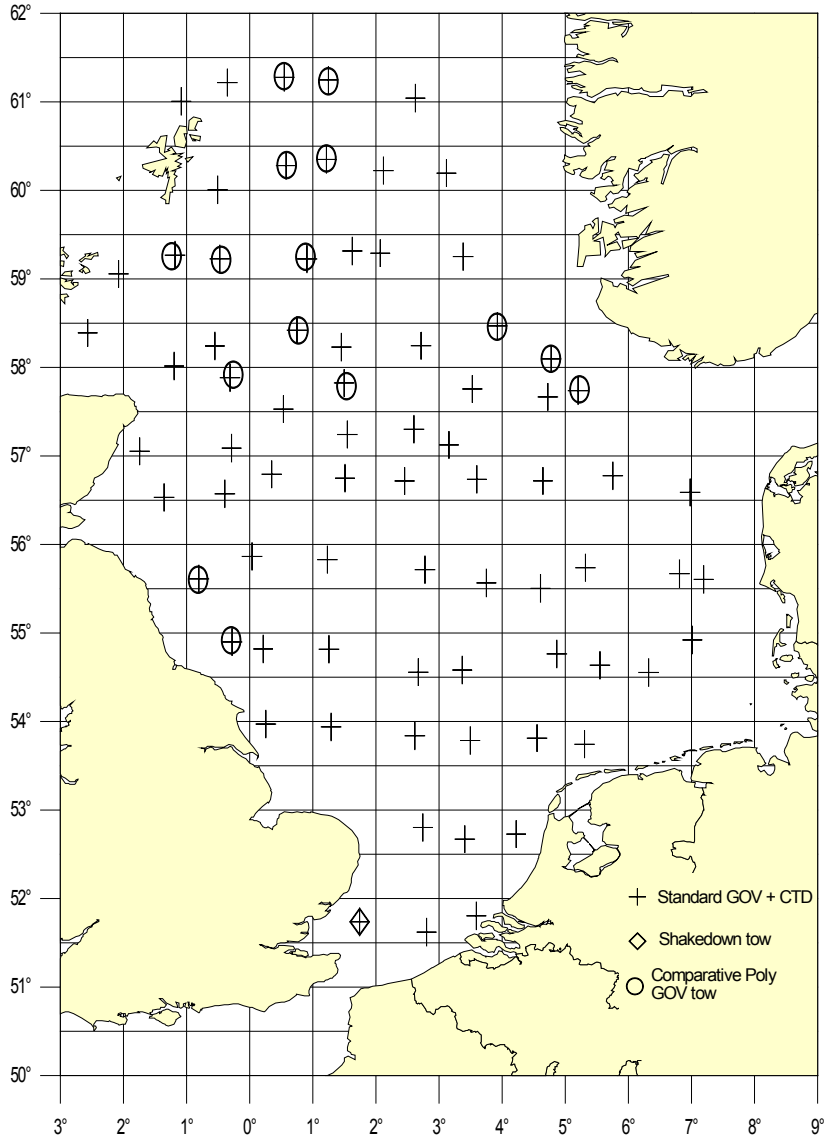
Stations fished (aims: to complete 75 valid tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
IV	N/A	Standard GOV	75	75	1	6	100	
IV	N/A	Q4IBTS GOV	-	15	-	-	-	Internal study

Number of biological samples (maturity and age material)

SPECIES	NUMBER	SPECIES	NUMBER
Clupea harengus	1163	*Pleuronectes platessa*	964
Gadus morhua	288	*Limanda limanda*	394
Melanogrammus aeglefinus	850	*Lophius piscatorius*	16
Merlangius merlangus	987	*Scomber scombrus*	369
Pollachius virens	160	**Leucoraja naevus*	30
Sprattus sprattus	454	**Raja clavata*	29
Psetta maxima	1	**Raja montagui*	14
Trisopterus esmarki	489	**Amblyraja radiata*	134
Microstomus kitt	211		

*** Maturity only**



Cruise track of "CEFAS Endeavour" during the Q3 IBTS 2009.

4.2.2.2 Sweden – North Sea Quarter 3 IBTS

NATION:	SWEDEN	VESSEL:	ARGOS
Survey:	12/09	Dates:	24 August – 10 September 2009

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, lemon sole, witch flounder and saithe.
Gear details:	IBTS standard GOV 36/47 with ground gear 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.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 61 species of fish were recorded during the survey.

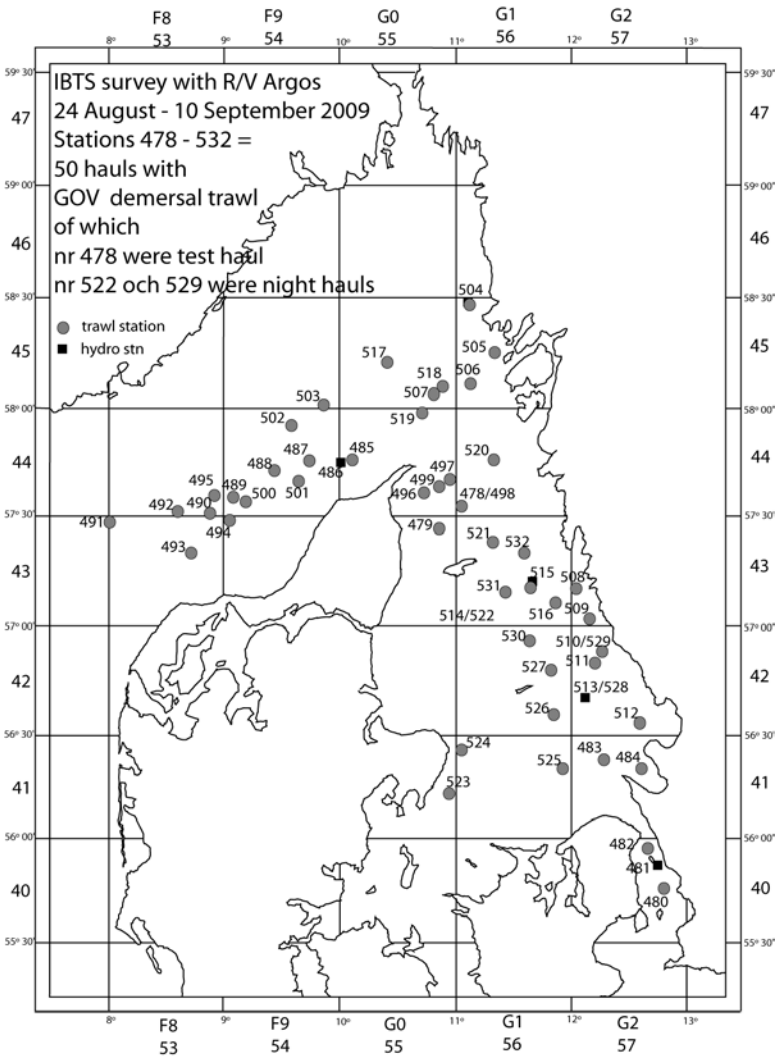
Stations fished (aims: to complete 47 valid tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
IIIa	N/A	GOV	47	47	0	0	100	

Number of biological samples (maturity and age material):

SPECIES	NUMBER	SPECIES	NUMBER
Clupea harengus	1176	*Sprattus sprattus*	679
Gadus morhua	618	*Trisopterus esmarki*	129
Melanogrammus aeglefinus	211	*Microstomus kitt*	158
Pollachius virens	108	*Pleuronectes platessa*	787
Glyptocephalus cynoglossus	111		

*** Maturity only**



Cruise track of "Argos" during the Q3 IBTS 2009.

4.2.2.2 Germany – North Sea Quarter 3 IBTS

NATION:	GERMANY	VESSEL:	WALTHER HERWIG III
Survey:	324	Dates:	14 July – 10 August

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 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 ground gear 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-beamtrawl 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, 43 species of fish were recorded during the survey.

Stations fished (Goal: 29 valid tows per year; additional, otherwise un-sampled rectangle added 2009)

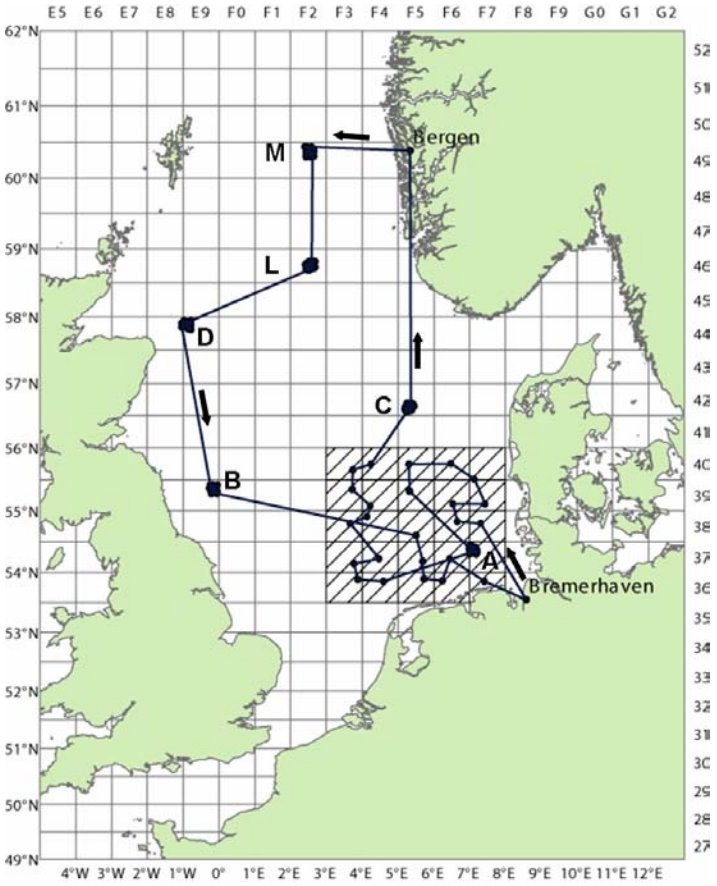
ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED
IV	N/A	IBTS standard GOV	29	30	1	0	100

Number of biological samples (maturity and age material)

SPECIES	NUMBER	SPECIES	NUMBER
Clupea harengus	322	*Sprattus sprattus*	224
[1] *Gadus morhua*	309	[1] *Trisopterus esmarckii*	41
[1] *Melanogrammus aeglefinus*	127	* *Merluccius merluccius*	11
[1] *Merlangius merlangus*	411	* *Pleuronectes platessa*	402
Microstomus kitt	95 +*15	* *Scophthalmus rhombus*	2
[1] *Pollachius virens*	0	* *Glyptocephalus cynoglossus*	6
Psetta maxima	6	* *Lophius piscatorius*	8
Scomber scombrus	186	* *Trigla lucerna*	20

*** only maturity**

1 Only Age



Cruise track of "Walther Herwig III 324", 07/14–08/10/2009, 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.

4.2.2.3 Denmark – North Sea Quarter 3 IBTS

NATION:	DENMARK	VESSEL:	DANA
Survey:	07/09	Dates:	11 – 27 August 2009

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 was 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, during 2 hauls groundgear B was used.
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 were recorded during the survey.

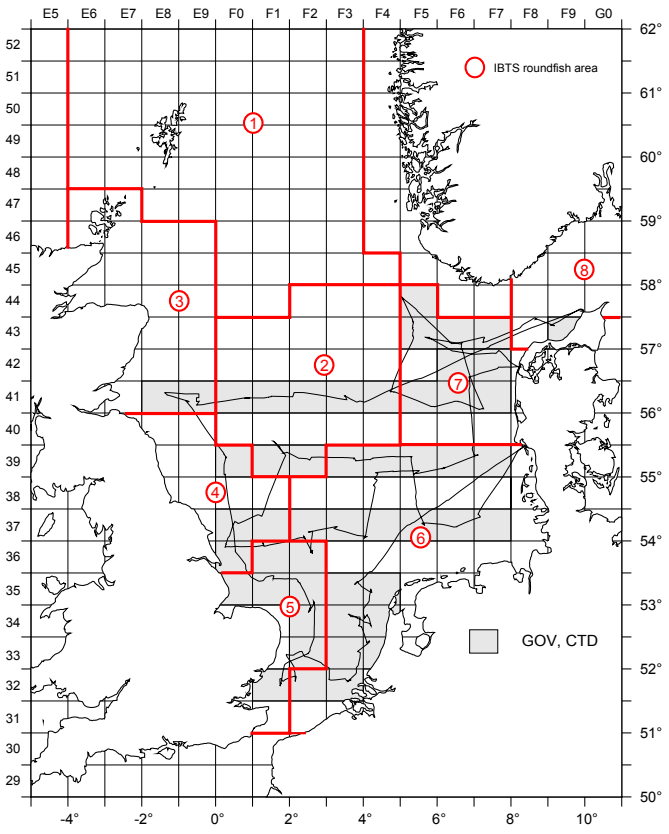
Stations fished

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
IV	N/A	GOV	48	48	0	0	100	
		GOV-B	2	2				
		Total	50	50				

Number of biological samples (maturity and age material)

SPECIES	NO	SPECIES	NO
Clupea harengus	805	*Scomber scombrus*	242
Gadus morhua	329	*Lophius piscatorius*	6
Melanogrammus aeglefinus	448	*Merluccius merluccius*	49
Merlangius merlangus	812	*Mullus surmuletus*	17
Pollachius virens	4	*Psetta maxima*	13
Sprattus sprattus	513	*Trachurus trachurus*	114
Trisopterus esmarki	43	*Pleuronectes platessa*	969
Microstomus kitt	414	*Solea solea*	107

*** maturity only**



Cruise track of Dana during the Q3 IBTS 2009.

4.2.2.4 UK (Scotland) – North Sea Quarter 3 IBTS

NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	1109s (IBTS Quarter 3)	Dates:	9–31 August 2009

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 was 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.):	No significant problems encountered. The ship's thermosalinograph failed at the outset of the cruise and prevented continuous sampling throughout the trip. The CTD and reverser bottle were deployed at each station to obtain temperature and salinity profiles, when this was no longer possible due to a CTD failure after the port call, a double dip method was employed to obtain temperature and salinity at surface and sea bed in line with minimum WGIBTS requirements. Samples of low nutrient sea water were collected in the region of statistical rectangle 45F1 The survey was completed satisfactorily with the standard 84 stations being sampled over a total of 85 hauls with 82 being valid. Two of the new stations (49E6 & 48E6) proved once again problematic for the standard survey gear deployed and more investigation is required to identify areas within these squares that can be sampled with the standard survey gear. 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 78 different species were observed during the trip with a total catch weight of 25367kgs. Numbers of juvenile cod (0+) were down on last year's numbers with distribution of juvenile restricted to inshore stations off the Scottish coast. Numbers of juvenile haddock showed a more considerable increase on the last few years which have been relatively low with the exception of 2005. The numbers of juvenile haddock were higher in the stations off the east and northeast coasts of Scotland, with the overall distribution being similar to last year. The number of juvenile whiting showed a decrease following the promising increases of 2007 and 2008, with the distribution being wide across the survey area. Numbers of Norway pout were up considerably on last year's results and are still high in relation to the recent high mean figures. Distribution of this species showed slight variation from last year with the higher numbers being encountered in the northern and western part of the survey area. It should be noted that the survey area has changed from last year with 10 stations being dropped from the south eastern (Danish and German sectors) and an additional 7 stations being included in the vicinity of the Shetland and Orkney Isles. 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.

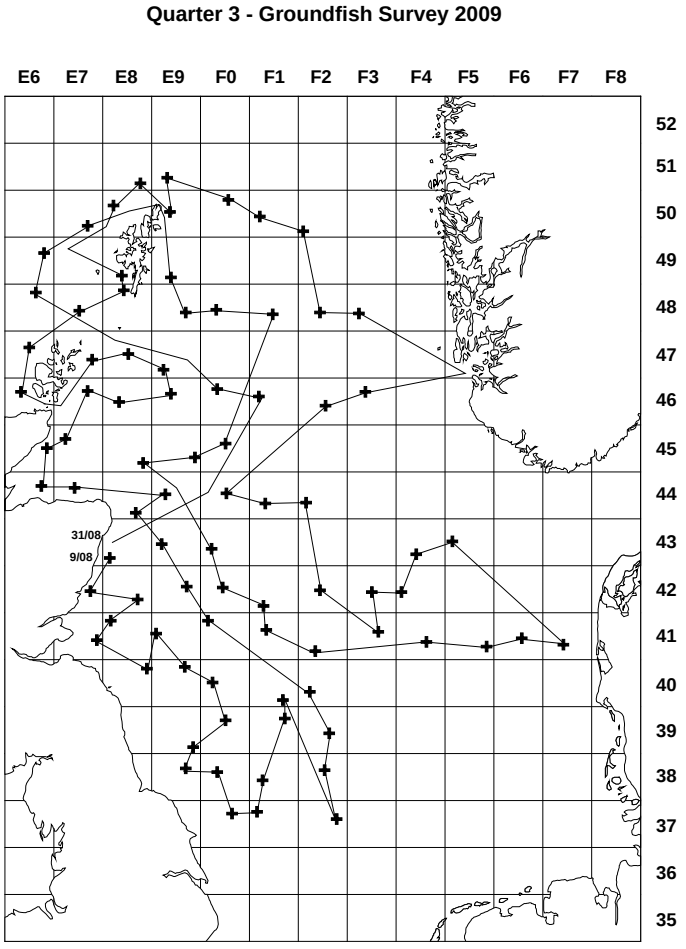
Stations fished (aims: to complete 84 valid tows per year).

ICES Divisions	Strata	Gear	Tows Planned	Valid	Valid with rockhopper	Additional	Invalid	% stations fished	comments
IVb		GOV-A	40	40	-	0	0	100	
IVa		GOV-B	45	42	-	0	0	93	
	TOTAL		85	82	-	2	2	96	

Number of biological samples (maturity and age material)

Species	No.	Species	No.
Gadus morhua	255	*Pollachius virens*	168
Melanogrammus aeglefinus	1295	*Trisoperus esmarki*	425
Merlangius merlangus	1126	* *Microstomus kitt*	125

*** maturity only**



Cruise track of "Scotia" during the Q3 IBTS 2008.

4.2.3 Results

4.2.3.1 GOV

The combined indices for the 0-group recruits of seven commercial species based on the 2008 quarter 3 surveys are shown in Figure 4.2.3.1. Last year all indices were below the long term mean. It can be seen from the addition of the 2009 data that Norway pout, sprat and mackerel in 2009 are now above the long term mean, with haddock and herring being close to it. It should be noted that Norway did not participate in 2009 and any affect this might have had on these results has not be taken into account.

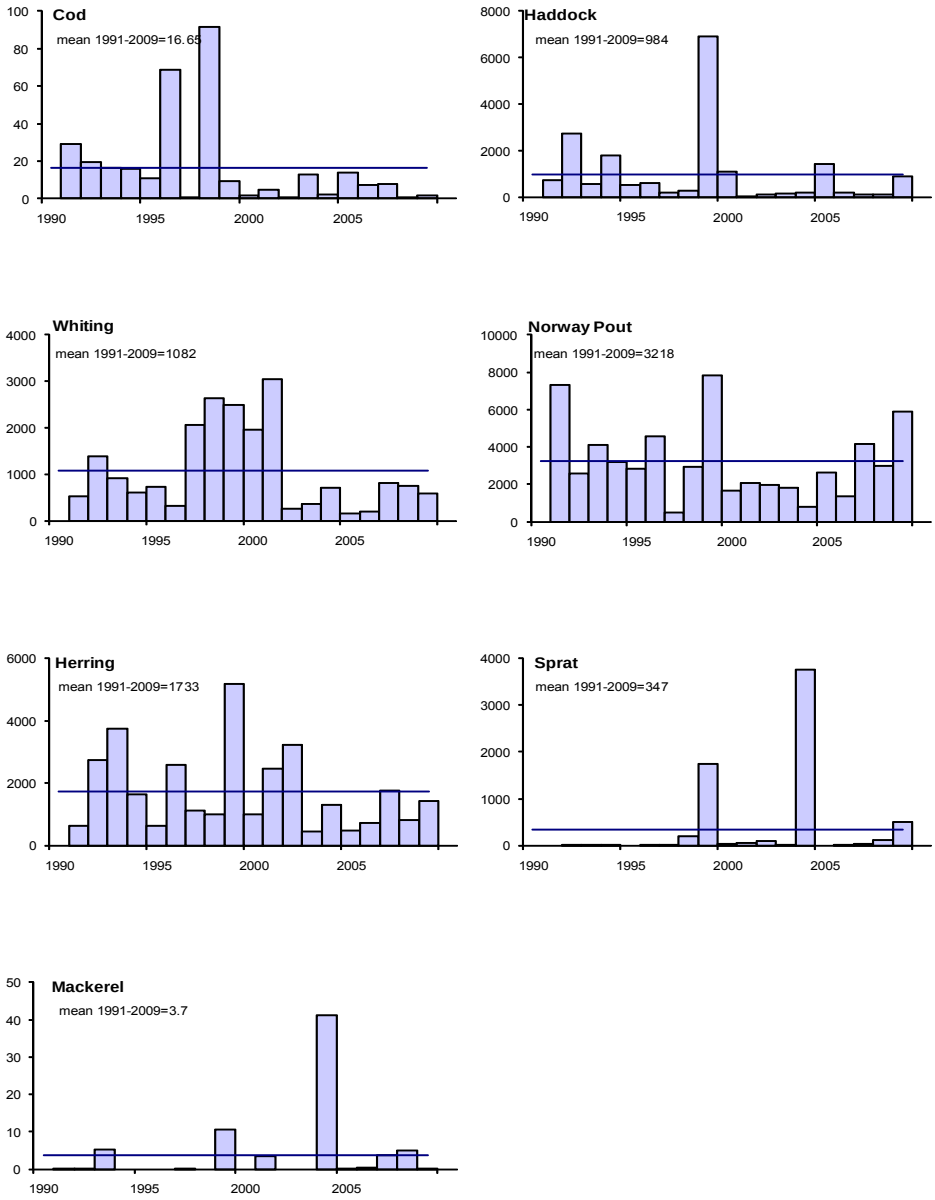


Figure 4.2.3.1 Time series of indices for 0-group species during the quarter 3 IBTS survey in the North Sea, extracted from DATRAS.

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	TOTAL
Target species						
Clupea harengus	805	1163	322	1346	1176	4812
Gadus morhua	329	288	309	290	618	1834
Melanogrammus aeglefinus	448	850	127	1182	211	2818
Merlangius merlangus	812	987	411	1126		3336
Pollachius virens	4	160		170	108	442
Sprattus sprattus	513	454	224	252	679	2122
Trisopterus esmarki	43	489	41	425	129	1127
Scomber scombrus	242	369	186	511		1308
Additional species						
Scophtalmus rhombus			2			2
Microstomus kitt	414	211	110	125	158	1018
Glyptocephalus cynoglossus			6	11	111	128
Lophius piscatorius	6	16	8			30
Merluccius merluccius	49		11	1010		1070
Mullus surmuletus	17					17
Psetta maxima	13		6	2		21
Trachurus trachurus	114					114
Pleuronectes platessa	969	964	402	477	787	3599
Solea solea	107					107
Limanda limanda		394				394
Trigla lucerna			20			20
Amblyraja radiata		134		74		208
Dipturus batis				1		1
Raja montagui		14		4		18
Raja calvata		29				29
Raja brachyura				5		5
Leucoraja naevus		30		39		69

4.2.4 Precision estimates

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

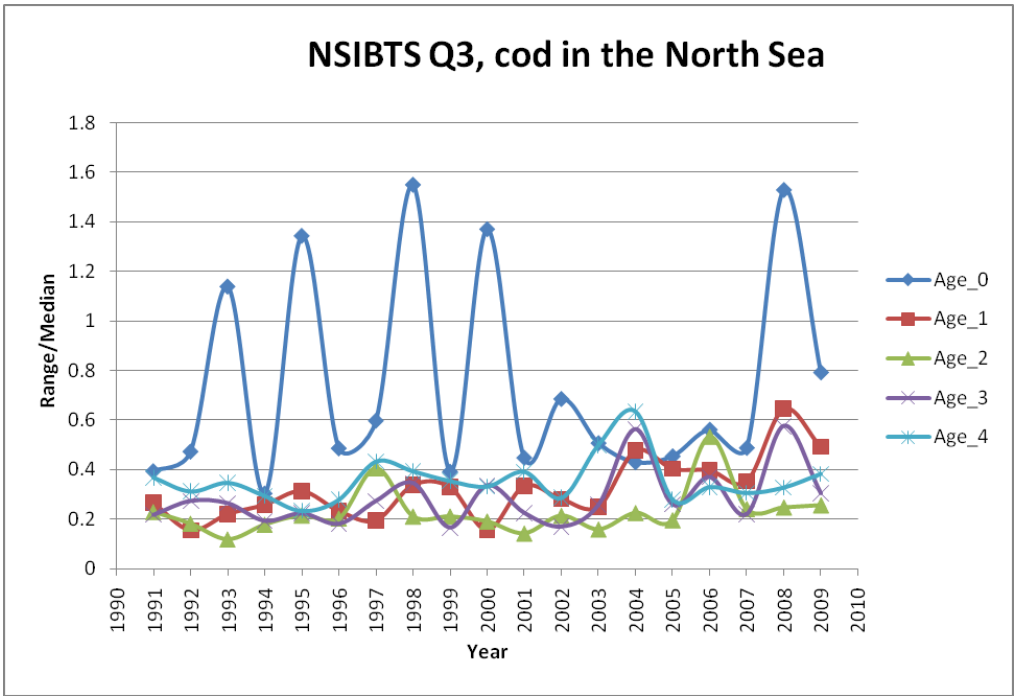


Figure 4.2.4.1. Precision estimates for cod in the survey area over the time series.

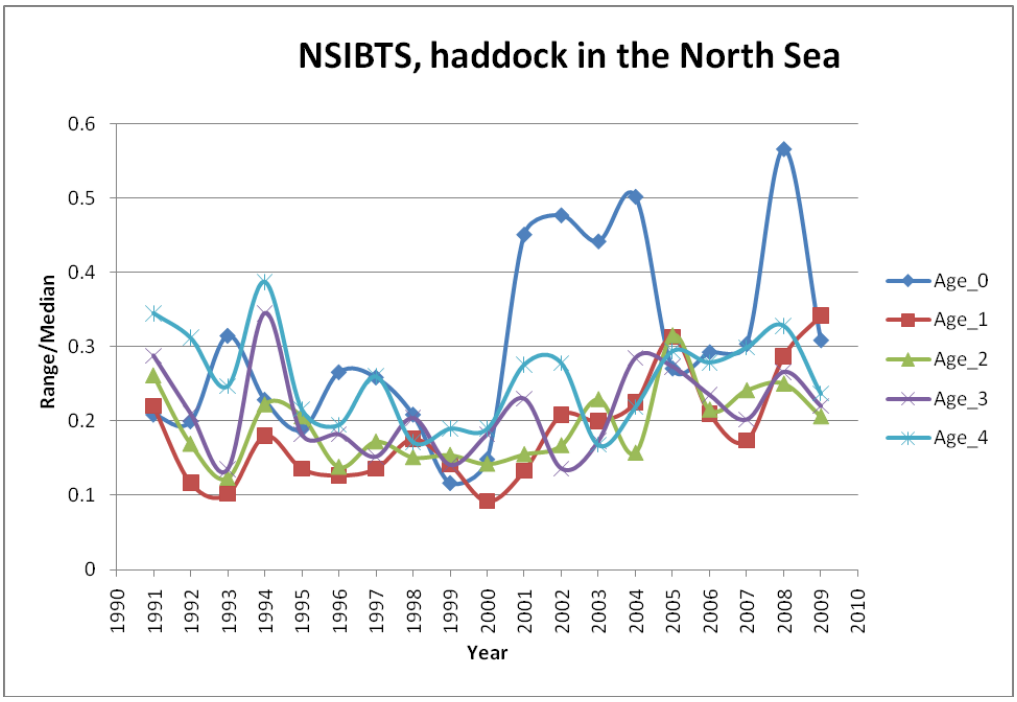


Figure 4.2.4.2. Precision estimates for haddock in the survey area over the time series.

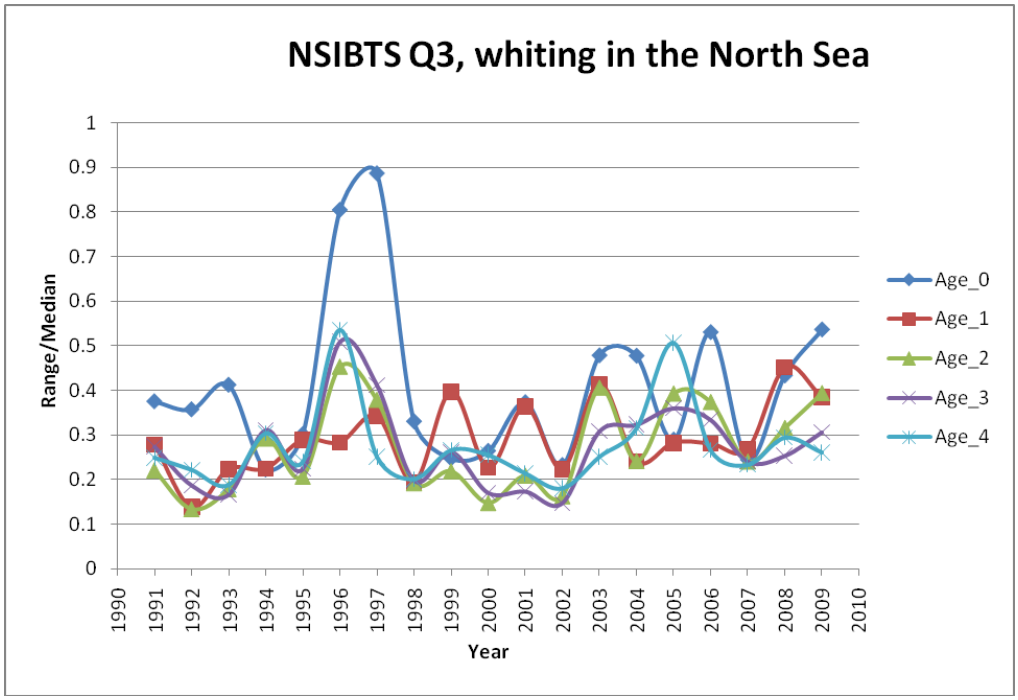


Figure 4.2.4.3. Precision estimates for whiting in the survey area over the time series

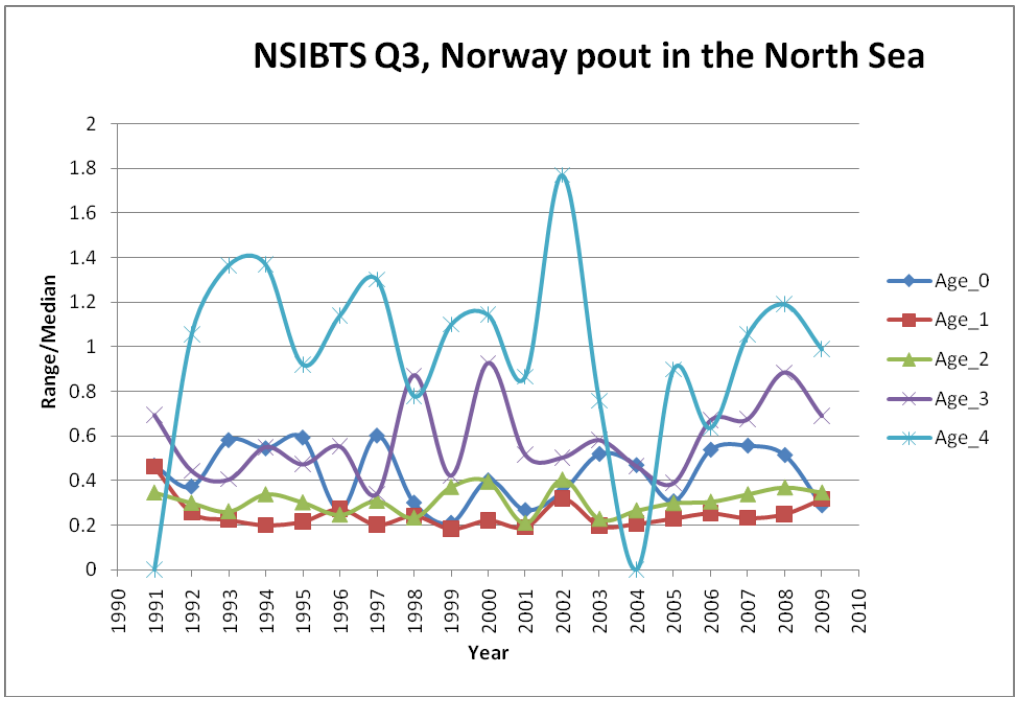


Figure 4.2.4.4. Precision estimates for Norway pout in the survey area over the time series

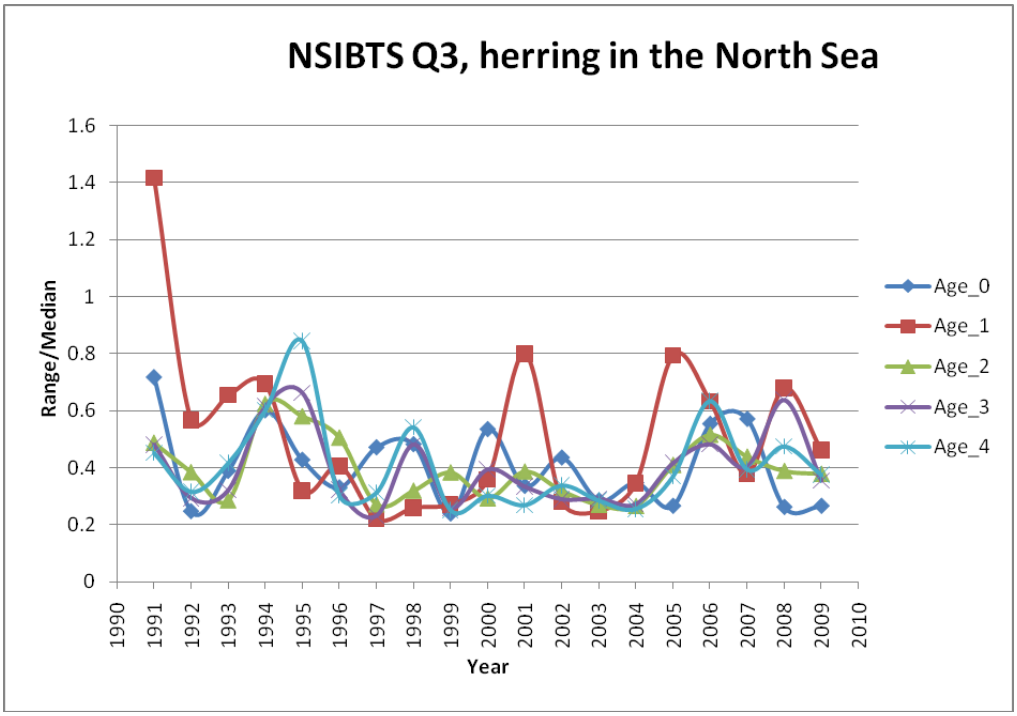


Figure 4.2.4.5. Precision estimates for herring in the survey area over the time series.

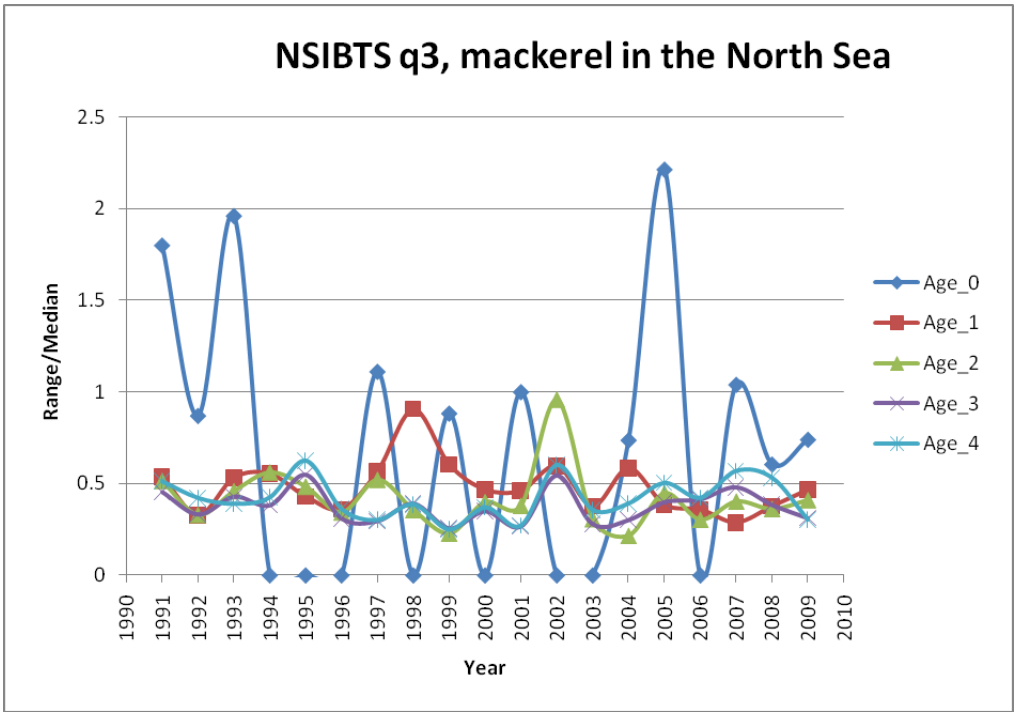


Figure 4.2.4.6. Precision estimates for mackerel in the survey area over the time series.

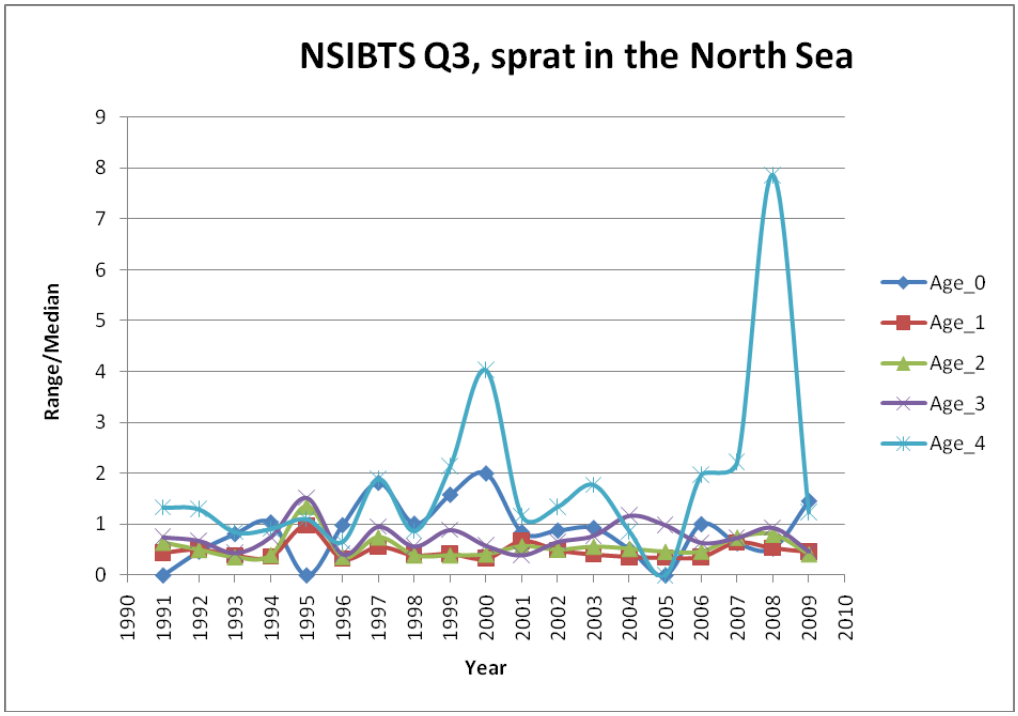


Figure 4.2.4.7. Precision estimates for sprat in the survey area over the time series.

4.2.5 Participation in 2010

Denmark, England-Wales, Germany, Scotland and Sweden have advised that they will be participating fully in the programme in 2010. The timing of the surveys will be broadly in line with recent years. Norway has confirmed it will be able to participate in the quarter 3 survey in 2010, and this is welcomed by IBTS. It is recommended that the survey is maintained in the future. IBTS strongly recommends that all countries try to have the majority of the 3rd quarter survey in August in order to minimise the variance associated with survey timing.

4.2.6 Other issues

4.2.6.1 Staff exchange in 2009

There is a recommendation from the IBTS working group as well as the LRC (Living Resource Committee) 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 other's trawling and biological sampling procedures onboard ships, and may lead to new insights to improve one's own protocol. Unfortunately in 2009 no staff exchanges occurred during the quarter 3 surveys.

4.2.7 References

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.

Parker-Humphreys, M. 2009. Report investigating the affects of including or excluding Norway data on the IBTS Q3 indices. See WD2 in ICES IBTSWG 2009, 178–197.

4.3 Eastern Atlantic

4.3.1 General overview

Since the last meeting in March 2009, 14 groundfish surveys have taken place in the ICES NE Atlantic area, under the co-ordination of IBTS. This brought the overall total number of valid survey hauls to 1125 out of a planned 1155 which results in a 97.5% completion rate. Weather did not appear to be a significant factor in quarter 1, but several countries reported days lost to weather in Q4.

One less survey than previous years was carried out in '09 due to a withdrawal of funding for the Portuguese Q1 survey. Clarification on the context for this decision is being sought. The SGRN report of February 2007 had classed this survey as a pilot and recommended co-ordination through the IBTSWG and suggested a data plan should be available. While co-ordination has always been through IBTS no further documentation or clarification was available to the group during the meeting. The absence of this survey in a very broad sense reduces the planned annual coverage from 2008 level by 75 planned hauls during the hake spawning season.

Both Spring and Autumn Scottish groundfish surveys report continuing low abundance of gadoids for Rockall and West of Scotland respectively. While there was some improvement on 2008 abundance for cod and whiting, all three remain significantly below the 10 year average.

In contrast significant increases in haddock were seen by both the Irish and UK surveys in Q4 2009 for the Celtic Sea area, as well as noticeable increases for plaice. Increases in common sole in VIa and hake VIIb,g&j was also noted by Ireland.

Moving west, the Spanish Porcupine Survey encountered significant improvement in blue whiting abundance on 2008. This may be slightly confounded by some technical difficulties with the gear in 2008, but the overall 5 year trend is still down at -45%. The ~7000% increase in blue whiting between 2008 – 2009 for Northern Spain however is not reflected in other species apart from mackerel and is therefore quite significant. In addition, this extreme value highlights the potential difficulty with using ratios for survey trends as in 2 years this extreme value will switch to the denominator in the ratio calculation.

Again contrasting the Spanish surveys above, the Q1 survey in Cadiz highlights a significant drop in blue whiting for that area, while for Q4 an improvement on the 2008 figure is reported. This Q1 reduction is most noticeable in number but also in biomass, suggesting low recent recruitment. Reducing Nephrops abundance was also noted for this area in both Q1 and Q4 Cadiz surveys.

As most western area surveys occur currently in Q4 this part of the year afford the greatest opportunity for routine inter-calibration work. Adverse weather curtailed these opportunities, although Spain and France did achieve some comparative data in Q4.

In addition to the regular survey duties, auxiliary programs were undertaken again by IBTS survey in 2009 to include CTD data acquisition, sea bird observations, sampling for genetic studies and video deployments to the seabed for mapping of DCF Annex 1 reef species.

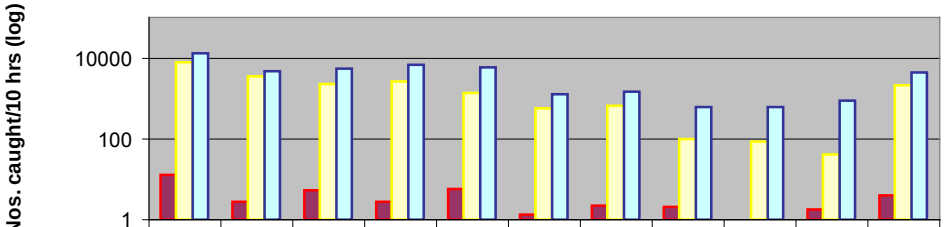
4.3.2 Survey summaries by country

4.3.2.1 UK-Scotland: Western Division Bottom Trawl Survey - Quarter 1 2009 (0409s)

NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	0409S	Dates:	March 2009

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 areas VIa. Age data was collected for Cod, Haddock, Whiting, Saithe, Norway Pout, Herring, Mackerel and Sprat.
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. 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.):	Despite continuously bad weather in the second half of the cruise Scotia still managed to complete the survey. A total of 55 valid hauls were achieved with all but two of the core time series hauls being attempted. There were four foul hauls. Fishing was generally carried out during the daylight period commencing each day at first light. Four of the stations were classified as night hauls. All otoliths collected from both pelagic and demersal species were aged at sea. All haul summary data, length frequency, benthic and pelagic age data were punched at sea.
Number of fish species recorded and notes on any rare species or unusual catches:	82 species were caught during the survey for a total catch weight of 55978 kg. The provisional 1-group indices using a length rather than age based delimiter for cod, haddock and whiting are shown in Figure 1. The index continues to display the downward trend of recent surveys for haddock producing the second lowest value since 1981. Cod and whiting both show a slight increase on the 2008 values however all three species are still well below the 10 year average. Even more than in 2008, pelagic species dominated the catch with 52 tonnes of mackerel (including the 20 tonnes of slipped fish from haul 114) and 16 tonnes of herring being caught during the survey. This is a significant increase on 2008 where the total catch weight for the survey was 25 tonnes and 4 tonnes respectively.

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



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	10yr ave
Cod	13	2.7	5.3	2.7	5.7	1.3	2.2	2.1	0.8	1.8	3.9778
Haddock	7936	3421	2339	2650	1397	573	633	99	86	42	2126
Whiting	12862	4653	5542	6934	5888	1308	1441	614	593	906	4426.1

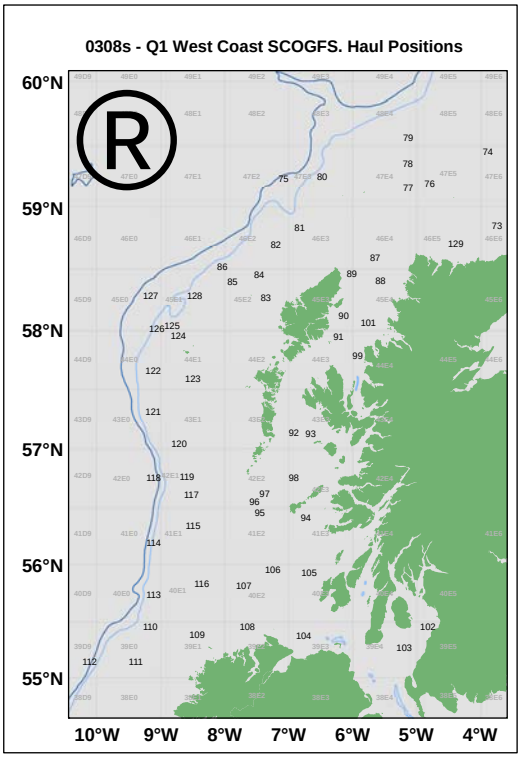
Stations fished (aims: to complete 50 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	Comments
VIa		GOV - C	50	55	5	4	110	
	TOTAL		50	55	5	4	110	

Number of biological samples (maturity and age material)

Species	No.	Species	No.
Gadus morhua	20	*Dipturus batis*	22*
Melanogrammus aeglefinus	831	*Scopthalmus rhombus*	1*
Merlangius merlangius	536	*Leucoraja naevus*	34*
Pollachius virens	10	*Raja clavata*	27*
Merluccius merluccius	517*	*Molva molva*	3*
Lepidorhombus whiffiagonis	105*	*Raja montagui*	118*
Lophius piscatorius	10*	*Mustelus mustelus*	3*
Lophius budegassa	3*	*Mustelus asterias*	3*
Clupea harengus	1204	*Trisopterus esmarkii*	205
Scomber scombrus	787		

*** Maturity only**



Q1WCSCGFS 2008 Trawl Stations

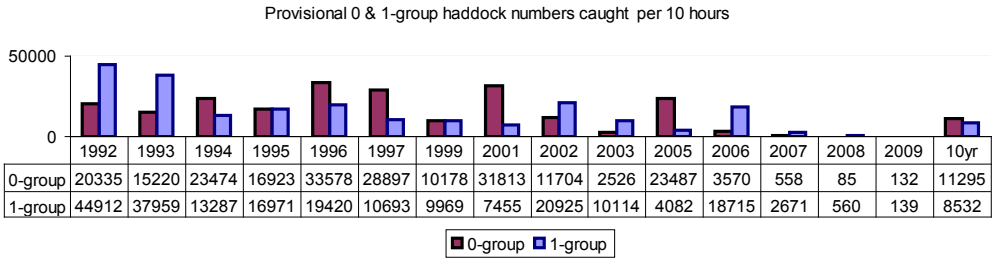
Q1 SCOGFS CPUE data for major species: 2009

SPECIES	STRATA	MEAN NOS/HR	MEAN KGS/HR
Gadus morhua	All	0.74	1.17
Melanogrammus aeglefinus	All	183.16	57.79
Merlangius merlangus	All	150.82	16.04
Merluccius merluccius	All	47.29	12.31
Pollachius virens	All	0.37	.82
Lepidorhombus whiffiagonus	All	4.65	1.46
Lophius piscatorius	All	0.37	0.87
Pleuronectes platessa	All	18.03	2.32
Microstomus kitt	All	18.62	2.11
Clupea harengus	All	4403.27	596.58
Scomber scombrus	All	13080.48	1194.84

4.3.2.2 UK-Scotland: West of Scotland Deepwater Survey - 2009 (1209s)

NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	1209s	Dates:	September 2009

Cruise	Q3 Rockall Haddock survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on a range of fish species in ICES area VIb. The primary objective of the survey is to assess the state of the haddock stock on the Rockall Plateau. Age data was collected for cod, haddock, and saithe.
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. 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.):	The GOV was deployed on 42 occasions with 41 fishing stations being sampled successfully. (See Figure 1 for trawl positions) Beyond the normal wear and tear in the wings associated with this fishing gear there was very little gear damage to report. One foul haul resulted on account of one of the clips holding the exocet kite in place releasing. . Fishing was generally carried out during the daylight period commencing each day at first light. All demersal otoliths were aged at sea and all haul summary data, length frequency, benthic and age data were also punched at sea. During trawling downtime the TV drop-frame was deployed successfully at various locations on the plateau with 20 deployments being successfully completed over five nights. 16 of the deployments contributed to mapping the distribution of Annex 1 reef habitat on the plateau and in particular the presence of Lophelia pertusa. Coral was observed on three occasions. (See Figure 1 for drop-frame locations and accompanying coral and closed areas) This work was carried out as a collaborative project between JNCC and MSSML under the EC Habitats Directive. In addition to this, 4 deployments were made to observe Nephrops burrows on the Southwest of Rockall Bank and burrows were recorded on two out of the four deployments.
Number of fish species recorded and notes on any rare species or unusual catches:	The primary objective of this survey is to assess the state of the haddock stock on the Rockall Plateau: this is done by comparing the strength of the respective year classes in the current year with those of previous years. The provisional indices (See figure below) using a length rather than age based delimiter indicate a small improvement in 0 –group recruitment for Haddock on Rockall for 2009, however given that 2007 and 2008 results delivered the lowest values since the survey began there is very little to be optimistic about with 0 – group numbers still extremely low and well below the 10 year average. There was also a paucity of one year old fish, however this was expected given the record low recruitment seen in 2008. A total of 34 species were recorded during the survey with a total weight of 10434 kgs. All fish species encountered during the survey were recorded and measured and a haul weight recorded for each species. All benthic organisms encountered during the trawl survey were recorded and quantified. Where possible identification was to species level, although in some cases this was only possible to the genus/family. All problem specimens were retained for further investigation back at the Marine Laboratory. In addition to the usual fish species encountered on the Rockall Plateau was a Dealfish (Trachipterus arcticus) at 114cm encountered during haul 352 on the southeast side of the Rockall Plateau. Ray's Sea Bream (Brama brama) was present in 5 hauls and a total of 9 specimens were encountered ranging from 50 – 55cm TL. A sunfish (Mola mola) was also observed from the vessel on the morning of the 7th September.



	1992	1993	1994	1995	1996	1997	1999	2001	2002	2003	2005	2006	2007	2008	2009	10yr
0-group	20335	15220	23474	16923	33578	28897	10178	31813	11704	2526	23487	3570	558	85	132	11295
1-group	44912	37959	13287	16971	19420	10693	9969	7455	20925	10114	4082	18715	2671	560	139	8532

Figure 1. Provisional 0 & 1 catches in number per 10 hours

Aim is to perform 37 stations

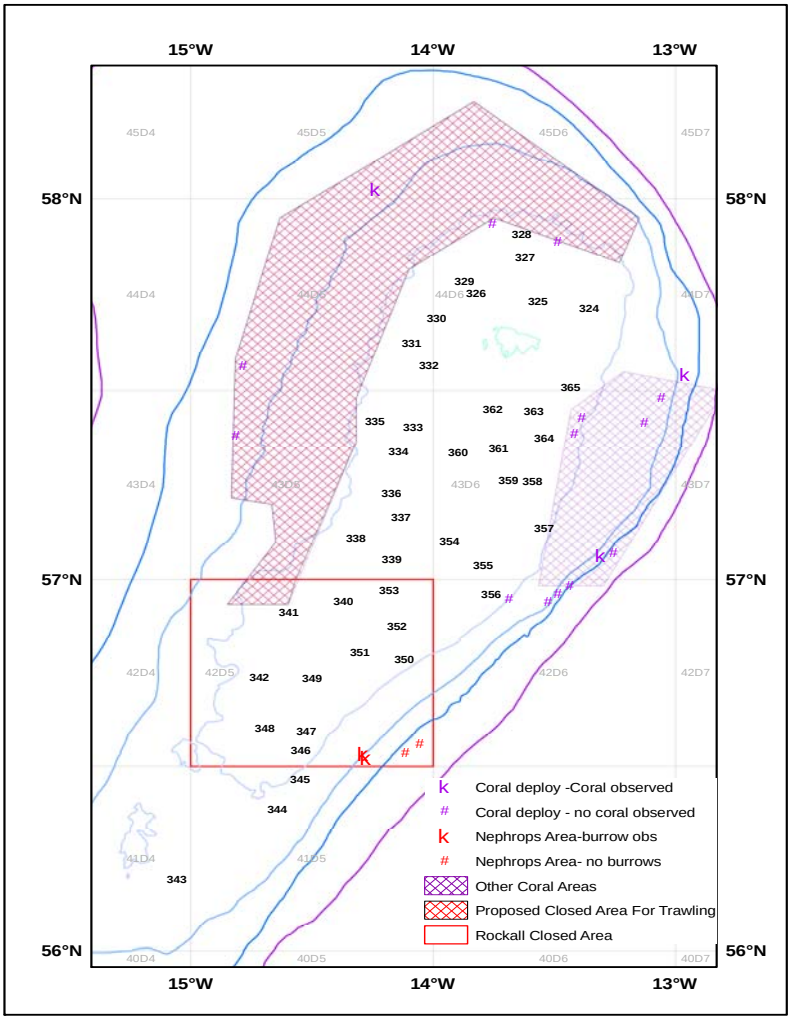
ICES Divisions	Strata	Gear	Tows Planned	Valid	Valid with rockhopper	Additional	Invalid	% stations fished	Comments
VIb		GOV - C	37	41	-	3	1	111	
	TOTAL		37	41	-	3	1	111	

Number of biological samples (maturity and age material)

Species	No.	Species	No.
Gadus morhua	1	**Brama brama*	5
Melanogrammus aeglefinus	940	**Leucoraja fullonica*	4
Pollachius virens	18	**Psetta maxima*	1
**Lepidorhombus whiffiagonis*	292	**Merluccius merluccius*	1
**Lophius piscatorius*	65	**Molva molva*	70

*** Maturity only**

NB: following recommendation from WKMSCWHS no maturity data was collected from cod, haddock and saithe.



Rockall Trawl stations and dropframe locations made during survey1209S.

Q3 SCO Rockall CPUE data for major species: 2009

SPECIES	STRATA	MEAN NOS/HR	MEAN KGS/HR
Gadus morhua	All	0.049	0.35
Melanogrammus aeglefinus	All	285.24	116.36
Pollachius virens	All	0.88	8.16
Microstomus kitt	All	49.80	4.72
Lepidorhombus whiffiagonus	All	14.20	2.27
Lophius piscatorius	All	3.15	9.73
Argentina sphyraena	All	346.22	17.43
Trisopterus minutus	All	1988.98	21.90
Micromesistius poutassou	All	1992.12	78.38

4.3.2.3 UK-Scotland: Western Division Bottom Trawl Survey - Quarter 4 2009 (1509S)

NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	1509S	Dates:	6–27 November 2009

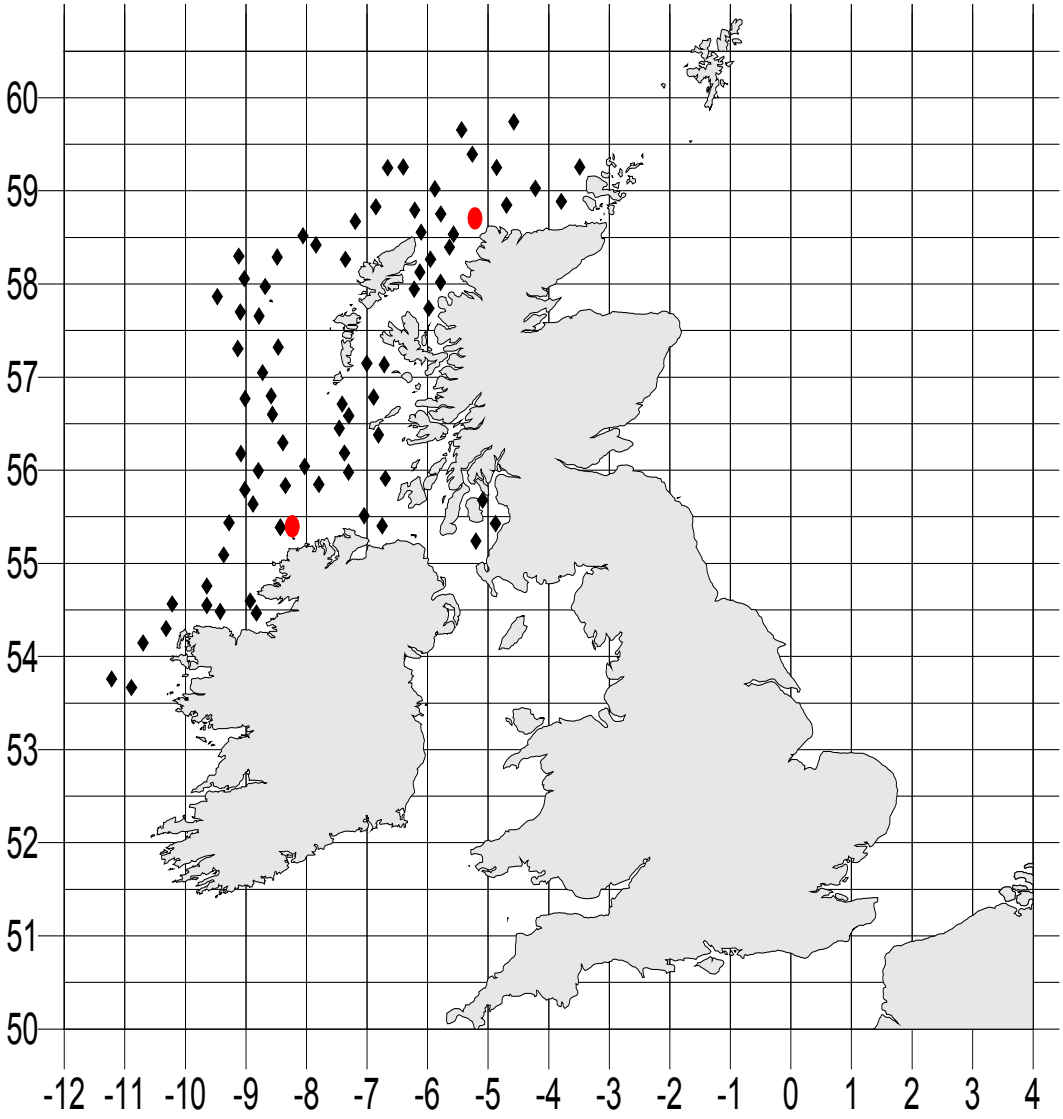
Cruise	Q4 Western Groundfish survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on a range of fish species in ICES areas VIa, VIIb & IVa. Age data was collected for Cod, Haddock, Whiting, Saithe, Herring, Mackerel and Sprat.
Gear details:	GOV (+belly lines) with ground gear C for all stations.
Notes from survey (e.g. problems, additional work etc.):	76 valid hauls For the majority of the survey, Scotia was fortunate to have reasonable weather conditions for the time of year. As a result, only one half day was lost due to weather. This resulted in the trip achieving a total of 78 trawl hauls with the GOV. Of this total, 2 were assigned as foul hauls due to the level of gear damage sustained. Of the remaining 76 hauls, 68 were undertaken in ICES area VI. The Scanmar gear monitoring system and the NOAA bottom contact sensor were used throughout the survey to observe the gear performance.
Number of fish species recorded and notes on any rare species or unusual catches:	83 fish species were encountered during the survey for a total catch weight of 24985kg. Biological data was recorded for a number of species in accordance with the requirements of the EU Data Regulations.

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VIa		GOV - C	68	68	2	2	100	
VIIb		GOV - C	6	6	0	0	100	
IVa		GOV - C	2	4	0	0	100	
	TOTAL		76	76			100	

Number of biological samples (maturity and age material)

SPECIES	NO.	SPECIES	NO.
Clupea harengus	513	*Merluccius merluccius**	359
Gadus morhua	83	*Zeus faber**	93
Melanogrammus aeglefinus	887	*Pollachius virens*	59
Merlangius merlangus	682	*Scomber scombrus*	392
*Molva molva**	4	*Scophthalmus rhombus**	5
*Pollachius pollachius**	5	*Raja clavata**	25
*Conger conger**	15	*Raja brachyura**	1
Spratus spratus	217	*Raja montagui**	60
*Psetta maxima**	2	*Leucoraja naevus**	44

*** Maturity only**



Trawl Positions for Scotland Q4 IBTS survey 2009 (Foul / Invalid tows displayed as red circles).

Q4 SCOGFS CPUE data for major species

Species	Strata	Mean nos/hr	Mean kgs/hr
Gadus morhua	All	4.44	2.74
Melanogrammus aeglefinus	All	372.25	54.86
Merlangius merlangus	All	988.56	34.21
Pollachius virens	All	6.90	2.98
Lophius piscatorius	All	2.35	1.76
Pleuronectes platessa	All	56.39	3.41
Microstommus kitt	All	40.19	2.40
Lepidorhombus whiffiagonus	All	13.96	1.71
Clupea harengus	All	900.70	75.82
Scomber scombrus	All	3503.98	183.03
Spratus spratus	All	67.11	0.34

4.3.2.4 UK – Northern Ireland: Northern Irish Groundfish Survey Q1 2009 – Q1NIGFS

NATION:	UK (NORTHERN IRELAND)	VESSEL:	RV CORYSTES
Survey:	10/09	Dates:	2–22 March 2009

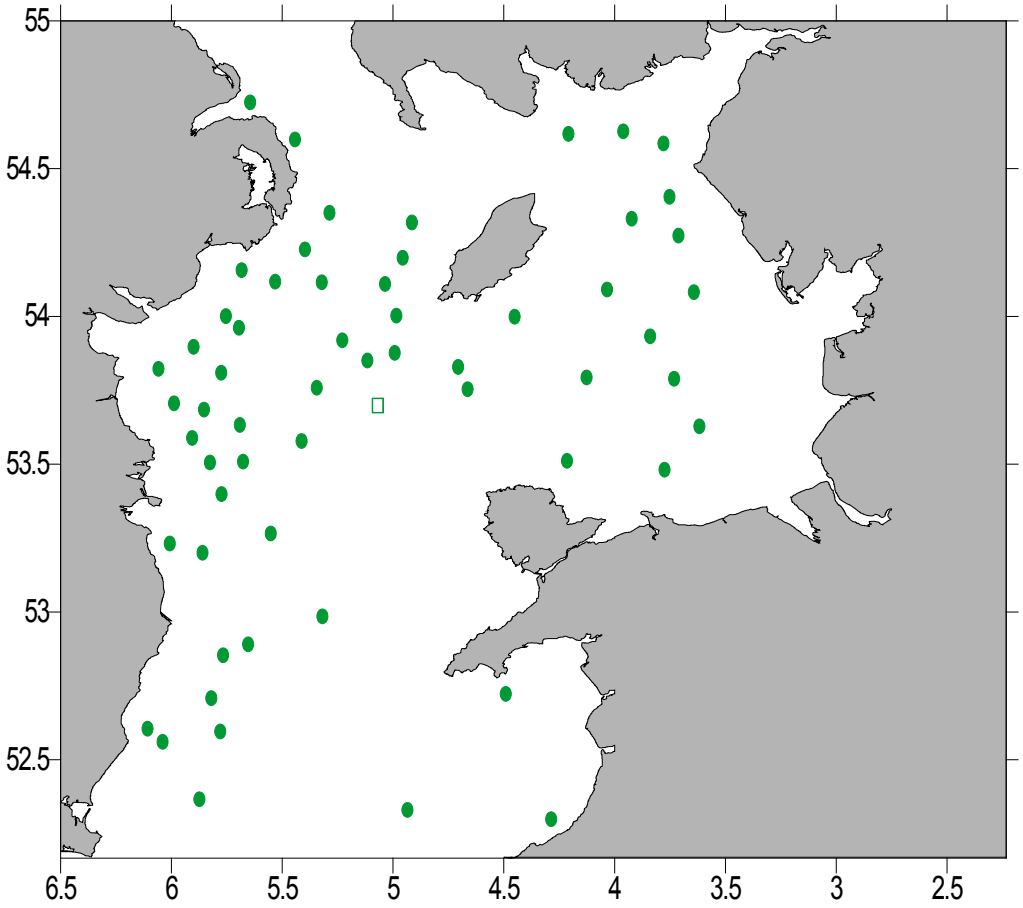
Cruise	Q1Irish Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in VIIa. The primary species are cod, haddock and whiting, herring and plaice.
Gear details:	Rock-hopper otter trawl with a 17m footrope fitted with 250 mm non-rotating 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. Fecundity samples were taken from over 170 haddock females and all female cod that had IBTS stages 2 and 3.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 71 species of fish were recorded during the survey. Less common fish species caught included one specimen of corkwing Crenilabrus melops off the west coast of the Isle of Man.

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

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VIIa		Otter trawl	60	60	0	1	100	
	TOTAL		60	60		0	100	

Number of biological samples (maturity and age material)

SPECIES	NO.	SPECIES	NO.
Gadus morhua	122	*Merlangius merlangus*	1205
Melanogrammus aeglefinus	570	*Merluccius merluccius*	78
Pleuronectes platessa	530		



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

4.3.2.5 UK – Northern Ireland: Northern Irish Groundfish Survey Q4 2009 – Q4NIGFS

NATION:	UK (NORTHERN IRELAND)	VESSEL:	CORYSTES
Survey:	41/09	Dates:	10–27 October 2009

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.):	First 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, 64 species of fish were recorded during the survey.

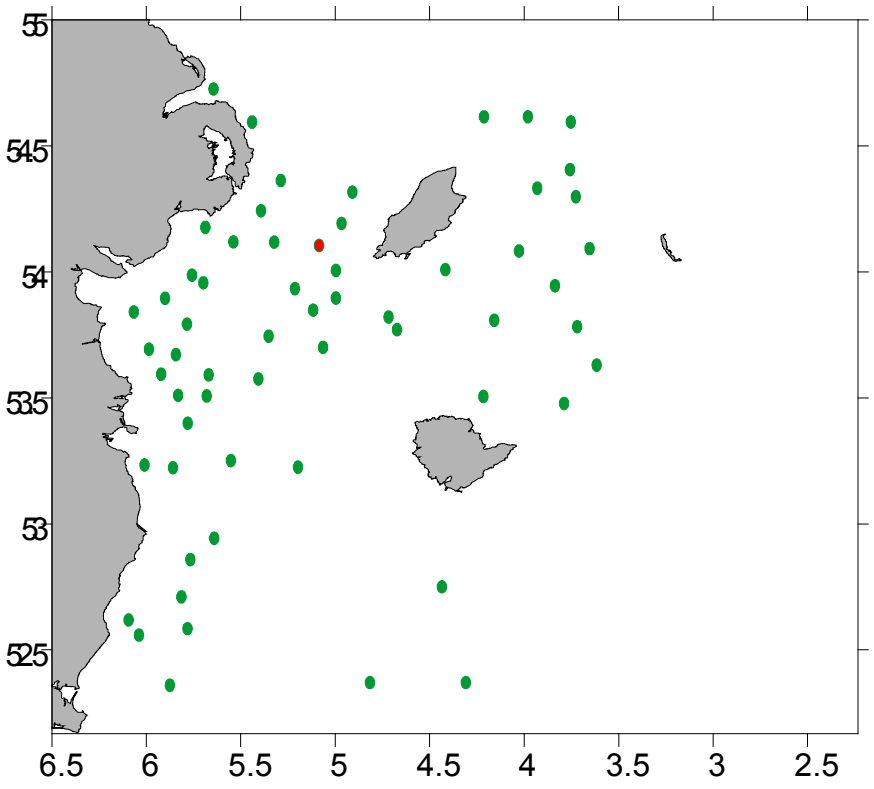
Stations fished (aims: to complete 61 valid tows per survey)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIIA	ALL	ROCK-HOPPER	61	61	0	1	100	
	TOTAL		61	61	0	1	100	

Number of biological samples (maturity and age material):

SPECIES	NO	SPECIES	NO
Gadus morhua	163	*Raja montagui* *	129
Melanogrammus aeglefinus	605	*Raja clavata* *	110
Pleuronectes platessa	0	*Raja brachyura* *	30
Merlangius merlangus	1289	*Leucoraja naevus* *	7
Merluccius merluccius	19	*Dicentrarchus labrax*	2
Scophthalmus rhombus	10	*Pollachius pollachius*	1
Psetta maxima	1	*Molva molva*	1
Conger conger	1		

*** Maturity only**



Map of valid survey stations completed during the Northern Irish quarter 4 groundfish survey (red circle is a repeat station).

4.3.2.6 Ireland: Irish Groundfish Survey Q4 – IGFS09

NATION:	IRELAND	VESSEL:	CELTIC EXPLORER
Survey:	IGFS	Dates:	25 September – 7 October (VIa) 29 October – 1 December (VIIb,g,j)

Cruise	Q4 Irish Groundfish survey aims to collect data on the distribution, relative abundance and biological parameters of commercial fish in VIaS, VIIb, VIIgN & VIIjN. The indicess currently utilised by assessment WG's are for haddock, whiting, plaice and sole with survey data provided also for cod, white & 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).
Gear details:	Two gear survey since 2004, using GOV ground gear "A" for areas VIIb,g & j; and "D"for area VIa.
Notes from survey (e.g. problems, additional work)	Weather was poor on the latter stages of the survey in particular and 4 full days in a row were lost as well as a number of hauls elsewhere. Significant damage resulting in invalid tows was encountered on 12 hauls. Due to weather and resulting time constraints no inter-calibration work was possible in 2009.
Number of fish species recorded and notes on any rare species or unusual catches:	In 2009 85 species of fish and 14 elasmobranch species were caught. As is evident in the table of survey trends below, plaice is significantly up in area VIIb-k, with a strong showing also for haddock in the 2009 Q4 survey in the Celtic Sea. Some increase in Sole numbers (*cf* biomass) are noted for VIa, while hake biomass in Area VII is steadily increasing over number suggesting maturing of previous recruitment.

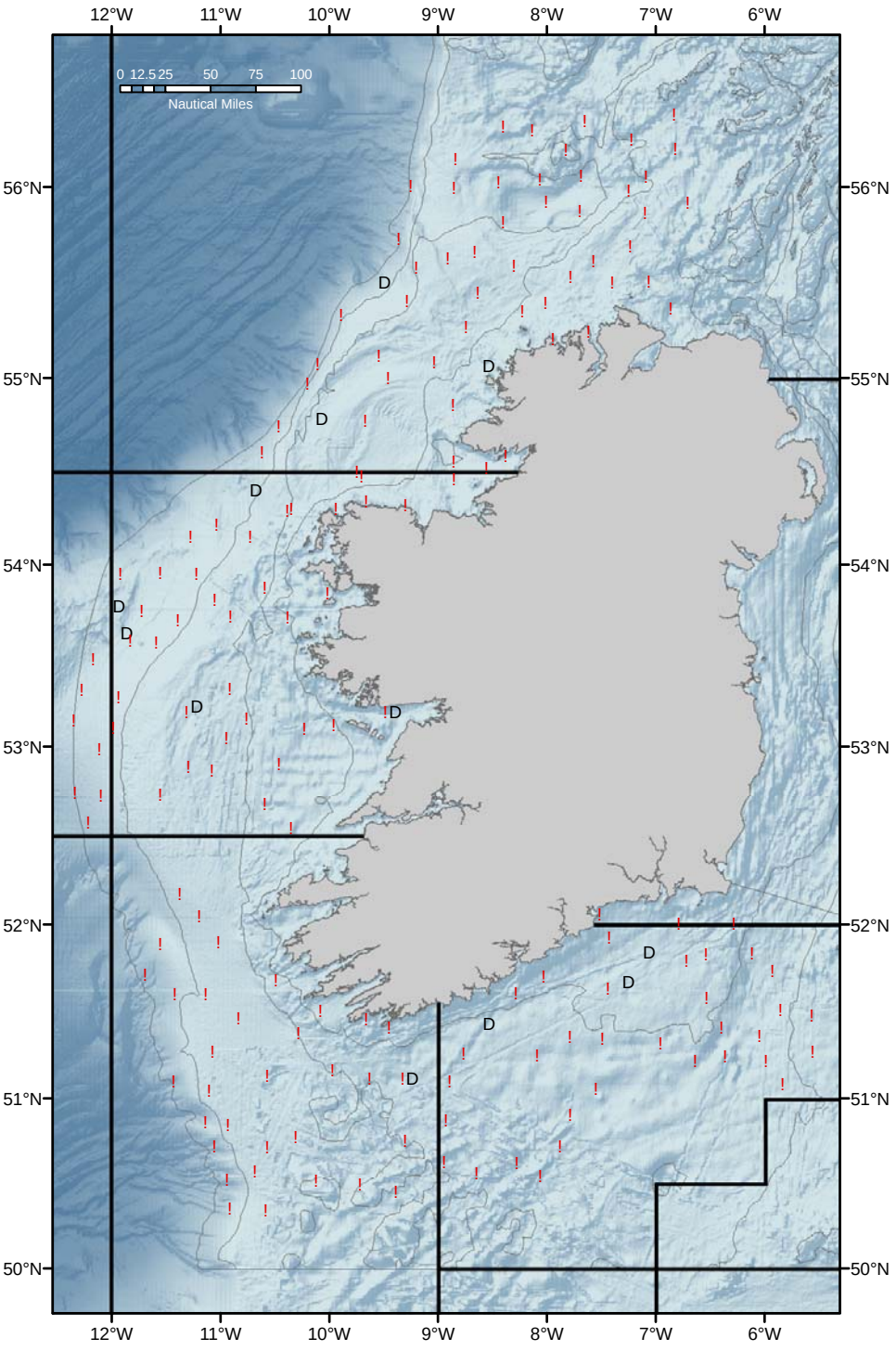
Stations fished (aim to complete 170 valid tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VIa	All	D	50	47	0	2	98	
VIIb,c	All	A	39	39	0	1	102	
VIIg	All	A	38	38	4	0	110	
VIIj	All	A	44	44	2	0	104	
	TOTAL		170	167	6	3	108	

Number of biological samples (maturity and age material)

SPECIES	NO.	SPECIES	NO.
Alosa alosa	1	*Lophius budegassa*	149
Clupea harengus	214	*Lophius piscatorius*	124
Gadus morhua	131	*Molva molva*	123
Melanogrammus aeglefinus	1517	*Solea solea*	110
Merlangius merlangus	1018	*Scomber scombrus*	513
Merluccius merluccius	1701	*Trachurus trachurus*	544
Micromesistius poutassou	835	**Raja brachyura*	33
Pollachius virens	314	**Raja clavata*	220
Lepidorhombus whiffiagonis	1126	**Leucoraja naevus*	123
Microstomus kitt	663	**Raja montagui*	255
Pleuronectes platessa	980		

*** Maturity only**



Map of Survey Stations completed by the Irish Groundfish Survey in 2009. 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.

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/Km2	%	%
Lophius piscatorius	VIa	46	2.0	101.2	-29.8	1.5	53.2	-55.1
Gadus morhua	VIa	46	0.4	-57.7	-11.3	0.9	-9.2	-49.4
Melanogrammus aeglefinnus	VIa	46	0.8	-17.2	-26.0	0.7	-26.8	-17.1
Merluccius merluccius	VIa	46	0.9	-9.1	58.7	0.7	-32.3	-37.0
Lepidorhombus whiffiagonis	VIa	46	1.2	15.8	-1.5	1.1	12.9	-43.9
Pleuronectes platessa	VIa	46	1.2	15.5	-15.8	1.1	5.0	-10.3
Pollachius virens	VIa	46	0.6	-39.2	45.5	0.4	-55.1	36.4
Merlangius merlangus	VIa	46	1.2	22.7	-21.8	1.5	48.4	-6.3
Solea solea	VIa	46	0.8	-22.2	42.2	2.6	157.7	154.7
Lophius piscatorius	VIIb	121	1.2	24.6	-32.1	2.2	120.5	-42.4
Gadus morhua	VIIb	121	0.5	-51.8	12.2	0.9	-8.8	-47.9
Melanogrammus aeglefinnus	VIIb	121	1.9	85.9	51.4	2.3	133.9	34.2
Merluccius merluccius	VIIb	121	2.6	163.2	182.8	1.7	68.4	30.3
Lepidorhombus whiffiagonis	VIIb	121	1.4	38.8	50.7	1.3	26.8	2.7
Pleuronectes platessa	VIIb	121	2.1	106.5	201.3	2.1	110.8	173.4
Pollachius virens	VIIb	121	0.4	-63.6	-80.1	0.5	-54.4	-90.7
Merlangius merlangus	VIIb	121	2.2	119.2	59.7	2.6	161.3	97.7
Solea solea	VIIb	121	1.3	25.8	20.5	1.9	91.1	0.9
Lophius piscatorius	VIIg&j	121	0.9	-5.3	9.4	2.1	111.2	1.9
Gadus morhua	VIIg&j	121	0.7	-28.3	8.4	1.2	17.3	-30.5
Melanogrammus aeglefinnus	VIIg&j	121	2.5	146.6	197.7	4.9	393.2	306.0
Merluccius merluccius	VIIg&j	121	1.4	35.2	151.9	0.4	-61.4	100.6
Lepidorhombus whiffiagonis	VIIg&j	121	1.2	17.7	39.2	1.1	14.3	12.3
Pleuronectes platessa	VIIg&j	121	1.4	44.3	160.1	1.6	56.7	259.5
*Pollachius virens**	VIIg&j	121	0.0	na	na	0.0	na	na
Merlangius merlangus	VIIg&j	121	0.9	-12.0	6.3	0.9	-14.8	29.2
Solea solea	VIIg&j	121	1.9	87.1	36.6	1.3	28.6	40.3

Year estimate 2009 (y_i); previous year estimate 2008 (y_{i-1}); average of last two years estimate ($y_{(i,i-1)}$); average of the previous three year estimates 2005–07 ($y_{(i-2,i-3,i-4)}$). As results for survey trend 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&j due to lack of catch in 2009 and 2007.**

4.3.2.7 UK – England: Western Groundfish Survey Q4 – 17/09

NATION:	UK (ENGLAND AND WALES)	VESSEL:	CEFAS ENDEAVOUR
Survey:	17/09	Dates:	5 November – 6 December 2009

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 rockhopper GOV with ground gear D on hard ground stations, and GOV with ground gear 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 cod-end to minimise damage to the cod end when bringing the net on board and emptying the cod end. 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 southern North Sea whilst en route to the main fishing area. The rockhopper GOV trawl was used on hard ground stations around the Cornish peninsula and in St George's Channel, with minor gear damage at one of these stations. Once the hard ground stations were completed, the GOV on ground gear A was rigged and stations in the northern Celtic Sea and Irish Sea sampled. During the mid-survey change of staff, RV Cefas Endeavour remained in port due to a period of very severe weather. After departing, the remaining stations in the Irish Sea were completed, and then stations in the Bristol Channel and Celtic Sea fished. Additional work included CTD casts, 2m beam trawl sampling for epibenthos, a tag/release programme for various dogfish, and a collection of material from fish species to cryopreserve samples for a DNA bank.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 92 species of fish were recorded during the survey, and most of the species caught were relatively common. Mackerel Scomber scombrus were only caught at a few stations, and in small numbers. Unusual fish species caught included three species not previously recorded in this cruise series: Ekstroms topknot Phrynorhombus regius, tadpole fish Raniceps raninus and two-spot clingfish Diplecogaster bimaculatus. Other unusual fishes caught included one specimen of sea trout Salmo trutta (prime station A1), and specimens of common eel Anguilla anguilla at prime stations E15 and F8, the latter site quite far offshore.

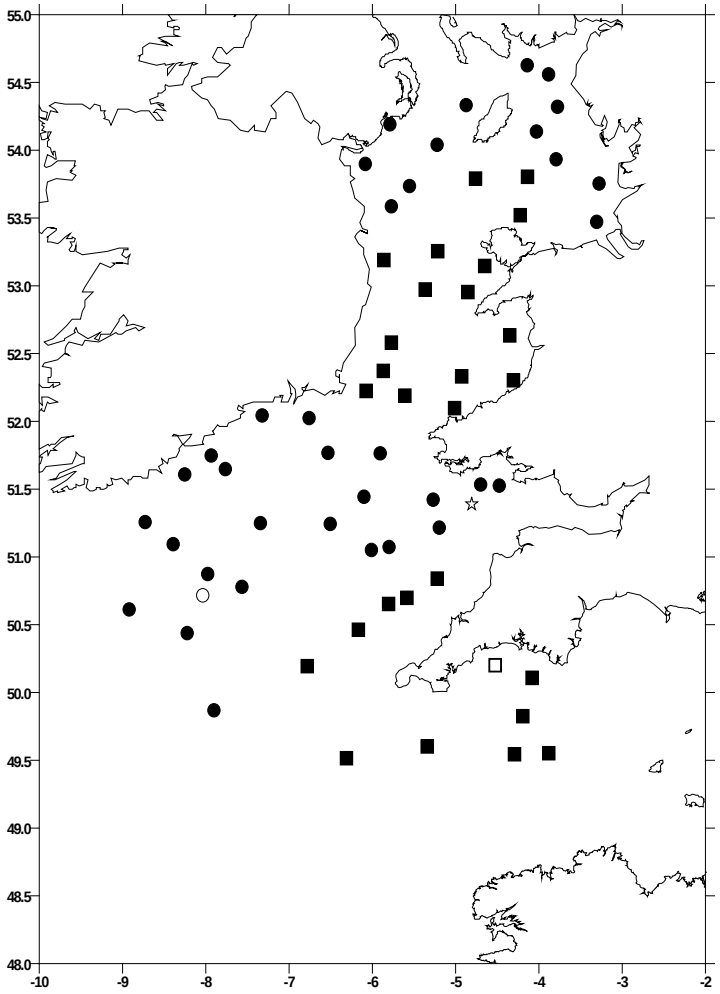
Number of Stations fished (aim to complete 72 valid tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITI-ONAL	INVALID	STATIONS FISHED	COMMENTS
VII a	A-C	Standard	12	13	0	0	108%	
	H	Rockhopper	14	16	0	1	114%	
VII e-h	D-E	Standard	19	16	0	1	84%	Poor weather prevented completion of grid in this area
	F	Standard	14	7	1	0	50%	
	G	Rockhopper	9	11	1	0	122%	
TOTAL			68	63	2	2	93%	

Number of biological samples (maturity and age material)

Species	Stock	No.	Species	Stock	No.
Gadus morhua	VIIa	55	*Psetta maxima*	-	8
Gadus morhua	VIIe-k	28	*Microstomus kitt*	-	146
Melanogrammus aeglefinus	VIIa	140	*Scophthalmus rhombus*	-	22
M. aeglefinus	VIIe-k	384	*Lophius budegassa*	-	15
Merlangius merlangus	VIIa	230	*Lophius piscatorius*	-	42
Merlangius merlangus	VIIe-k	329	*Mullus surmuletus*	-	4
Pleuronectes platessa	VII a	436	*Dicentrarchus labrax*	-	9
Pleuronectes platessa	VII e and VII f-g	301	**Dipturus batis*	-	1
Solea solea	VII a	16	**Leucoraja fullonica*	-	-
Solea solea	VII e and VII f-g	105	**Leucoraja naevus*	-	34
Clupea harengus	VII a	161	**Raja brachyura*	-	29
Clupea harengus	Celtic Sea	163	**Raja clavata*	-	211
Merluccius merluccius	Northern	212	**Raja microocellata*	-	104
Lepidorhombus whiffiagonis	VIIb,c,e-k, VIIIa,b,d	169	**Raja montagui*	-	146
Scomber scombrus	Northern	13	*Conger conger*	-	21
Molva molva	-	12	*Squalus acanthias*	-	105

*** Maturity only**



Map of survey area indicating sites sampled with GOV trawl with rockhopper ground gear (filled squares: valid tows; open squares: additional tows) and standard ground gear (filled circles: valid tows; open circles: additional tows). Open stars indicate invalid tows.

UK (Cefas) Groundfish Survey – quarter 4 2009

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	26	Both	.45	- 64	-75	3.79	+509	-6
Gadus morhua	VIIe-k	42	Both	4.57	-67	-11	1.61	-17	-16
Melanogrammus aeglefinus	VIIa	26	Both	5.43	-58	-64	89.35	-10	-35
Melanogrammus aeglefinus	VIIb-k	68	Both	69.76	+71	+417	765.77	+351	+793
Merlangius merlangus	VIIa	26	Both	76	-36	+201	1813.51	-34	+237
Merlangius merlangus	VIIe-k	42	Both	38.29	-29	+256	423.92	-58	+146
Merluccius merluccius	VIIe-k	42	A	5.71	-54	+138	68.54	-66	+168
Pleuronectes plattessa	VIIa	26	A	18.46	-6	+125	256.25	+203	+284
Squalus acanthias	NE atlantic	68	Both	6.41	-15	+250	3.2	-66	+173

y=2009, y-1=2008,y(1–2)=average 2007–2008.

4.3.2.8 France: EVHOE Groundfish Survey Q4 – EVHOE2009

NATION:	FRANCE	VESSEL:	THALASSA
Survey:	EVHOE 2009	Dates:	13 October – 1 December 2009

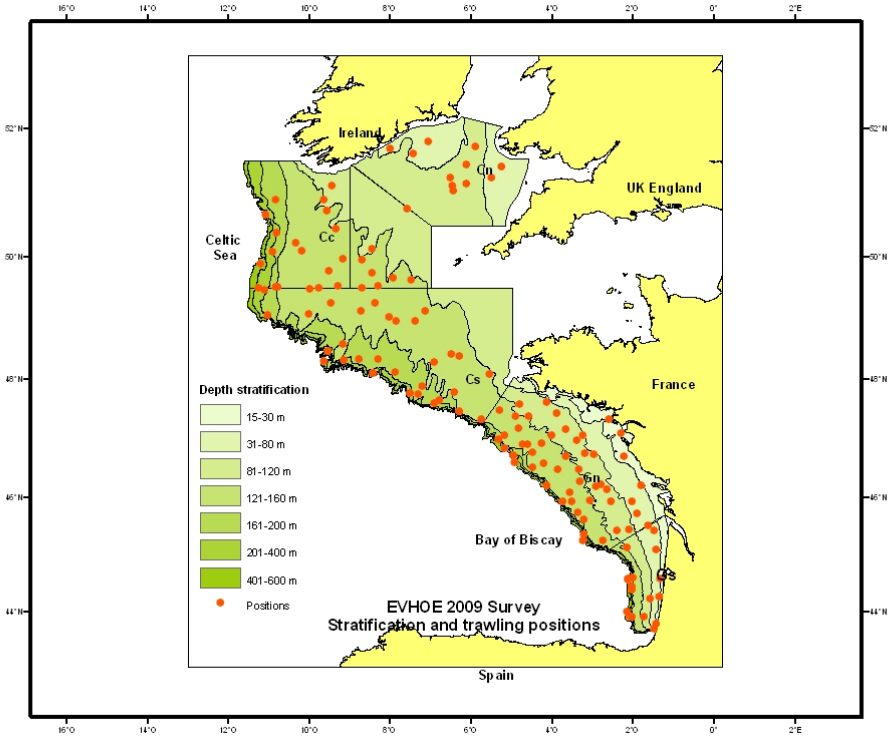
Cruise	EVHOE Groundfish survey aims to collect data on the distribution and relative abundance, and biological information of all fish and selected commercial invertebrates in subareas VIIf-j VIIIa,b. The primary species are hake, monkfishes, anglerfishes, megrim, cod, haddock and whiting, with data also collected for all other demersal and pelagic fish. CTD temperature and salinity profiles recorded at each trawling position. Sampling design is stratified random.
Gear details:	A GOV with standard Ground gear (A) but no kite replaced by 6 extra floats.
Notes from survey (e.g. problems, additional work etc.):	88% of the initial program was achieved. The bad weather conditions caused reduction in the number of hauls performed. Videos transects in VIIj in deep waters (400 - 800m) for location of corals reefs. Multibeam coverage of some trawled areas.
Number of fish species recorded and notes on any rare species or unusual catches:	161 species encountered..

Stations fished

ICES DIVISIONS	STRATA	TOWS PLANNED	VALID	ADDITIONAL	% STATIONS FISHED	COMMENTS
VII	Cc3	9	4		44.44%	
	Cc4	20	14		70.00%	
	Cc5	3	3		100.00%	
	Cc6	3	2		66.67%	
	Cc7	2	2		100.00%	
	Cn2	7	5		71.43%	
	Cn3	7	6		85.71%	
	Cs4	20	17		85.00%	
	Cs5	10	10		100.00%	
	Cs6	3	3		100.00%	
	Cs7	2	2		100.00%	
VIII	Gn1	3	3		100.00%	
	Gn2	4	4		100.00%	
	Gn3	16	16		100.00%	
	Gn4	21	21		100.00%	
	Gn5	3	3		100.00%	
	Gn6	2	3	1	150.00%	
	Gn7	2	2		100.00%	
	Gs1	3	3		100.00%	
	Gs2	3	3		100.00%	
	Gs3	3	3		100.00%	
	Gs4	3	3		100.00%	
	Gs5	2	2		100.00%	
	Gs7	2	2		100.00%	
TOTAL		155	136	1	87.74%	

Number of biological samples (maturity and age material).

SPECIES	AGE	SPECIES	AGE
Merluccius merluccius	858	*Lophius piscatorius*	210
Gadus morhua	30	*Solea solea*	93
Melanogrammus aeglefinus	284	*Pleuronectes platessa*	84
Merlangius merlangus	691	*Aspitrigla cuculus*	209
Lepidorhombus whiffiagonis	403	*Micostomus kitt*	106
Lophius budegassa	153	*Glyptocephalus cynoglossus*	140



Cruise track of RV "Thalassa" in EVHOE 2009 survey.

4.3.2.9 France: The Channel Groundfish Survey - CGFS

NATION:	FRANCE	VESSEL:	GWEN DREZ
Survey:	CGFS08	Dates:	1–31 October 2009

Cruise	The first objective of the Channel Ground Fish Survey carried out every years in October since 1986 sea is to collect data on the distribution, the relative abundance, and biological informations on commercial fish in in the Eastern English Channel and the South of the North. The most important species are cod, whiting, plaice 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.):	106 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. Trawl parameters were not recorded due to a problem with the computer hard disk.. 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 was also determinate and counted at each hauls. An increase of the total biomass and abundance was observed this year compared to the mean time-series value.

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		

Number of biological samples (maturity and age material)

SPECIES	AGE	SPECIES	AGE
Gadus morhua	136	*Pleuronectes platassa*	250
Merlangius merlangus	325	*Mullus surmuletus*	81

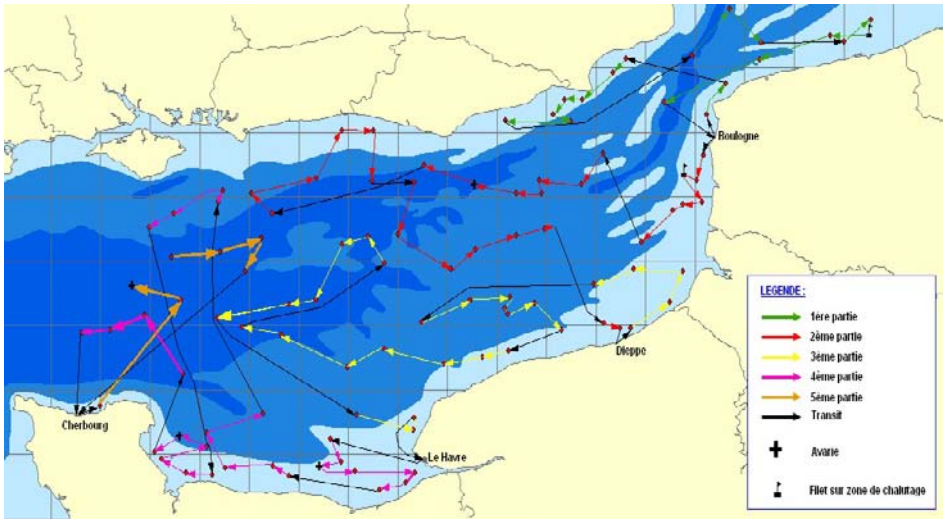


Figure 4.3.2.9. Track of the stations performed during CGFS 200 9 – Quarter 3.

4.3.2.10 Spain: The Porcupine Groundfish Survey Q3 – P09

NATION:	SP (SPAIN)	VESSEL:	VIZCONDE DE EZA
Survey:	P09	Dates:	30 September – 26 October 2009

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 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 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
Notes from survey (e.g. problems, additional work etc.):	The survey was delayed from 8th Sept. to 30th Sept. due to administrative problems, nevertheless the aims were completed. Additional work undertaken included CTD casts at most trawl stations. 12 box corer were carried out.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 99 species of fish, 54 crustaceans and 31 molluscs were recorded during the survey. Problems with the trawl in 2008 were rectified for 2009 and are highlighted by the significant increase in all species for the current year and in particular Micromesistius poutassou.

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

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	TOWS VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VIIb-k	All	Porc. baca 39/52	80	79	5	4	98.8%	*Also avail. by depth and geogr. strata
	TOTAL		80	79	5	4	98.8%	

***Avail: available**

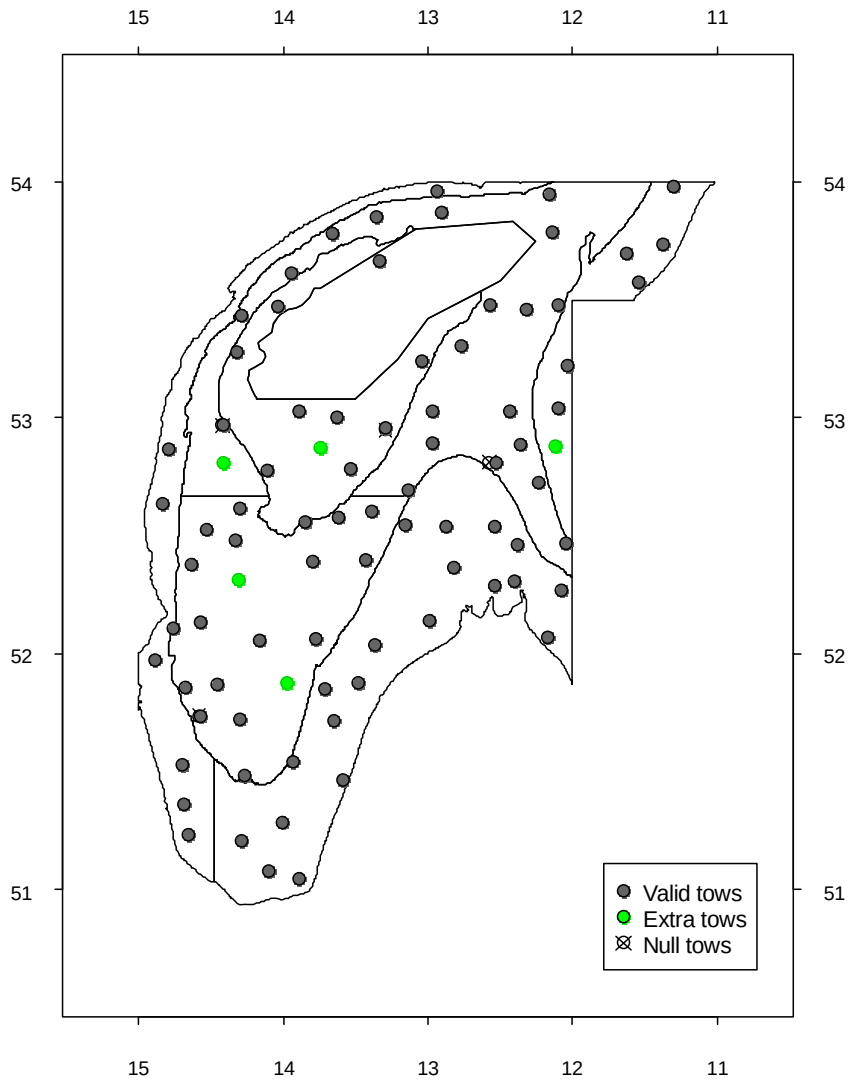
***geogr. strata: geographical strata**

Number of biological samples (maturity and age material)

SPECIES	NO.	SPECIES	NO.
Merluccius merluccius	985	*Merluccius merluccius* d.growth+	226
Lepidorhombus whiffiagonis	646	*Molva molva*	68
Lepidorhombus boscii	286	*M. macrophthalma*	112
Lophius budegassa	40	*Conger conger*	48
Lophius piscatorius	168	*Merlangius merlangus*	1
Glyptocephalus cynoglossus	198	*Nephrops norvegicus**	245
Helicolenus dactylopterus	105		
Phycis blennoides	100		

+d. growth: daily growth

*** Maturity only**



Stations performed during Porcupine Bank survey SPPGFS.

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 N°/.5HOUR	YI/YI-1 %	Y(I,I-1)/ Y(I-2,I-3,I-4) %
Merluccius merluccius	All	79	23.14	99.1	44.8	53.23	56.3	63.2
Lepidorhombus whiffiagonis	All	79	8.11	35.4	-2.2	113.68	3.6	-29.1
Lepidorhombus boscii	All	79	5.8	29.5	-21.4	69.03	30.1	-29.2
Lophius budegassa	All	79	0.6	3.4	-20.3	0.44	-12.0	8.5
Lophius piscatorius	All	79	7.64	14.5	-18.0	1.87	22.2	-29.8
Micromesistius poutassou	All	79	134.12	2.8	-49.4	2663.83	58.1	-45.0
Nephrops norvegicus	All	79	0.24	140.0	-50.5	9.20	561.9	0.5

y_i, year estimate (2009); y_{i-1}, previous year estimate (2008); $y_{(i,i-1)}$, Average of last two year estimates (2009 and 2008); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2007, 2006 and 2005).

4.3.2.11 Spain: Spanish North Coast Survey – N08

NATION:	SP (SPAIN)	VESSEL:	CORNIDE DE SAAVEDRA
Survey:	N09	Dates:	18 September – 27 October 2009

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 ground rope. Seabirds census also carried out during fishing manoeuvres. As in previous years 5 additional hauls were done to cover shallow stations between 30 and 70 m, and 11 deeper stations between 500 and 700 m. Besides 8 new stations were explored this year in the usual strata to increase the possible tracks available. Also as in previous years, in 2009 4 calibration hauls with the EVOHE were carried out during the survey in the French shelf of the Bay of Biscay in the stations fished by the R/V Thalassa.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 119 species of fish, 54 crustaceans and 42 molluscs were recorded during the survey.

Stations fished (aims: to complete 116 valid tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VIIIc-IXa	All	Standard baca	116	116	28	3	100	Also avail. by * depth and geogr. strata
	TOTAL		116	116	28	3	100	

***Avail: available**
***geogr. strata: geographical strata**

Number of biological samples (maturity and age material)

SPECIES	AGE	SPECIES	AGE
Merluccius merluccius	700	*Merluccius merluccius* (d. growth+)	442
Lepidorhombus whiffiagonis	330	*Trisopterus luscus*	142
Lepidorhombus boscii	497	*Helicolenus dactylopterus*	98
Lophius budegassa	56	*Molva macrophthalma*	40
Lophius piscatorius	244	*Phycis blennoides*	139
Trachurus trachurus	937	*Conger conger*	100
Micromesistius poutassou	1303		
Scomber scombrus	219		

+ d. growth: daily growth

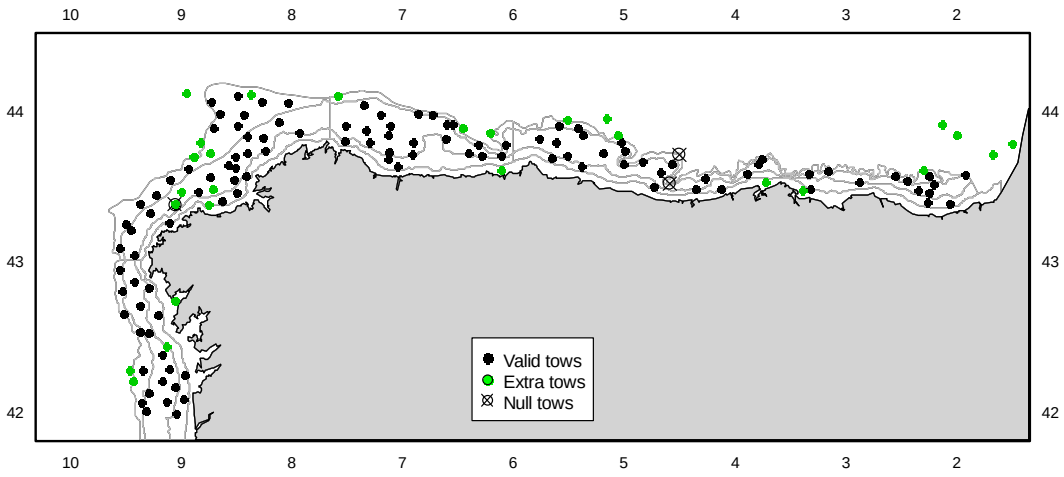


Figure: stations trawled by the "Cornide de Saavedra" in SPNGFS.

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 N°/.5HOUR	YI/YI-1 %	Y(I,I-1)/ Y(I-2,I-3,I-4) %
Merluccius merluccius	All	116	9.32	89.0	26.3	559.65	463.5	36.1
Lepidorhombus whiffiagonis	All	116	0.80	17.6	-35.5	4.17	-3.7	-44.6
Lepidorhombus boscii	All	116	3.96	90.4	-10.7	52.83	63.8	-17.9
Lophius budegassa	All	116	0.30	-14.3	-57.6	0.35	20.7	-70.5
Lophius piscatorius	All	116	1.07	-42.2	-33.4	1.91	-2.6	-22.0
Micromesistius poutassou	All	116	67.45	1461.3	-36.1	3898.04	7186.1	-21.6
Nephrops norvegicus	All	116	0.02	0.0	-14.3	0.25	31.6	-55.4
Trachurus trachurus	All	116	15.57	577.0	-36.0	542.86	511.2	-15.0
Scomber scombrus	All	116	1.83	976.5	-70.0	23.51	3462.1	-80.4

y_i, year estimate (2008); y_{i-1}, previous year estimate (2007); $y_{(i,i-1)}$, Average of last two year estimates (2008 and 2007); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2006, 2005 and 2004).

4.3.2.12 Spain: Spanish Gulf of Cadiz Bottom Trawl Survey Q1

NATION:	SP (SPAIN)	VESSEL:	CORNIDE DE SAAVEDRA
Survey:	GC_spring 09 (ARSA)	Dates:	4–16 March 2009

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 & 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, 135 species of fish, 59 of crustacean and 51 of mollusca were recorded during the survey.

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

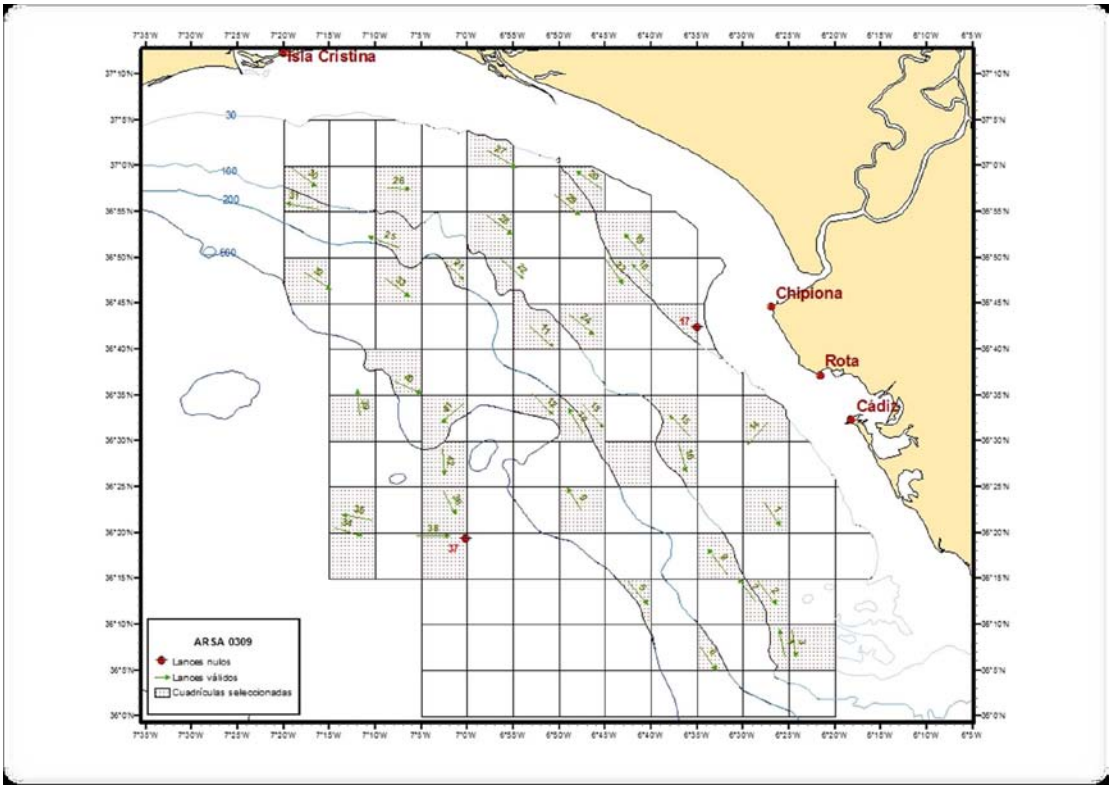
ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
IXa	All	Standard baca 36/40	42	40	-	-	95%	Also avail. by depth
	TOTAL		42	40	-	-	95%	

Also avail. by depth: Also available by depth

Number of biological samples (maturity and age material)

SPECIES	AGE	SPECIES	AGE
Merluccius merluccius	366	*Loligo vulgaris**	62
*Merluccius merluccius**	590	*Sepia officinalis**	62
*Parapenaeus longirostris**	1601	*Eledone cirrhosa**	8
*Nephrops novergicus**	119	*Eledone moschata**	497
*Octopus vulgaris**	218		

*** Maturity only**



Stations done during GC_spring 09 Survey.

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	40	4.24	17.9	-39.25	80.37	22.0	-43.27
Micromesistius poutassou	ALL	40	0.02	-365.9	-1128.9	0.12	-500.5	-1609.7
Nephrops norvegicus	ALL	40	0.20	-70.4	30.72	5.03	-70.9	9.16
Parapenaeus longirostris	ALL	40	6331.56	74.8	89.08	1313.85	71.8	88.81
Octopus vulgaris	ALL	40	2.91	-109.6	17.42	5.26	-8.2	-9.22
Loligo vulgaris	ALL	40	0.42	2.9	28.31	1.43	11.3	-6.87
Sepia officinalis	ALL	40	0.77	-64.2	0.97	1.56	-88.8	7.54

y_i, year estimate (2009); y_{i-1}, previous year estimate (2007); $y_{(i,i-1)}$, Average of last two year estimates (2009 and 2008); $y_{(i-2,i-3,i-4)}$, Average of the previous three year estimates (2007, 2006 and 2005).

4.3.2.13 Spain: Spanish Gulf of Cadiz Bottom Trawl Survey Q4

NATION:	SP (SPAIN)	VESSEL:	CORNIDE DE SAAVEDRA
Survey:	GC09	Dates:	9–23 November 2009

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 & 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, 144 species of fish, 47 of crustacean and 56 of mollusca were recorded during the survey.

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

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	TOWS VALID	TOWS ADDITIONAL	TOWS INVALID	% STATIONS FISHED	COMMENTS
IXa	All	Standard baca 36/40	45	43	-	-2	96%	Also avail. by depth
	TOTAL		45	43	-	-2	96%	

Also avail. by depth: Also available by depth

Number of biological samples (maturity and age material)

SPECIES	AGE	SPECIES	AGE
Merluccius merluccius	424	*Loligo vulgaris**	204
*Merluccius merluccius**	2863	*Loligo forbesi**	246
*Parapenaeus longirostris**	2133	*Sepia officinalis**	139
*Nephrops novergicus**	42	*Eledone cirrhosa**	23
*Octopus vulgaris**	278	*Eledone moschata**	600

*** Maturity only**

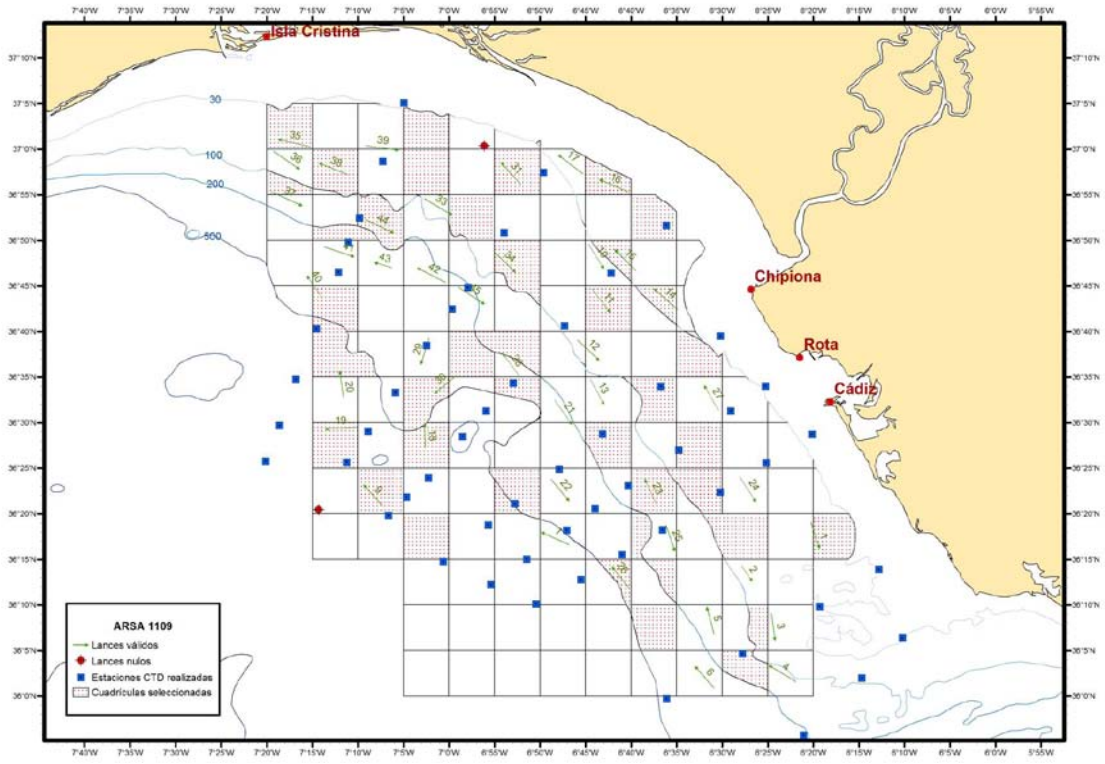


Figure: Map showing the stations done during GC 09 Survey.

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	43	7.35	0.04	-6.03	123.03	36.2	-86.35
Micromesistius poutassou	ALL	43	11.15	0.09	62.53	288.57	98.7	71.72
Nephrops norvegicus	ALL	43	0.11	-0.16	-162.31	3.10	-188.3	-275.88
Parapenaeus longirostris	ALL	43	2.26	-0.14	81.44	343.85	-349.2	83.33
Octopus vulgaris	ALL	43	3.82	0.06	-60.68	5.99	53.5	-129.09
Loligo vulgaris	ALL	43	0.87	-0.14	-10.39	4.33	-175.0	-12.73
Sepia officinalis	ALL	43	0.76	-0.04	-101.83	2.33	27.8	-94.94

y_i. year estimate (2009); y_{i-1}. previous year estimate (2008); $y_{(i.i-1)}$. Average of last two year estimates (2009 and 2008); $y_{(i-2.i-3.i-4)}$. Average of the previous three year estimates (2007. 2006 and 2005).

4.3.2.14 Portugal: Autumn Groundfish Survey – Autumn 2009

NATION:	PORTUGAL	VESSEL:	NORUEGA
Survey:	Autumn 2009	Dates:	28 September – 27 October 2009

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 (Div. IXa). from 20 to 500 m depth.
Survey design	96 fishing stations. 66 at fixed (grid) positions and 30 at random. Tow duration is 30 min. with a trawl speed of 3.5 knots. during day light.
Gear details	NCT (Norwegian Campbell Trawl) gear with rollers in the groundrope. The mean horizontal opening between the wings is 14.7 m and the mean vertical opening is 4.4 m. Codend mesh size is 20 mm.
Notes from survey (e.g. problems. additional work etc.)	Temperature was recorded with a CTD (Conductivity. Temperature. Depth) equipment: – 93 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. 93 species of fish. 15 of cephalopods and 19 of crustaceans were recorded during the survey. 41 species of other groups were recorded. e.g.. Echinodermata. Cnidarians. Bivalves. Gastropods. Polychaeta. Ascidians and Nudibranchia.

Stations fished

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	INVALID	% STATIONS FISHED	COMMENTS
IXa	ALL	NCT	96	93		97	

Number of biological samples (maturity and age material)

SPECIES	SAMPLES	OTOLITHS
Merluccius merluccius	91	1098
Trachurus trachurus	68	530
Micromesistius poutassou	38	331
Scomber colias	34	275
Scomber scombrus	40	167
Lophius budegassa	1	1
Lepidorhombus boscii	13	10
Lepidorhombus whiffiagonis	1	1

Portuguese Groundfish survey – autumn 2009 (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	93	37.5	+8.3	+76.1	476	+62.3	+62.5
Trachurus trachurus	All	93	41.5	+160.8	+1.6	1903	+772.6	+7.0
Trachurus picturatus	All	93	9.1	-66.5	-76.6	114	-70.6	-90.6
Micromesistius poutassou	All	93	96.6	+336.3	-31.0	4691	+1677.1	+3.8
Scomber colias	All	93	3.8	-11.7	-65.6	36	-43.5	-64.6
Scomber scombrus	All	93	40.6	+244.1	-21.1	564	+370.2	-33.6
Lophius budegassa	All	93	0.0	-99.7	-	0.01	-84.1	-
Lophius piscatorius	All	93	-	-	-	-	-	-
Lepidorhombus whiffiagonis	All	93	0.0	-	-	0.02	-	-
Lepidorhombus boscii	All	93	0.1	-28.9	-34.8	0.44	-31.4	-49.4
Nephrops norvegicus	All	93	0.03	+3.4	-60.8	0.50	+7.1	-78.4

y=2009. 2y=average 2008–2009. y(3–5)= average 2005–2007.

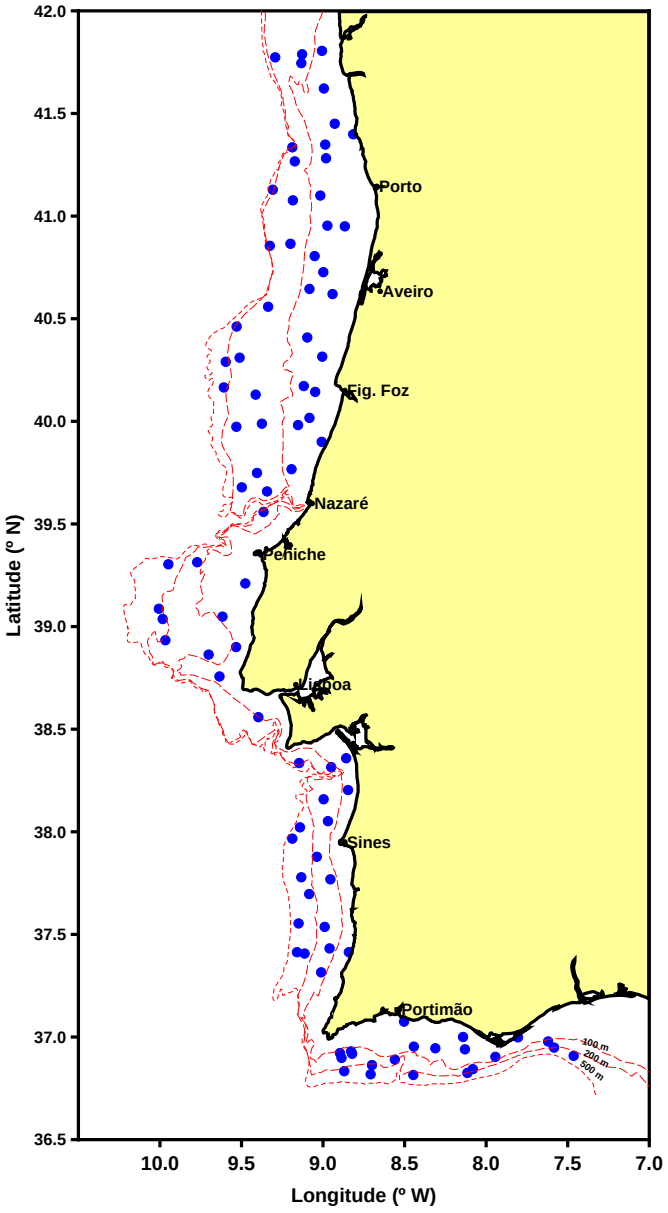


Figure: Map showing the stations done during Portuguese Autumn 2009 Survey

4.3.3 Results

4.3.3.1 Biological samples

Table 4.3.3.2 gives an overview of the number of biological samples as reported per country/survey in Section 4.3.2.

Table 4.3.3.2. 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	GCádiz	
Target species													
Clupea harengus	1204	--	513	--	--	214	324	--	--	--	--	--	--
Gadus morhua	20	1	83	122	163	131	83	136	858	--	--	--	--
Lepidorhombus boscii	--	--	--	--	--	--	--	--	--	286	497	--	10
L. whiffiagonis	105*	292*	--	--	--	1126	169	--	403	646	330	--	1
Lophius budegassa	3*	--	--	--	--	149	15	--	153	40	56	--	1
L. piscatorius	10*	65*	--	--	--	124	42	--	210	168	244	--	--
Melanogrammus aeglefinus	831	940	887	570	605	1517	524	--	284	--	--	--	--
Merlangius merlangus	536	--	682	1205	1289	1018	559	325	691	1	--	--	--
Merluccius merluccius	517*	1*	359*	78	19	1701	212	--	858	985	700	790	1098
Pollachius virens	10	18	59	--	--	314	--	--	--	--	--	--	--
Scomber scombrus	787	--	392	--	--	513	13	--	--	--	219	--	167
Sprattus sprattus	--	--	217	--	--	--	--	--	--	--	--	--	--
Trachurus trachurus	--	--	--	--	--	544	--	--	--	--	937	--	530
Trisopterus esmarki	205	--	--	--	--	--	--	--	--	--	--	--	--
Additional species													
Aspitrigla cuculus	--	--	--	--	--	--	--	--	209	--	--	--	--
Brama brama	--	5*	--	--	--	--	--	--	--	--	--	--	--
Conger conger	--	--	15*	--	1	--	21	--	--	48	100	--	--
Glyptocephalus cynoglossus	--	--	--	--	--	--	--	--	140	198	--	--	--
Helicolenus dactylopteruis	--	--	--	--	--	--	--	--	--	105	98	--	--
Micromesistius poutassou	--	--	--	--	--	835	--	--	--	--	1303	--	331
Microstomus kitt	--	--	--	--	--	663	146	--	106	--	--	--	--
Molva molva	3*	70*	4*	--	--	123	12	--	--	68	--	--	--
M. macrophthalma	--	--	--	--	--	--	--	--	--	112	40	--	--
Mullus surmuletus	--	--	--	--	--	--	4	81	--	--	--	--	--
Phycis blennoides	--	--	--	--	--	--	--	--	--	100	139	--	--
Pleuronectes platessa	--	--	--	530	--	980	737	250	--	--	--	--	--

Pollachius pollachius	--	--	5*	--	1	--	--	--	--	--	--	--	--
Psetta maxima	--	1*	2*	--	1	--	--	--	--	--	--	--	--
Scophtalmus rhombus	1*	--	5*	--	10	--	22	--	--	--	--	--	--
Scomber colias	--	--	--	--	--	--	--	--	--	--	--	--	275
Solea solea	--	--	--	--	--	110	121	--	93	--	--	--	--
Trisopterus luscus	--	--	--	--	--	--	--	--	--	--	142	--	--
Zeus faber	--	--	93*	--	--	--	--	--	--	--	--	--	--
Raja brachiura *	--	--	--	--	--	33	29	--	--	--	--	--	--
Raja clavata *	--	--	25	--	110	220	--	--	--	--	--	--	--
Raja montagui *	118	--	60	--	129	255	--	--	--	--	--	--	--
Dipturus batis *	22	--	--	--	--	--	1	--	--	--	--	--	--
Leucoraja fullonica *	--	4	--	--	--	--	--	--	--	--	--	--	--
Leucoraja naevus *	34	--	44	--	7	123	34	--	--	--	--	--	--
Mustelus mustelus *	3	--	--	--	--	--	--	--	--	--	--	--	--
Mustelus asterias *	3	--	--	--	--	--	--	--	--	--	--	--	--
Squalus acanthias *	--	--	--	--	--	--	105	--	--	--	--	--	--

*** Samples collected for maturity only**

**** Scottish survey in Rockall. Division VIb ICES**

4.3.4 Participation 2010/2011

Survey	Code	Starting	Ending	No. expected hauls	Intercal.
UK-Scotland Rockall	1110S	10/09/10	20/09/10	42	None
UK-Scotland Western (autumn)	1310S	1/11/10	23/11/10	78	None
UK-Scotland Western (spring)	0311S	22/02/11	16/03/11	55	None
UK-North Ireland (autumn)	CO4109	04/10/10	27/10/10	60	None
UK-North Ireland (spring)	CO1011	01/03/11	25/03/11	60	None
Ireland – Groundfish Survey VIa	IGFS10	25/9/10	7/10/10	50	None
Ireland – Groundfish Survey VIIb.g.j	IGFS10	15/11/10	20/12/10	120	IFREMER
UK-England & Wales	Q4SWIBTS	01/11/10	02/12/10	80	None
France – Eastern Channel	FR-CGFS	01/10/10	31/10/10	100	None
France - EVHOE	EVHOE-2010	15/10/10	1/12/10	155	None
Spain - Porcupine	SP- P10	8/09/10	08/10/10	80	None
Spain - North Coast	SPNGFS-N10	20/09/10	27/09/10	116	EVHOE
Spain - Gulf of Cádiz (Spring)	ARSA	01/03/11	10/03/11	42 (41)	None
Spain - Gulf of Cádiz (Autumn)	SPGC10	1/11/10	14/11/10	42	None
Portugal - Autumn	AUTUMN	29/09/10	28/10/10	96	None

4.3.5 Other issues

Concerns were raised at the IBTSWG 2010 meeting in relation to constructively addressing ongoing issues facing the Celtic Sea Groundfish Survey which may be working in a transition area with migratory and/or mixed stocks. Confounding the age structure of the indices.

The need for clarification following the downgrading of DCF priority status of the Q1 surveys from Northern Ireland. Portugal and Spain was also discussed. The Q1 Irish Biological Survey has not yet achieved DCF recognition despite being the sole source of the DCF biological data for a large area of the Irish shelf. In addition, assimilation of a number of design updates to the UK Q4 and Scottish Q1 surveys were raised.

The western area IBTS group are very aware of the national requirements under the DCF to provide maturity data outside of the Q4 surveys for which there is not currently a multinational co-ordinated survey effort in this area. Some surveys do operate independently at this time of the year however providing these data but all appear to struggle for recognition. It was noted that the now retired UK Q1 survey for example provided a useful tuning index in its own right previously. As well as providing indices, limited data is readily available to confirm or dispute assumptions around constant maturity of other biological parameters for the assessments.

It was suggested therefore that following discussion at the national labs, a proposal for the consolidation of existing survey effort to be directed specifically at Q1 be looked at.

Where surveys required modification to be coordinated with existing Q1 surveys, they would be passed to the relevant assessment working groups to ensure relevance to current management needs, and monitored under the "pilot surveys" criteria (STECF Subgroup on Research Needs: SGRN 2007-01).

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 North Eastern 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 6. As part of ongoing efforts to standardize the format and improve the usefulness of reporting for IBTS coordinated surveys. This 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 North Eastern Atlantic Area Quarter 4 (NeAtl) surveys. When interpreting these maps. Two aspects need to be borne in mind. Moving from the North Sea (NS) to North Eastern Atlantic (NeAtl) Area means also moving from Q3 to Q4 surveys, and secondly. The trawl gears used in the NeAtl area are more diverse than the single gear GOV surveys used in the NS 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 pre-recruit (0-group) and post-recruit (1+ group) where appropriate. The maps cover all the area encompassed by surveys coordinated within the IBTSWG (North Sea Q3 and North-eastern 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	*	
Nephrops norvegicus	Norway Lobster	NEP	28	
Pleuronectes platessa	European Plaice	PLE	22–23	12
Raja clavata	Thornback ray (Roker)	THR	34	
Raja microocellata	Painted/Small Eyed Ray	PTR	35	
Raja montagui	Spotted Ray	SDR	36	
Raja undulata	Undulate Ray	UNR	37	
Scomber scombrus	European Mackerel	MAC	12–13	24
Scyliorhinus canicula	Lesser Spotted Dogfish	LSD	29	
Scyliorhnus stellaris	Nurse Hound	DGN	38	
Squalus acanthias	Spurdog	DGS	31	
Sprattus sprattus	European sprat	SPR	39	
Trachurus picturatus	Blue Jack Mackerel	JAA	40	
Trachurus trachurus	Horse Mackerel (Scad)	HOM	10–11	15

*** No catches in 2009 surveys.**

An effort has been made to provide information on "recruits" and post-recruits for the main species. The approach used, as in last year's, 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).

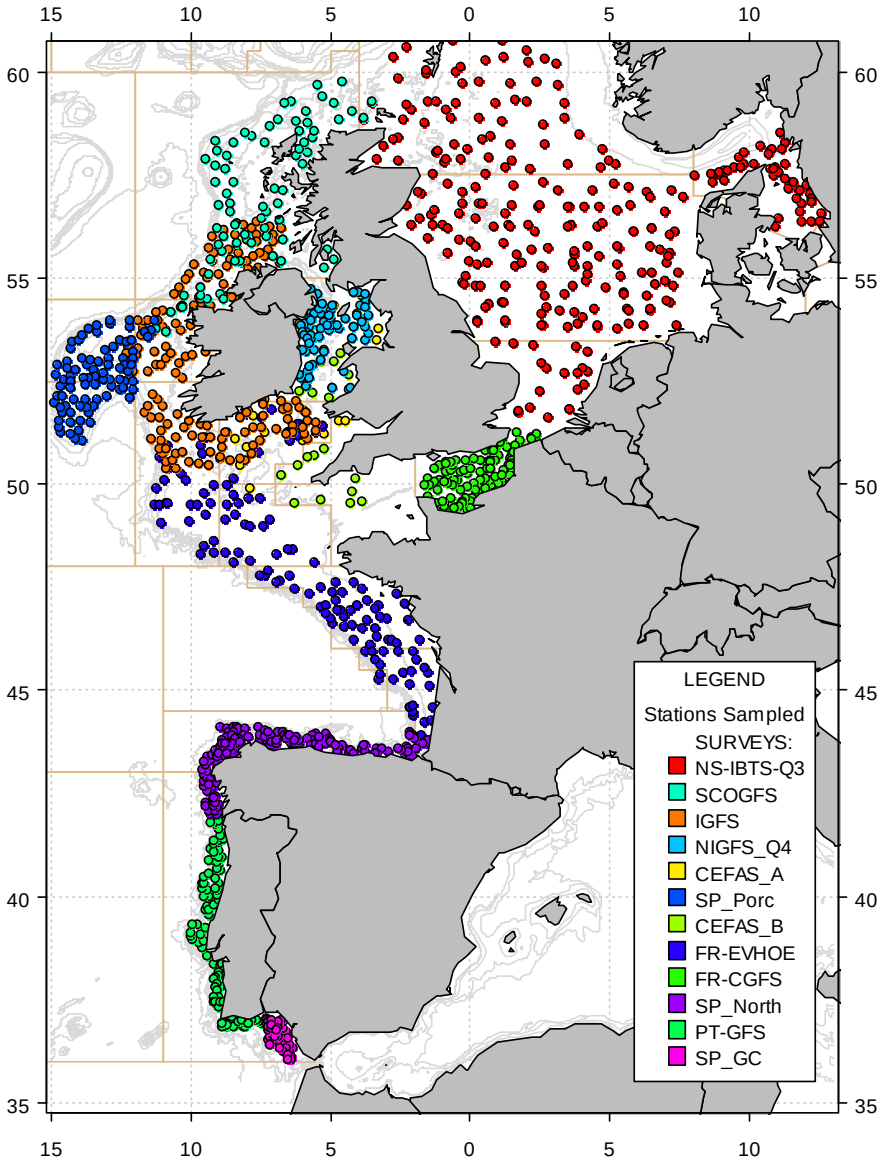


Figure 4.4.1. Station positions for the IBTS Surveys carried out in the North Eastern Atlantic and North Sea area in autumn/winter of 2009.

5 Review of age-structured survey data (ToR b)

b) Review of age-structured survey data as a quality exercise for indicated species using survey based assessment exploratory plots (standard SURBA output); in order to achieve the required level of quality in survey data. There is a demand for the evaluation and control of indices.

5.1 Overview

In recent years there has been growing focus on survey data, largely as a result of a reduction in the quantity and quality of commercial data for fisheries management. Along with a number of stocks now being managed entirely using survey data. Attention has also focused on incorporation of new survey areas and target species as well as the advantages and disadvantages of new equipment (ICES, 2003; ICES, 2004a; ICES, 2005a) and different survey designs (ICES, 2004b. ICES, 2005b).

Research surveys ostensibly collect relative indices of abundance and therefore rely on strict standardization to ensure annual changes in survey abundance actual changes in the stock and not a change in the survey's ability to sample that stock. Several afore mentioned studies highlighted the fact that complete standardization over many surveys and extended periods is possibly unrealistic in the long term. At a very basic level vessels and staff will retire. Netting materials will become unavailable to some or all countries and so on.

Discussions at IBTS on foot of involvement in and recommendations from several expert groups resulted in a realisation that there was a requirement to pro-actively manage some of the assumptions around surveys. The most important being that effort and catchability are fixed. While effort is directly measurable in terms of time or swept area and thus straightforward to correct for, catchability is complex. We rarely have direct observation at the net to see what is or is not being caught and a myriad of factors might affect a fish's susceptibility to capture.

Acceptance that an element of change to "standard" had and would always occur, it seemed prudent to combine standardization of the technical survey aspects of surveys alongside monitoring of the final data output. In managing standardization the possibilities to measure technical aspects of the gear, environmental conditions and so on is almost limitless. However, the impact of any of these variables alone, or in combination, will only be seen in the indices themselves. A week of bad weather for example will have a negative effect on catches, but in terms of a survey time series will its impact be significant?

Several approaches for looking at survey indices are readily available and were discussed in last year's report (IBTSWG Report 2008). It was agreed at last year's meeting that the best approach would be to narrow an initial data exploration to one or two species of relevance to both IBTS surveys and data users at assessment working groups. What follows is a brief outline of some of the initial findings when looking at haddock across several of the IBTS Q3 and Q4 surveys.

5.2 Data Availability

Currently surveys in the Western Area are reported individually so vessel specific data is readily available for this area. Given there was interest in making no assumptions about standardization, but looking at what the data was indicating it was decided to look at the North Sea combined survey index at the individual vessel level as well. While a large combined survey index is obviously more powerful. Once indi-

vidual surveys are merged into a large dataset much of the local spatial and temporal variability will be smoothed out and hard to resolve should it exist.

As data in the North Sea are combined across countries, construction of separate national indices proved more problematic as links between traditional survey managers and traditional survey data users (assessment folk) varied greatly. The next logical source then was the ICES database DATRAS.

DATRAS is configured to produce a series of data products, which for the North Sea is a combined index, but in addition will provide the ingredients to construct separate national indices manually. As can be seen in the in Table 5.1., when the index constructed from raw survey data provided by one North Sea survey was compared to that constructed from DATRAS CPUE at Age data there were some observed differences. Initial numbers at length and numbers at age were identical, but in the raising of numbers at length to catch number at age (CNAA) DATRAS seems to use a combined age length key (ALK). Therefore numbers are allocated differently to different age classes, but the sum of all fish in the catch at age data are essentially equal between both outputs.

Table 5.1. Haddock numbers at age from one of the North Sea Surveys for 2007. Indices constructed from original data is compared to those constructed from DATRAS CPUE at age as well as from the Exchange Format. While difference in CNAA is greater for the CPUE input. the total number from the Exchange format actually differ more starkly. All number standardised to 60min.

	AGE_0	AGE_1	AGE_2	AGE_3	AGE_4	AGE_5	AGE_6	TOTAL NO
Raw Data	514.0	1531.1	2750.9	30.1	72.1	11.3	10.3	4920
CPUE Age	501.9	1484.4	2811.6	65.6	32.2	3.8	19.5	4919
% diff	-2.4	-3.1	2.2	54.0	-124.1	-196.8	47.0	
Exchange	524.4	1579.1	2703.3	30.1	71.4	11.3	10.3	4930
% diff	2.0	3.0	-1.8	0.0	-1.0	0.0	0.0	

The same procedure was done for the raw data exchange format. Not surprisingly the CNAA matched well (within rounding errors) with the raw data index, but differed somewhat from both the Raw and CPUE in terms of the total sum of all CNAA.

It must be emphasised that these are initial findings and may reflect some inexperience in using the DATRAS extraction modules, but will be teased out further in a subsequent working document to follow.

For expediency, to get a standard dataset for subsequent data presentation the individual and combined indices for the North Sea were constructed from the CPUE At Age Per Haul output from DATRAS. Those for the Western Area were provided directly by the survey leaders.

5.3 Visualisation of Survey Time Series

The underlying objective of the IBTS co-ordinated surveys is largely to produce age structured relative indices of abundance for commercially exploited fish stocks. Assuming natural and fishing mortality are reasonably consistent. An age structured index should give some prediction of what proportion of fish of a certain age class this year will be present in the catch the following year. This is invariably more pro-

nounced for the younger more abundant cohorts, but a survey's ability to predict year class strength between years is generally referred to as internal its consistency.

While there is no formal analysis required, there are a number of useful approaches to visualising the CNAA data to see the surveys ability to track cohorts. These again were largely detailed in the 2008 IBTSWG report. We will present a number of these plot types below using example indices from the North Sea and Western Area in sequence.

In Figure 5.1.a we have a plot of log mean standardized index by year class. All surveys are dominated by the strong 1999 year class, including the combined index. This is illustrated by the peak above the relevant year class on the x-axis showing this cohort has remained a significant proportion of the annual catch since it appeared. A second strong recruitment and subsequent cohort is clear in 2005. However this is less pronounced in the Norwegian and German surveys. All surveys except for Sweden (in the Baltic area) and the combined index appear to indicate a year of low of recruitment in 2001. Sweden and Germany seem to have somewhat weak internal consistency in the years between the strong 1999/2005 year classes. It should be noted that 2009 data was not available for Norway so the most recent and significant pulse of 0-group fish is missing for this area.

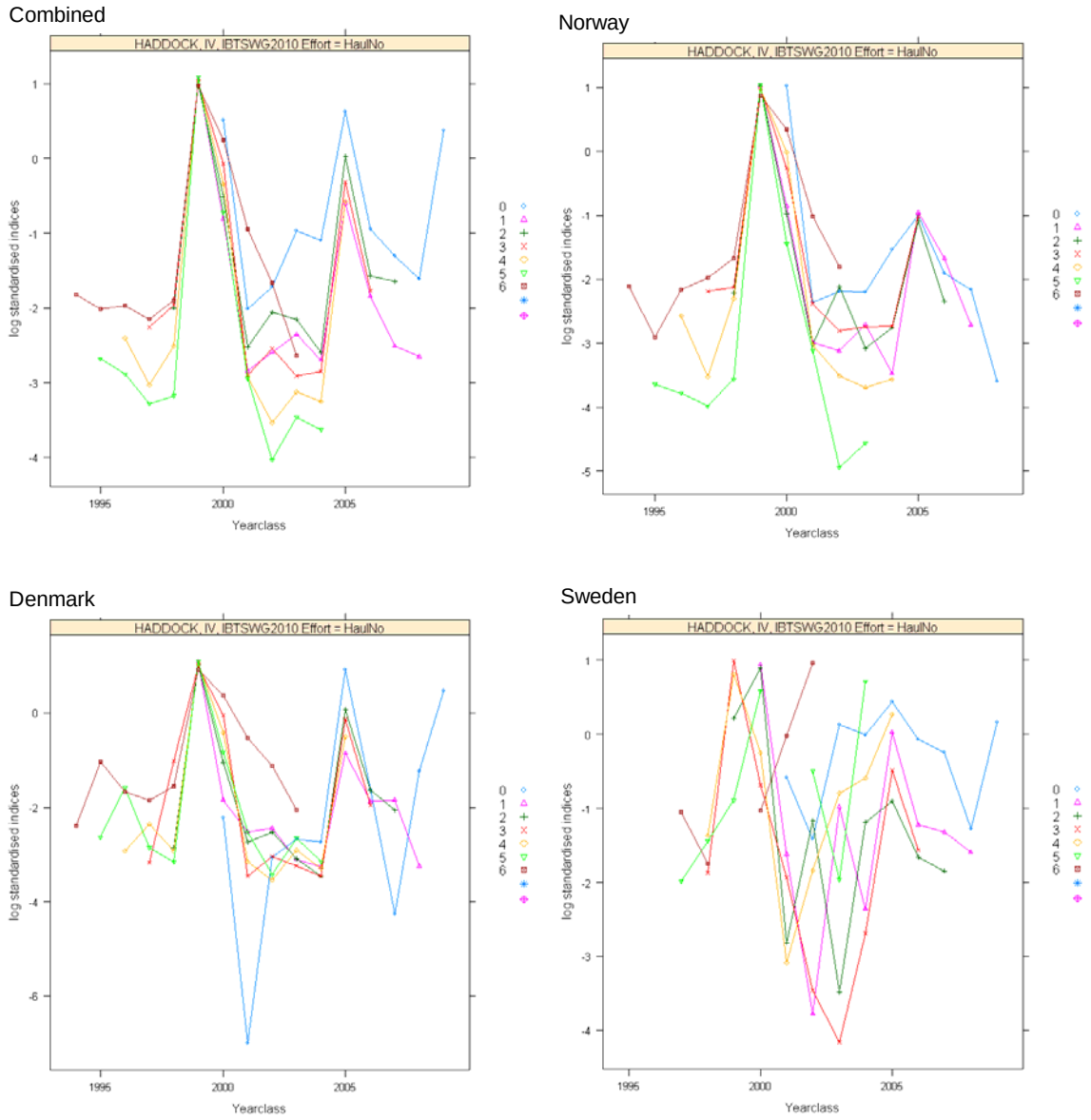


Figure 5.1.a. Log mean-standardized Indices for haddock in the North Sea. First panel shows the combined index and remaining panels are labelled by country. Tightly grouped peaks or troughs above a particular year –class on the x-axis indicates a consistently strong or weak year class is being well tracked by the survey. Consistency across year classes therefore indicates good internal consistency for the survey for this species.

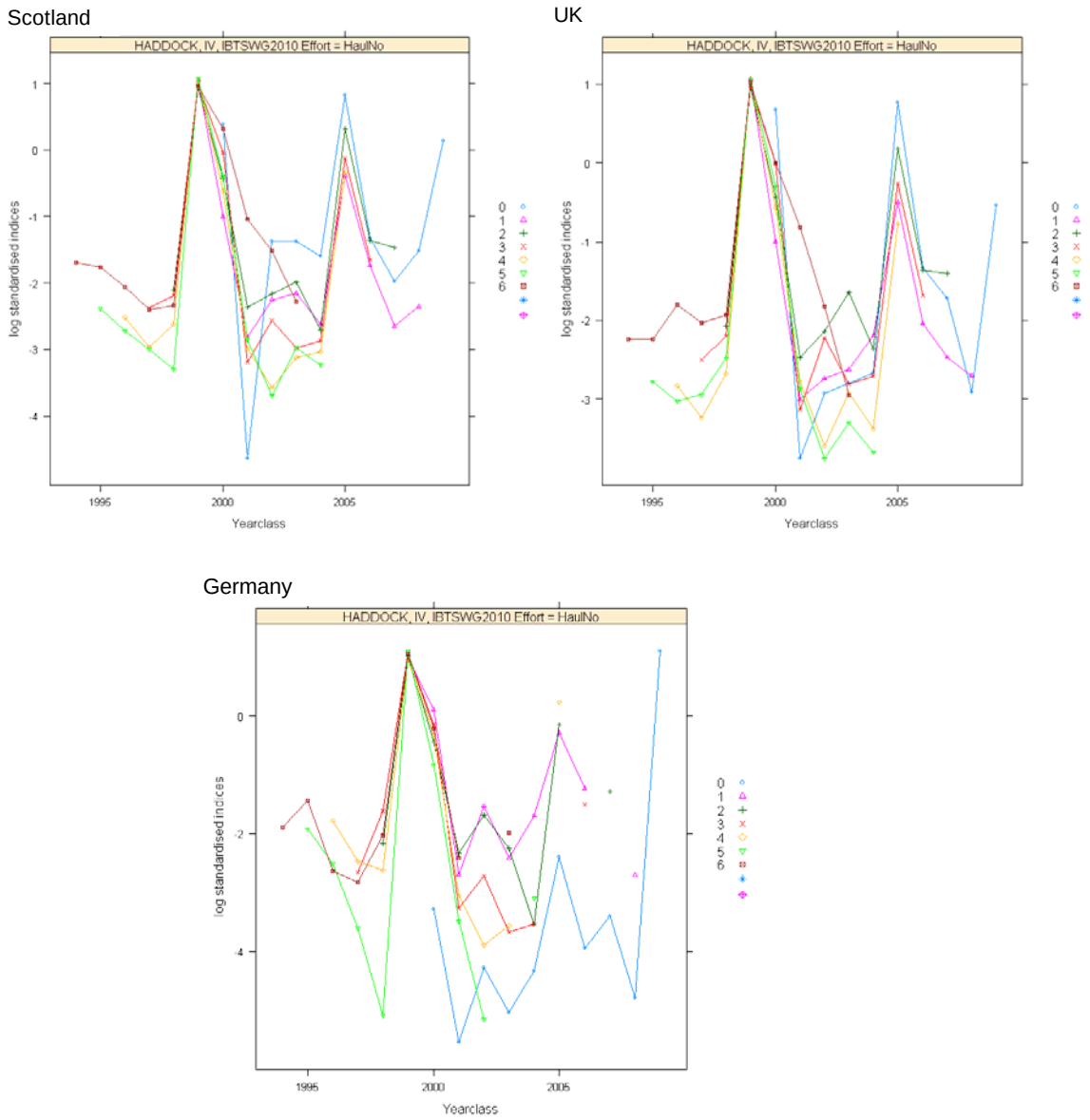


Figure 5.1.a contd-. Log mean-standardized Indices for haddock in the North Sea.

Moving to the Western Area Fig 5.1.b presents the same figure as above for France in the Celtic Sea and Ireland in VIIg exclusively. Both surveys show similar patterns with generally strong year classes early on in the time series, particularly 2001–2003. Improved internal consistency appears evident in the Irish index post 2003, which coincides with the current survey series initiated in 2003 after delivery of a new, more capable research vessel. Strong recruitment is also seen for 2009 in the Irish survey as a strong 0-goup. This difference in indices may partly be explained as different coverage between the two surveys and may reflect some spatial heterogeneity in the stock structure. The Irish survey in particular would have a comparatively higher number of shallow coastal stations in VIIg as well as on the established commercial fishing grounds "the Smalls".

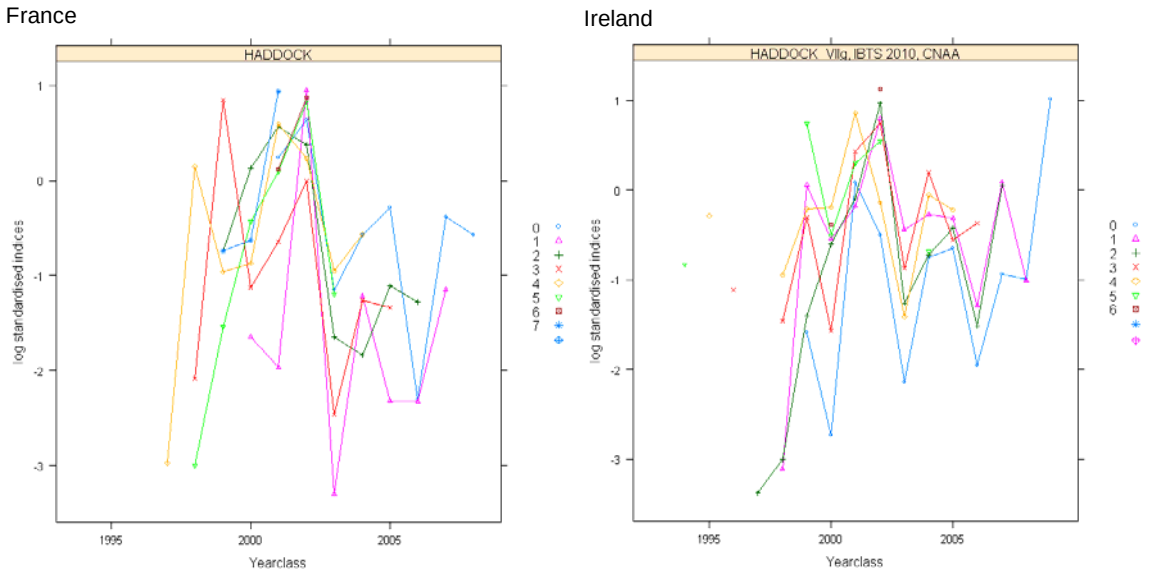


Figure 5.1.b. Log mean-standardized Indices for haddock in the NE Atlantic (Western Area). Strong year class around 2002 is evident in both surveys, with a further pulse of 0-group fish in 2009 in the Irish survey.

Plotting the same Log mean-standardized indices by year gives Figure 5.2.a for the North Sea. Here the strong 1999 year class is evident in all surveys as a peak of 1 year olds in 2000, 2 year olds in 2001 and so on. There seems to be a fall off in the 1999 year class in 2003 for the Swedish survey (Figure 5.2.a) which we might expect as a reasonable peak of 3 year old fish for that year, while 4 year old fish then appear as a significant component of the catch the following year. Whether this is a migration effect in the Baltic, an ageing issue or data error will be looked into subsequently as part of the follow up review document, across all surveys.

In contrast, Sweden shows a consistently strong 0-group signal whereas they are poorly represented in the German survey despite it tracking the '99 year class well.

Recruitment shows a time series dip for 2003 across all surveys with a pulse of 0-group fish in the most recent year (again Norway's data is truncated after 2008).

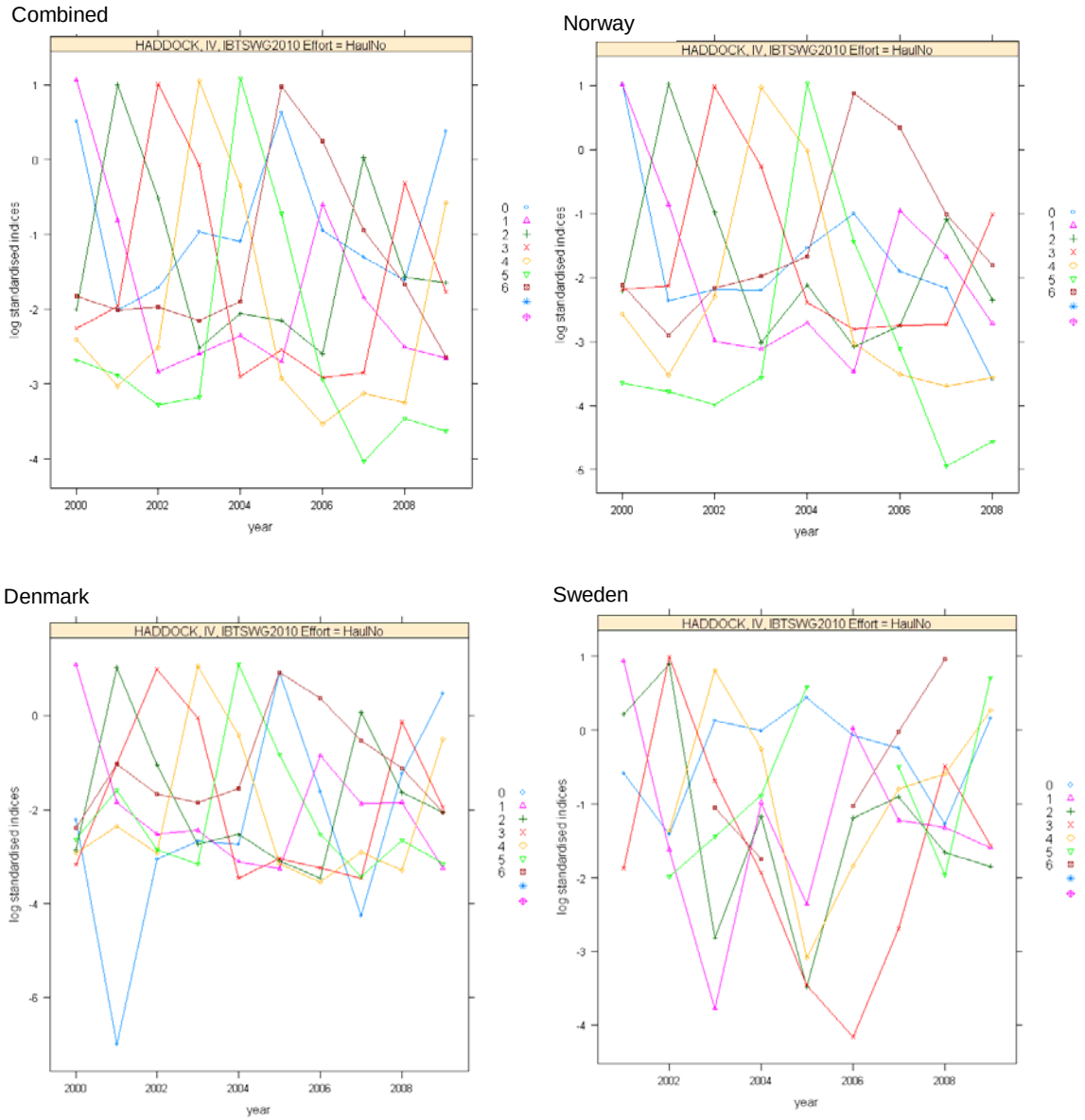


Figure 5.2.a. Log mean-standardized indices by year for NS Area. Strong year classes, such as 1999, can ideally be seen as a peak of 1-year fish in 2000, 2-year fish 2001 and so on.

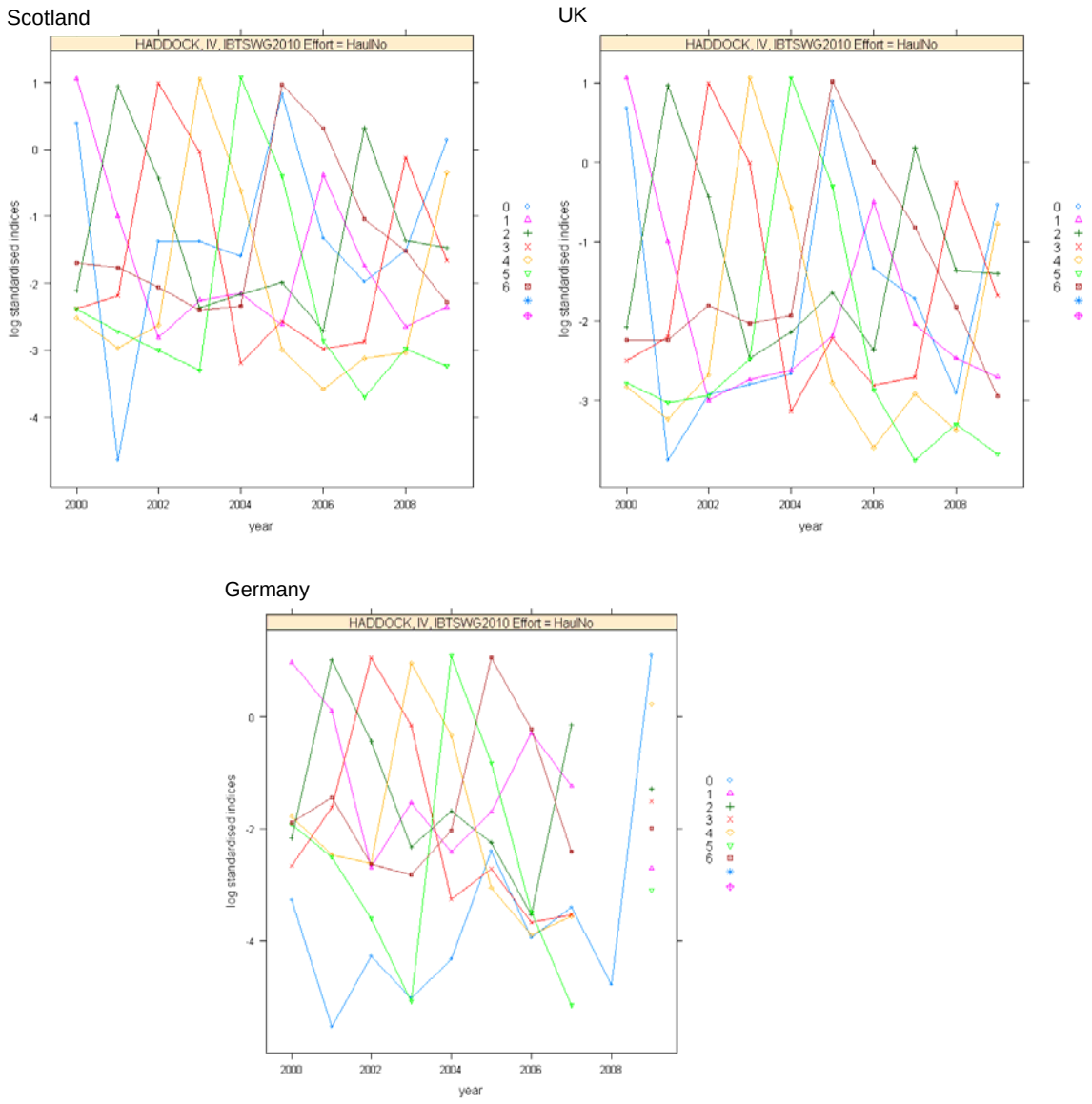


Figure 5.2.a contd- Log mean-standardized indices by year for NS Area.

For the Western Area the French survey (EVHOE) suggests quite a noisy picture for the Celtic Sea overall, while that for VIIg only is more consistent (Figure 5.2.b). Both show the 2002 year class as a strong cohort of 1 year olds in 2003. The 2003 year class is virtually absent as 1 year olds from the EVHOE survey in 2004, although 0-group fish were a relatively stronger catch component the previous year, than in the Irish survey. Again there may be spatial factors that can be investigated further.

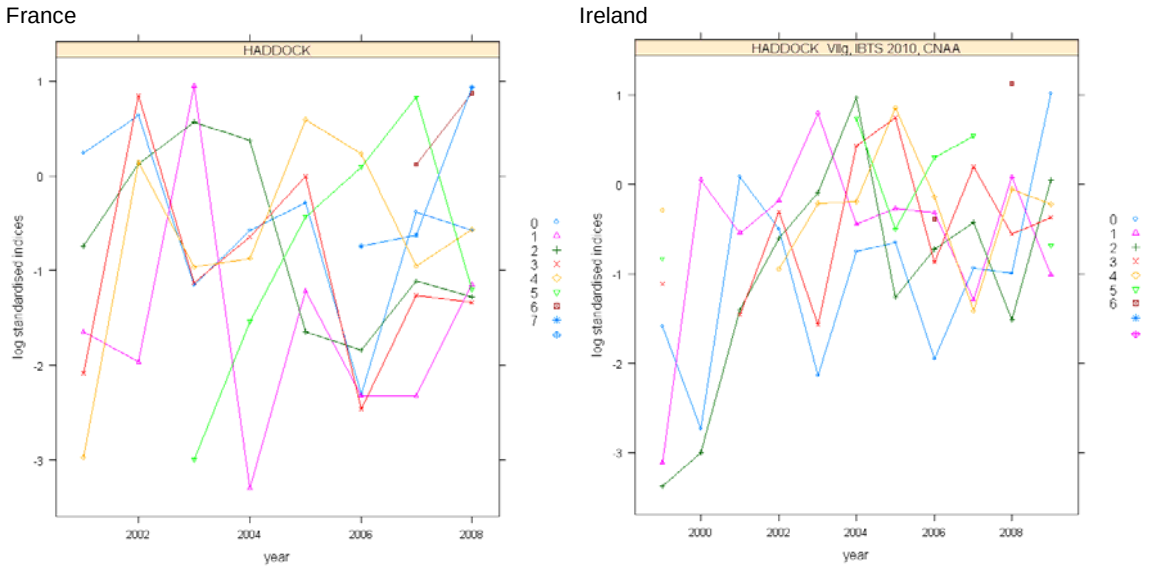


Figure 5.2.b Log mean-standardized indices by year for NE Atlantic Area.

Where catchability and Total Mortality 'Z' (Z = natural (M) and fishing (F) mortality) are constant, cohorts should decline predictably over time. The slope of the log index curves (Figure 5.3.a-b) give a proxy for total mortality, but will obviously be confounded by changes in catchability should that be an issue.

The combined North Sea index (Figure 5.3.a) shows pretty consistent exploitation patterns in year classes over time. Good consistent parallel negative sloping lines and limited hooks (hooks suggest more fish were caught in year +1 than were estimated in the stock the previous year). As abundance reduces greatly for older ages and length at age increasingly overlaps, this is to be expected towards the end of the life of a year class.

Regular upward hooks at the start of several year classes for Denmark, UK-England and Wales and Scotland reflect these surveys trend for a low number of 0-group fish initially with strong year classes appearing first as 1-year olds.

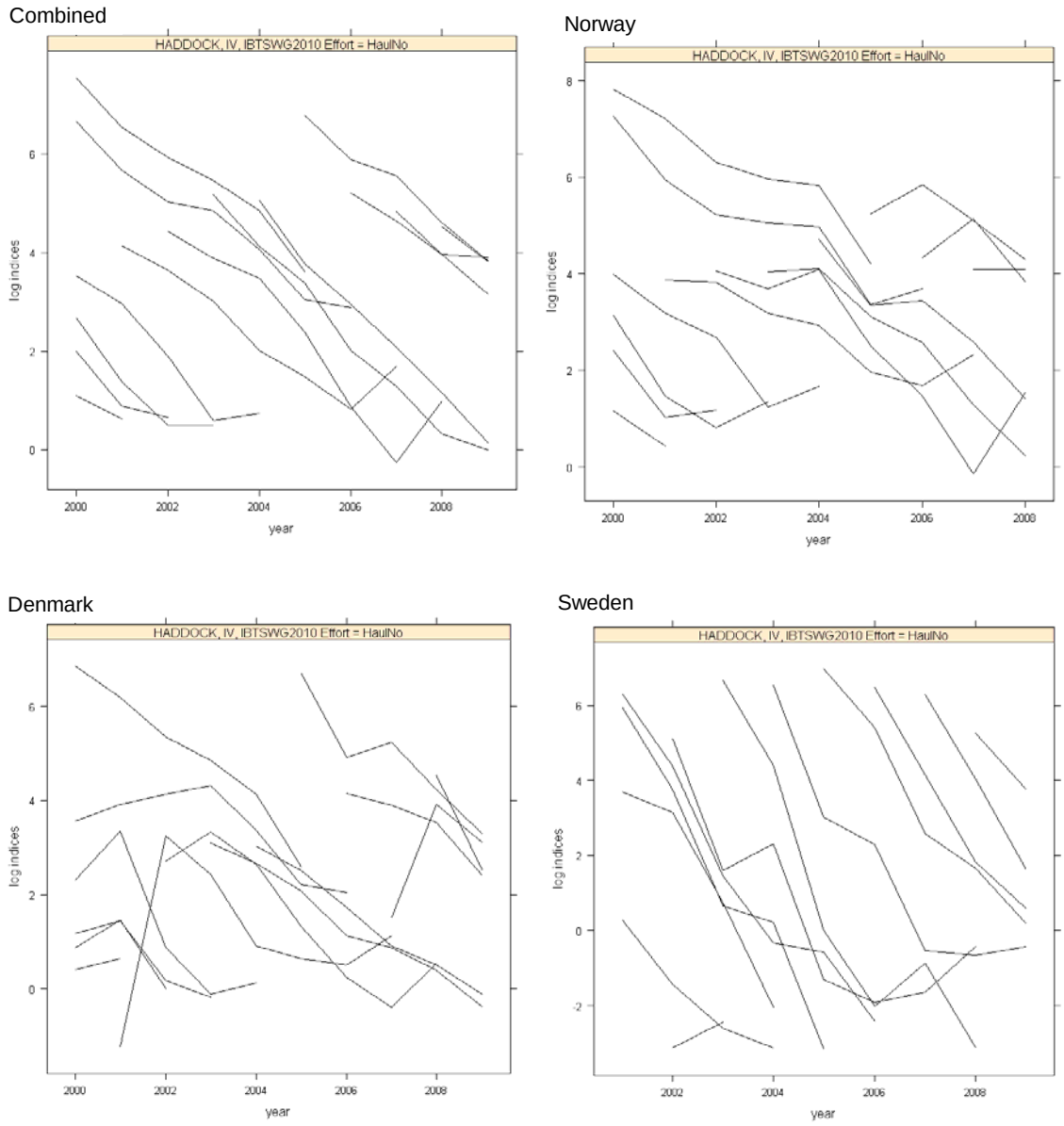


Figure 5.3.a. Log index by age for Haddock in the North Sea. Parallel negative sloping lines suggest stable and consistent catchability. Assuming catchability is constant this slope is then a proxy for total mortality (Z) (i.e. natural and fishing mortality M + F respectively). All track the 1999 year class well, ending in 2005 as the 6+ group fish. A number of surveys can be seen to only see full recruitment as a peak of 1+ fish, while 0-group are relatively weak, indicated by the upward hooks at the start of the mortality (catchability) curves.

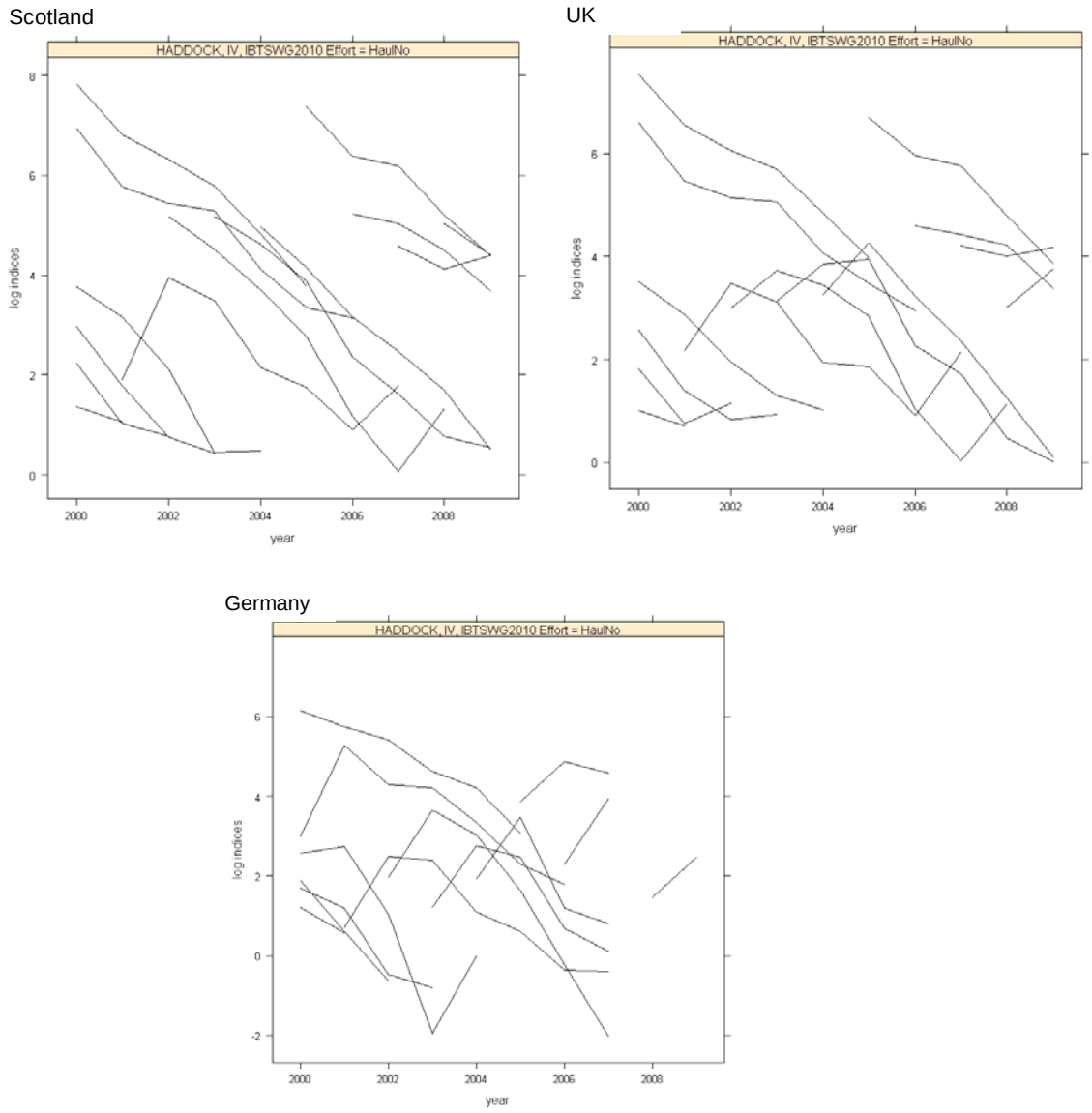


Figure 5.3.a contd-. Log index by age for Haddock in the North.

The slope of catchability/mortality curves for the Irish survey are slightly more negative than for EVHOE (Figure 5.3.b), suggesting higher exploitation in that area compared to the North Sea. However both surveys show good internal consistency.

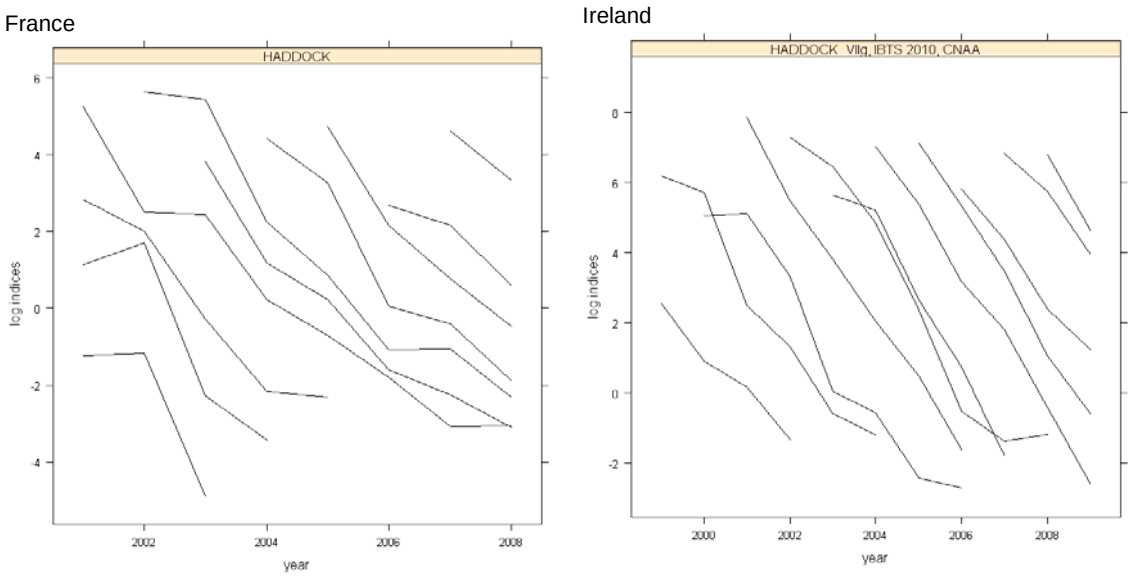


Figure 5.3.b. Log index by age for Haddock in the NE Atlantic Area. Both surveys show a consistent predictable decline over time.

To look in more detailed at the survey's ability to track cohorts from one year to the following year we can look at a matrix of paired years (Fig 5.4.a-b) where age X in year Y is plotted against age X+n in year Y+n. A strong positive slope between year Y vs year Y+n indicates a good ability for the survey to estimate the catch of this year class in the following year. Confidence bands were not available in this version of the code, but precision can be estimated visually by the spread of data points about around fitted line. Points tightly packed around the line indicate good confidence in the modelled line.

The combined index (Fig 5.4.a) shows a strong positive correlation across essentially all years and age classes, even where these are non-neighbouring. The Swedish survey has very strong positive correlation in the younger year classes. as indicated in previous Figures above, weakening in the older ages or even negative.

Overall the trends are positive across surveys with some performing better for younger age classes while others have greater precision for the older ages.

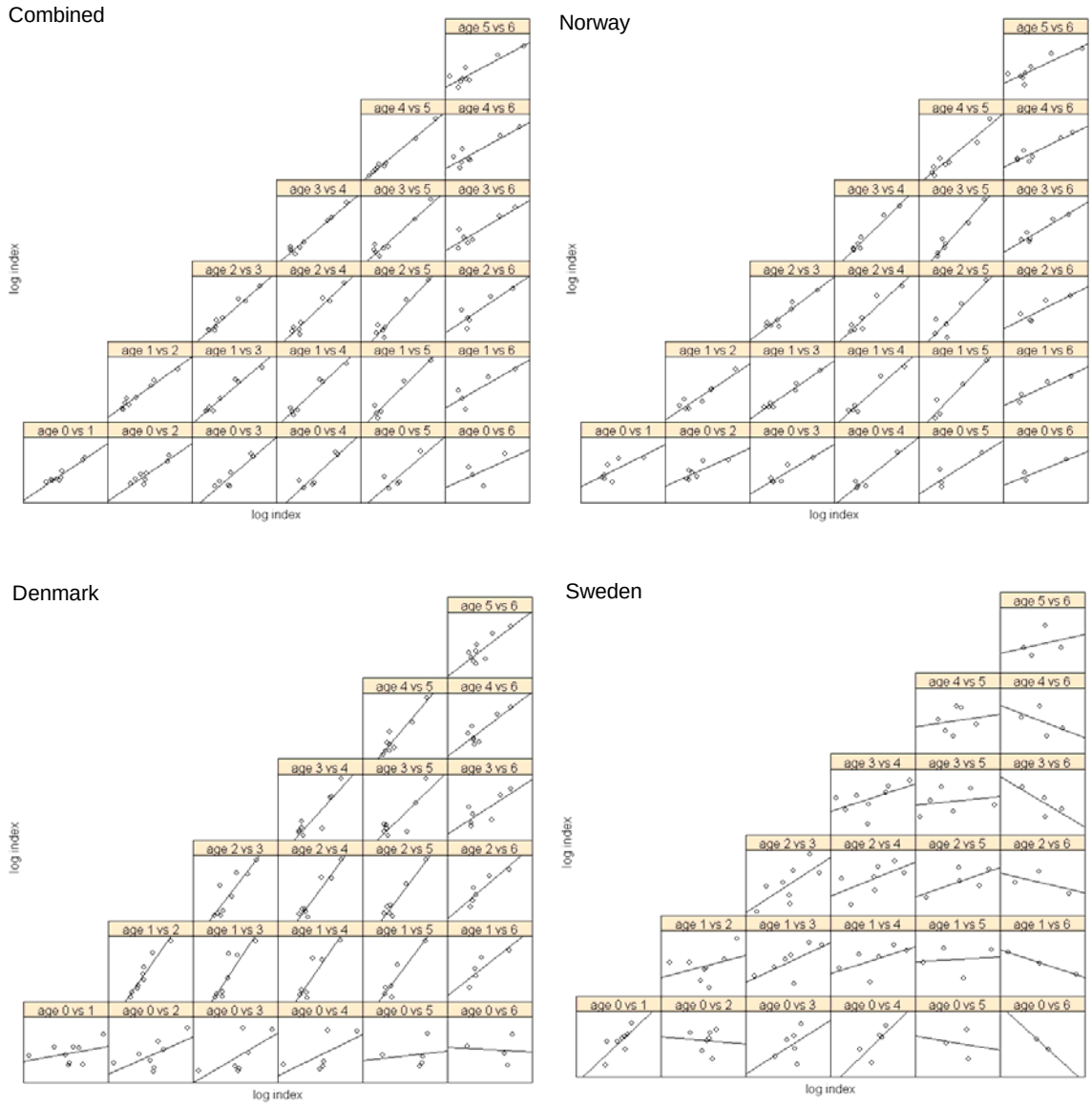


Figure 5.4.a. Scatter matrix plots of mean-standardized age by paired years for the North Sea Area. Positive slope indicates a positive correlation between abundance at Age X in Year Y with Age X+n in Year Y+n. Tightly clustered data points around the line would indicate a good fit of the overall trend to the data.

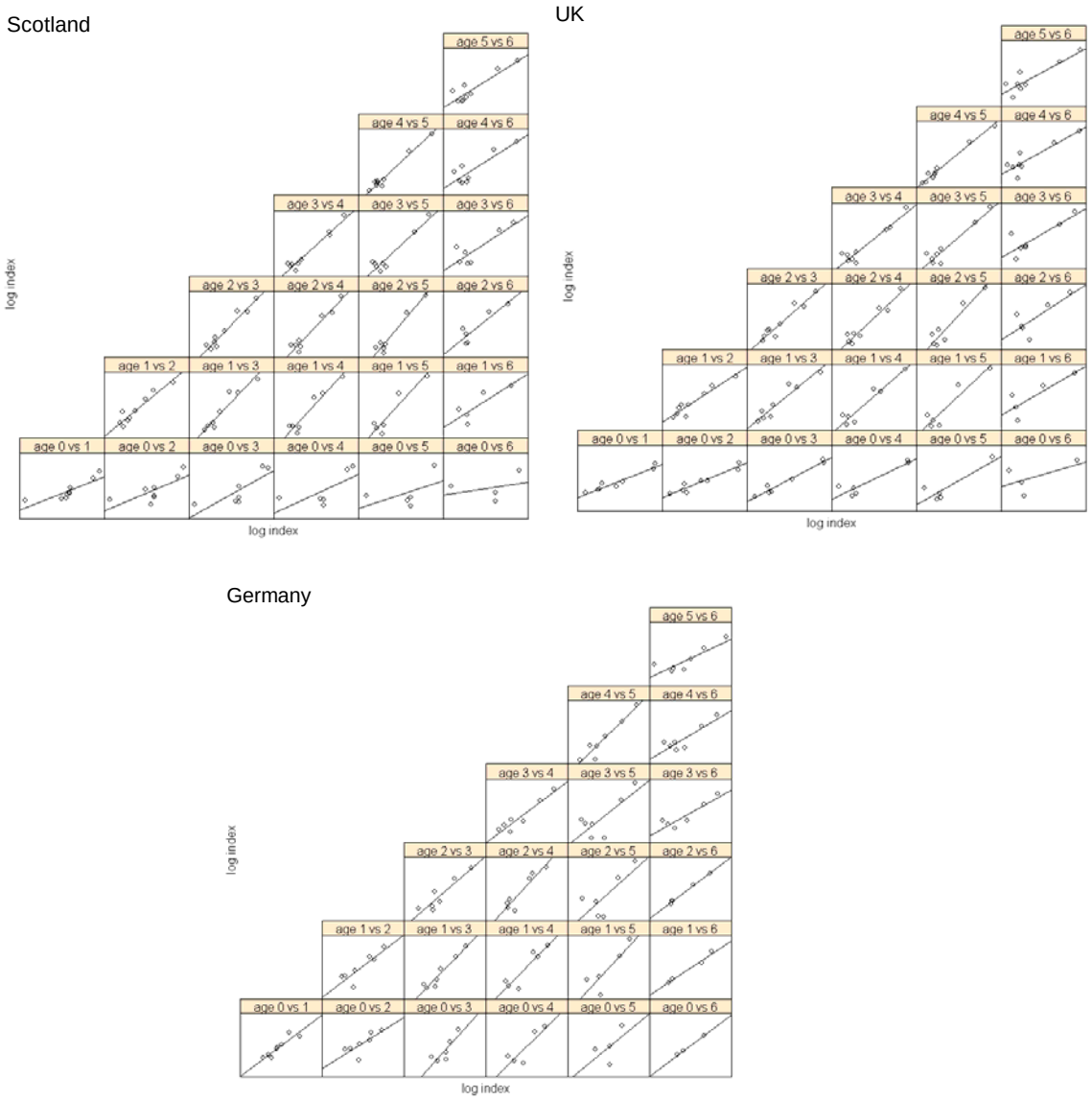


Figure 5.4.a contd-. Scatter matrix plots of mean-standardized age by paired years for the North Sea Area.

In the Western Area there is weaker cohort tracking between paired years, gradually becoming neutral and ultimately negative where paired data is minimal in older age classes (Figure 5.4.b). Internal consistency seems reasonable up to age 3 for both surveys, with evidence of poor consistency at 3 – 4yrs for EVHOE, but with improvement again at 4 -5yrs. Again, this index as presented covers a very large area and spatial patterns of stock distribution at age will need to be looked at.

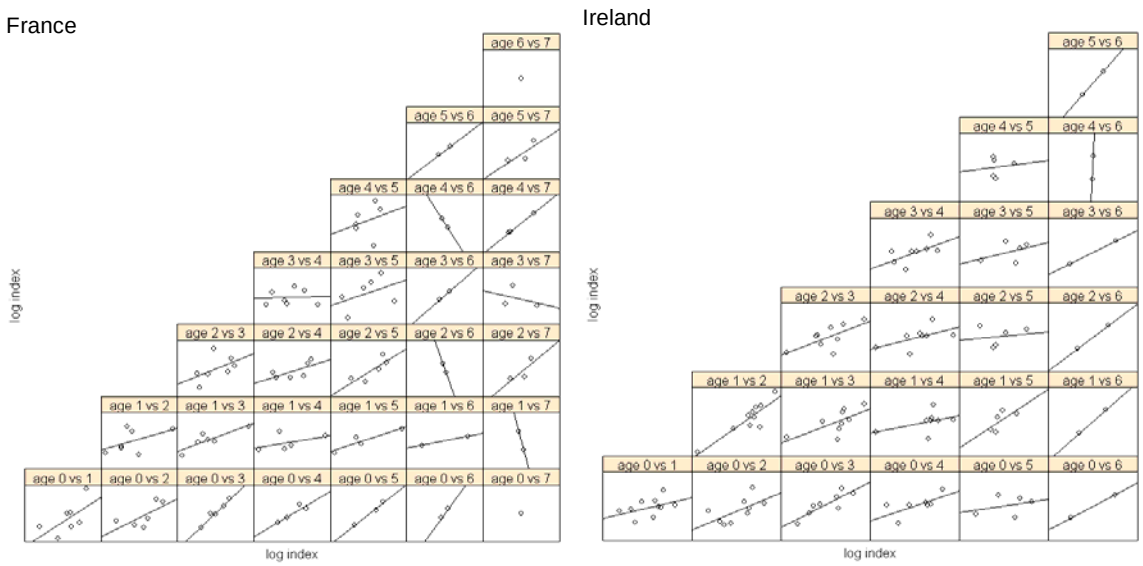


Figure 5.4.b. Scatter matrix plots of mean-standardized age by paired years for the Western Area. Positive slope indicates a positive correlation between abundance at Age X in Year Y with Age X+n in Year Y+n. Tightly clustered data points around the line would indicate a good fit of the overall trend to the data.

Another useful way of visualising cohort tracking is bubble plots of proportions at age across years. These are presented in Figure 5.5.a-b and indicate the proportion of the standardized catch for each year accounted for by each age class. Light grey circles indicate above average for that year, while large black circles indicate a significantly below average year class.

In all but the Swedish survey the strong 1999 and 2005 year classes are clearly tracked through the survey (Figure 5.5.a). There is however some possible "leaking" of the '99 year class in to an older age towards the end of its life in the Scottish. Danish and to some degree UK-England survey's in 2006. This in turn shows up clearly in the combined index although not clear across remaining surveys.

Why there is a breakdown in internal consistency for haddock in the Baltic survey needs to be confirmed in terms of spatial trends in this area and/or any data issues.

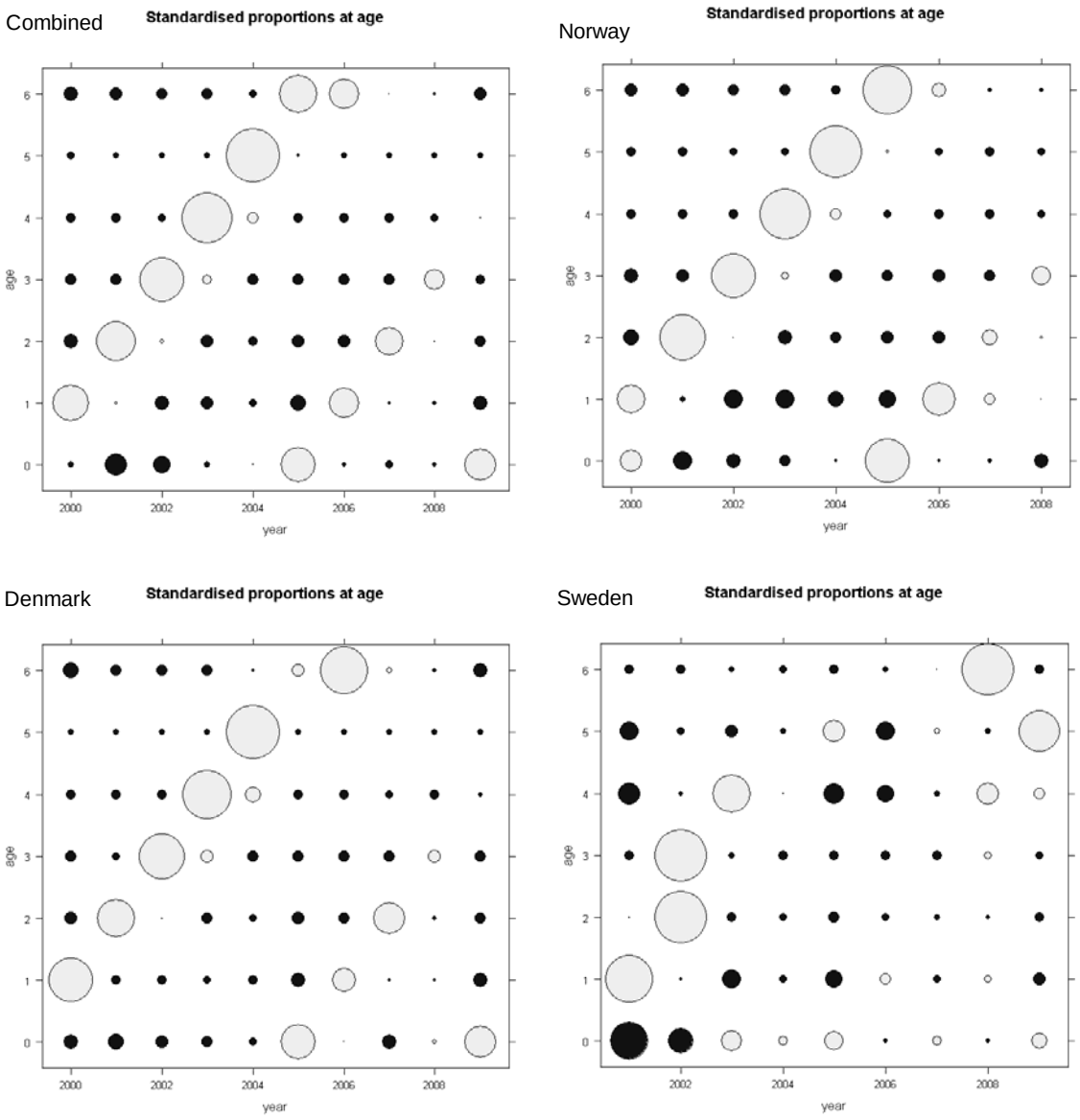


Figure 5.5.a. Bubble plots of proportion at age per year for the North Sea Area. Strong (grey circles) and weak (black circles) can be followed diagonally as they move up through the age classes annually.

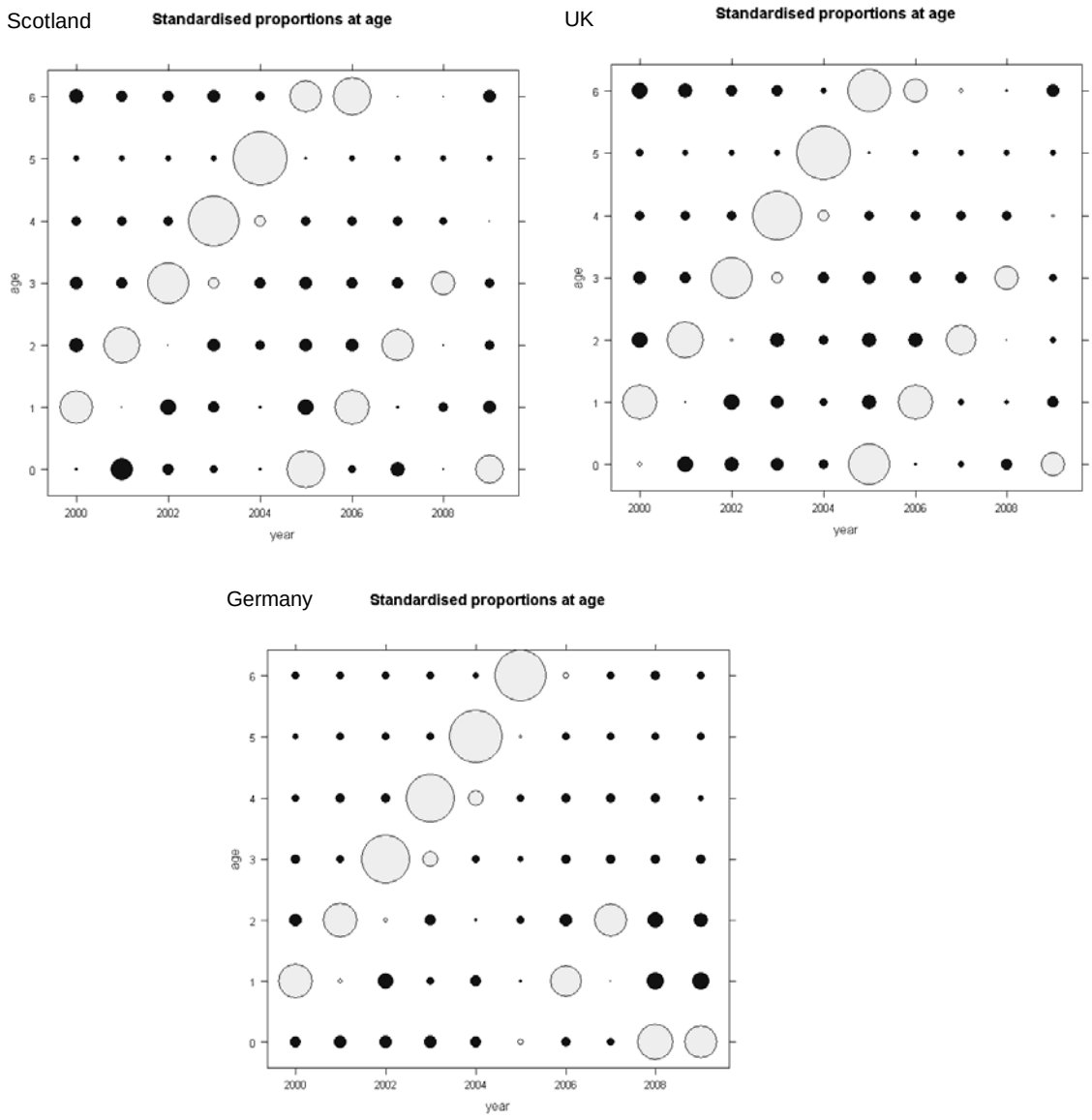


Figure 5.5.a contd-. Bubble plots of proportion at age per year for the North Sea.

Both surveys in the Celtic Sea area (Figure 5.5.b) pick up a strong 2002 year class, but only really as 1-group fish in the following year. The general trend is apparent. but there is evidently some inconsistencies over time, either with the ageing or distribution of the stock, or both.

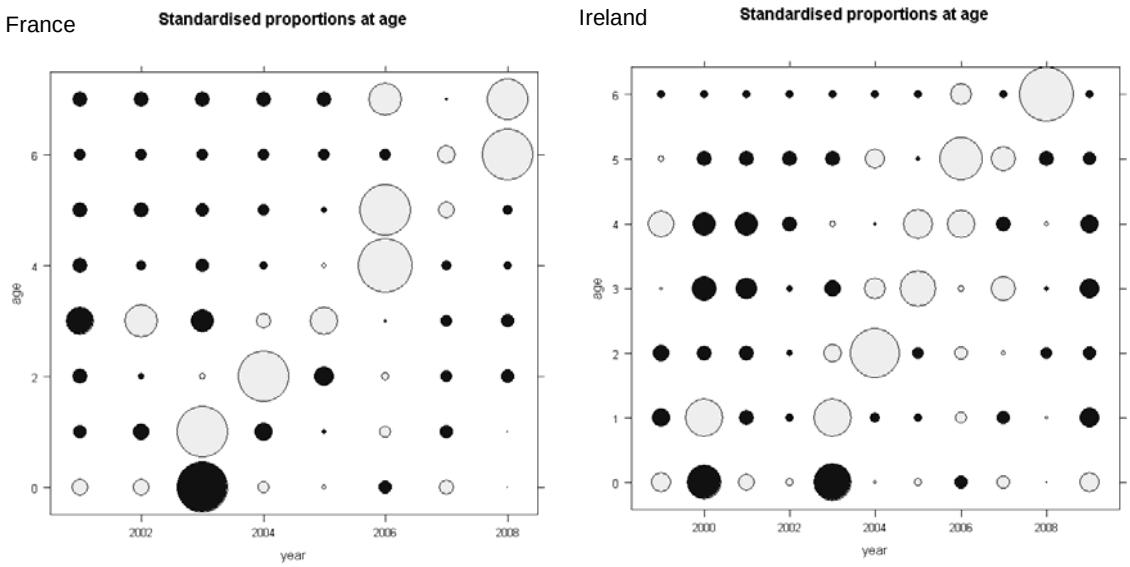


Figure 5.5.b. Bubble plots of proportion at age per year for the Western Area. Strong (grey circles) and weak (black circles) can be followed diagonally as they move up through the age classes annually.

Finally, a convenient way to look at any potential ageing issues is to plot the Age Length Keys (ALK) being used directly on to the length frequency of interest to check for a visual "fit". It is often the case that ALK data may not be available for all lengths and is in general quite variable for older ages. To produce useful plots where missing and variable older ages can be predicted with some confidence the work of Gerritsen *et al.*, (2006) has been followed here with just a few example surveys. Multinomial logistic models are used to construct the ALK distribution curves.

Figure 5.6 presents the modelled combined ALK for the North Sea from 2008 in relation to the combined length frequency (LF) for the same year. Good correlation can be seen between the ALK and LF modes for Age-1 and a reasonably good fit also for Ages -1 and 2, although a slight offset is visible. Later ages appear less distinct and tend to merge, particularly from 3+ years.

Looking at the fit of the combined ALK to the single German survey LF we can see the ALK seems appropriate, even though there is a similar offset between modes for Age-2 fish (Figure 5.7). This offset is being driven presumably by other survey data. Poor levels of 0-group fish highlighted earlier are evident here as low abundance of small size classes in the survey specific LF.

As we move to the French and Irish surveys in the Western Area in Figure 5.8 and Figure 5.9 respectively, we can see a significant increase in length at age. There is almost a 10cm shift in mean length of 1-year old fish from about 21cm in the North Sea to 30–31cm in the NE Atlantic. The large numbers of young fish make modes in the LF difficult to discern on the current scale beyond Age 1. This makes it obviously difficult to comment for the older ages, but there is obviously good agreement between ALK and LF for younger ages. The Binomial distribution of 0-group fish either side of about 15cm is approximately where the mode for this year class is in the Irish survey and seems likely to be a data error.

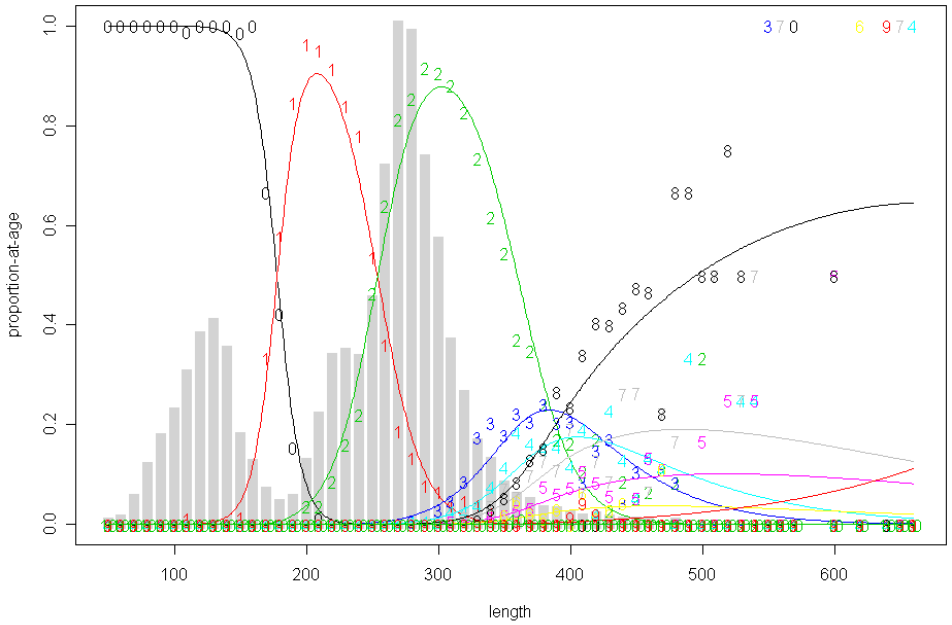


Figure 5.6. Modelled combined ALK for the North Sea from 2008 (solid lines) in relation to the combined length frequency (shaded bars) for the same year. Length is in mm. Individual age samples are plotted (as the corresponding age number) in relation to the predicted line. Ideally modes for both ALK and LF should correspond.

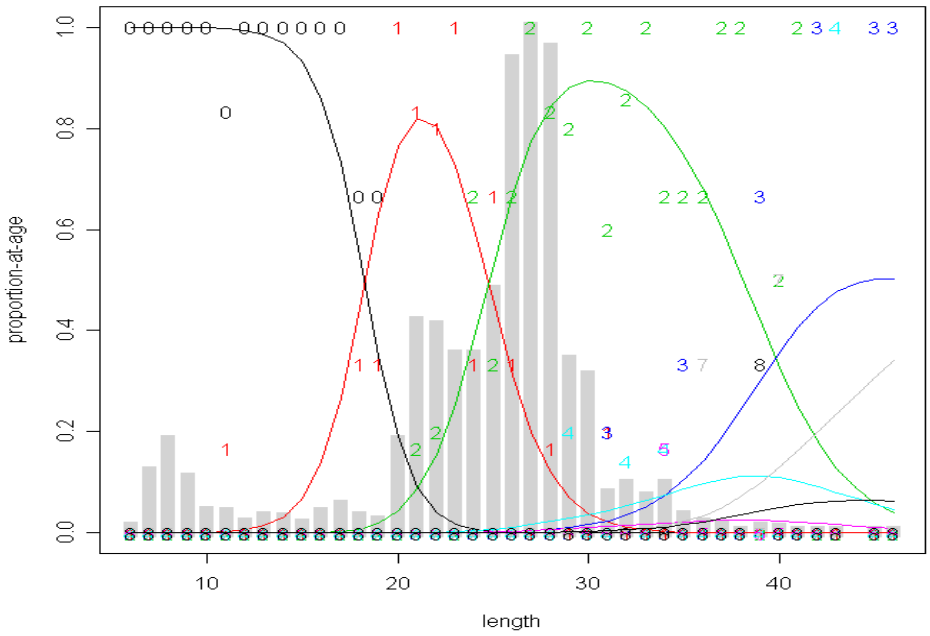


Figure 5.7. Modelled combined ALK for the German survey from 2007 (solid lines) in relation to the combined length frequency (shaded bars) for the same year. Length is in cm.

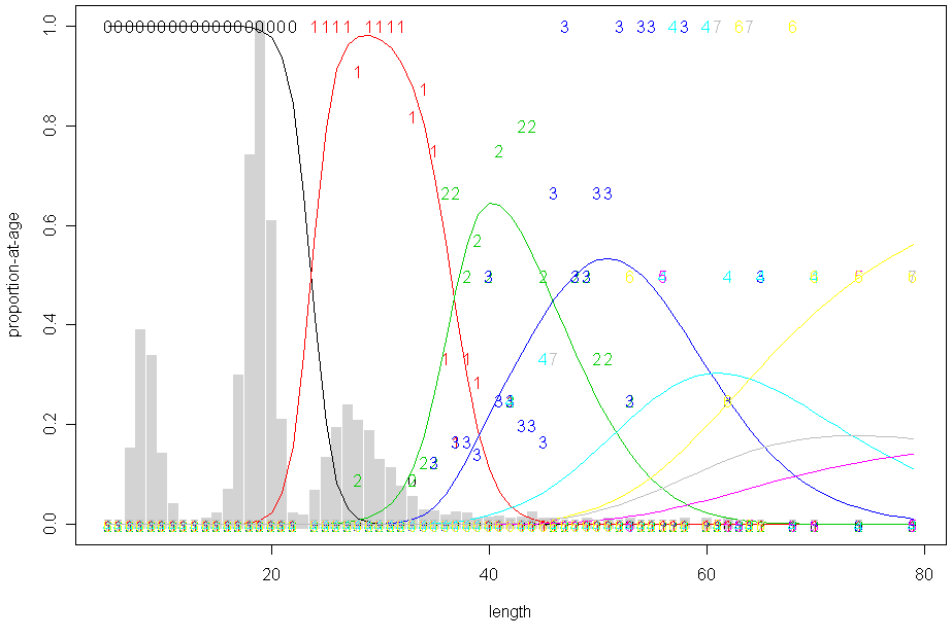


Figure 5.8. Modelled combined ALK for the French survey from 2008 (solid lines) in relation to the combined length frequency (shaded bars) for the same year. Length is in cm.

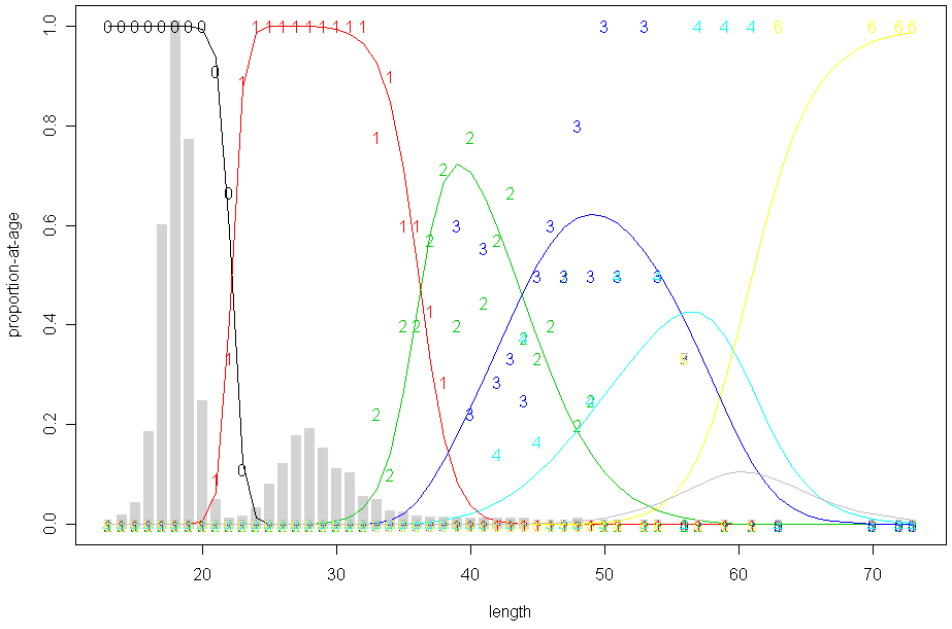


Figure 5.9. Modelled combined ALK for the Irish survey from 2008 (solid lines) in relation to the combined length frequency (shaded bars) for the same year. Length is in cm.

5.4 Discussion

The underlying objective of the IBTS co-ordinated surveys is to produce age structured relative indices of abundance for commercially exploited fish stocks. In particular for the younger age classes which are not present in commercial catch data. While standardizing effort and catch efficiency is a core part of survey coordination, the

critical end factor is to be able to track cohorts through the time series in order to infer exploitation rates.

Some indices were not readily available and will be incorporated into follow up work. Some checks and clarification are also required to address a few data anomalies. However, in the above preliminary exploratory review we have highlighted a number of issues for further investigation.

- A review of the DATRAS data products and documentation would be very beneficial. For example even as an "experienced" survey data user/provider it was easy to make an analytical mistake in this type of analysis where data for length is stored in mm while all other surveys use cm. When using the exchange file format as a data source one needs to know to check the LengthCode and what it means to avoid merging data of different units. Documentation could of course take care of a lot of this. Critical however is an understanding of any mismatches between input and output data and possibly some test data sets could be set up.
- Individual surveys show specific characteristics. Whether due to fish availability in a specific area or other survey specific technical parameters. the surveys are not identical in the components of haddock stock they are sampling in this example. While combined data is a powerful management tool. caution should evidently be used in assuming vessels are immediately inter-changeable or dropped samples in one area can be supplemented by those in another. Gerritsen *et al*., (2006) has shown that significant bias in haddock numbers at age can occur when not applying strata specific ALK's even within sub-areas of the Irish Groundfish Survey. Sweden appears to have a consistently high level of 0-group haddock while in the inverse is the case for the German index. In 2008 for example German survey vessel problems resulted in loss of a significant number of stations and therefore the relative proportion of 0-group fish in the combined index one would expect to increase if no survey specific weighting were used. While this example is unlikely to be critical to such a large index, knowing these characteristics can provide a useful health check prior to explainable variance being merged and confounded in the typical noise of most fisheries data sets.

The IBTSWG has a core role in the standardization of survey effort and catchability to facilitate provision of useful relative abundance indices. As we and other expert groups have alluded to, change can sometimes be unavoidable. Separating the impact of technical changes from natural changes in abundance can be complex and also very costly. In addition, where species are difficult to age or stocks are not sufficiently available for trawl survey sampling, then a law of diminishing returns comes into play. Beyond a certain point, even microscopic standardization of data collection can't improve the sample size and data precision of a rare species for example.

Ongoing review of survey indices and the impact of changes or indeed natural abundance in the stock is a useful way to quantify the impact and source of change. Whether change is foreseen or accidental, natural or human, simple techniques like those above are a valuable way to communicate with survey managers and survey data users alike how well our data is meeting our critical survey assumptions.

5.5 References

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6 Gear performance (ToR c)

c) Further examine the quality of gear performance by (i) reviewing the reporting procedures. and (ii) analyze net geometry readings and warp out to depth ratio to evaluate changes; the standardized gear settings seem to differ among countries. therefore reporting protocols for trawl, vessel and environmental parameters have to be improved and detected changes in the settings have to be evaluated

6.1 Reviewing the reporting procedures

Gear performance data reported to DATRAS and their consistency have been checked and reviewed, this work has been summarized in Section 9.6 when dealing with data omissions in HH data. Tables in this section (Tables 9.1.6.1–4) summarize data availability regarding: net opening, door spread, distance towed and ground speed registered in DATRAS within the NS-IBTS. Besides some clear outliers regarding net opening and door spread have been noted and it is pointed out that these outliers should be checked and updated to allow comparisons and estimations between the different surveys.

Regarding data reporting, in the update of SGSTS report (Section 10) it is stated that data from gear monitoring systems should be recorded every 30 seconds and a central estimate of the values recorded, either pre-screened mean value or median value are to be reported to DATRAS within the survey HH records, these protocols have also been included as the standard in the revisions of both the IBTS Manual (ICES 2010a) and the IBTS NeAtl Manual (ICES 2010b).

6.2 Analysis of net geometry readings

IBTS provides a major dataset for demersal fish stock assessment. Being an international collaborative survey a basic prerequisite is the standard rigging and deployment of the survey gear. The traditional gear employed by the IBTS surveys is the GOV and while it's application outside of the North Sea area has been problematic its role in standardisation within the North Sea has been key to the production fisheries independent combined indices.

One of the assumptions concerning gear performance is that a standard trawl (GOV here). towed at a standard speed for a set period will sweep (sample) a fixed area of

seabed (Forest and Minnet, 1981). However, it is known that the area swept by a trawl increases with depth towards a limiting value as a result of increased warp length (Carrothers, 1981).

A graph defining the ratio of warp to be deployed at depth is included in the IBTS manual. The length of the warp is a driving factor for the geometry of the gear and therefore affects the opening of the trawl, namely the door spread and the headline height. Obviously this recommended ratio was introduced with the aim of standardizing the swept area in order to calculate combined species-specific abundance indices using data from different countries. In other words, to allow an assumption of a sampling unit (haul) on one vessel would be equivalent to that on another vessel fishing at the same depth.

However, it transpired during recent discussion that over time there has been some deviation in fishing methods. Therefore not all the countries follow this rule and consequently different gear geometry is achieved during the towing of the same area by different vessels. For those countries that are following the established warp ratio the door spread and net opening achieved are widely outside the target ranges also included in the manual. The result is higher door spread and a lower headline height, with the divergence increasing with the depth, compared to the values shown in the manual. Understandably this inability to meet all recommended gear parameters simultaneously is likely to have driven much of the modification in deployment methods as gear, vessels and personnel have changed and evolved.

Countries that use shorter wire length than recommended (e.g. Scotland) show instead values of door spread and headline height within the ranges shown in the manual (Figures 6.1. 6.2 and 6.3).

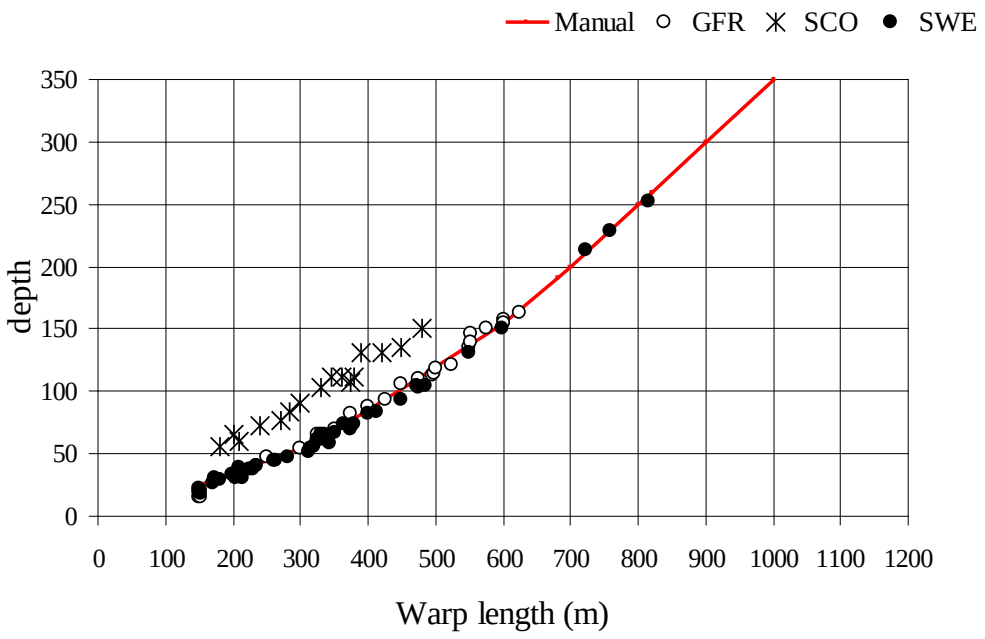

Figure 6.1. Plot of warp out/ depth ratio obtained by Germany. Scotland and Sweden in 2009 compared with the recommended one in the IBTS manual.

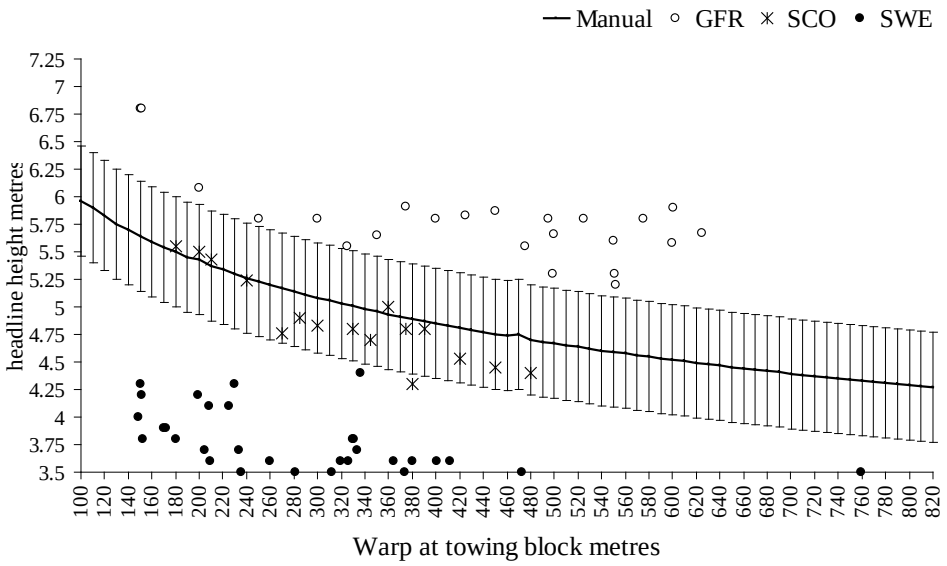

Figure 6.2. Plot of warp out/ headline height obtained by Germany. Scotland and Sweden in 2009 compared with the recommended one in the IBTS manual.

This issue was widely discussed during the IBTSWG2010 and it was agreed that gear net geometry, consistent among countries and year, should be the first aim and the warp/depth ratio should be adjusted consequently during the survey. Consequently the graph related to warp out/depth ratio although still included in the manual ought to be used as guide for the initial values when shooting the net, but then net geometry has to be the first aim as stated above. These graphs will be updated when enough information to produce new ones is available.

Furthermore the manual requires the use of two different sweep lengths at different depth (60 meters down to 70 meters and 110 meters thereafter) but only during the first quarter survey, while a sweep length of 60 meters ought to be used during the other quarters throughout the survey area. Even in this case discrepancies exist in the application of this rule by different countries (Table 1), undermining the standard deployment of the gear.

Table 6.1. The table shows which country change the sweep length for depths over 70 meters in the first quarter of the year as recommended in the manual and since when this recommendation as been followed.

Year	Denmark	England	France	Germany	Netherlands	Norway	Scotland	Sweden
1985	yes	yes	yes		yes	yes	no	yes
1986	yes	yes	yes		yes	yes	yes	yes
1987	yes	yes	yes		yes	yes	yes	yes
1988	yes	yes	yes		yes	yes	no	yes
1989	yes	yes	yes		yes	yes	no	yes
1990	yes	yes	yes		no	yes	no	yes
1991	yes	no	yes		yes	yes	yes	yes
1992	yes	no	yes		yes	yes	no	yes
1993	yes	no	no		no	yes	no	yes
1994	yes	no	no		no	yes	no	yes
1995	yes	no	no		no	yes	no	yes
1996	yes	no	no		no	yes	no	yes
1997	yes	no	no		no	yes	no	yes
1998	yes	no	no		no	yes	no	yes
1999	yes	no	no		no	yes	no	yes
2000	yes	no	no		no	yes	no	yes
2001	yes	no	no		no	yes	no	yes
2002	yes	no	no		no	yes	no	yes
2003	yes	no	no		no	yes	no	yes
2004	yes	no	no	yes	no	yes	no	yes
2005	yes	no	no	yes	no	yes	no	yes
2006	yes	x	no	yes	no	yes	no	yes
2007	yes	x	no	yes	no	yes	no	yes
2008	yes	x	no	yes	no	yes	no	yes
2009	yes	x	no	yes	no	yes	no	yes
2010	yes	x	no	yes	no	yes	no	yes

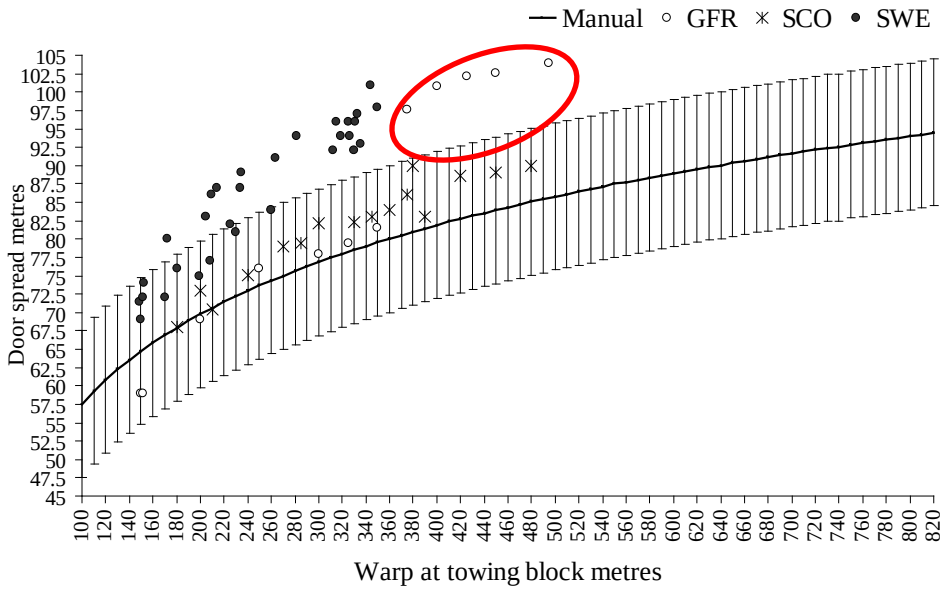

Figure 6.3. Plot of warp out/ door spread obtained Germany. Scotland and Sweden in 2009 compared with the recommended one in the IBTS manual.

Figure 6.3 shows how the values of door spread in the German survey step outside the aimed range at a warp length over 70 meters corresponding to higher sweep

length. The pattern showed by the Swedish gear geometry is probably due to the use of an otter board with a surface larger than recommended in the manual. The area swept by different countries (i.e. door spread × distance towed) shows in fact dissimilar values at equal depth (Figure 6.4).

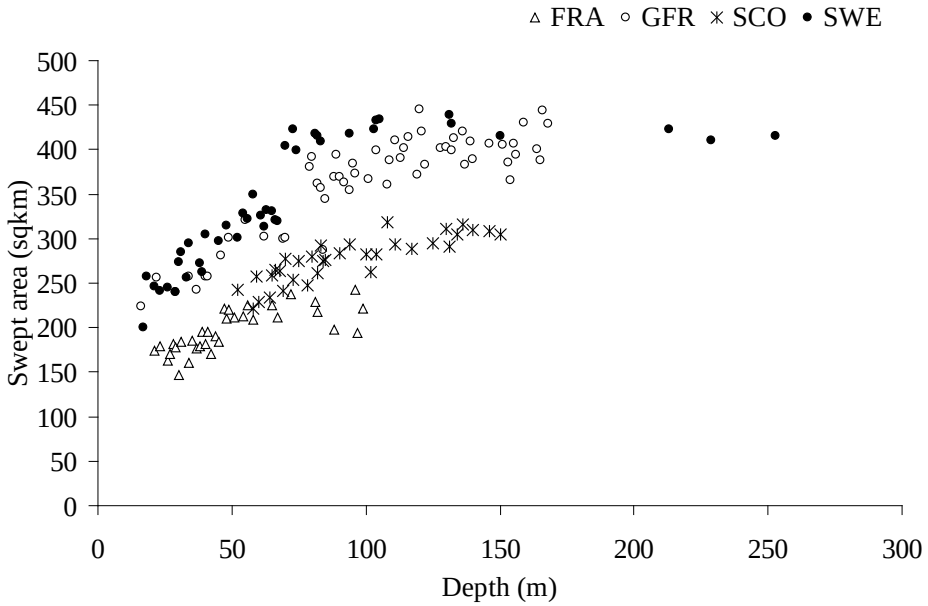

Figure 6.4. Comparison of areas at different depth swept by Germany, Scotland, Sweden and France in 2009, reflecting different gear deployment.

In addressing this issue we have to look at the two main impacts of varying gear geometry. the sampling unit and sampling efficiency of the trawl (for general discussion see (Godø, 1994)). Firstly there will be an unequivocal change in the sampling unit (swept area). As previously discussed the swept area is a direct function of the gear geometry multiplied by the time the trawl is in contact with the area to be sampled. This is a straight scalar and any changes made in the future, or to be accounted for historically, can be standardised simply using the gear and time parameters routinely collected.

The second effect of changing trawl geometry, whether through warp length or sweep length, is more problematic. Increased warp and sweep length effect not only increased door spread and therefore swept area, but also the angles between door, sweep and net. As this sweep angle (the 'Angle of Attack') becomes broader the herding efficiency of the sweeps may well change for certain species under some or all conditions and may even be a function of fish size and or abundance (Main and Sangster, 1981; Main and Sangster, 1979; Somerton, 2003; Ramm and Xiao, 1995).

Unlike simple adjustments to the sampling unit by using swept area for example, sampling efficiency is essentially an inter-calibration exercise. This would require comparison of similar spatial and temporal haul data between hauls/vessels showing different gear geometry to establish if evidence of contrasting catchability exists. Depth. species. ground type. length and so on would all need to be considered to ensure the comparison/calibration was robust empirically (Fryer. Zuur and Graham, 2003; Fryer, 1991; Millar and Fryer, 1999; Pelletier, 1998).

In summary, if changes to gear parameters are evident historically, and advantageous to the future standardisation of survey indices, then standardisation to an agreed sampling unit is a trivial exercise and can be done. In contrast, given the noise inher-

ent in survey data, identifying specific species, density, ground type and length dependent catchability interactions is likely to be quite complex. Given standardising to a specific sampling unit is likely to reduce inter-vessel variability, it is suggested that initially a two phase approach is taken. In so far as is possible:

1) the standard tow (sampling unit) will be re-defined in the manual terms of updated and achievable gear parameters. Where changes are deemed necessary a move toward the standard tow being reported more accurately in terms of spatial units will be made, while retaining time and speed as critical components of QA in the field.

2) if year effects or other anomalies transpire as a result of any adjustments, a calibration type analysis will be targeted at the relevant data to evaluate whether catchability is likely to have been significant in that circumstance.

6.3 References

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Main., J., and Sangster, G.I. 1981. A study of the sand clouds produced by trawl boards and their possible effect on fish capture. DEPARTMENT OF AGRICULTURE AND FISHERIES FOR SCOTLAND/ABERDEEN (UK).

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Somerton, D.A. 2003. Bridle efficiency of a survey trawl for flatfish: measuring the length of the bridles in contact with the bottom. Fisheries Research (Amsterdam), 60. 273–279.

7 Improvements to the quality of historical biological data (ToR d)

d) Improve the quality of historical biological data by (i) examination of DATRAS data to identify erroneous records. with a focus on (a) Amblyraja radiata-Raja clavata; (b) argentines; (c) topknots and (d) rocklings, and (ii) review national progress in improving quality of historical IBTS data;

7.1 Introduction

Given the concern over the accuracy and consistency of some of the data for taxonomically problematic fish species held in DATRA (see Daan 2001; ICES 2007; previous IBTSWG reports). IBTSWG is trying to improve both historical data and establish methods for improving species identification in future surveys.

There have been several reports of the kinds of mistakes involving many of the non-target species (see ICES, 2007; ter Hofstede & Daan 2008 WD), and only a brief overview for some of the problems of the case study species is given below. 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 Data examined

Data for the North Sea IBTS (all years. all ships. all quarters. all gears. all areas) where downloaded from the DATRAS database on 22 March 2010 for rocklings, topknots and argentines.

A more restricted dataset was extracted for thornback ray and starry ray (NS-IBTS. Q1&3, 1990–2010, all ships except SOL and ISI, all areas, GOV trawl only), with data extracted for *Raja radiate, Amblyraja radiata* and *Raja clavata*.

7.2.1 Topknots

Several taxonomic clearing houses are now treating the three species of topknot that occur in European waters to all be in the genus *Zeugopterus* (Table 7.1). Previously, two species were included in the genus *Phrynorhombus.*

Table 7.1. Topknots occurring in the North Sea and North-east Atlantic giving the currently accepted scientific name, and the invalid names that have been superseded.

COMMON NAME	VALID SPECIES NAME	INVALID SYNONYM
Common topknot	*Zeugopterus punctatus* (Bloch, 1787)	
Norwegian topknot	*Zeugopterus norvegicus* (Günther, 1862)	*Phrynorhombus norvegicus*
Eckström's topknot	*Zeugopterus regius* (Bonnaterre, 1788)	*Phrynorhombus regius*

In the data extracted, there is a single record for *Phrynorhombus norvegicus* (Year: 2010, Quarter: Q1, vessel: THA2, Haul number: 118132) which needs to be updated to *Zeugopterus norvegicus*.

There are comparatively few records of *Zeugopterus regius,* which might be erroneous. Only two of these records are post-1990 (1993. 1, SCO2, 43844; 1994, 2, SCO2, 49964).

Now that all three species of topknot are within a single genus, any unidentified topknot can be categorised as *Zeugopterus* spp.

There are some obvious discrepancies in the national recording of topknots, for example:

Denmark and France primarily report *Z. punctatus,* whereas England, Netherlands, Sweden and Norway report primarily (or exclusively) *Z. norvegicus.*

There are some 'yearly' differences, whereby one species is recorded in only one year, with the sister taxa not recorded (for example Germany in 1999, Norway in 1986). These records should be examined.

There do not appear to be any Norwegian captures of any species of topknot since 1986. Although the GOV trawl is not the best method of capturing topknots, the complete absence from this survey for such an extended period could be a concern.

In terms of the size distributions. the longest recorded topknot was 29 cm (1981, Q1, ARG, 66575), which is greater than the normally accepted Lmax for *Z. punctatus*. There were also one record of a 22 cm specimen of *P. norvegicus* which is much greater than the expected Lmax (1991, Q1, SCO, 44656). There were also a few records of *P. norvegicus* of 13–14 cm. although these may be valid.

7.2.2 Rocklings

There are seven 'rocklings' (excluding lings etc.) that may occur in the areas surveyed by the IBTSWG surveys (Table 7.2). Big-eye rockling may not occur in the North Sea, although it is known from the western sea board of the British Isles.

Table 7.2. Rocklings occurring in the North Sea and North-east Atlantic giving the currently accepted scientific name, and the invalid names that have been superseded.

COMMON NAME	VALID SPECIES NAME	PREVIOUS SYNONYM
Five-bearded rockling	*Ciliata mustela* (Linnaeus, 1758)	
Northern rockling	*Ciliata septentrionalis* (Collett, 1875)	
Four-bearded rockling	*Enchelyopus cimbrius* (Linnaeus, 1766)	*Rhinonemus cimbrius*
Arctic rockling	*Gaidropsarus argentatus* (Reinhardt, 1837)	
Big-eye rockling	*Gaidropsarus macrophthalmus* (Günther, 1867)	*Antonogadus macrophthalmus*
Shore rockling	*Gaidropsarus mediterraneus* (Linnaeus, 1758)	
Three-bearded rockling	*Gaidropsarus vulgaris* (Cloquet, 1824)	

Five-bearded rockling is recorded on DATRAS under two species names, *Ciliata mustela* and *Ciliata mustella,* the latter an incorrect spelling. This mis-spelling should be corrected on DATRAS.

Four-bearded rockling has been recorded under two species names, *Enchelyopus cimbrius* and *Rhinonemus cimbrius*. Most records are for the former (the valid scientific name), with the latter only used for one survey (2009. Q1. THA2). The latter records should be updated using the valid scientific name.

There are only a few records of Arctic rockling, all in the north of the area and taken in Norwegian surveys. Other surveys operating in the northern North Sea (e.g. Scotland and England) should be aware of the presence of this species in the area.

Only two nations (Norway and Germany) have reported shore rockling, and these records were from years in which (the more common) three-bearded rockling was not reported, and so should be investigated.

The majority of records for northern rockling are from English, Dutch and French surveys. Other surveys should ensure that sea-going staff are aware of the presence of northern rockling and how to distinguish it from the relatively similar five-bearded rockling. The reporting of northern rockling seems sporadic in some survey series. For example, English surveys did not report any from 1990–2006 inclusive, although five-bearded rockling was reported. Similarly, Dutch surveys (with the exception of 1983), have only reported northern rockling since 2004. Given the overlap in spatial distribution and size distribution, data for these two species are highly likely to be confounded and will not be disentangled easily. Scientists using DATRAS data to undertake multi-species 'community' analyses should combine these two species. Historical data should be re-allocated to *Ciliata* spp.

In terms of length compositions, there is a record of a 53 cm specimen of five-bearded rockling which is much greater than the Lmax (1976, Q1. TRI, 68566). and should be checked if possible.

7.2.3 Argentines

There are only two species of argentine in the survey area, lesser argentine *Argentina sphyraena* and greater argentine *A. silus.* A third species, small-tooth argentine *Glossanodon leioglossus* may also occur in the southern IBTS area. In terms of the North Sea, those survey data reported as Argentinidae are synonymous with *Argentina* spp.

These data still need to be examined spatially in order to highlight potential misidentifications between these species based on the geographical distributions.

Additionally, it was raised by those laboratories surveying the north of the area and that catch both species tended to have a greater confidence in their identifications of the two species.

7.2.4 Thornback and starry ray

ICES is expected to provide advice on various species of skate and ray and. within the North Sea ecoregions, early assessments for thornback ray have been compromised by poor data quality.

Most data for starry ray are stored in DATRAS under the valid scientific name *Amblyraja radiate,* although there are still some records using the junior synonym of *Raja radiata* (Norwegian data for 2004, 2007, and 2008; French data for 2010). These records should be updated to the valid scientific name.

There are some likely erroneous length records, with some of these species records in DATRAS of 30, 40, and 50 mm, which are all less than the size at hatching. These data (2003, Q1, THA2, 39670; 2006, Q1, THA2, 94701) should be investigated.

There are some records of *A. radiata* that are larger than Lmax, and the records of this species at lengths of 760–820 mm should be investigated (2000, Q3, MIC, 52051; 1995, Q1, MIC, 42994; 1994, Q3, THA, 55075; 1995, Q1, THA, 42832; 1995, Q1, THA, 42838; 1996, Q3, THA2, 53818).

French data seem to have a greater proportion of *A. radiata* in the southern North Sea and higher proportion of *R. clavata* at sites further north than for other nations, and it is possible that data for the two species are confounded. For example, French Q1 sur-

veys in 1992 (very few records of *A. radiata*), 1995 and 1998 need to be investigated. The data for the two species appear to be transposed in the latter year.

Given that WGEF is expected to undertake assessments and advise on the status of rajids during June 2010, the checking of these data should be a high priority.

7.3 National progress in improving data quality

Certain nations have updated national databases, although many laboratories are still in the process of checking their data.

For further information on DATRAS and the facilities for re-uploading corrected data, see Section 9.

7.4 References

Daan, N. 2001. The IBTS database: a plea for quality control. ICES CM 2001/T:03. 19 pp.

Hofstede, R., ter and Daan, N. 2008. A proposal for a consistent use of the North Sea IBTS data. Working Document 2 (see Annex 5 of ICES. 2008)

ICES. 2007a. Report of the Workshop on Taxonomic Quality Issues in the DATRAS Database (WKTQD). 23-25 January 2007. ICES. Copenhagen. ICES CM 2007/RMC:10. 46 pp.

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.

8 Improvements to the recently collected quality of historical biological data (ToR e)

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 2009/Q1 2010 surveys to identify and correct erroneous HL- and CA-records;

8.1 Potential errors to be investigated

Catch at length data (for the NS-IBTS. Q1&3, 2009–2010) were extracted on 23 March 2010, and the list of species, use of taxonomic names, and their size ranges examined.

Potential errors that need to be checked are summarised in Table 8.1. Geographical distributions still need to be checked, and it is suggested that further consideration be given to streamlining methods for such data checking.

8.2 Taxonomic irregularities

Certain species are currently stored in DATRAS under multiple names, with the currently accepted, valid scientific name and incorrect names (e.g. junior synonyms and incorrect spellings), which are highlighted in Table 8.2. Taxa for which there is still confusion regarding the current valid names include the eelpouts (Zoarcidae) and gurnards (e.g. *Aspitrigla cuculus*/*Chelidonichthys cuculus; Chelidonichthys lucernus*/*Trigla lucerna*).

This topic is discussed in greater detail in Section 9.

Table 8.2. Species that are included in the DATRAS database under multiple scientific names

VALID NAME	INCORRECT NAME
Ciliata mustela	*Ciliata mustella*
Enchelyopus cimbrius	*Rhinonemus cimbrius*
Entelurus aequoreus	*Entelurus aequerius*
Lumpenus lampretaeformis	*Lumpenus lumpretaeformis*
Alloteuthis subulata	*Loligo subulata*
Amblyraja radiata	*Raja radiata*
Dipturus batis	*Raja batis*
Echiichthys vipera	*Trachinus vipera*
Leucoraja fullonica	*Raja fullonica*
Leucoraja naevus	*Raja naevus*
Lycenchelys sarsii	*Lycenchelys sarsi*
Psetta maxima	*Scophthalmus maximus*
Solea solea	*Solea vulgaris*
Zeugopterus norvegicus	*Phrynorhombus norvegicus*

8.3 Length measurements

There were several records of fish/shellfish either <Lmin or >Lmax that may be expected, and so improved species-specific data checks are required within DATRAS.

There were often irregularities in those shellfish species that are measured to the mm. and all laboratories are asked to pay particular attention to ensuring that these data are correct prior to submitting data.

8.4 Consistency in reporting

Some surveys appear to be reporting and/or measuring invertebrates on an irregular basis. Improved consistency is required, especially with regards to bivalves and cephalopods.

For example, surveys should report length data for squids (Order Teuthida; main genera including *Illex, Todarodes, Loligo* and *Alloteuthis*)) and cuttlefish (Order Sepiidae; *Sepia* spp.), as these two groups have hard structures in the mantle. However, some nations report some data for the lengths of those cephalopods where such a 'cuttlebone' is lacking, including bobtail squids (Sepiolidae. e.g. *Sepiola* spp., *Rossia* spp., *Sepietta* spp.) and octopuses. Furthermore, in some instances it is apparent that only a proportion of these species are measured, which needs to be further investigated.

8.5 Species identification material

There have been several developments in fish identification material, including further developments of the Zeus software, development of a photographic identification guide, as well as other publications.

8.5.1 ZEUS

ZEUS (developed at IMARES) is a tool to help with the identification of fish and benthic species. The most recent version of ZEUS can be downloaded from the website (http://www.zeus-id.org/). This website also allows users to upload photographs.

8.5.2 Photographic guide to fishes

Progress has been made intersessionally on a photographic identification guide for marine fishes, including various problematic taxa. Although this has not been finalised, it is hoped that it will be completed during the coming year. This guide follows the general format developed for rocklings, lings and dragonets during the 2009 IBTSWG meeting (ICES, 2009).

8.5.3 Recent publications

There has been some recently published identification guides on fishes that field scientists in the NE Atlantic may find useful, including:

Kay, P., and Dipper, F. 2009. A field guide to marine fishes of Wales and adjacent waters. Marine Conservation Society; 256 pp. (ISBN: 0956204805/ISBN-13: 9780956204806).

Pietsch, T.W. 2009. Oceanic anglerfishes: Extraordinary diversity in the deep sea. University of California Press. 576 pp.

8.5.4 Recent changes in fish taxonomy

Recent studies have highlighted that common skate *Dipturus batis* encompasses two distinct species (Iglesias *et al.*, 2009; Griffiths *et al.*, 2010), and Iglesias *et al.* (2009) provide information to help with the separation of the two species. Although it may not be possible to correct data in DATRAS, which should be viewed as the 'common skate complex', future surveys could usefully provide information for the two distinct species (proposed to be *Dipturus flossada* and *D. intermedia*) after new names are finalised.

8.6 References

Griffiths, A.M., Sims, D.W., Cotterell, S.P., El Nagar, A., Ellis, J.R., Lynghammar, A., McHugh, M., Neat, F.C., Pade, N.G., Queiroz, N., Serra-Pereira, B., Rapp, T., Wearmouth, V.J., and Genner, M.J. 2010. Molecular markers reveal spatially segregated cryptic species in a critically endangered fish, the common skate (*Dipturus batis*). Proceedings of the Royal Society, B Biological Sciences: In press

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

Iglesias, S.P., Toulhoat, L., and Sellos, D.Y. 2009. Taxonomic confusion and market mislabelling of threatened skates: important consequences for their conservation status. Aquatic Conservation: Marine and Freshwater Ecosystems.

Table 8.1a. Potentially erroneous fish records in the DATRAS database (NS-IBTS. Q1/Q3 2009. Q1 2010).

Fish species	Year(s)	Quarter(s)	Nation(s)	Haul No.	Comment	Action
	2009	3	SCO	112540	1 cm total length seems small	National lab to check and correct if appropriate
	2009	1. 3	SWE. NL	-	Species unlikely - id to be checked	National labs to check and correct
	2009	3	DEN	114439	Small total length (8 cm to be checked)	National lab to check and correct if appropriate
	2010	1	FRA	118201	Small total length (3 cm to be checked)	National lab to check and correct if appropriate
	2009	1	FRA	-	Length >> 25 cm => Ammodytidae ?	National lab to check and correct if appropriate
	2009	1	DEN	-	Length >> 25 cm => Ammodytidae ?	National lab to check and correct if appropriate
	2010	1	DEN	117677	18 cm - too large. check length/ species	National lab to check and correct if appropriate
	2009/10	1. 3	GER. SCO	-	Length > 16 cm. check length / species	National labs to check and correct
	2009	3	SCO	112577	1400 mm ?! Check length (mm/ cm)	National lab to check and correct
	2009	1	DEN	116054	Many small individuals. species id correct?	National labs to check and correct if appropriate
	-	-	FRA. ENG. FRA. GER	-	Incorrect spelling of	DATRAS to update names/TSN codes
	2009	1	SCO	107239	Record of one at 860 mm	National lab to check and correct
	2009	1	NOR	107193	Check species identification. Possible boarfish?	National lab to check and correct if appropriate
	-	-	DEN	-	Denmark is the only nation reporting this species.	National lab to check and correct
	-	-	SCO. DEN	-	Check species identification. Possible	National labs to check and correct if appropriate
	2009	1	GER	107583	Check species identification. Possible ?	National lab to check and correct if appropriate
	2010	1	FRA	118196	Record of species in 38E9 possibly incorrect (too far north)	National lab to check and correct if appropriate
	2010	1	FRA	-	Old name for	DATRAS to update names/TSN codes
	2009	1	FRA	-	Old name for	DATRAS to update names/TSN codes
	2010	1	FRA	-	Old name for	DATRAS to update names/TSN codes
	2010	1	FRA	118131	Species outside geographical range	National lab to check and correct
	-	-	SWE. ENG. NOR. NL. FRA	-	Old name for	DATRAS to update names/TSN codes
	-	-	DEN. SCO. FRA. GER	-	Old name for	DATRAS to update names/TSN codes
	2009	1	DEN	116052	Records of fish 10–30 mm to be checked	National lab to check and correct if appropriate

Table 8.1b. Potentially erroneous shellfish records in the DATRAS database (NS-IBTS. Q1/Q3 2009. Q1 2010).

Shellfish species	Year(s)	Quarter(s)	Nation(s)	Haul No.	Comment	Action
	2009. 2010	1	DEN. SCO	-	Only two nations occasionally reporting queen scallops by size	National labs to check data. and report according to IBTSWG requirements
	2009	1	GER	107567	Lengths > 160 mm possibly >Lmax	National lab to check and correct
	2009	1	DEN	-	Included in total catch?	Species reporting should be consistent
	2009	1	SCO	-	Length 10 mm to be checked	National lab to check and correct if appropriate
	2009	1	DEN	116049	Taxon at too high a level to be useful	National lab to check and correct
	2009	1	DEN. GER	-	Only two nations reporting by size	National labs to check data. and report according to IBTSWG requirements
	2010	1	DEN. GER	-	Only two nations reporting by size	National labs to check data. and report according to IBTSWG requirements
	2009. 2010	1	DEN. GER	-	Specimens of 10–20 mm seem small	National labs to check and correct if appropriate
	2009	1	DEN	114454	Specimens of 300–1260 mm	National lab to check and correct
				-	Incorrect synonym for	DATRAS to update names/TSN codes
	2009	3	DEN	114432	Specimens of 180–200 mm too large	National lab to check and correct
	2009	1	FRA	107053	Specimens of 840 and 960 mm to be corrected	National lab to check and correct
	2010	1	FRA	118178	Specimens of 250–510 mm to be corrected	National lab to check and correct
	2009	3	DEN	114423	Small specimens of 20–20 mm	National lab to check and correct if appropriate
	2010	1	FRA	118205	Specimens of 1300–1400 mm to be corrected	National lab to check and correct
	2009/10	1. 3	DEN/GER	-	Are these measured consistently?	Laboratories check data and report according to the IBTS manual
	2009/10	1	GER	-	Are these measured consistently?	Laboratories check data and report according to the IBTS manual
	2010	1	DEN	-	Are these measured consistently?	Laboratories check data and report according to the IBTS manual
	2009/10	1. 3	DEN. GER	-	Are these measured consistently?	Laboratories check data and report according to the IBTS manual
	2009	1	SCO	107233	Are these measured consistently?	Laboratories check data and report according to the IBTS manual

9 Review of DATRAS (ToR f)

f) The development of DATRAS needs to be evaluated annually. IBTSWG will recommend on desired further developments;

9.1 Automatic upload pilot

IBTS 2010 was the pilot survey for the automatic upload to DATRAS. The responsible data-submitters at the institutes had minor problems in uploading. All provided feedback to the ICES Data centre and were helped conveniently.

Some problems in the automatic upload are still being worked on by the Data centre:

Dealing with CA records of > 1 fish at a time. Some countries collect biological data by cm group and so, the number of fish in a CA record might be > 1. When uploaded by ICES, problems did never occur, however, the automatic upload did create error messages.

Error messages on total numbers per haul when uploading sex=female, male and unknown in one haul. The screening seems to work fine when either unknown or male/female is uploaded. However, three different values for sex do not seem to be handled in the right way.

IBTSWG raised some questions concerning the automatic upload:

Re-uploading data: since it was not completely clear what happens when using the automatic upload, data-submitters hesitated to upload corrected datasets. During IBTSWG it became clear that data are uploaded immediately to DATRAS and over-write the data present in DATRAS. IBTSWG recommends that a warning will be sent to the data-submitter when uploading data already present in DATRAS.

Permissions for (re-)uploading:

- Currently, the DATRAS team grant the permission by contacting WG Chair if there is a new data-submitter.
- Currently, a data-submitter is allowed to overwrite data from another country or survey than the survey being responsible for. If this type of incident should be prevented. DATRAS can handle it and this can be incorporated in due time. The rule will be then as follows:
  - Maximum 2 data-submitters per country per survey will be allowed
  - There will be a check on the combination of user name and country for the data submitted. By implementing this check only data-submitters from a particular country can upload or re upload a file.

To prevent errors, IBTSWG recommends that the cross-check between the data-submitter and the country in the data uploaded will be executed when uploading data to DATRAS automatically.

Often, there is a request for the correction of data. Either because data in national databases were changed or because errors were discovered when working with the international data. Since uploading a complete dataset to DATRAS might be time-consuming for data-submitters (and so: it might take long before an update is realised), the question was raised if it is possible to upload parts of the dataset to DATRAS. A selection might be: only corrected data, only HL records, only HH re-

cords, only CA records. The ICES Data centre is testing this possibility. The test for uploading one haul at a time is done and is planning to be implemented during 2010.

IBTSWG recommends that the option of uploading only parts of datasets or single data-corrections will be investigated and implemented by ICES Data-centre.

9.2 Data upload

9.2.1 Screening criteria

There was agreement on unifying DATRAS checks as much as possible. The survey working groups have a responsibility for checking and updating the criteria used in the data screening done previous to the upload. Survey working groups can provide feedback on columns not being used in the survey or other topics concerning the data screening.

The reference table for maximum and minimum length has to be species specific and related to the length measurement method (see 9.4).

Records containing TSN codes on a genus level should be allowed for all species, including Cephalopods and Crustaceans. When uploading species on a genus level a summary notification is wished for (TSN code. number of records. Notification: 'Note: uploading species on a higher taxonomic level than species level'). Example: when uploading gobies, one might upload *Pomatoschistus* (TSN 171977) instead of e.g. *Pomatoschistus minutus* (TSN 171978) for 3 length classes in 2 hauls. The notification should then be like 'TSN 171977, 6 records. Note: uploading species on a higher taxonomic level than species level). This should not only apply for fish species, but also for other groups uploaded in DATRAS (like Cephalopods and Crustaceans).

The check on the quarter has to be independent of the date. Quarter is used as an extension of the survey name, like the IBTS Q1 or Q3 survey. If data are uploaded where the date is outside the quarter, a summary notification is wished for (Quarter. date. Notification: 'Warning: date values and quarter do not correspond'). If the discrepancy is accepted, no changes have to be made in the quarter. Data available in DATRAS should be revised according to these criteria.

There is a strong wish to get quality checks updated properly and rapidly. However, changes in quality checks should not be made without permission of the survey WG involved. In case the screening has to be changed intersessionally, the Chair of the WG had to be consulted before applying the change.

Since checking on board during the surveys usually allows a quick and effective correction of the possible mistakes and problems, especially those concerning species identification. measures and other HL-CA data, would it be possible to have a portable version of the Screening procedure from DATRAS, if it could be used to check the data on board, it could help improving the quality and checking of the data.

9.2.2 Other topics

IBTSWG recommends creating the possibility to upload the larvae data from the MIK hauls to a central database kept at ICES.

IBTSWG discussed how to deal with maturity data collected outside the recommended sampling period. The WG decided it is the responsibility of the country uploading the data and if uploaded. DATRAS will accept the data.

IBTSWG recommends tracking of uploads, which means that the last date of upload is available and in case of partial upload it should be clear which values were updated. Track information is also whished for when downloading data.

9.3 Quality assurance of calculated downloads

9.3.1 Standard procedure for generating output

During the WG an extraction of DATRAS was made for IBTS North Sea haddock CPUE per age per haul to calculate an index per country (see Section 4). To check if the method followed was the same as used by ICES, the over-all North Sea index per age per year was calculated. It was discovered that night hauls were taken into account in the index calculation and there did not seem to be any selection of an index area for the species. This example proved the need for a clear quality assurance procedure for the calculated DATRAS output as presented on the ICES website.

In general, IBTSWG recommends that the following procedure for generating standard output by ICES Data Centre will be adopted:

1) When a survey WG has a wish for standard output, the survey WG sends the algorithms used for the standard output (e.g. index calculations) to ICES Data Centre.

The minimum requirements to send are:

- a copy of the raw dataset used. in DATRAS exchange format
- the criteria used to get the selected dataset (like the index area used. removal of night hauls. removal of invalid hauls. aggregation of sex. aggregation of species. etc.)
- the algorithm used for the calculation
- the outcome of the calculation

2) a. ICES Data centre creates the output based on the input as described in 1) with its own programmes and checks the outcome.

b. The results of the check will be archived by the ICES Data Centre.

3) ICES Data Centre sends the outcome of the check to the Chair of the survey WG and the DUAP coordinator.

4) When the outcome of the ICES Data Centre algorithm is identical to the outcome of the WG, the algorithm can be used for creating standard output on the ICES website.

When ICES Data Centre develops a calculated output without being asked for by a survey working group, the same procedure applies, but then step 1 will be taken by ICES Data Centre and step 2a by the working group, Step 2b. 3 and 4 will be carried out as described above.

9.3.2 Other topics

IBTSWG recommends that an option for only downloading station information in Exchange format (HH records) from DATRAS will be made available.

IBTSWG encourages that an option to select a single species as an Exchange format file will be made available.

IBTSWG recommends that information on the variables is available when downloading data from DATRAS (e.g. units used for temperature. explanation of the column names. uploading tracking) for clarification reasons.

IBTSWG suggests changing the following in DATRAS:

Old survey name	New survey name
ALT-IBTS	SWC-IBTS (Scottish West Coast IBTS)

9.4 Comparison of calculated and downloaded CPUE per length per haul

During IBTSWG, a comparison of the calculation of CPUE per length per haul was carried out for a set of species, to guarantee that the way IBTSWG expects the CPUE to be calculated is similar to the way the CPUE per length is calculated. To cover the variety of data collection methods, the selected data included:

- Data containing different DataTypes (C and R);
- Data on species measured by using different increments (to the nearest cm. half cm. mm below);
- Data on sex-separated species.

9.4.1 Data and calculation method used

9.4.1.1 Data used

The selection criteria above resulted in a dataset containing Scottish and Danish data for the species *Amblyraja radiata*. *Clupea harengus, Melanogrammus aeglefinus,* and *Nephrops norvegicus.*

For the analysis as a basis the following sets were downloaded from DATRAS on March 26. 2010:

- Download Exchange format 2010 IBTS Q1 SCO3 and DAN2
- Download CPUE per length per haul 2010 IBTS Q1 SCO3 and DAN2, GOV, all areas, *Amblyraja radiate, Clupea harengus, Melanogrammus aeglefinus,* and *Nephrops norvegicus*.

9.4.1.2 Method used

Data of all datasets were read by using SAS. Subareas were selected in the CPUE files (Scotland: 42E7, 43F1 and 46F0; Denmark: 36F0, 41F5, 42F5) and the country was added to the file, based on the ship (SCO3 → Scotland, DAN2 → Denmark). From the Exchange file only the HH and HL records were selected. The records were merged in order to calculate the CPUE (numbers/hour). StatRecs were selected (Scotland: 42E7, 43F1 and 46F0; Denmark: 36F0, 41F5, 42F5). For both files, the fish length (LngtClass) was transformed to an identical unit, i.e. meters. In the Exchange file for all species measured to the nearest mm below (LngtCode.) this was calculated as LngtClass/1000, for the other LngtCodes length was calculated as LngtClass/100. In the CPUE per length file length was calculated as LngtClass/1000.

For the Exchange file, CPUE per length per haul was calculated as follows:

1) For DataType=R: CPUE=HLNoAtLngt*(60/HaulDur) for each HL record

2) For DataType=C: CPUE=HLNoAtLngt for each HL record

3) Adding up the CPUE per Year Country Ship Quarter Station Haul Nodc10 LngtClass Sex

9.4.2 Results

The output of the sets are showed by species.

9.4.2.1 Nephrops norvegicus

a) Calculated output Exchange file for DataType R (Denmark)

StatRec	Year	Month	Day	Time	Haul	Length (m)	Sex	CPUE
36F0	2010	2	16	712	30	0.026	f	2
36F0	2010	2	16	712	30	0.033	m	2
41F5	2010	2	8	1535	11	0.03	m	4
41F5	2010	2	8	1535	11	0.031	m	2
41F5	2010	2	8	1535	11	0.033	f	2
41F5	2010	2	8	1535	11	0.034	m	4
41F5	2010	2	8	1535	11	0.041	m	4
41F5	2010	2	8	1535	11	0.042	m	2
41F5	2010	2	8	1535	11	0.044	m	2
41F5	2010	2	8	1535	11	0.047	m	2
42F5	2010	2	8	1325	10	0.041	-9	2

b) Calculated output Exchange file for DataType C (Scotland)

StatRec	Year	Month	Day	Time	Haul	Length (m)	Sex	CPUE
42E7	2010	1	27	1624	2	0.027	f	2
42E7	2010	1	27	1624	2	0.03	m	4
42E7	2010	1	27	1624	2	0.031	m	2
42E7	2010	1	27	1624	2	0.032	m	2
42E7	2010	1	27	1624	2	0.033	m	4
42E7	2010	1	27	1624	2	0.034	m	4
42E7	2010	1	27	1624	2	0.035	b	2
42E7	2010	1	27	1624	2	0.035	m	6
42E7	2010	1	27	1624	2	0.036	m	2
42E7	2010	1	27	1624	2	0.037	m	6
42E7	2010	1	27	1624	2	0.038	f	2
42E7	2010	1	27	1624	2	0.038	m	2
42E7	2010	1	27	1624	2	0.039	m	4
42E7	2010	1	27	1624	2	0.04	f	4
42E7	2010	1	27	1624	2	0.04	m	4
42E7	2010	1	27	1624	2	0.042	m	2
42E7	2010	1	27	1624	2	0.043	m	2
42E7	2010	1	27	1624	2	0.044	m	4
42E7	2010	1	27	1624	2	0.045	m	2
42E7	2010	1	27	1624	2	0.048	m	4
42E7	2010	1	27	1624	2	0.049	m	2
43F1	2010	2	1	1524	14	0.039	m	2

StatRec	Year	Month	Day	Time	Haul	length (m)	Sex	CPUE
46F0	2010	2	3	1518	20	0.033	f	2
46F0	2010	2	3	1518	20	0.038	m	2
46F0	2010	2	3	1518	20	0.04	f	2
46F0	2010	2	3	1518	20	0.041	m	2
46F0	2010	2	3	1518	20	0.046	m	2
46F0	2010	2	3	1518	20	0.049	m	2

c) Output CPUE per length per haul (downloaded file) for DataType R (Denmark)

Subarea	Date	Time	Haul	length	Sex	CPUE_ICES
36F0	16/02/2010	07:12:00	117693	0.02	-	2
36F0	16/02/2010	07:12:00	117693	0.03	-	2
41F5	08/02/2010	15:35:00	117674	0.03	-	12
41F5	08/02/2010	15:35:00	117674	0.04	-	10
42F5	08/02/2010	13:25:00	117673	0.04	-	2

d) Output CPUE per length per haul (downloaded file) for DataType C (Scotland)

Subarea	Date	Time	Haul	length	Sex	CPUE_ICES
43F1	01/02/2010	15:24:00	116503	0.03	-	2
46F0	03/02/2010	15:18:00	116509	0.03	-	4
46F0	03/02/2010	15:18:00	116509	0.04	-	8

Differences in the output:

- The results for StatRec 42E7 (valid night haul) are not in file b.
- The length measurements in file b are rounded to cm
- Variable sex is not available in file b
- Haul number is not identical in files a and b, although country, ship, date, time and statistical rectangle correspond.

9.4.2.2 Melanogrammus aeglefinus

a) Calculated output Exchange file for DataType R (Denmark)

StatRec	Year	Month	Day	Time	Haul	length (m)	Sex	CPUE
41F5	2010	2	8	1535	11	0.16	-9	2
41F5	2010	2	8	1535	11	0.19	-9	2
42F5	2010	2	8	1325	10	0.28	-9	2

b) Calculated output Exchange file for DataType C (Scotland)

StatRec	Year	Month	Day	Time	Haul	Length (m)	Sex	CPUE
42E7	2010	1	27	1624	2	0.13	u	4
42E7	2010	1	27	1624	2	0.14	u	10
42E7	2010	1	27	1624	2	0.15	u	32
42E7	2010	1	27	1624	2	0.16	u	92
42E7	2010	1	27	1624	2	0.17	u	126
42E7	2010	1	27	1624	2	0.18	u	100
42E7	2010	1	27	1624	2	0.19	u	60
42E7	2010	1	27	1624	2	0.2	u	16
42E7	2010	1	27	1624	2	0.21	u	10
42E7	2010	1	27	1624	2	0.22	u	2
42E7	2010	1	27	1624	2	0.23	u	2
42E7	2010	1	27	1624	2	0.26	u	2
42E7	2010	1	27	1624	2	0.27	u	4
42E7	2010	1	27	1624	2	0.28	u	2
42E7	2010	1	27	1624	2	0.29	u	2
42E7	2010	1	27	1624	2	0.31	u	2
42E7	2010	1	27	1624	2	0.32	u	6
42E7	2010	1	27	1624	2	0.33	u	2
42E7	2010	1	27	1624	2	0.34	u	10
42E7	2010	1	27	1624	2	0.35	u	6
42E7	2010	1	27	1624	2	0.36	u	6
42E7	2010	1	27	1624	2	0.37	u	4
42E7	2010	1	27	1624	2	0.38	u	6
42E7	2010	1	27	1624	2	0.43	u	2
43F1	2010	2	1	1524	14	0.18	u	2
43F1	2010	2	1	1524	14	0.26	u	2
43F1	2010	2	1	1524	14	0.28	u	2
43F1	2010	2	1	1524	14	0.29	u	4
43F1	2010	2	1	1524	14	0.31	u	4
43F1	2010	2	1	1524	14	0.32	u	4
43F1	2010	2	1	1524	14	0.34	u	4
43F1	2010	2	1	1524	14	0.35	u	6
43F1	2010	2	1	1524	14	0.36	u	4
43F1	2010	2	1	1524	14	0.37	u	2
43F1	2010	2	1	1524	14	0.39	u	2
46F0	2010	2	3	1518	20	0.12	u	18
46F0	2010	2	3	1518	20	0.13	u	78
46F0	2010	2	3	1518	20	0.14	u	102
46F0	2010	2	3	1518	20	0.15	u	116
46F0	2010	2	3	1518	20	0.16	u	52
46F0	2010	2	3	1518	20	0.17	u	30

StatRec	Year	Month	Day	Time	Haul	length (m)	Sex	CPUE
46F0	2010	2	3	1518	20	0.18	u	18
46F0	2010	2	3	1518	20	0.19	u	22
46F0	2010	2	3	1518	20	0.2	u	4
46F0	2010	2	3	1518	20	0.21	u	12
46F0	2010	2	3	1518	20	0.24	u	26
46F0	2010	2	3	1518	20	0.25	u	24
46F0	2010	2	3	1518	20	0.26	u	20
46F0	2010	2	3	1518	20	0.27	u	14
46F0	2010	2	3	1518	20	0.28	u	32
46F0	2010	2	3	1518	20	0.29	u	22
46F0	2010	2	3	1518	20	0.3	u	48
46F0	2010	2	3	1518	20	0.31	u	42
46F0	2010	2	3	1518	20	0.32	u	34
46F0	2010	2	3	1518	20	0.33	u	46
46F0	2010	2	3	1518	20	0.34	u	32
46F0	2010	2	3	1518	20	0.35	u	34
46F0	2010	2	3	1518	20	0.36	u	20
46F0	2010	2	3	1518	20	0.37	u	12
46F0	2010	2	3	1518	20	0.38	u	4
46F0	2010	2	3	1518	20	0.39	u	8
46F0	2010	2	3	1518	20	0.4	u	10
46F0	2010	2	3	1518	20	0.44	u	2

c) Output CPUE per length per haul (downloaded file) for DataType R (Denmark)

Subarea	Date	Time	Haul	length	Sex	CPUE_ICES
41F5	08/02/2010	15:35:00	117674	0.16	-	2
41F5	08/02/2010	15:35:00	117674	0.19	-	2
42F5	08/02/2010	13:25:00	117673	0.28	-	2

d) Output CPUE per length per haul (downloaded file) for DataType C (Scotland)

Subarea	Date	Time	Haul	length	Sex	CPUE_ICES
43F1	01/02/2010	15:24:00	116503	0.18	-	2
43F1	01/02/2010	15:24:00	116503	0.26	-	2
43F1	01/02/2010	15:24:00	116503	0.28	-	2
43F1	01/02/2010	15:24:00	116503	0.29	-	4
43F1	01/02/2010	15:24:00	116503	0.31	-	4
43F1	01/02/2010	15:24:00	116503	0.32	-	4
43F1	01/02/2010	15:24:00	116503	0.34	-	4
43F1	01/02/2010	15:24:00	116503	0.35	-	6
43F1	01/02/2010	15:24:00	116503	0.36	-	4
43F1	01/02/2010	15:24:00	116503	0.37	-	2
43F1	01/02/2010	15:24:00	116503	0.39	-	2
46F0	03/02/2010	15:18:00	116509	0.12	-	18
46F0	03/02/2010	15:18:00	116509	0.13	-	78

SUBAREA	DATE	TIME	HAUL	LENGTH	SEX	CPUE_ICES
46F0	03/02/2010	15:18:00	116509	0.14	-	102
46F0	03/02/2010	15:18:00	116509	0.15	-	116
46F0	03/02/2010	15:18:00	116509	0.16	-	52
46F0	03/02/2010	15:18:00	116509	0.17	-	30
46F0	03/02/2010	15:18:00	116509	0.18	-	18
46F0	03/02/2010	15:18:00	116509	0.19	-	22
46F0	03/02/2010	15:18:00	116509	0.2	-	4
46F0	03/02/2010	15:18:00	116509	0.21	-	12
46F0	03/02/2010	15:18:00	116509	0.24	-	26
46F0	03/02/2010	15:18:00	116509	0.25	-	24
46F0	03/02/2010	15:18:00	116509	0.26	-	20
46F0	03/02/2010	15:18:00	116509	0.27	-	14
46F0	03/02/2010	15:18:00	116509	0.28	-	32
46F0	03/02/2010	15:18:00	116509	0.29	-	22
46F0	03/02/2010	15:18:00	116509	0.3	-	48
46F0	03/02/2010	15:18:00	116509	0.31	-	42
46F0	03/02/2010	15:18:00	116509	0.32	-	34
46F0	03/02/2010	15:18:00	116509	0.33	-	46
46F0	03/02/2010	15:18:00	116509	0.34	-	32
46F0	03/02/2010	15:18:00	116509	0.35	-	34
46F0	03/02/2010	15:18:00	116509	0.36	-	20
46F0	03/02/2010	15:18:00	116509	0.37	-	12
46F0	03/02/2010	15:18:00	116509	0.38	-	4
46F0	03/02/2010	15:18:00	116509	0.39	-	8
46F0	03/02/2010	15:18:00	116509	0.4	-	10
46F0	03/02/2010	15:18:00	116509	0.44	-	2

Differences in the output:

- The results for StatRec 42E7 (valid night haul) are not in file b.
- Haul number is not identical in files a and b, although country, ship, date, time and statistical rectangle correspond.

9.4.2.3 Clupea harengus

a) Calculated output Exchange file for DataType R (Denmark)

STATREC	YEAR	MONTH	DAY	TIME	HAUL	LENGTH (M)	SEX	CPUE
36F0	2010	2	16	712	30	0.26	-9	2
41F5	2010	2	8	1535	11	0.105	-9	12
41F5	2010	2	8	1535	11	0.11	-9	18
41F5	2010	2	8	1535	11	0.115	-9	50
41F5	2010	2	8	1535	11	0.12	-9	124
41F5	2010	2	8	1535	11	0.125	-9	178
41F5	2010	2	8	1535	11	0.13	-9	266
41F5	2010	2	8	1535	11	0.135	-9	234
41F5	2010	2	8	1535	11	0.14	-9	240

StatRec	Year	Month	Day	Time	Haul	length (m)	Sex	CPUE
41F5	2010	2	8	1535	11	0.145	-9	166
41F5	2010	2	8	1535	11	0.15	-9	148
41F5	2010	2	8	1535	11	0.155	-9	50
41F5	2010	2	8	1535	11	0.16	-9	50
41F5	2010	2	8	1535	11	0.165	-9	18
41F5	2010	2	8	1535	11	0.17	-9	24
41F5	2010	2	8	1535	11	0.175	-9	12
41F5	2010	2	8	1535	11	0.18	-9	12
42F5	2010	2	8	1325	10	0.105	-9	46
42F5	2010	2	8	1325	10	0.11	-9	140
42F5	2010	2	8	1325	10	0.115	-9	512
42F5	2010	2	8	1325	10	0.12	-9	746
42F5	2010	2	8	1325	10	0.125	-9	1164
42F5	2010	2	8	1325	10	0.13	-9	1956
42F5	2010	2	8	1325	10	0.135	-9	1956
42F5	2010	2	8	1325	10	0.14	-9	1398
42F5	2010	2	8	1325	10	0.145	-9	1118
42F5	2010	2	8	1325	10	0.15	-9	1118
42F5	2010	2	8	1325	10	0.155	-9	606
42F5	2010	2	8	1325	10	0.16	-9	280
42F5	2010	2	8	1325	10	0.165	-9	326
42F5	2010	2	8	1325	10	0.17	-9	46
42F5	2010	2	8	1325	10	0.225	f	2
42F5	2010	2	8	1325	10	0.23	m	2
42F5	2010	2	8	1325	10	0.235	f	2

b) Calculated output Exchange file for DataType C (Scotland)

StatRec	Year	Month	Day	Time	Haul	length (m)	Sex	CPUE
42E7	2010	1	27	1624	2	0.1	u	4
42E7	2010	1	27	1624	2	0.105	u	14
42E7	2010	1	27	1624	2	0.11	u	22
42E7	2010	1	27	1624	2	0.115	u	38
42E7	2010	1	27	1624	2	0.12	u	54
42E7	2010	1	27	1624	2	0.125	u	40
42E7	2010	1	27	1624	2	0.13	u	26
42E7	2010	1	27	1624	2	0.135	u	24
42E7	2010	1	27	1624	2	0.14	u	24
42E7	2010	1	27	1624	2	0.145	u	18
42E7	2010	1	27	1624	2	0.15	u	10
42E7	2010	1	27	1624	2	0.155	u	4
42E7	2010	1	27	1624	2	0.16	u	4
42E7	2010	1	27	1624	2	0.165	u	2
42E7	2010	1	27	1624	2	0.205	u	2
42E7	2010	1	27	1624	2	0.21	u	2

StatRec	Year	Month	Day	Time	Haul	length (m)	Sex	CPUE
43F1	2010	2	1	1524	14	0.235	u	2
43F1	2010	2	1	1524	14	0.26	u	2
43F1	2010	2	1	1524	14	0.265	u	4
43F1	2010	2	1	1524	14	0.27	u	8
43F1	2010	2	1	1524	14	0.275	u	12
43F1	2010	2	1	1524	14	0.28	u	10
43F1	2010	2	1	1524	14	0.285	u	10
43F1	2010	2	1	1524	14	0.29	u	6
43F1	2010	2	1	1524	14	0.295	u	4
46F0	2010	2	3	1518	20	0.255	u	2
46F0	2010	2	3	1518	20	0.265	u	2
46F0	2010	2	3	1518	20	0.275	u	2
46F0	2010	2	3	1518	20	0.285	u	2
46F0	2010	2	3	1518	20	0.29	u	4

c) Output CPUE per length per haul (downloaded file) for DataType R (Denmark)

Subarea	Date	Time	Haul	length	Sex	CPUE_ICES
36F0	16/02/2010	07:12:00	117693	0.26	-	2
41F5	08/02/2010	15:35:00	117674	0.105	-	12
41F5	08/02/2010	15:35:00	117674	0.11	-	18
41F5	08/02/2010	15:35:00	117674	0.115	-	50
41F5	08/02/2010	15:35:00	117674	0.12	-	124
41F5	08/02/2010	15:35:00	117674	0.125	-	178
41F5	08/02/2010	15:35:00	117674	0.13	-	266
41F5	08/02/2010	15:35:00	117674	0.135	-	234
41F5	08/02/2010	15:35:00	117674	0.14	-	240
41F5	08/02/2010	15:35:00	117674	0.145	-	166
41F5	08/02/2010	15:35:00	117674	0.15	-	148
41F5	08/02/2010	15:35:00	117674	0.155	-	50
41F5	08/02/2010	15:35:00	117674	0.16	-	50
41F5	08/02/2010	15:35:00	117674	0.165	-	18
41F5	08/02/2010	15:35:00	117674	0.17	-	24
41F5	08/02/2010	15:35:00	117674	0.175	-	12
41F5	08/02/2010	15:35:00	117674	0.18	-	12
42F5	08/02/2010	13:25:00	117673	0.105	-	46
42F5	08/02/2010	13:25:00	117673	0.11	-	140
42F5	08/02/2010	13:25:00	117673	0.115	-	512
42F5	08/02/2010	13:25:00	117673	0.12	-	746
42F5	08/02/2010	13:25:00	117673	0.125	-	1164
42F5	08/02/2010	13:25:00	117673	0.13	-	1956
42F5	08/02/2010	13:25:00	117673	0.135	-	1956

SUBAREA	DATE	TIME	HAUL	LENGTH	SEX	CPUE_ICES
42F5	08/02/2010	13:25:00	117673	0.14	-	1398
42F5	08/02/2010	13:25:00	117673	0.145	-	1118
42F5	08/02/2010	13:25:00	117673	0.15	-	1118
42F5	08/02/2010	13:25:00	117673	0.155	-	606
42F5	08/02/2010	13:25:00	117673	0.16	-	280
42F5	08/02/2010	13:25:00	117673	0.165	-	326
42F5	08/02/2010	13:25:00	117673	0.17	-	46
42F5	08/02/2010	13:25:00	117673	0.225	-	2
42F5	08/02/2010	13:25:00	117673	0.23	-	2
42F5	08/02/2010	13:25:00	117673	0.235	-	2

d) Output CPUE per length per haul (downloaded file) for DataType C (Scotland)

SUBAREA	DATE	TIME	HAUL	LENGTH	SEX	CPUE_ICES
43F1	01/02/2010	15:24:00	116503	0.235	-	2
43F1	01/02/2010	15:24:00	116503	0.26	-	2
43F1	01/02/2010	15:24:00	116503	0.265	-	4
43F1	01/02/2010	15:24:00	116503	0.27	-	8
43F1	01/02/2010	15:24:00	116503	0.275	-	12
43F1	01/02/2010	15:24:00	116503	0.28	-	10
43F1	01/02/2010	15:24:00	116503	0.285	-	10
43F1	01/02/2010	15:24:00	116503	0.29	-	6
43F1	01/02/2010	15:24:00	116503	0.295	-	4
46F0	03/02/2010	15:18:00	116509	0.255	-	2
46F0	03/02/2010	15:18:00	116509	0.265	-	2
46F0	03/02/2010	15:18:00	116509	0.275	-	2
46F0	03/02/2010	15:18:00	116509	0.285	-	2
46F0	03/02/2010	15:18:00	116509	0.29	-	4

Differences in the output:

- The results for StatRec 42E7 (valid night haul) are not in file b).
- Haul number is not identical in files a and b, although country. Ship, date, time and statistical rectangle correspond

9.4.2.4 Amblyraja radiata

a) Calculated output Exchange file for DataType R (Denmark)

STATREC	YEAR	MONTH	DAY	TIME	HAUL	LENGTH (M)	SEX	CPUE
36F0	2010	2	16	712	30	0.41	f	2
41F5	2010	2	8	1535	11	0.3	f	2
41F5	2010	2	8	1535	11	0.31	f	2
41F5	2010	2	8	1535	11	0.33	f	2
41F5	2010	2	8	1535	11	0.34	f	2
41F5	2010	2	8	1535	11	0.37	m	2

StatRec	Year	Month	Day	Time	Haul	length (m)	Sex	CPUE
41F5	2010	2	8	1535	11	0.38	f	2
41F5	2010	2	8	1535	11	0.43	f	2
41F5	2010	2	8	1535	11	0.43	m	2
42F5	2010	2	8	1325	10	0.39	f	2
42F5	2010	2	8	1325	10	0.4	m	2
42F5	2010	2	8	1325	10	0.41	m	2
42F5	2010	2	8	1325	10	0.42	f	2
42F5	2010	2	8	1325	10	0.44	f	2

b) Calculated output Exchange file for DataType C (Scotland)

StatRec	Year	Month	Day	Time	Haul	length (m)	Sex	CPUE
43F1	2010	2	1	1524	14	0.33	f	2
43F1	2010	2	1	1524	14	0.35	f	2
43F1	2010	2	1	1524	14	0.37	m	2
43F1	2010	2	1	1524	14	0.38	m	2
43F1	2010	2	1	1524	14	0.39	f	2

c) Output CPUE per length per haul (downloaded file) for DataType R (Denmark)

Subarea	Date	Time	Haul	length	Sex	CPUE_ICES
36F0	16/02/2010	07:12:00	117693	0.41	-	2
41F5	08/02/2010	15:35:00	117674	0.3	-	2
41F5	08/02/2010	15:35:00	117674	0.31	-	2
41F5	08/02/2010	15:35:00	117674	0.33	-	2
41F5	08/02/2010	15:35:00	117674	0.34	-	2
41F5	08/02/2010	15:35:00	117674	0.37	-	2
41F5	08/02/2010	15:35:00	117674	0.38	-	2
41F5	08/02/2010	15:35:00	117674	0.43	-	4
42F5	08/02/2010	13:25:00	117673	0.39	-	2
42F5	08/02/2010	13:25:00	117673	0.4	-	2
42F5	08/02/2010	13:25:00	117673	0.41	-	2
42F5	08/02/2010	13:25:00	117673	0.42	-	2
42F5	08/02/2010	13:25:00	117673	0.44	-	2

d) Output CPUE per length per haul (downloaded file) for DataType C (Scotland)

Subarea	Date	Time	Haul	length	Sex	CPUE_ICES
43F1	01/02/2010	15:24:00	116503	0.33	-	2
43F1	01/02/2010	15:24:00	116503	0.35	-	2
43F1	01/02/2010	15:24:00	116503	0.37	-	2
43F1	01/02/2010	15:24:00	116503	0.38	-	2
43F1	01/02/2010	15:24:00	116503	0.39	-	2

Differences in the output:

- Haul number is not identical in files a and b, although country, ship, date, time and statistical rectangle correspond
- Variable sex is not available in file b)

9.4.3 Conclusions

The haul number in the downloaded file containing CPUE per length per haul is not identical to the haul number in the Exchange file. It is recommended that the variable Haul always refers to the haul number as uploaded by the responsible institute and that this haul number is presented in the CPUE per length per haul file.

For night hauls the CPUE per haul per length is not calculated for the CPUE per length per haul file. It is recommended that CPUE per length per haul will be calculated for all valid hauls present in the dataset and to add the column DayNight to the output file so a downloader can decide whether or not to select hauls at a specific time of the day.

For species measured to the nearest cm or nearest half cm below, for day hauls the CPUE per haul per length is identical for both methods when sexes are aggregated.

For species measured to the nearest mm below, for day hauls the CPUE per haul per length is identical for both methods when sexes are aggregated and measurements are rounded to the nearest cm below. However, measurement to the nearest mm below is done to be able to derive a useful length frequency distribution. Rounding the lengths to the nearest cm below results in a useless length frequency distribution. It is recommended that the CPUE per length per haul for species measured to the mm below, is calculated for the length classes to the mm below.

9.5 Species names

As described in Section 8.3, there were irregularities in the taxonomic names of fish species. DATRAS is using the ITIS database (www.itis.gov. last update June 2008) for the valid TSN codes and valid scientific names.

For submitting species data, there are four options:

1) Uploading valid TSN: DATRAS accepts the data

2) Uploading invalid TSN: an error message will appear. In the automatic upload this is will be implemented soon.

3) Uploading NODC linked to valid TSN: DATRAS accepts the data

4) Uploading NODC linked to invalid TSN: an error message will appear. In the automatic upload this is will be implemented soon.

Currently, the download page at www.ices.dk sometimes shows species names related to invalid TSN. Examples are: *Amblyraja radiata/Raja radiata*. *Entelurus aequoreus/Entelurus aequerius*. *Engraulis encrasicolus* (twice spelled similar). IBTSWG recommends that inconsistencies in species names caused by invalid TSN codes in the dataset will be solved. As a result, only species names for valid TSN codes should come up when selecting data. Invalid TSN codes should be updated to the valid TSN code available.

For *Solea solea/Solea vulgaris* two valid TSN codes exist on the ITIS website. ITIS has been contacted to find out the reason for this. The answer was as follows "As of the

last time ITIS updated the genus Solea, the Catalogue of Fishes (CoF) had not synonymized these names. That version of CoF is cited for each of these names. Since then these have been dealt with in CoF (they are synonyms. as you suggest). We should be able to make a fairly quick update of a Solea and a few closely-related genera (which will solve this and reflect some other changes), but it will take some time to get the update into the public system due to some IT work that is currently underway."

9.6 Data omissions in HH data

For a number of haul parameters, the completeness of the data in DATRAS was evaluated for the period 1999–2009. IBTSWG recommends that all countries report in 2011 to IBTSWG if the data are available and if the correct data were uploaded to DATRAS. If data are never collected, this should be pointed out.

Table 9.1.6.1. Net opening registered in NS-IBTS, per country and quarter. X=data available.

	Denmark		England		France	Germany		Neth.	Norway		Scotland		Sweden	
	Q1	Q3	Q1	Q3	Q1	Q1	Q3	Q1	Q1	Q3	Q1	Q3	Q1	Q3
1999				X	X	X	X	X	X	X	X	X	X	X
2000	X	X		X	X	X	X	X	X	X	X	X	X	
2001			X	X	X	X	X	X	X	X	X	X	X	X
2002	X	X	X	X	X	X	X		X	X	X	X	X	X
2003			X	X	X	X	X	X	X	X	X	X	X	X
2004	X	X		X	X	X	X	X	X	X	X	X	X	X
2005	X	X		X	X	X	X	X	X	X	X	X	X	X
2006	X	X		X	X	X	X	X	X	X	X	X	X	*
2007	X	X		X	X		X	X	X	X	X	X	X	X
2008	X	X		X	X	X	X	X	X	X	X	X	X	X
2009	X	X		X	X	X	X	X	X		X	X	X	X

***net opening was available in earlier download**

Table 9.1.6.2. Door spread registered in NS-IBTS, per country and quarter. X=data available.

	Denmark		England		France	Germany		Neth.	Norway		Scotland		Sweden	
	Q1	Q3	Q1	Q3	Q1	Q1	Q3	Q1	Q1	Q3	Q1	Q3	Q1	Q3
1999	X	X		X	X			X	X	X	X	X	X	X
2000	X	X		X	X				X	X	X	X	X	
2001	X	X	X	X	X				X	X	X	X	X	X
2002	X	X	X	X	X			X	X	X	X	X	X	X
2003			X	X	X				X	X	X	X	X	X
2004	X	X		X	X				X	X	X	X	X	X
2005	X	X		X	X	X	X		X	X	X	X	X	X
2006	X	X		X	X	X	X		X	X	X	X	X	X
2007	X	X		X			X		X	X	X	X	X	X
2008	X	X		X		X	X		X	X	X	X	X	X
2009	X	X		X	X	X	X		X		X	X	X	X

Table 9.1.6.3. Distance towed registered in NS-IBTS, per country and quarter. X=data available.

	Denmark		England		France	Germany		Neth.	Norway		Scotland		Sweden	
	Q1	Q3	Q1	Q3	Q1	Q1	Q3	Q1	Q1	Q3	Q1	Q3	Q1	Q3
1999	X				X	X	X	X			X	X	X	X
2000					X	X	X	X			X	X	X	
2001	X	X			X	X	X	X			X	X	X	X
2002	X	X			X	X	X	X			X	X	X	X
2003	X	X			X	X	X	X			X	X	X	X
2004	X	X			X	X	X	X			X	X	X	X
2005	X	X			X	X	X	X			X	X	X	X
2006	X	X			X	X	X	X			X	X	X	X
2007	X	X			X	X	X	X			X	X	X	X
2008	X	X			X	X	X	X			X	X	X	X
2009	X	X			X	X	X	X			X	X	X	X

Table 9.1.6.4. Ground speed registered in NS-IBTS, per country and quarter. X=data available.

	Denmark		England		France	Germany		Neth.	Norway		Scotland		Sweden	
	Q1	Q3	Q1	Q3	Q1	Q1	Q3	Q1	Q1	Q3	Q1	Q3	Q1	Q3
1999						X	X				X	X	X	X
2000						X	X				X	X	X	
2001						X	X				X	X	X	X
2002						X					X		X	X
2003						X	X	X			X	X	X	X
2004						X	X	X			X	X	X	X
2005	X	X				X	X	X			X	X	X	X
2006	X	X				X	X	X			X	X	X	X
2007	X	X			X	X	X	X			X	X	X	X
2008	X	X			X	X	X	X			X	X	X	X
2009	X	X				X	X	X			X	X	X	X

The following data should be checked and updated by the countries responsible:

Country	Year	Quarter	Net opening	Door spread	Valid
Denmark	2009	1	98	5	V
Denmark	2009	1	71	5	V
Denmark	2009	3	61	71	V

For haul duration, IBTSWG agreed that all hauls less than 15 minutes should be classified as invalid, in DATRAS and in the national databases. This applies for the following records:

Country	Year	Quarter	Haul	Duration	Valid
Germany	2002	1	56	10	V
Netherlands	2005	1	5	6	V
Netherlands	2006	1	37	10	V
Scotland	1999	3	55	12	V
Scotland	1999	3	86	9	V

COUNTRY	YEAR	QUARTER	HAUL	DURATION	VALID
Scotland	2002	3	27	10	V
Norway	2001	3	536	7	V
Norway	2004	3	321	12	V
Norway	2005	3	197	14	V
Norway	2006	3	343	11	V
Norway	2008	3	283	14	V

9.7 DUAP topics discussed

Since during IBTSWG a wish-list came up for a number of variables which might be useful for other surveys as well, the list is stated below and posted on the DUAP sharepoint (see Section 3.1) as discussion to get input from other groups uploading data in DATRAS.

9.7.1 New common maturity scales

Since the new common maturity scales tend to move towards the 6 point scale as proposed for gadoids (ICES, 2008; ICES, 2010 in prep.), the proposal as launched by IBTSWG in 2009 (ICES, 2009) to use codes 61. 62. 63. 64. 65 and 66 for this maturity scale is most convenient.

For future new maturity scales the same code can be applied if the 6 point scale is used. It is recommended that references to maturity staging workshop reports will be available in the DATRAS maturity reference tables to have more information on the description of the maturity stages.

9.7.2 Type of length measurements

The type of length measurement is not added in DATRAS. In most cases, for fish total length is measured. However, sometimes other length measurement types are used, mainly for deepwater fish species. A complete list for the measurement types for deepwater species can be found in the PGNEACS 2008 report, Table 2. (ICES, 2008b).

Additionally, there is a wish for measurement types for Cephalopods (mantle length. head length) and Crustaceans (carapace length. carapace width).

It is crucial to know which measurement method is used when creating length frequency diagrams. Length measurement information should be available on a record level in all HL and CA records and is additional to the class increment.

9.8 References:

ICES. 2008a. Report of the Workshop on Sexual Maturity Staging of Cod. Whiting. Haddock and Saithe (WKMSCWHS), 13–16 November 2007, Copenhagen, Denmark. ICES CM 2007/ACFM:33. 62 pp.

ICES. 2008b. Report of the Planning Group on the Northeast Atlantic Continental Slope Survey (PGNEACS), 29 January-1 February 2008, Galway, Ireland. ICES CM 2008/LRC:02. 38 pp.

ICES. 2010 (in prep.). Report of the Workshop on Sexual Maturity Staging of sole. plaice. dab and flounder (WKMSSPDF), 22–26 February 2010, Ijmuiden, The Netherlands. ICES CM 2010/ACOM:50.

10 Implement the outcome of SGSTS (ToR g)

g) Aspects of quality in survey design, sampling strategies and analysis of data are of prime importance for IBTSWG. Many aspects of trawl standardisation and intercalibration being examined by SGSTS are pertinent to IBTS and review of recommendations is essential.

At the time of IBTSWG (2009), SGSTS was working on the publication of an additional ICES Cooperative research Report on GOV standardisation, based on the work carried out by SGSTS (ICES. 2007). The CRR was expected to be finalised during 2009 and IBTSWG considered it to be more appropriate to wait for the completion of the CRR in order to study the protocols and tools provided, and consider their adoption within the IBTS standard protocols.

As the CRR was not available for consideration during this meeting. IBTSWG (2010) considered a presentation (Annex 6) based on the report of SGSTS (ICES. 2009).

This report sets out to provide the state-of-the-art in the standardisation of survey bottom trawls and to provide guidance on how to maintain consistent and robust data sets from these gears for the many and often conflicting demands placed upon them.

The report dealt with 7 different subjects relating to surveys;

1) Procurement and construction
2) Preparation for sea. shakedown and calibration
3) Maintenance of gear at sea
4) Trawl performance Monitoring
5) Training & Personnel
6) Inter-calibration of Trawls & Vessels
7) Ideal Survey Trawl – State of the art

10.1 Procurement and construction

It was agreed by IBTSWG that this section provides an extensive description and relevant advice on all aspects of specifying, procuring, constructing and checking new survey trawls.

10.2 Preparation for sea, shakedown and calibration

SGSTS (ICES. 2009) state that, although gears, electronic equipment and databases are typically checked prior to sailing, few groundfish surveys have formal procedures for the at-sea testing of the trawl, trawl sensors and other practical elements of the survey prior to commencing the survey proper. This can also be seen as a major part of the training procedure, indoctrinating all staff in the correct use of the equipment. Although many surveys deploy the net prior to commencing the first trawl station, this tends to be so that the fishing skipper and deck crew can check that the rigging is satisfactory and the deck machinery functioning correctly. In some instances, the net is only shot into the surface waters before being retrieved and no proper haul undertaken.

However, it should be recognised that the trawl and trawl sensors are being used as scientific equipment and that in other scientific disciplines the testing of scientific equipment prior to data collection is a fundamental element of scientific protocols. The proper testing of trawls in scientific studies prior to data collection should there-

fore be considered as an important element of the quality assurance (QA) procedures that are in place for groundfish surveys.

Hence, it is suggested that all nations undertaking standardised surveys allocate some of the survey time to carrying out additional hauls at the start of the survey with the specific aim of ensuring that all standard elements of the groundfish survey are working correctly. This should include:

- Gear deployment: is the gear rigged correctly and being deployed and retrieved appropriately by the crew? Is the deck machinery all functioning?
- Ground contact: do the ground gear and doors indicate that the net is on the bottom and fishing correctly? Are bottom contact sensors working?
- Trawl sensors and CTDs: are all electronic equipment functioning correctly, and collecting meaningful data?
- Catch processing: are all elements of catch processing and data inputting functioning?

Though there are good reasons for having these additional hauls in the main survey area, for practical reasons they should be undertaken near the port of departure. This would then allow additional staff (including a gear technologist) to be present to fully check the gear and electronics, and would also save time in case something requires further attention.

IBTSWG recommends that the concept of shakedown hauls and calibration should be adopted by each participating country but recognized that this requires being specific to their needs. For the development of new surveys, the information provided in this section is particularly relevant.

10.3 Maintenance of gear at sea

SGSTS set out to produce a set of key trawl components that could and should be checked regularly at sea and particularly after repairs. The aim was to identify those areas of the net where changes or problems could have a substantial impact on trawl performance. In addition to providing summaries relating to new and used nets, several issues for general consideration were presented with a list of acceptable discrepancies for specific measurements for two of the most commonly used bottom trawls, the GOV and the Campelen 1800 Trawl. They went on to provide advice on switching gear during the survey, and on how long a gear should be used before it is retired.

IBTSWG were in agreement that this chapter would serve to improve on the attempts to ensure that fishing performance is consistent from year to year and within surveys.

10.4 Trawl performance Monitoring

This chapter addressed the use and analysis of trawl monitoring technology with emphasis on:

- Acquisition of key trawl performance parameters
- Guidance for use of key parameter data
- Provide guidance for the use of "other" surveillance instrumentation which may affect trawl derived indices of abundance.
- Analytical tools for describing variability in key parameters

The report goes on to provide a comprehensive appraisal of the issues surrounding the use and analysis of what is regarded as the key parameters.

Given that the four key parameters described in the report can best be considered as those by which the operator decides when a particular tow is valid or not. IBTSWG strongly recommends that countries record the following information:

- Door spread
- Wing spread
- Headline height
- Bottom contact

IBTS reports parameters quantifying the net geometry but usually only as a mean value by haul. However, there will be variance around these values and this should be considered as an important description of each haul performance. Although it is suggested that hauls with a large variance (in net geometry) be repeated, this is not often appropriate or practical but by including variance in database, such hauls can be readily identified and treated with caution during analysis.

SGSTS went on to recommend that net geometry data be archived and that mean value and indication of variance be included in survey data base (e.g. DATRAS).

IBTSWG agreed that this would be desirable but after discussion regarding the current differences in recording either, the mean or median value, a review of the current procedures would be conducted before adopting the recommendation.

The acceptance or rejection of a tow is often a subjective decision made by the chief scientist whilst in the field. This decision may or may not concur with the views of others and consequently may be a major source for bias and inter annual variability. Surveys should have experienced personnel in the field with similar training and a clear set of guidelines defining successful, or conversely, unsuccessful tows. SGSTS provide suitable examples of the criteria that need to be met (on particular surveys) in order to determine the validity of a tow and also the catch processing sampling procedures. IBTSWG agreed that clearly defined criteria, supported by suitable decision flow charts will "help field personnel faced with similar situations, make similar decisions".

The principle use of trawl geometry data on demersal surveys is to ensure that the net is fishing within agreed standards. Range tolerances on the North Sea IBTS was considered by SGSTS and this had previously been conveyed to IBTSWG (2008). This matter was discussed extensively within the group and the comments of SGSTS that there were problems with the current recommended warp out to depth tables proposed in the IBTS manual were highlighted. There was agreement with the SGSTS recommendation that "warp to depth recommendations be changed, and that the manual reflect the importance of consistency in gear geometry rather than warp out relationships". However, this matter also promoted discussion on difficulties that some countries were encountering with gear geometry in locations where the longer sweeps (100 m) were deployed. It was acknowledged that the concept of consistency in gear geometry was desirable but there were concerns that adopting new warp out relationships in conjunction with changes to sweep length could result in changes to swept area, impacting on the catchability of the GOV. A summary indicating the extent of the problems associated with gear geometry has been compiled in order to assess the potential impact of any changes (Table ##).

The Chair of IBTSWG will contact Chairs of the relevant Assessment Working Group in order to seek clarification on how best to move forward with this issue.

10.5 Training & Personnel

Apart from the gear and the various monitoring systems used with it, one other vital aspect needs to be considered and this is the people who will actually operate the gear. This issue is covered in Chapter 5: "Training and Personnel". SGSTS first deal with general aspects of the "human factor" where we should not forget that we are often relying on fallible humans to maintain high standards in a difficult and stressful environment. This includes issues of QA such as engaging the personnel in the reasons for the often unwelcome additional work of checking gear, trawl monitoring equipment etc. A key factor in both achieving high standards of gear maintenance and maintaining quality assurance is the involvement of personnel and their engagement with the issues. The best approach to achieving this is through a strong training programme for both scientific staff and vessel crew, that covers not only how to do this type of work, but also, and very critically, WHY we do this. To this end we offer examples from the courses run in Canada and the US for both science and vessel personnel.

IBTSWG are of the opinion that the examples and advice provided in this section should be used by participating countries in the continuing development of their training and QA procedures.

10.6 Inter-calibration of Trawls & Vessels

Much of the discussion thus far in the SGSTS report has been about setting and maintaining standards and achieving consistency and stability in the data derived from trawl surveys. However, occasions can and do arise when we cannot maintain the status quo. The most obvious would be when we change vessels, but equally, we may have to change components of our survey gear, with unknown effects. Alternatively we may wish to introduce better procedures. e.g. trawl symmetry of autotrawl. Essentially, we cannot ignore that changes will need to be made in our survey gear and practices, and we need to be able to account for these. Stock assessment scientists often ask for "no change" in our surveys, to maintain a consistent time series. But many changes cannot be rejected simply to "maintain consistency". To illustrate this, in this report we advise on the correct approach to repairing gear at sea and maintaining the standard. In the past, when this was not done, it is highly likely that the performance of the gear would have deteriorated throughout the survey. It is clearly not sensible to suggest that we should NOT repair our gear properly simply to maintain consistency in the time series. Therefore, we need to have a sensible approach to incorporating and accounting for changes, both voluntary (e.g. better repairs) or by necessity (e.g. materials no longer available). This subject is covered extensively in this chapter.

In this chapter SGSTS considers "changes" to fall into three categories, and advise on appropriate approaches to each of these;

- Minor improvements designed to allow better compliance with the standards agreed for the survey.
- Modest changes or departures from agreed standards whose effects are individually hard to estimate.
- Major changes that depart significantly from agreed standards for the survey.

This section is particularly relevant at this stage as it is very likely that IBTSWG will be adopting recommendations and suggestions from the SGSTS reports and from the proposed CRR on GOV standardization. IBTSWG also fully supported the view of SGSTS that "we cannot ignore that changes will need to be made in our survey gear and practices, and we need to be able to account for these". This philosophy will be relevant as IBTSWG investigate the need to adopt new depth / warp ratios as well as strive for standardization on issues such as sweep length.

10.7 Ideal Survey Trawl – State of the art

The final detailed chapter in the report looks at the concept of the "Ideal" survey trawl. There is probably no "ideal" survey trawl, however, SGSTS felt it useful to determine what this perfection would look like, and then to compare current trawls with this. The hope would be that we could work towards such a net over time.

Initially SGSTS offered a list of twelve key features of the "Ideal" survey trawl. These include; basic design, geometry, robustness, price etc. Perhaps the most important features of the "ideal" trawl would be lack of herding and selectivity. Most "survey" nets are actually adapted commercial nets. For instance the Campelen 1800 was modified from a commercial shrimp trawl. In 2004, the Norwegians set out to try and design and produce a survey trawl, built for purpose, and that lived up to the standards of the "ideal" trawl. Their developments and some results with the gear are presented in this report. Some of the most novel components were to aim for a self spreading gear, and to use plates for the ground gear rather than bobbins or hoppers.

SGSTS then examined how two nets (the Norwegian trawl described above. and the GOV) compared to the ideal, where they reached that standard and where not. Most importantly, there was evidence of selectivity by both nets, although it appears there may be significantly less herding in the Norwegian trawl than the GOV.

IBTSWG discussed the use of the information in this section and also reflected on the comparison of the GOV against the "ideal". The value of this section is clearly very high when setting out on designing a new survey. Marine Scotland Science indicated that they referred to the key features for an ideal trawl when preparing the survey gear for two new surveys: MSS joint industry-science Anglerfish survey and the West Coast Industry Gadoid Survey (commenced 2010).

10.8 References

ICES. 2007. Report of the Study Group on Survey Trawl Standardisation (SGSTS). 19–20 April 2007, Galway, Ireland. ICES CM 2007/FTC:04. 14pp.

ICES. 2009. Report of the Study Group on Survey Trawl Standardisation (SGSTS), by correspondence, ICES CM 2009.

11 Update and review the IBTS Manuals (ToR h)

h) All changes in the protocols of the surveys coordinated by the IBTSWG have to be implemented in the IBTS manuals.

It has been five years since the last update of the "Manual for the International Bottom Trawl Surveys" (Revision VII), and eight years since the update of the "Manual for the International Bottom Trawl Surveys in the Western and Southern areas" (Revision II). During this time a number of issues have been brought to light, and changes in survey protocols have been implemented (especially in the Western and Southern areas) that have resulted in the required revisions for both manuals during

2009 and the beginning of 2010. Up until now these survey manuals have been produced as addendums to the report of the IBTSWG in the given year, however these are not year specific, so taking for referencing purposes it is recommended that the manuals appear as independent references not linked to any report in particular.

11.1 IBTS Manual update

In 2009 IBTSWG meeting it was decided that a new revision of the "IBTS Manual" would be presented and approved as revision VIII. The main issues reviewed and modified are:

- Additional information on the measurement of crustacea and deepwater species
- Standardised way to measure the net during trawl check procedures
- More information of how the indices are calculated
- An update of the survey coverage for quarter 1 and 3
- More detail on MIK and GOV gear preparation and rigging
- New information of the use of the six stage maturity identification key
- Update of DATRAS code list
- Update of Round Fish Area (RFA) map to include RFA 10
- More information on the standard practices of the quarter 3 survey
- More information on the use of net geometry equipment and screening of SCANMAR data
- Move Section 2.9 (Current objectives) to the start of the chapter and update
- Update the history of the survey for the last few years
- Update list of target species to measure after recommendations of the DCR
- Highlight the need to sample MIK and GOV hauls more than 10nm apart
- Update the sampling section to include weights of all biologically sampled species

Nevertheless a few issues, mainly related to documenting the MIK sampling, have not been reviewed due to time constrains and the fact that the MIK is not used in all surveys, therefore the review of this section is postponed for the next year.

11.2 IBTS Northeastern Atlantic manual update

In the case of the IBTS Manual for the Southern and Western areas, more changes have occurred since 2002. Surveys have been discontinued, some due to shifts in the resources, some forced by budgetary constraints and reductions, also changes in gears used and sampling designs in order to cover the area or seasons more efficiently.

These changes made it necessary for a thorough revision of the report structure and content, to ensure a more comprehensive document that can also be used as a field manual at sea and as a reference manual when using the IBTS NeAtl area data. Following this approach the manual has been restructured with emphasis on the protocols and common work across the individual surveys, taking advantage of sections already included in the main IBTS Manual, and now in the NeAtl Manual also. The information for the individual surveys has been updated and reviewed throughout. to reflect the most recent information available and includes a short summary of the most relevant changes in the history of each survey.

12 Other business

12.1 Litter/Debris data

With the EC's Marine Strategy Framework Directive (MSFD) listing Marine litter as one descriptor of Good Environmental Status: "Properties and quantities of marine litter do not cause harm to the coastal and marine environment." (MSFD, 2008), there is growing interest in monitoring marine litter in European waters, and sources of information and/or on-going surveys that could provide a time series to monitor marine litter. The EC has also recognised the importance that "*monitoring methods are consistent across the marine region or subregion so as to facilitate comparability of monitoring results*" (CEC. 2008). And so requests information from ICES on the monitoring, and assessment of marine litter. Within this context, ICES has also been approached from several sides regarding the establishment of an expert group on marine litter. as a result it has been created the joint MEDPOL/Black Sea/ICES Workshop on Marine Litter (WKMAL), which will be held 2–4 November at ICES HQ. Also in this regard, bottom trawl surveys as those coordinated in the IBTSWG. WGBIFS or WGBEAM in the Atlantic/Baltic area, and MEDITS project in the Mediterranean, are seen as a good alternative to assess the amount marine litter on the seabed with consistent methodology.

With this aim the IBTSWG has been contacted to know if marine litter information is already been collected up to know, and study the possibility of collecting this information in an standardized way.

Table 11.1 summarizes the IBTS coordinated surveys that collect information on litter and the time series available. This information is kept at the national data bases and collected according to the protocols and categories decided by the different surveys.

Table 11.1. Information on litter collected during IBTSurveys.

Survey	ICES Divisions	Litter information	Time series
Cefas NS & Celtic Sea	IV & VIIefgh	Yes	1992–2009
Denmark - NS	IV	No	
Fr-IBTS - NS	IV	Yes	1998 / 2010
Fr-CGFS	IVc – VIId	Yes	1998 / 2010
Fr-Evhoe	VIIejgh - VIIIab	Yes	1994 / 1998 / 2010
Germany – NS	IV	No	
Ireland – IGFS	VIa – VIIbjgh	Yes	?
Netherlands – NS	IV	No	
Norhtern Ireland Irish Sea	VIIa	Yes	2009/2010
Norway – NS	IV	No	
Portugal – IXa	IXa	Yes	2006–2009
Scotland - VIa	VIab	No	
Scotland – NS	IV	No	
Sp-Arsa GC	IXaS	Yes	1997–2009
Sp-NGFS	VIIIc – IXa	Yes	1992–2009
Sp-PGFS	IXaM	Yes	2001–2009

Different protocols and litter classifications, together with the report from the MSFD Task Group 10 were presented and discussed at the IBTSWG meeting. The discussion

on the recording forms, methods and categories used by the different institutes that already collect this information revealed that an important effort on coordination and revision would be needed to produce a coherent data set.

Also the time and staff dedication required to collect the information were discussed, because of the increasing information demands from the surveys cast doubts on the feasibility of attending these demands. After studying the different litter classifications proposed. it was the opinion of the group that the UNEP/IOC classification in general-broad groups (See list below) could be used as a first approach starting with quarter 3 surveys in 2010 if this classification is deemed valuable by the MSFD Task Group 10 and other expert groups that would use the information.

- Plastic
- Paper and cardboard
- Wood ("industrial")
- Metal
- Glass and ceramics
- Cloth (textile)
- Rubber

The approach proposed would be to fill in one form per haul to collect the data on the weight of each category in the catches.

Other aspects also discussed at the meeting, and that need further guidance by the experts responsible of assessing the data on litter, and are also proposed as questions to be addressed by the WKMAL are:

- The use of weight/number in assessing the amount of litter.
- The inclusion of special categories for fishing related litter.
- The exclusion of items coming from natural events. as trees washed out to the sea by rivers

The IBTSWG discussed the possibility of including the litter data collected in DATRAS, but this was not considered adequate given that DATRAS is meant to collect the information of the organisms (species) collected in the surveys, and including the data on litter would be out of the original scope and aim of DATRAS. Therefore further information on how to store the information and exchange formats would be required to ensure the affectivity of the sampling and the exploitation of the information collected.

12.2 Climate change indicator

The Working Document "New usage of bottom trawl fish survey (IBTS) data Climate change indicator?" (See Annex 4: WD 1) was presented.

IBTSWG thinks the plots for individual species are very useful, but these should be checked before publishing (see Section 9.4).

In terms of the suggestion to use the ratio between the number of Boreal and Lusitanian fish species as an 'indicator' of climate change IBTSWG did not feel that there had been sufficient scientific investigation to warrant this at the present time. Although IBTSWG do not support the publication of the results on the website, the group would encourage further exploration of these data to better evaluate such a tool (see Section 9.4).

In the current form, the ratio of Lusitanian to boreal fish species is not an indicator, but simply a metric or index. An indicator is a metric that has been scientifically demonstrated to respond closely (in space and time) to a particular pressure or variable (e.g. climate change) that would allow managers to discriminate between different factors.

Indeed, the framework for the use of this suggested 'indicator' was not clear to IBTSWG. For now, it cannot be considered as an indicator for the effects of climate change on the fish community, but is only a potential metric on a fish assemblage, since only part of the fish community is sampled in the survey.

WGFE has carried out studies on various potential indicators and IBTSWG recommends that WGFE is asked to provide feedback on this topic. It is also recommended to involve ICES working groups such as the IBTSWG and WGFE in the process of developing this indicator (instead of only to comment). Although much of the work that is needed for the development is already undertaken by different working groups (such as quality control and data explorations).

IBTSWG had some general comments on calculating indices and indicators from fisheries survey data:

- The number of hauls taken per rectangle will influence the outcome of the index/indicator. To prevent any influence of the number of hauls per rectangle, bootstrapping the dataset and selecting hauls randomly in a rectangle should be investigated (e.g. Hofstede *et al.* in prep.).
- Gear selectivity might influence the outcome of the index/indicator. This has to be taken into account when calculating indices.
- It is important to select the area that will be used for the index, since an index will only be useful when the same area of coverage is used in its calculation.
- Recruitment events can strongly influence a variety of metrics for the wider fish assemblage, particularly when biomass, relative abundance and spatial distribution are included, and such events need to be understood to aid in the interpretation of the metric.
- A ratio of species number (not weighted by relative abundance or biomass) may be affected by temporal changes in taxonomic resolution of catches, especially as some problem taxa (for which data quality and taxonomic resolution may have improved over time) are predominantly southerly fish species (e.g. gobies. dragonets etc.).

IBTSWG would also highlight the following issues, which would require more detailed analyses of the data to better evaluate and understand such a metric:

- Why would the 3rd quarter optimal to derive indicators from? The `optimal` quarter to use will depend on the important factors for a particular species to move north, which might vary between species.
- There are still some identification issues that may affect such a metric. For example, as noted in Section 7.2.4, there is still some confusion between *Amblyraja radiata* (a northerly species) and *Raja clavata* (a southerly species).
- It is recommended that more detailed studies are undertaken so that the potential effects of water temperature can be disentangled from other ecosystem changes, such as the influx of Atlantic water which can lead to 'southerly' fish species entering the North Sea.

- It is recommended that more detailed studies are undertaken so that the potential contrasting or confounding effects of environmental variables and potential fisheries impacts are better understood and disentangled. For example, many of the larger, northerly fish species are commercially exploited (e.g. cod. Haddock, whiting, saithe), whilst many of the 'southerly' fish species may be smaller non-target species. Exploratory analyses of the ratios of northerly/southerly fish species for both commercial and non-commercial species are required to better understand the utility of the metric.
- For the Baltic Sea, oxygen concentration is also an important variable to take into account.

12.2.1 References

Hofstede, R. ter. Hiddink, J.G., Rijnsdorp, A.D. (under review at MEPS). Global warming changes the species richness of marine fish in the Eastern North Atlantic Ocean.

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Annex 2: IBTSWG terms of reference for the next meeting

The **International Bottom Trawl Survey Working Group** (IBTSWG), chaired by Francisco Velasco*, Spain will meet in ICES Headquarters. Copenhagen, Denmark, 28 March–1 April 2011 to:

a) Coordinate, report and plan for the next twelve months North Sea and North-Eastern 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.

IBTSWG will report by 25 April 2011 (via SSGESST) for the attention of SCICOM, WGISUR, and ACOM.

Supporting Information

Priority	Essential.

Scientific justification	The general need for monitoring fish abundance using surveys is evident in relation to fish stock assessments and in biodiversity studies. The meeting is based on the following needs: 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 IBTSWG annually provides a brief. structured overview of the main results and difficulties from individual vessel surveys. and thereby a centralised and accessible overview of specific survey data sets. to those using the data. IBTSWG will continue to review feedback and implement modifications. including new requirements of the EU DCF. b) In order to achieve the required level of quality in survey data. there is a demand for the evaluation and control of indices and includes the idea of assessing the use of swept area to standardize CPUE looking for a further standardization between surveys. Firstly it would be necessary to carry out a detailed review of the available information regarding gear parameters to estimate swept area and perform a trial comparing results between swept area and standard indices per haul. A first approach would be to carry out comparisons between surveys where information to estimate swept area is available. c) Address again problems in gear performance. but special attention is paid to evaluate the effects of the changes in the sweep length during the 1st Q North Sea IBTSurveys. Since this change is not done consistently between the different countries the group has posed the question of using just one sweep length in all surveys. However it is neccesary to address the possible effect of this decision. This will be done in two ways:: (i) using data already available on trawl geometry. review differences between surveys. and in combination with ToR b. assess possible year effects and differences between years with changes or without changes and intercomparisons between countries changing sweeps and those not changing them. (ii) an aditional option is to carry out a limited experiment on Q1 Surveys in 2011: If every institute carrying out the change in sweeps repeats at least one haul with both sweep lengths. there will be some data to work with on both gear performance but also to very roughly assess possible catchability issues since that is one of the key problems that may be overlooked. The issue has to be addressed before a further step on standardization can be taken. d) and e) Errors in the DATRAS database should be detected and corrected and protocols for the prevention of future errors should be developed and implemented. f) The development of DATRAS needs to be evaluated annually. IBTSWG will recommend on desired further developments. g) After the problems detected in the coherency of the data downloaded from DATRAS. both at the IBTSWG and those posed in DUAP. taking advantage of being in ICES Headquarters to document and solve this issues. h) Aspects of quality in survey design. sampling strategies and analysis of data are of prime importance for IBTSWG. Some of the aspects addressed by the SGSTG have been implemented. and their appropriateness needs to be reviewed i) All changes in the protocols of the surveys coordinated by the IBTSWG have to be implemented in the IBTS manuals.

Resource requirements	A five 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 pre-preparation
Participants	All members will participate in all ToRs. although leads for each ToR will be allocated. The venue of the meeting has been decided in order to facilitate participation by DATRAS responsibles.
Secretariat facilities	None
Financial	None
Linkages to advisory committees	ACOM
Linkages to other committees or groups	Assessment WG's. WGBEAM. WGBIFS. WGDIM. DUAP h) Cooperation with SGSTG
Linkages to other organizations	IOC. GOOS

Annex 3: Recommendations

RECOMMENDATION	ACTION
1) Review the CGFS indices covering the whole Channel area – Section 3.3 The IBTSWG recommends that use of the CGF Survey for providing assessment working groups with abundance indices of several species should be further investigated to determine whether the design of CGFS is suitable for supplying robust stock indices. Also explore the possibility of increasing the area covered or facilitate the overlap with (new) surveys covering the gap between the Eastern part of the Channel and the Celtic sea.	IFREMER (CEFAS?)
2) Logging and recording gear monitoring data – Section 6/Section 10 It is strongly recommended that (a) vertical opening. (b) wing spread. (c) door spread. and (d) ground contact are logged during each haul. and mean/median values and variance estimator are reported for all surveys	All institutes
3) HAWG and IBTSWG to implement MIIK index in DATRAS – Section 4.1 the IBTSWG recommends the HAWG involve the IBTSWG from 2011 onwards in the process of the calculation of the index for herring larvae based on MIK-data	HAWG
4) DATRAS including MIK data – Section 9/4.1 It is recommended that a database for the storage of the MIK-data is implemented in DATRAS from 2011 onwards	ICES Data Centre
5) Staff exchange within IBTSurveys – Section 4 / 10 There is a recommendation from the IBTS working group 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
6) ICES specific number for Survey Manuals – Section 11 It is recommended that ICES Secretariat creates a specific reference for the Surveys Manuals. in order to make it a document easily referenced indepent of a particular annual report	ICES
7) Incorporate SGSTG recommendations – Section 10 The IBTSWG recommends in general the adoption of recommendations made in the SGSTS report in particular a) total check of the trawl is carried out prior to the survey. b) shakedown haul(s) at the beginning of a survey.	All institutes
8) Supression of surveys Section - 3.10 The IBTSWG recommends that Portuguese Q1 and Irish Q1. Northern Ireland Q1. SP-GCadiz Q1 survey series are re-instated (i.e. considered as priority 1 in the DCF) since they: a) Constitute a key platform to cover the collection of maturity and ageing samples required by the DCF; b) Provide the opportunity to explore the utility of the resulting time series for the assessment of the species in the respective areas under the pilot surveys criteria	RCM!NEA
9) The participation of Norway for the IBTS-Q3 NS survey in 2010 is welcomed by the IBTSWG and it is recommended that this survey is maintained in the future	IMR Norway
10) Changes/suggestions for DATRAS – Section 9 Since there is a long list of recommendations dealing with DATRAS. these recommendations have been collated in a separate table: See table below with recommendations from Chapter 9: Review of DATRAS	ICES Data Centre

RECOMMENDATION	ACTION
11) Maintaning surveys protocols and materials – Section 10 It is recommended that survey procedures are maintained as constant as possible. but when changes are needed they should be addressed to the group in respect of implications for standardization. These have been highlighted by WKSAD and SGSTS reports	All institutes

Detailed list of recommendations for ICES Datacentre regarding DATRAS use and implementations.

RECOMMENDATION	ACTION
10.1) Warning of re-uploads – Section 9.1 IBTSWG recommends that a warning will be sent to the data-submitter when uploading data already uploaded in DATRAS. to ensure corrections are uploaded.	DATRAS ICES Data Centre
10.2) Check uploader with country – Section 9.1 To prevent errors. IBTSWG recommends that the cross-check between the data-submitter (two persons allowed per country) and the country in the data uploaded will be executed when uploading data to DATRAS automatically	DATRAS ICES Data Centre
10.3) Implement partial uploads – Section 9.1 IBTSWG recommends that the option of uploading only parts of datasets or single data-corrections will be investigated and implemented by ICES Datacentre	DATRAS ICES Data Centre
10.4) Tracking and documtne date of uploads and corrections – Section 9.2.2 IBTSWG recommends tracking of uploads. which means that the last date of upload is available and. in case of partial upload. it should be clear which values were updated. Track information is also requested when downloading data.	DATRAS ICES Data Centre
10.5) Standard procedure to generate outputs – Section 9.3.1 IBTSWG recommends that the procedure for generating standard output by ICES Datacentre will be: 1) algorithm proposed by IBTSWG to ICES Datacentre together with a raw data set. data selection criteria and expected result. 2) ICES Datacentre generates the Algorithm and IBTSWG checks results before final approval.	DATRAS ICES Data Centre
10.6) IBTSWG recommends that an option for only downloading station information in Exchange format (HH records) from DATRAS will be made available	DATRAS ICES Data Centre
10.7) IBTSWG recommends that information on the variables is available when downloading data from DATRAS (e.g. units used for temperature. explanation of the column names. uploading tracking) for clarification reasons.	DATRAS ICES Data Centre
10.8) Independent download of HH records – Section 9.3.2. It is recommended that the variable Haul always refers to the haul number as uploaded by the responsible institute an that this haul number is presented in the CPUE per length per haul file.	DATRAS ICES DataCentre
10.9) document variables with the download bundle – Section 9.3.2. IBTSWG recommends that information on the variables is available when downloading data from DATRAS (e.g. units used for temperature. explanation of the column names. uploading tracking) for clarification reasons.	DATRAS ICES Data Centre
10.10) Keep the original haul number uploaded – Section 9.4.3 It is recommended that the variable Haul always refers to the haul number as uploaded by the responsible institute an that this haul number is presented in the CPUE per length per haul file.	DATRAS ICES Data Centre

RECOMMENDATION	ACTION
10.11) Add night/day information to HH downloaded – Section 9.4.3 It is recommended that CPUE per length per haul will be calculated for all valid hauls present in the dataset and to add the column DayNight to the output file so a downloader can decide whether or not to select hauls at a specific time of the day.	DATRAS ICES Data Centre
10.12) Maintain the length unit in the CPUE per length – Section 9.4.3 It is recommended that the CPUE per length per haul for species measured to the mm below. is calculated for the length classes to the mm below.	DATRAS ICES Data Centre
10.13) Solve inconsistencies in TSN codes – Section 9.5 IBTSWG recommends that inconsistencies in species names caused by invalid TSN codes in the dataset will be solved.	DATRAS ICES Data Centre
10.14) Check and upload or document gear parameters in HH – Section 9.6 IBTSWG recommends that the gear parameters are reviewed by all countries. and report in 2011 to IBTSWG if the data are available and if the correct data were uploaded to DATRAS. If data were never collected. this should be pointed out.	All countries
10.15) References to maturity staging workshop – Section 9.7.1 It is recommended that references to maturity staging workshop reports will be available in the DATRAS maturity reference tables to provide more information on the description of the maturity stages. and ensure the standardization of data collection among data providers.	DATRAS ICES Data Centre

Annex 4: Working documents presented to the IBTSWG 2010

WD 1: Jørgen Nørrevang Jensen and Carlos Pinto 2009. Climate effects indicator based on IBTS data?

WD 2: Cardador. F., and Chaves. C. 2010. Changes in abundance and distribution of the main species in Portuguese continental waters in 2009.

WD 3: De Boois. I., and Pinto. C. 2010. 1 Stomach sampling data (1981–1991)

WD 4 Coppin. F. *et al.* CGFS abundance indices revised and its combination with the FR-IBTS NS.

WD1 Climate effects indicator based on IBTS data? – Jørgen Nørrevang Jensen and Carlos Pinto. ICES Data Centre

An overview of some preliminary analyses

Different fish species are known to have moved northwards during the recent decades. With the purpose of investigating the potential use of IBTS data as a basis for an indicator for the distributional effects of climate change, we have made some analyses of these data using ArcGis. Some of the results are displayed in the PowerPoint presentation attached. As highlighted in this presentation it is obvious that there are some biases in the use of these data on a species level which should be taken into account if using these data for an indicator:

- The taxonomic resolution is most likely not the same throughout the time series but is considered to be at the same level since 1982
- The quarters of the year when sampling takes place varies throughout the time series but has been the same since 1991
- The areal coverage is not the same throughout the time series
- It is likely that there is a bias in the occurrence of pelagic and demersal species in the catches

Data has gone through some pre-treatment before they have been displayed on a spatial scale:

- Data has been reduced to presence/absence for the individual species
- Some species synonyms have been clarified (e.g. same species occurring twice under different synonyms)
- Pelagic species filtered out due to sampling bias by using bottom trawl gears
- Species has been classified biogeographically using recent classification (RECLAIM project. Engelhard et al. 2008)

Some species are known to have spread northwards during the recent decades. An example is the Red and Red Striped Mullet (*Mullus barbatus* and *M. surmuletus*). The maps in Figure 1 show their distribution in two five-year periods (1966–1970 and 2001–2005). The massive northwards spread is very obvious and the dynamics are made visible in the animation in the PowerPoint presentation.

The use of single (charismatic) species can be illustrative as an indicator but including the whole range of species would constitute a more robust and integrative indicator. Based on the classification made in the RECLAIM project the different species have been classified into Lusitanean, Boreal, Atlantic etc. By using only species classified

as Lusitanean or Boreal, a ratio between the number of lusitanean and boreal species has been calculated. This ratio has been divided into 3 classes: L/B < 1 (blue dots); LB >= 1 (yellow dots); and L/B >= 2 (red dots). As an example the graphic display of these data for 1980 and 2006 can be seen in Figure 2. More details are visualised in the PowerPoint presentation. It is noticeable that the rectangles dominated by lusitanean species in the recent years seem to coincide with the area in the North Sea that has experienced the largest temperature increase during the recent decades (Tasker, 2008).

Summary and conclusions based on the preliminary analyses of data

- Taxonomic resolution varies throughout the survey history. but it is reasonable to assume that the present resolution will stay at a high level which means that it is secure to use these data for biodiversity indicators
- There is no reason to assume that the taxonomic resolution in a given year is different between Lusitanean and Boreal species indicating that it is relatively safe to use the ratio between the number of Boreal and Lusitanean species
- Fish species seems to react relatively fast to changes in sea temperature
- Spatial distribution of fish species is a very simple indicator of impacts of climate changes and easy to understand by the general public
- Potential indicator should be based on a specific quarter of the year, preferably 3. Quarter, in order to avoid seasonal "noise" in the data.

Suggestions for indicators

We suggest developing an ICES web-based facility to display species distributions based on the IBTS data and with expert input from the IBTSWG:

- The user should be able to select species (or groups of species) and period of year (quarter) and make time series maps that are displayed as animated maps based on presence/absence data. It should be mandatory to select a specific quarter in order to avoid that the user is making time series that does not cover the same period every year.
- The user should be able to make animated maps of the ratio between lusitanean and boreal species.

Questions to IBTSWG:

- IBTSWG is asked to consider if they find the development of such an indicator useful and whether they are willing to provide support for its development. If so:
- We would appreciate any suggestions/comment from the members of IBTSWG with respect to improve and modify this indicator based on the group's knowledge and experience.

Finally we would like to emphasize that we will be happy to facilitate the need of the IBTSWG in relation to the viewing and checking the data. We aim to empower how the user studies the data by building procedures and features to view and map the data on the fly.

References:

Engelhard, G.H., Ellis, J.R., Pinnegar, J.K., Payne, M.R., ter Hofstede, R. 2008. RECLAIM. 2.5. Climate effects on distribution and production of species of contrasting ecotypes. (044133 (SSP8)) RECLAIM (Resolving CLImatic Impacts on fish stocks) 32 pp.

Tasker, M.L. (eds.) (2008). The effects of climate change on the distribution and abundance of marine species in the OSPAR Maritime Area. ICES Cooperative Research Report No. 293. 39 pp.

WD 2: Changes in abundance and distribution of the main species in Portuguese continental waters in 2009. – Cardador, F., and Chaves. C.

See presentation on next page of the report.

WD 3: Stomach sampling data (1981–1991) – De Boois, I., and Pinto, C.

Background: in Oct 2008, WGSAM requested that WGDIM works towards making the ICES "Year of the Stomach" datasets for the North Sea and Baltic more readily available to the ICES community. Following this request the relevant datasets have been reviewed and checked (there were different copies and parts of the data set). A final version of the dataset was merged and prepared at IMARES. This dataset will be available online for download in 2010.

WD 4: Comparison of abundance indices estimation methods from CGFS and its combination with the FR-IBTS NS – Coppin. F.

This working document summarizing the trials on different methods to estimate the abundance from the FR-CGFSurvey was presented at the WD to answer IBTSWG 2009 recommendation to investigate the suitability of CGFS indices for assessment purposes. The methods compared were:

- The standard ICES estimation method (mean per ICES rectangle);
- Estimates using a stratification based on four fish-assemblages:
    - Using all the assemblages for each species.
    - Using only the preferred assemblages for each species
- Combining the CGFS and the North Sea IBTS Q-3 in the area closer to the Eastern Channel

The results of the studies carried out show the same inconsistencies between the ICES rectangles method and the fish assemblages for individual species. not showing significant changes in the comparison. Neither the combination of indices CGFS and NS-IBTS Q3 improves the consistency of the indices.

IBTSWG, Lisbon, 22-26 March 2010

CHANGES IN ABUNDANCE AND DISTRIBUTION OF THE MAIN SPECIES IN PORTUGUESE CONTINENTAL WATERS IN 2009

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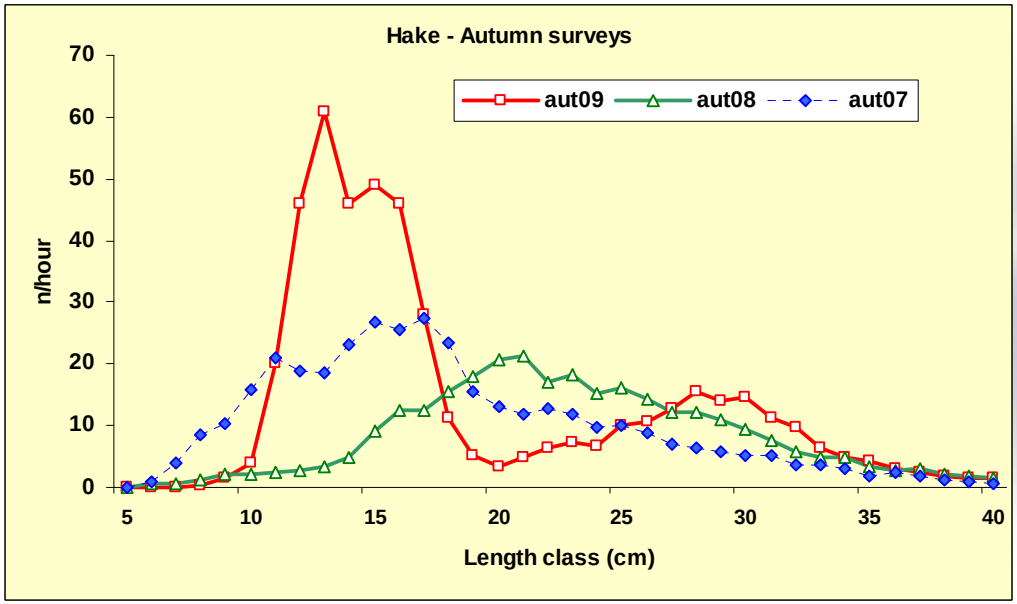
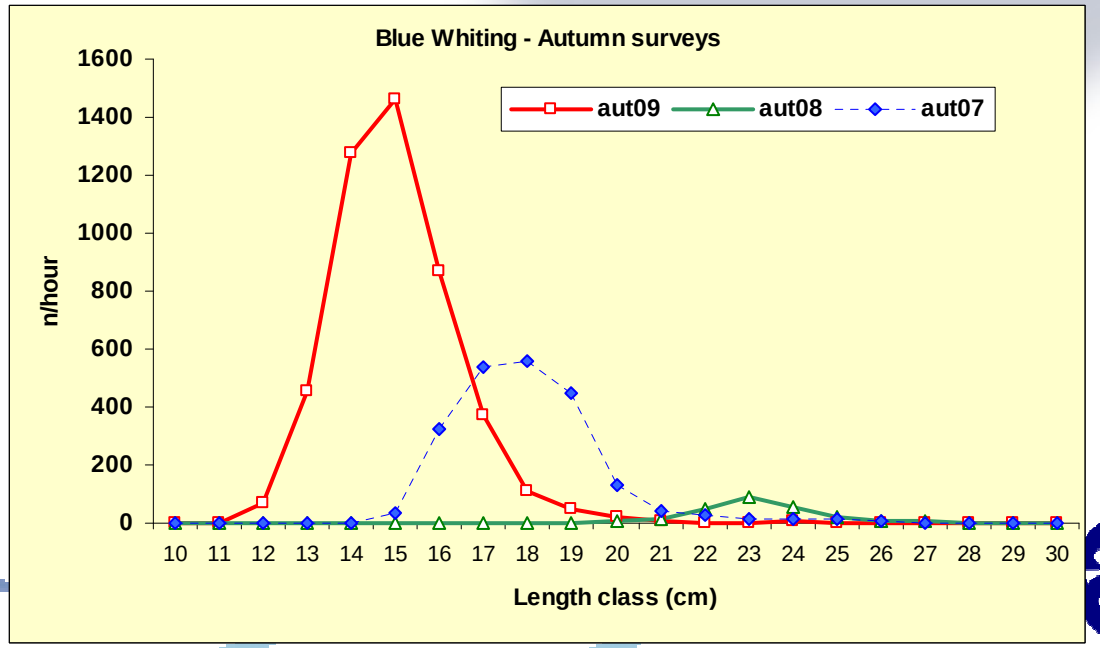
2009 Abundance Indices

	Biomass index		Number index	
Species	2009 kg/h	% rel 2008	2009 n/h	% rel2008
Merluccius merluccius	37.5	+8.3	476	+62.3
Trachurus trachurus	41.5	+160.8	1903	+772.6
Trachurus picturatus	9.1	-66.5	114	-70.6
Micromesistius poutassou	96.6	+336.3	4691	+1677.1
Scomber colias	3.8	-11.7	36	-43.5
Scomber scombrus	40.6	+244.1	564	+370.2


Hake - Autumn surveys
aut09
aut08
aut07
n/hour
Length class (cm)
0
10
20
30
40
50
60
70
5
10
15
20
25
30
35
40


Merluccius merluccius


Micromesistius poutassou


Blue Whiting - Autumn surveys
aut09
aut08
aut07
n/hour
Length class (cm)
0
200
400
600
800
1000
1200
1400
1600
10
11
12
13
14
15
16
17
18
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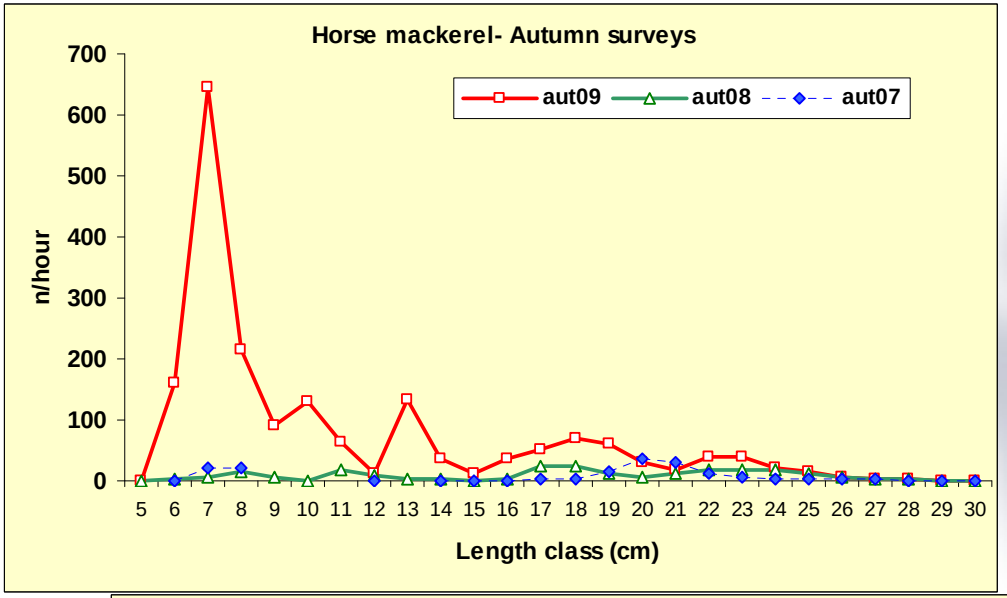
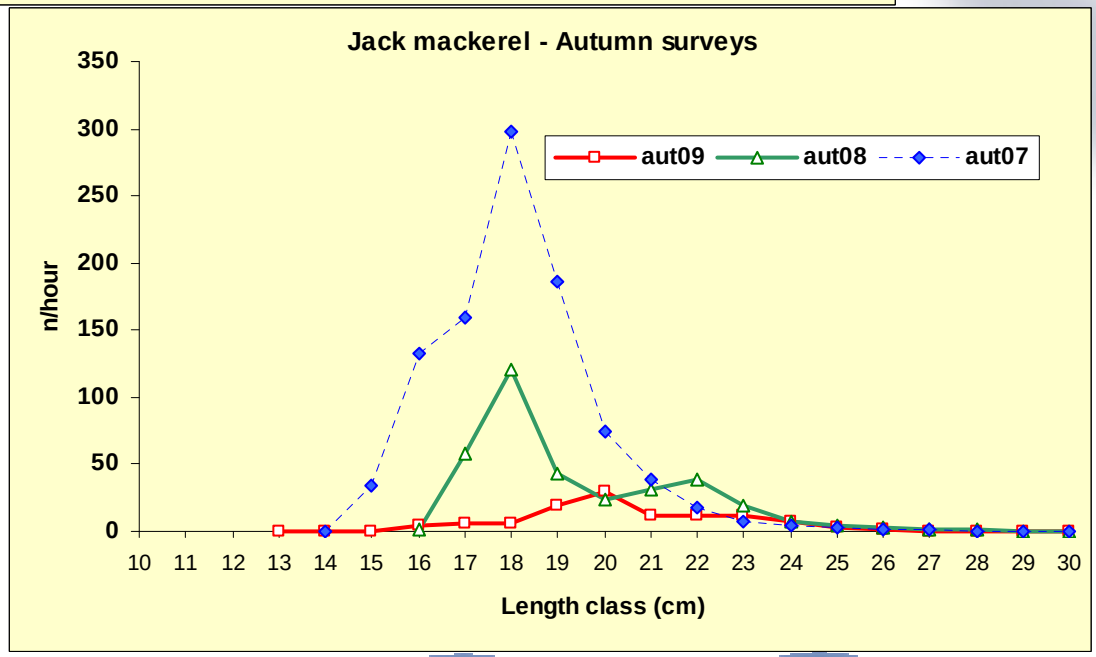
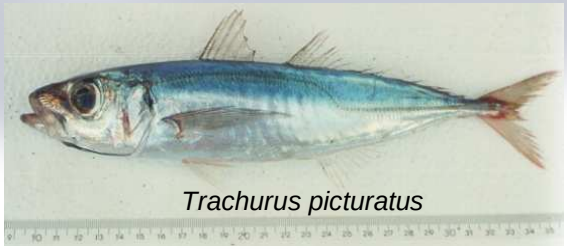
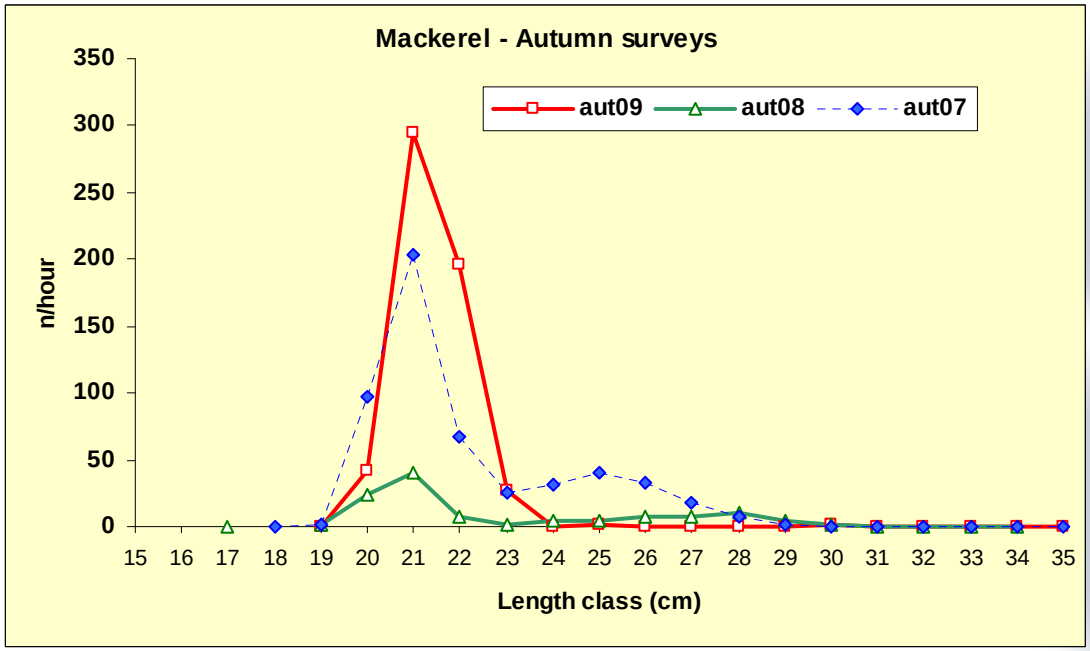

Horse mackerel- Autumn surveys
aut09
aut08
aut07
n/hour
0
100
200
300
400
500
600
700
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Length class (cm)

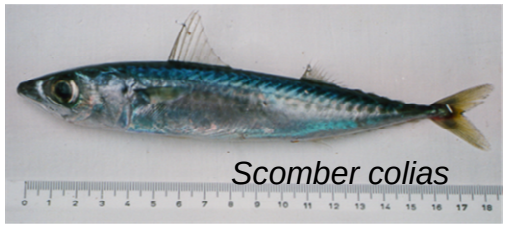

Trachurus trachurus

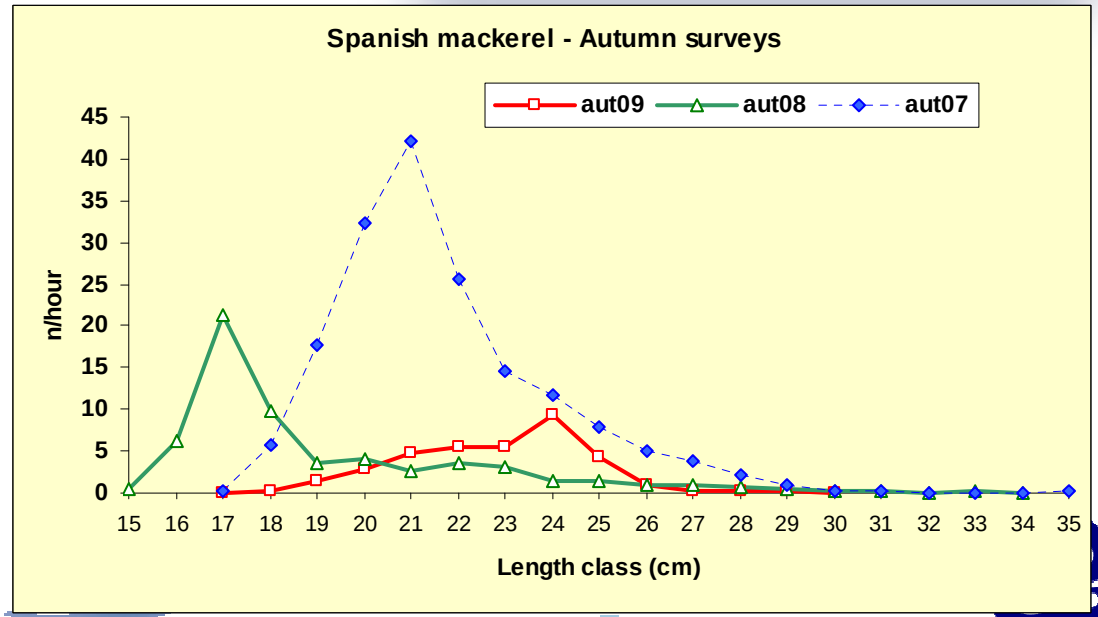

Jack mackerel - Autumn surveys
aut09
aut08
aut07
n/hour
0
50
100
150
200
250
300
350
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Length class (cm)


Trachurus picturatus


Mackerel - Autumn surveys
aut09
aut08
aut07
n/hour
0
50
100
150
200
250
300
350
15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
Length class (cm)

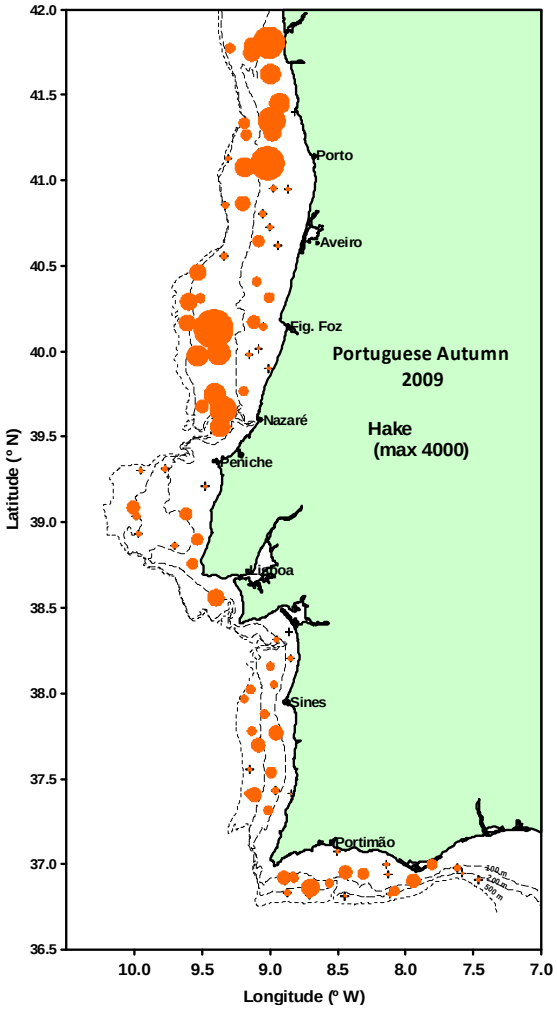

Scombrus scombrus


Scomber colias

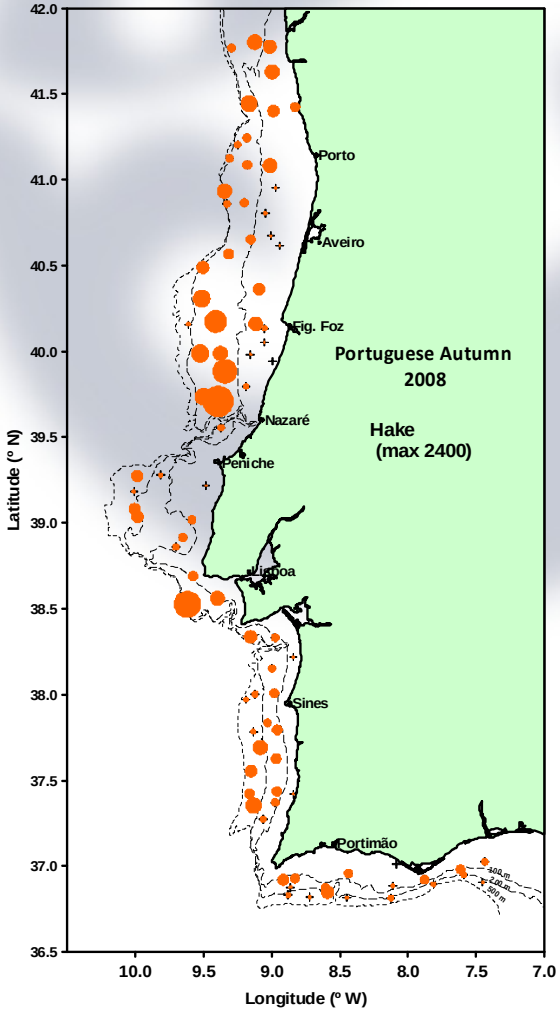

Spanish mackerel - Autumn surveys
aut09
aut08
aut07
n/hour
0
5
10
15
20
25
30
35
40
45
15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
Length class (cm)

Distribution - Hake

2009



2008



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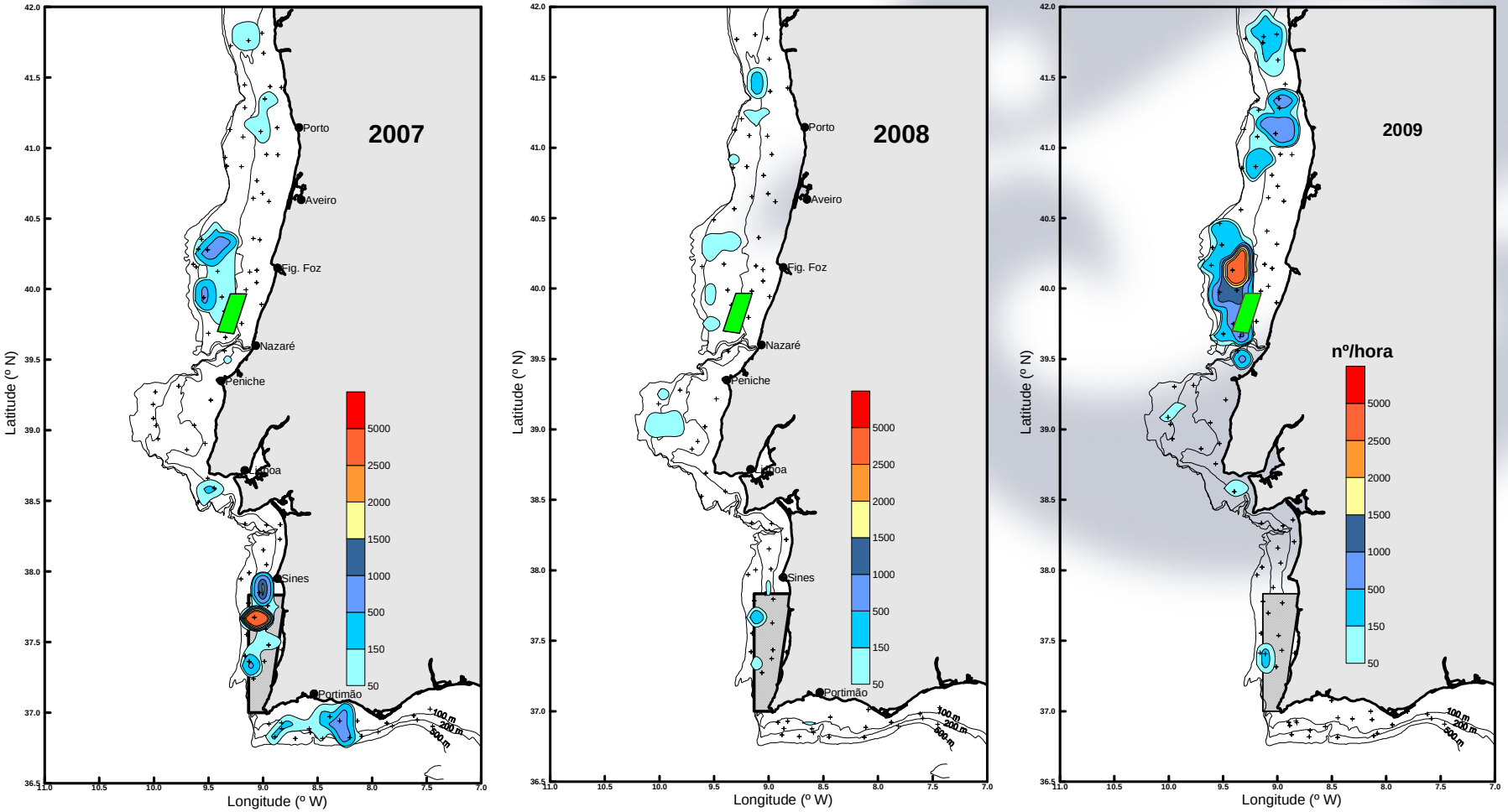
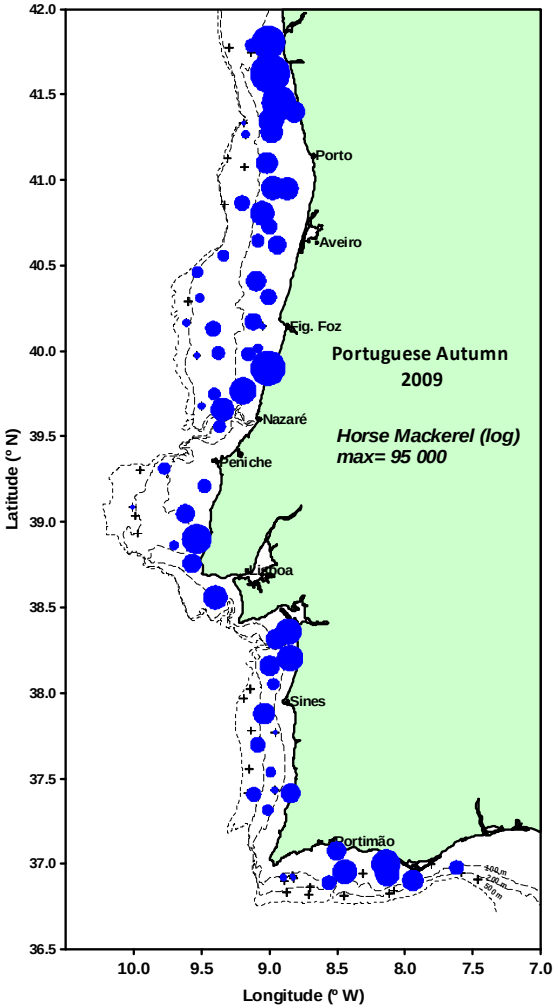
Hake – recruitment (age 0)



Horse mackerel

2009



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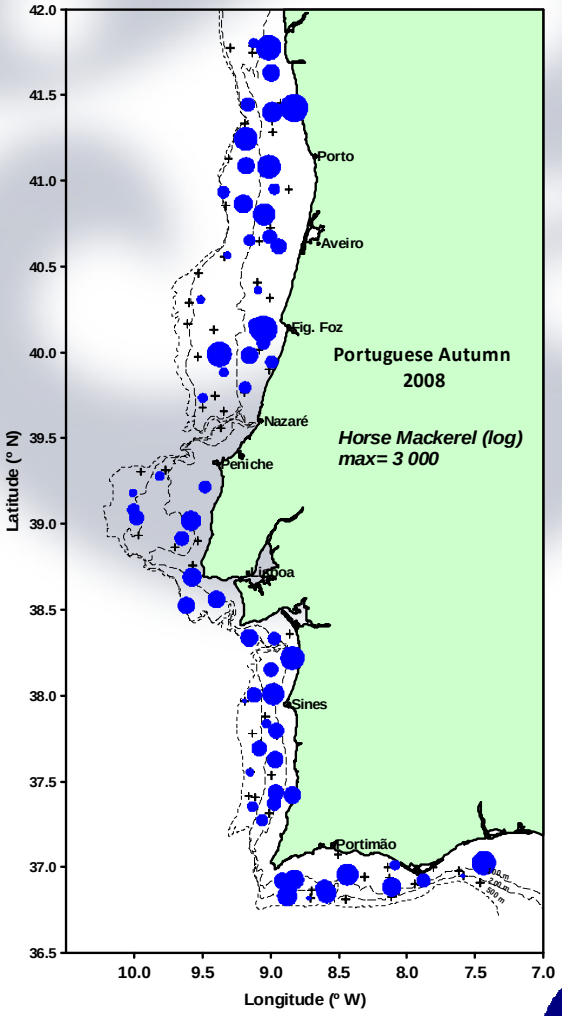

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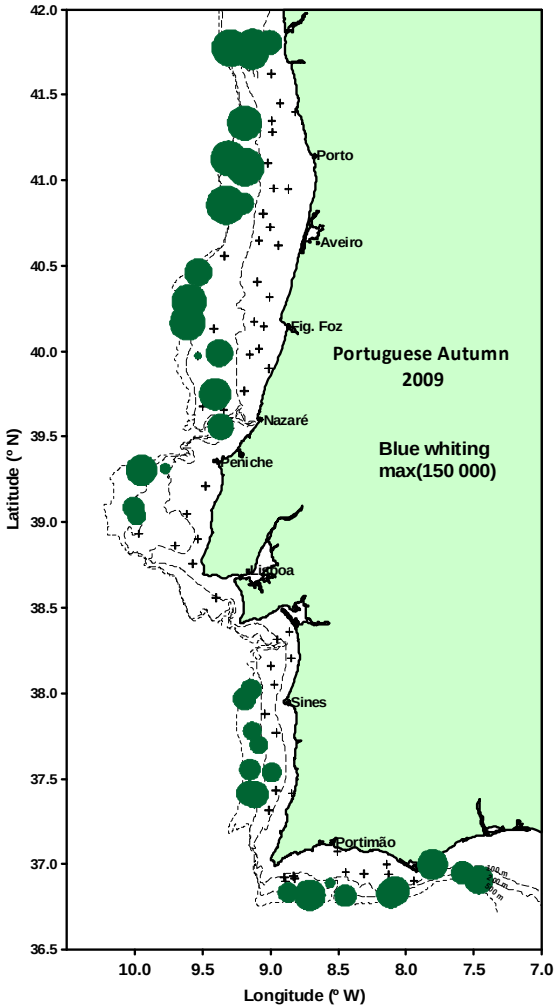
Blue whiting

2009



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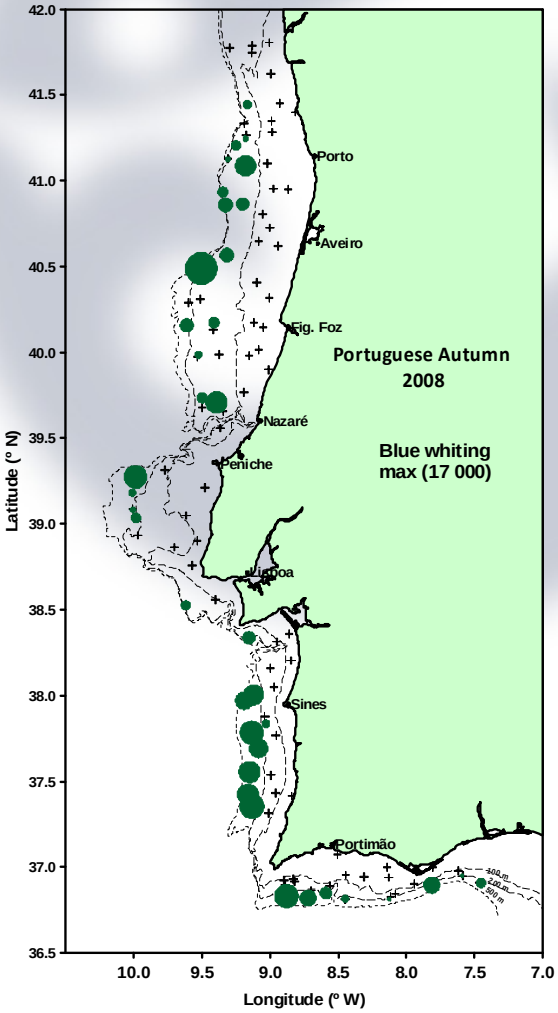

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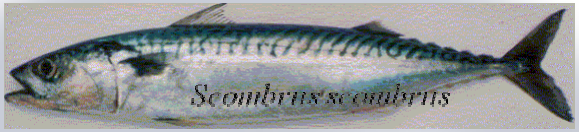
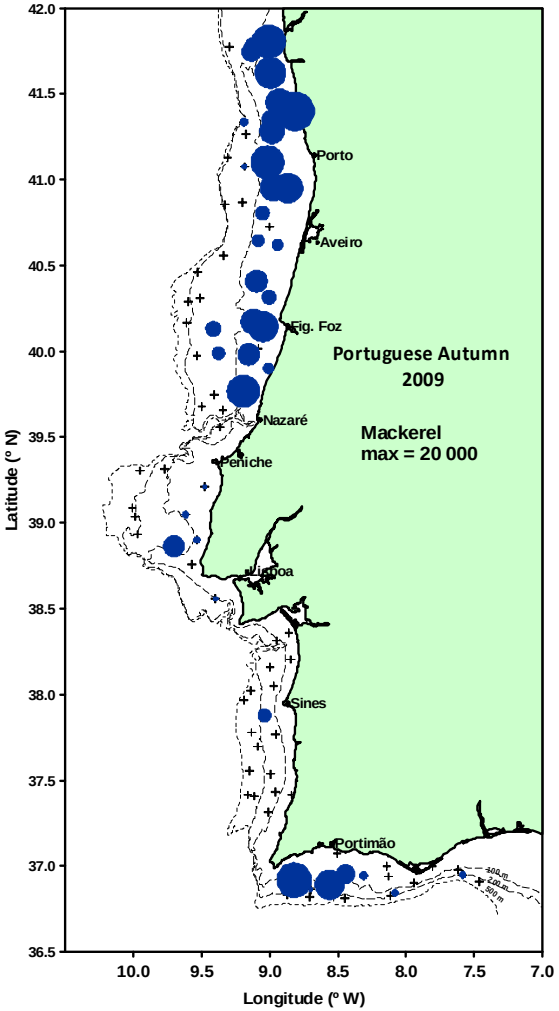


Mackerel

2009



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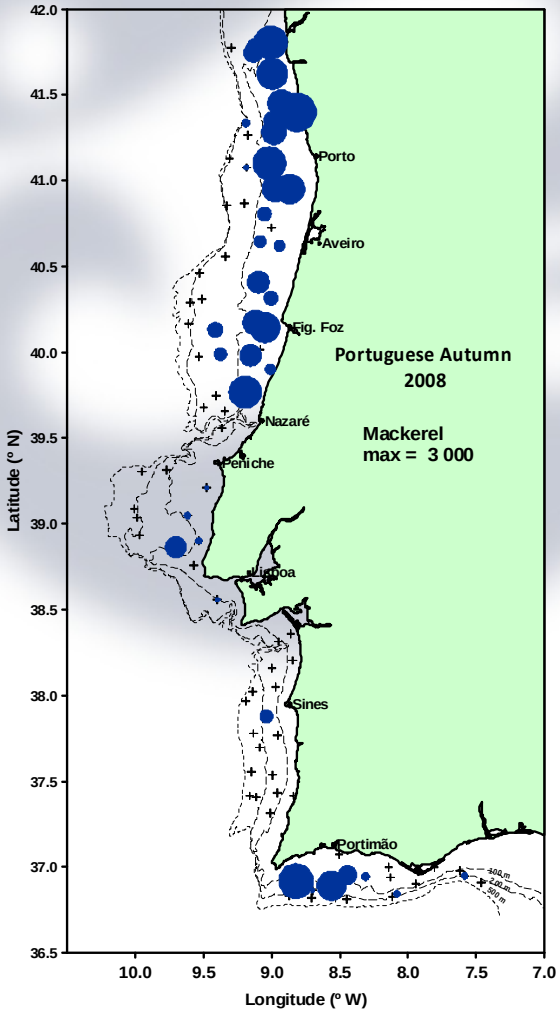

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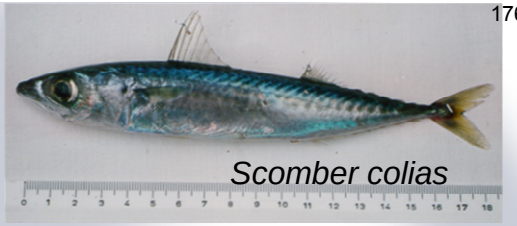
Spanish mackerel



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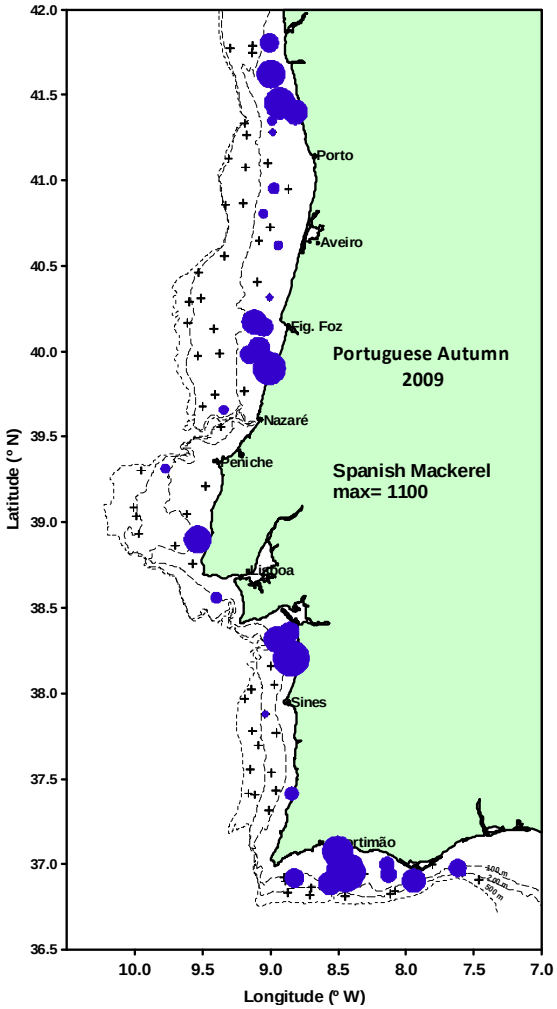

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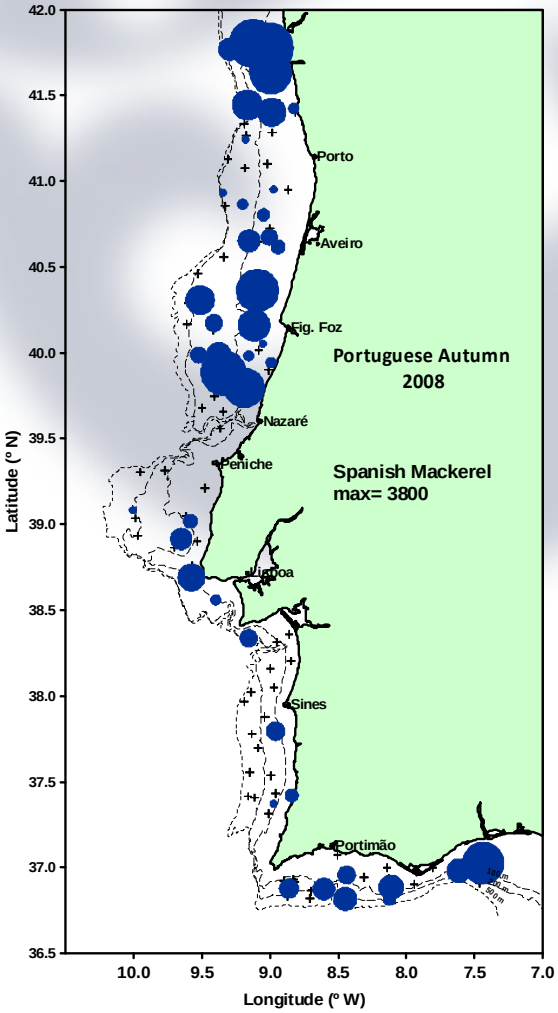

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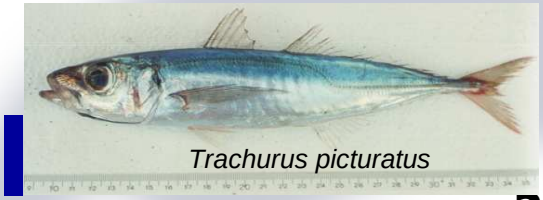
Jack mackerel



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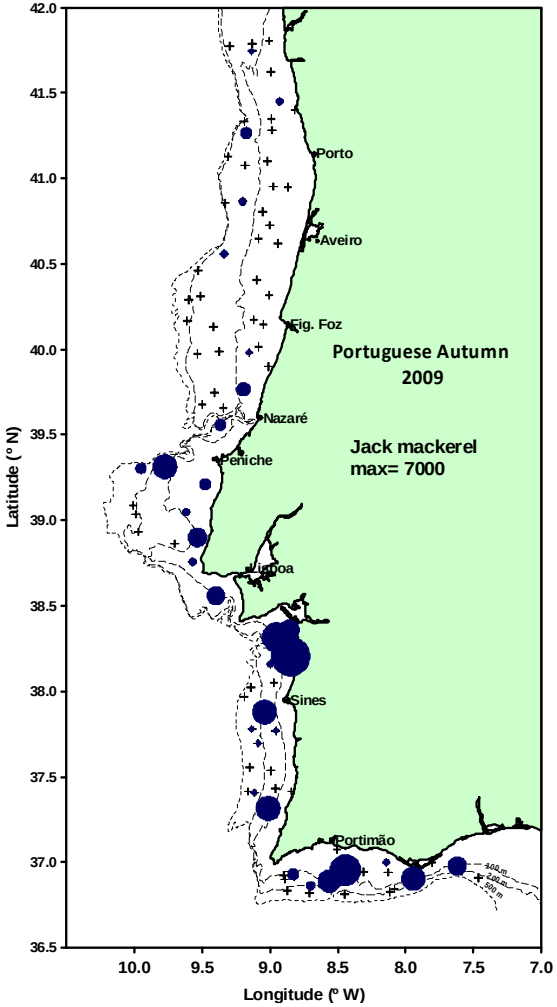

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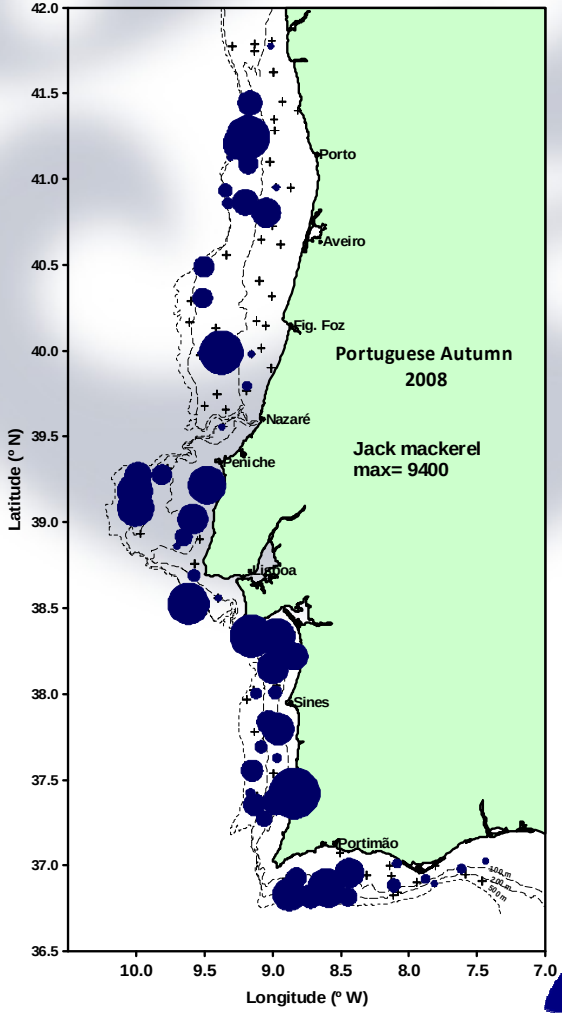

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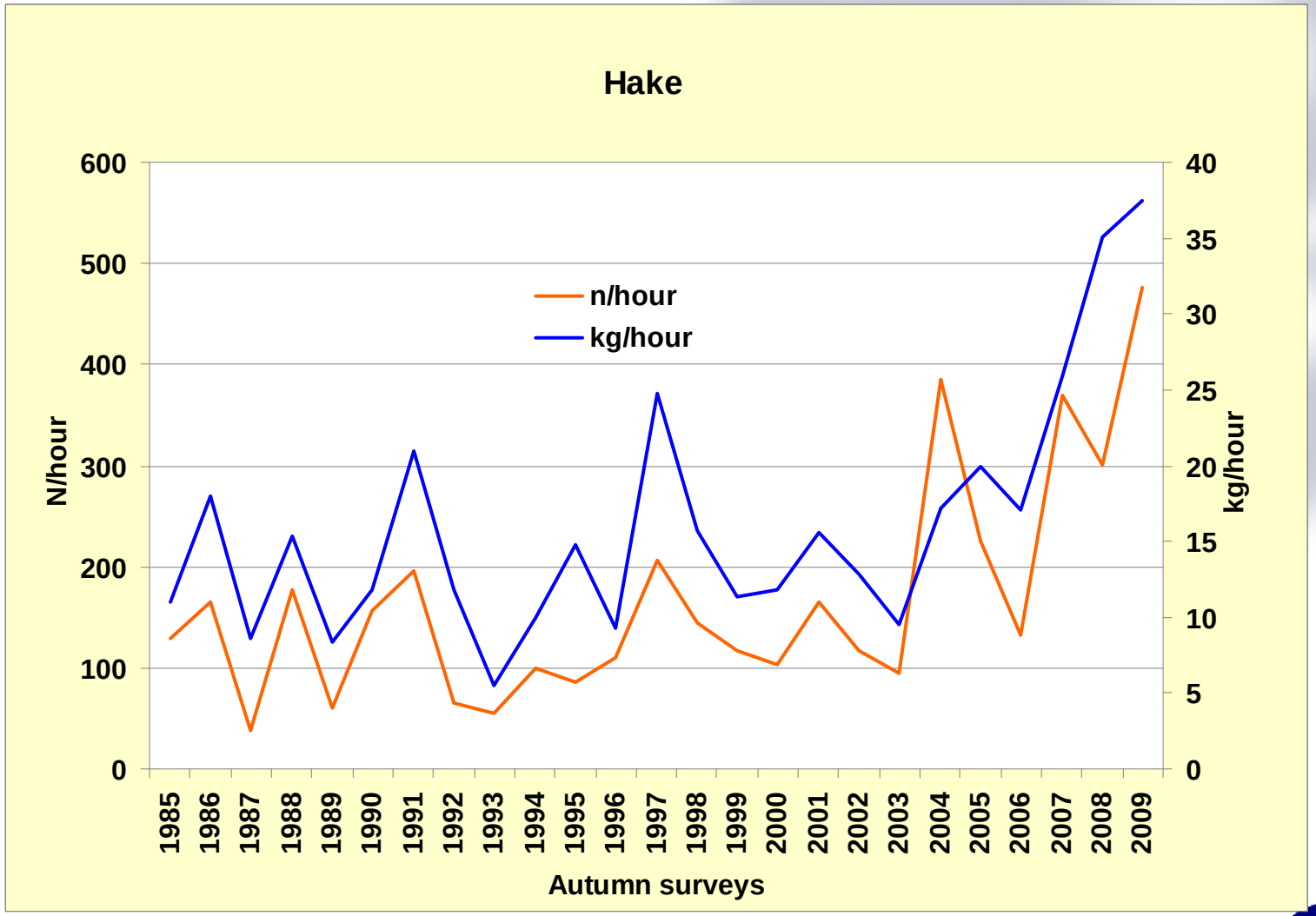
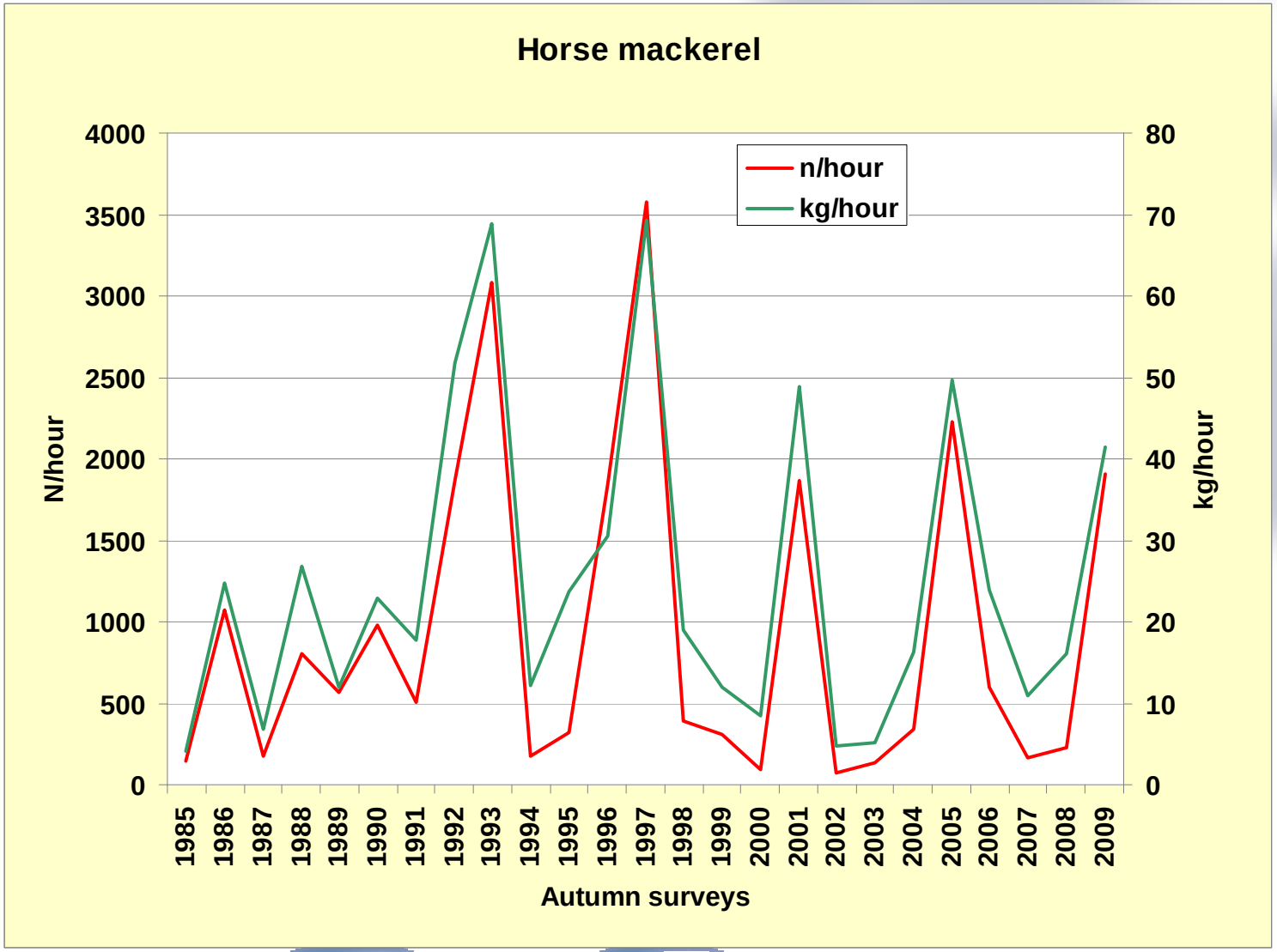
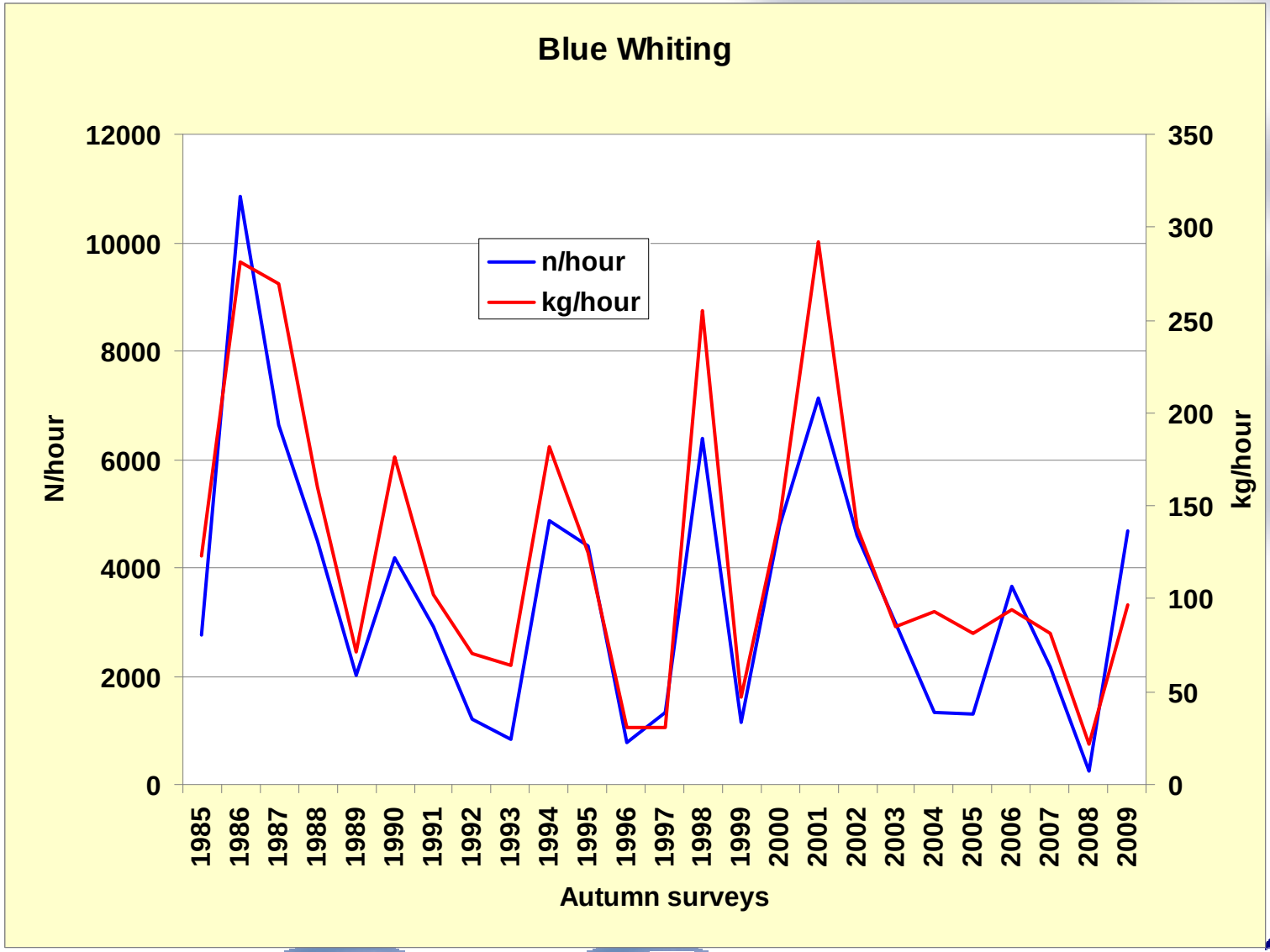
Abundance and biomass indices



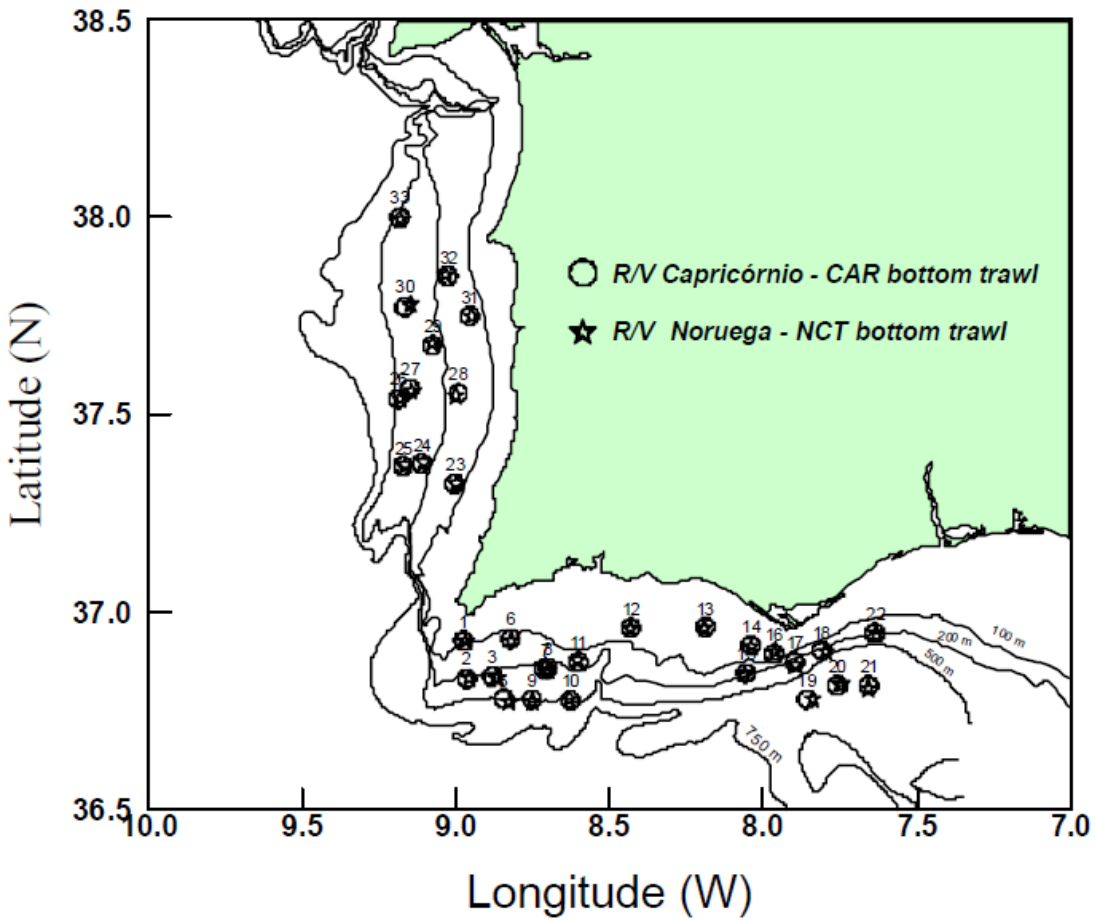
Abundance and biomass indices



Abundance and biomass indices




Thanks for your attention


38.5
38.0
37.5
37.0
36.5
Latitude (N)
10.0
9.5
9.0
8.5
8.0
7.5
7.0
Longitude (W)
R/V Capricórnio - CAR bottom trawl
R/V Noruega - NCT bottom trawl
100 m
200 m
500 m
750 m

Annex 5: SGSTS report presentation

IBTS
INTERNATIONAL-BOTTOM-TRAWL-SURVEY

The Scottish Government

Study Group on Survey Trawl Standardisation (SGSTS) 2009

Tor f - **IBTSWG** 2009

ToR f) review the outcome from the SGSTS in respect to issues relevant to IBTS and implement recommendations where agreed.

The Scottish Government

This Study Group was set up to develop recommendations and protocols to improve standardisation and hence quality assurance in the use and design of survey trawls within and beyond the ICES area.
At the time of the IBTSWG meeting in 2008, SGSTS was working on the publication of an additional ICES Cooperative Research Report on GOV standardization, based on the work carried out during the life of the Study Group.

IBTSWG considered it to be more appropriate to wait for the completion of the CRR, thereby allowing time to study the protocols and tools provided, and to consider their adoption within the IBTS standard protocols.

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Tor for SGSTS 2005

At the ICES Annual Science Conference in Vigo, Spain, in September 2004 it was decided that (C.Res. 2004/2B02) the Study Group on Survey Trawl Standardisation [SGSTS] (Chair: David Reid, UK) will meet in Rome, Italy, Norway, 16–18 April 2005 to:

a) review and report on the current status of survey trawl design, recent developments in design, and new technologies which could be suitable for application in revised survey trawl designs, aiming to reduce trawl performance variability or for use in absolute abundance estimation, for example;

b) design and discuss the implementation of a generic ICES survey trawl standardization programme for all survey bottom trawls inside and outside the ICES areas;

c) design and discuss the implementation of a quality control programme for survey trawl procurement, construction, rigging, repair and maintenance;

d) define the operational requirements to be used in intercalibration studies;

e) develop protocols to be followed when changes are made to the survey gear;

f) develop an outline for an ICES Cooperative Research Report on Standardization and Quality Control Protocols for Bottom Survey Trawls.

SGSTS will report by 21 May 2005 for the attention of the Fisheries Technology Committee, the Living Resources Committee, and the Resource Management Committee and make its report available to WGFTFB and WGIBTS.

Outcomes of SGSTS 2009

Set out to provide state of-the-art in the standardisation of survey bottom trawls and to provide guidance on how to maintain consistent and robust data sets from these gears for the many and often conflicting demands placed upon them.

- **Procurement and construction**
- Preparation for sea, shakedown and calibration
- Maintenance of gear at sea
- **Trawl performance Monitoring**
- Training & Personnel
- **Inter-callibration of Trawls & Vessels**
- Ideal Survey Trawl – State of the art

The Scottish Government

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1. Procurement and Construction

The Scottish Government

This chapter provided advice on all aspects of specifying, procuring, constructing and checking new survey trawls.

Resource assessments derived from multi-national trawl surveys would be improved if all participants used the same standardized gear and protocols.

This has been addressed at various stages by IBTS during the period of SGSTS although different gears are used throughout the regions:

North Sea variations in GOV

Western variations in GOV

- **Norwegian Campelen 1800 shrimp trawl**
- **Spanish Baca Trawl**

Specifications of each trawl should be survey-specific (individual or multi-national).

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Procurement & Construction

Standard Net Drawings

Procurement & Construction Specifications

Standardised Procurement Protocols

Parts List

Tolerances

Inspection

Protocols for Certification (should include):

- purchase and use of materials
- assembly process and finished product
- repair and maintenance history
- all certification documentation

The Scottish Government

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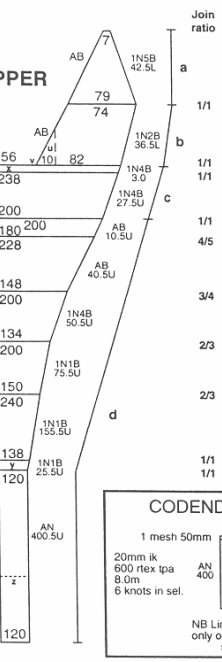
Construction of the 36/47 GOV Trawl

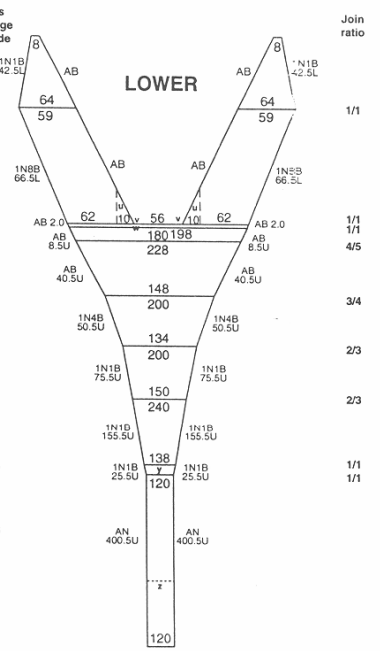
The Scottish Government

Construction of the 36/47 GOV trawl (adapted from drawings of the Institute des Peches Maritimes, Boulogne/Mer)

Mesh mm kc/ik	Twine rtex/mat. (bpa)	Stretched length (m)	Knots selvedge per side	Join ratio
200kc	3700	8.5	1/1	
200kc	3700	7.3	6/1	
200kc	8025	0.6	6/6	
200kc	3700	5.5	6/6	
200kc	3700	2.1	6/6	
160kc	3700	6.5	6/6	
120kc	2800	6.1	6/6	
80kc	2800	6.0	6/6	
50kc	2500	7.8	6/6	
50DY/kc	2500	1.3	6/6	
50DY/kc	2500	20.0	6/6	



Mesh mm kc/ik	Twine rtex/mat. (bpa)	Stretched length (m)	Knots selvedge per side	Join ratio
200kc	5500	8.5	1/1	
200kc	5500	13.3	6/1	
200kc	8025	0.4	6/6	
200kc	5500	1.7	6/6	
160kc	3700	6.5	6/6	
120kc	2800	6.1	6/6	
80kc	2800	6.0	6/6	
50kc	2500	7.8	6/6	
50DY/kc	2500	1.3	6/6	
50DY/kc	2500	20.0	6/6	



CODEND LINER

1 mesh 50mm
20mm ik
600 rtex tpa
8.0m
6 knots in sel.
1/2 (laced)
590
AN 400
AN 400
590

NB Liner with with only one selvedge shown

Headline : 36m (15.50 + 5.00 + 15.50) x 14mm ϕ wire (f/c) served (6/19 - 12/6/1 65.8kg/100m).
Fishingline : 47.20m (21.10 + 5.00 + 21.10) x 22mm ϕ combination wire 6 strand/steel core 54.6kg/100m).
Winglines : Upper 8.2m, Lower 8.2m x 20mm ϕ combination wire (6 strand/steel core 54.6kg /100m)

a - 7.1m x 14mm ϕ wire (6/19 - 12/6/1 - 65.8kg/100m)
b - 6.7m x 20mm ϕ combination wire (6 strand/steel core - 54.4kg/100m)
c - 5.55m x 20mm ϕ combination wire (6 strand/steel core - 54.4kg/100m)
d - length for length x 22mm ϕ nylon (3 strand - 26kg/100m)

u - Gussets 8025rtex
v - 4 meshes gathered at quarters

w - 200 198
x - 240 238
y - 138 120

z - Joining position for Liner

kc = knot centre to knot centre
ik = inside knot measurement
tpa = polyamide twine/twisted
bpa = polyamide twine/braided
dy = double yarn

Method of join used, sewing.
Type of knot, weavers knot.

NOTE TO NETMAKERS
The numbers of meshes shown for netting panel widths do NOT include selvedge meshes. Five meshes (six knots) per selvedge must be added where indicated. Conversely to obtain panel depths one row (1/2 mesh) must be subtracted from each panel as the joining row is included in the number of meshes deep. The total numbers of meshes (width and depth) for each individual panel are set out in GOV 36/47 Groundfish Survey Trawl Checklist (Page 2 of 5)

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Construction of Groundgear 'A' - GOV

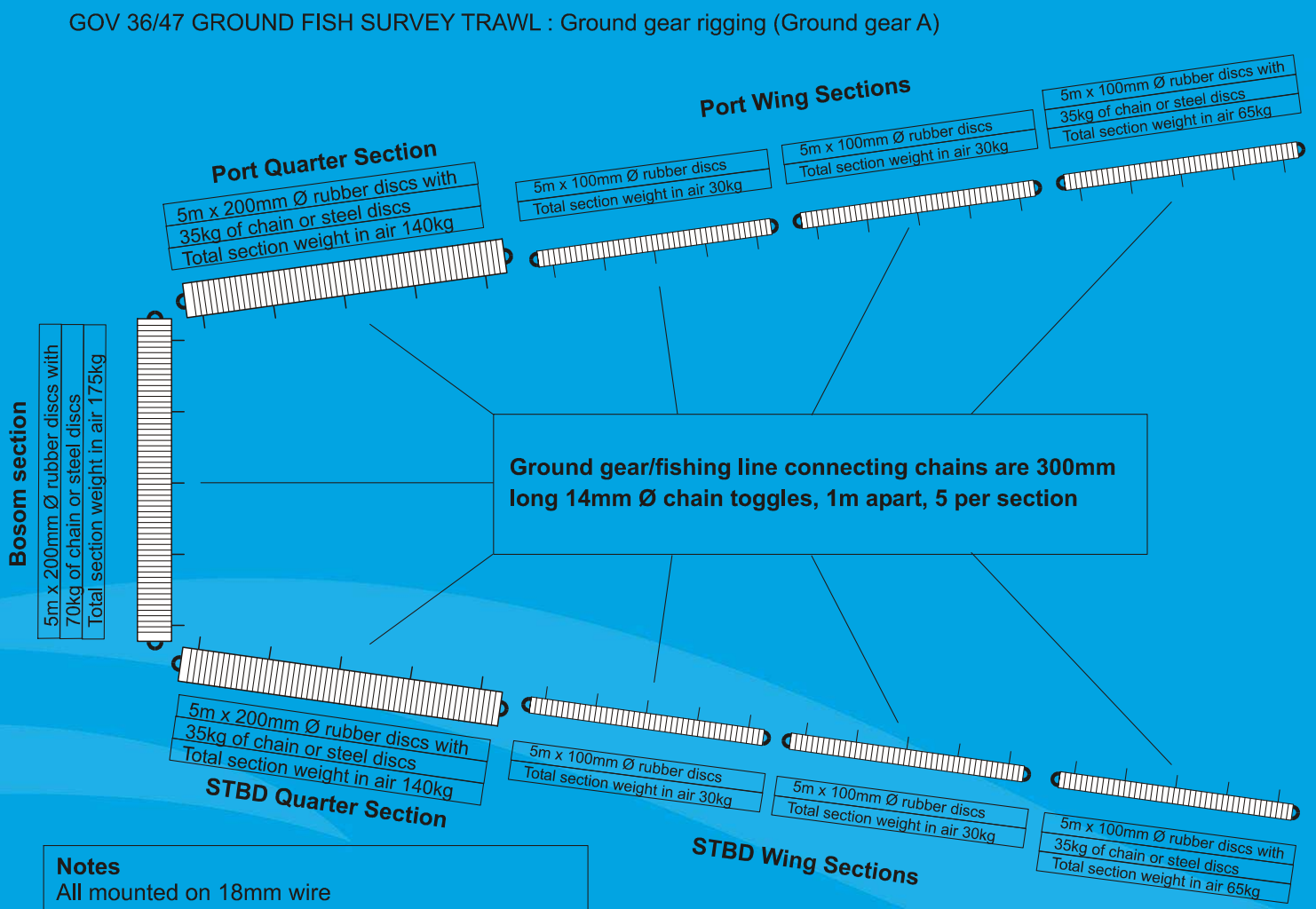


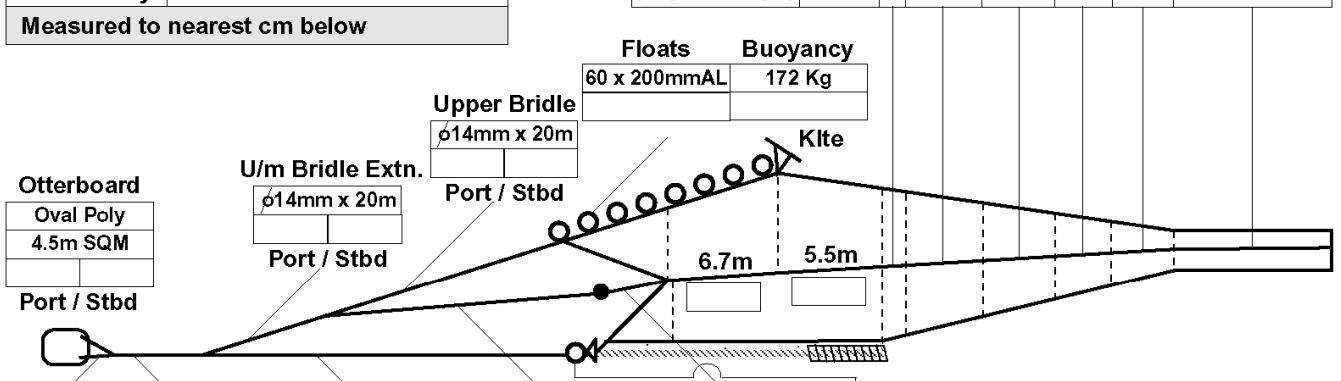
Figure 2.4 Standard groundrope for the 36/47 GOV Trawl

Rigging Diagram (and Checklist)

Vessel	
Cruise	
Date	
Checked by	
Checked by	
Measured to nearest cm below	

GOV 36/47 GROUND FISH SURVEY TRAWL CHECKLIST
Page 1 of 5 : Overall rigging diagram

Ribline longer than netting (length for length)	YES						
	NO						

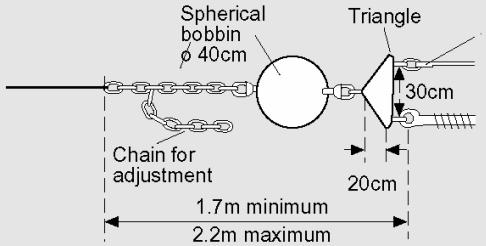


Sweep	Lower Bridle	Middle Bridle	M. Bridle Extn.
ø22mm	ø20mm x 38m	ø14mm x 20m	ø14mm x 7.1m
Port / Stbd	Port / Stbd	Port / Stbd	Port / Stbd

	Upper	Lower
Backstrop		
Port		
Stbd		
Backstrop Extn.		
Port		
Stbd		

Sweep length + Backstrop length + Backstrop extension length (if used) should total 60m overall.

Details of rigging adjustments



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2. Preparation for sea, shakedown and calibration

Proper testing of trawls in scientific studies prior to data collection should be considered as an important element of QA procedures for groundfish surveys. Currently no formal procedures within IBTS for at sea testing of trawl, sensors etc

SGSTS – allocate survey time to undertaking additional hauls with aim of ensuring all standard elements of survey are working correctly:

- Gear deployment (rigged, deployed and retrieved appropriately)
- Ground contact
- Trawl sensors & CTD's
- Catch processing (including data inputting)

Near port of departure, covering 8 -12 hauls (could include training or gear staff)

- Fixed stations
- Comparable environment
- Process catch (including data entry – data to be uploaded to ND
- Opportunity to test all equipment
- Not to be viewed as losing a day.

NAFC Shakedown and Calibration Trials

The Scottish Government

Calibration Test Site

Range of depths, sediment type, suitable currents

Gear rigged with hydro-acoustic instrumentation to measure:

•door-spread, wing-spread, opening, depth and bottom contact

At each depth interval - <50, 50-100, 100-200 & 200-300:
gear deployed (codend left untied) with specified warp with tows carried out on at least 4 points on the compass.

(*potentially 16+ hauls*)

Measurements and sediment and current data will help set up calibration site for future testing.

Baseline can then be established for future trial comparisons.

Pre cruise calibrations carried out as above.

Typically 8 -12 hauls – Two Days Work

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!! MSS – training – shakedown !!

3. Maintenance of Gear at Sea

While extensive information on procedures for procurement, construction and pre-survey set up has been provided in this report (and previous) these may not be applicable at sea.

The Scottish Government

SGSTS set out to produce a set of key trawl components that should be regularly checked at sea, particularly after repair.

Brief summaries relating to: new nets / used nets

Several issues for general consideration were presented with a list of acceptable discrepancies for specific measurements in:

Wing measurements
Belly measurements
Lastridge (ribline / selvage)
Flotation
Ground gear

This section is self explanatory

and should be adopted

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3. Maintenance of Gear at Sea:

The Scottish Government

Reducing systematic error in catch efficiency by switching nets throughout a survey.

- Small differences in net construction exist
- Extended use may impact on performance
- Could lead to minor differences in catch efficiency
- Skippers often have a preferred net

SGSTS solution – to swap nets every 20 – 30 tows (between vessels as well) using all available nets for an equal number of tows and randomize the error over different geographic areas and depths.

Is this a manageable solution given that the hauls will not be completed randomly by depth or geographic area?

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4. Trawl Performance Monitoring

This chapter addressed the use & analysis of trawl monitoring technology.

- Acquisition of key trawl performance parameters
- Guidance for use of key parameter data
- Provide guidance for the use of “other” surveillance instrumentation which may affect trawl derived indices of abundance.
- Analytical tools for describing variability in key parameters

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4.1 Key Net Performance Parameters

Parameters collected and actually used are well covered in this section:

- Distance between the trawl doors
- Distance between the wings
- Vertical opening of the trawl
- Ground gear bottom contact

Table of all trawl surveillance parameters and their use

Table of suppliers of trawl surveillance equipment and contacts

Provides a comprehensive appraisal of the issues surrounding the use and analysis of these parameters

This section describes current procedures effectively.

The Scottish Government

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Bottom Contact Sensors

The Scottish Government

Relatively new to bottom trawl surveys

Implications for catch efficiency for some species

Hauls having poor ground contact should be considered invalid and not used in stock assessments (Zimmerman *et al*, 2003)

Various methods described for monitoring

Still remains the challenge of interpretation, including trawl adjustment during tow (not an option for some methods)

??

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Guidance for use of key parameter data

The Scottish Government

Data Screening:

1. Develop a routine where filters are applied
2. Range checks to edit out unrealistic values
   - Depth 1 – 1200
   - Door spread 0 – 100
   - Wing spread 0 - 30
3. Further screening for identifying outliers

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Identifying outliers

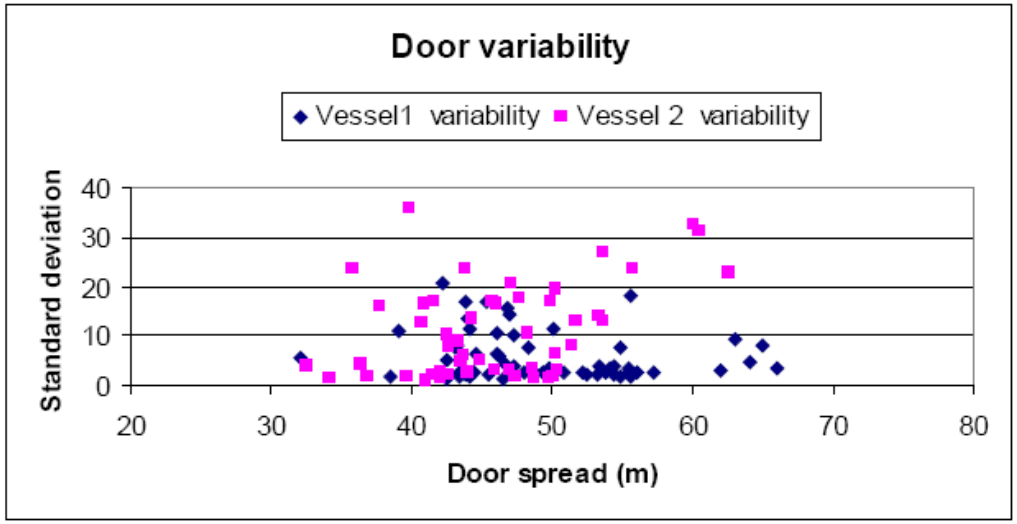

Figure 4.2.1.1. Data screening using standard deviations and mean door spread for each haul.

Plotting SD against the mean geometry parameter for each haul in survey then investigate those with high dispersion

Trawl door not functioning throughout the tow.

Remove door spread data from analysis.

? Over removing wingspread but would take into account prior knowledge of range of performance.

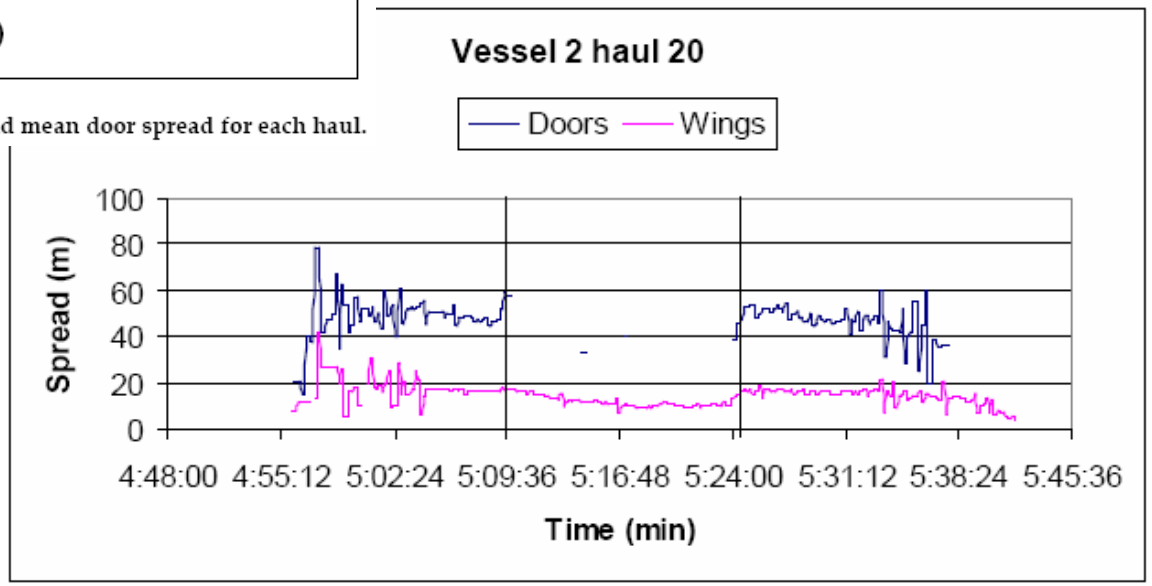

Figure 4.2.1.2. Plot of door spread and wing spread over a 15 minute tow.

Within and between haul variation in net geometry

The Scottish Government

IBTS reports parameters quantifying the net geometry but usually only as a mean value by haul. However, there will be variance around these values and this should be considered as an important description of each haul performance.

It is recommended that net geometry data be archived and that mean value and indication of variance be included in survey data base (eg DATRAS).

Although suggested that hauls with a large variance (in net geometry) be repeated, this is not often appropriate or practical.

By including variance in database, such hauls can be readily identified and treated with caution during analysis.

Within and between haul variation in vessel towing speed.

The report describes the issue and solutions well (with focus on communication).

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Survey criteria for valid tow and catch processing procedures

The Scottish Government

Acceptance or rejection of a tow is often a subjective decision by Chief Scientist.

Requires experienced personnel, similar training and clear guidelines.

- Tear of 4 – 5 meshes in Belly maybe OK
- Tear of 10 – 15 meshes in wing maybe OK
- Duration of bottom contact

Need to provide acceptable thresholds for key parameters.

Decision flow chart can help field staff and can also help with consistency in catch sampling.

?? Maybe change presentation here and check previous slides ??

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Example of Criteria for assigning tow validity – Bering Sea

The Scottish Government

Listed below are the criteria that need to be met for a totally satisfactory (performance code 0) tow. Acceptable variations are shown inside parentheses.

- 30 minutes towing time from brakeset to haulback (10 minute tows in areas of extreme fish concentrations)
- Tow during daylight hours (starting 30 minutes after sunrise and 30 minutes before sunset, as determined by actual observation, Tides & Currents software, or other position-related means)
- Mean towing speed of 3 knots (2.8–3.2 knots)
- Adherence to scope table or justified reason for change, such as inclement seas
- Net mensuration instruments indicate gear operating within "normal" limits (mean width = 12–22 m, mean height = 1–3 m)
- Constant gear contact with the sea bottom (occasional minor separations between bottom and the footrope)
- No hang ups, gear damage, or gear conflicts (If a hang-up or gear obstruction has occurred at a time that is fairly obvious, such as a shudder or stopping of the vessel, and haulback is immediately started, the trawl should be examined. If damage is minimal and restricted to forward parts of the trawl, then the tow may be considered successful. This assumes that at least 10 minutes of on bottom time was achieved).

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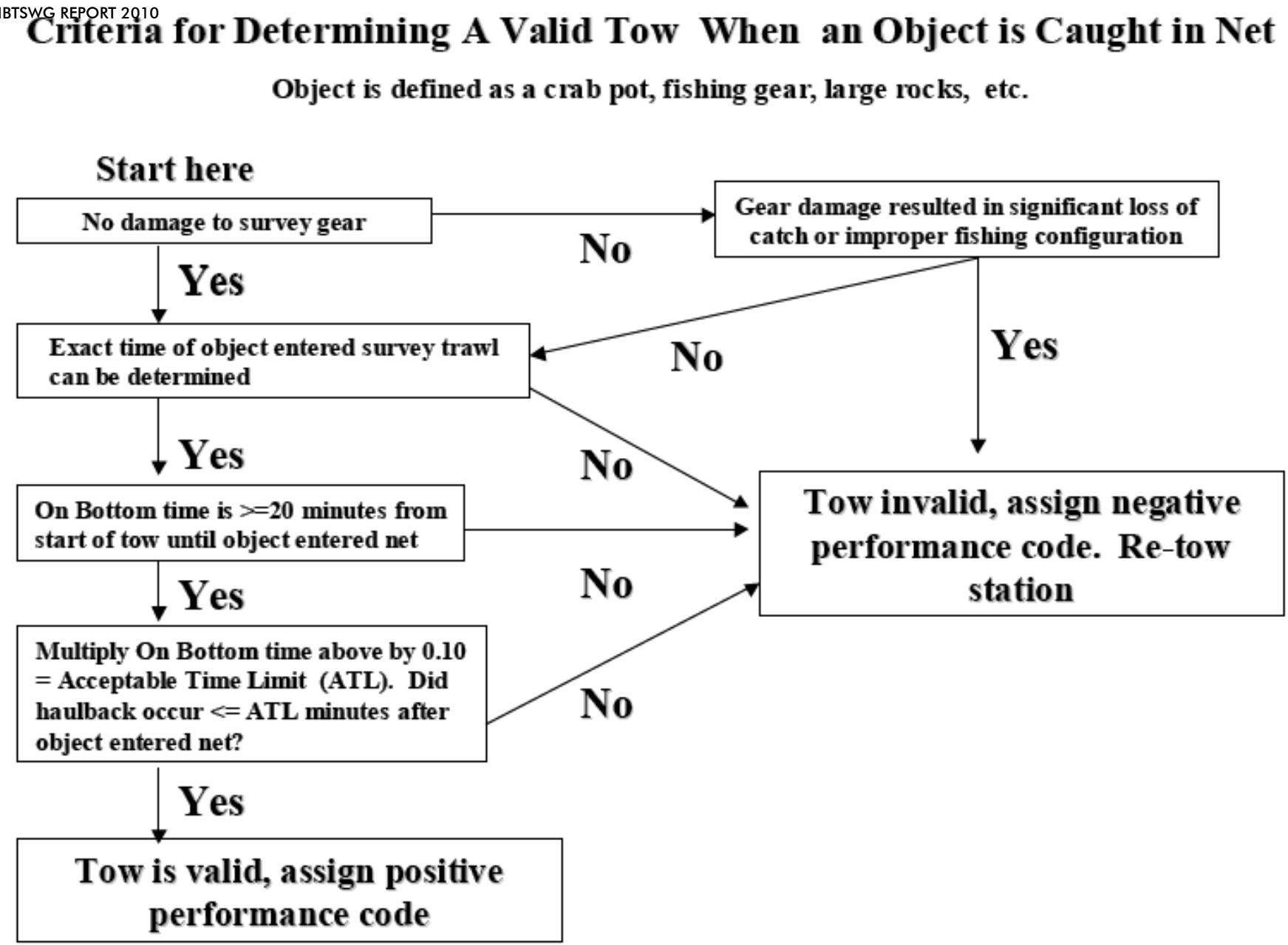

Figure 4.2.4.1. Flowchart depicting the process for making tow validation decision when large object enters the net.

Range tolerances on the North Sea IBTS

The principle use of trawl geometry data on demersal surveys is to ensure that the net is fishing within agreed standards.

The IBTS manual (ICES 2006) provides graphs showing expected headline height and door spread. However, these are 20 years old and changes in vessel power, warp diameter, and net construction are likely to have changed in that time.

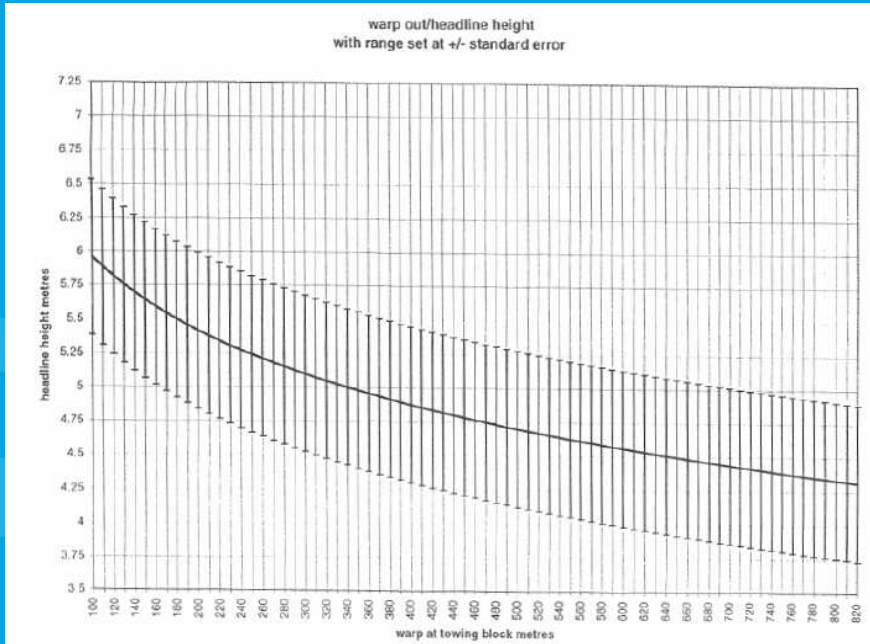

Figure 4.2.5.1. Expected warp out /headline height ratio (from ICES, 2006)

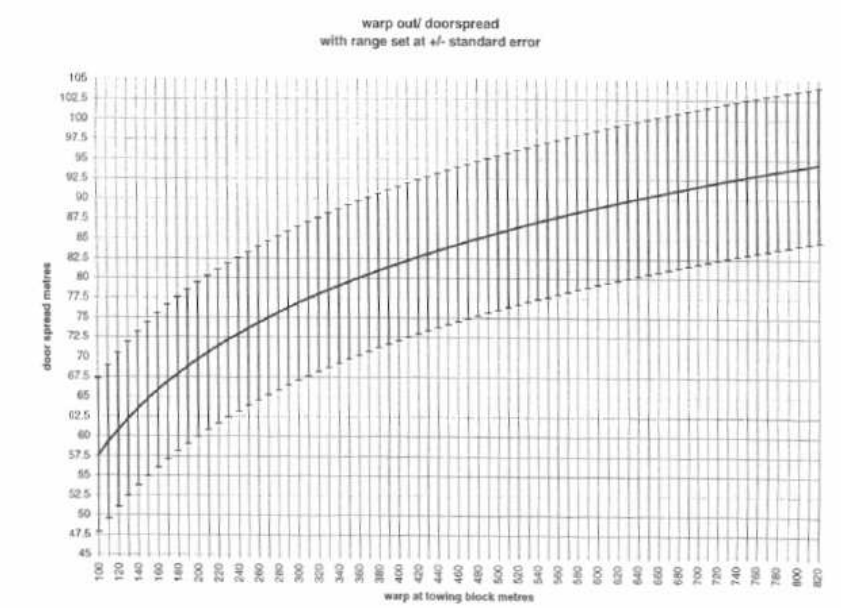

Figure 4.2.5.2. Expected warp out /door spread ratio (from ICES, 2006).

Warp – depth ratio I

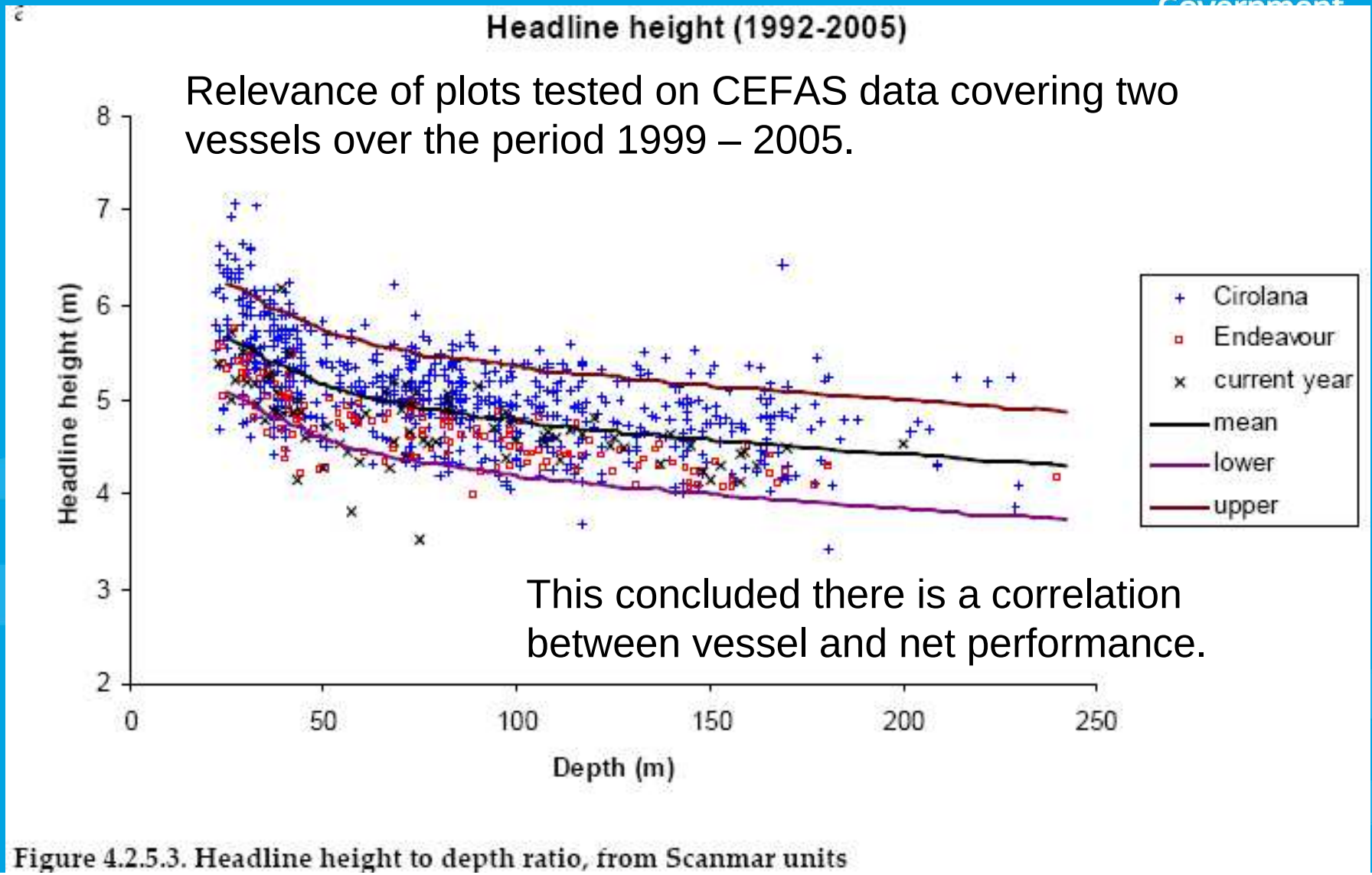

Figure 4.2.5.3. Headline height to depth ratio, from Scanmar units

Warp – depth ratio II

The Scottish Government

SGSTS analysed 10 years data provided by IBTS participants.

Concluded that there were problems with current ratio plots.

Recommended that warp to depth recommendations be changed, and that the manual reflect the importance of consistency in gear geometry rather than warp out relationships.

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Additional Parameters

The Scottish Government

One goal of a successful bottom trawl survey is to maintain consistency in catch efficiency across stations and years.
With trawl efficiency constant, variability in CPUE could be attributed to true differences in fish density.

Understand & evaluate factors impacting on trawl performance

Influential variables should be routinely recorded for post cruise analysis.

Direct measurements

- Length of warp deployed
- Tension on each warp
- Door angle
- Speed through water & over the ground
- Net offset from vessel
- Catch size & composition

Indirect measurements

- Bottom Depth
- Skipper
- Trawl deployment & retrieval procedures
- Winch control settings
- Age & condition of vessel
- Wind force & direction
- Sea height & direction relative to course of vessel
- Surface & bottom current
- Substrate type

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Analytical tools for describing variability in key parameters

The Scottish Government

Significant developments in acoustic and other technologies have allowed investigation of the complex interactions in the catching process.

This section serves to highlight that modelling gear sampling efficiency can be used to provide correction factors to the catches (possibly by species, length sex, depth area etc).

Key parameters identified through discussion for further analysis.

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Training & Personnel

The Scottish Government

Ticking the Box

Need to balance desire to have every factor under control and quantified, and the ability of personnel to accomplish that target.

Achievable Targets

Need to provide guidance on how far a net can deviate from standards and still be acceptable (already done for tow speed, net geometry etc.)

Achievable targets should also be set for repair & maintenance at sea - need to be aware of abilities of crew.

Some vessels have experienced crew allowing major repairs at sea.

If crew inexperienced then net may need to be switched or put ashore.

Important to have all parties involved in the process of ensuring the quality of each fishing operation.

Shakedown period – already highlighted.

Familiarity breeds contempt- it is the role of cruise leader to maintain the QA procedures at the same level throughout and between surveys**.**

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Training of Scientific and Fishing vessel Personnel

The Scottish Government

Scientists must have a good understanding of the mechanics of trawling and fishing officers and crew must understand the basics of good survey sampling and data collection. Workshops and other training initiatives help to foster teamwork between vessel crew & scientists,

In time routine survey operations will include the use of rigorous specifications, tolerances & QA protocols in construction, repair & deployment.

For scientific staff use of trawl reference plans & QA checklists requires knowledge of fundamentals of gear technology – training to include:

- An introduction to fishing gear technology
- Identification of what aspects need monitoring & how to do this
- Suggest that where possible gear technologists should be used

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Training Courses

The Scottish Government

Need to be designed specifically for RV crews and scientific survey staff.

Vessel crews – basic sampling methodologies, gear behaviour and rigging.

Survey scientists – what parts of the trawl needs monitoring, how to do this, why it is important to do this well.

Trawl mensuration techniques, performance, otterboard theory, component variability, fish behaviour, use of net monitoring systems should be common to both courses.

Could include formal classroom lectures, flume tanks or virtual flume tanks,

The effects of incorrect rigging, damage, vessel speed, warp ratio etc are easily demonstrated.

Examples of course curriculum used by AFSC (Seattle) and NAFC (St Johns') are provided.

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Intercalibration of trawls and vessels

The Scottish Government

The intention of this chapter is to advise on the intercalibration of trawling gears and vessels used for standardised fish surveys.

When to intercalibrate

- Minor improvements designed to allow better compliance with the standards agreed for the survey – **Not normally necessary**
- Modest changes or departures from agreed standards **–save up minor changes or introduce over a period of time**
- Major changes that depart significantly… **full intercalibration required**

Intercalibration options

- Doing nothing
- Comparitive fishing trials
- Modelling
- Gradually changing the survey

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Additional advice on intercalibration

The Scottish Government

Group did not feel able to recommend one intercalibration option over others. Other aspects of intercalibration studies discussed led to following recommendations:

- For multi vessel surveys, several days should be allowed for paired tows by each pair of vessels so far as is practically possible. (documented and reported to allow intercalibration factors to be refined)
- Factors that are difficult to control should be randomised as far as possible (eg. Time of day effect)
- Procedures for handling catches and sub-sampling should be identical during intercalibration trials. (Protocols and detailed records of each trial, by haul)
- Proposals for intercalibration trials should preferably be discussed with ICES colleagues so as to draw on all experience.
- Workshop on Survey Design and Analysis (WKSAD- ICES 2004b) reviewed methods of intercalibrating fish surveys with detailed summaries presented.

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Ideal survey trawl – State of the art

The Scottish Government

SG(ICES 2005) agreed on the characteristics of an ideal standard survey gear design.

Basic Design, Ground gear contact, vertical opening, horizontal opening, mesh size, robustness & durability, towing speed, herding effect, selectivity, speed of deployment, stability, Costs.

NST comparison against ideal standard

GOV comparison against ideal standard

No recommendations.

This was not meant as a comparative across gears but an appraisal of the characteristics of these gears against the "ideal standard".

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Detailed trawl standardization programmes have been developed in:

- Canada by North West Atlantic Fisheries Centre (NAFC) in ST. John's for the Campelen 1800 shrimp trawl.
- USA by the ASFC in Seattle for the Poly Nor'eastern trawl
- Europe by the ICES IBTS Working Group (2006)

These programmes serve as examples for developing new trawl standardization protocols or the fine-tuning of existing programmes,

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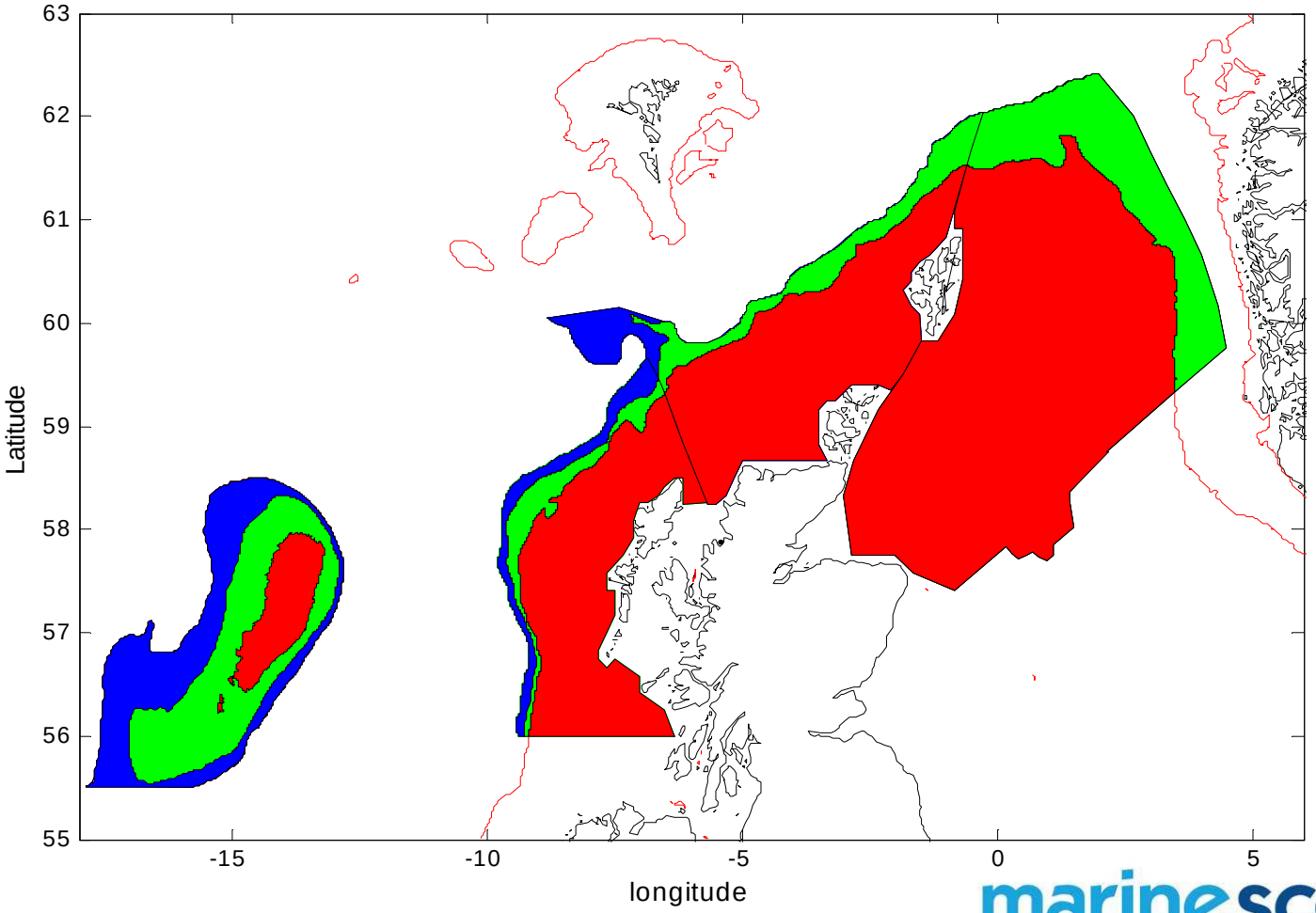
Joint Industry –Science Anglerfish Survey

The Scottish Government



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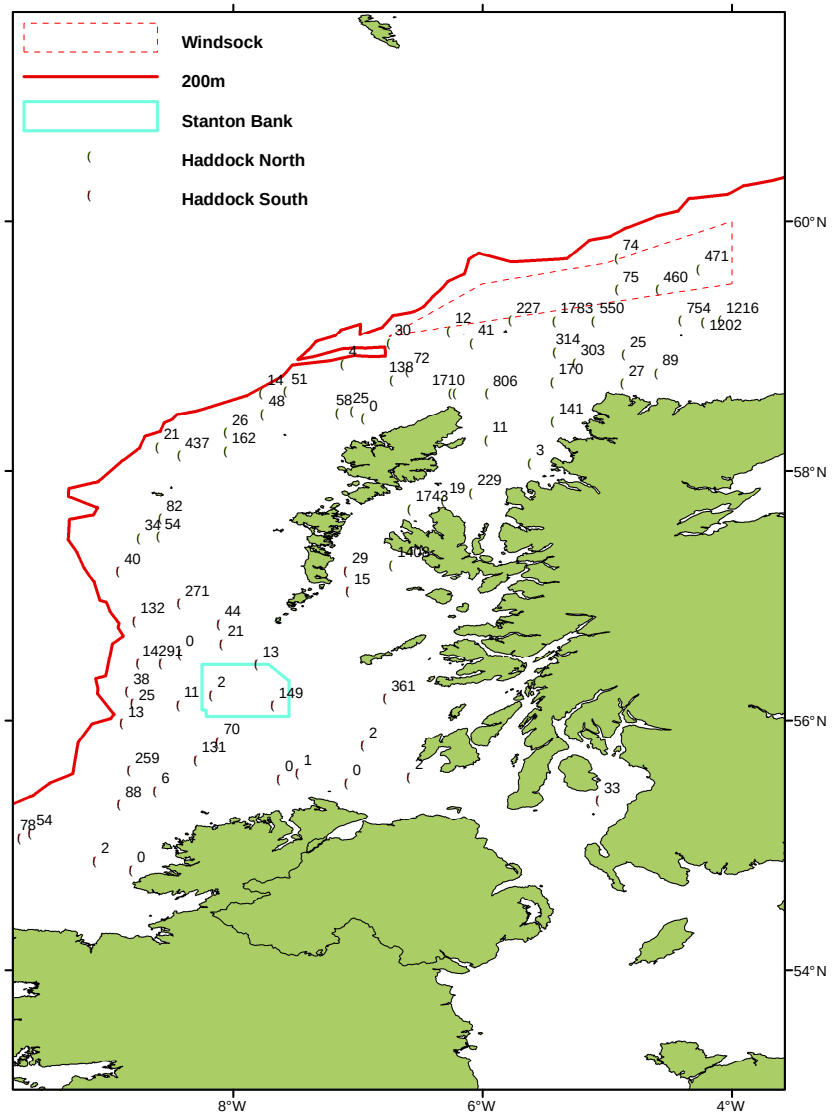
Industry West of Scotland Survey – 2010



The Scottish Government

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Annex 6: Maps of species distribution in 2009

Table A6.1. 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 North-eastern 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	*	
Nephrops norvegicus	Norway Lobster	NEP	28	
Pleuronectes platessa	European Plaice	PLE	22-23	12
Raja clavata	Thornback ray (Roker)	THR	34	
Raja microocellata	Painted/Small Eyed Ray	PTR	35	
Raja montagui	Spotted Ray	SDR	36	
Raja undulata	Undulate Ray	UNR	37	
Scomber scombrus	European Mackerel	MAC	12-13	24
Scyliorhinus canicula	Lesser Spotted Dogfish	LSD	29	
Scyliorhnus stellaris	Nurse Hound	DGN	38	
Sprattus sprattus	European sprat	SPR	39	
Squalus acanthias	Spurdog	DGS	31	
Trachurus picturatus	Blue Jack Mackerel	JAA	40	
Trachurus trachurus	Horse Mackerel (Scad)	HOM	10-11	15

*** No catches in 2009 surveys**

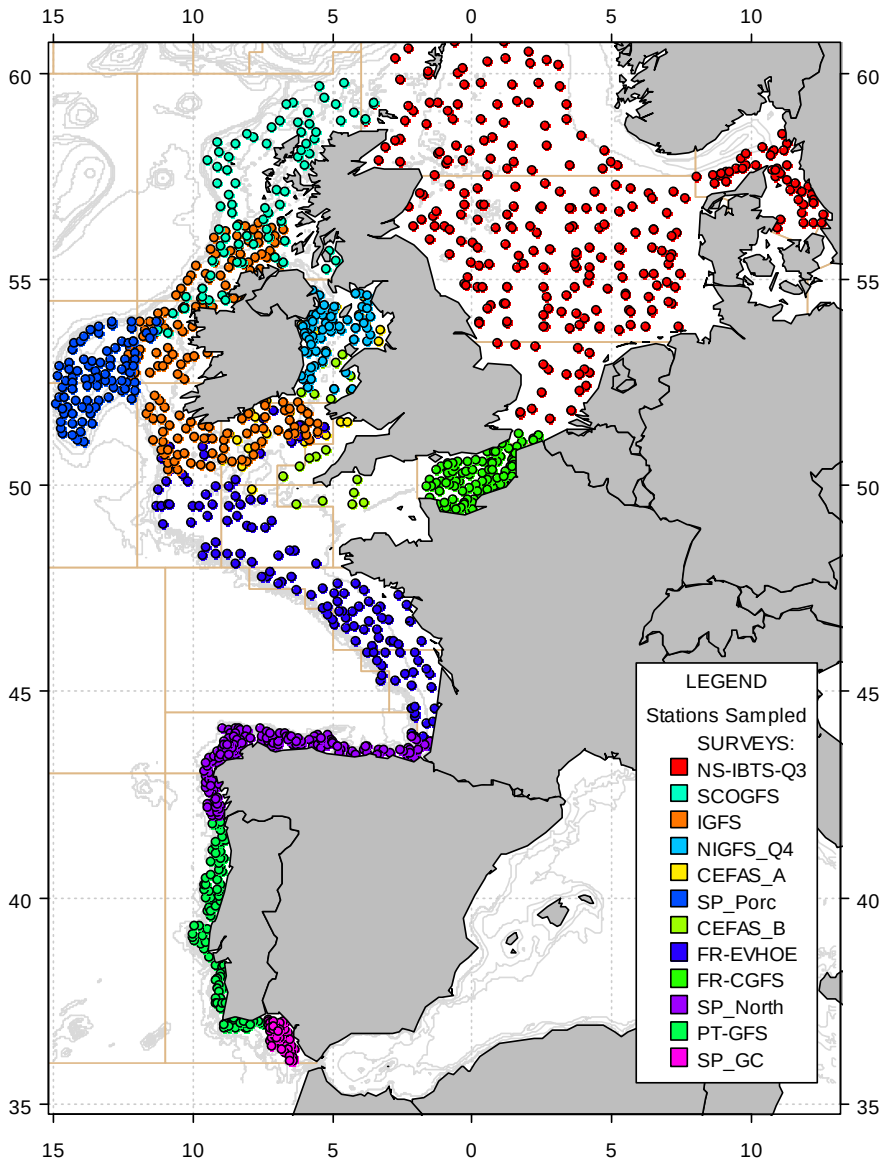

Figure A.6.1. Station positions for the IBTS Surveys carried out in the North Eastern Atlantic and North Sea area in autumn/winter of 2009.

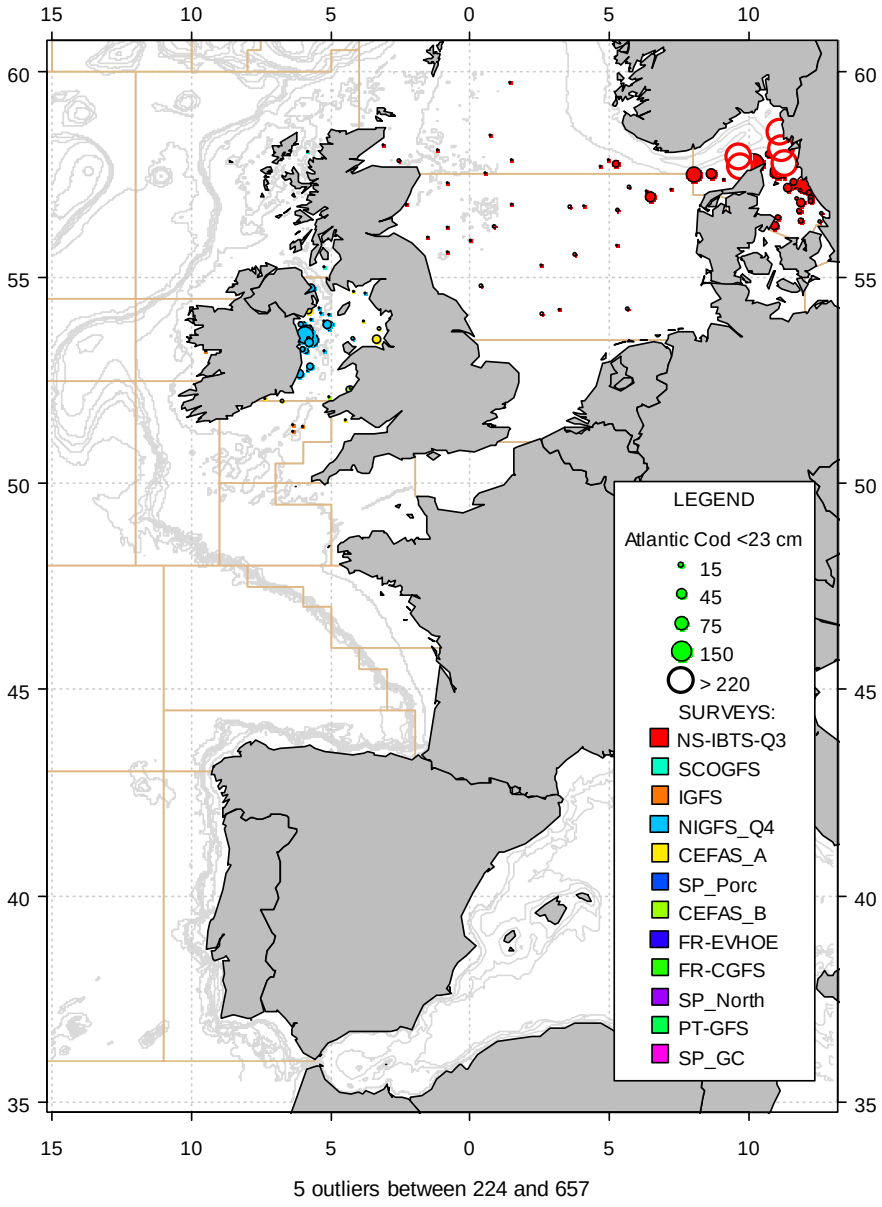

Figure A.6.2. Catches in numbers per hour of 0-group Cod, *Gadus morhua* (<23cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

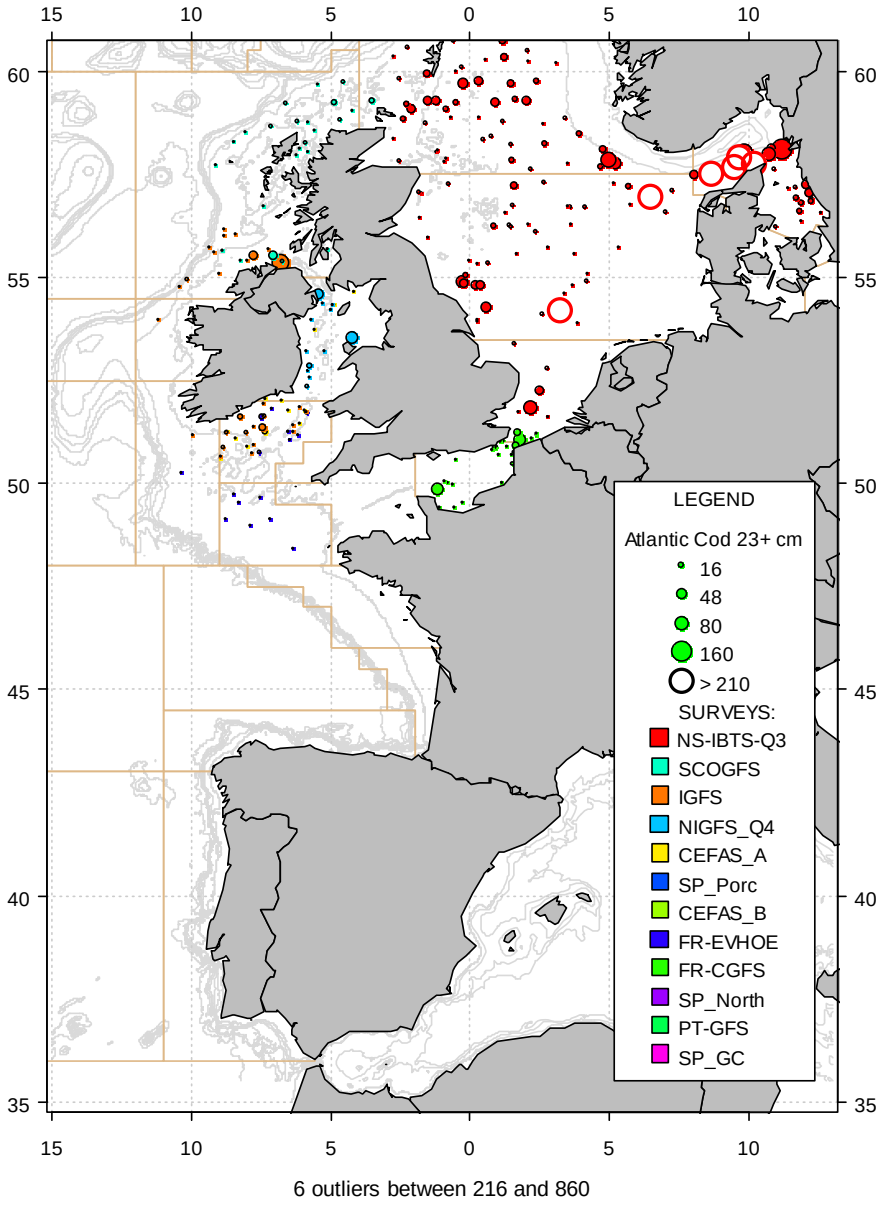

Figure A.6.3. Catches in numbers per hour of 1+ cod, *Gadus morhua* (≥23cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

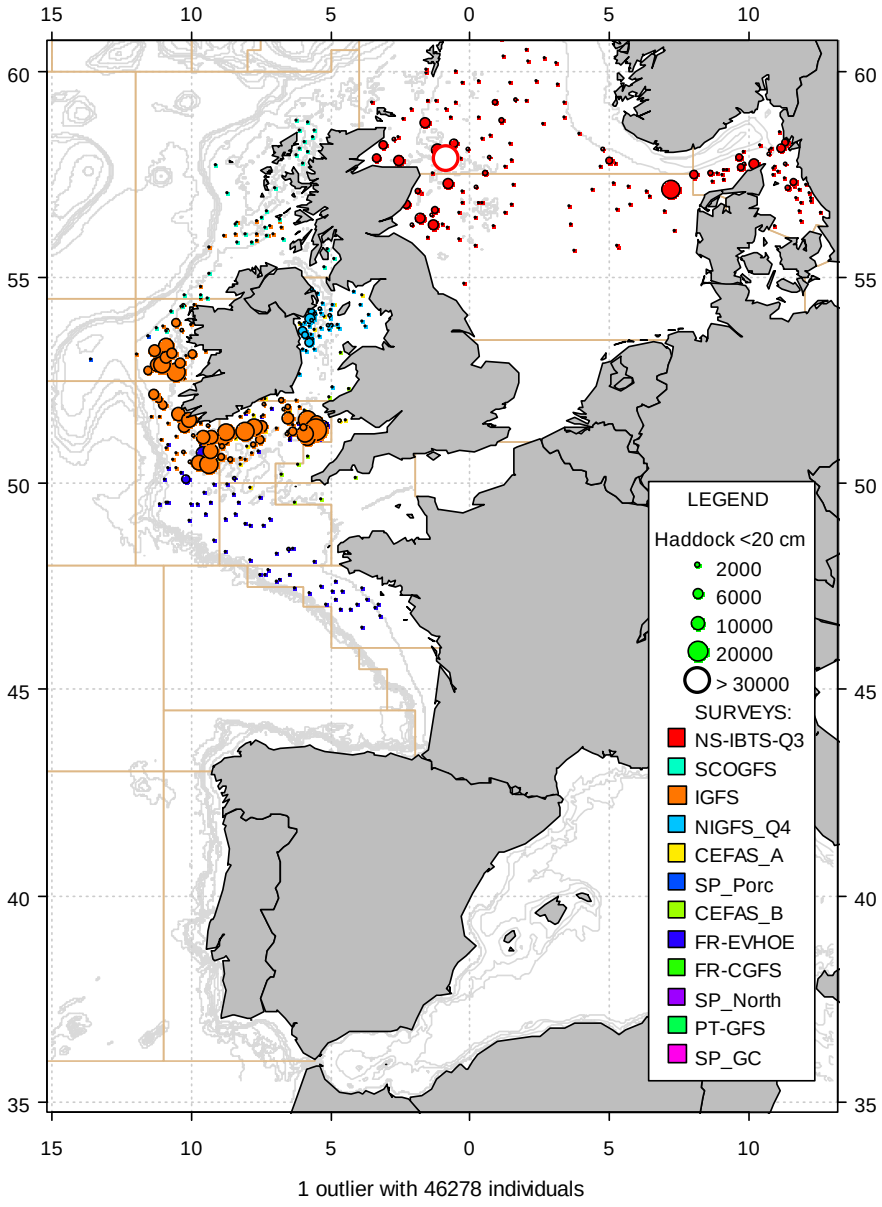

Figure A.6.4. Catches in numbers per hour of 0-group haddock, *Melanogrammus aeglefinus* (<20cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

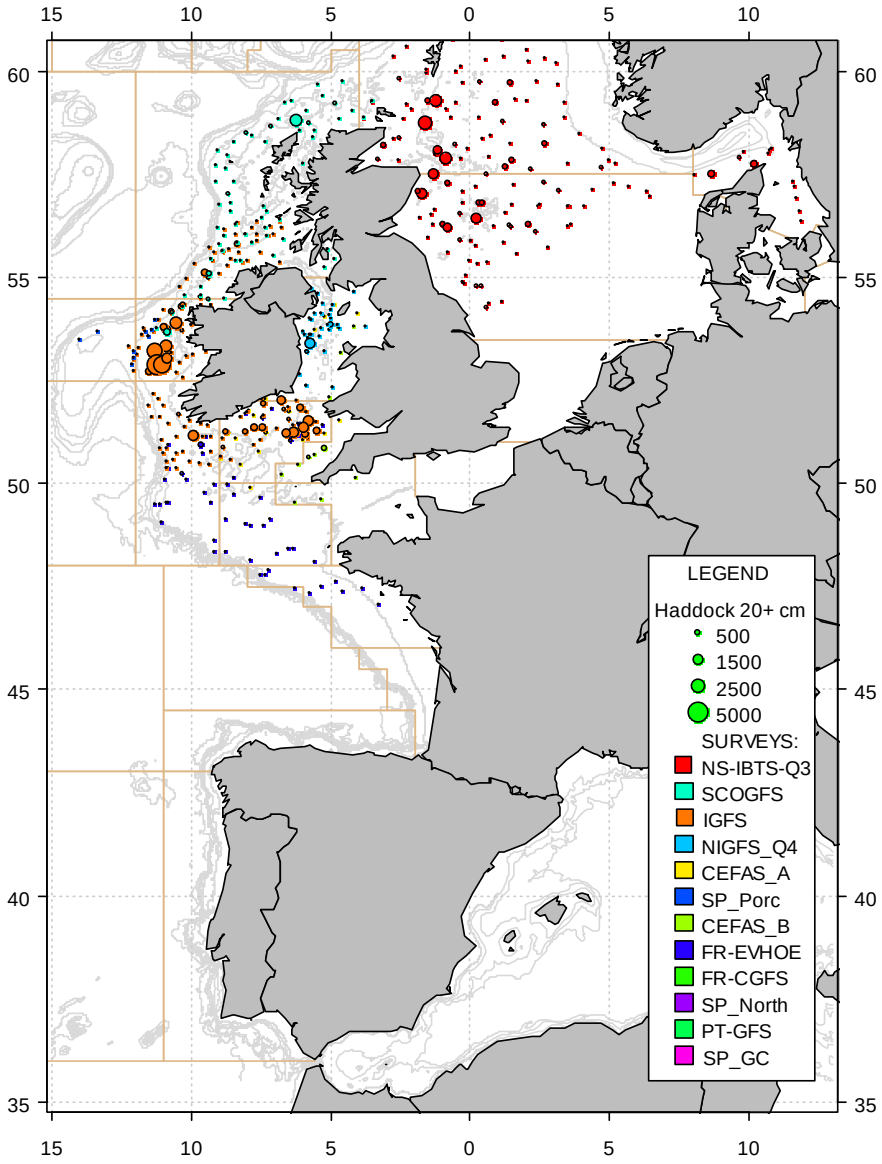

Figure A.6.5. Catches in numbers per hour of 1+ group haddock, *Melanogrammus aeglefinus* (≥20cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

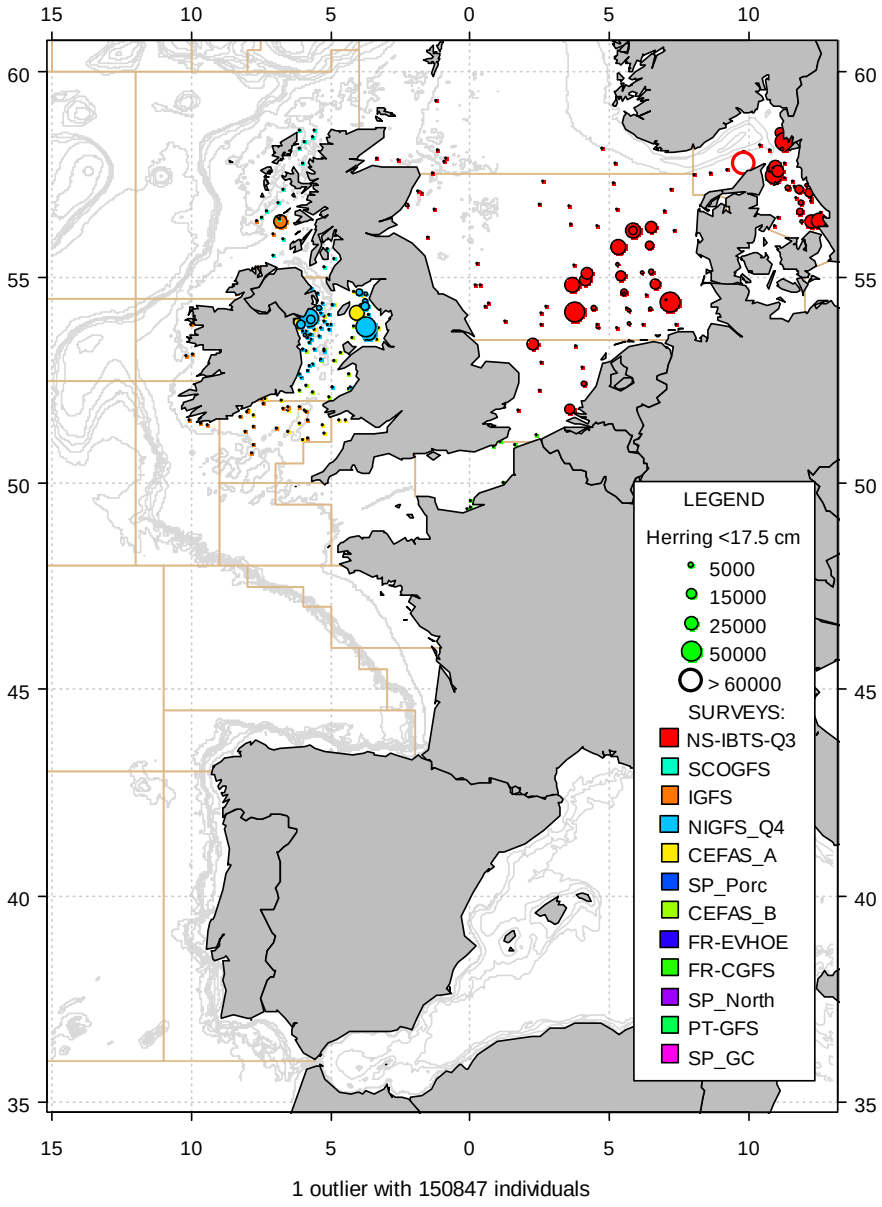

Figure A.6.6. Catches in numbers per hour of 0-group herring, *Clupea harengus* (<17.5 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

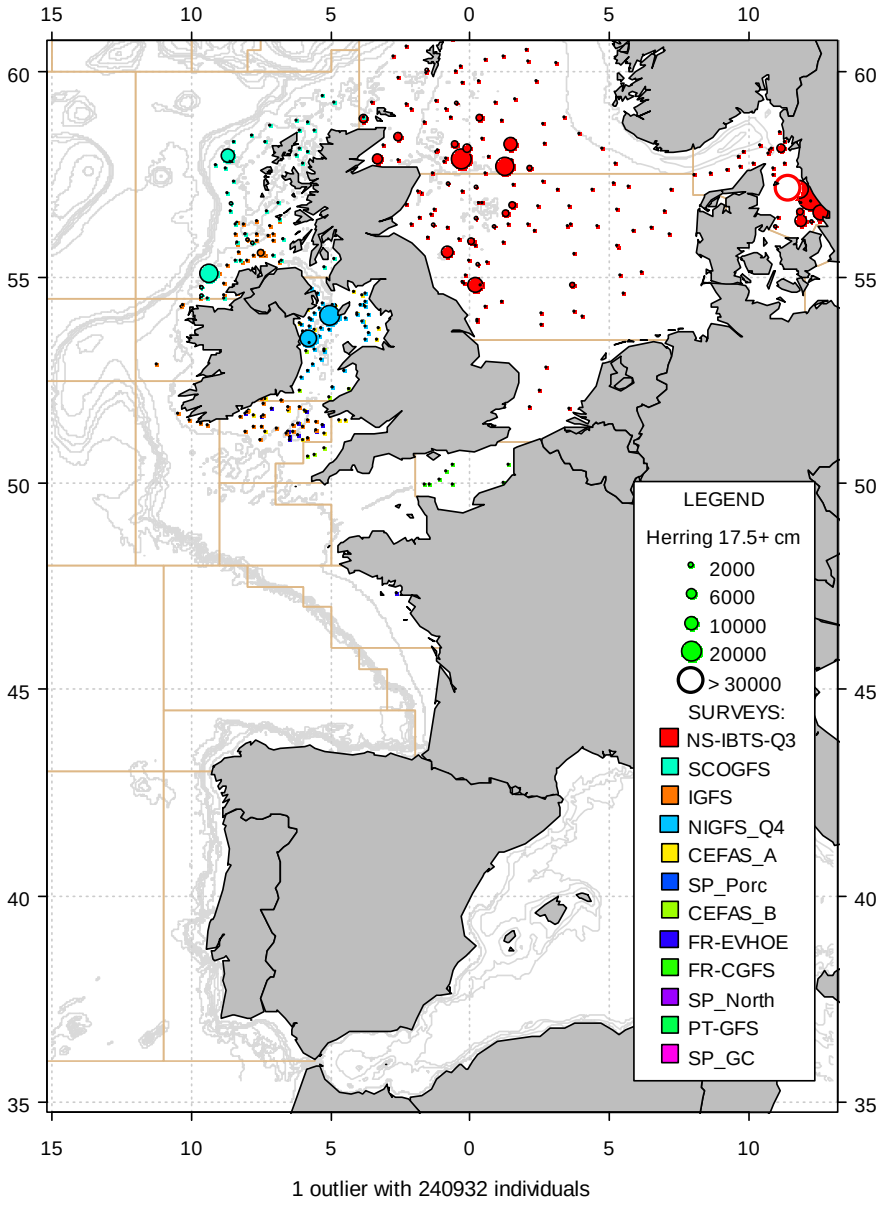

Figure A.6.7. Catches in numbers per hour of 1+ group herring, *Clupea harengus* (≥17.5 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

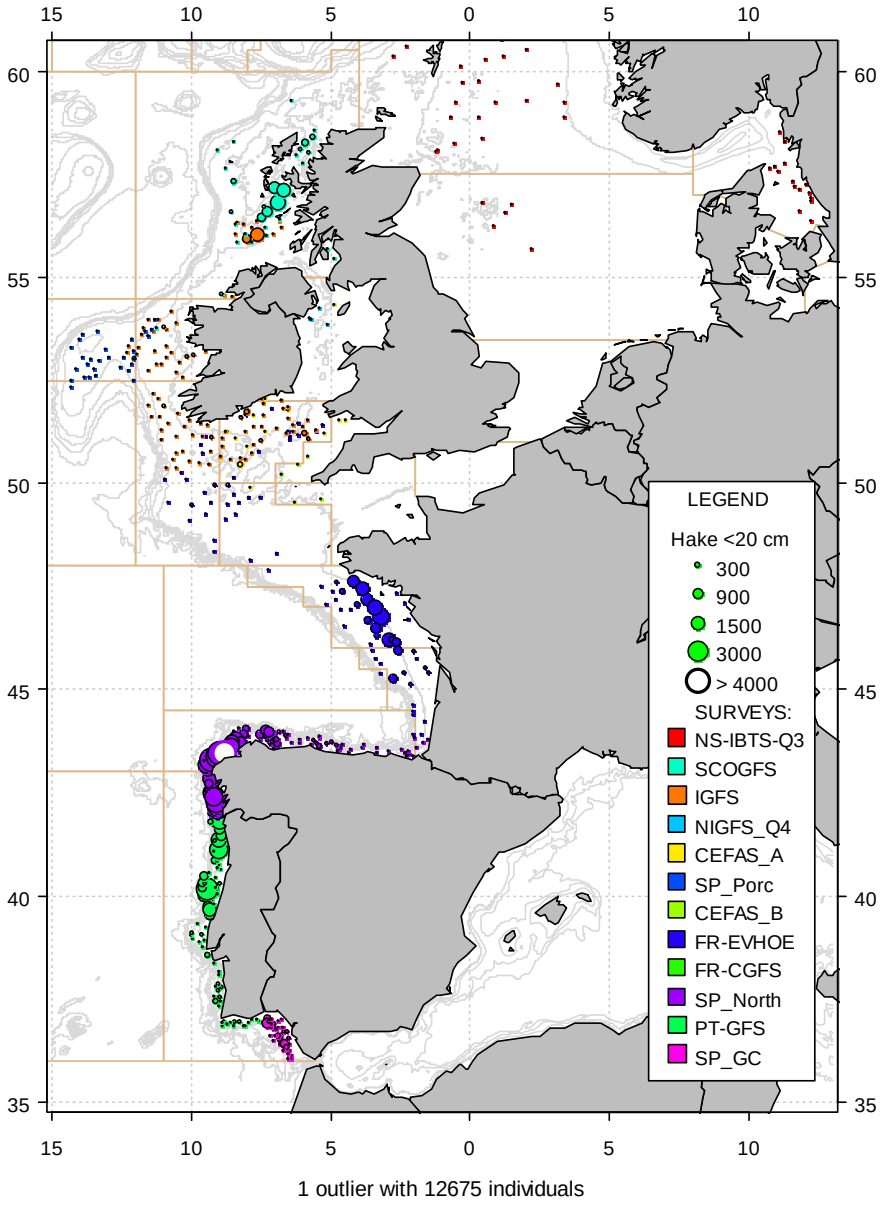

Figure A.6.8. Catches in numbers per hour of 0-group Europan hake, *Merluccius merluccius* (<20cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

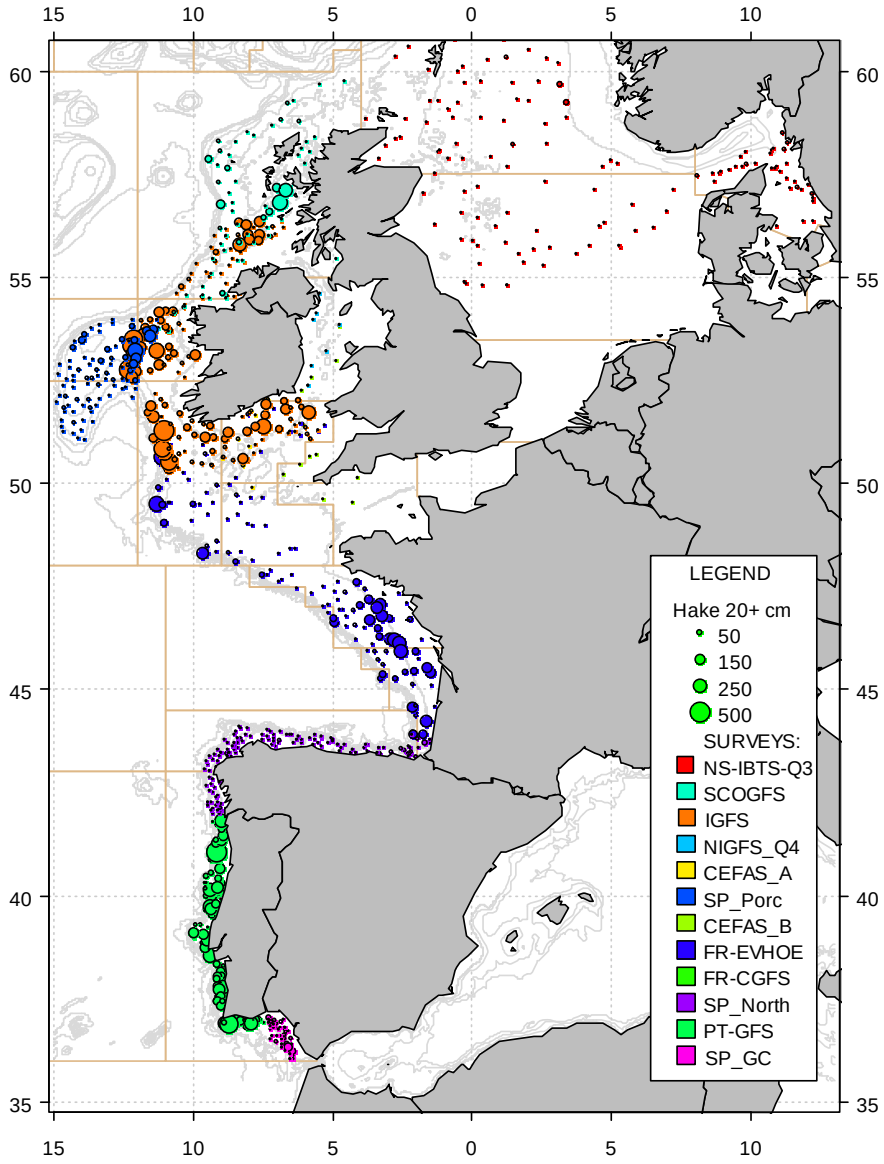

Figure A.6.9. Catches in numbers per hour of 1+ group hake, *Merluccius merluccius* (≥20cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

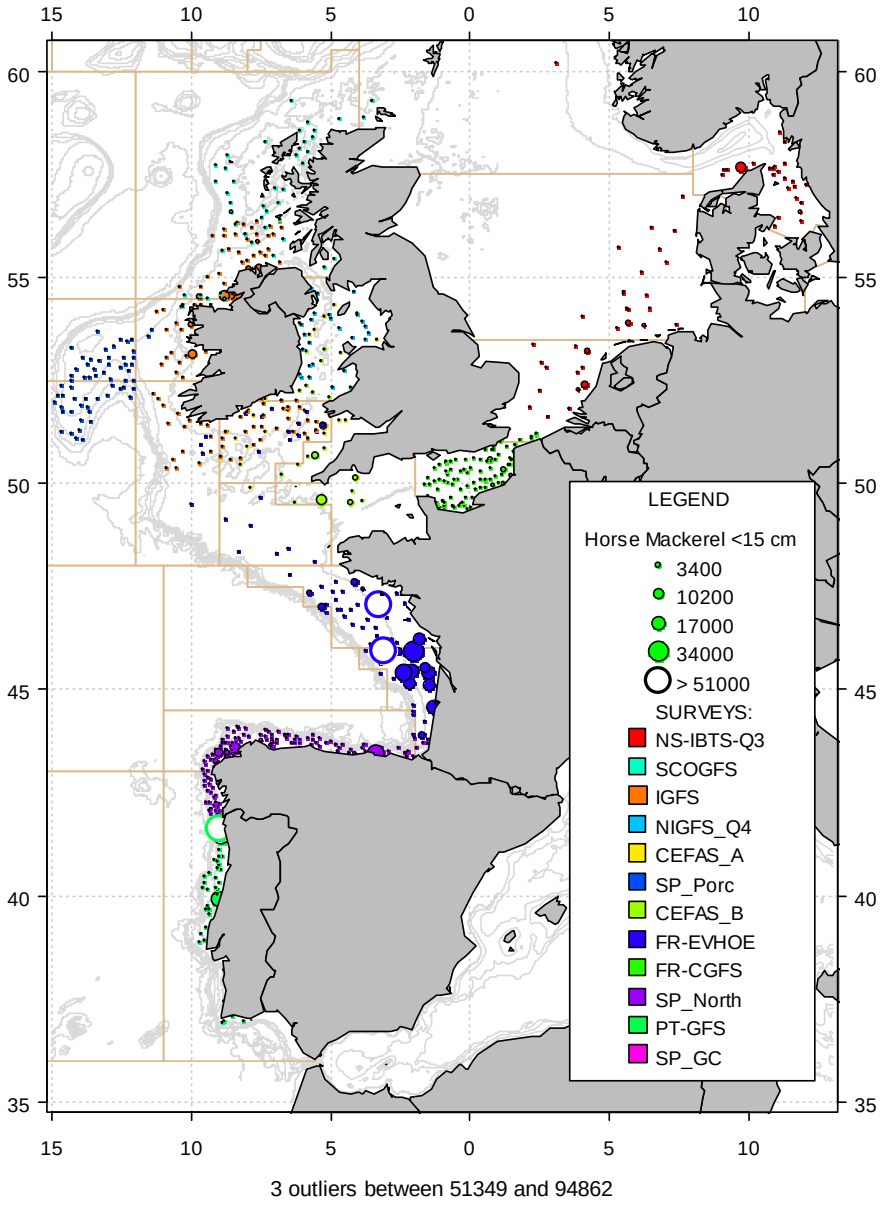

Figure A.6.10. Catches in numbers per hour of 0-group horse mackerel, T*rachurus trachurus* (<15 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

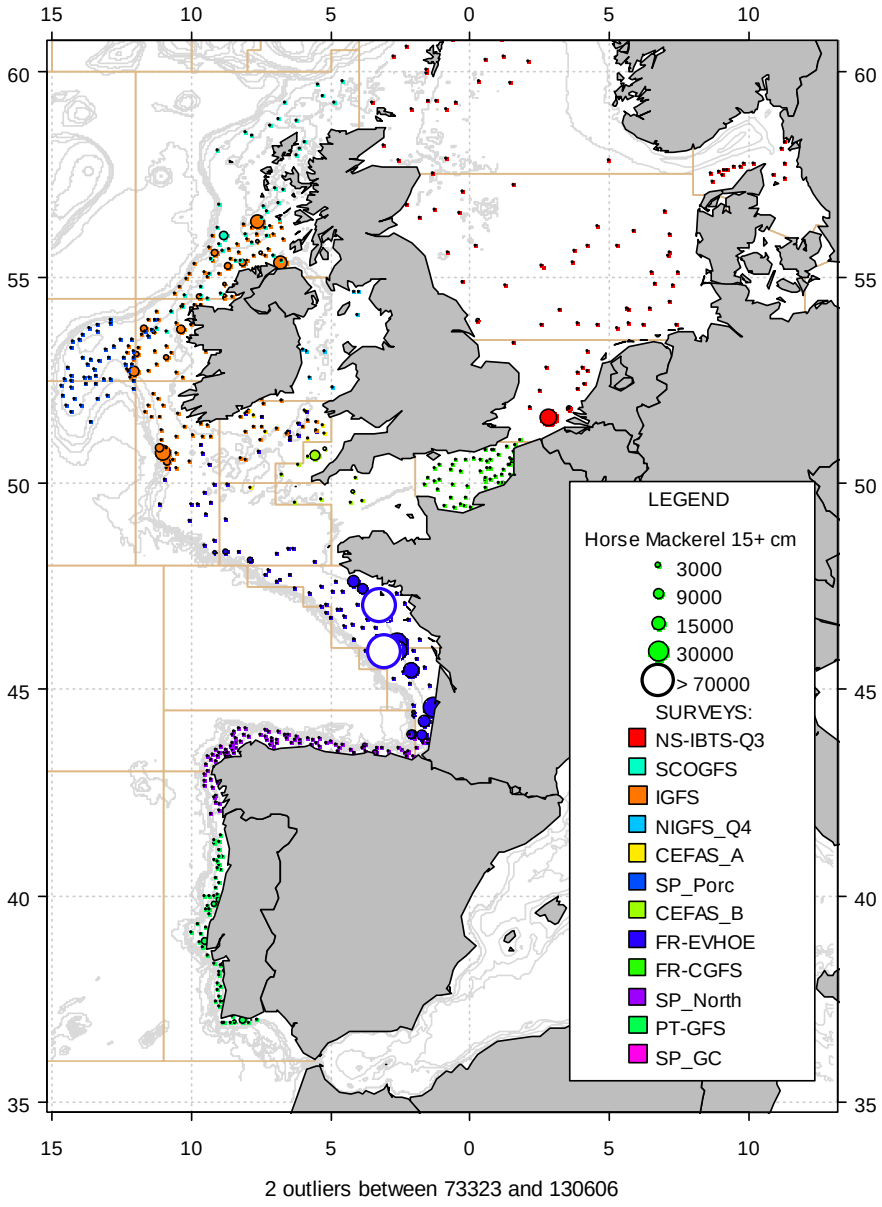

Figure A.6.11. Catches in numbers per hour of 1+ group horse mackerel, *Trachurus trachurus* (≥ 15 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

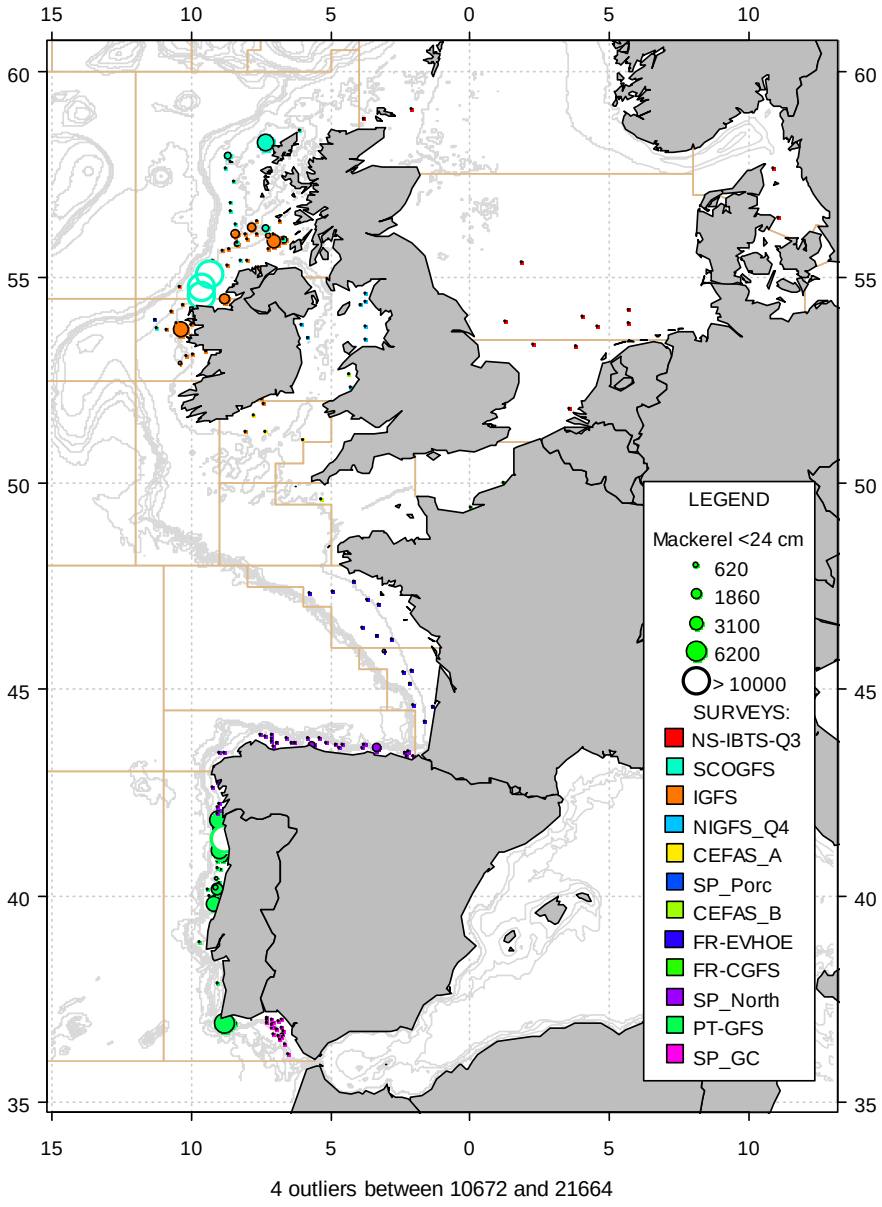

Figure A.6.12. Catches in numbers per hour of 0-group mackerel, *Scomber scombrus* (<24 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

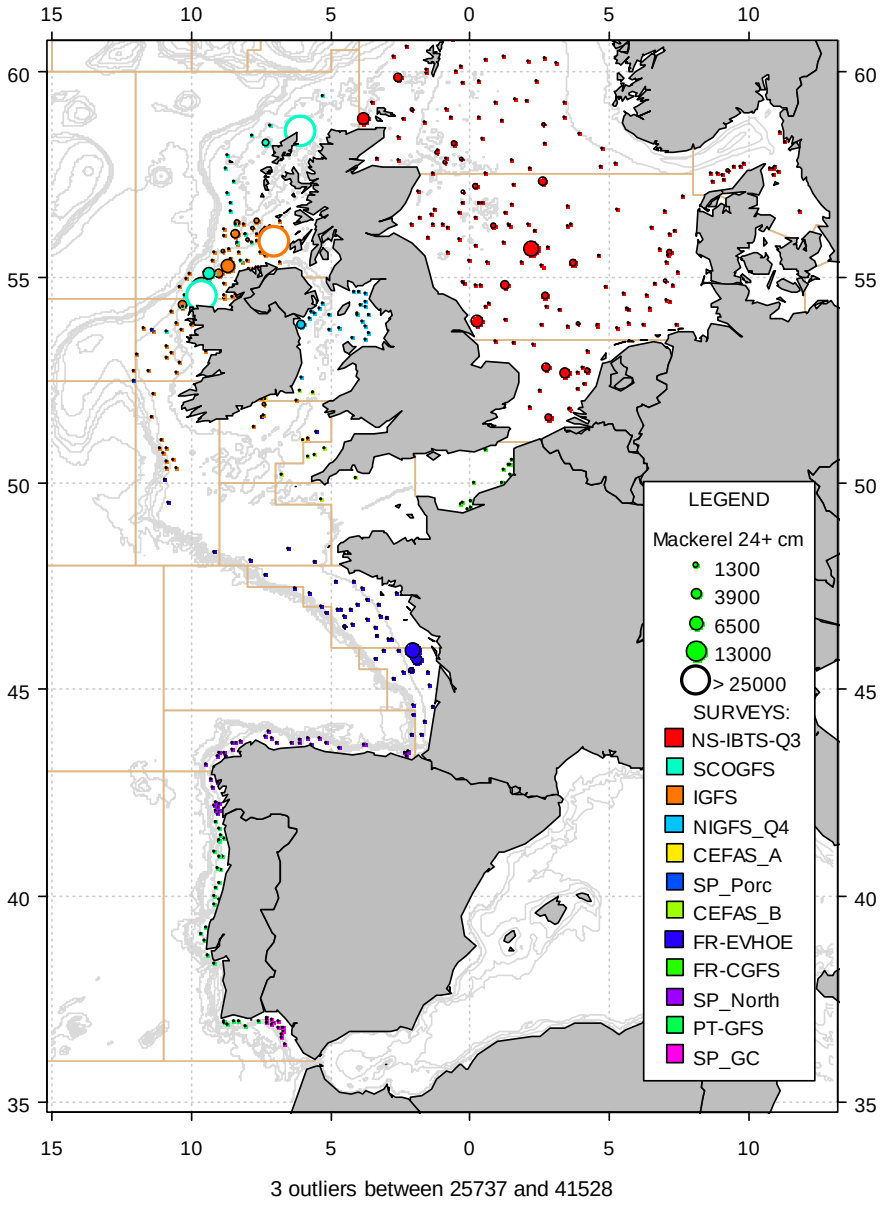

Figure A.6.13. Catches in numbers per hour of 1+ group mackerel, *Scomber scomrus* (≥24 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

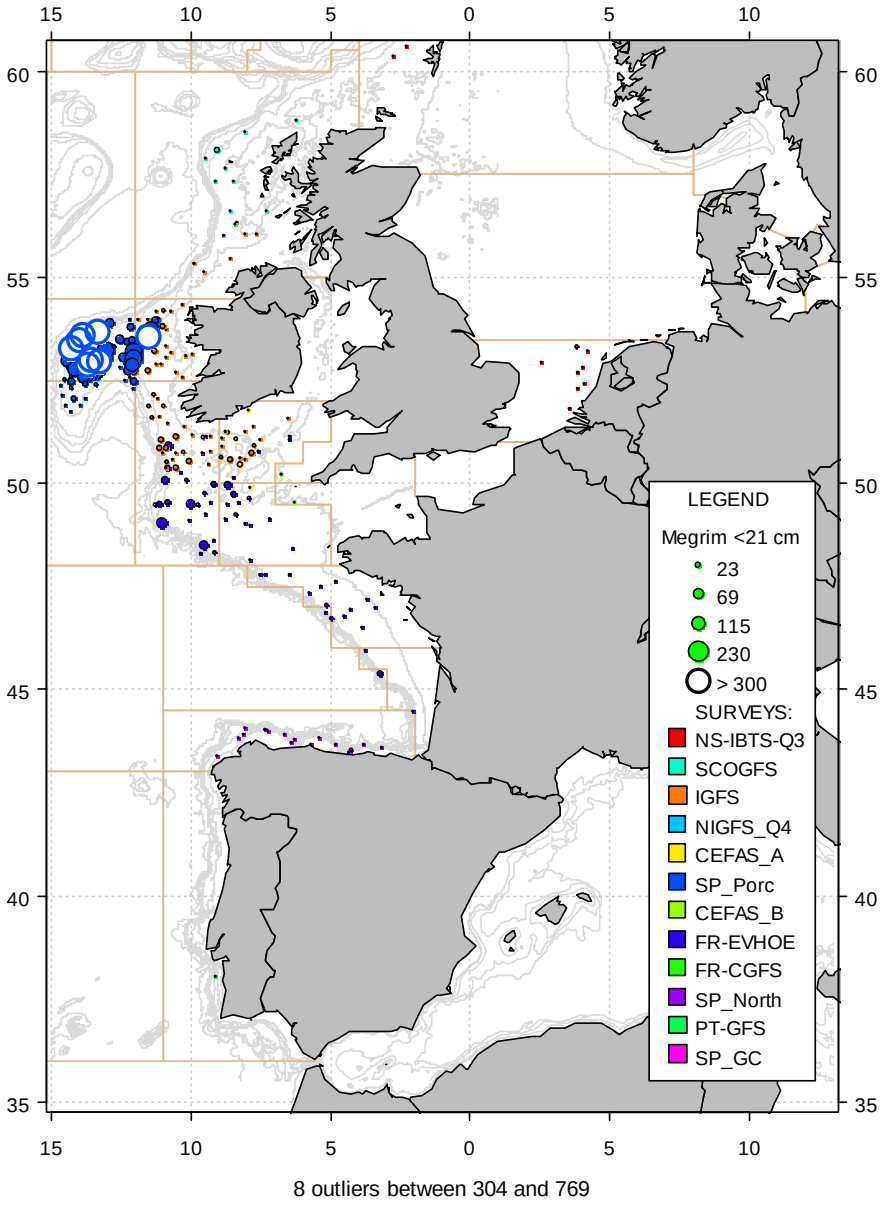

Figure A.6.14. Catches in numbers per hour of megrim recruits, *Lepidorhombus whiffiagonis* (<21 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

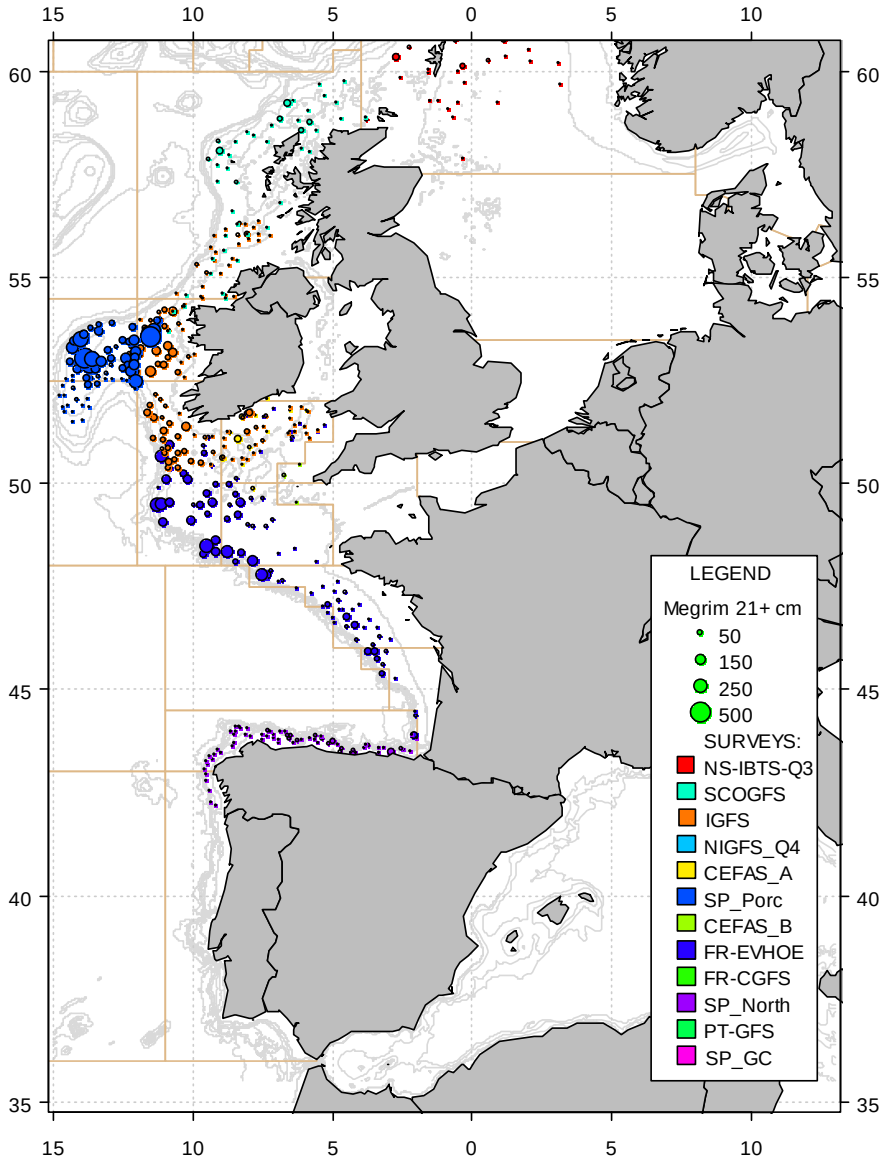

Figure A.6.15. Catches in numbers per hour of 2+ group megrim, *Lepidorhombus whiffiagonis* (≥21cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

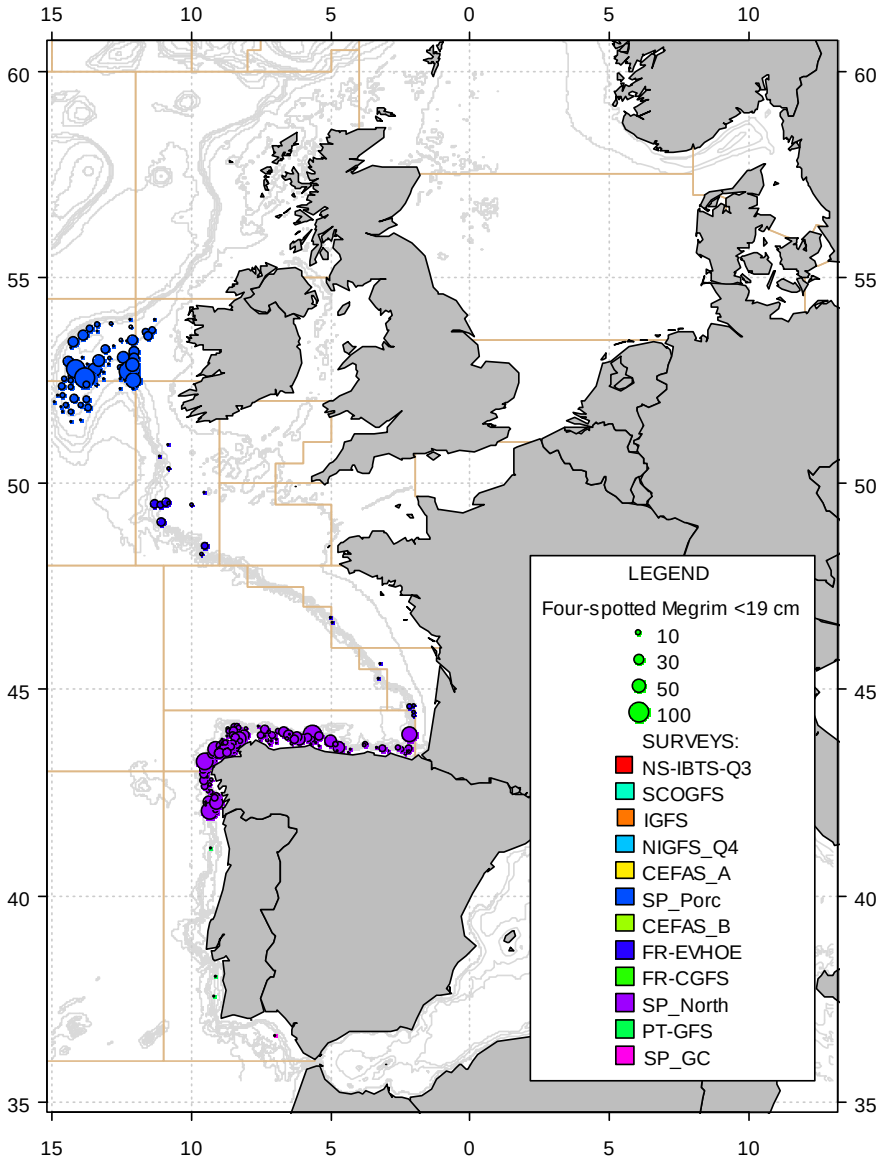

Figure A.6.16. Catches in numbers per hour of recruits of four-spotted megrim, *Lepidorhombus boscii* (<19 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

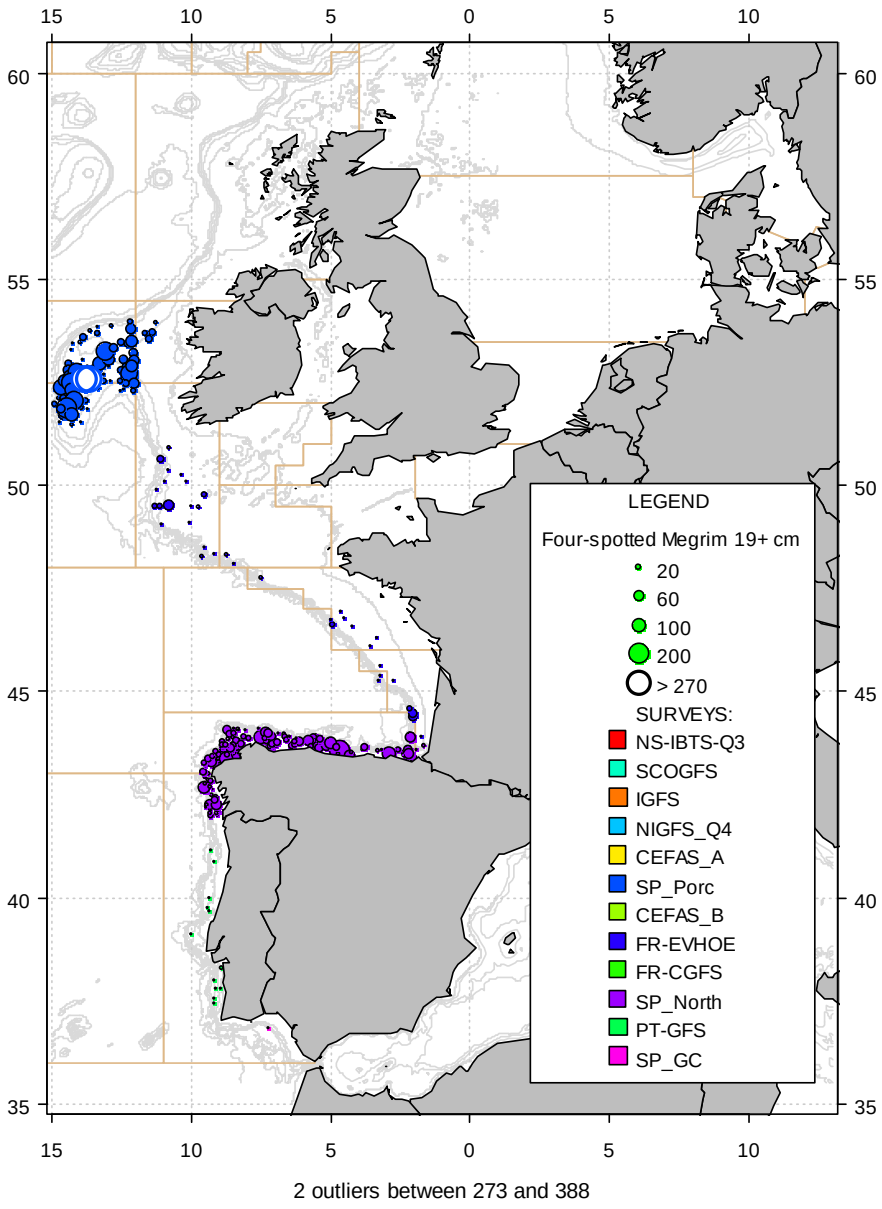

Figure A.6.17. Catches in numbers per hour of 2+ group four-spotted megrim, *Lepidorhombus boscii* (≥19 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

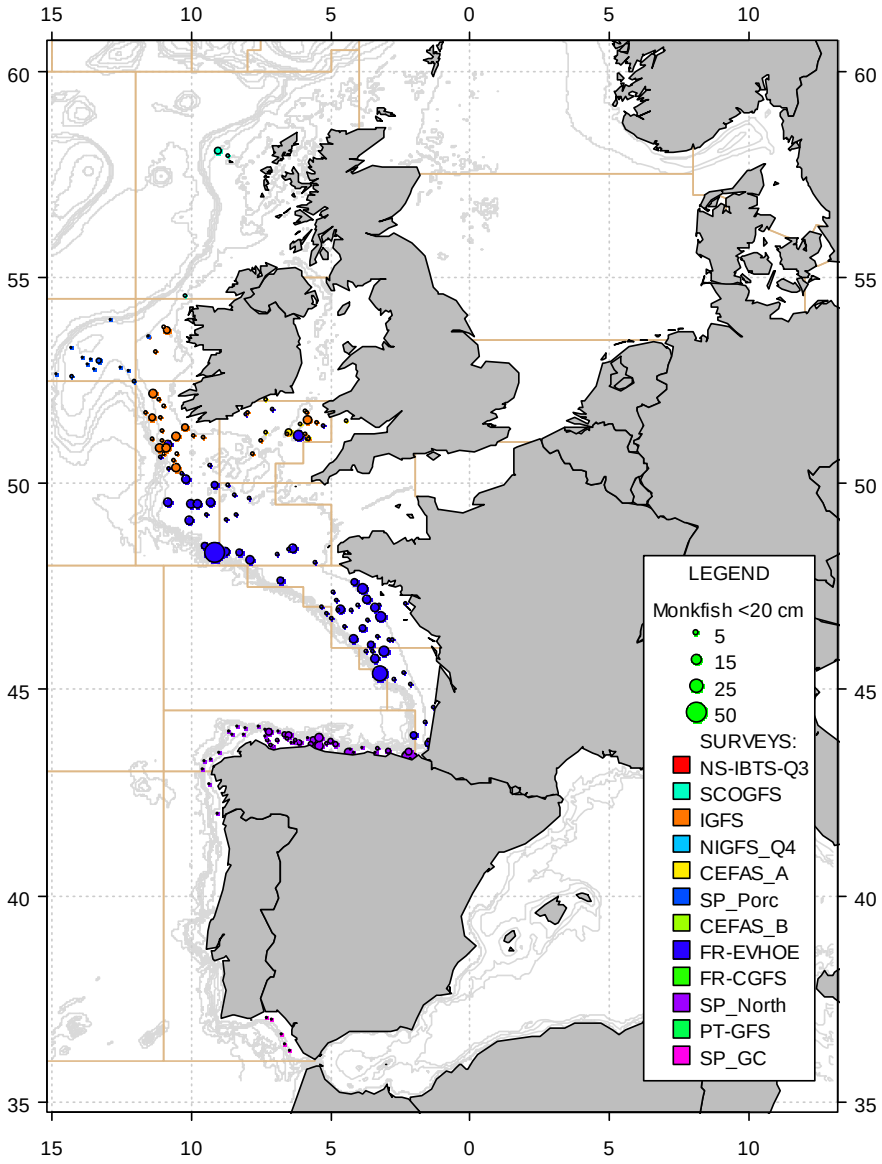

Figure A.6.18. Catches in numbers per hour of 0-group monkfish, *Lophius piscatorius* (<20 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

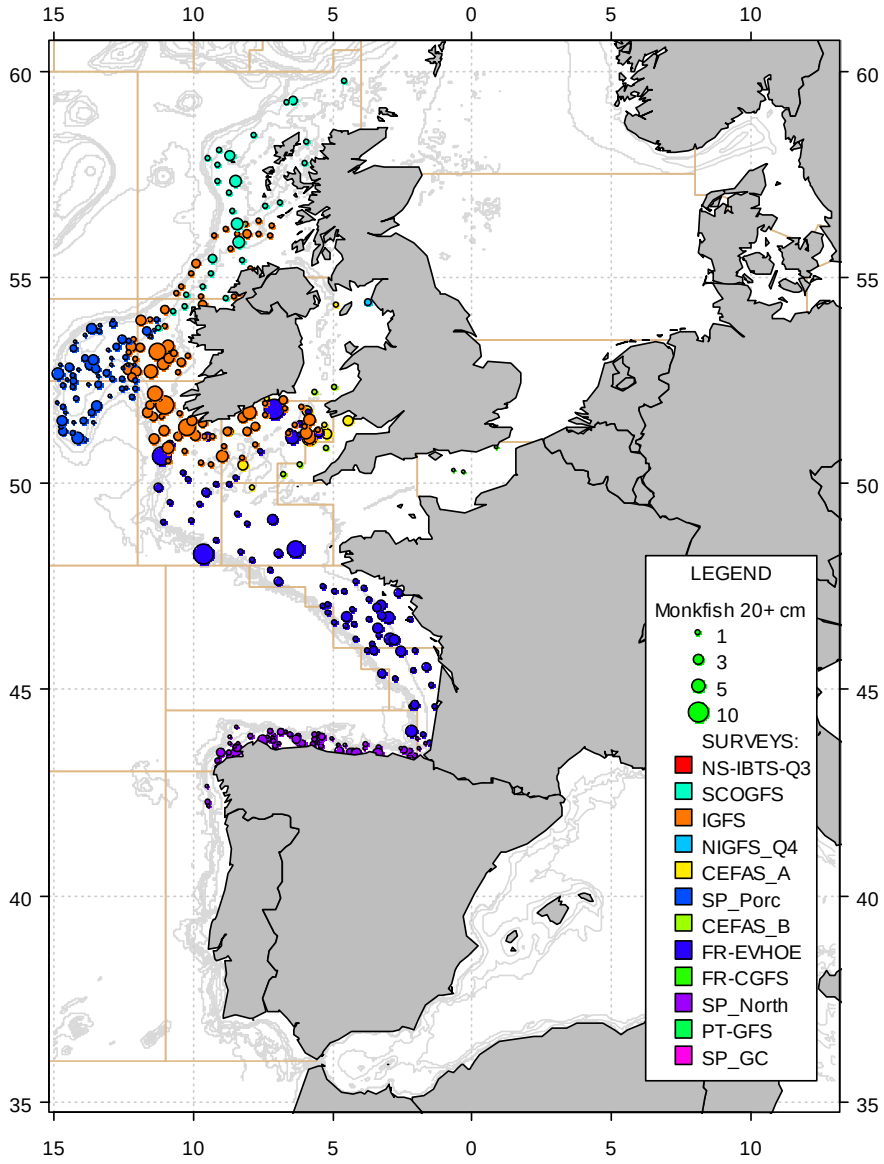

Figure A.6.19. Catches in numbers per hour of 1+ group monkfish, *Lophius piscatorius* (≥20 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

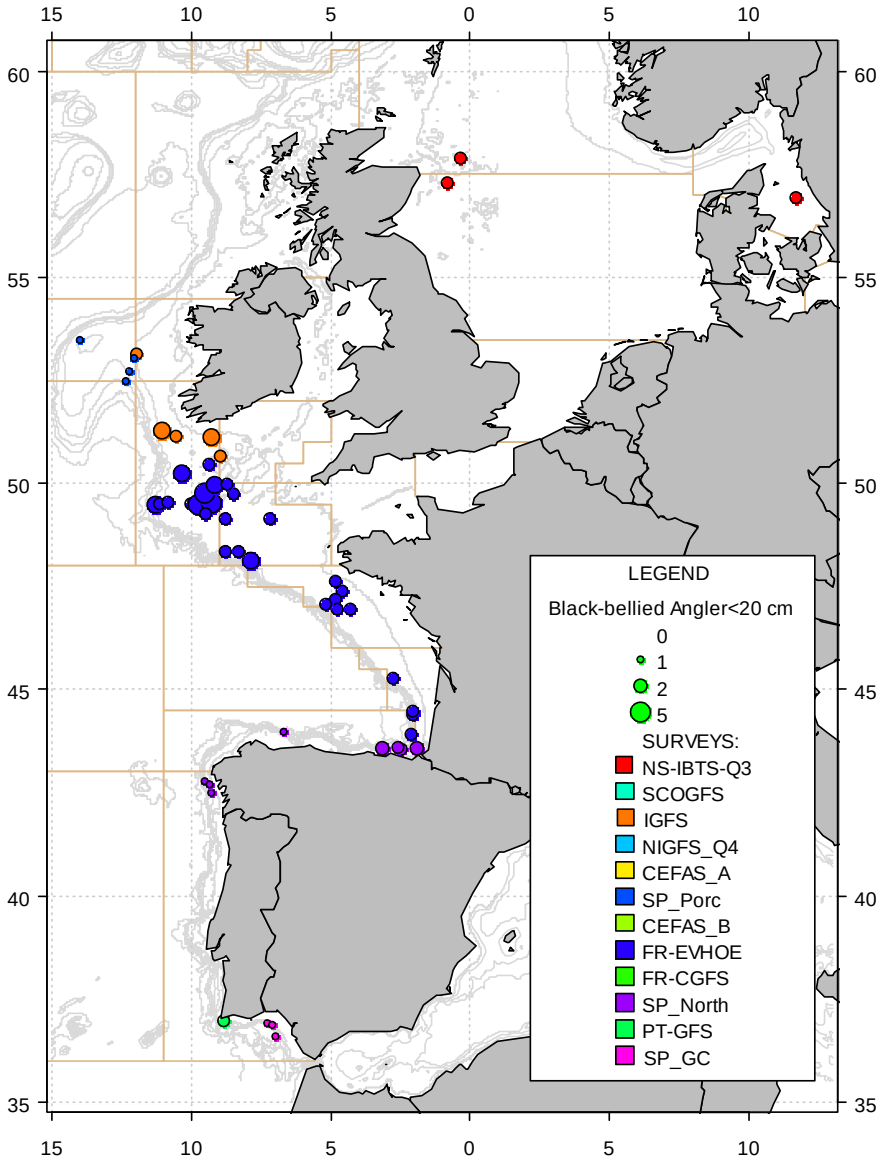

Figure A.6.20. Catches in numbers per hour of 0-group black-bellied anglerfish, *Lophius budegassa* (<20 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

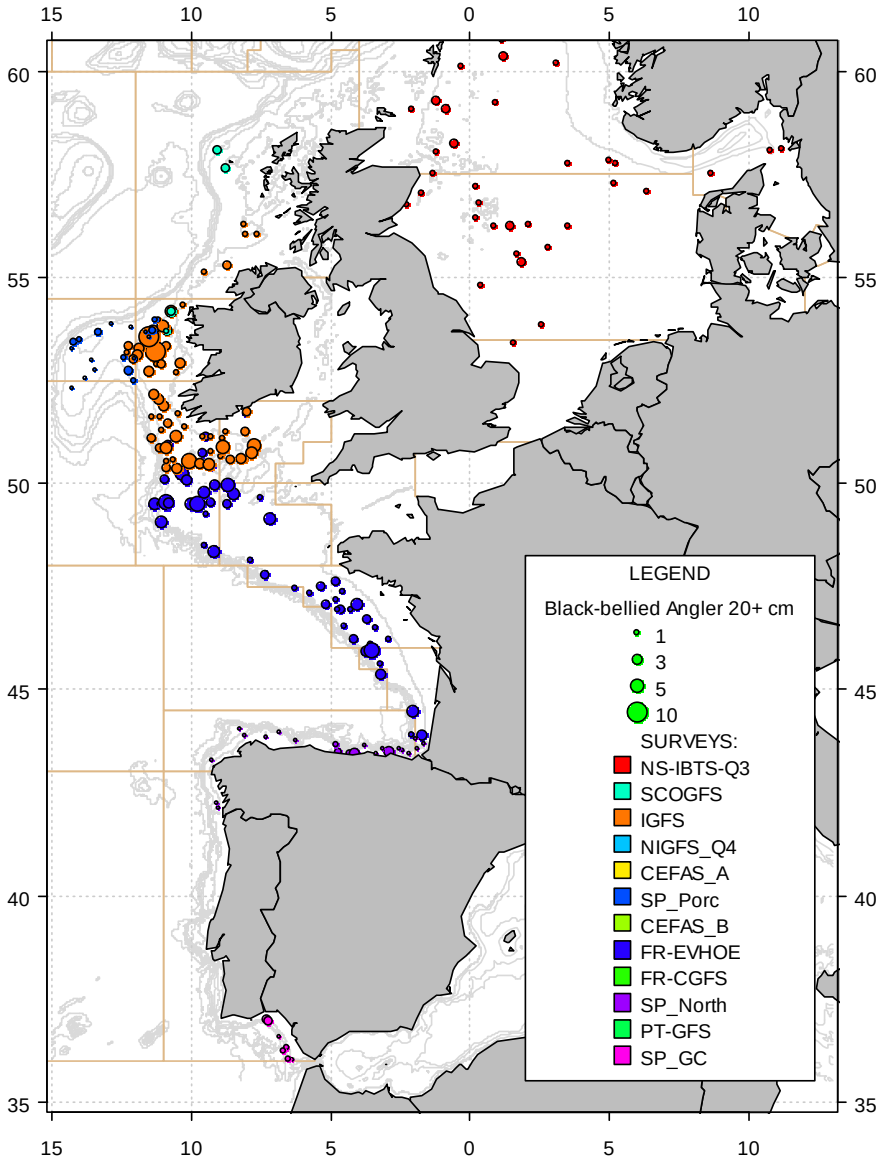

Figure A.6.21. Catches in numbers per hour of 1+ group black-bellied anglerfish, *Lophius budegassa* (≥20 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

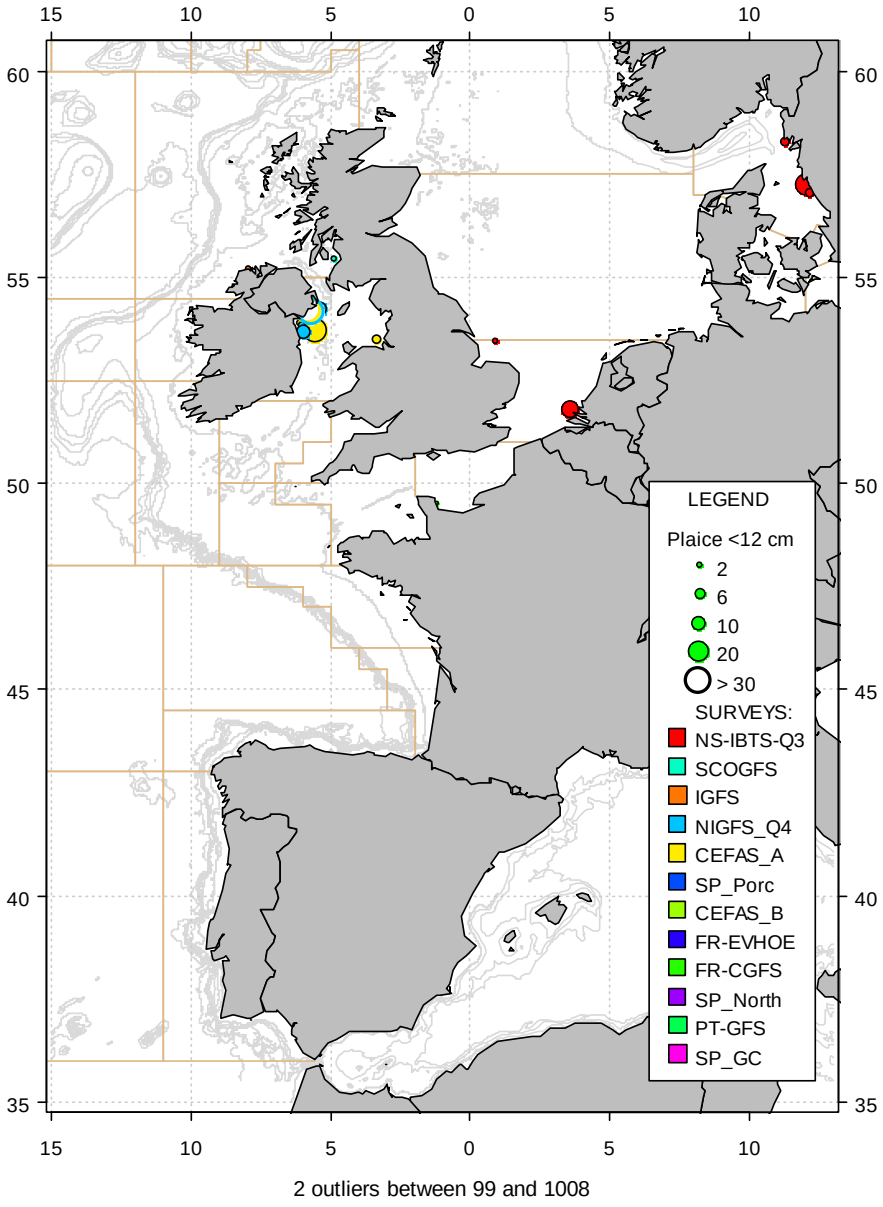

Figure A.6.22. Catches in numbers per hour of 0-group plaice, *Pleuronectes platessa* (<12 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

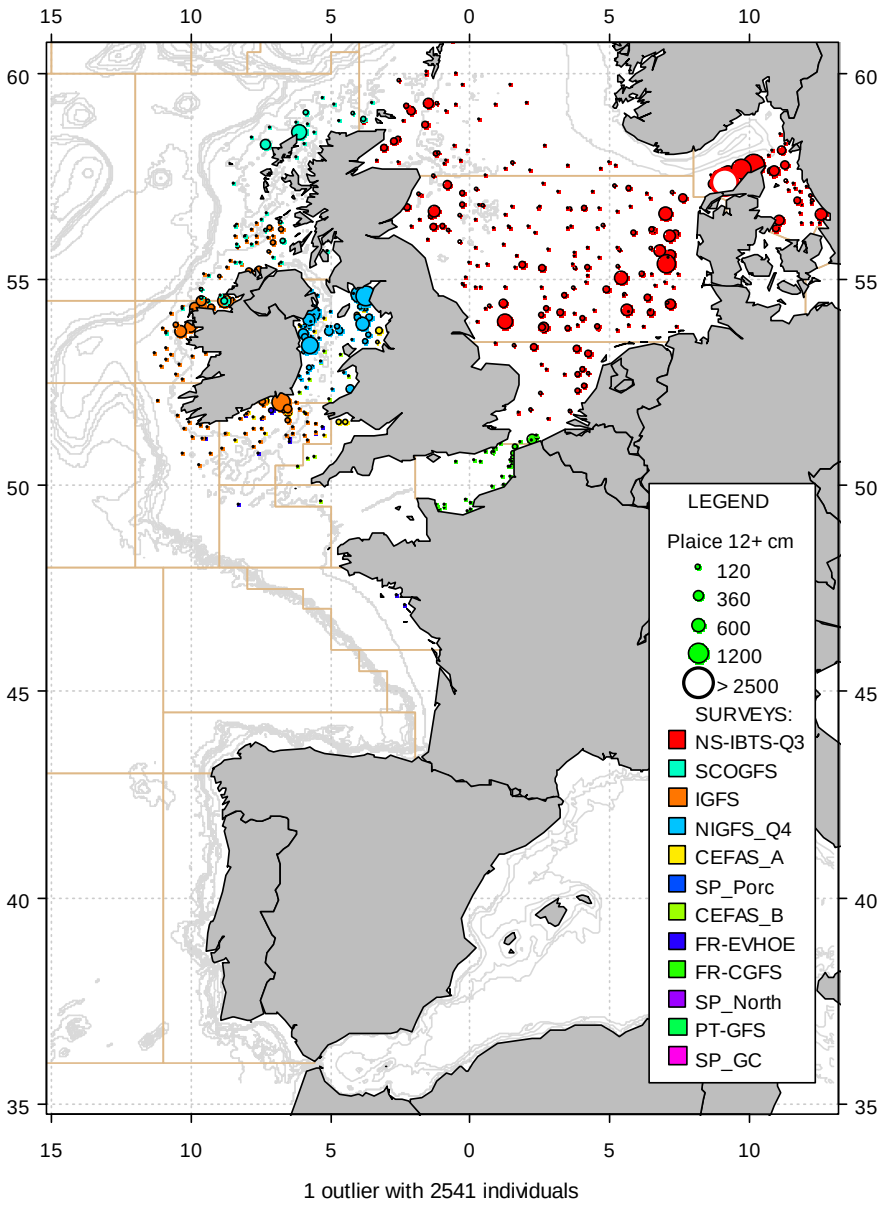

Figure A.6.23. Catches in numbers per hour of 1+ group plaice, *Pleuronectes platessa* (≥12 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

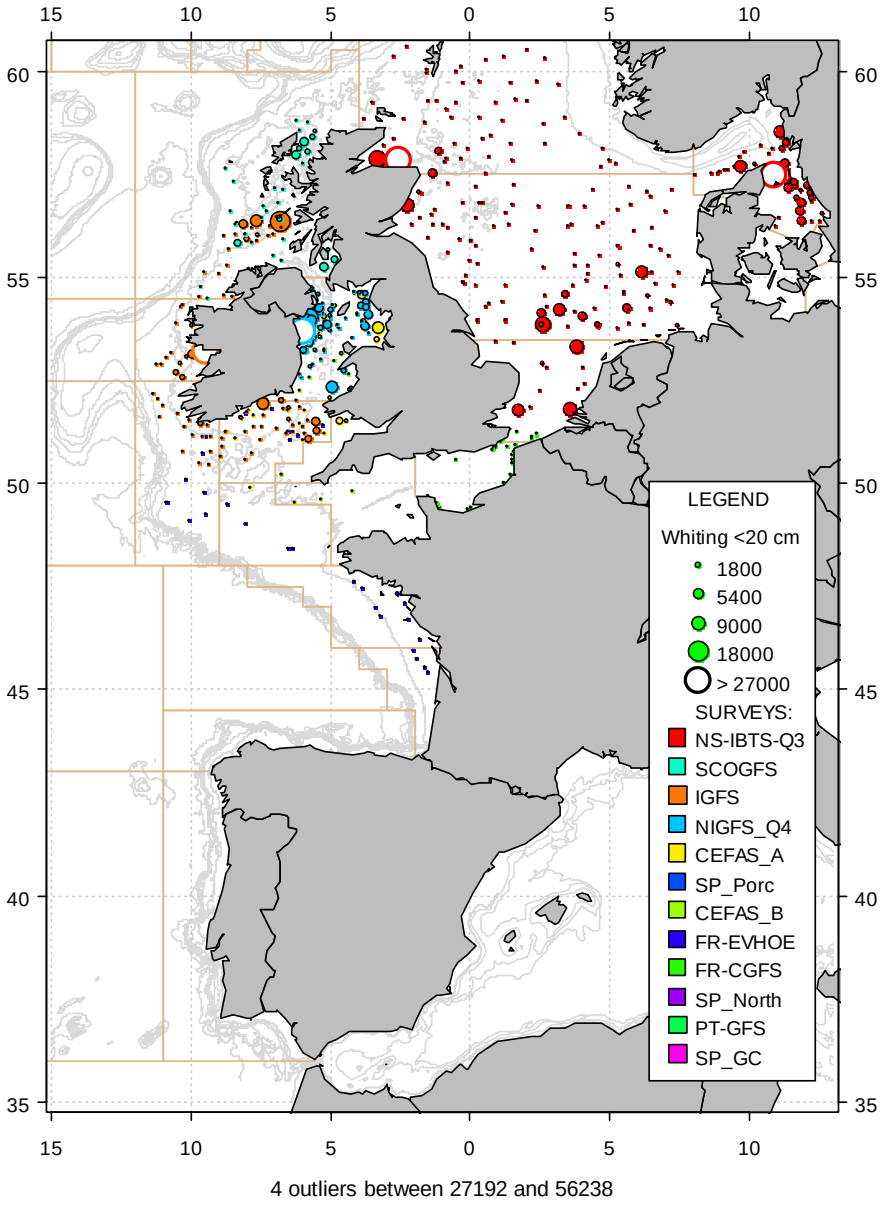

Figure A.6.24. Catches in numbers per hour of 0-group whiting, *Merlangius merlangus* (<20 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

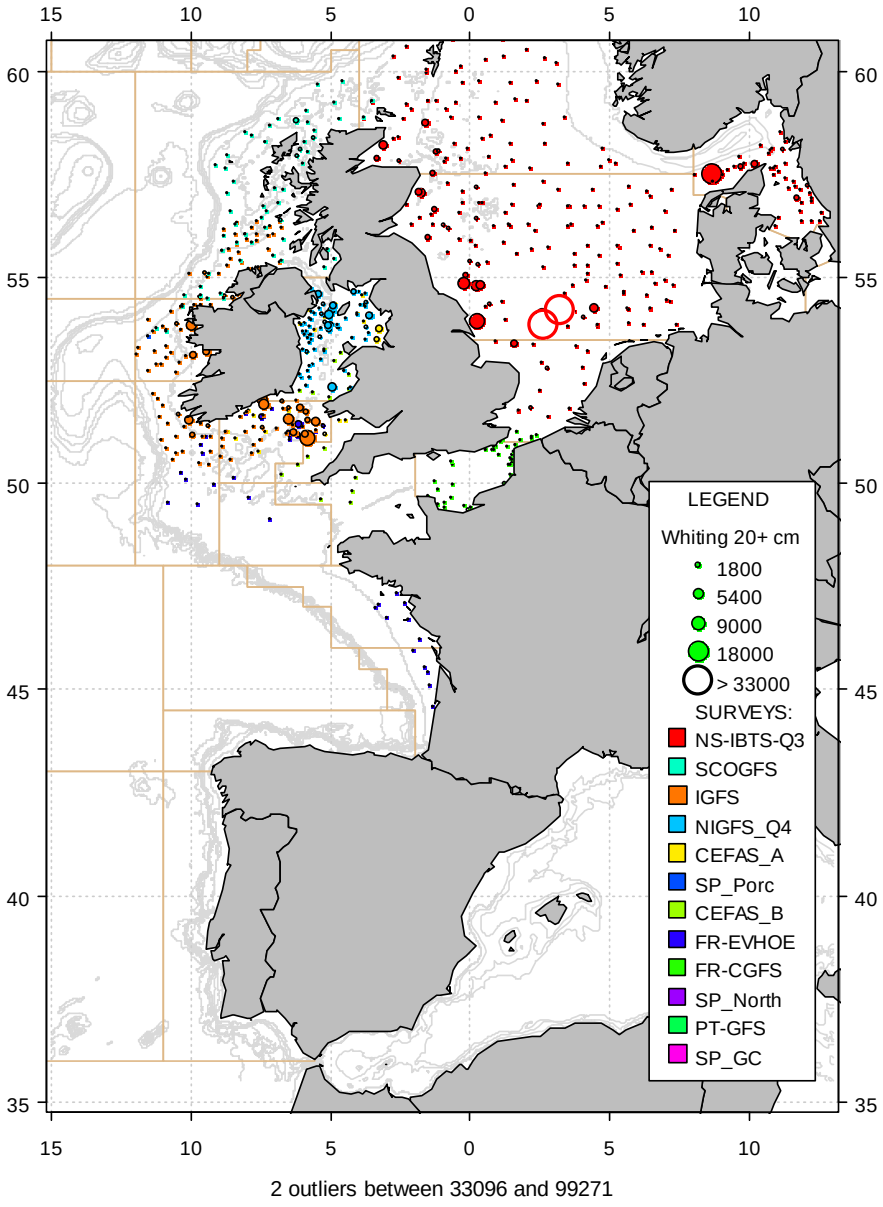

Figure A.6.25. Catches in numbers per hour of 1+ group whiting, *Merlangius merlangus* (≥20 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

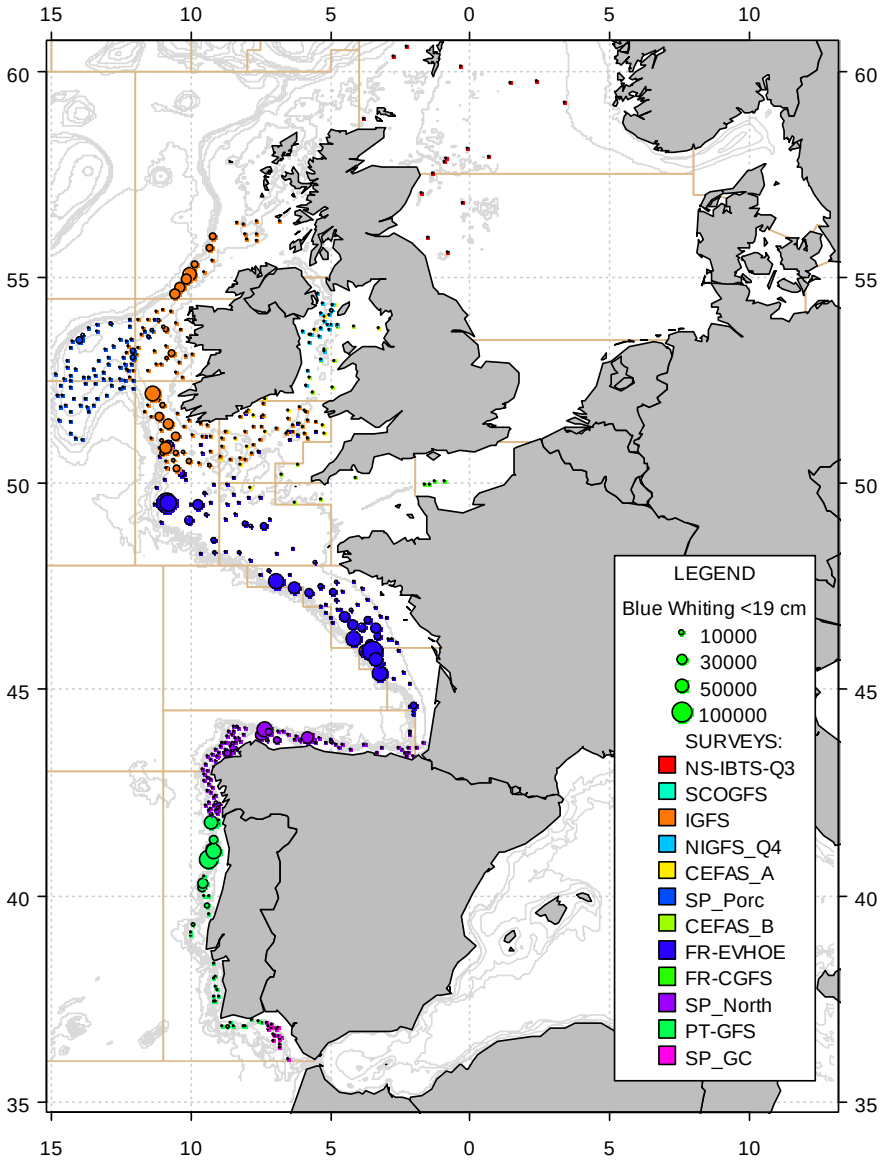

Figure A.6.26. Catches in numbers per hour of 0-group blue whiting, *Micromesistius poutassou* (<19 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

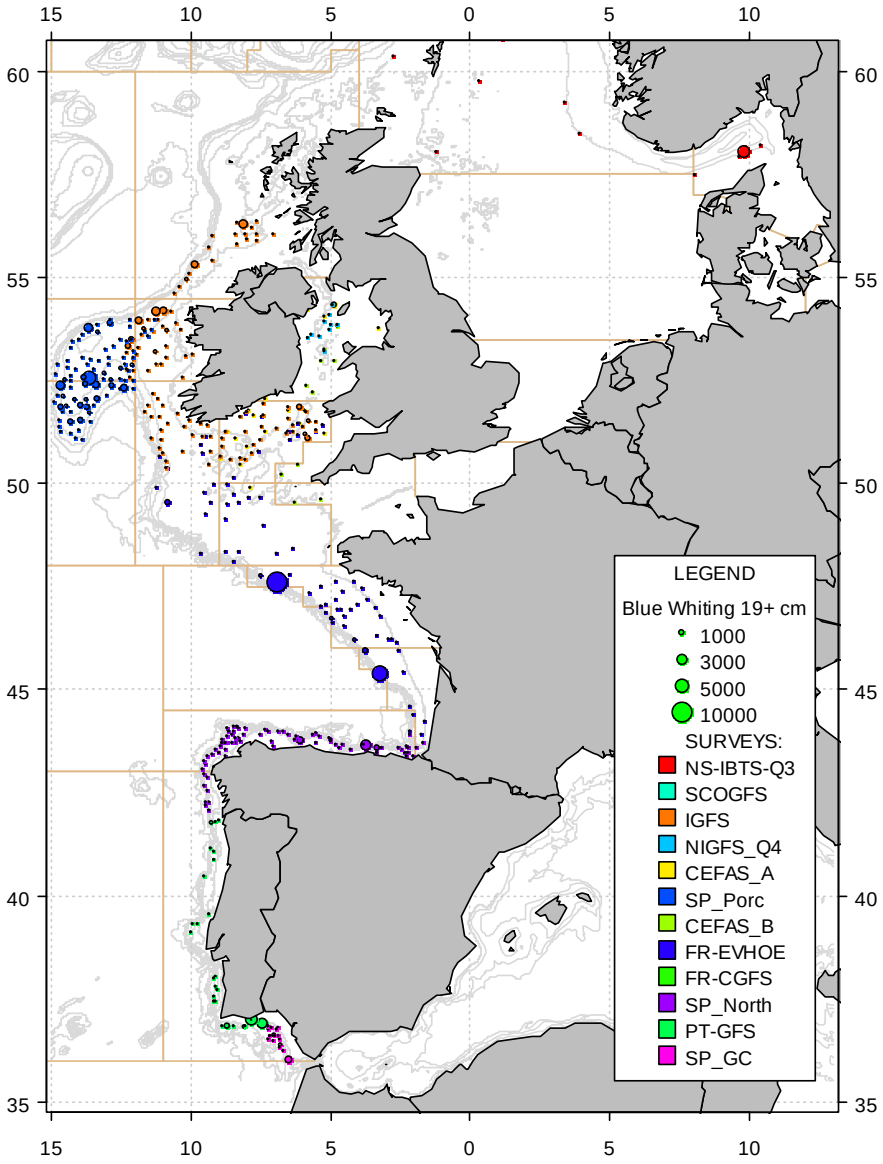

Figure A.6.27. Catches in numbers per hour of 1+ group blue whiting, *Micromesistius poutassou* (≥19 cm), in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

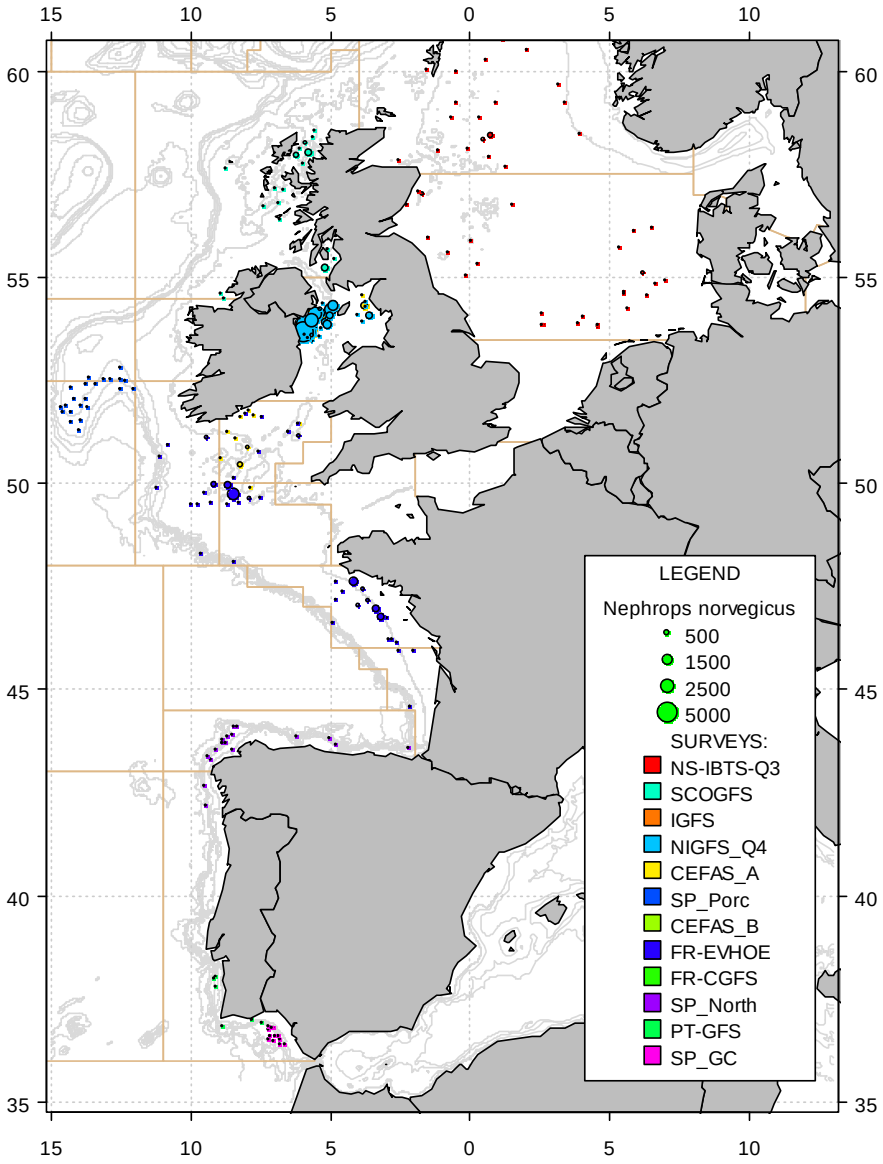

Figure A.6.28. Catches in numbers per hour of Norway lobster, *Nephrops norvegicus*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

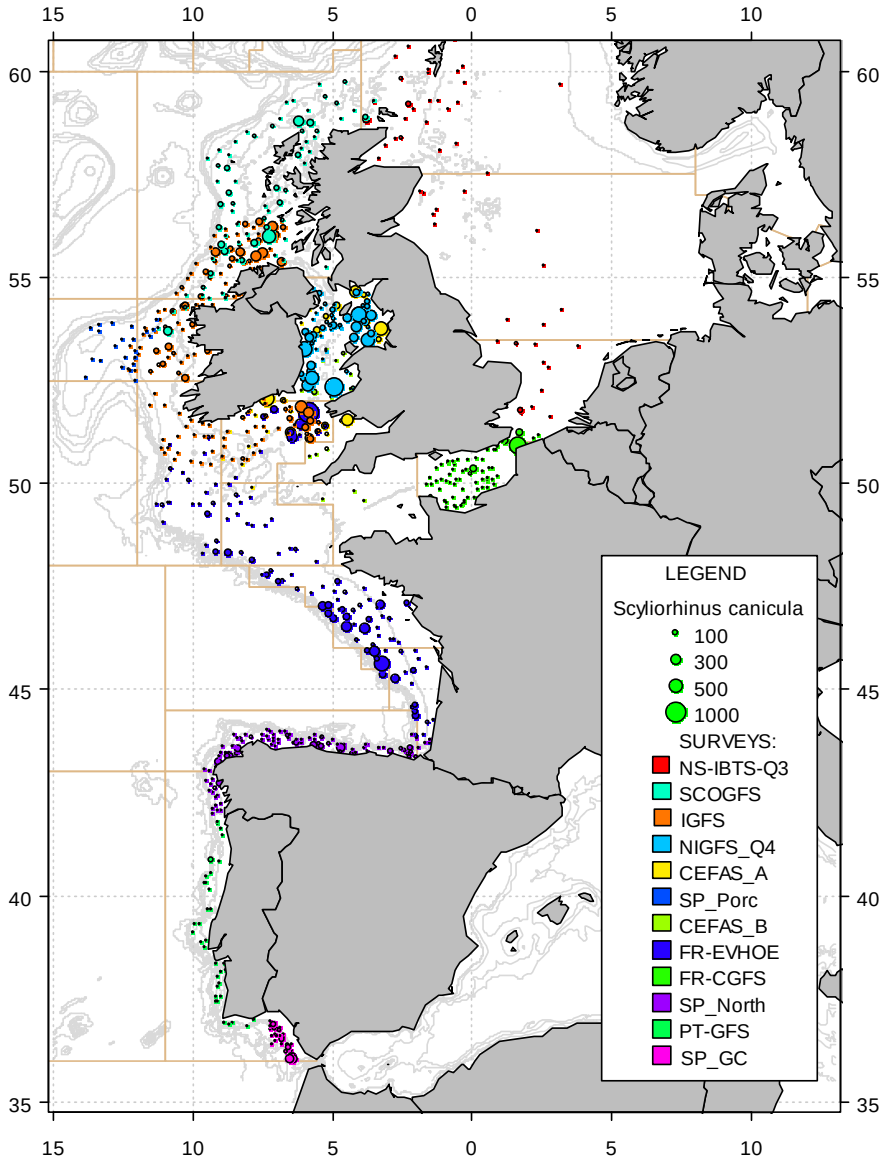

Figure A.6.29. Catches in numbers per hour of lesser spotted dogfish, *Scyliorhinus canicula*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

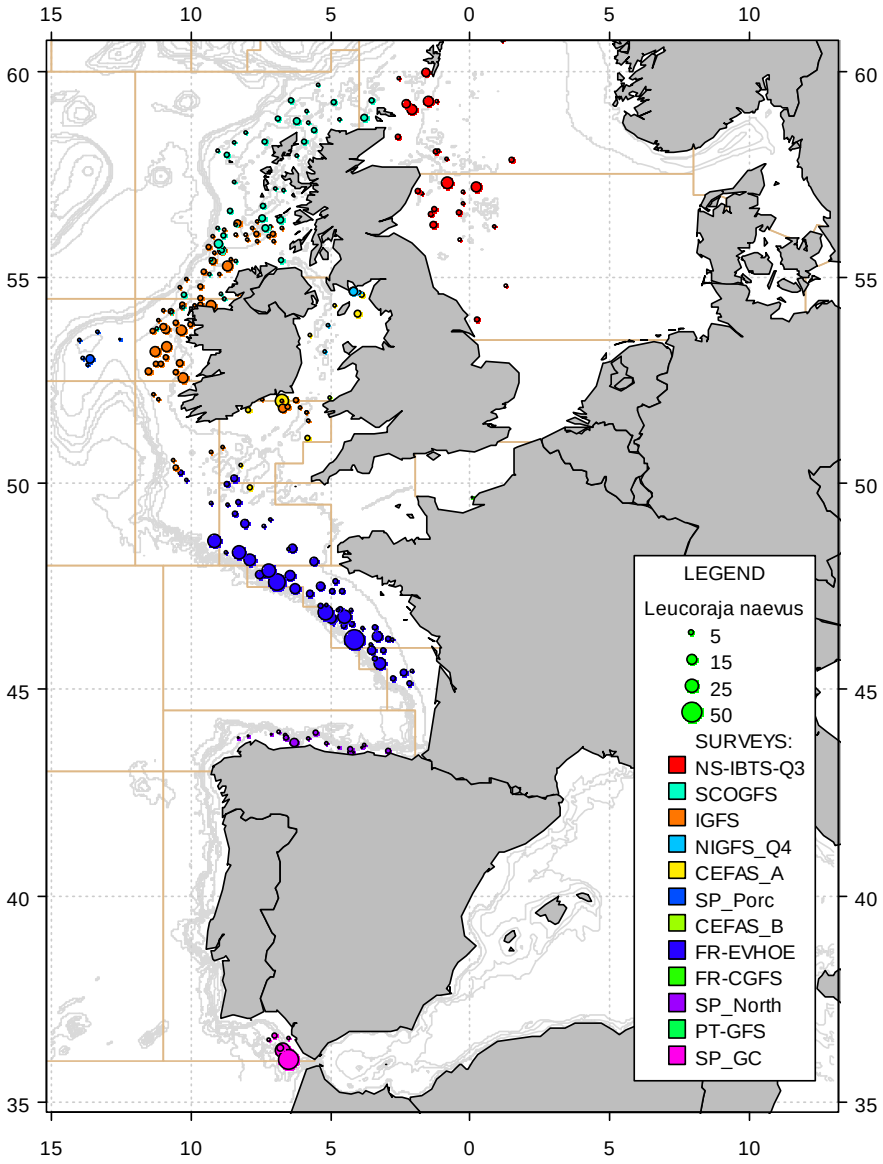

Figure A.6.30. Catches in numbers per hour of cuckoo ray, *Leucoraja naevus*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

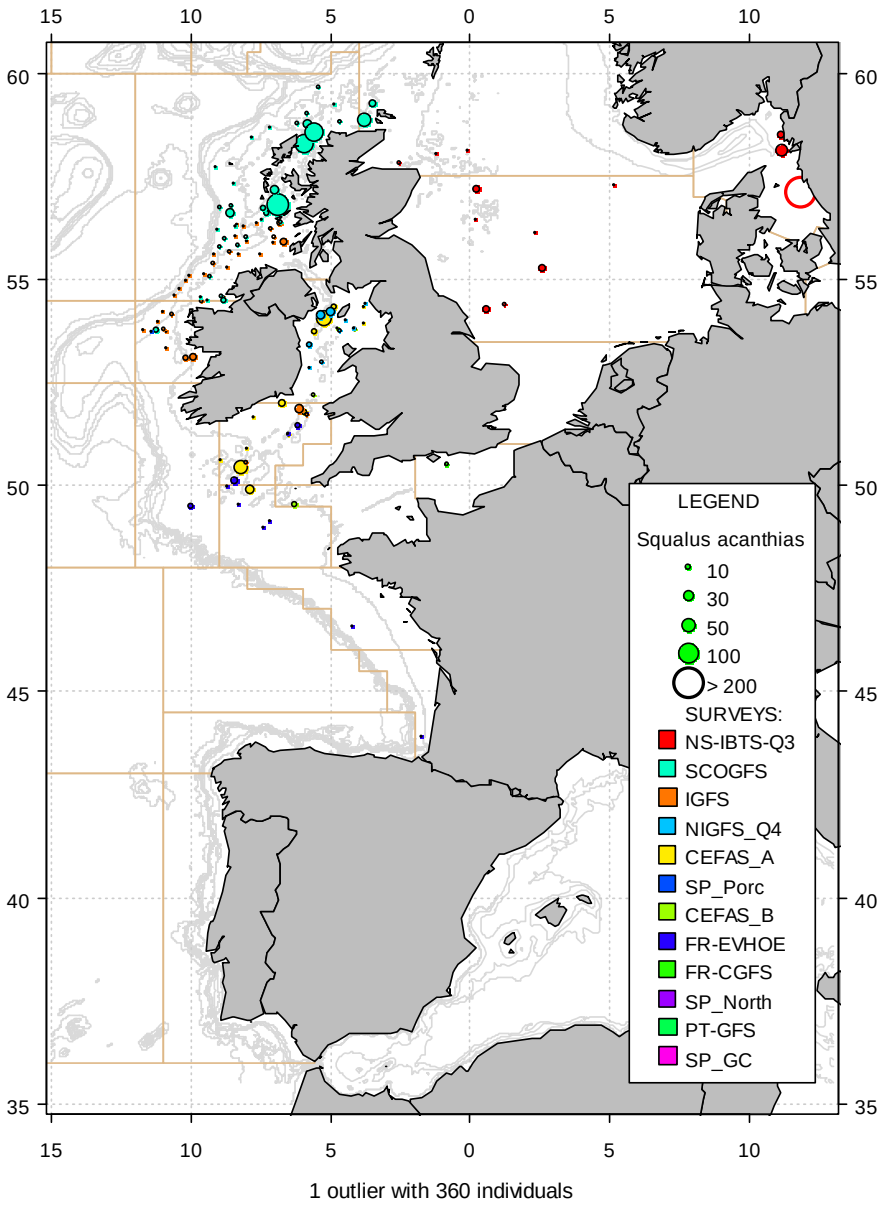

Figure A.6.31. Catches in numbers per hour per hour of spurdog, *Squalus acanthias*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

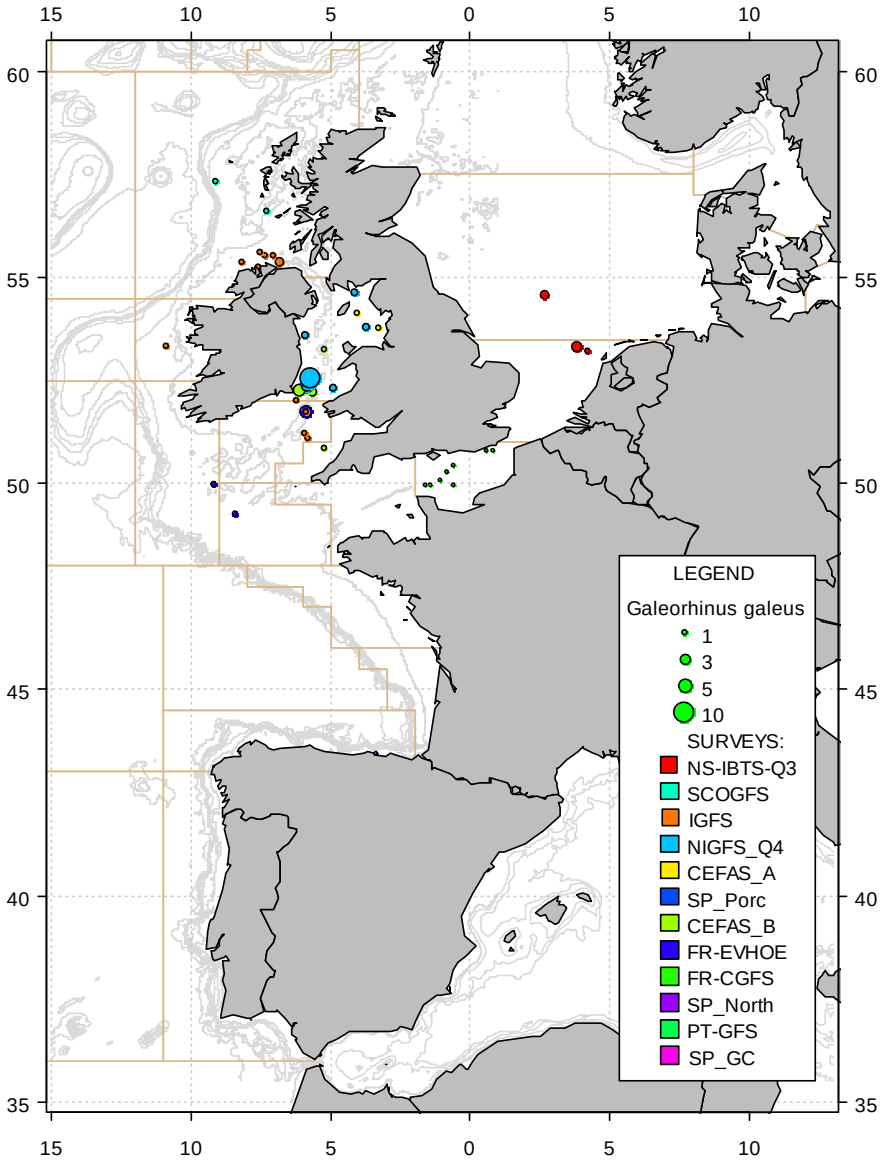

Figure A.6.32. Catches in numbers per hour per hour of tope, *Galeorhinus galeus*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

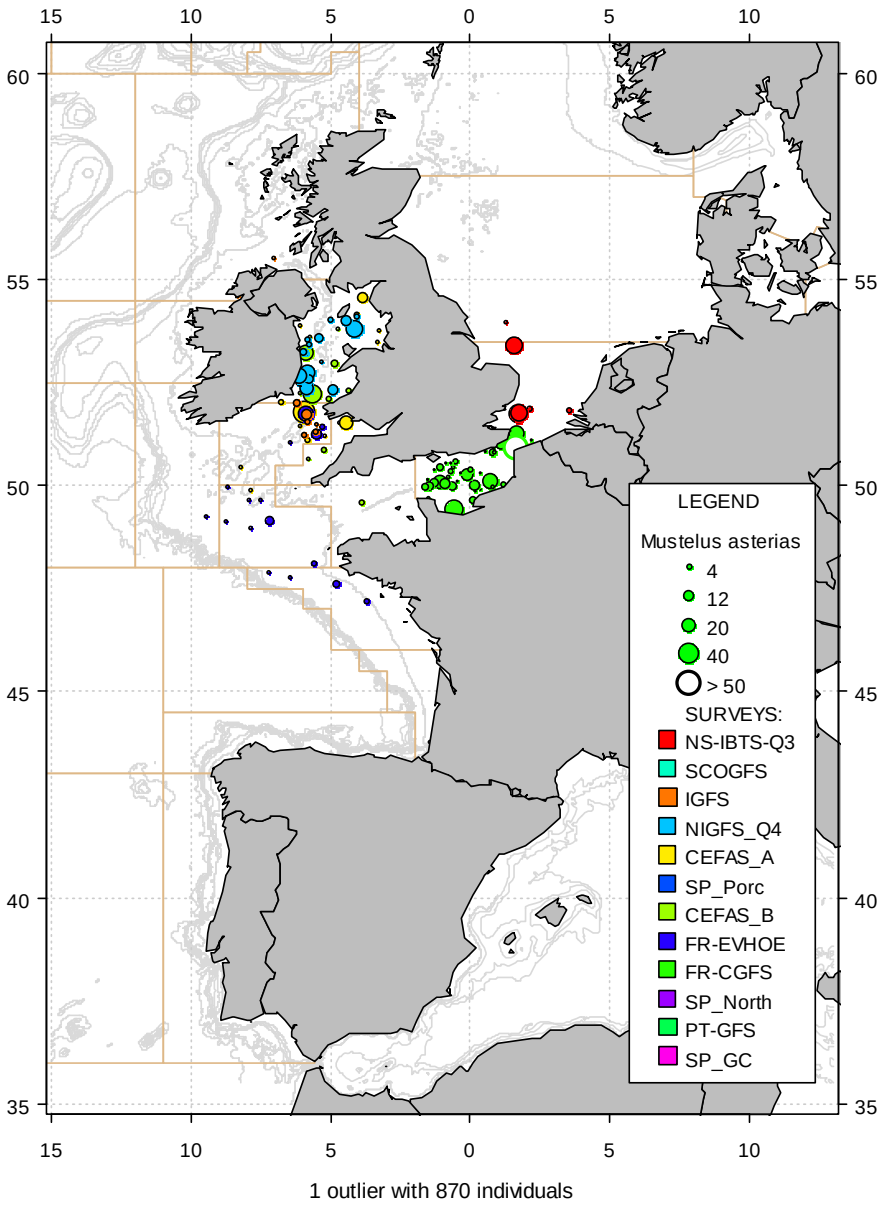

Figure A.6.33. Catches in numbers per hour per hour of smooth hound, *Mustelus asterias*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

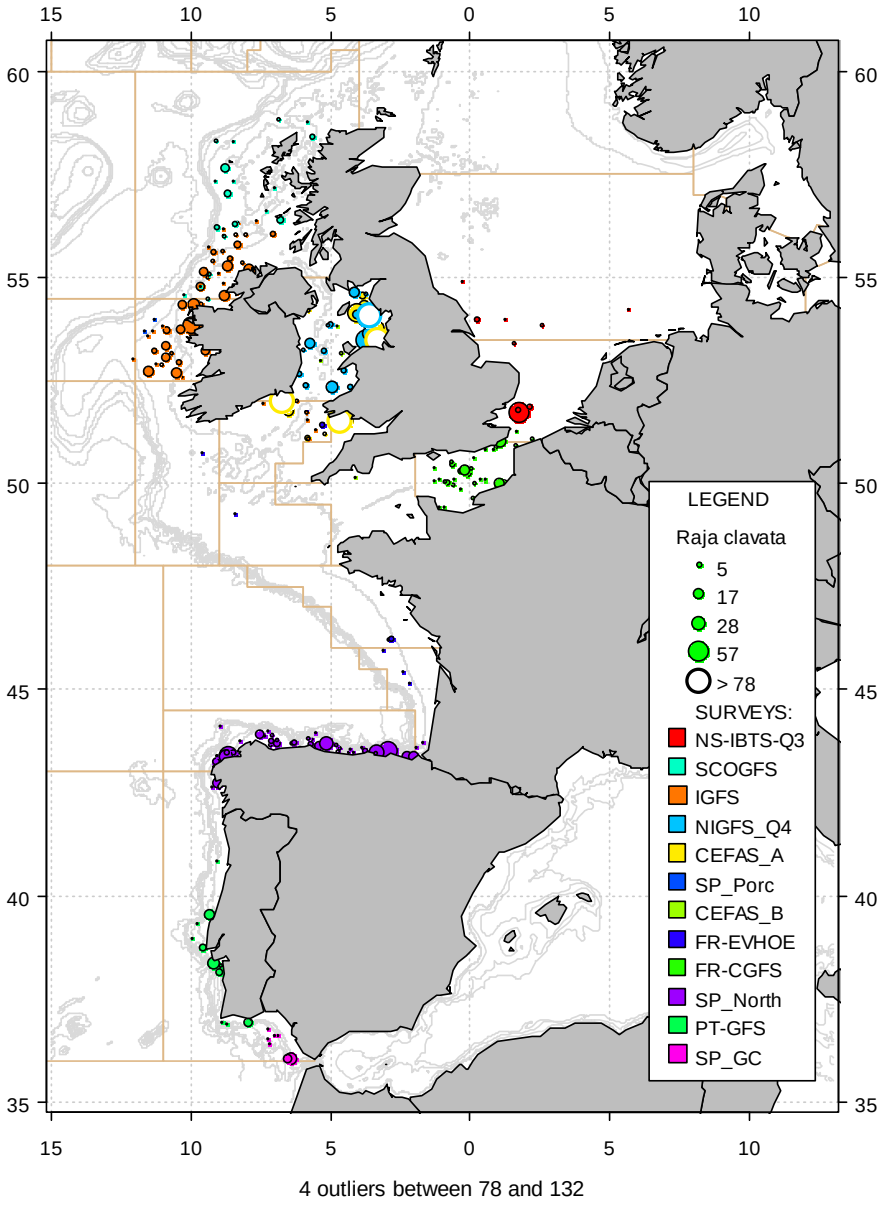

Figure A.6.34. Catches in numbers per hour per hour of thornback ray, *Raja clavata*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

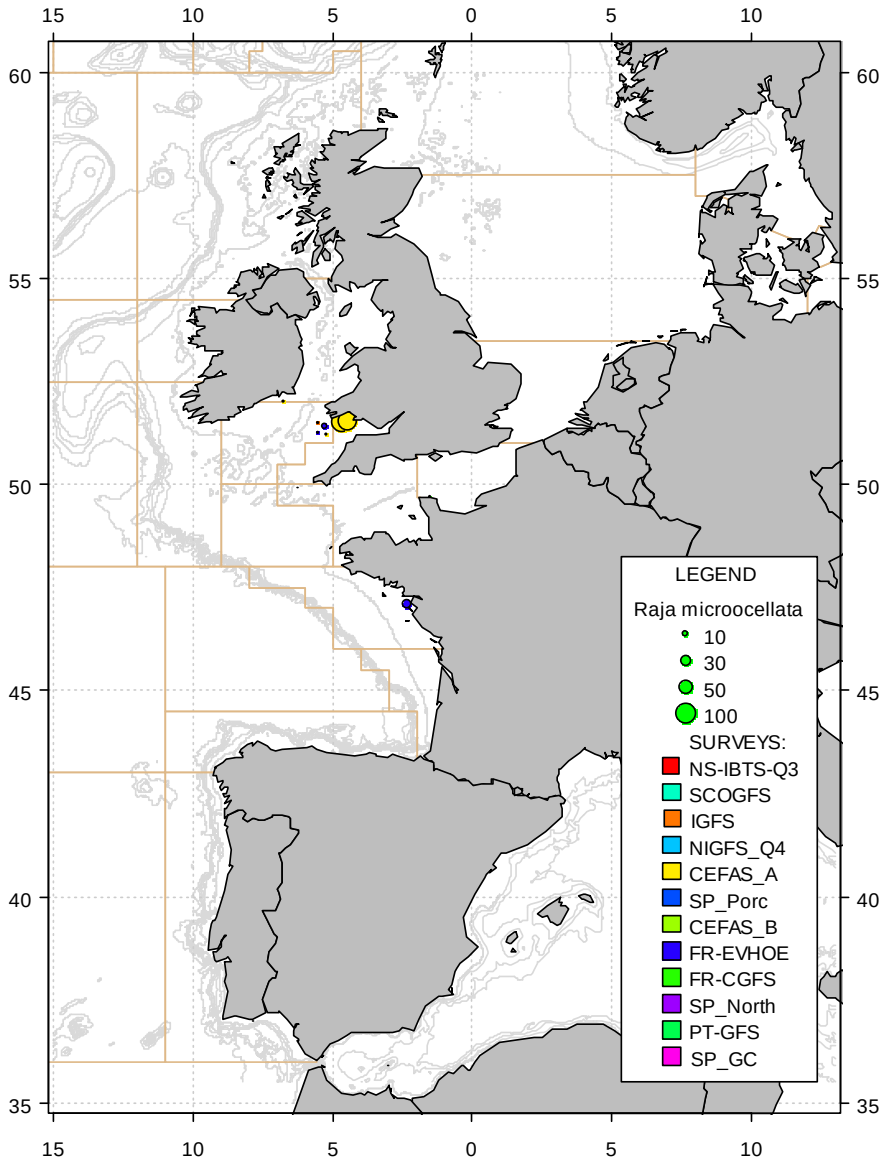

Figure A.6.35. Catches in numbers per hour per hour of small eyed ray, *Raja microocellata*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

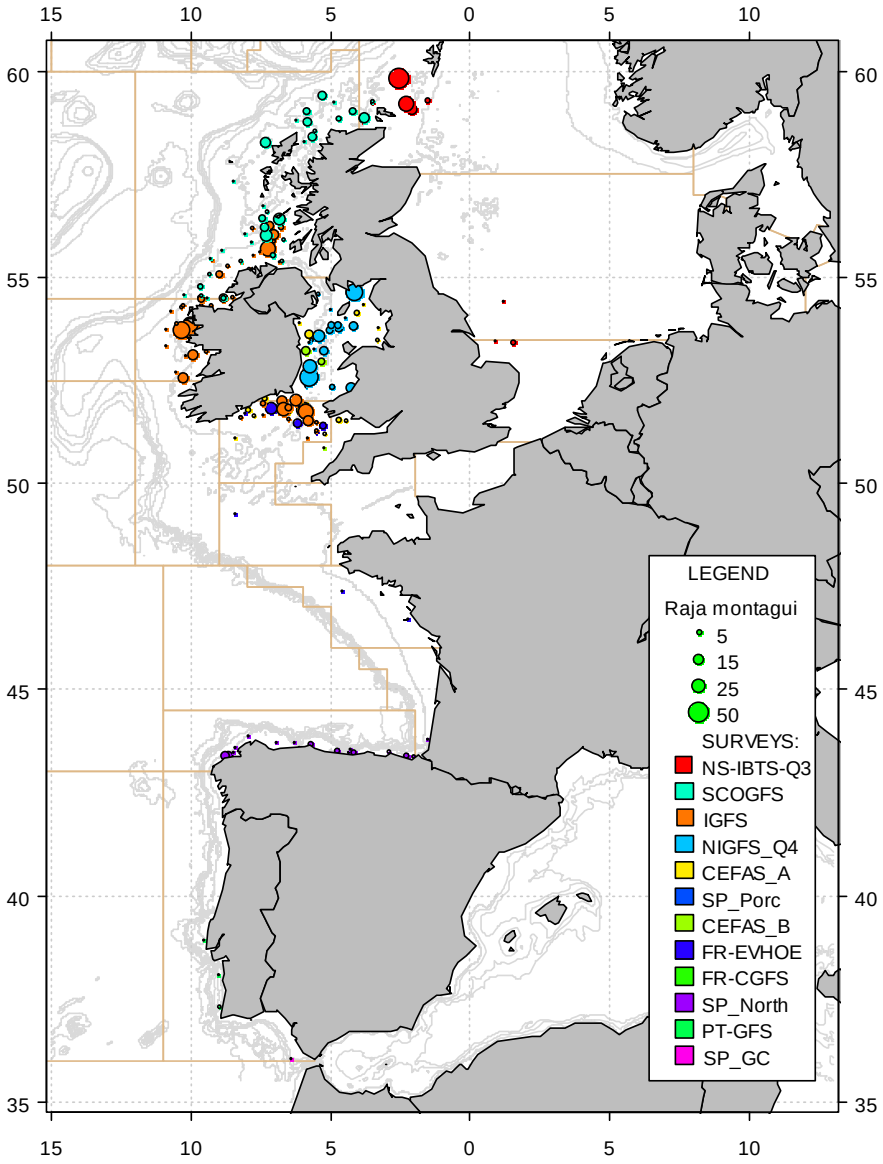

Figure A.6.36. Catches in numbers per hour per hour of spotted ray, *Raja montagui*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

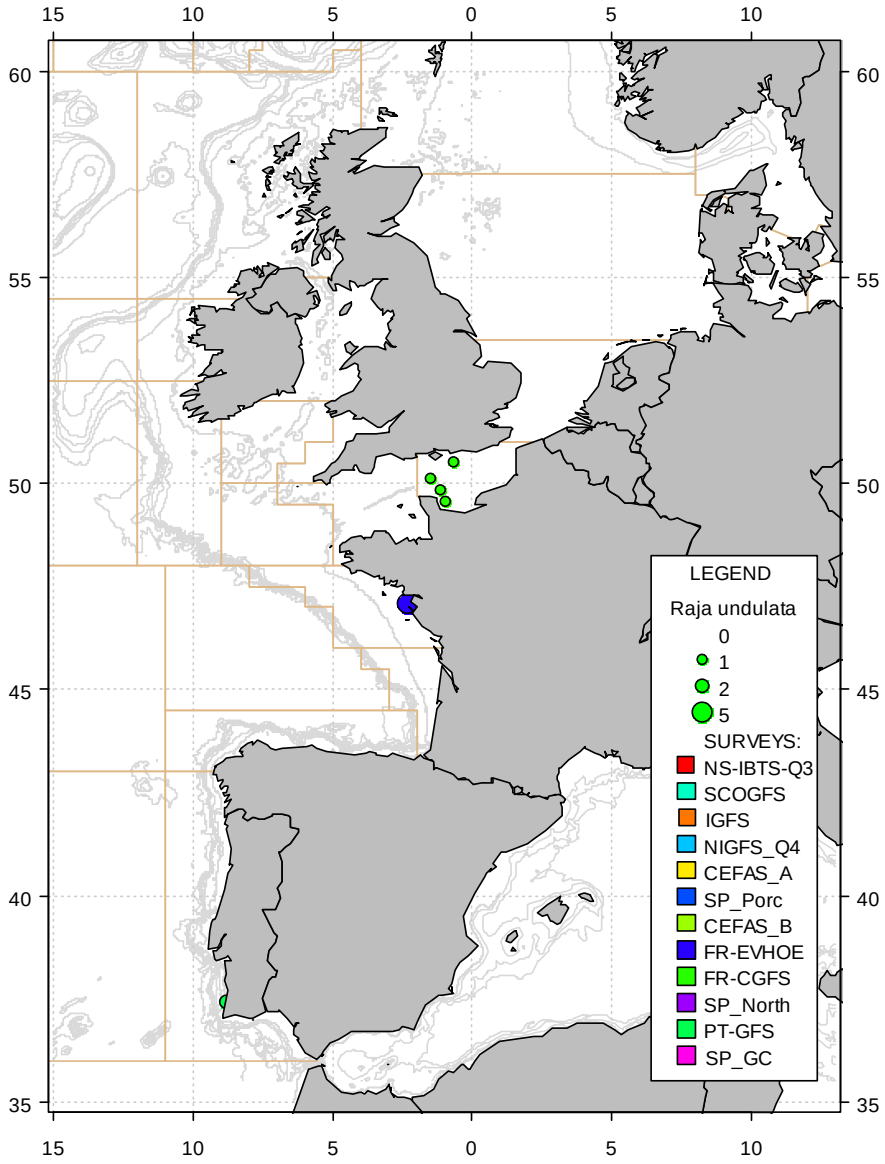

Figure A.6.37. Catches in numbers per hour per hour of undulate ray, *Raja undulata*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

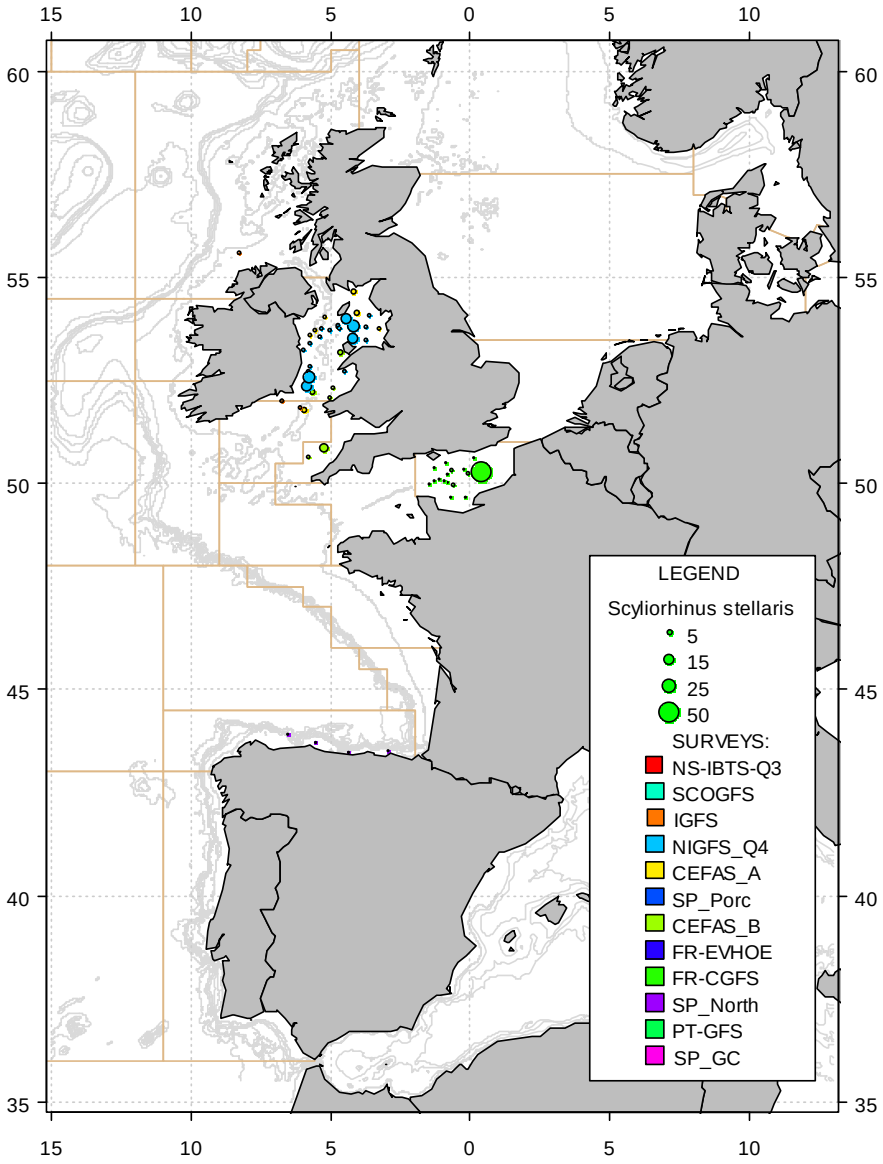

Figure A.6.38. Catches in numbers per hour per hour of nurse hound, *Scyliorhinus stellaris*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

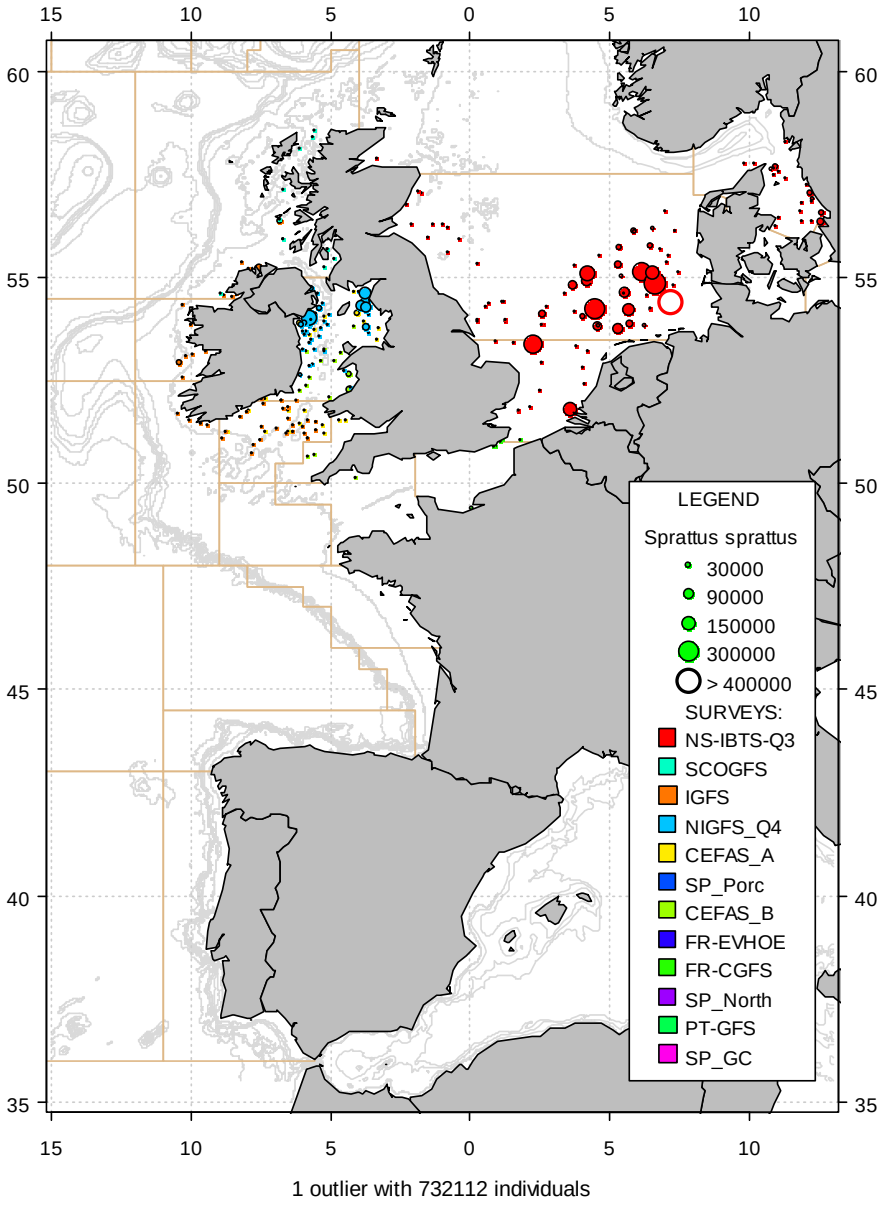

Figure A.6.39. Catches in numbers per hour per hour of European sprat, *Sprattus sprattus*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.

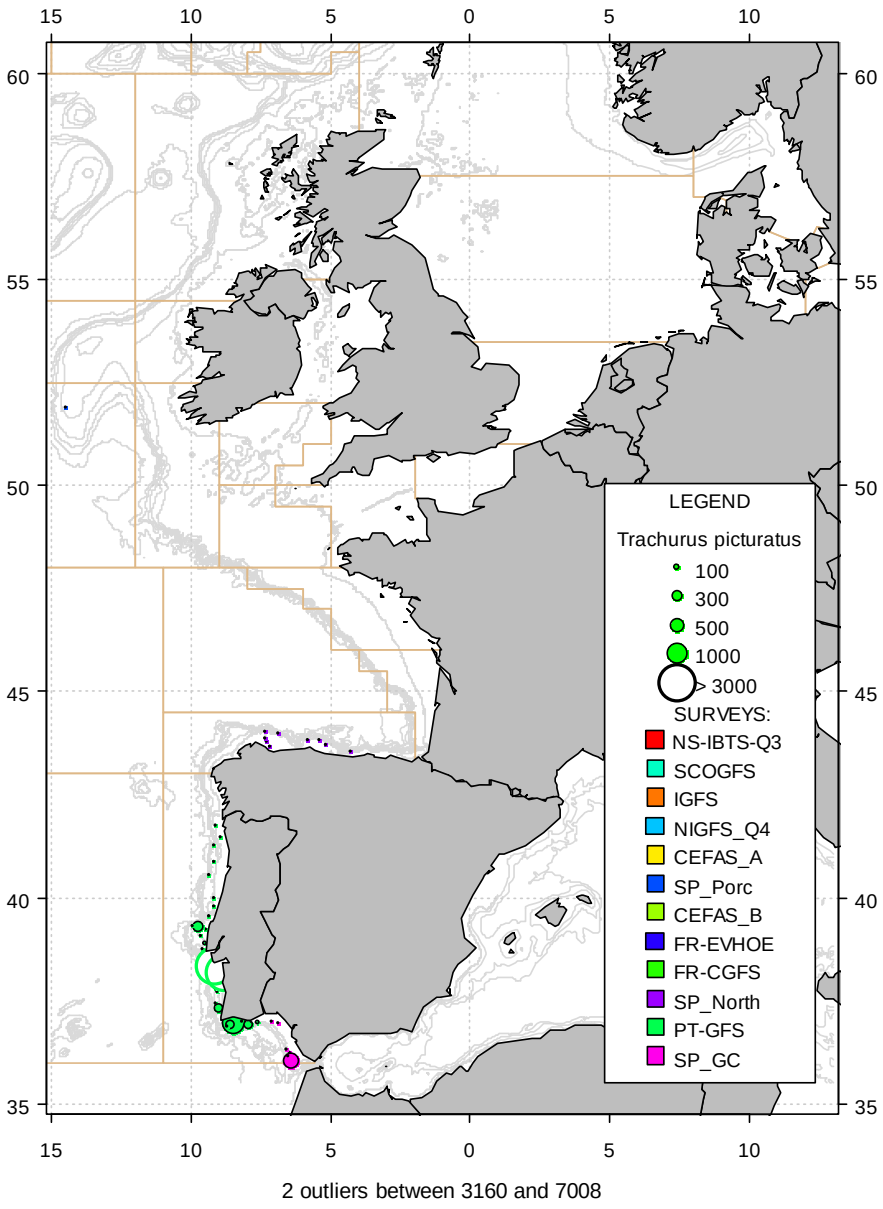

Figure A.6.40. Catches in numbers per hour per hour of blue jack mackerel, *Trachurus picturatus*, in autumn/winter 2009 IBTS surveys. The catchability of the different gears used in the NeAtl surveys is not constant; therefore the map does not reflect proportional abundance in all the areas but within each survey.