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ICES RESOURCE MANAGEMENT COMMITTEE

ICES CM 2008/RMC:02

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

31 March-4 April 2008

Vigo, Spain

ICES International Council for the Exploration of the Sea
CIEM Conseil International pour l'Exploration de la Mer

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Contents

Executive summary

Highlights

- The IBTSWG further developed its standard reporting format and users (e.g. assessment working groups) are invited to comment (sections 4 and 5).
- A central international database (i.e. DATRAS) should be supported by the establishment of a User Group to evaluate the functionality of the database, to provide feedback by data submitters and data users, to suggest updates of the system where needed, and to prioritize future developments (section 7).
- The IBTSWG has agreed upon implementing the recommendations made by WKMSCWHS (Workshop on Sexual Maturity Staging of Cod, Whiting Haddock and Saithe) concerning the maturity staging of these 4 gadoid species and e.g. the sampling will be according to the new 6 stage scale (section 8.4).

The International Bottom Trawl Working Group (IBTSWG) met in Vigo, Spain, from 31 March to 4 April 2008. There were 22 participants from 13 countries all involved in designing and conducting bottom trawl surveys.

All terms of reference have been met, details are given in relevant sections (see table of contents). Major developments, achievements and recommendations from the 2008 meeting are given below:

Presentation of survey results

Individual surveys coordinated by IBTSWG are presented using an improved version of a reporting format bearing information on survey design, coverage, and aggregated results for the most important species (see section 4). Such a standard reporting format provides a centralised and easily accessible overview of specific survey data sets, to those using the data. One development is the creation of maps showing the distribution of some target species throughout the entire area covered by IBTS surveys (see section 5).

During the meeting several historic overviews of IBTS issues were created, which can function as background information for users. Section 7.2 provides an overview of the execution of IBTS surveys in the past by country, per quarter and year, including information on whether the data are submitted and stored in the DATRAS Database. Also, several intercalibration experiments have been conducted in the past during groundfish surveys coordinated by the IBTSWG. The aim was to compare the catchability of different bottom trawl gears or different research vessels using different type of bottom trawl nets in the surveys. Section 11.3 gives an overview of these experiments.

Gear parameters

Quality control of survey gear is a key issue of the IBTSWG. This year, a review of measurement protocols for mesh size and the effect of intensive professional use on the initial characteristics has been performed (see section 6.2). The outcome of the study lead to the recommendation that for quality control of survey gear with respect to the control of mesh size, a stretched mesh measurement protocol should be used.

In terms of standardisation, it is most important that the net geometry is the main aspect of fishing operations and that it should be as near constant as possible. From simplistic analysis it could be argued that nations should alter warp out to depth ratios, divergent from the protocol described in the manuals (section 6.3). Before implementing these changes, a more detailed analysis of the trends in gear parameters will be done intersessionally.

DATRAS database

The IBTSWG discussed the progress made within the new version of DATRAS. Detected errors in the database should always be reported and corrected, and protocols for the avoidance of misuse of existing data and for the prevention of future errors should be developed and implemented. The survey data stored in DATRAS should be consistent with the data held in the national laboratories, and therefore the IBTSWG recommended in 2007 that all national laboratories should undertake a critical analysis of their data and provide DATRAS with an update when needed. Section 8.3 lists the work done during the past year by country.

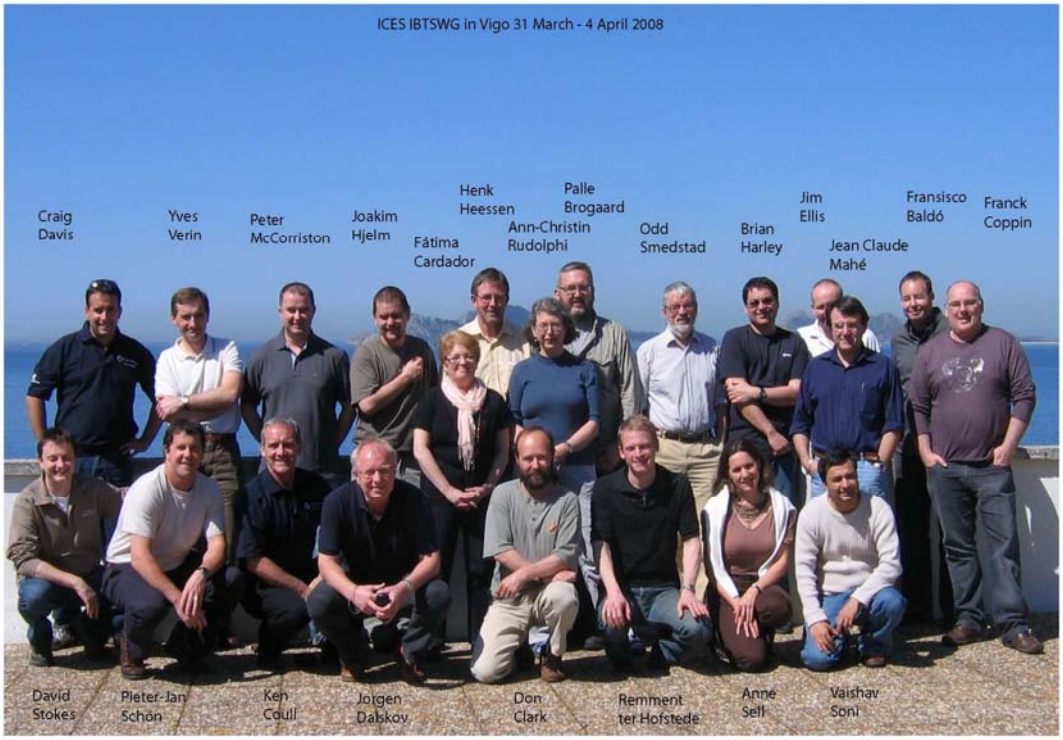
For further development of the database, it is important that working groups continuously provide DATRAS with feedback on recent updates, and in addition to that, the IBTSWG strongly recommends the establishment of a DATRAS User Group to evaluate the functionality of the DATRAS database, to provide feedback by data submitters and data users, to suggest updates of the system where needed, and to prioritize future developments.

Maturity staging of gadoids

The IBTSWG reviewed the recommendations made by WKMSCWHS (Workshop on Sexual Maturity Staging of Cod, Whiting Haddock and Saithe) concerning the maturity staging of the 4 gadoid species mentioned in the name of the workshop (section 8.4). It was accepted to implement the recommendations starting in Q3 2008, meaning that no maturity data on cod, haddock, whiting and saithe will be collected during the North Sea IBTS Q3 survey anymore, and that the collection of maturity data of the 4 species during the North Sea IBTS Q1 survey will be according to the proposed 6 stage scale.

Objectives of the IBTSWG

The objectives of the International Bottom Trawl Survey (IBTS) have not been clearly specified in previous reports of the IBTS Working Group. It is generally accepted, however, that the main objective of the IBTS surveys is to provide recruitment estimates for several commercially important fish species and other data used for tuning stock assessments. In section 11.1 the IBTSWG proposes a definition of its remits, including a set of criteria as drafted last year, and asks the RCM for its approval.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1 Terms of Reference and participation

2007/2/RMC02 The International Bottom Trawl Survey Working Group [IBTSWG] (Chair: R. ter Hofstede, The Netherlands) will meet in Vigo, Spain, from 31 March–4 April 2008 to:

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

b) Further develop the standard reporting format for the annual surveys for species of interest to assessment working groups according to their response;

c) Further evaluate and standardise criteria for ensuring quality and consistency in collection and reporting of survey data. These include (i) review of abundance indices and estimates of precision in DATRAS; and (ii) review the reporting procedures of trawl, vessel and environmental parameters and analyse changes in survey effort and/or constant catchability;

d) Review recent updates within DATRAS, including the implementations of user requirements as defined by the workshop DATRAS URS;

e) Improve the quality of future and historic IBTS data by: (i) the production and dissemination of identification keys for IBTS groundfish surveys; (ii) the examination of DATRAS data, i.e. to analyse size distributions, geographical distributions, and consistency of taxonomic use, and to correct data where possible;

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

g) Agree on strata and their definitions for surveys in the Eastern Atlantic (including shapefiles and supporting information; shapefiles to be completed inter-sessionally and prior to the Q4 survey).

IBTSWG will report by 30 April 2008 for the attention of the Resource Management Committee.

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

2 Introduction

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

The IBTSWG assumed responsibility for co-ordinating western and southern division surveys in 1994. Initially progress in co-ordination 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 co-operation between the participating institutes.

In recent years, the IBTSWG is developing the accessibility and quality of their data by storing these in a common database at ICES headquarters, i.e. DATRAS (Database for TRAwl Surveys). The IBTSWG aims to have all their surveys stored in this database, in order that all data are stored in the same format, and can be easily supplied to different users. Furthermore, it facilitates the detection and correction of errors in the historic data, and the prevention of storage of future errors, eventually resulting in one large, high quality database.

Also recently, there has been some amount of discussion about the lack of communication between survey coordinators and assessment working groups about the survey data used in assessments. Already the IBTSWG had started to modify the structure of the report to be more informative about the latest survey results. This year, the format is being further developed and in addition to general distribution maps for species of interest to assessment working group, main results for most surveys are given using the same template and include some estimate of precision. Still, a better adaptation to the needs of assessment working groups is under development and cooperation with the assessment working groups is essential.

3 Review of IBTSWG 2007 recommendations

3.1 IBTS North Sea Q1 and Q3 coordination – section 4.1, 4.2, 4.4.

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. (IBTS Q1 and Q3 participants)

This recommendation is in the process of being implemented. See section 4.

3.2 Non-standard gear use in English Q3 IBTS section 4.2.5.

As a result of incorrect rigging of the GOV by Cefas during part of the 2006 Q3 IBTS, the IBTSWG recommends that the data be flagged as non-standard in the DATRAS database and before the use of the data, Cefas will inform relevant assessment groups of the problem. (Cefas and ICES DATRAS)

This recommendation is implemented.

3.3 Correct rigging section 4.2.5.

All survey participants are recommended to review their protocols relating to checking of their survey gear prior to deployment and to maintain the rigging of the survey gear to the standard described in the IBTSWG manual (revision VII). If deviation from the standard rigging of the survey gear occurs then it should be brought to the attention of the IBTSWG. (All national institutes)

This recommendation has been partly implemented, though not consistently between all nations. The IBTSWG won't put effort in designing a common protocol for checking survey gear parameters this year, since it expects advice from SGSTS on this matter in its final report (May 2008), see section 9.

3.4 Comparative fishing experiments section 6.3.

The IBTSWG values the outcome of (limited) comparative fishing exercises and recommends that (i) more intercalibration experiments be conducted between countries, in order to identify the actual causes of catchability differences; (ii) a separate study should be carried out to compare the trawl parameters of all vessels in relation to depth. (All national institutes and relevant Assessment WG's)

This recommendation is being implemented (see Sections 6.2 and 6.3).

3.5 Standardisation of data collection for shellfish and cephalopods – section 6.4.

The IBTSWG agreed that the species listed in Table 6.5.1 should be recorded in all IBTS surveys and data should be submitted to the DATRAS database from 2008 onwards. (All national institutes)

This recommendation has been implemented by all nations.

3.6 Correcting historical data - section 10.2.1.

Survey data stored in DATRAS should be consistent with the data held in the national laboratories. Therefore the IBTSWG recommends that national laboratories undertake a critical analysis of their data and provide DATRAS with an update when needed. (All national institutes)

This recommendation has been implemented by several institutes (see section 8.3).

3.7 Extension of NS-IBTS Q1 into the Eastern Channel – section 12.1.

The IBTSWG recommends that the extension of the North Sea IBTS programme with 5 rectangles into the Eastern Channel will also take place in 2008, however emphasizes that the first priority must be given to GOV hauls and MIK samples as required in the IBTS protocol, and that additional surveying (e.g. acoustics, CUFES samples) are carried out only if it does not delay the regular IBTS programme. (IFREMER and IMARES)

This recommendation has been implemented by Ifremer and IMARES (see section 4.1.5.2). However, the data cannot be submitted to DATRAS, since it falls out of the allowed survey-area. DATRAS should adjust its reporting format in order for countries to be able to upload data from the Eastern Channel to the North Sea IBTS database. The IBTSWG recommends to name the area "roundfish area 10" (see section 4.1.5.1), in addition to the other 9 roundfish areas that are covered by the North Sea IBTS.

3.8 Coordination of new surveys – section 12.2

The IBTSWG should approach ACFM and RMC for an official clarification of the objective(s) they envisage for the IBTSWG moving forward. (Chair of IBTSWG)

This recommendation has been implemented. The comments of the chairs of RCM and ACFM were as follows:

RMC: "As chair of RMC, my feeling is that the IBTS group should stay discipline specific, in other words only include GOV type trawls. Therefore I am going to suggest that for the 2008 meeting, only those existing members of the IBTS surveys and other GOV type trawls be included in the work of that WG."

ACFM: "For the moment, I would agree. However in the longer term we should perhaps reconsider the organization and interactions between survey planning/methodology groups. "

However, the IBTSWG considers these comments to be too vague to clarify the objectives of the working group. Therefore, the IBTSWG proposes a definition of their remits (see section 11.1), including a set of criteria as drafted last year, and will ask the RCM for its approval.

3.9 Additional sampling of age and sexual maturity – section 12.5

The IBTSWG recommends that also in 2008 maturity data should be collected for a number of species in addition to the data collection for cod, haddock, whiting, saithe, Norway pout, mackerel, herring and sprat (see Table 12.5.1). (Survey coordinators and all national institutes)

This recommendation has been implemented in 2008 (see section 4).

4 North Sea and Eastern Atlantic Surveys (ToR a)

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

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. A CTD was deployed at most trawl stations to collect temperature and salinity profiles. 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). During day-time a bottom trawl is used. This is the GOV (Grand Ouverture Verticale), with ground gear A or B. During night-time herring larvae are sampled with a MIK-net (Methot Isaac Kidd). Seven vessels participated in the quarter 1 survey in 2008: "Argos" (Sweden), "Dana" (Denmark), "Håkon Mosby" (Norway), "Scotia" (Scotland), "Thalassa" (France), "Tridens II" (Netherlands) and "Walter Herwig III" (Germany). The survey covered the period 5 January to 29 February (see Table 4.1.1). In total, 379 GOV and 652 MIK hauls were carried out (see Figure 4.1.1). All rectangles were covered, most of them by two or more GOV hauls. The number of MIK hauls was often below the intended 4 hauls per rectangle, but still the coverage of the MIK sampling can also be considered as good.

Table 4.1.1. Overview of the surveys performed during the North Sea IBTS Q1 survey in 2008.

Survey:	North Sea IBTS Q1	Dates:	January – February 2008
Nation:	Vessel:	Period:	
Denmark	Dana	1 – 18 February	
France	Thalassa	25 January – 22 February	
Germany	Walter Herwig III	17 January – 15 February	
Netherlands	Tridens 2	28 January – 29 February	
Norway	Håkon Mosby	5 – 31 January	
Scotland	Scotia	1 – 23 February	
Sweden	Argos	21 January – 8 February	

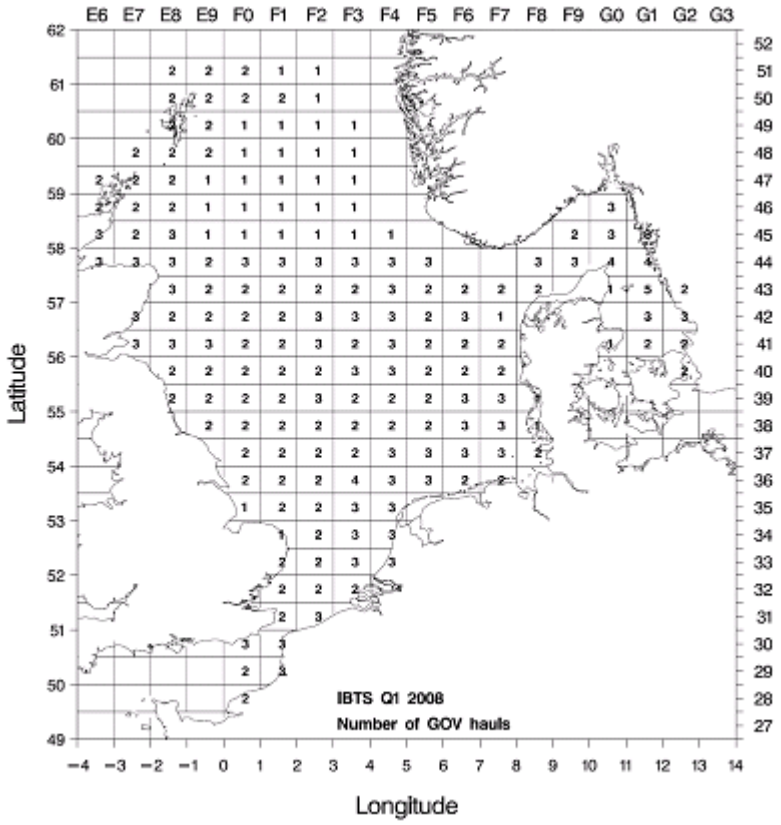


Figure 4.1.1. Number of hauls per ICES-rectangle with GOV during the North Sea IBTS Q1 2008.

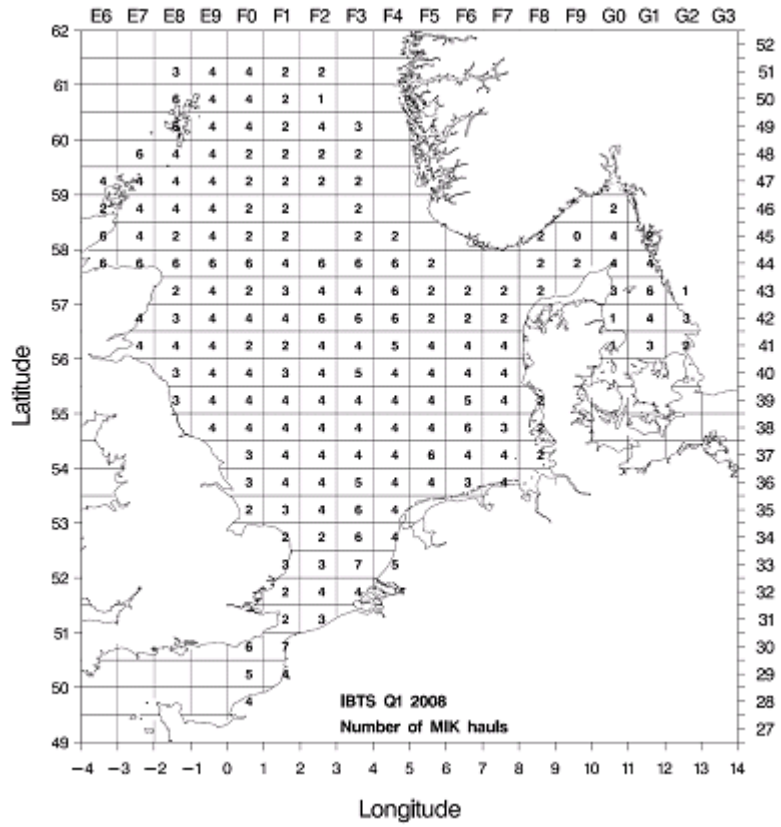


Figure 4.1.2. Number of hauls per ICES-rectangle with MIK during the North Sea IBTS Q1 2008.

4.1.2 Survey summaries by country

4.1.2.1 Denmark – North Sea Quarter 1 IBTS

Nation:	**Denmark**	Vessel:	Dana
Survey:	01/08	Dates:	1–18 February 2008

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 was collected for cod, haddock, whiting, saithe, Norway pout, herring, mackerel and sprat. Sampling for herring larvae is carried out during night time
Gear details:	The bottom trawl used is the GOV (Grand Ouverture Verticale), during two hauls a rock-hopper was used. 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. In a small area off the Danish coast 6 additional hauls were made.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 78 species of fish were recorded during the survey.

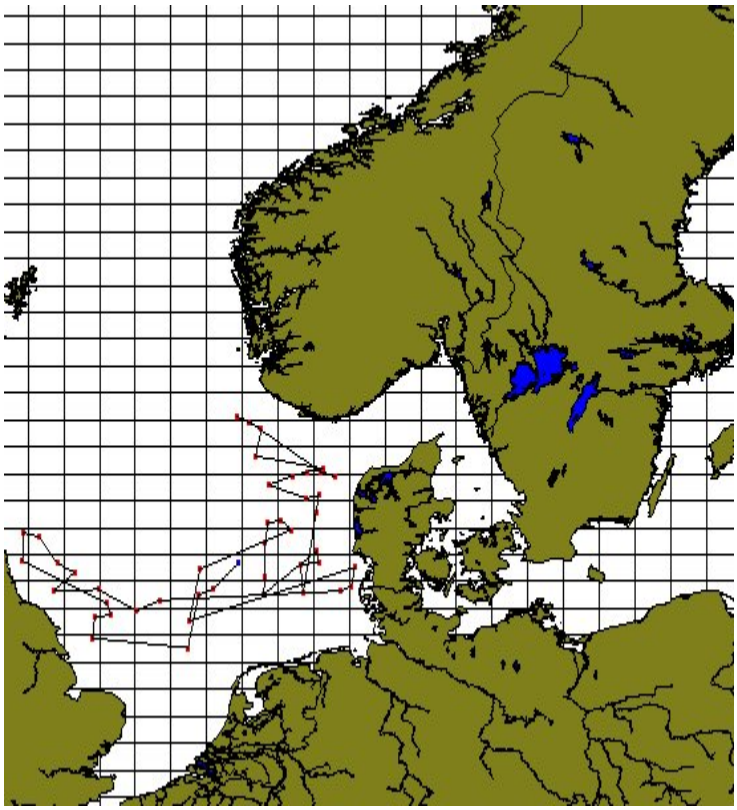
Stations fished (aims: to complete 40 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
		IBTS standard						
IV	N/A	GOV	38	38	6	0	100	
		GOV-R	2	2				
		MIK	80	80				

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

Species	Age	Species	Age
Clupea harengus	716	*Limanda limanda*	-
Gadus morhua	199	*Scomber scombrus*	0
Melanogrammus aeglefinus	170		
Merlangius merlangus	445		
Pollachius virens	90	**Leucoraja naevus*	1
Sprattus sprattus	519	**Raja clavata*	1
Psetta maxima	7	**Raja montagui*	3
Trisopterus esmarki	82		
Microstomus kitt	96		
Pleuronectes platessa	465		
Solea solea	3		

Cruise track of "Dana" during the Q1 IBTS 2008



4.1.2.2 France – North Sea Quarter 1 IBTS

Nation:	**France**	Vessel:	Thalassa
Survey:	IBTS08	Dates:	25 January–22 February 2008

Cruise	Participation to the North Sea IBTS Q1 survey. France sampled the southern part of the North Sea and the Eastern English Channel. CTD was deployed at each trawl station to collect temperature and salinity profiles. Age data were collected for the main species. Sampling for herring larvae was carried out during nighttime.
Gear details:	The gear used is the IBTS standard GOV 36/47 with ground gear A, Exocet kite with Scanmar door, wing and vertical openning sensors. For larvae the standard MIK net is used.
Notes from survey (e.g. problems, additional work etc.):	The Eastern Channel was covered first with 10 GOV hauls and 19 MIK stations. Due to trawl dammages, 2 GOV hauls were invalidated. In addition, observers for mammals and birds collected information during the 4 days in the English Channel. Acoustic data were also recorded in this area and 2 pelagic hauls were carried out on herring schools. In the North Sea 65 GOV hauls and 111 MIK stations were made. No major problems were encountered. 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. Samples (1050) collected will be sorted at the laboratory.
Number of fish species recorded and notes on any rare species or unusual catches:	90 species of fish and shellfish were recorded during the survey.

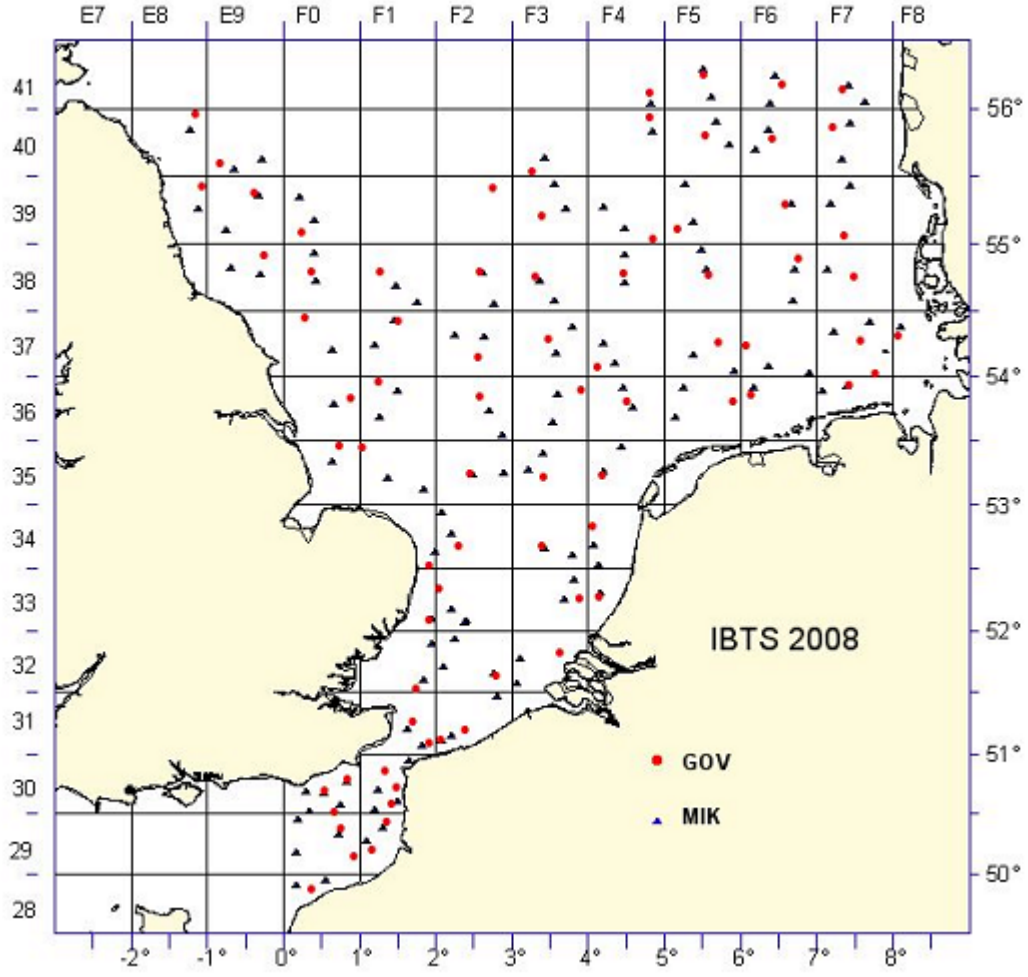
Stations fished (aims: to complete 70 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIId		IBTS standard GOV	5	10	5	2	200	
IVb,c	N/A	IBTS standard GOV	65	65	4	0	100	

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

Species	Age	Species	Age
Clupea harengus	300	*Sprattus sprattus*	148
Gadus morhua	430	*Scophthalmus rhombus*	4
Melanogrammus aeglefinus	215	*Trisopterus esmarki*	62
Merlangius merlangus	727	*Mullus surmuletus*	46
Hippoglossoides platessoides	58	*Pleuronectes platessa*	798

Cruise track of "Thalassa" during the Q1 IBTS 2008



4.1.2.3 Germany – North Sea Quarter 1 IBTS

Nation:	**Germany**	Vessel:	Walther Herwig III
Survey:	308	Dates:	17 January–15 February 2008

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.
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 70 stations for the IBTS Q1 survey, 63 were fished (limitation by rough weather). The GOV in the standard version was used and 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.

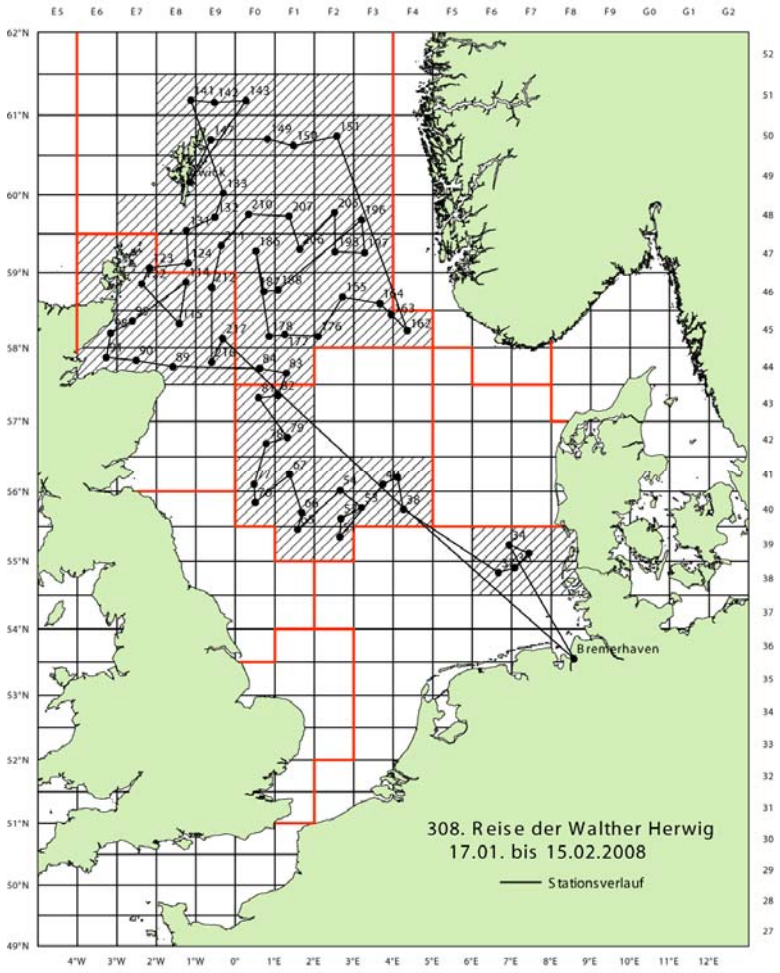
Stations fished (aims: to complete 70 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	stand. GOV	70	63	0	0	90	
IV	N/A	MIK	140	129	0	0	92	

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

Species	Age	Species	Age
Clupea harengus	430	*Scomber scombrus*	211
Gadus morhua	246	*Engraulis encrasicolus*	15
Melanogrammus aeglefinus	835	*Sprattus sprattus*	61
Merlangius merlangus	827	*Trisopterus esmarki*	*249*
Pollachius virens	320		

Cruise track of "Walther Herwig" during the Q1 IBTS 2008



4.1.2.4 Netherlands – North Sea Quarter 1 IBTS

Nation:	**The Netherlands**	Vessel:	Tridens 2
Survey:	IBTS Q1	Dates:	28 January–29 February 2008

Cruise	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 VIId. The primary species are cod, haddock, whiting, Norway pout, sprat, herring, mackerel, and plaice.
Gear details:	IBTS standard GOV 36/47 with ground gear A. No Exocet kite is used but wooden kite with similar lifting power, Scanmar door and and headline height sensors. Headline height sensor positioned above central part of groundrope.
Notes from survey (e.g. problems, additional work etc.):	As in 2007 five additional rectangles in VIId were sampled (both with GOV and MIK). A number of rectangles on the Dutch EEZ have been fished twice. In the Southern Bight, two GOV's were severely damaged: one during a haul off the Dutch coast, because of fishing in an area with "sand dunes", the other one off the English coast in 35F0. A number of elasmobranchs has been tagged and released: *R. montagui* (14), *R. clavata* (41), *L. naevus* (3), *A. radiata* (7), *R. brachyura* (2), and *S. canicula* (69).
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 71 species of fish were recorded during the survey. Unusual was the catch of one grater weever in VIId and some 150 rays in 35F2: mainly consisting of *R. clavata* and *R. montagui* and some *R. brachyura*. Benthos was sampled and recorded according to Beam Trawl Survey procedures. For all species the number, total weight, Lmin and Lmax have been recorded.

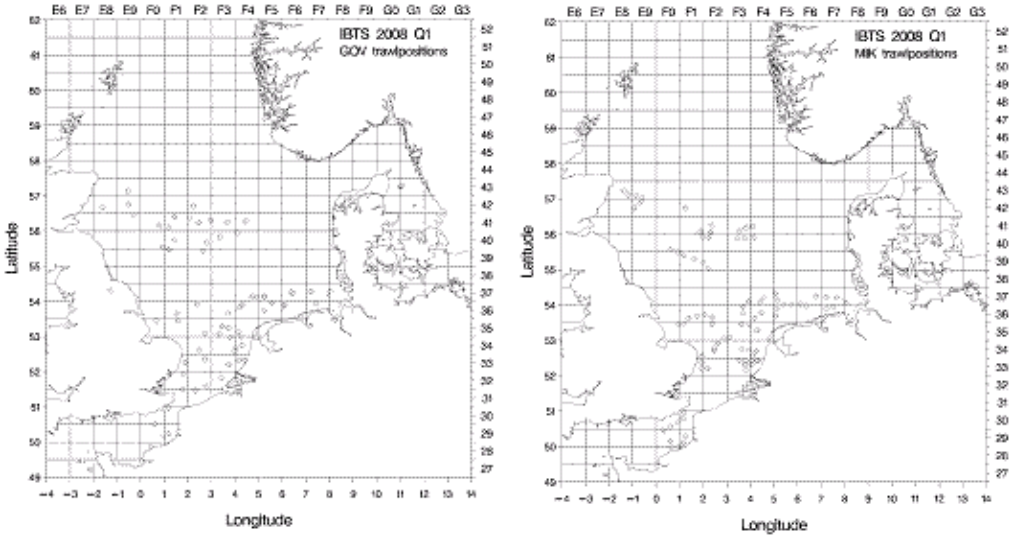
Stations fished (aims: to complete 54 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	GOV	49	62	13	2	127	
VIId		GOV	5	5	0	0	100	
IV		MIK	108	81	0	0	75	
VIId		MIK	10	10	0	0	100	
	TOTAL		54/118	67/91	13/0	2/0	-	

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

Species	Age	Species	Age
Gadus morhua	173	*Psetta maxima*	8
Melanogrammus aeglefinus	340	*H. hippoglossus*	1
Merlangius merlangus	795	*Microstomus kitt*	136
Trisopterus esmarki	115	*Pleuronectes platessa*	397
Merluccius merluccius	1		
Mullus surmuletus	30		
Clupea harengus	575		
Sprattus sprattus	250		
Scomber scombrus	20		

Cruise track of "Tridens" during the Q1 IBTS 2008



4.1.2.5 Norway – North Sea Quarter 1 IBTS

Nation:	**Norway**	Vessel:	Håkon Mosby
Survey:	2008601	Dates:	5–31 January 2008

Cruise	The Q1 North Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in area IV. The primary species are cod, haddock, 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 and headline height sensors.
Notes from survey (e.g. problems, additional work etc.):	Two days were used to check trawls and doors in use at sea. The warp lengths recommended in the manual were too long for our doors. It was decided to use warp lengths of three times the depth. A hydrographical transect was taken including sampling of phytoplankton and zooplankton.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 54 species of fish were recorded during the survey

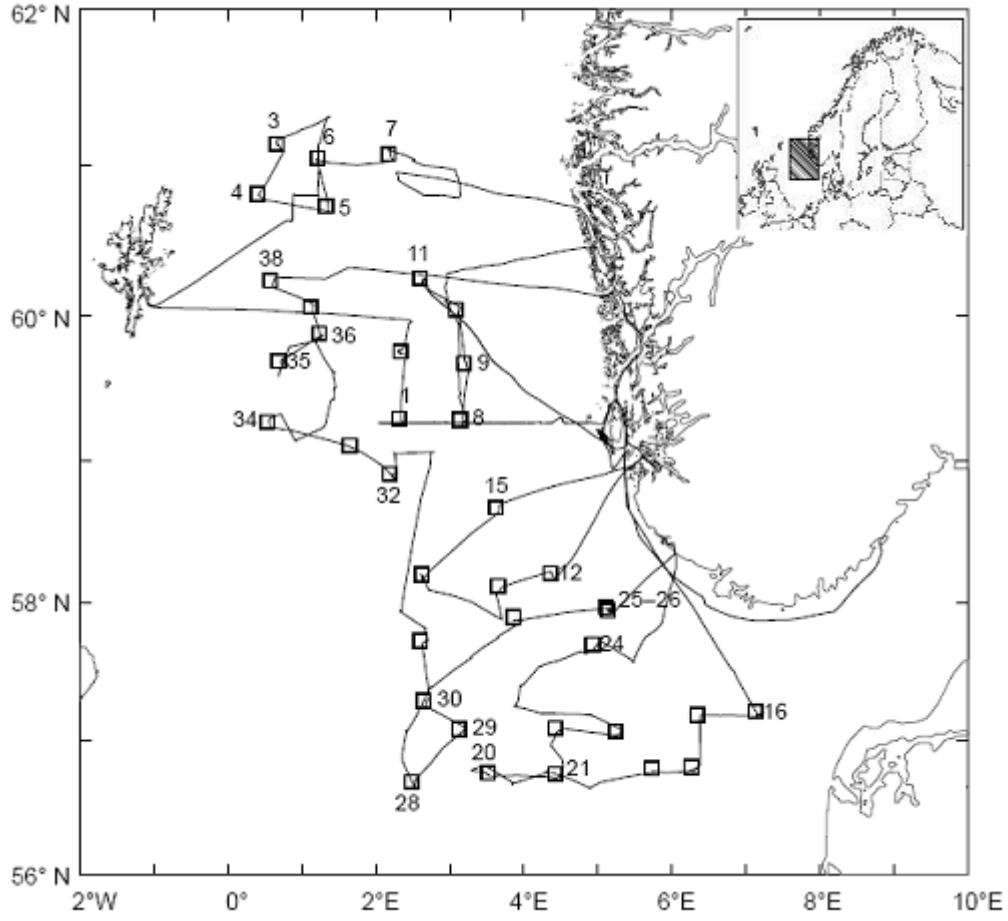
Stations fished (aims: to complete 40 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	IBTS standard GOV	40	38	0	0	95	

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

Species	Age	Species	Age
Clupea harengus	69		
Gadus morhua	159		
Melanogrammus aeglefinus	226		
Merlangius merlangus	190		
Pollachius virens	98		
Trisopterus esmarki	63		
Scomber scombrus	72		
Lophius piscatorius	7		

Cruise track of "Håkon Mosby" during the Q1 IBTS 2008



4.1.2.6 Sweden – North Sea Quarter 1 IBTS

Nation:	**Sweden**	Vessel:	Argos
Survey:	2/08	Dates:	21 January–8 February 2008

Cruise	The 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 and whiting, sprat, herring, mackerel, Norway pout, plaice and saithe. The aim of the MIK trawl survey is to sample 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 GOV hauls. Oblique hauls with the Methot Isaac Kidd (MIK) during night
Notes from survey (e.g. problems, additional work etc.):	In spite of the fact that the auto trawl system was repaired there was still a problem with the winches. The wire on starboard side was 5 m longer compared to the port wire and throughout the cruise the wires were manually adjusted to decrease the trawl skewness.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 68 species of fish were recorded during the survey.

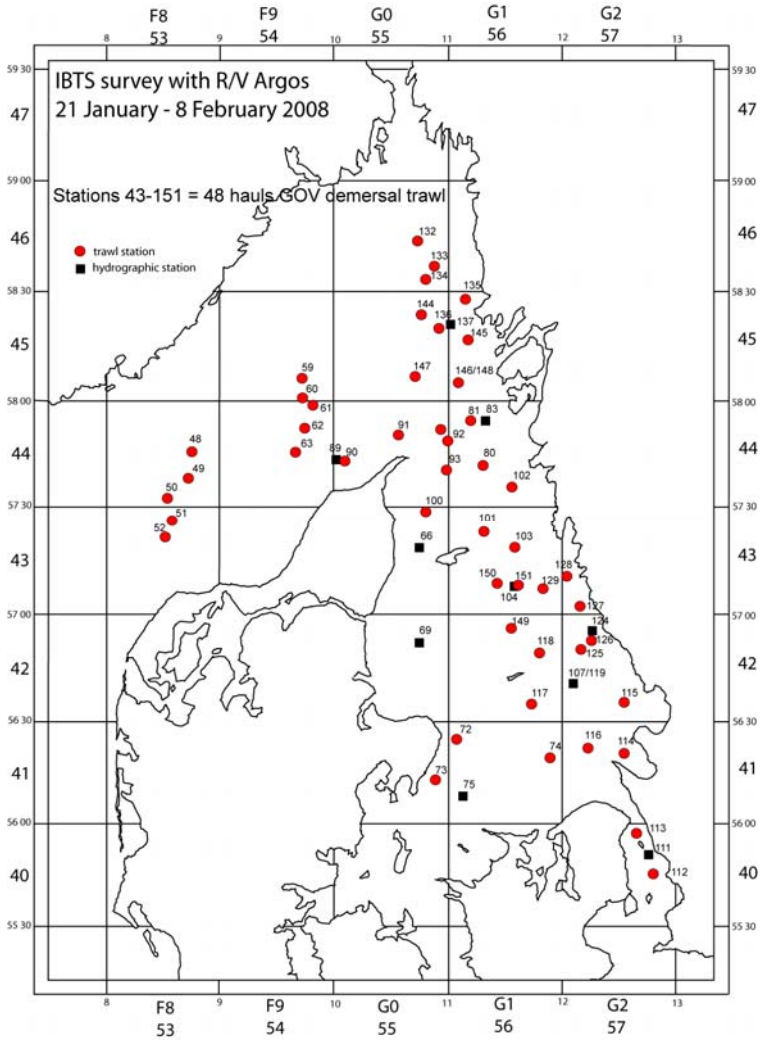
Stations fished (aims: to complete 48 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IIIa	N/A	IBTS standard GOV	48	48	1	1	100	
IIIa	N/A	MIK	-	48	1	1	100	

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

Species	Age	Species	Age
Clupea harengus	1369	*Pollachius virens*	12
Gadus morhua	684	*Solea solea*	84
Melanogrammus aeglefinus	303	*Sprattus sprattus*	679
Merluccius merluccius	85	*Trisopterus esmarki*	128
Pleuronectes platessa	954		

Cruise track of "Argos" during the Q1 IBTS 2008



4.1.2.7 UK (Scotland) – North Sea Quarter 1 IBTS

Nation:	**UK (Scotland)**	Vessel:	Scotia
Survey:	0208ss	Dates:	1–23 February 2008

Cruise	The 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 deg 30 min North and groundgear A used on all other stations south of 57deg 30min North.
Notes from survey (e.g. problems, additional work etc.):	No problems encountered. Ship's thermosalinigraph was run continuously throughout the cruise. Temperature, salinity and water samples for nutrient analyses were collected at each station. All survey stations were completed with an additional 7 trawls done to support the international coverage. MIK net sampling was conducted at all stations with an additional 8 rectangles being sampled to support the international coverage. The newly acquired circular frame was used throughout the cruise for all hauls. 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 74 fish species were recorded during the survey with a total weight of 9,335 kgs. Indices for this particular (national) survey indicated that while catches of juvenile cod (1+) were low, catches of the 2005 year-class (3+) were relatively high. Catches of juvenile haddock and whiting were also relatively low (for recent years) but catches of juvenile Norway pout were relatively high. Within the regular sampling protocols FRS continue to develop the recording of benthic species caught in the GOV trawl.

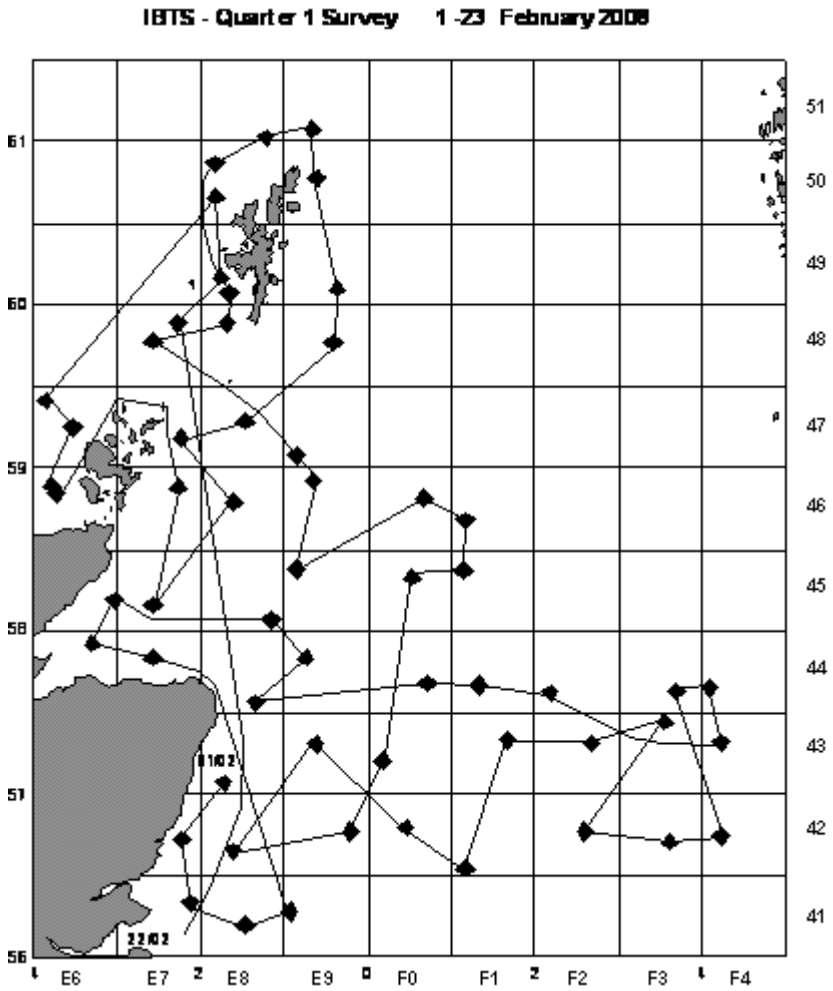
Stations fished (aims: to complete 50 valid tows per year)

ICES Divisions	Strata	Gear	Tows Planned	Valid	Valid with rockhopper	Additional	Invalid	% stations fished
IVa		GOV – B	30	30	-	7	0	123
IVa		GOV - A	2	2				100
IVb		GOV – A	15	15				100
IVb		GOV - B	3	3	-	0	0	100
	TOTAL		50	50	-	7	0	114

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

Species	No.	Species	No.
Clupea harengus	Na	**Mullus surmuletus*	3
Gadus morhua	169	**Lophius piscatorius*	17
Melanogrammus aeglefinus	1100	*Trisoperus esmarki*	371
Merlangius merlangus	820	**Lepidorhombus whiffiagonis*	28
**Psetta maxima*	2	**Hippoglossus hippoglossus*	3
Pollachius virens	127		

Cruise track of "Scotia" during the Q1 IBTS 2008



4.1.3 Results

4.1.3.1 GOV

The preliminary indices for the recruits of seven commercial species based on the 2008 quarter 1 survey are shown in Figure 4.1.3.1. According to these preliminary results, only sprat showed a year class in 2008 well above the long-term average for the years 1980–2007. The index for 1-group herring was about average, but the average catch was higher than in the four previous years. For haddock only few 1-year-olds have been caught. The index for cod, whiting, Norway pout and mackerel was smaller than the long term average value, but that for whiting was better than the average catch in the last four years.

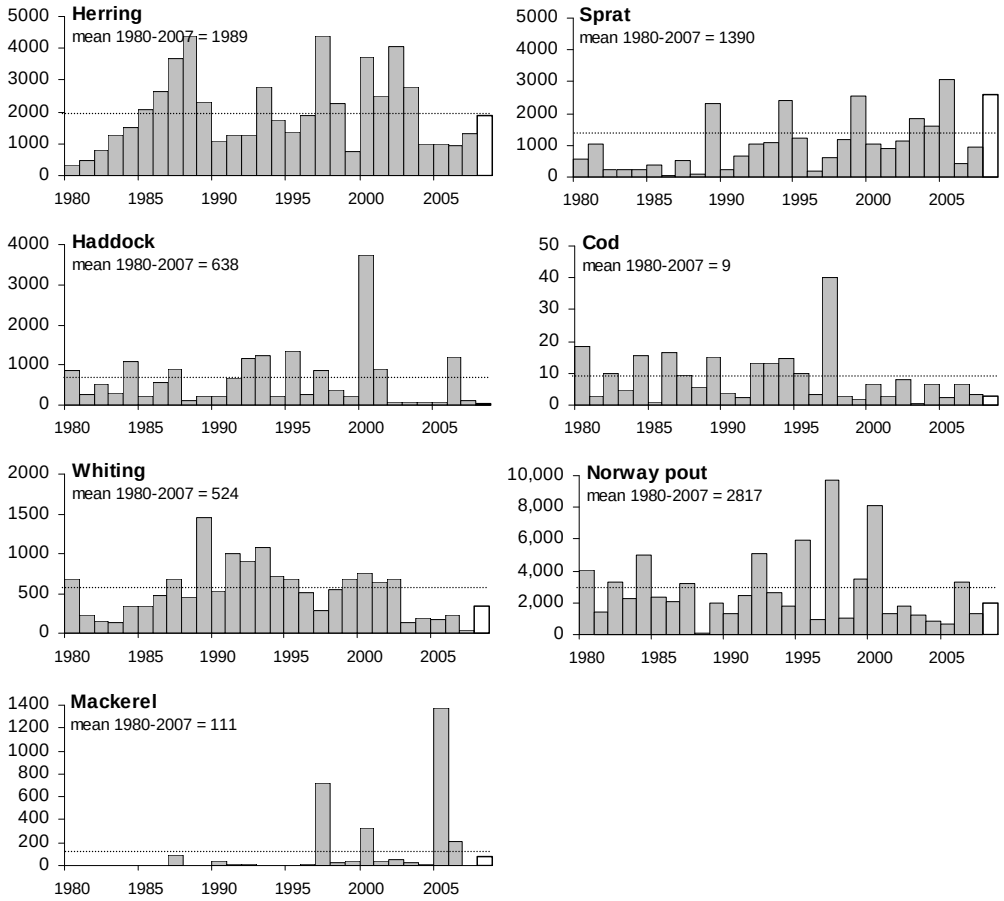


Figure 4.1.3.1. Time series of indices for 1-group (1-ring) mackerel caught during the quarter 1 IBTS survey in the North Sea, Skagerrak and Kattegat. Indices for the last year are preliminary, and based on a length split of the catches.

4.1.3.2 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.

This year's 0-ringer index is based on 652 hauls. Index values are calculated as described in the 1996 report of the Herring Assessment Working Group (ICES 1996/ACFM:10).

The index for the 2008 survey is the lowest since the estimate of the 1989 year class, and it continues a now 5 year long series of low recruitment estimates (the average for these 5 years is about 50% of the all-year average) (Figure 4.1.3.2). The 0-ringers were predominantly distributed in two concentrations, one off the Scottish coast (in the central-western area) and one in the Southern Bight. Compared to the two preceding year classes, which are also shown in Figure 4.1.3.3, the distribution of 0-ringers from this year class is very restricted, without significant concentrations along the English coast. The long term trend in the distributional patterns of 0-ringers shows an increase of herring larvae in the western part of the North Sea. The relative abundance of the number of 0-ringers in the area west of 2°E relative to the total number of 0-ringers was 25% for year class 1982. In the last decade, the majority of 0-ringers have been distributed in the western part, and the calculated relative abundance of 86% for the present year class is in accordance with the long term trend.

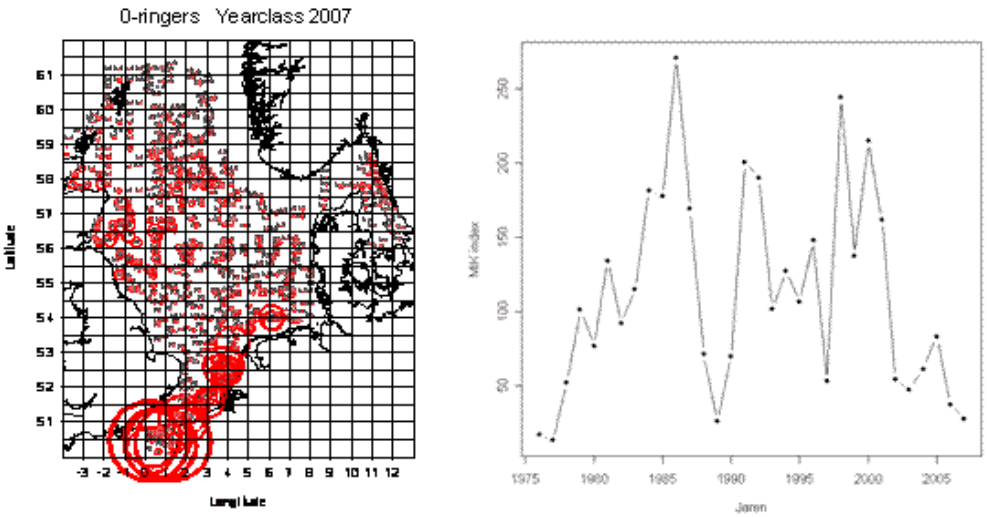


Figure 4.1.3.2 Distribution of MIK caught herring larvae of all size classes during the IBTS Q1 2008 (left) and the time series of herring larvae since 1976 (right).

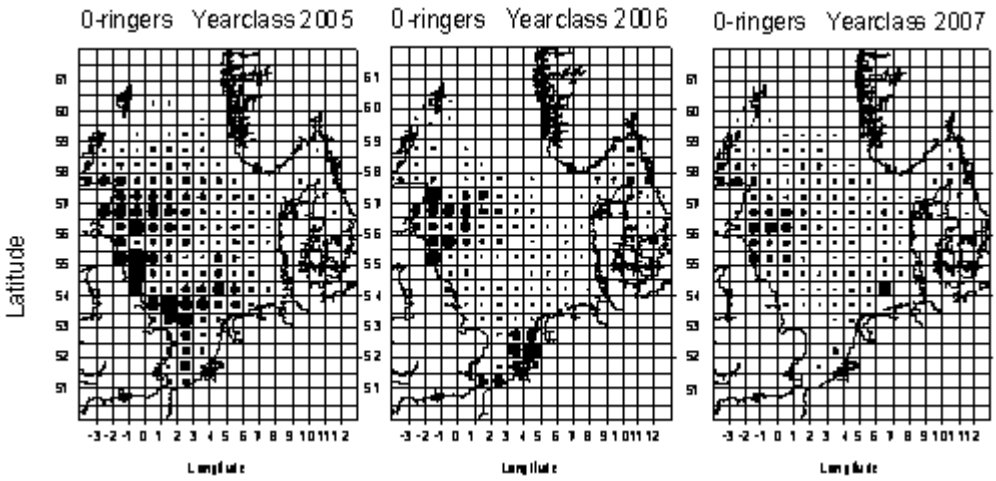


Figure 4.1.3.3. North Sea herring. Distribution of 0-ringer herring, year classes 2005–2007. Abundance estimates of 0-ringers within each statistical rectangle are based on MIK catches during IBTS in February 2006–2008. Areas of filled circles illustrate densities in no m-2, the area of a circle extending to the border of a rectangle represents 1 m-2.

The following comment was copied from the report of the 2008 meeting of the Herring Assessment WG: "This year's 0-ringer index is based on 648 depth-integrated hauls with a 2 metre ring-net (MIK). Index values are calculated as described in the WG report of 1996 (ICES 1996/ACFM:10). The series of estimates is shown in Table 2.3.3.3 (report HAWG), the new index value of 0-ringer abundance of the 2007 year class is estimated at 27.8. The index is the lowest since the estimate of the 1989 year class strength, and indicates a recruitment which is only 25% of the long term mean. It adds to a 5 year long series of low recruitment estimates. The 0-ringers included in the index were predominantly distributed off the Scottish coast, in the central-western area. Compared to the preceding two year classes, the 0-ringers from this year class is further restricted in distribution, without significant concentrations in other areas. Concentrations of Downs herring larvae were apparent from MIK catches in the area of the English Channel, however, due to their small size (mean sizes 11-17 mm) these will not represent recruitment at a scale comparable to estimates based on catches of larger larvae (> 20 mm), and they are not included in the standard procedure of index estimation (see ICES 1996 /ACFM:10). The WG investigated the potential increase in the present 0-ringer index, when including the Downs larvae, but accounting for 10% daily mortality of these until they reached the 20 mm length. This procedure only led to an approx. 15 % increase in index estimate, thus indicates a relatively minor bias when excluding this group from the index estimation. However, due to the apparent increasing importance of the Downs herring in the North Sea stock, the possibilities for inclusion of this component into the MIK-index will be investigated further and discussed at the 2009 meeting of the WG."

4.1.4 Participation in 2009

As in recent years, the timing of the national contributions to the international survey in 2008 has been rather widespread. The IBTSWG recommends that participants in the North Sea IBTS Quarter 1 survey in 2009 aim to perform their cruise during the month of February, in order to have good overlap of the different vessels participating in the survey. Obligations for other surveys however influence the availability of vessels and therefore the spread in timing is likely to continue.

4.1.5 Other issues

4.1.5.1 Roundfish area 10

Since two years the survey area has extended into the eastern Channel. As code for this area it is proposed to use roundfish area 10, in addition to the other 9 roundfish areas that are covered by the North Sea IBTS.

4.1.5.2 Extension of the IBTS area and acoustic prospection in the Eastern Channel

In 2007, the extension of the IBTS 1st quarter survey area in the Eastern English Channel was implemented in the survey design: additional GOV hauls and MIK stations carried out in this area have provided more information on Downs herring. This sampling continued in 2008 and the area was covered by two different vessels, the RV "Tridens" and the RV "Thalassa".

In addition the RV "Thalassa" recorded acoustic data in the same way as in 2007 (Figure 4.1.5.1). The most important marks were recorded along French coasts and the catch composition of pelagics hauls consisted of herring of 27.6 cm mean length fish (26 cm in 2007) belonging to age-groups 4-7 (Figure 4.1.5.2). Large and continuous shoals of herring were found at the same time in a restricted area, but less

concentrated than in 2007. Mean density could be estimated around 1 000 tonnes per nautical mile square (half less than in 2007) but it could not be raised to the whole area due to the spatial heterogeneity and the sampling protocol used. Nevertheless, this survey gives more information on herring shoals observed, their evolution and the possible change in behaviour in relation to herring spawning area. Due to the findings of the survey in the eastern part of the Channel, it is recommended to maintain survey effort.

The CUFES (Continuous Underway Fish Eggs Sampler) was also carried out during this survey and 1050 samples were collected both in the Eastern Channel and in the North Sea. Spawning areas of main species will be mapped using geostatistics in the same way than for ISADA project (see section 4.1.5.3).

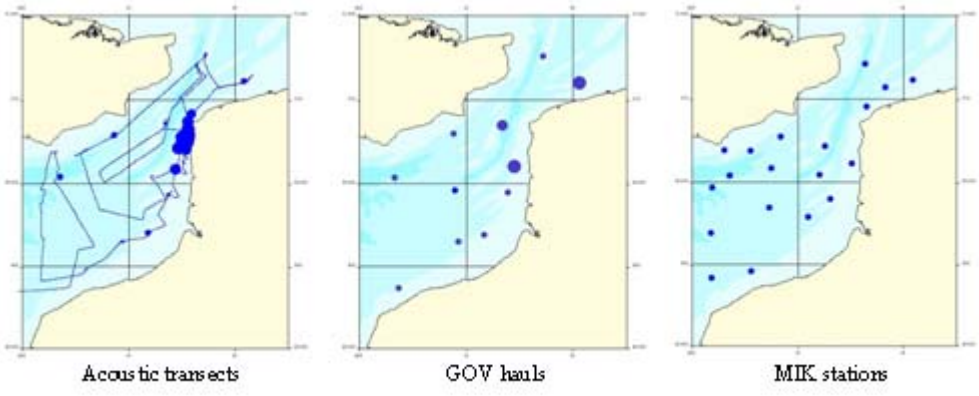


Figure 4.1.5.1: Sampling by RV "Thalassa" in the Eastern English Channel during IBTS Q1 2008.

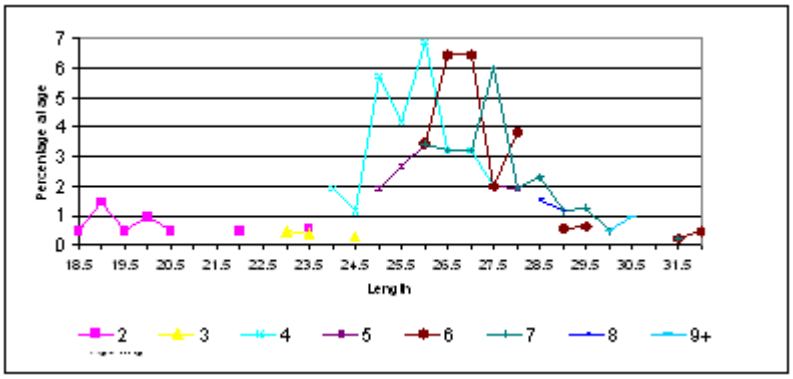


Figure 4.1.5.2: Age composition of herring catches from the pelagics hauls.

4.1.5.3 Identification of the Spawning Areas in the Dover Strait and adjacent marine areas

The Continuous Underway Fish Egg Sampler (CUFES) is used on the French RV "Thalassa" since 2006 during the IBTS 1st quarter surveys. With co-funding from the Interreg IIIa Programme, the ISADO (Identification of the Spawning Areas in the Dover Strait and adjacent marine areas) project processed 800+ egg samples from the 2006 IBTS survey, with the development of a taxonomic identification key (Martin *et al*. 2007). The aim of the project was to increase the knowledge of fish spawning areas, and their associated habitats, in the Dover Strait and southern half of the North Sea. The spawning areas of seven fish species were mapped (Figure 4.1.5.3) using geostatistics, and the associated spawning habitats were modelled using generalised

linear models. The egg abundances of a further eight fish species were also mapped. Preliminary work was also undertaken on the use of molecular techniques (genetic markers) and automated image analysis (ZooScan) so as to improve the accuracy and/or the speed of taxonomic egg identification and counting.

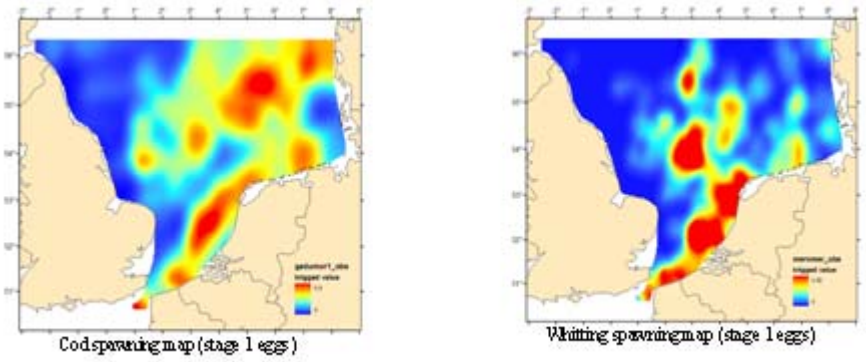


Figure 4.1.5.3: Example of spawning map (stage 1 eggs) for two main species in the North Sea.

4.1.5.4 International workshop on the identification of clupeid larvae

Up till now an international workshop on the identification of clupeid larvae has never taken place. For reasons of quality assurance it is advisable to organise such a workshop. Taking IMARES (Netherlands) as an example, in recent years new as well as the experienced technicians have worked up the herring larvae samples, but so far the quality of the determination of the clupeid larvae was not known. At IMARES a workshop (of one day) was conducted to calibrate determination of the larvae within the institute. The results are presented in Working Document 4 and show that agreement in the determination of clupeid larvae is reasonable but could be improved.

PGHERS discussed the issue in 2008 and recommends to conduct an international workshop on the identification of fish larvae and eggs to ensure data quality and especially deal with possible misidentifications of sprat, herring and other clupeid larvae (ICES, 2008) The IBTSWG fully sustains this recommendation.

4.2 Q3 North Sea

4.2.1 General overview

Six vessels participated in the quarter three survey in 2007: Dana (Denmark), Walter Herwig III (Germany), Johan Hjort (Norway), Argos (Sweden), CEFAS Endeavour (England) and Scotia (Scotland). In all, 327 valid GOV hauls were made, allowing full coverage of the survey area. The North Sea, Skagerrak and Kattegat quarter 3 surveys have now completed 17 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.

Table 4.2.1.1. Number of valid hauls and days at sea per country for quarter 3 surveys 1991-2006 and number of days proposed for 2007.

YEAR 2007	DENMARK	GERMANY	NORWAY	SWEDEN	UK ENGLAND	UK SCOTLAND	TOTAL
Days	18	11	30	18	32	25	134
Hauls	46	29	45	47	75	85	327

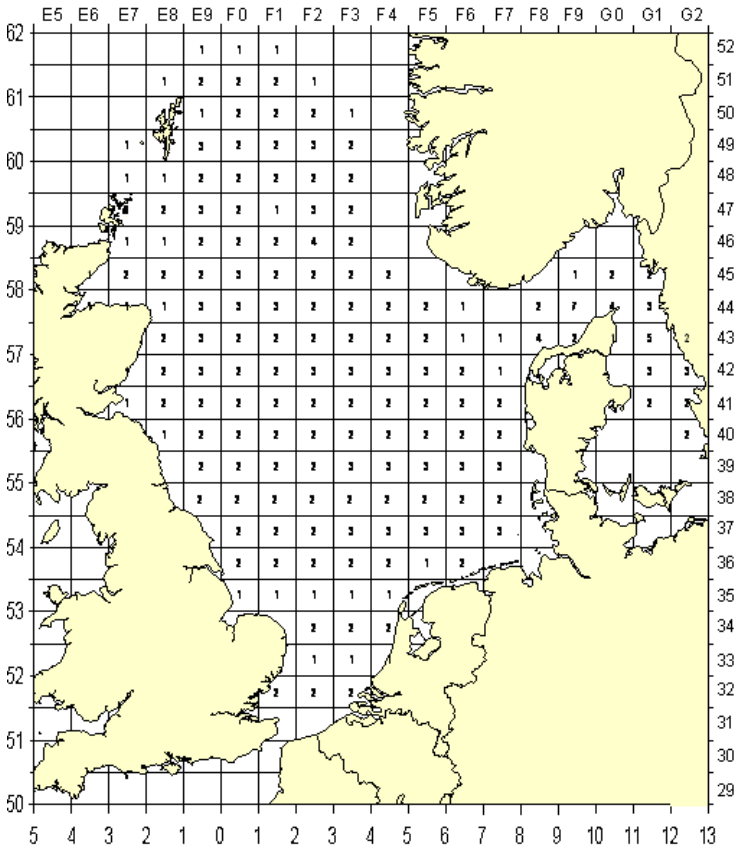


Figure 4.2.1.1 Plot of number of stations fished by rectangle by all participants of the 3rd Quarter IBTS survey 2007.

4.2.2 Survey summaries by country

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

Nation:	**UK (England and Wales)**	Vessel:	Cefas Endeavour
Survey:	16/07	Dates:	10 August–9 September 2007

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.):	An additional tow was carried out on the day of sailing to ensure gear could be deployed correctly and to test all the shipboard systems. On the second station fo the survey, with very strong tides in the Thames estuary one station was abandoned to be refished later in the survey. After the mid survey staff change Barbara Bland from the Sweden, joined us for 7 days as part of the staff exchange program. The abandoned station was returned to and fish as the last station of the survey with no difficulties. In addition 10 day grabs were deployed for an external contract.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 81 species of fish were recorded during the survey. Unusual fish species caught included two specimens of Allis shad Alosa alosa and two specimens of Leucoraja fullonica. Entelrus aequoreus was caught at 56% of core survey stations.

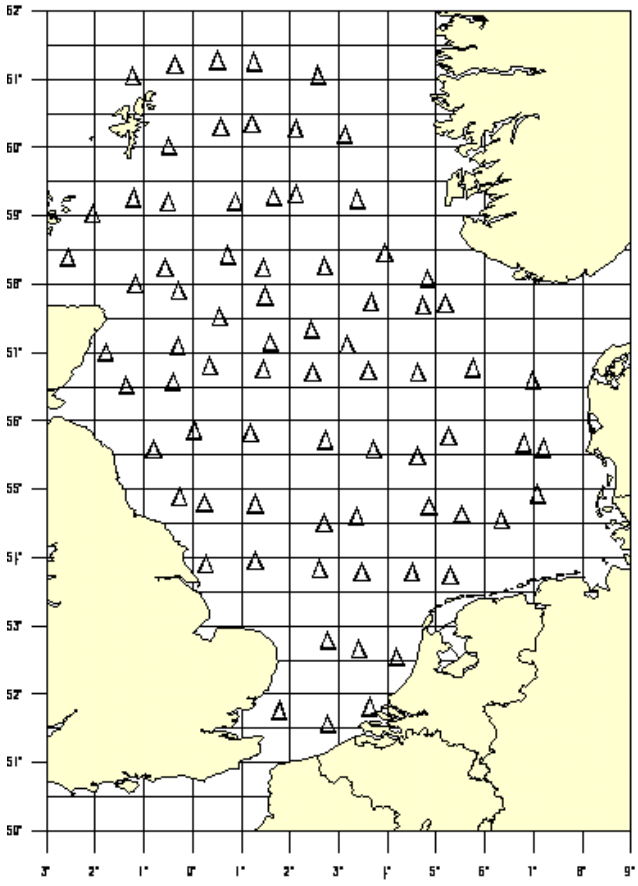
Stations fished (aims: to complete 75 valid tows per year)

ICES Divisions	Strata	Gear	Tows Planned	Valid	Additional	Invalid	% Stations fished	Comments
IV	N/A	IBTS standard GOV	75	75	1	0	100	

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

Species	Number	Species	Number
Clupea harengus	852	*Limanda limanda*	394
Gadus morhua	514	*Scomber scombrus*	341
Melanogrammus aeglefinus	1099		
Merlangius merlangus	1351		
Pollachius virens	355	**Leucoraja naevus*	34
Sprattus sprattus	308	**Raja clavata*	6
Psetta maxima	12	**Raja montagui*	6
Trisopterus esmarki	370	**Leucoraja fullonica*	2
Microstomus kitt	245	**Amblyraja radiata*	242
Pleuronectes platessa	910		

Cruise track of "Endeavour" during the Q3 IBTS 2008



4.2.2.2 Norway – North Sea Quarter 3 IBTS

Nation:	**Norway**	Vessel:	Johan Hjort
Survey:	2007208	Dates:	21 June–19 July

Cruise	The survey is a combination of the acoustic herring survey and IBTS quarter 3. It aims to collect data on the distribution and relative abundance, and biological information of commercial fish in IV. The primary species are herring, saithe, cod, haddock, whiting, sprat, mackerel, Norway pout and plaice
Gear details	I IBTS standard GOV 36/47 with ground gear A, 4 Balmoral floats with Scanmar door and headline height sensors.
Notes from survey (e.g. problems, additional work, etc.):	Four hydrographical transects were taken. On two of them also phytoplankton and zooplankton were sampled.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 65 species of fish were recorded during the survey.

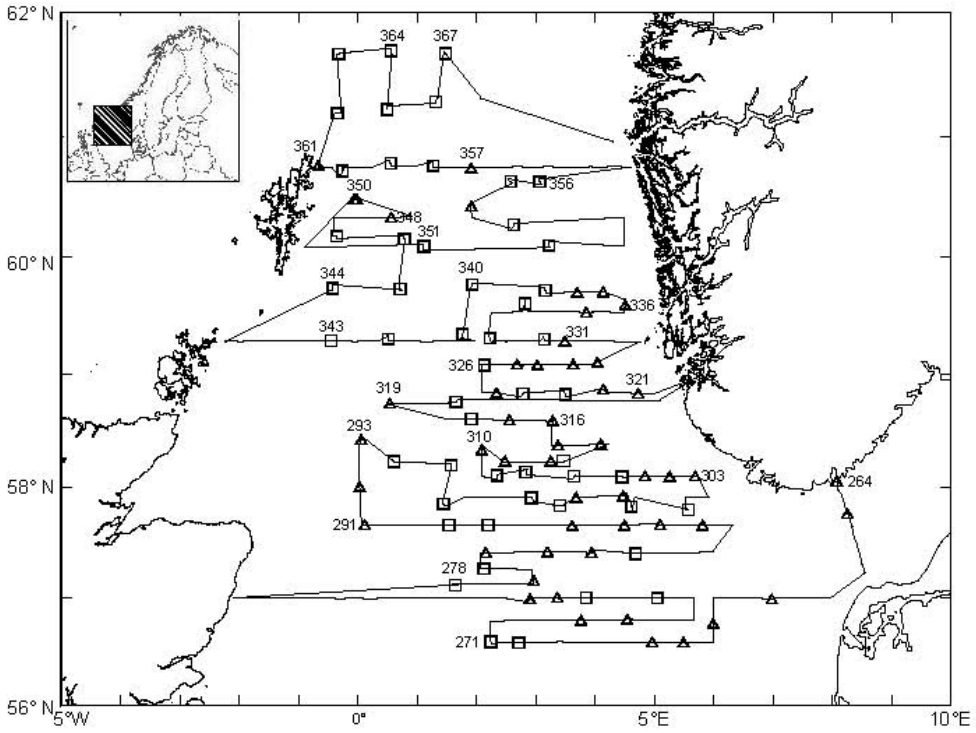
Stations fished (aims: to complete 45 valid tows per year)

ICES Divisions	Strata	Gear	Tows Planned	Valid	Additional	Invalid	% Stations fished	Comments
IV	N/A	IBTS standard GOV	45	45	0	0	100	All stations fished after 1st July

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

species	number	species	number
Clupea harengus	1095	*Trisopterus esmarki*	83
Gadus morhua	363	*Lophius piscatorius*	4
Melanogrammus aeglefinus	362	*Scomber scombrus*	2
Merlangius merlangus	272	*Brosme brosme*	1
Pollachius virens	391		

Cruise track of "Johan Hjort" during the Q3 IBTS 2008



4.2.2.3 Sweden – North Sea Quarter 3 IBTS

Nation:	**Sweden**	Vessel:	Argos
Survey:	12/07	Dates:	3–20 September 2007

Cruise	Q3 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 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, bottom contact, trawl eye and headline height sensors..
Notes from survey (e.g. problems, additional work, etc.):	The hydraulics to the winches broke down during the first week. This problem was fixed but the auto trawl system was not working correctly. Throughout the rest of the cruise the wires were manually adjusted to decrease the trawl skewness.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 62 species of fish were recorded during the survey.

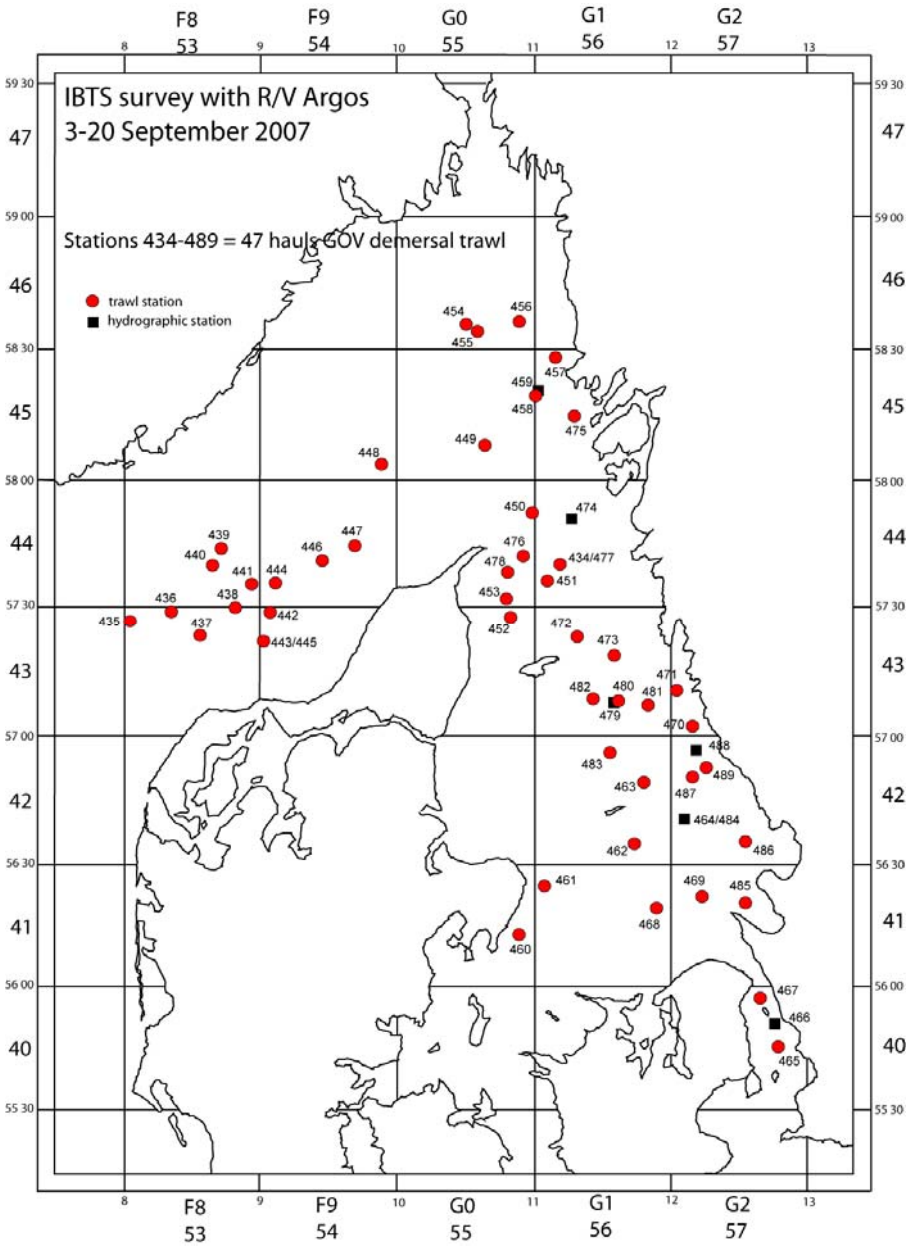
Stations fished (aims: to complete 47 valid tows per year)

ICES Divisions	Strata	Gear	Tows Planned	Valid	Additional	Invalid	% Stations fished	Comments
IV	N/A	IBTS standard GOV	47	47	0	0	100	

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

Species	Number	Species	Number
Clupea harengus	1139	*Pleuronectes platessa*	786
Gadus morhua	814	*Pollachius virens*	96
Melanogrammus aeglefinus	276	*Solea solea*	11
Merluccius merluccius	312	*Sprattus sprattus*	799
Microstomus kitt	184	*Trisopterus esmarki*	168

Cruise track of "Argos" during the Q3 IBTS 2008



4.2.2.4 Germany – North Sea Quarter 3 IBTS

Nation:	**Germany**	Vessel:	Walther Herwig II
Survey:	302	Dates:	19 July–17 August 2007

Cruise	This cruise contributed to the Q3 IBTS in the North Sea, while it also had the objective and to monitor the bottom fish fauna and the benthic epifauna in 6 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.
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.):	At the planned 29 stations of IBTS Q3 survey, the GOV in the standard version was used and depth profiles of temperature and salinity were obtained with a CTD combined with a water sampler for nutrient samples. A 2m-beamtrawl and a "van Veen" grab were applied to sample the benthic epifauna and sediment, respectively. Two ornithologists recorded abundances of seabirds.
Number of fish species re-corded and notes on any rare species or unusual catches:	Overall, 43 species of fish were recorded during the survey.

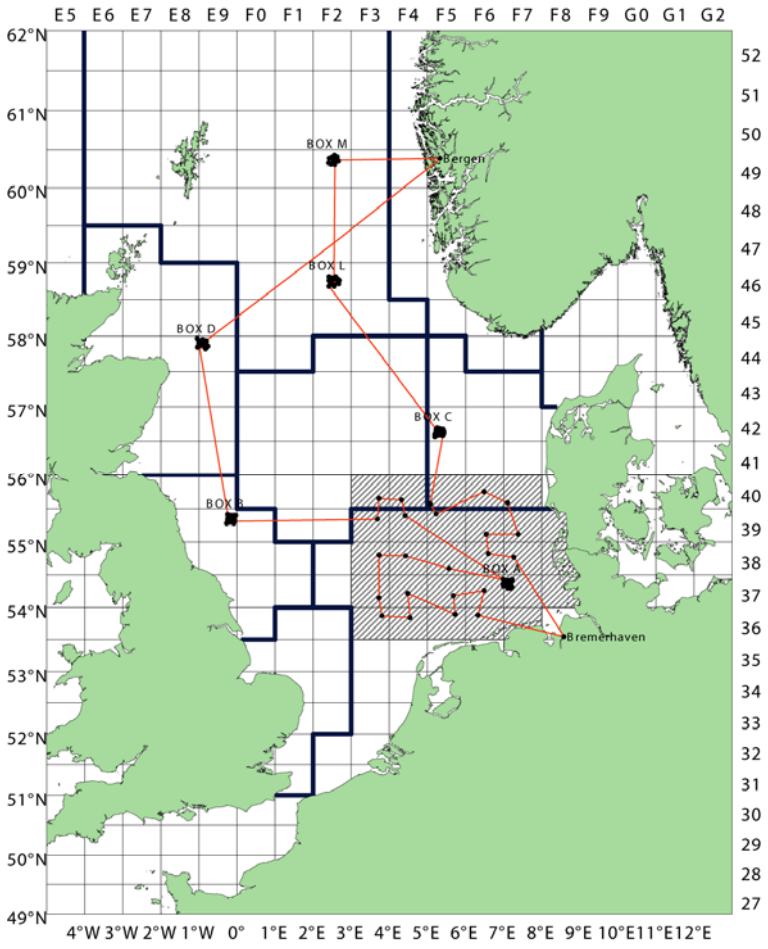
Stations fished (aims: to complete 29 valid tows per year)

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

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

species	number	species	number
Clupea harengus	297	*Scomber scombrus*	321
Gadus morhua	246	*Sprattus sprattus*	256
Melanogrammus aeglefinus	156	*Trisopterus esmarki*	25
Merlangius merlangus	426		
Pollachius virens	3		
**Anarchias lupus*	1	**Microstomus kitt*	92
**Lophius piscatorius*	1	**Pleuronectes platessa*	244
**Merluccius merluccius*	9	**Psetta maxima*	4

Cruise track of "Walter Herwig II" during the Q3 IBTS 2008



4.2.2.5 Denmark – North Sea Quarter 3 IBTS

Nation:	**Denmark**	Vessel:	Dana
Survey:	05/07 IBTS 3Q 2007	Dates:	8–25 August 2007

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	Two gear survey, using a modified GOV with rockhopper ground gear on hard ground stations, and GOV with ground gear A on fine ground stations..
Notes from survey (e.g. problems, additional work, etc.):	The cruise plan was fulfilled as planned.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 73 species of fish were recorded during the survey.

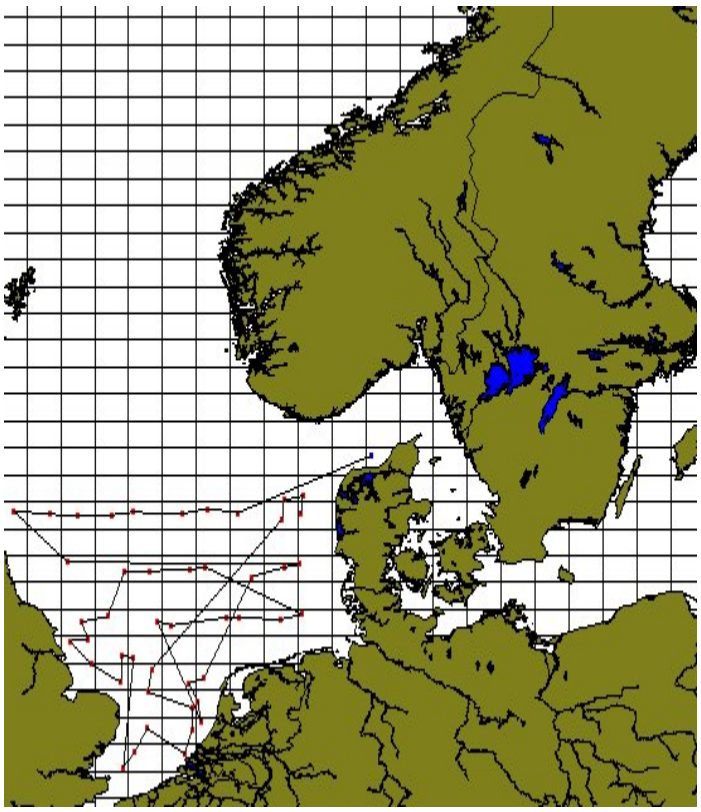
Stations fished (aims: to complete 46 valid tows per year)

ICES Divisions	Strata	Gear	Tows Planned	Valid	Additional	Invalid	% Stations fished	Comments
IV	N/A	IBTS standard GOV	44	44	0	0	100	
IV	N/A	GOVR	2	2	0	1	100	
	TOTAL		46	46		1		

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

Species	Number	Species	Number
Clupea harengus	807	*Limanda limanda*	-
Gadus morhua	378	*Scomber scombrus*	430
Melanogrammus aeglefinus	344	*Mullus surmuletus*	102
Merlangius merlangus	659		
Pollachius virens	1	**Leucoraja naevus*	0
Sprattus sprattus	75	**Raja clavata*	2
Scophthalmus maximus	6	**Raja montagui*	4
Trisopterus esmarki	32	*Lophius piscatorius*	1
Microstomus kitt	103	*Trachurus trachurus*	106
Pleuronectes platessa	807	*Solea solea*	46

Cruise track of "Dana" during the Q3 IBTS 2008



4.2.2.6 UK (Scotland) – North Sea Quarter 3 IBTS

Nation:	**UK (Scotland)**	Vessel:	Scotia
Survey:	1207s	Dates:	10 August–1 September 2007

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 problems encountered. A CTD deployed at each station. Four regular stations in the south east part of the survey area (37F3, 37F4, 37F5 & 37F6) were not sampled in order to allow additional time to cover 6 stations north and west of the Shetland Islands (in response to questions from the UK Industry). Bottom contact sensor was used throughout the cruise and data retained for future analyses. Sampling of benthic species were sampled and recorded according to developing FRS protocols.
Number of fish species re-corded and notes on any rare species or unusual catches:	Although the indices show an increase for juvenile cod, this is heavily influenced by one haul off the Danish Coast. The survey indices indicate that juvenile haddock are rather low this year. An encouraging increase in the number of juvenile whiting encountered is reflected in the survey indices. Large numbers of juvenile Norway pout were encountered in the northern half of the survey area. A total of 77 species were recorded during the survey with a total weight of 28,127 kgs.

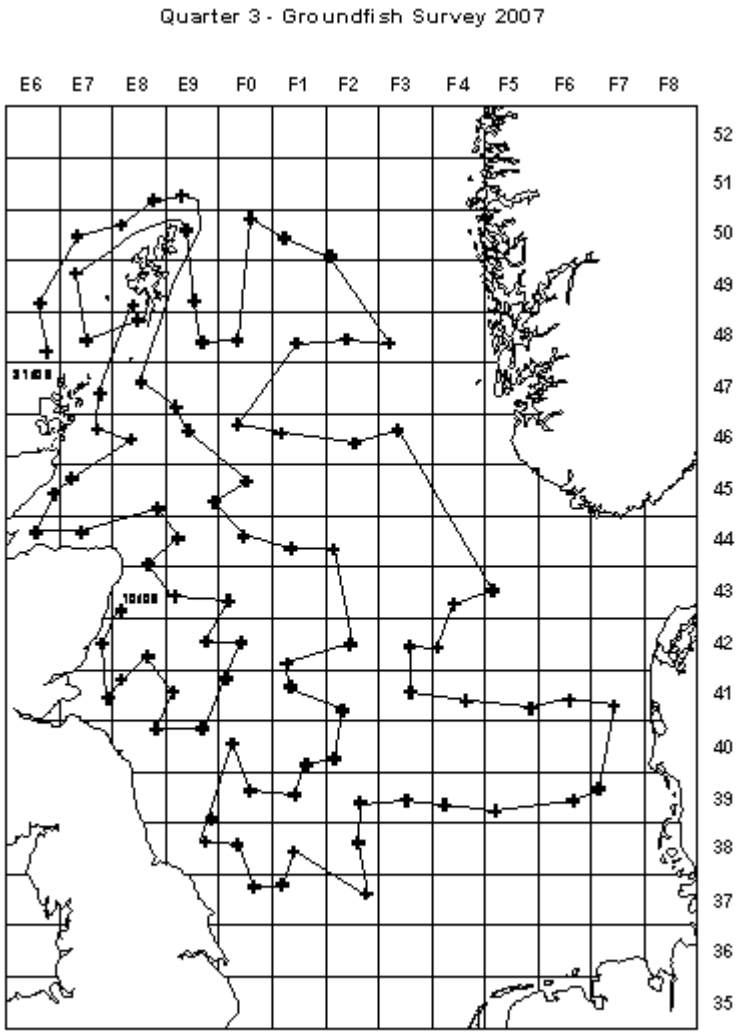
Stations fished (aims: to complete 87 valid tows per year)

ICES Divisions	Strata	Gear	Tows Planned	Valid	Additional	Invalid	% Stations fished	Comments
IVa		GOV-A	37	37	6	0	100	
IVb		GOV-B	50	46	0	0	92	
	Total		87	83	6	0		

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

Species	Number	Species	Number
Clupea harengus	Na	**Lophius budegassa*	2
Gadus morhua	286	**Lophius piscatorius*	31
Melanogrammus aeglefinus	1404	*Trachurus trachurus*	143
**Merlangius merlangus*	1228	**Pleuronectes platessa*	289
**Merluccius merluccius*	260	**Microstomus kitt*	266
**Psetta maxima*	4	*Trisoperus esmarki*	360
Pollachius virens	211	**Lepidorhombus whiffiagonis*	125

Cruise track of "Scotia" during the Q3 IBTS 2008



4.2.3 Results

4.2.3.1 GOV

The indices for the recruits of seven commercial species based on the 2007 quarter 3 surveys are shown in Figure 4.2.3.1. According to these results, only Norway pout produced a year class in 2007, above the long-term average for the years 1980–2007. The index for 0-group herring was about average, but all other indices were below the long-term average.

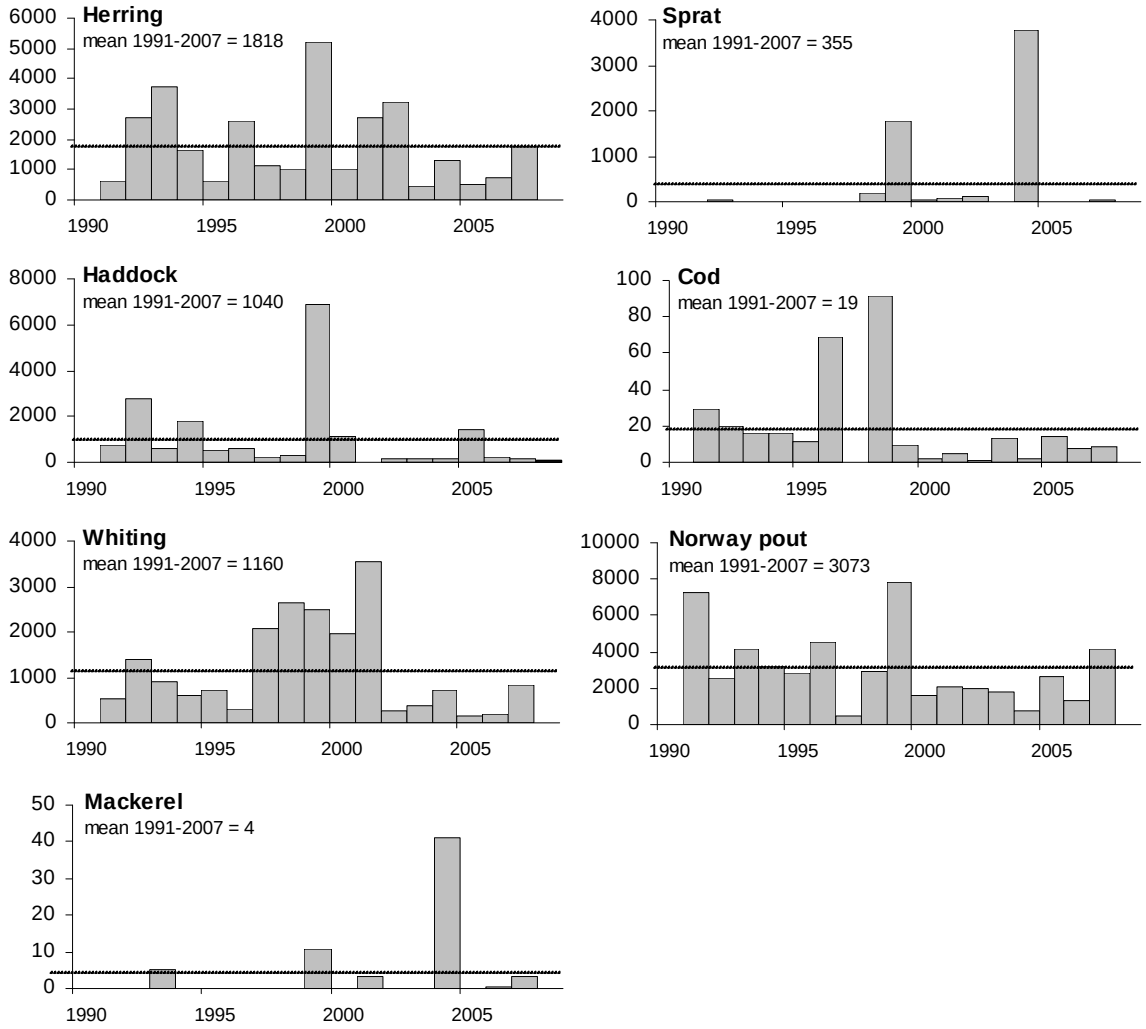


Figure 4.2.3.1: Time series of indices for 0-group species during the quarter 3 IBTS survey in the North Sea, extracted from DATRAS.

4.2.3.2 Precision estimates

The ICES DATRAS system now provides precision estimates for the survey area. They are provided in Figure 4.2.3.2 as plots over the time series. The individual country precision tables have been removed from the survey summary sheets.

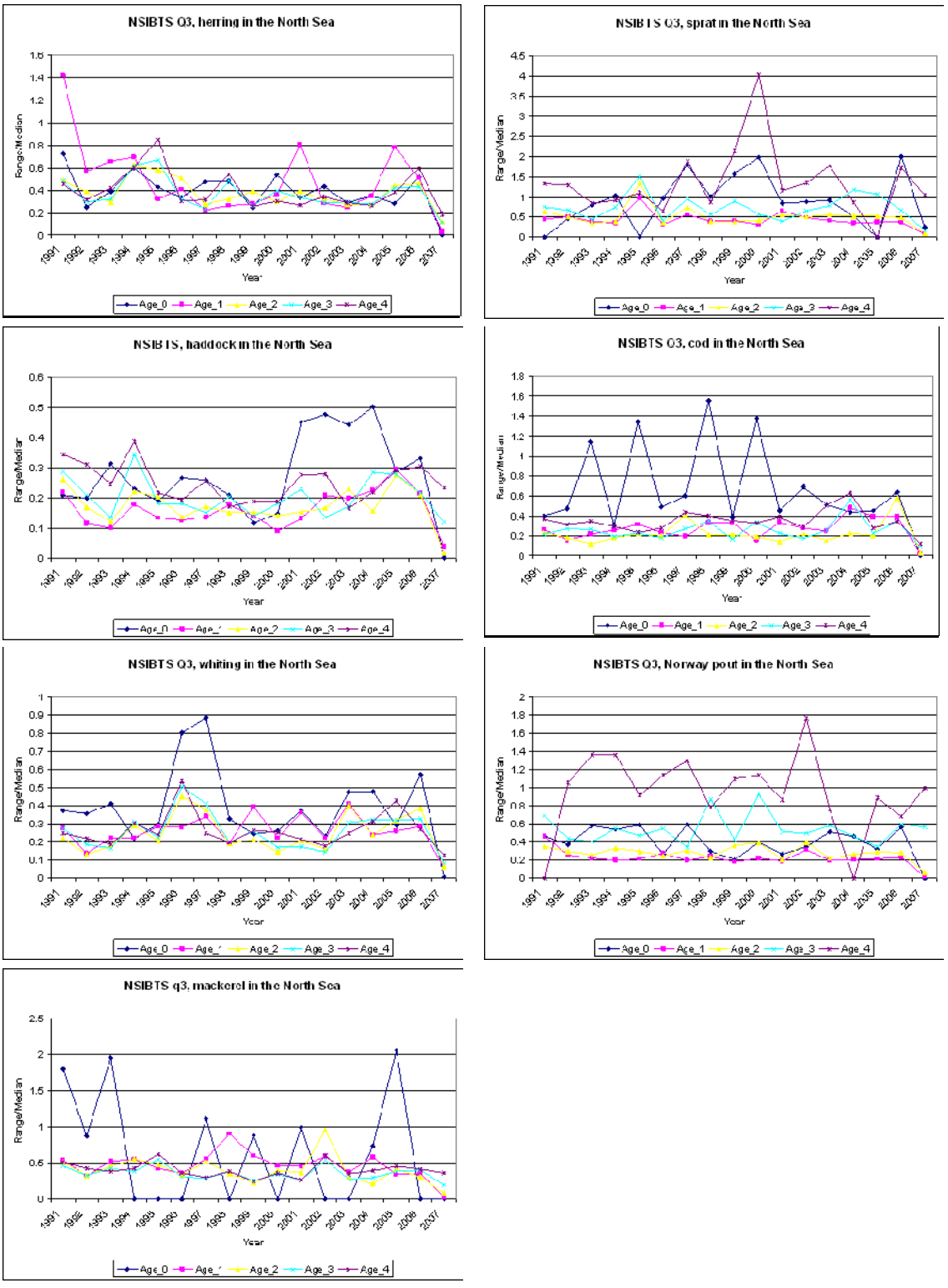


Figure 4.2.3.2: Precision estimates.

4.2.4 Participation in 2009

All the participants of the third quarter 2007 survey have advised that they will be participating fully in the programme in 2008. The timing of the surveys will be broadly in line with recent years. Norway will continue to start their survey on 1 July, as their IBTS survey is combined with an acoustic survey but they will still cover their allotted area. 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.

4.2.5 Other issues

4.2.5.1 Staff exchange in 2007

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. In August 2007, Barbara Bland, from the IMR, Lysekil, had the opportunity to join the British Ground Fish Survey and the RV "Cefas Endeavour" for a week at sea.

Barbara Bland: *"Cefas Endeavour, as well as Argos, is stern trawlers without a stern ramp, which is a huge disadvantage in terms of safety and stress on gear when bringing the trawl in or out.*

Shooting and hauling the trawl is controlled from the bridge where the SIC (Scientist in Charge) is closely monitoring the procedure. The SIC and the mates have a very good working climate, well understanding each others needs and responsibilities.

Figure 4.2.5.1: Shooting the gear (left) and sorting the catch (right).

The crew transfers the catch to a big hopper on deck where it is dropped. The sorting of the catch is done outside on aft deck. The safety regulations are rigorous even by Swedish standards. No one goes beyond the sorting area without wearing a hard hat!

From the hopper the catch is led on to two chutes where 3 persons on each side easily can sort. Between the chutes there are boxes for putting the different species in. This sorting arrangement works very well, particularly from an ergonomical point of view, standing near the chute and throw the fish away from you rather than having the boxes between you which is the case when you have a conveyor belt that brings the fish forward. In addition to sorting by species, you also sort by length group. If the catch is very large you will need to take sub

samples and weigh the mix. You take a sub sample from the beginning of the catch, one or more, depending on catch size, in the middle and one at the end.

Figure 4.2.5.2: Fish lab (left) and sorted catch (right).

The Deckmaster punches the weights in as well as being responsible for handing out the otolith boxes.

The flooring in the lab is teak, which proves to be non-slippery and sound absorbing. There are 5 workstations, each comprising of a measuring board, balance, computer and other necessary instruments for taking individual data. Earphones are useful so you can hear the beep that tells you your swipe has been registered.

The measuring board has bar codes for length classes (1 cm and .5 cm) as well as alphabetical and a numerical barcodes. Starting a sample you identify yourself and swipe the necessary codes, which the computer tells you to do, and then you measure the fish. If otoliths and other individual data need to be taken, the computer keeps tabs on that and beeps you. When the sample is finished a length distribution is showed that you can accept or discard.

When all species have been measured and sampled, the data from the different units are dumped to a server. Only after that is done are you allowed to discard the fish! A healthy safety measure in case something goes wrong!

The EDC (Electronic Data Collection) system seemed to work very well. However, it does require that all personnel are trained in taking otoliths and judging maturity stages for several species.

As expected, species range looked very much the same as in Skagerrak/Kattegat. Minor differences on what taxonomic level some species were determined existed, for instance Argentina is reported on a genus level where as Sweden determine it to species. Several species of rays were found, among others Raja neavus and Leucoraja fullonica, which normally would not be seen in Swedish waters. A couple of odd visitors from the south were noted, Trigloporus lastoviza and Aspitrigla cuculus.

Conclusion

Since all research vessels within the IBTS use the same manual, differences in fishing or sampling catch would be unlikely to find. Only minor differences were noted. One such difference was that on Endeavour sort the fish in length groups to a much larger extent than we do. Another issue was the maturity judging which raised one or two vivid and interesting discussions.

I also found the EDC system very interesting. If Sweden were to get a new research vessel an EDC system most certainly would be introduced. Presently, a change would not be possible due to lack of space in the lab as well as lack of skilled personnel.

I also want to take the opportunity to encourage other sea-going personnel to join in on different boats and cruises. It gives rise to interesting discussions and certainly broadens your fishy perspective!"

4.2.5.2 Coordination of additional biological sampling

In 2007, IBTSWG recommended that maturity data should be collected for a number of species in addition to the data collected for cod, haddock, whiting, saithe, Norway pout, mackerel, herring and sprat. Table 4.2.5.1 gives the number, by country, collected during the third quarter survey in 2007.

These samples were in addition to those taken in the recommended sampling period of the first quarter and from 2009 only *Microstomus kitt* will be requested as an additional species to be biologically sampled in the third quarter IBTS.

Table 4.2.5.1. Number of additional biological samples, by species, taken on third quarter North Sea IBTS surveys in 2007.

Species	Den	Ger	Nor	Sco	Swe	Eng	Total (combined)
Amblyraja radiata						242	**242**
Anarchias lupus		1					**1**
Brosme brosme			1				**1**
Lepidorhombus whiffiagonis				125			**125**
Leucoraja fullonica						2	**2**
Leucoraja naevus						34	**34**
Limanda limanda						394	**394**
Lophius budegassa				2			**2**
Lophius piscatorius	1	1	4	31			**37**
Merluccius merluccius		9		260	312		**581**
Microstomus kitt	103	92		266	184	245	**890**
Mullus surmuletus	102						**102**
Pleuronectes platessa	807	244		289	786	910	**3036**
Psetta maxima		4		4		12	**20**
Raja clavata	2					6	**8**
Raja montagui	4					6	**10**
Scophthalmus maximus	6						**6**
Solea solea	46				11		**57**
Trachurus trachurus	106			143			**249**
Total (by country)	**1177**	**351**	**5**	**1120**	**1293**	**1851**	**5797**

4.3 Eastern Atlantic

4.3.1 General overview

A total of 15 groundfish surveys were coordinated and carried out in the ICES Western and Southern Area of the Eastern Atlantic in 2007/08 by IBTS participants, resulting in a total of 1199 valid tows. The increase from last year stems from formal inclusion of the Q1 and Q4 Northern Ireland Groundfish Survey results in this years report.

Weather seems to have adversely impacted on surveys in Q1 with Scotland losing 2 days in the 2007 West Coast GFS and Northern Ireland losing similar in this years 2008 Q1 Irish Sea survey. In addition, Scotland lost a further 2 days due to crew sickness and transfer. Northern Ireland had technical difficulties relating to the autopilot in 2008 Q1, and reported strong conditions in both Q4 2007 and Q1 2008, particularly in the area of the St. Georges Channel.

The Q4 surveys however, have not generally reported weather as causing significant survey downtime (for a change!) and overall survey targets have been met, or exceeded slightly in some cases.

Two intercalibration exercises were reported for 2007. The addition of a further 10 parallel tows were added to the RV "Visconde de Eza" and RV "Celtic Explorer" dataset, bringing the total to 41 parallel tows, virtually all carried out during routine survey activity in the eastern Porcupine Bank. Given favourable weather conditions, time afforded a dataset to be initiated also between the RV "Thalassa" and the RV "Celtic Explorer" in the Northern Celtic Sea. This can hopefully be built up on the coming years in the same way.

Large numbers of juvenile haddock have been reported from the Irish west coast, but low numbers of juvenile megrim (*Lepidorhombus whiffiagonis*). Good catches of mackerel were also reported with a catch of 7.3 tons off the Cork coast during the Irish Groundfish Survey at one tow, where the fish were so tight on the seabed virtually nothing appeared on the fishing sounder.

Portugal reported increasing numbers of blue scad/blue jack mackerel (*Trachurus picturatus*) during recent surveys (see Working Document 3). Other notable catches were a haul of 51 red sea bream (*Pagellus bogaraveo*) by Scotland in ICES 42E0, a first for the FRS Survey. In addition, black mouthed dogfish (*Galeus melastomus*) was recorded in the Irish Sea by Northern Ireland (see annex 4 for species distribution maps).

4.3.2 Survey summaries by country

4.3.2.1 UK-Scotland: Western Division Bottom Trawl Survey - Quarter 4 2007 (1707S)

Nation:	**UK (Scotland)**	Vessel:	Scotia
Survey:	1707S	Dates:	13 November–4 December 2007

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 with ground gear C for all stations.
Notes from survey (e.g. problems, additional work etc.):	Weather conditions were very favourable throughout the whole survey and as such no fishing time was lost. 84 valid tows were completed. Additional work undertaken included the collection of temperature and salinity data from the seabed and surface, the collection of DNA from selected Elasmobranchs and the collection of samples of selected O-group gadoids.. All benthic species caught were identified and quantified. Gear parameters were monitored throughout each haul and in addition a bottom contact sensor was used and the readings recorded.
Number of fish species recorded and notes on any rare species or unusual catches:	88 species were encountered during the survey for a total catch weight of 25814.28kg. One unusual catch worth noting is a catch of 51 Red Sea Bream *(Pagellus bogaraveo)* in one haul, caught in stat rect 42E0. I believe that this is the first and only occurrence of this species being caught on any FRS survey.

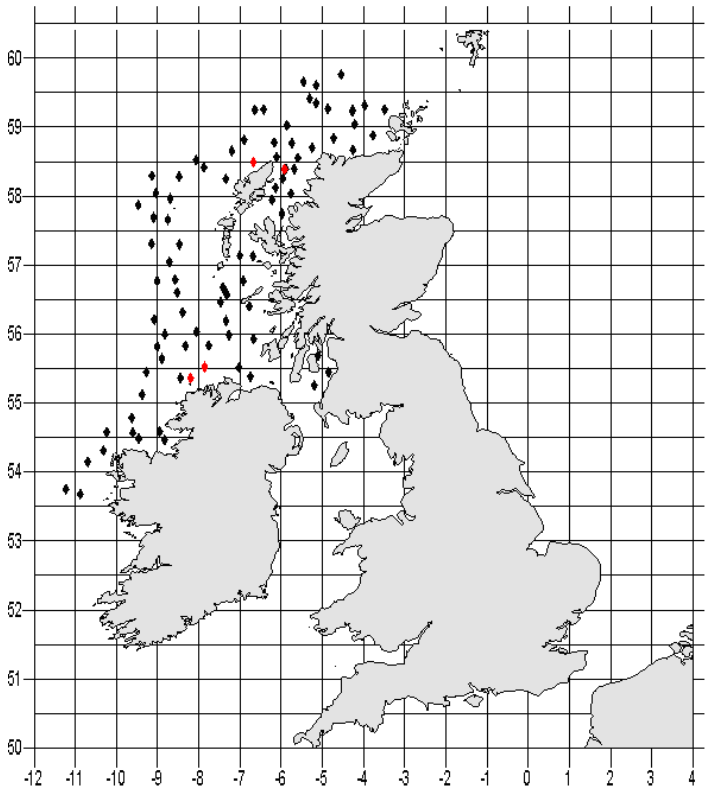
Stations fished

			Tows					% stations	
Ices divisions	Strata	Gear	Planned	Valid	Valid with rockhopper	Additional	Invalid	fished	Comments
VIa		GOV - C	75	75	-	4	4	100	
VIIb		GOV - C	6	6	-	0	0	100	
IVa		GOV - C	3	3	-	0	0	100	
TOTAL			84	84	-	4	4	100	

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

Species	Age	Species	Age
Clupea harengus	692	**Lophius budegassa*	7
Gadus morhua	133	**Lophius piscatorius*	126
Melanogrammus aeglefinus	1234	*Pollachius virens*	141
Merlangius merlangus	794	*Scomber scombrus*	458
**Merluccius merluccius*	485	**Lepidorhombus whiffiagonis*	214
**Molva molva*	2	**Trachurus trachurus*	256

Trawl Positions for Scotland Q4 IBTS survey 2007 (Foul / Invalid tows displayed in red).



Q4 SCOGFS CPUE data for major species 2007

Species	Strata	Mean nos/hr	Mean kgs/hr
Gadus morhua	All	3.207	4.641
Melanogrammus aeglefinus	All	254.469	68.381
Merlangius merlangus	All	277.548	27.500
Merluccius merluccius	All	79.534	7.659
Pollachius virens	All	10.828	1.786
Lepidorhombus whiffiagonus	All	9.019	5.796
Lophius piscatorius	All	3.642	6.021
Pleuronectes platessa	All	41.479	3.156
Microstomus kitt	All	28.416	11.542

4.3.2.2 UK-Scotland : West of Scotland Deepwater Survey - 2007 (1307s)

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	1307s	Dates:	5–28 September 2007

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, whiting, saithe.
Gear details:	GOV using groundgear C.
Notes from survey (e.g. problems, additional work etc.):	No problems encountered. Ship's thermosalinigraph was run continuously throughout the cruise. Due to the loss of the vessels CTD, temperature and salinity data were restricted to 4 hauls. Scanmar system and bottom contact sensor was used throughout the cruise to monitor net parameters and gear performance. Sampling of benthic species were sampled and recorded according to developing FRS protocols.
Number of fish species recorded and notes on any rare species or unusual catches:	In addition to the usual fish species encountered on the Rockall Plateau was Rays Sea Bream (Brama brama). This unusual species was present in 9 out of the 42 hauls with a total of 21 individuals being recorded for the survey, ranging in length from 44 – 50cm. Inspection of the gut contents of this offshore pelagic predator yielded significant number of Snake Pipefish (Entelurus aequorus). Also recorded was a Yarrell's Blenny (Chirolophis ascanii). They are both firsts for the Rockall Haddock Survey. A total of 38 species were recorded during the survey with a total weight of 13,824 kgs.

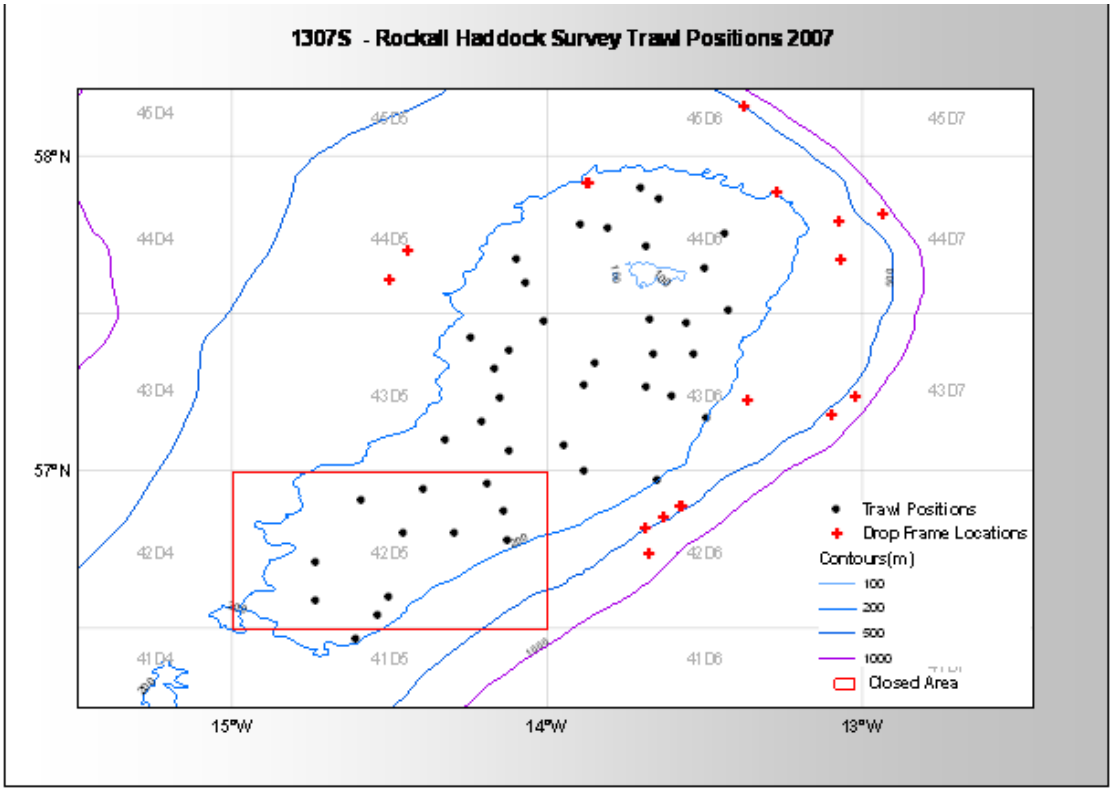
Stations fished

ICES Divisions	Strata	Gear	Tows Planned	Valid	Valid with rockhopper	Additional	Invalid	% stations fished	comments
VIb		GOV - C	42	42	-	0	0	100	
		TOTAL	42	42	-	0	0	100	

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

Species	No.	Species	No.
Clupea harengus	Na	**Brama brama*	12
Gadus morhua	10	**Lophius piscatorius*	79
Melanogrammus aeglefinus	1281		
Merlangius merlangus	8		
Pollachius virens	31		
**Lepidorhombus whiffiagonis*	263		

Cruise track of Scotia during the West of Scotland Deepwater survey 2007



Q4 Rockall Haddock Survey CPUE data for major species.

Species	Strata	Mean nos/hr	Mean kgs/hr
Gadus morhua	All	0.48	2.31
Melanogrammus aeglefinus	All	1097	269.26
Merlangius merlangus	All	0.38	0.08
Pollachius virens	All	1.48	12.86
Microstomus kitt	All	85.18	7.56
Lepidorhombus whiffiagonus	All	13.93	2.45
Lophius piscatorius	All	3.82	6.63
Argentina sphyraena	All	109.60	7.06
Trisopterus minutus	All	3358	17.89
Micromesistius poutassou	All	5636	171.37

4.3.2.3 UK-Scotland: Western Division Bottom Trawl Survey - Quarter 1 2007 (0307s)

Nation:	**UK (Scotland)**	Vessel:	Scotia
Survey:	0307S	Dates:	9–30 March 2007

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, Herring, Mackerel and Sprat.
Gear details:	GOV with ground gear C for all stations
Notes from survey (e.g. problems, additional work etc.):	Ship technical difficulties resulted in the survey delaying the sailing time by nearly one day. As Scotia made passage to the West coast, a crew member became seriously ill and it was necessary for him to be immediately returned to shore. This resulted in the loss of another day waiting for a replacement crew member to join the ship. On arrival at the area VIa, Scotia encountered severe weather conditions which resulted in the loss of another two days operational time. Despite the numerous set backs in the first half of the survey, 67 valid tows were completed. During trawling downtime, 10 three by three nautical mile areas were surveyed using the Simrad EM950 swathe bathymetry system. These sites were generally selected to correspond with the sites previously visited during the PRODD (project MF0753) undertaken from 2001 to 2004. Data from the surveyed areas were used to generate sidescan backscatter images in QTC Multiview and from these basic images, sediment cluster distribution maps were created. Guided by these maps, ground-truth sediment samples were collected from five sites. Further to the above, 15 benthic infaunal samples were collected from one site during the cruise. 506 digital images of gonad samples were taken for WKMSCWHS along with numerous associated histological samples. All benthic species caught were identified and quantified. Gear parameters were monitored throughout each haul and in addition a bottom contact sensor was used and the readings recorded
Number of fish species recorded and notes on any rare species or unusual catches:	80 species were encountered during the survey for a total catch weight of 37957kg.

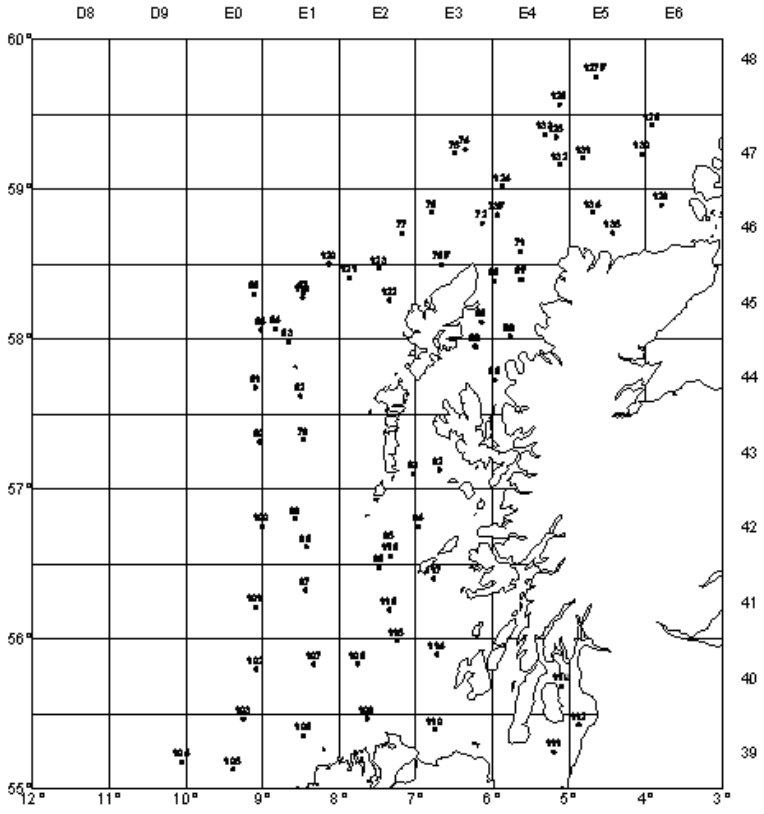
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIa		GOV - C	50	67	11	3	134	
	TOTAL		50	67	11	3	134	

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

Species	Age	Species	Age
Clupea harengus	1370	**Lophius budegassa*	1
Gadus morhua	77	**Lophius piscatorius*	44
Melanogrammus aeglefinus	1045	*Pollachius virens*	17
Merlangius merlangus	598	*Scomber scombrus*	866
**Merluccius merluccius*	330	**Trachurus trachurus*	136
**Lepidorhombus whiffiagonis*	40	**Pleuronectes platessa*	127

Q1WCSCGFS 2007 Trawl Stations



4.3.2.4 UK - Northern Ireland: Northern Irish Groundfish Survey Q4 2007 – Q4NIGFS

Nation:	**UK (Northern Ireland)**	Vessel:	Corystes
Survey:	41/07	Dates:	09–27 October 2007

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.
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 590 nm around the Isle of Man and Scottish coastal waters as part of an extended acoustic survey programme in the Irish Sea. No gear damage and relatively good weather so very little fishing time was lost overall. Tides were very strong during sampling at the St Georges channel stations. Additional work included quantifying external parasite loads in whiting and cod by area and collecting tissue samples from gadoids for a genetics study. Edward Farrell, University College Dublin, joined the survey to collect biological information on Mustelus spp.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 64 species of fish were recorded during the survey.

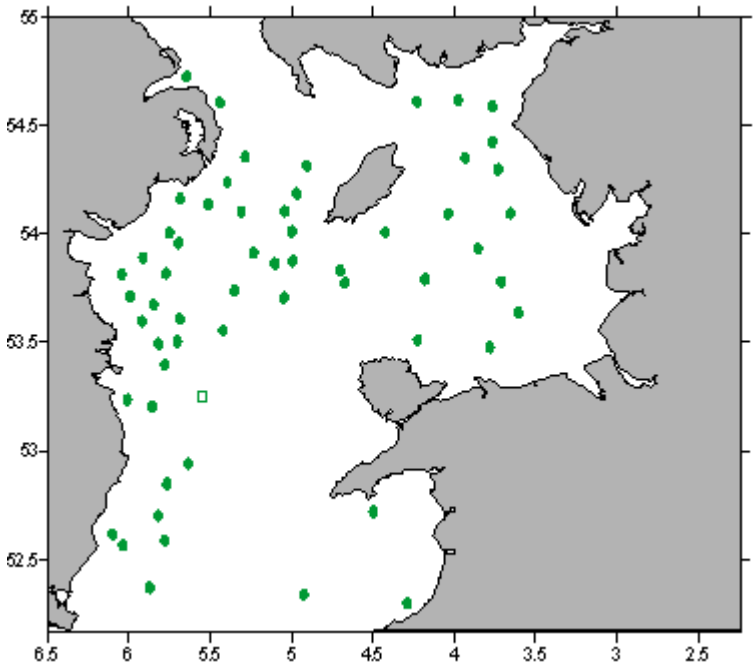
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIIa	All	Rock-hopper	60	58	0	1	98.3	
	TOTAL		60	58	0	1	98.3	

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

Species	Age	Species	Age
Gadus morhua	14	*Clupea harengus*	302
Melanogrammus aeglefinus	530		
Merlangius merlangus	1154		
Merluccius merluccius	46		

Map of survey stations completed during the Northern Irish quarter 4 groundfish survey (filled circles: valid tows; open circles: invalid tows).



Q4 NIGFS CPUE data for major species 2007

Species	Strata	Mean nos/hr	Mean kgs/hr
Gadus morhua	All	0.7	0.6
Melanogrammus aeglefinus	All	356.3	50.5
Merlangius merlangus	All	4634.1	235.6
Pleuronectes platessa	All	112.4	11.4
Clupea harengus	All	3900.0	231.6

4.3.2.5 UK - Northern Ireland: Northern Irish Groundfish Survey Q1 2008 – Q1NIGFS

Nation:	**UK (Northern Ireland)**	Vessel:	Corystes
Survey:	10/08	Dates:	06–25 March 2008

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.
Notes from survey (e.g. problems, additional work etc.):	Three fishing days were lost at the start of the survey due to technical difficulties to the ship's autopilot that had to be replaced. The survey was conducted during prolonged periods of unsettled weather. Strong winds and strong tides in the St Georges Channel were a particular problem in the final week of the survey. Approximately 4 fishing days were lost as a result of poor weather. 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 200 haddock ovaries, all cod and 87 plaice, as part of the Irish Sea Egg Production survey programme.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 70 species of fish were recorded during the survey. Less common fish species caught included one specimen of ballan wrasse *Labrus bergylta* off the south east coast of the Isle of Man, black-mouth dogfish *Galeus melastomus* and three specimens of river lamprey *Lampetra fluviatilis* were caught in Liverpool Bay.and Solway Firth.

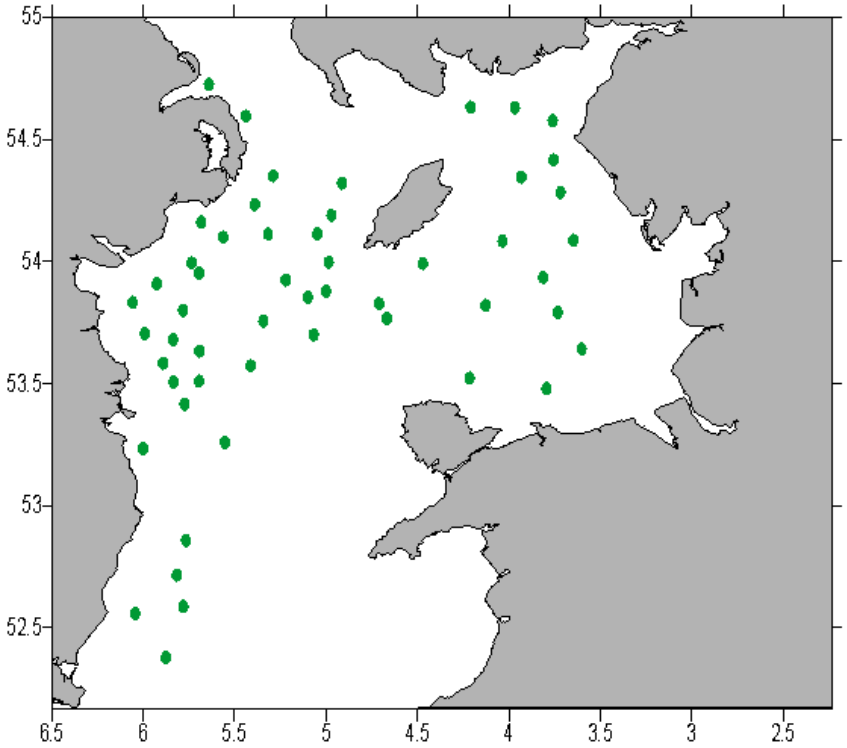
Stations fished

ICES Divisions	Strata	Gear	Tows Planned	Valid	Additional	Invalid	% stations fished	comments
VIIa		Otter trawl	60	53	0	1	88.3	
	TOTAL		60	53	0	1	88.3	

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

Species	Age	Species	Age
Gadus morhua	146	*Merlangius merlangus*	1120
Melanogrammus aeglefinus	765	*Merluccius merluccius*	91

Map of valid survey stations completed during the Northern Irish quarter 1 groundfish survey.



Q1 NIGFS CPUE data for major species 2008

Species	Strata	Mean nos/hr	Mean kgs/hr
Gadus morhua	All	2.8	3.3
Melanogrammus aeglefinus	All	278.2	45.7
Merlangius merlangus	All	1273.0	64.7
Pleuronectes platessa	All	143.1	10.3
Clupea harengus	All	2572.8	97.7

4.3.2.6 Ireland: Irish Groundfish Survey Q4 – IGFS07

Nation:	**Ireland**	Vessel:	Celtic Explorer
Survey:	IGFS	Dates:	22–30 September (VIa) 26 October–27 November (VIIb,g,j)

Cruise	Q4 Western Groundfish survey aims to collect data on the distribution, relative abundance and biological parameters of commercial fish in VIaS, VIIb, VIIgN & VIIjN. The currently assessed species are haddock, whiting, plaice and sole with data also collected for other demersal fish (e.g. 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 etc.):	Very little gear damage or poor weather so only a couple of half days lost to weather and/or repairs. A third year of intercalibration with IEO Survey on Porcupine carried out, with 10 valid parallel tows being completed. A further 10 intercalibration stations were carried out with the Thalassa in the Celtic sea also, which will be hopefully be built upon in the coming years. It is becoming increasingly difficult to complete shallower tows, particularly in VIa due to seemingly increased amounts static gear being placed on in the area.
Number of fish species recorded and notes on any rare species or unusual catches:	In 2007 97 species of fish and 21 elasmobranch species were caught. Overall, good number of juvenile haddock were seen, also cod were appearing at stations throughout the survey. Megrim juveniles appeared to be low.

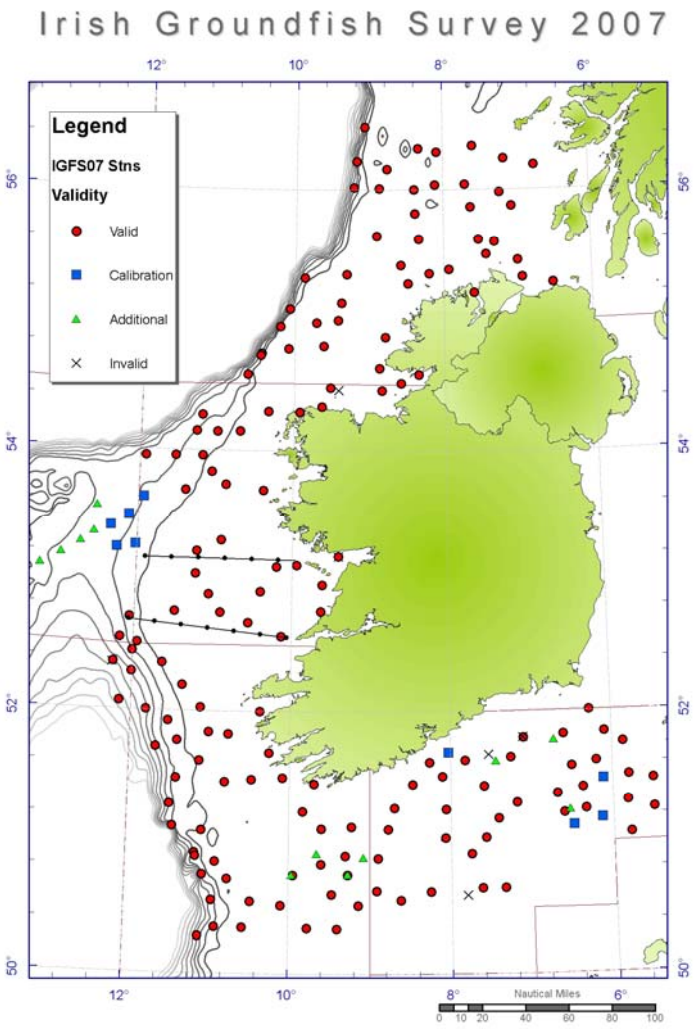
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIa	All	D	50	47	0	1	94	
VIIb,c	All	A	39	38	7	2	98	
VIIg	All	A	38	41	3	3	109	
VIIj	All	A	44	45	4	1	103	
	TOTAL		170	171	14	7	101	

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

Species	No.	Species	No.
Clupea harengus	314	*Lophius budegassa*	65
Gadus morhua	225	*Lophius piscatorius*	169
Melanogrammus aeglefinus	1328	*Molva molva*	99
Merlangius merlangus	982	*Solea solea*	50
Merluccius merluccius	1668	*Scomber scombrus*	548
Micromesistius poutassou	697	*Trachurus trachurus*	517
Pollachius virens	231	**Raja brachyura*	31
Lepidorhombus whiffiagonis	1040	**Raja clavata*	203
Microstomus kitt	776	**Leucoraja naevus*	198
Pleuronectes platessa	858	**Raja montagui*	356

Map of Survey Stations completed by the Irish Groundfish Survey in 2007



Valid = red circles; Invalid = crosses; Intercalibration = blue squares; intercal and additional stations not valid for IBTS survey indices = green rectangles. Two CTD transect lines in ICES VIIb also shown.

Catch rates followed by % difference from previous year

Species	Strata	Mean No. hr-1	% diff from 2006	Mean Kg hr-1	% diff from 2006	Comments
Gadus morhua	All	3.8	-53	4.5	-61	
Melanogrammus aeglefinus	All	1257.8	238	93.4	59	
Merluccius merluccius	All	165.9	56	19.4	61	
Lepidorhombus whiffiagonis	All	18.0	39	2.2	2	
Lophius piscatorius	All	1.7	-44	3.7	-50	
Pleuronectes platessa	All	28.8	-26	5.1	-25	
Pollachius virens	All	5.0	-69	4.1	-80	
Solea solea	All	0.8	-80	0.2	-78	
Merlangius merlangus	All	1151.7	45	79.4	14	

4.3.2.7 UK – England: Western Groundfish Survey Q4 – 20/07

Nation:	**UK (England and Wales)**	Vessel:	Cefas Endeavour
Survey:	20/07	Dates:	7 November–8 December 2007

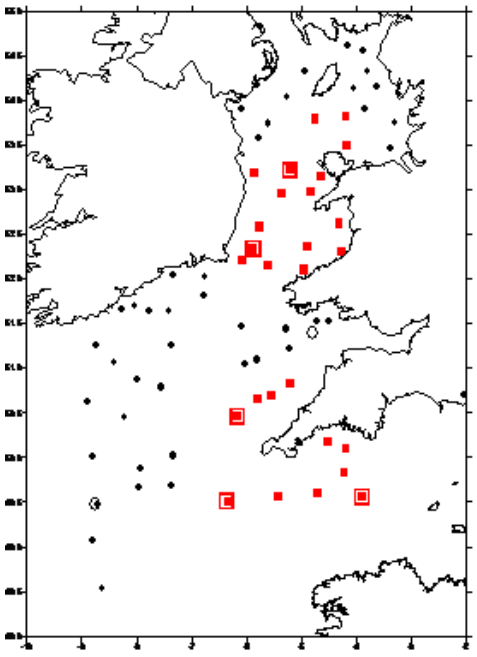
Cruise	Q4 Western Groundfish survey aims to collect data on the distribution, relative abundance, and biological information of commercial fish in VIIa and VIIe-h. The primary species are cod, haddock, hake and whiting, with data also collected for other demersal fish (e.g. skates and rays, anglerfish, 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). As per 2006, the trawls were 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.
Notes from survey (e.g. problems, additional work etc.):	A shakedown tow was undertaken in the southern North Sea prior to steaming to the main fishing area. The polyethylene net was used on the rockhopper GOV, and this gear had only limited gear damage, with stations around the Cornish peninsula and in St George's Channel fished successfully. Once hard ground stations were completed, the polyethylene GOV on ground gear A was rigged and stations in the Irish Sea and Celtic Sea sampled. Severe weather conditions restricted fishing operations during the second half of the survey (in the Celtic Sea). Additional work included CTD casts, 2m beam trawl sampling for epibenthos, a tag/release programme for various dogfish and skate species, additional tows after dark, and tissue sampling of smoothhounds and skates.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 96 species of fish were recorded during the survey. Species recorded for the first time in this survey series included single specimens of bogue Boops boops and black-mouth dogfish Galeus melastomus caught in the western English Channel and Celtic Sea respectively. Although crystal gobies have been observed in previous surveys, the 2007 survey yielded several examples of transparent goby Aphia minuta. Other unusual fish species caught included single specimens of electric ray Torpedo nobiliana and Yarrell's blenny Chirolophis acanii, and three specimens of river lamprey Lampetra fluviatilis were caught in Liverpool Bay. Catches south of Cork yielded comparatively large numbers of red band fish Cepola rubescens and pearlside Maurolicus muelleri.

Stations fished

Ices divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	Comments
VII a	A-C	Standard	13	14	0	0	107.6	
	H	Rock-hopper	15	16	2	0	106.7	Additional tows included one dark tow, and one tow was repeated after the winches failed during hauling
VII e-h	D-E	Standard	19	15	1	0	78.9	One tow classed as an additional tow, as hole in the belly (possibly on hauling), and time prevented the site being resampled
	F	Standard	15	14	1	0	93.3	One additional dark tow
	G	Rockhopper	10	11	3	1	110.0	Three additional dark tows.
TOTAL			72	70	7	1	97.2	

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

Species	Stock	No.	Species	Stock	No.
Gadus morhua	VIIa	29	*Psetta maxima*	-	3
Gadus morhua	VIIe-k	60	*Scophthalmus rhombus*	-	8
Melanogrammus aeglefinus	VIIa	225	*Microstomus kitt*	-	146
Melanogrammus aeglefinus	VIIe-k	293	*Lophius budegassa*	-	39
Merlangius merlangus	VIIa	207	*Lophius piscatorius*	-	53
Merlangius merlangus	VIIe-k	220	*Mullus surmuletus*	-	9
Pleuronectes platessa	VII a	414	*Dicentrarchus labrax*	-	32
Pleuronectes platessa	VII e and VII f-g	200	**Dipturus batis*	-	4
Solea solea	VII a	14	**Leucoraja fullonica*	-	2
Solea solea	VII e and VII f-g	28	**Leucoraja naevus*	-	76
Clupea harengus	VII a	160	**Raja brachyura*	-	8
Clupea harengus	Celtic Sea	150	**Raja clavata*	-	71
Merluccius merluccius	Northern	218	**Raja microocellata*	-	36
Lepidorhombus whiffiagonis	VIIb,c,e-k, VIIIa,b,d	174	**Raja montagui*	-	65
Scomber scombrus	Northern	215			



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).

Catch rates of commercial stocks

Species/stock	Stock area	Area surveyed	Gear	Valid tows	Mean catch (no.h-1)
G. morhua	VII a	VII a	A	14	4.43
			D	16	0.25
	VII e-k	VII e-g	A	29	3.86
			D	11	0.73
M. aeglefinus	VII a	VII a	A	14	323.83
			D	16	229.71
	VII e-k	VII e-g	A	29	127.77
			D	11	352.54
M. merlangus	VII a	VII a	A	14	2851.17
			D	16	368.19
	VII e-k	VII e-g	A	29	794.12
			D	11	23.45
M. merluccius	North	VIIa, e-g	A	43	55.42
			D	27	2.59
L. piscatorius	VIIb-k, VIIIa,b	VII a,e-g	A	43	2.42
			D	27	0.22
S. acanthias	NE Atlantic	VIIa, e-g	A	43	5.19
			D	27	0.44

4.3.2.8 France: EVHOE Groundfish Survey Q4 – EVHOE2007

Nation:	**France**	Vessel:	Thalassa
Survey:	EVHOE 2007	Dates:	18 October–1 December 2007

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 replace by 6 extra floats.
Notes from survey (e.g. problems, additional work etc.):	94% of the initial program was achieved. 11 valid tows were conducted in parallel with the Irish Celtic Explorer RV in the Celtic Sea.
Number of fish species recorded and notes on any rare species or unusual catches:	180 species encountered. Unusual catches of Entelurus aequoreus in the Celtic Sea as in most recents years. Unusual catch of 141 Balistes capriscus in the Bay of Biscay by 43°49'N and 1°27'W at a depth of 31 m.

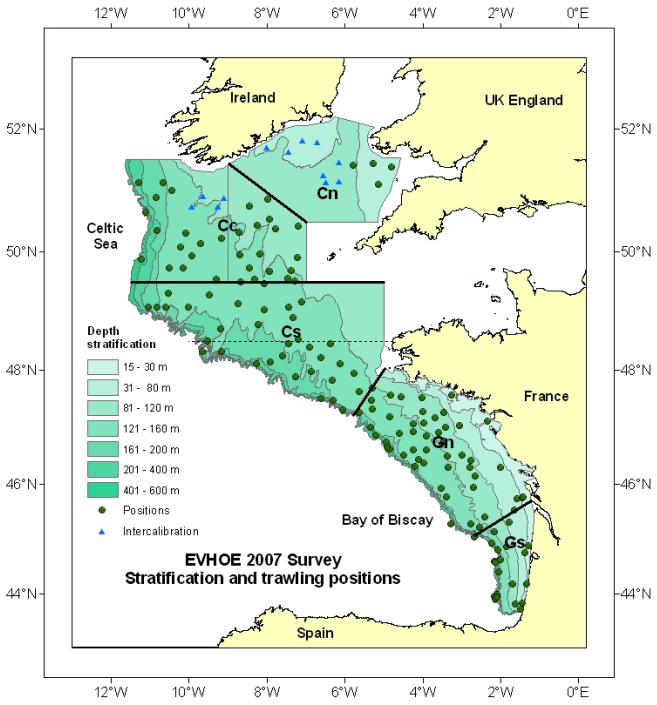
Stations fished

	Strata	Tows planned	Valid	Additional	% stations fished	comments
VII	Cc	37	33	1	89%	
	Cn	14	12		86%	
	Cs	35	31		89%	
VIII	Gn	51	49	2	96%	
	Gs	18	16	2	89%	
TOTAL		155	141	5	94%	

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

Species	Age	Species	Age
Merluccius merluccius	1129*	*Lophius budegassa*	134*
Gadus morhua	51	*Lophius piscatorius*	127*
Melanogrammus aeglefinus	333	*Solea solea*	70*
Merlangius merlangus	565	*Pleuronectes platessa*	151*
Lepidorhombus whiffiagonis	405*	*Dicentrarchus labrax*	100

Cruise track of Thalassa during EVHOE 2007



Species	Area	Valid tows	Kg/set	RSE	Nb/set	RSE	Comments
Merluccius merluccius	Cn, Cc, Cs, Gn, Gs	146	8.5	23.6%	144.22	8.9%	
Merlangius merlangius	Cn, Cc, Cs	77	14.0	35.2%	227.4	45.0%	
Melanogrammus aeglefinus	Cn, Cc, Cs	77	12.4	22.0%	125.9	29.5%	
Gadus morhua	Cn, Cc, Cs	77	2.3	23.8%	0.7	22.9%	
Lepidorhombus whiffiagonnis	Cn, Cc, Cs, Gn, Gs	146	2.0	7.1%	15.4	9.8%	
Lophius budegassa	Cn, Cc, Cs, Gn, Gs	146	1.1	14.0%	2.4	10.7%	
Lophius piscatorius	Cn, Cc, Cs, Gn, Gs	146	3.5	14.8%	1.6	10.9%	
Scomber scombrus	Cn, Cc, Cs, Gn, Gs	146	101.7	47..0%	982.4	53.8%	
Tcrachurus trachurus	Cn, Cc, Cs, Gn, Gs	146	69.6	23.3%	1470.0	18.1%	
Scylorhinus canicula	Cn, Cc, Cs, Gn, Gs	146	12.2	17.7%	44.1	21.8%	
Leucoraja naevus	Cn, Cc, Cs, Gn, Gs	146	1.9	19.2%	2.9	20.1%	
Raja clavata	Cn, Cc, Cs, Gn, Gs	146	0.4	42.1%	0.3	39.3%	
Nephrops norvegicus	Cn, Cc, Cs	77	3.0	31.8%	99.2	42.9%	
Nephrops norvegicus	Gn, Gs	69	0.1	50.0%	2.0	42.3%	

4.3.2.9 France: The Channel Groundfish Survey - CGFS

Nation:	**France**	Vessel:	Gwen-Drez
Survey:	CGFS2007	Dates:	1 January 2007–30 October 2007

Cruise	Q4 Eastern English Channel and south of North sea aims to collect data on the distribution and relative abundance, and biological information of commercial fish in VIId . The most important species are cod, whiting, plaice and striped red mullet.
Gear details:	The fishing gear used in CGFS is a basic trawl with large vertical opening (GOV) selected in priority for the capture of demersal species (fig. 2). Its dimensions are of 19.70 m (headline) on 25.90 m (groundrop) and the codend mesh size is 10mm (20 mm) stretched. To record the principal parameters, a system named SCANMAR was used: it is a cordless system made of sensors positioned on the various parts of the fishing gear.
Notes from survey (e.g. problems, additional work etc.):	Four stations were not validated because there was lot of gillnets on the area. Benthic organisms were identified and counted. Sampling was done on sea bass to know the pollution effect on the thyroid gland. Sampling was also realised on anchovy for Faculty of Marine and Environmental Sciences, University of Algarve in the setting of a genetic study.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 70 species of fish were recorded during the survey.

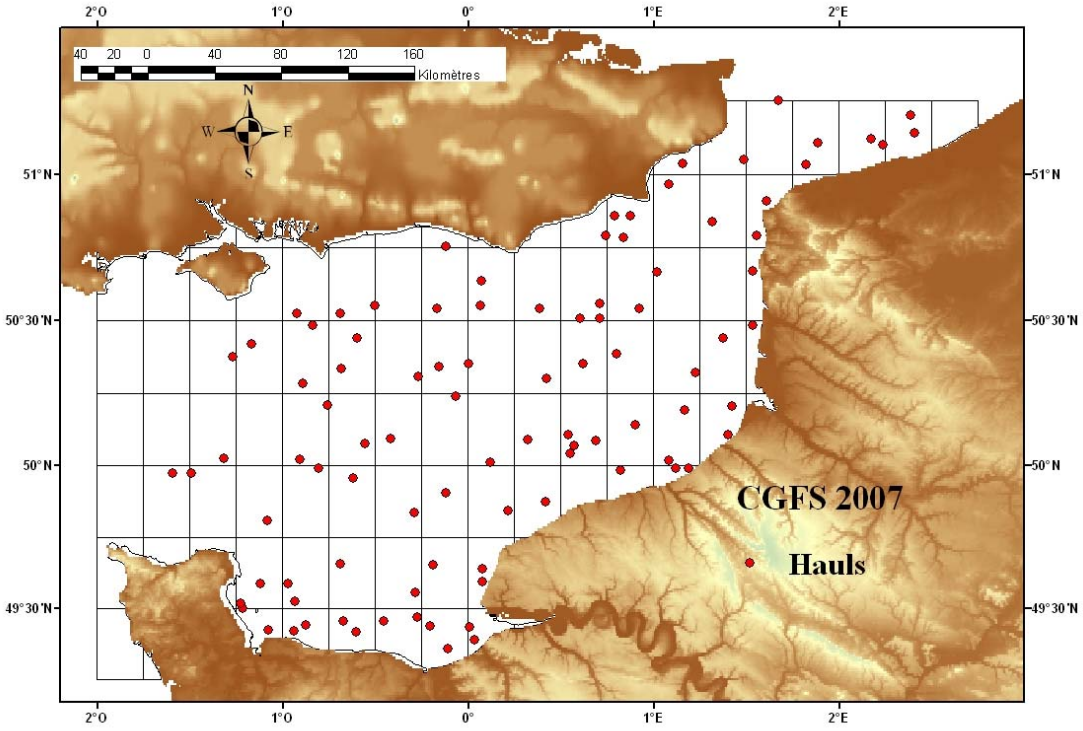
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIId, IVc4	N/A	CGFS standard GOV	100	96	0	4	96	
	TOTAL		100	96	0	4	96	

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

Species	Age	Species	Age
Gadus morhua	291	*Pleuronectes platassa*	282
Merlangius merlangus	344	*Mullus surmuletus*	127

Channel Ground Fish Survey sample area



4.3.2.10 Spain: The Porcupine Groundfish Survey Q3 – P07

Nation:	**SP (Spain)**	Vessel:	Vizconde de Eza
Survey:	P07	Dates:	8 September–6 October 2007

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.):	Additional work undertaken included CTD stations at most trawl stations, and tagging of monkfish species. 19 box corer were carried out. 10 paired hauls with the Celtic Explorer were carried out during the survey starting a data series that will allow to explore intercalibration.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 106 species of fish, 44 crustaceans and 32 molluscs were recorded during the survey.

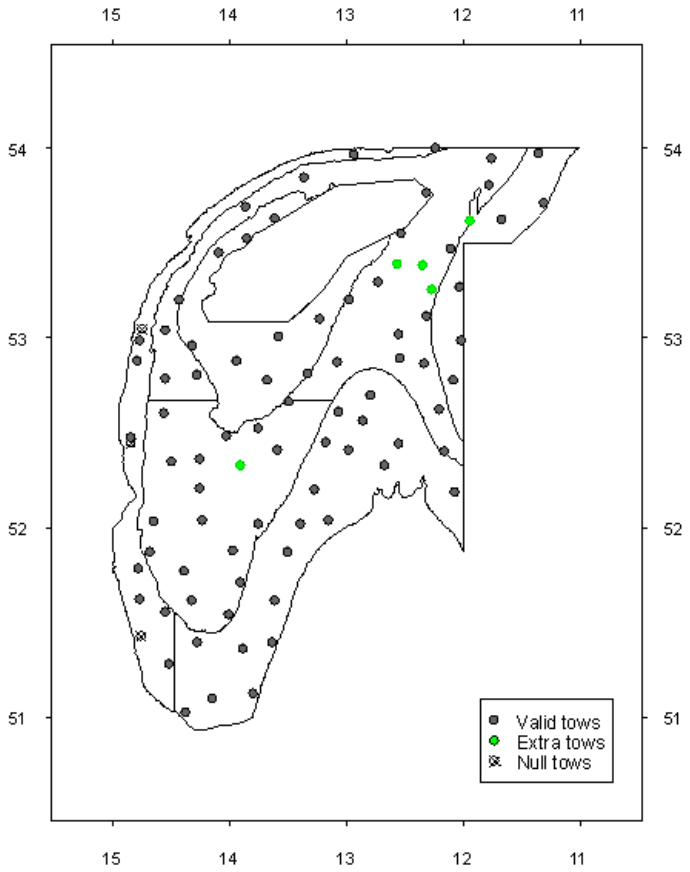
Stations fished

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

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

Species	Age	Species	Age
Merluccius merluccius	1333	*Lophius piscatorius*	136
Lepidorhombus whiffiagonis	311	*Nephrops norvegicus**	117
Lepidorhombus boscii	357	*Lophius budegassa*	70

Cruise track of Vizconde de Eza during the Q3 Porcupine groundfish survey 2007



Species	Strata	M catch no./0.5h	M catch Kg/0.5h	Comments
Merluccius merluccius	All	28.53	13.72	
Lepidorhombus whiffiagonis	All	177.38	7.31	
Lepidorhombus boscii	All	92.39	7.06	
Lophius budegassa	All	0.79	1.14	
Lophius piscatorius	All	2.29	9.17	
Micromesistius poutassou	All	3949.29	219.75	
Nephrops norvegicus	All	4.24	0.28	

4.3.2.11 Spain: Spanish North Coast Survey – N07

Nation:	**SP (Spain)**	Vessel:	Cornide de Saavedra
Survey:	N07	Dates:	11 October–10 November 2007

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 stations at all trawl stations, and tagging of lesser spotted dogfish. 3 additional hauls were done to cover shallow stations between 30 and 70 m, and 6 deeper stations between 500 and 700 m.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 120 species of fish, 55 crustaceans and 41 molluscs were recorded during the survey.

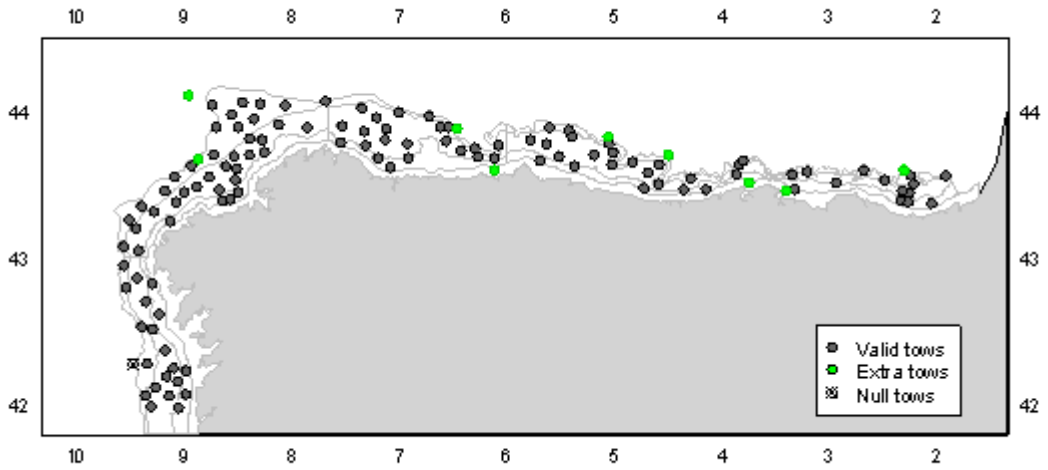
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIIIc-IXa	All	Standard baca	117	117	9	1	100	Also available by depth and geographical strata
	TOTAL		117	117	9	1	100	

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

Species	Age	Species	Age
Merluccius merluccius	531	*Lophius piscatorius*	119
Lepidorhombus whiffiagonis	415	*Trachurus trachurus*	548
Lepidorhombus boscii	480	*Micromesistius poutassou*	953
Lophius budegassa	54	*Scomber scombrus*	125
Merluccius merluccius	506	*Trisopterus luscus*	307
daily growth		*Nephrops norvegicus**	51

Cruise track of Cornide de Saavedra during the Spanish North Coast Survey 2007



Species	Strata	M catch no./0.5h	M catch Kg/0.5h	Comments
Merluccius merluccius	All	158.16	4.97	
Lepidorhombus whiffiagonis	All	6.87	1.13	
Lepidorhombus boscii	All	51.13	3.75	
Lophius budegassa	All	0.48	0.59	
Lophius piscatorius	All	2.56	1.65	
Micromesistius poutassou	All	743.20	26.86	
Nephrops norvegicus	All	0.30	0.02	
Trachurus trachurus	All	62.80	7.07	
Scomber scombrus	All	4.15	0.44	

4.3.2.12 Spain: Spanish Gulf of Cadiz Bottom Trawl Survey – GC_Spring07

Nation:	**SP (Spain)**	Vessel:	Cornide de Saavedra
Survey:	GC_spring 07 (ARSA)	Dates:	27 February–10 March 2007

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, 131 species of fish, 50 of crustacean and 45 of mollusca were recorded during the survey.

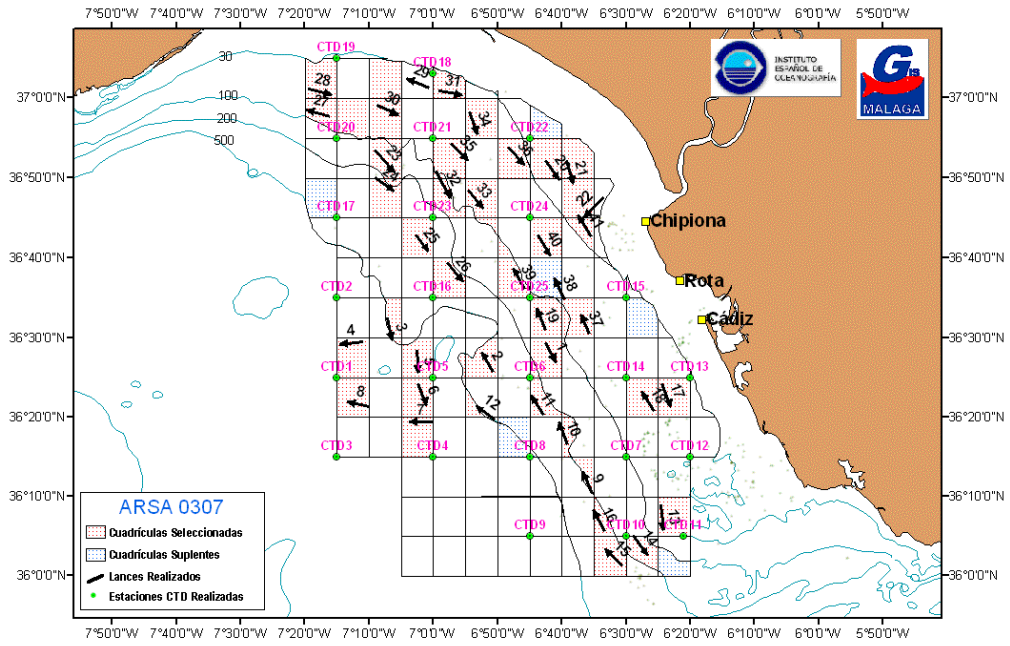
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rockhopper	Additional	Invalid	% stations fished	comments
IXa	All	Standard baca 36/40	41	41	-	-	-	100 %	Also available by depth
	TOTAL		41	41	-	-	-	100 %	

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

Species	Age	Species	Age
Merluccius merluccius	358	*Loligi vulgaris**	111
*Merluccius merluccius**	1458	*Loligo forbesi**	
*Parapenaeus longirostris**	2760	*Sepia officinalis**	81
*Nephrop novergicus**	196	*Eledone cirhorra**	25
*Octopus vulgaris**	56	*Eledone moschat**	449

Cruise track of Cornide de Saavedra during the GC_spring2007



Species	Strata	M catch no./hour	M catch Kg/hour	Comments
Merluccius merluccius	ALL	64	3.2	
Micromesistius poutassou	ALL	10	0.88	
Nephrops norvegicus	ALL	5	0.14	
Parapenaeus longirostris	ALL	89.	0.35	
Octopus vulgaris	ALL	1.7	1.4	
Loligo vulgaris	ALL	1.7	0.36	
Sepia officinalis	ALL	2.05	0.87	

4.3.2.13 Spain: Q1 Spanish Gulf of Cadiz Bottom Trawl Survey – GC07

Nation:	**SP (Spain)**	Vessel:	Cornide de Saavedra
Survey:	GC07	Dates:	14–24 November 2007

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, 133 species of fish, 42 of crustacean and 39 of mollusca were recorded during the survey.

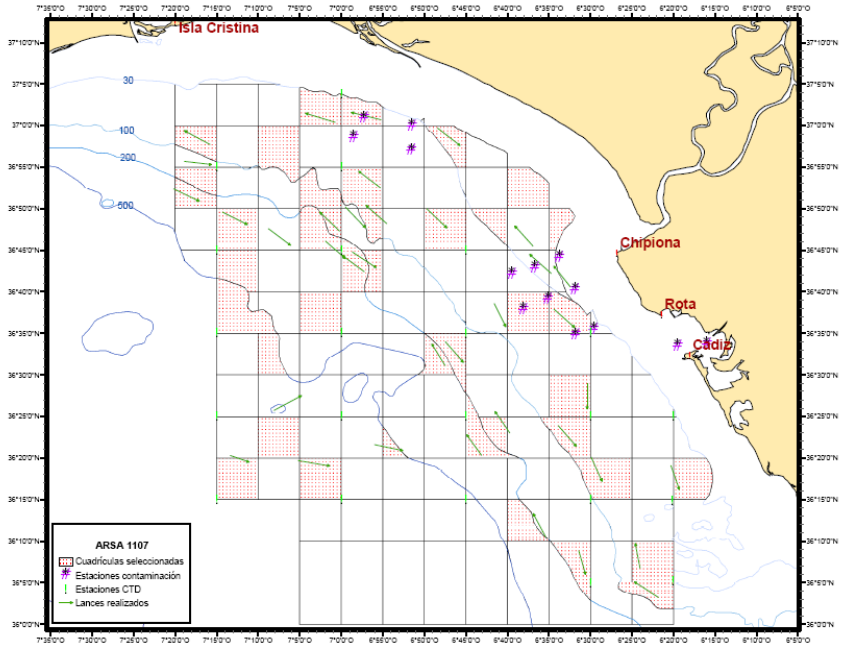
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rockhopper	Additional	Invalid	% stations fished	comments
Xa	All	Standard baca 36/40	41	37	-	-	-4	100%	Also available by depth
	TOTAL		41	37	-	-	-4	100%	

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

Species	Age	Species	Age
Merluccius merluccius	380	*Loligi vulgaris**	371
*Merluccius merluccius**	1457	*Loligo forbesi**	25
*Parapenaeus longirostris**	1818	*Sepia officinalis**	70
*Nephrop novergicus**	61	*Eledone cirhorra**	50
*Octopus vulgaris**	444	*Eledone moschat**	396

Cruise track of Cornide de Saavedra during the GC_spring2007



Species	Strata	M catch no./hour	M catch Kg/hour	Comments
Merluccius merluccius	ALL	221	6.9	
Micromesistius poutassou	ALL	1.9	0.42	
Nephrops norvegicus	ALL	4.9	0.01	
Parapenaeus longirostris	ALL	251	1.2	
Octopus vulgaris	ALL	8.4	4.0	
Loligo vulgaris	ALL	7.8	1.3	
Sepia officinalis	ALL	1.6	1.0	

4.3.2.14 Portugal: Autumn Groundfish Survey – Autumn 2007

Nation:	**Portugal**	Vessel:	Noruega
Survey:	Autumn 2007	Dates:	21 September–18 October 2007

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.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 102 species of fish, 14 of cephalopods and 24 of crustaceans were recorded during the survey.

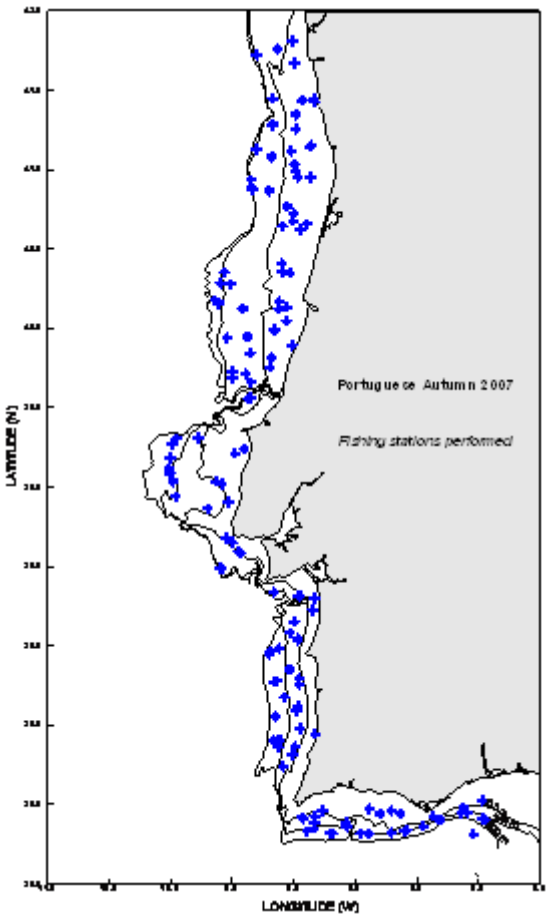
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Invalid	% stations fished	comments
IXa	ALL	NCT	96	96	0	100	

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

Species	Samples	Otoliths
Merluccius merluccius	90	2176
Trachurus trachurus	17	314
Micromesistius poutassou	24	361
Scomber colias	23	148
Scomber scombrus	31	138

Portuguese Groundfish survey – Autumn 2007 (4th quarter)



Species	Strata	Mean catch n/hour	Mean catch kg/hour	Comments
Merluccius merluccius	ALL	370.2	25.8	
Trachurus trachurus	ALL	161.8	10.8	
Micromesistius poutassou	ALL	2202.3	82.4	
Scomber colias	ALL	167.6	15.6	
Scomber scombrus	ALL	526.2	45.7	
Lophius budegassa	ALL	0.01	0.01	1 ind. caught
Lophius piscatorius	ALL	-	-	
Lepidorhombus whiffiagonis	ALL	-	-	
Lepidorhombus boscii	ALL	1.5	0.2	
Nephrops norvegicus	ALL	0.5	0.0	

4.3.2.15 Portugal: Portuguese Winter Groundfish Survey – Winter 2007

Nation:	**Portugal**	Vessel:	Noruega
Survey:	Winter 2007 – Groundfish survey for Hake	Dates:	09 March–04 April 2007

Cruise	Winter Groundfish survey aims to estimate distribution and abundance of hake in spawning season, indices of abundance and biomass of the most important commercial species, biological parameters, maturity, sex-ratio, weight, food habits, length and/or age compositions for the main commercial species. The primary species are hake, horse mackerel, blue whiting, mackerel, Spanish mackerel, anglerfish, megrim and Norway lobster.
Area	Portuguese continental waters (Div. IXa, from 20 to 500 m depth.
Survey design	75 fishing stations, 66 at fixed (grid) positions and 9 at random. Tow duration is 60 min, with a trawl speed of 3.5 knots, during day light.
Gear details	CAR bottom gear type FGAV019 without rollers in the groundrope. The mean horizontal opening between the wings is 25 m and the mean vertical opening iss 2.5 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. Tows not performed due to bad weather (8), rocky bottom (1) or presence of static artisanal gears (3).
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 135 species of fish, 21 of cephalopods and 40 of crustaceans were recorded during the survey.

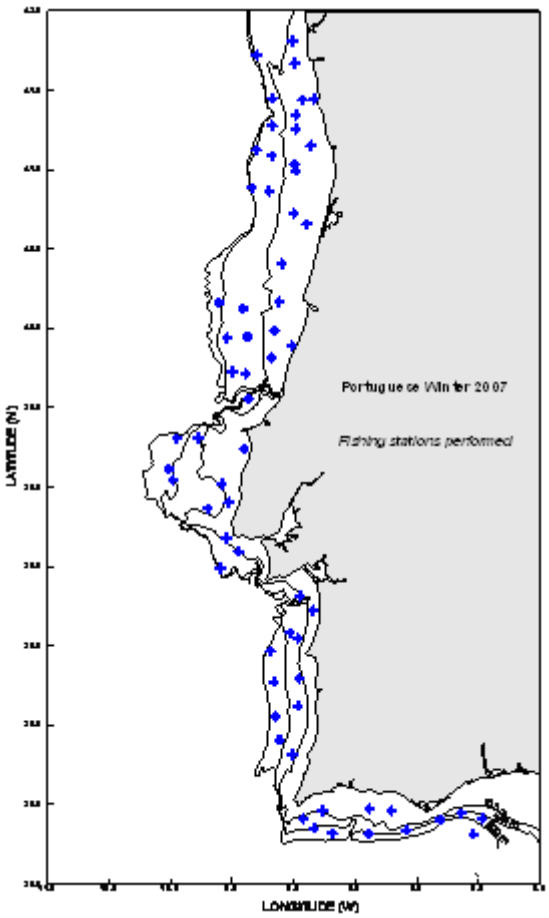
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Invalid	% stations fished	comments
IXa	ALL	CAR	75	63	5	84	

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

Species	Samples	Otoliths
Merluccius merluccius	58	1456
Trachurus trachurus	14	1397
Micromesistius poutassou	12	410
Scomber colias	19	317
Scomber scombrus	13	301
Lophius budegassa	5	7
Lophius piscatorius	7	9
Lepidorhombus whiffiagonis	4	7
Lepidorhombus boscii	19	409
Nephrops norvegicus	2	NA

Portuguese Groundfish survey – Winter 2007 (1st quarter)



Species	Strata	Mean catch n/hour	Mean catch kg/hour	Comments
Merluccius merluccius	ALL	598.3	21.3	
Trachurus trachurus	ALL	1182.0	86.2	
Micromesistius poutassou	ALL	1800.1	62.4	
Scomber colias	ALL	562.8	34.8	
Scomber scombrus	ALL	916.6	57.3	
Lophius budegassa	ALL	0.1	0.2	12 ind. caught
Lophius piscatorius	ALL	0.5	0.3	26 ind. caught
Lepidorhombus whiffiagonis	ALL	0.2	0.0	11 ind. caught
Lepidorhombus boscii	ALL	23.5	1.6	
Nephrops norvegicus	ALL	4.0	0.2	

4.3.3 Maps of species distribution

As part of ongoing efforts to standardize the format and usefulness of reporting for IBTS coordinated surveys, agreement was reached this year to produce a number of overview maps combining the North Sea and Western Atlantic areas (St. Georges Channel, Irish Sea and Western Atlantic). The specific surveys in question are the North Sea Quarter 3 (NS) and Western Area Quarter 4 (WA) surveys. In addition to a map of overall valid station coverage, it was decided to include 6 species in this years' report as combined area maps: Atlantic cod (*Gadus morhua*), Haddock (*Melanogrammus aeglelfinus*), Herring (*Clupea harengus*), Mackerel (*Scomber scombrus*), European Plaice (*Pleuronectes platessa*) and Whiting (*Merlangius merlangus*).

The remaining species are mapped as in previous years for the Western area only, with the notable addition of blue jack mackerel/scad (*Trachurus picturatus*) which has become a recent species of note in the surveys and commercial catch of Portugal in particular.

Data for the North Sea represents the components of a coordinated combined survey index and therefore, although collected by 6 individual countries, is comparable and therefore represented graphically as a single survey. For the more diverse Western Area however, a number of distinct trawls are employed, and it must be assumed that each will have a species and length specific catchability factor associated with it. Although differences in catchability between surveys is not at present be corrected by use of calibration/conversion factors, work done, and ongoing, suggests that this may be feasible in the future, if required.

Therefore, for the following maps of species distribution two aspects need to be borne in mind. As the reader moves from the North Sea (NS) to Western Area (WA) you are also moving from Q3 to Q4 surveys. Secondly, the trawls used in the WA are more diverse than the single gear GOV surveys in the NS and therefore literal inter-survey comparisons are more problematic in the WA than intra-survey comparisons over the time series.

Notwithstanding, raw numbers per hour are provided as a reasonable indication of inter-annual abundance and distribution. In addition, approximate pre- and post-recruit abundance for the main target species are mapped separately, by application of a length split to these species (see Table 4.3.1.).

Table 4.3.1. Species for which distribution maps have been produced, with length split for pre-recruit (0-group) and post-recruit (1+ group) where appropriate. Asterisk (*) denotes extended species map covering North Sea Q3 surveys along with Western Area Q4 data.

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	28	
Galeus melastomus	Blackmouted Dogfish	DBM	32	
Lepidorhombus boscii	Four Spot Megrim	LBI	15	
Lepidorhombus whiffiagonis	Megrim	MEG	14	
Leucoraja naevus	Cuckoo Ray	CUR	26	
Lophius budagassa	Black-bellied Anglerfish	WAF	17	
Lophius pscatorius	Anglerfish (Monk)	MON	16	
*Marlangius merlangus**	Whiting	WHG	20 – 21	20
*Melanogrammus aglefinus**	Haddock	HAD	4 – 5	20
Merluccius merluccius	European Hake	HKE	8 – 9	20
Micromeisistius poutassou	Blue Whiting	WHB	22 – 23	19
Mustelus asterias	Starry Smoot Hound	SDS	29	
Mustelus mustelus	Smooth Hound	SMH	33	
Nephrops norvegicus	Norway Lobster	NEP	24	
*Pleuronectes platessa**	European Plaice	PLE	18 – 19	12
Raja clavata	Thornback Ray (Roker)	THR	30	
Raja microocellata	Painted/Small Eyed Ray	PTR	34	
Raja montagui	Spotted Ray	SDR	35	
Raja undulata	Undulate Ray	UNR	36	
*Scomber scombrus**	European Mackerel	MAC	12 – 13	24
Scyliorhinus canicula	Lesser Spotted Dogfis	LSD	25	
Scyliorhinus stellaris	Nurse Hound	DGN	37	
Squalus acanthias	Spurdog	DGS	27	
Trachurus picturatus	Blue Jack Mackerel (Blue Scad)	JAA	31	
Trachurus trachurus	Horse Mackerel (Scad)	HOM	10 - 11	15

The distribution maps are shown in Annex 4.

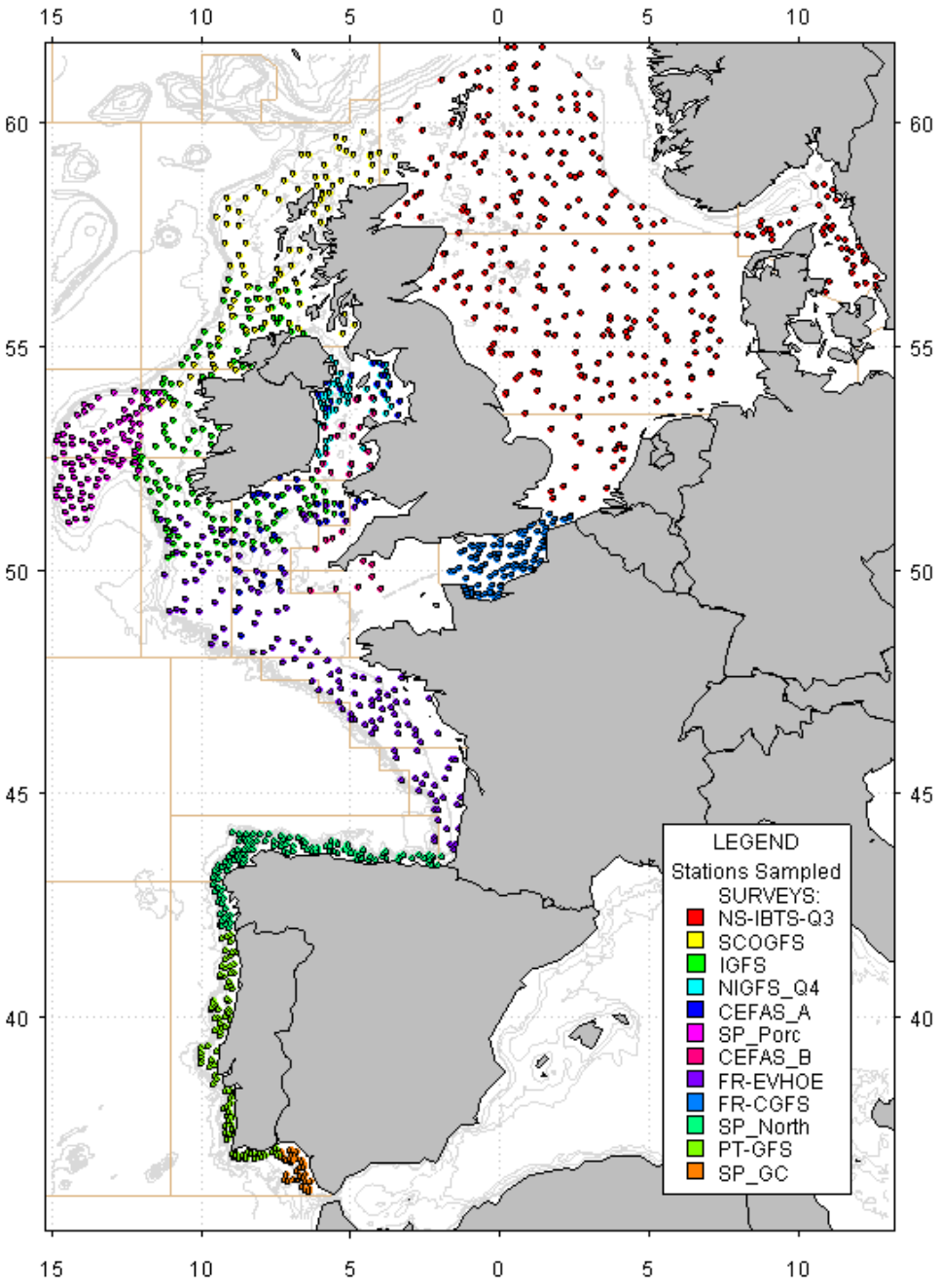


Figure 4.3.1: Station positions for the IBTS Surveys carried out in the Western and North Sea Area in the autumn/winter of 2007.

4.3.4 Participation in 2008/2009

SURVEY	CODE	START	END	NO. EXPECTED HAULS	INTERCAL.
UK-Scotland Rockall	1108S	2/9/08	15/09/08	42	None
UK-Scotland Western (autumn)	1408S	7/11/08	28/11/08	78	None
UK-Scotland Western (spring)	0409S	10/03/09	30/03/09	65	None
UK-North Ireland (autumn)	CO4108	10/10/08	28/10/08	60	None
UK-North Ireland (spring)	CO1009	02/03/09	24/03/09	60	None
UK-North Ireland (intercalibration)	CO4808	24/11/08	28/11/08	-	Cefas
Ireland – Groundfish Survey VIa	IGFS07	23/9/08	5/10/08	50	SP-PO?
Ireland – Groundfish Survey VIIb,g,j	IGFS07	26/10/08	29/11/08	120	IFREMER
UK-England & Wales					None
France - EVHOE					None
France - Western Channel					None
Spain - Porcupine	SP- P08	8/09/08	08/10/08	80	IGFS?
Spain - North Coast	SPGFS08	17/09/08	27/10/08	116	EVHOE
Spain - Gulf of Cádiz (Autumn)	SPGC07	1/11/08	14/11/08	42	None
Spain - Gulf of Cádiz (Spring)	ARSA	10/03/08	21/03/08	42 (41)	None
Portugal - Winter	PESCADA-BD	25/02/08	19/03/08	75 (68)	None
Portugal - Autumn	AUTUMN	02/09/08	30/09/08	96	None

4.4 References

Martin CS, Lelièvre S, Vaz S (2007). Identification of the Spawning Areas in the Dover Strait and adjacent marine areas, Final report of the ISADO project, Interreg IIIa Programme. Canterbury (UK): Canterbury Christ Church University, 114 pp.

ICES. 2008. Report of the Planning Group for Herring Surveys (PGHERS), 22–25 January 2008, IJmuiden, the Netherlands. ICES CM 2008/LRC:01. 256 pp.

5 Surveys reporting format (ToR b)

ToR b) Further develop the standard reporting format for the annual surveys for species of interest to assessment working groups according to their response.

In 2005, the IBTSWG decided that there was a need to provide more information on the various surveys under its coordination, and in 2006 a reporting format was designed. In 2007 and also this year, the standard reporting format is further developed, and the progress can be found in the previous section (4).

One major development during the meeting was the creation of maps showing the distribution of some target species throughout the entire area covered by IBTS surveys (see Annex 4).

Feedback from different assessment working groups on desirable information is necessary for the development of the reporting format in which survey information will be conveyed to the assessment working groups, in order to meet ICES demands to the fullest. So far, the Working Group on the Assessment of Northern Shelf Demersal Stocks (WGNSDS) was the only assessment working group that responded to the request of the IBTSWG to comment on the proposed standard data format (ICES, 2007). Other assessment working groups are (still) strongly encouraged to provide responses, including comments on the revised format presented in this year's report.

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.

6 Review abundance indices, precision estimates and reporting procedures of gear parameters (ToR c)

ToR c) Further evaluate and standardise criteria for ensuring quality and consistency in collection and reporting of survey data. These include (i) review of abundance indices and estimates of precision in DATRAS; and (ii) review the reporting procedures of trawl, vessel and environmental parameters and analyse changes in survey effort and/or constant catchability.

6.1 Abundance indices

The general recent decline in commercial stocks and associated data quality has forced a growing reliance by many assessment working groups on survey indices. In turn this has shifted the emphasis from using survey data purely for tuning assessments based on commercial CNAA data, towards entirely survey based methods. Survey data is likely to be less biased than commercial data, but also less precise, so whether for use in survey based assessments or as tuning series, evidently sources of variability need to be thoroughly investigated to ensure survey indices are of sufficient precision to be of value in the fisheries assessment process.

In view of this the IBTSWG will i) review a number the survey based assessment exploratory plots (standard SURBA output) for haddock indices for the IBTS area. This will be done on an individual survey basis and will look for year affects, changes in catchability and ability to track cohorts; ii) a multivariate analysis will be carried out on the gear parameter and environmental data provided by IBTS surveys to look at changes in inter-annual effort/catchability. Further, to investigate if changes in

effort coincide with evident year affects from the relevant index; iii) any relevant findings as regards important explanatory variables for year affects in terms of gear and/or environmental parameters will be recommended to the WG for inclusion as part of the standard protocol.

The calculation of survey precision however, has been undertaken as part of the development of DATRAS and therefore the WG will review the output of precision from DATRAS for the above indices as part of the review exercise.

For point (i) above, a review a number the survey based assessment exploratory plots (standard SURBA output) for haddock indices for the IBTS, all members of the WG agreed to generate exploratory plots for all haddock indices by individual survey. Due to the familiarity of SURBA output within ICES, already being extensively used by the assessment working groups, the software will be used for this exercise. As an initial attempt, model settings are to be kept at default:

Year range:	similar to data sumitted to assessment working groups
Age range:	As a minumum, similar to tuning indices, but could be extended
Catchability:	1.0 at all ages
Age weighting	1.0 at all ages
Smoothing (Lambda):	1.0
Cohort weighting:	not applied

More extensive analyses of individual survey data, exploring the effect of smoothing, fitting variable catchability at age and the choice of reference age, could be performed in future. The following exploratory plots should be presented for each survey: log mean standardised index by year-class and year, log cohort abundance and the comparative scatter plots at age. These summary plots could in future also be included in the standard survey reporting format (section 5)

6.2 Review of measurement protocols for mesh size and effect of intensive professional use on the initial characteristics

Quality control of survey gear is a recommendation of the ICES IBTS Working Group. However, there are still no references to tolerance levels to be used to qualify the results of the controls nor defined protocols to do the control. This is particularly true for the mesh size specifications, that is to say the main factor affecting selectivity. In some cases, it is mentioned that the net should be changed after a certain number of tows to avoid drifts in selectivity and catchability. On the other hand, it is a fact that since the first GOV drawings and constructions, twine characteristics readily available from manufacturers have changed to new standards. IFREMER has started to work on the implementation of survey gear quality control and is now checking on an annual basis its groundfish survey gears. The results of the first year of work has lead to a new and more field adequate design for the gear checking form and the development of a control protocol. In 2007, an experiment was carried in order to:

1) compare different ways of measuring mesh size in relation to the manufacturer's characteristics;

2) monitor any change in those characteristics after different periods of heavy uses by commercial fish nets.

The tests have been done with polyamide sheet net samples fastened for different time periods on a bottom trawl used aboard a professional fishing trawler. The details of the experiment and results are given in WD1 in Annex 5.

Measurements were made by mean of the Omega gauge and by measuring a stretched mesh with a ruler.

The Omega gauge was designed primarily for inspection of net conformity with legislation. The protocol was defined with a major goal as to give consistent results with the other standard measurement protocols and tools in use. It is therefore a tool adapted for assessing selectivity as it measures mesh opening under tension, which is close to the operating condition of trawls. However, this experiment has shown that, when the objective is to controlling net characteristics with reference to manufacturer's specifications, the simple stretched mesh measurement on a wet net appears as a most adequate method even if values are on average 5% higher than manufacturer's specifications, probably a manufacturer's choice to avoid legal problem related to twine shrinkage. If this +5% value can be taken into account when checking gear conformity, other measures on different manufacturer are needed to make sure it is a stable characteristic of fishing trawl material.

The results of the experiment on assessing working time on net characteristics show that some shrinking is observed on the mesh opening shortly after the first use of the net and that, even after 200 hours of trawling, no detectable changes are observed. If we want to answer the question "When do we have to change our survey trawl?", then we have to take into consideration other factors than deterioration of selectivity under normal use after X number of hours. Amount and extent of repair after damage to the gear should be extensively recorded in a file attached to the gear control forms. Visual inspection of the twine by experienced staff to detect abnormal deterioration of the twine material is essential. All this must be taken into consideration during standard gear control operations.

The IBTSWG recommends that for quality control of survey gear with respect to the control of mesh size, stretched mesh measurement protocol should be used. The WG also notes that some extra measurements on nets from different manufacturers and of different material should be made in order to define tolerance values to be applied.

6.3 Review of Scanmar data within the North Sea IBTS surveys

The North Sea participants of the IBTS surveys should have been using the tables reproduced in the IBTS manual Version VII (ICES, 2006) to deploy the gear on the quarter 1 and quarter 3 IBTS surveys. In recent years many countries have observed that it has become increasingly difficult to use the warp out to depth ratio graph, and continue to get Scanmar readings for door spread and headline height readings that are within the limits given on the graphs in the manual (Figures 6.3.1, 6.3.2).

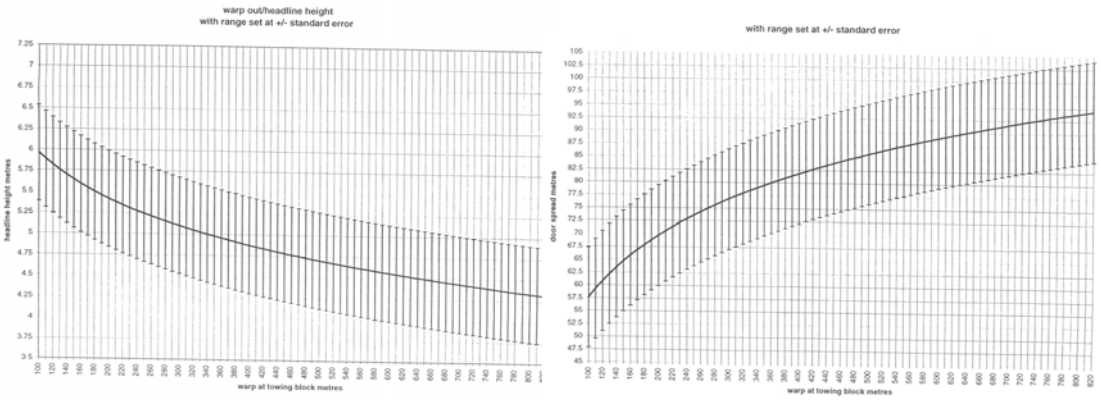


Figure 6.3.1 (left): Expected warp out / headline height ratio; and Figure 6.3.2 (right): Expected warp out/door spread ratio (From ICES, 2006).

Because of this, available data recorded on some surveys between 2006 and 2008, was analysed to see if there was a new pattern that could be plotted and used to provide new charts (including one for wing spread) that would replace the outdated figures in the IBTS manual.

6.3.1 Analysis

341 individual mean values for headline height, wingspread and door spread were analysed by plotting each variable against warp out, for five nations. Figures 6.3.1.1 to 6.3.1.2 shows the data by country. There is an overlap for most countries for each value, which is to be expected when all are using the same table to calculate warp out. However, in Figure 6.3.1.1 it can be seen that the majority of the current headline heights are below the average value described in the IBTS manual (though mostly within the range). This in turn means that values of door spread (Figure 6.3.1.3) are above the average values described in the IBTS manual.

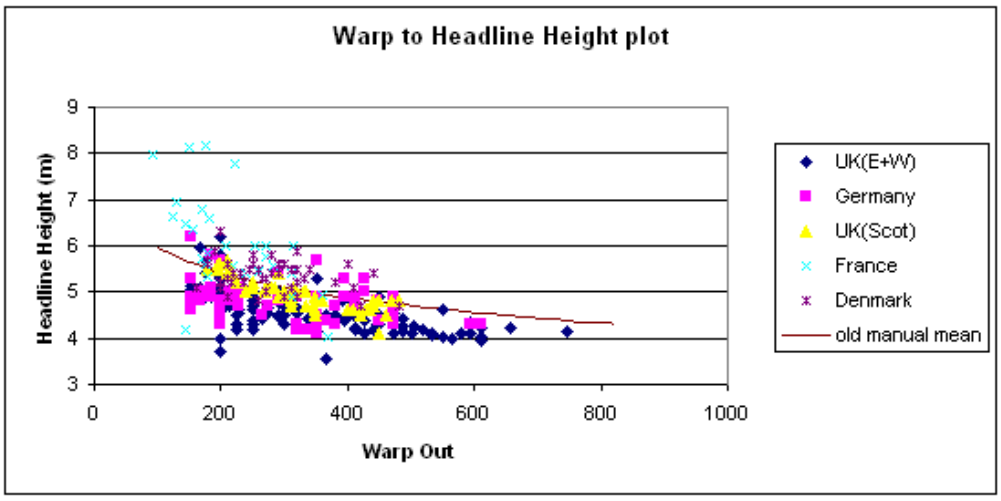


Figure 6.3.1.1: Warp out to Headline Height.

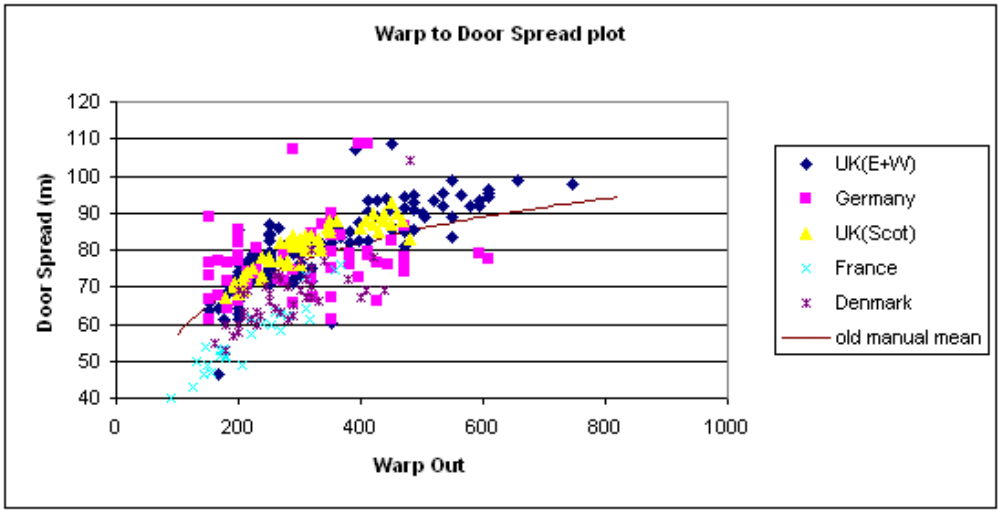


Figure 6.3.1.2: Warp out to Door spread.

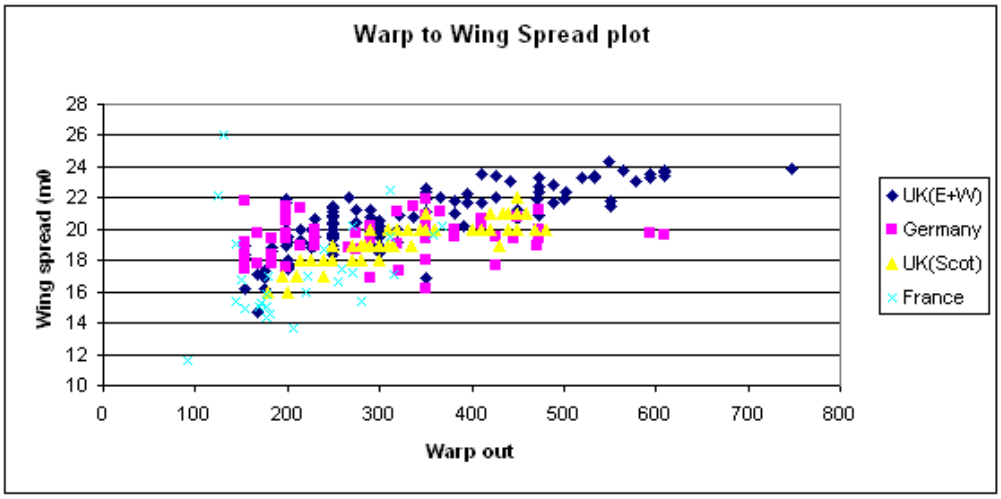


Figure 6.3.1.3: Warp out to Wing Spread.

With these data in mind, it is possible to plot the combined data and calculate new average values with acceptable standard error (Figures 6.3.1.4-6.3.1.6).

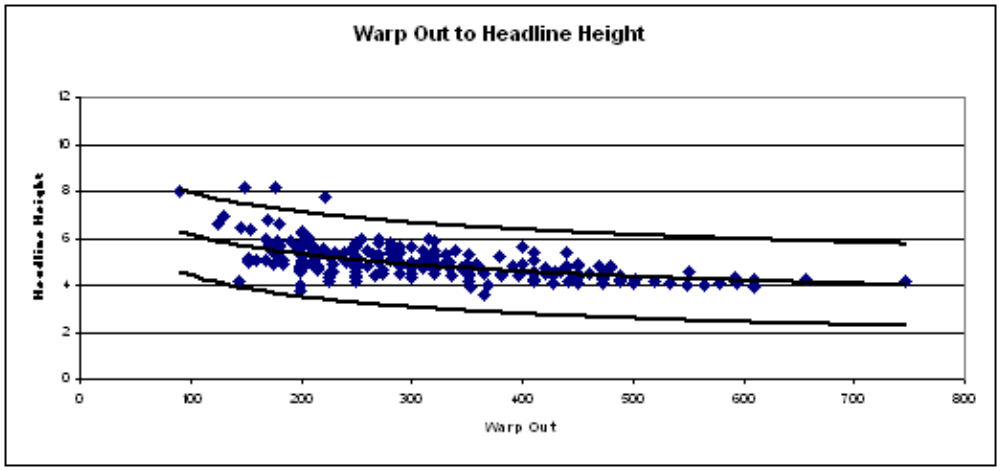


Figure 6.3.1.4: Warp out to Headline Height.

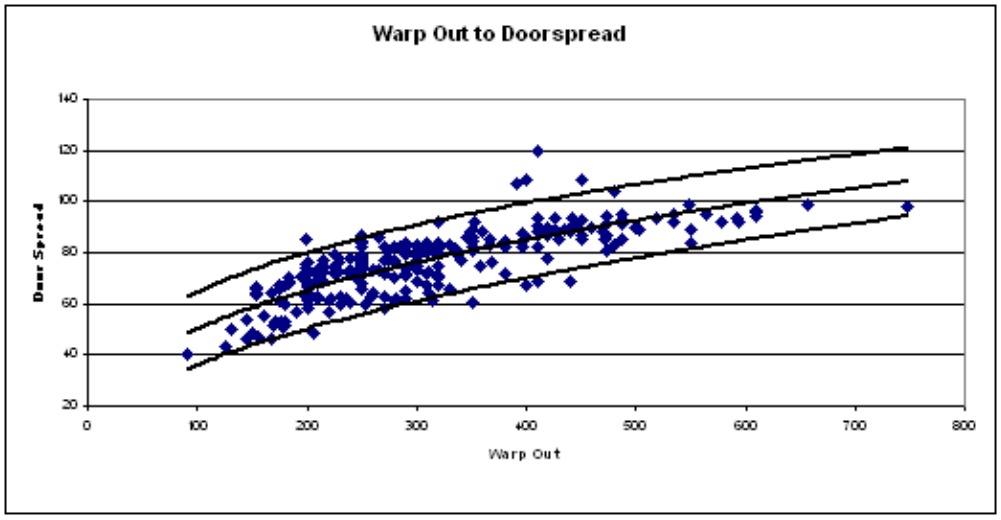


Figure 6.3.1.5: Warp out to Door spread.

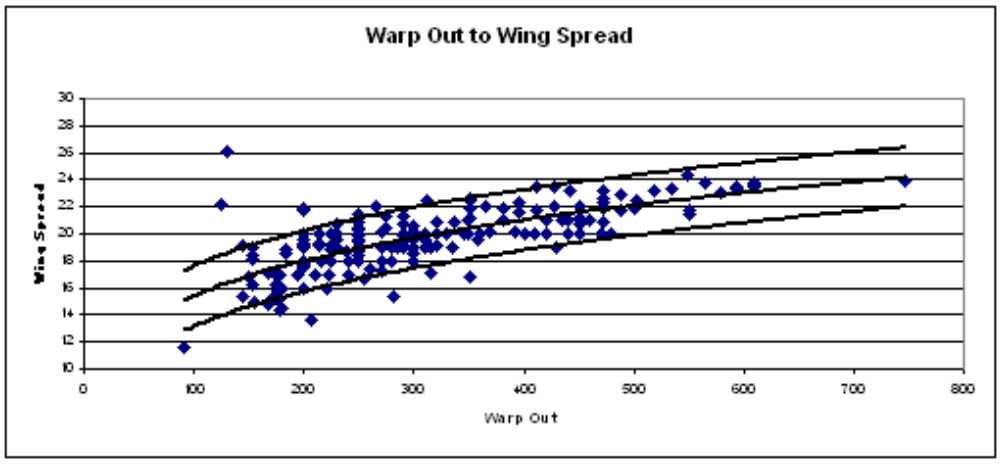


Figure 6.3.1.6: Warp out to Wingspread.

6.3.2 Conclusion

Even with the figures above, this does not address the problems of gear stability when using the historic warp to depth ratio (Figure 6.3.1.7).

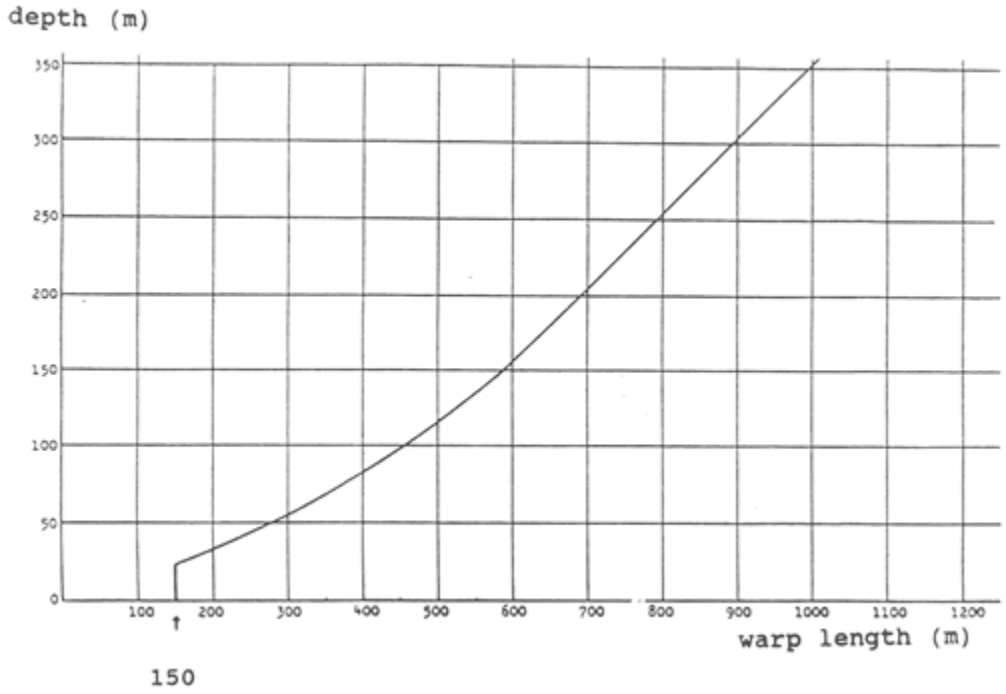


Figure 6.3.1.7: Warp/Depth ratios for the 36/47 GOV Trawl. (From ICES, 2006)

The IBTS surveys in the North Sea should use the warp out to depth ratio graph the tables reproduced in the IBTS manual Version VII (ICES, 2006) but it has been suggested that its becoming more and more difficult to get Scanmar readings for door spread and headline height readings that are within the limits given in the manual (Figures 6.3.1.1, 6.3.1.2). Figure 6.3.1.8 shows a plot of the existing warp to depth figures used on the 2006 to 2008 surveys with a trend line (labelled - Power (warp to depth ratio)) fitted giving an approximation of the old warp to depth ratio used.

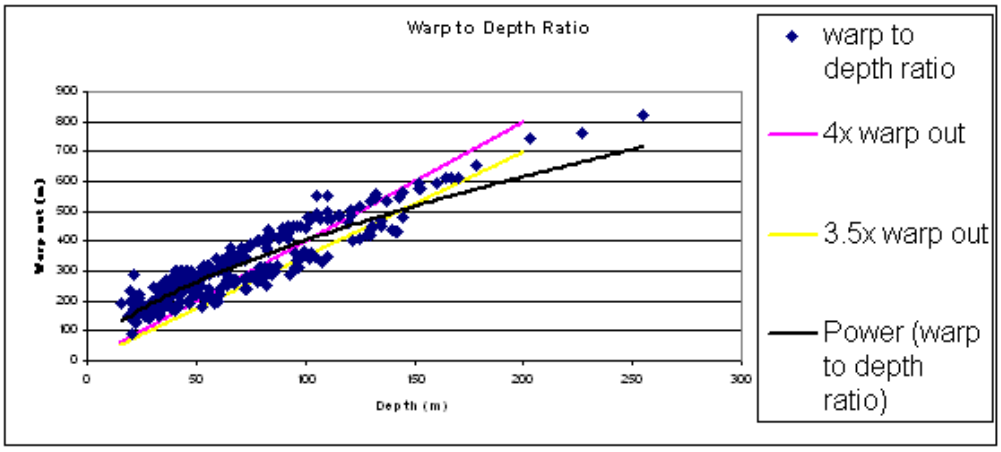


Figure 6.3.1.8: combined warp out to depth ratio.

Lines showing the warp to depth ratio of 4 times the depth and 3.5 times the depth are also plotted on figure 6.3.1.8. Given that most expert users agree that the warp to

depth ratio used by IBTS is in excess of that required, IBTSWG consider that, in terms of standardisation, it is most important that the net geometry is the main aspect of fishing operations and that it should be as near constant as possible. From this initial, simplistic analysis, it could be argued that nations should alter warp out to depth ratios, using the ratio of between 3.5:1 and 3:1 (depending on depth). However, in plenary, the implementation of these changes was postponed until a more detailed analysis at next years IBTS meeting has been presented. To allow a detailed analysis of the trends in gear parameters for different vessels over time as a function of warp length, the WG in 2008 has decided that all countries should submit their gear parameter data, to Sweden (minimum 10 years and both quarters) according to a template to be distributed by Sweden, and returned no later than January 2009. This data should be median values by haul with any missing values noted with -1. Changes in warps, doors or vessel during the period shall be noted along with information on any filtering that is used to calculate the median data values.

6.4 Proposal for a second comparative fishing experiment between the Scottish and German vessels used in the IBTS

A comparative fishing experiment was conducted in 2006 between the RVs "Scotia" and "Walther Herwig III" during the Q3 IBTS (detailed description in IBTS Report, ICES 2008). 14 hauls were conducted by each of the vessels. The main results were:

No significant difference in numbers of individuals caught, or in length distribution	Significant difference in numbers as well as length distribution
Herring, Norway pout (age-1), haddock (age-1+)	Norway pout (age-0), haddock (age-0), whiting, cod

IBTSWG recommended that further comparative studies would be conducted to quantify possible systematic differences between national contributions to the IBTS (ICES 2008). Complementary to this 2006 study, another comparative fishing experiment has therefore been planned for the Q3 IBTS survey of 2008. This experiment will compare between the gears used during the Scottish and the German IBTS surveys, respectively, but deployed them from the same vessel. To accomplish this study, the "Walther Herwig III" cruise will be extended by several days and will take aboard the Scotia gear and a gear specialist to oversee the rigging and switching of the two GOVs. The comparative fishing will take place within a 10 x10 nm area, since 1986 regularly investigated during the German Small-scale Bottom Trawl Survey (GSBTS, Box D). Positions and directions of the individual hauls will be randomly assigned as it is standard in the GSBTS (Ehrich *et al*. 2007). The ship will alternate between both gears day-by-day in order to minimize the likelihood of principal differences arising, e.g. changes in fish distribution caused by weather events. Switching gears more often than once per day would be impractical as it requires too much time that could be spent for additional hauls.

The following schedule has been foreseen, with an anticipated seven hauls per sampling day, resulting in a total of 28 hauls per GOV:

- 31 July '08 Aberdeen port, WHIII to take aboard a gear specialist from FTFB (Iain Penny) and the 'Scotia' GOV
- 1–8 August Fishing in Box D with Scottish and German GOVs, alternating daily
- 9 August Transferring gear and staff back to Aberdeen

GOVs will be equipped with Scanmar sensors measuring distances between doors and wings, as well as vertical net opening. Both gears will be operating with the Groundgear Type A.

6.5 References

Ehrich, S.; Adlerstein, S.; Brockmann, U.; Floeter, J.; Garthe, S.; Hinz, H.; Kröncke, I.; Neumann, H.; Reiss, H.; Sell, A.F.; Stein, M.; Stelzenmüller, V.; Stransky, C.; Temming, A.; Wegner, G.; Zauke, G.-P. 2007. 20 years of the German Small-Scale Bottom Trawl Survey (GSBTS): A review. Senckenbergiana maritima. 37(1): 13-82.

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.

7 Review of DATRAS (ToR d)

ToR d) Review recent updates within DATRAS, including the implementations of user requirements as defined by the workshop DATRAS URS.

7.1 Progress in DATRAS

Several new components for the DAtabase TRawl Survey have been developed during the DATRAS version 2.0 project (project number QLRT-2001-00025; Development of a central database for European trawl survey data). In December 2007, a DATRAS status report has been sent by ICES to the EU about achievements and upcoming task to complete a new version of DATRAS. Several further tasks that had been identified by the DATRAS URS Workshop in 2007 (ICES 2008a) have been completed since then, and the current status is summarized below.

The remaining deliverables identified by DATRAS URS are expected to be implemented into an upgrade if DATRAS by the end of June 2008 and will include the completed uploading facility and DATSU scanning facility.

7.1.1 Completed tasks:

- **Improvement of existing functionalities in DATRAS:**

- *Flexibility in data products selections*, with display of the available inventory of data and the option to select multiple parameters such as survey, year, quarter, ship, gear, area and species.

- *Flexibility for data products calculation*, where data products can be calculated based on selection of individual or multiple parameters.

- A new Data products calculation module has been developed with .Net technology. The *calculation of products is now much faster* than in the previous DATRAS version.

- **Added functionalities in DATRAS to extend quality analyses of the data:**

- Calculation of *accuracy (variance) of survey indices* for all surveys.

- Functionality for *calculating new data products* (e.g. CPUE per area, CPUE per age per area, CPUE per age and length per area, final age-length-key, bootstrap services (indices and calculations): raw bootstrap value per iteration, range/ median bootstrap) [For further details on bootstrapping, see ICES (2008c), section 5).

- *Automatic updating* in data warehouse functionality: Data Products are automatically updated to Data warehouse and available on the web for download after each calculation.

- Functionality for generating *graphical overview* of data products using Microsoft SQL 2005 reporting system.

- **Update of DATRAS to accommodate the new ICES data policy**

- *Downloading* data product through web either by species or by country for a given survey, year, quarter and area.

- **User access to DATRAS page and restriction.**

- Implementation of user roles and *access rights* with .Net framework and Active directory such as ADM, data owner, working group user and public user.

- *Tracking system* to record user access to the data

7.1.2 Tasks to be completed by June 2008:

- **Improvement of data checking and uploading routines**

- *Automatic data screening during uploading and editing* of data: New checking routines for outliers, using size range, length- weight-relationships, length at maturity, and length-at-age

- *Flagging utility for status of data* and for out-of range entries to be verified by data submitters

- *Description of data fields and units* on the web

- **Convert window-based code to web services**
- **Added functionalities in DATRAS**

- New calculation: *maturity ogive* weighted by CPUE

7.1.3 Second priority tasks, to be completed by the end of 2008:

- **Improvement of data checking and uploading routines**

- *Quality assurance by survey* (inter-survey comparisons to compare results for different regions and identify potential inconsistencies)

- *Updates to the exchange format* as specified by IBTSWG (ICES 2007b, section 8.2.2.3) and WGBITS (ICES 2007a, section 9).

- **Mapping of data**

- *GIS mapping* of data for visual inspection and identification of outliers in spatial distributions

- **Incorporation of new data fields**

- A *new data field* will be installed by the end of 2008 in order to allow submission of maturity data using the new 6-stage-scale suggested by WKMSCWHS (ICES 2008d).

- **Incorporation of additional data sets**

- *Recording/screening data on invertebrates.*

7.1.4 Further additions anticipated to be included in DATRAS:

For two additional surveys, a description will be incorporated in the DATRAS webpage:

1) Since 1988, IFREMER has during each October conducted the *Channel ground fish survey (CGFS)*, in order to evaluate abundance indices for the main commercial species caught in the Eastern English Channel (see section Working Document 4, Annex 5). Documentation describing this survey has been provided to IBTSWG 2008 and will be made available through the DATRAS webpage.

2) The DATRAS webpage will also supply a description of the *Portuguese Groundfish Survey*, initially designed with the main objective to estimate the abundance and study the distribution of the most important commercial species in the Portuguese trawl fishery: hake, horse mackerel, blue whiting, seabream and Norway lobster (see section 7.3).

7.1.5 Recommendations

In 2008, two one-off workshops, DATRAS URS (ICES 2008a) and BTDATRAS (ICES 2008b) have resulted in a list of tasks for the improvement of DATRAS as summarized above. IBTSWG supports this list for upgrades to be completed in the near future.

To continuously maintain and improve the database thereafter, IBTSWG proposes that a *DATRAS User Group* will be established 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. The group should include both, scientists working involved in data collection and data analyses, as well as representatives of the technical staff responsible for checking and uploading the data at the national institutes. The ICES DATRAS team should also be present at the working group.

7.2 Overview of availability of IBTS data in Datras

Table 7.2.1 provides an overview of North Sea IBTS data, per quarter, which are submitted and stored in the Datras database. The overview was prepared on the basis of a facility in Datras to make such overviews for the number of hauls in the database by area, country vessel and year. All data for the surveys in quarter 1 since 1965 are believed to have been submitted and included in Datras. For the other quarters the same holds for surveys carried out since 1991, the first year when ICES coordinated quarterly surveys were carried out. In earlier years several surveys were carried out in quarters 2, 3 and 4. The data for part of these surveys may also be submitted to Datras in the near future.

Table 7.2.2. provides similar information for surveys carried out in the western area. For these surveys only part of the data are included in Datras. The data for the English quarter 4 groundfish survey are currently being thoroughly checked and are expected to be submitted within the coming year. The data for the Frenchs CGFS (Channel Ground Fish Survey) have been submitted to ICES last year, but are not yet in the database.

AFBI (Northern Ireland) is currently developing an electronic data recording system, as well as the migration of national databases. As part of this process, the automatic transforming of data from the national database into DATRAS format is being

developed. Due to limited resources, progress has been slower than anticipated. Uploading of data to DATRAS should, however, commence during 2008.

The Irish Groundfish Survey data is currently undergoing final data quality checks and migration to a new SQLserver database with integrated functionality to create the DATRAS exchange format. The new SQLserver database is part of the Electronic Data Capture system developed at CEFAS and the exchange format module output for DATRAS is tested and currently being implemented by the UK. It is envisaged therefore that the current Irish time series, which was initiated in 2003, will be available for upload to DATRAS within a couple of months.

For Spanish surveys the process of incorporating the data to DATRAS is made directly from the SIRENO database at IEO to DATRAS, and at the moment Porcupine Survey data (2001-2007) have been checked through the DATRAS Data Screening Utility (DATSU) and submitted to ICES. Data from the North Spanish Coast Survey are being progressively transferred from SIRENO to DATRAS, 2001-2006 data have already been transferred, 2007 is being processed internally, and the rest of the data will be transferred backwards to DATRAS.

Gulf of Cadiz surveys (spring and autumn) data will be the following step, together with the biological samplings immediately after they are incorporated into the SIRENO Data Bases.

Portuguese data have not been uploaded to the DATRAS database but it is expected that this will occur in the near future.

Table 7.2.1. Overview of the hauls per country of the North Sea IBTS surveys. All hauls have been submitted and included in Datras.

NORTH SEA

quarter 1	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Denmark							20	17	20	28	41	31	38	39	33
England			27	18	27	30	12	27	25	27	41	37	63	62	48
France														52	34
Germany		63	55	62	45	43	43	30	43	50	79	61	83	105	135
Netherlands	8	27	27	26	43	49	37	36	39	52	61	54	70	69	58
Norway							22	15	10	13	43	53	48	54	49
Russia										41	47	58	55		69
Scotland			16	33	15	16	41	47	54	40	19	39	47	60	55
Sweden								35	17	21	28	31	22	25	30

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Denmark			27	51	37	39	41	41	40	41	24	40	40	43	48
England	56	54	50	52	53	57	64	65	44	64	57				
France	53		40	41	44	78	73	85	69	54	58	77	53	51	54
Germany	69	70	66	101	101	117	122	104	81	70	82	92	93	65	94
Netherlands	84	84	59	74	96	96	109	108	52	72	23	59	45	74	46
Norway	55	48	47	38	45	48	42	41	45	44	50	54	47	49	27
Russia		29	30												
Scotland	61	32	39	57	59	60	56	68	55	56	52	66	58	52	56
Sweden	32	32	23	35	35	34	43	49	39	43	45	53	47	46	48

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Denmark	45	46	48	51	35	34	41	39	40	40	44	41	46	45
England							53	41	23					
France	50	41	65	83	63	69	62	78	82	72	75	70	68	67
Germany	68	62	70	79	70	91	70	78	71	70	65	70	64	63
Netherlands	35	46	51	55	53	55	72	62	69	65	66	70	57	62
Norway	49	41	40	43	43	43	40	39	40	36	30	40	26	38
Scotland	46	45	45	60	53	46	53	53	53	50	63	52	53	58
Sweden	49	49	46	45	46	46	45	45	46	48	54	46	49	48

quarter 2	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
England	77																
Germany	70	65	12	71	71												
Netherlands	82	67	68	52	28												
Norway	27	49	32	67	68	60	58									6	
Scotland	57	73	74	76	66	72	73										
Sweden	40		48	51	50												

NB The Netherlands reported 23 Q2 hauls 1966, and England 4 Q2 hauls in 1971

quarter 3	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Denmark	89	75	77	79				51	53	60	56	47	46	46	46	46	46
England					87	86	77	79	75	76	79	79	75	75	74	75	75
France		61	69	55		57											
Germany		63				33	31	28	32	26	29	32	29	29	32	27	29
Netherlands	73	32	65	42	34	17	18										
Norway									76	71	54	57	43	60	57	51	45
Scotland	91	89	89	89	87	86	89	77	87	90	87	85	99	97	87	102	87
Sweden	49	48	50	50	52	50	43	46	46		46	46	46	46	47	48	48

quarter 4	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Denmark	71	78	47	70	73	66											
England	67	78	73	81	81	76											
France					46												
Netherlands	72	70	80	55	39		33										
Norway	47	62	79	77	79	80							18	10			

Table 7.2.2. Overview of the hauls per country of the western IBTS surveys. Only hauls highlighted in green have been submitted and included in Datras.

WESTERN ARERA

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Scotland Q4 W Div bottom trawl survey												56	53	45	47
Scotland Rockall survey															
Scotland Q1 W Div bottom trawl							67	50	61	67	54	51	65	42	45
Ireland Q4 groundfish survey															
Northern Ireland Q1 groundfish survey	-	-	-	-	-	-	-	-	-	-	-	-	-	46	46
Northern Ireland Q4 groundfish survey	-	-	-	-	-	-	-	-	-	-	-	-	-	37	47
England Q4 groundfish survey (groundgear A)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
England Q4 groundfish survey (Groundgear D)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
France Q4 EVHOE survey Bay of Biscay									131	136	134	142	137	142	107
France Q4 EVHOE survey Celtic Sea												56	57	52	-
France Q4 CGFS										68	61	75	81	60	65
Spain Porcupine survey															
Spain north coast survey					107	94	97	92	-	101	91	120	107	116	109
Spain Q1 Gulf of Cadiz survey															
Spain Q4 Gulf of Cadiz survey															
Portugal winter groundfish survey		99	67	69	69	-	-	-	-	-	-	-	-	88	75
Portugal summer groundfish survey	56	-	69	70	68	-	101	118	-	-	114	98	119	81	66
Portugal autumn groundfish survey	55	62	111	190	117	-	150	117	81	98	138	123	93	59	65

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Scotland Q4 W Div bottom trawl survey	34	57	55	70	59	63	72	78	84	82	80	87	71	88		
Scotland Rockall survey																
Scotland Q1 W Div bottom trawl	45	28	53	57	55	65	66	57	66	104	66	67	77			
Ireland Q4 groundfish survey										159	168	148	188	190		1)
Northern Ireland Q1 groundfish survey	42	35	44	44	45	43	39	55	57	58	58	57	46	59		1)
Northern Ireland Q4 groundfish survey	40	42	39	45	43	44	47	46	58	62	44	38	45	46	53	1)
England Q4 groundfish survey (groundgear A)	-	-	-	-	-	-	-	-	-	-	23	18	21	43		1)
England Q4 groundfish survey (Groundgear D)	-	-	-	-	-	-	-	-	-	-	56	55	25	27		1)
France Q4 EVHOE survey Bay of Biscay	101	114	-	77	66	52	63	69	71	66	69	67	64	69		
France Q4 EVHOE survey Celtic Sea				53	60	59	54	82	82	82	69	76	65	77		
France Q4 CGFS	88	89	63	90	83	102	102	109	101	96	95	109	110	103		2)
Spain Porcupine survey								80	86	80	70	76	79	80		2)
Spain north coast survey	118	116	114	116	114	116	113	113	110	112	114	116	115	117		2)
Spain Q1 Gulf of Cadiz survey	30	30	31	31	30	38	40	41	40	-	40	42	42	41	41	1)
Spain Q4 Gulf of Cadiz survey				27	33	39	20	39	39	41	40	40	41	39		1)
Portugal winter groundfish survey												70	67	64	66	
Portugal summer groundfish survey	-	81	-	87	87	65	88	83	93	stopped						
Portugal autumn groundfish survey	89	88	71	58	96	79	78	58	66	80	79	70	88	96		

1) data for these surveys are currently being checked before they will be submitted to Datras
2) submitted to Datras but not yet made available

7.3 Revision of text on IBTS surveys on the ICES DATRAS website

In 2007, the IBTSWG assumed the task of re-formatting the text describing the IBTS surveys on the ICES DATRAS website (ICES, 2007). All countries except Portugal provided text on their survey(s) following the format described in the report of 2007. However, this year also an update of the text on Portuguese surveys was provided (following) and will be inserted on the DATRAS website.

Portuguese surveys

History

The Portuguese groundfish surveys have been conducted along the Portuguese continental waters since 1979 with the RV "Noruega". The area extends from latitude 41°20' N to 36°30' N (ICES Division IXa). Surveys took place twice a year, in summer and autumn. A winter survey took place in 1992 and 1993 but, was interrupted for some years and then started again in 2005. The summer survey series has stopped in 2002.

Initially (1979) the main objectives of the surveys were to estimate the abundance and study the distribution of the most important commercial species in the Portuguese trawl fishery: hake, horse mackerel, blue whiting, sea bream and Norway lobster. Recruitment abundance and distribution for hake and horse mackerel were monitored in the autumn surveys. Additionally, trawl selectivity experiments for hake and horse mackerel with 40 mm mesh size were also conducted during 1981 surveys using the covered codend method.

At present, the main objective of the autumn surveys is to monitor the abundance and distribution of hake and horse mackerel recruitment, while the winter survey aims to monitor the abundance and distribution of hake in spawning season. Additionally these surveys estimate (i) abundance indices and biomass of the most important commercial species (ii) biological parameters, e.g. maturity, ages, sex-ratio, weight, food habits. (iii) biodiversity of the sampling area. The primary species are hake, horse mackerel, blue whiting, mackerel, Spanish mackerel, anglerfish, megrim and Norway lobster.

Sampling design was progressively modified in order to improve the precision of the abundance and biomass estimates. During 1979-1989 a stratified random sampling design was adopted with a total of 36 strata. Each stratum was divided into units of approximately 25 nm2.The stratification was based on depth and geographical areas, being the depth ranges 20–100 m, 101–200 m and 201–500 m. During 1979–1980, the number of hauls per stratum was based on the previous information of the relative abundance of the target species in each geographical area and on the ship time available. During 1981–1989, when the number of strata was 36, two random units were sampled by stratum, whenever possible, to achieve an estimate of the standard error of the stratified mean by stratum. In 1989 a new depth strata was included, e.g., 500-750 m, but in 2005 was removed, because the trawlable area of some of those strata was too small and not considered relevant for the survey purposes.

In 1989 a fixed stations sampling design was adopted, .comprising 97 positions spread over 12 sectors, which one divided into 4 depth ranges: 20–100 m, 101–200 m, 201–500 m and 501–750 m, making a total of 48 strata. The positions of the 97 fixed stations were based on common stations made during 1981–1989 surveys and taking into account that at least two stations per stratum should be sampled. A maximum of 30 supplementary stations were planned to be carried out if ship time was available or to replace positions that due to particular factors were not possible to trawl.

The present sampling design was introduced in the autumn 2005 (see protocol).

Gear

The surveys are carried with the RV "Noruega", which is a stern trawler of 47.5 m length, 1500 horse power and 495 G.T.R. In the autumn surveys the fishing gear used is a bottom trawl (type Norwegian Campell Trawl 1800/96 NCT) with a 20 mm codend mesh size. The main characteristic of this gear is the groundrope with bobbins. The mean vertical opening is 4.6 m and the mean horizontal opening between wings and doors is 15.1 m and 45.7 m, respectively. The polyvalent trawl doors used are rectangular (2.7 m x 1.58 m) with an area of 3.75 m2 and weighting 650 Kg.

In the winter surveys the fishing gear used is a bottom trawl net (CAR) type FGAV019, without rollers in the groundrope. The mean horizontal opening between the wings is 25 m, the mean vertical opening is 2.5 m and the codend mesh size is 20 mm. The trawl doors used are the same as those used in the NCT gear.

Sampling protocol

The new sampling scheme was implemented in autumn 2005. It is a mixed of a sampling scheme: with trawl positions distributed over a fixed grid with 5′ per 5′miles and random trawl positions. The new sampling scheme allows performing future calculations with the former strata and also allows performing spatial analysis by using geostatistics methods. The autumn groundfish survey plan comprises 96

fishing stations, 66 at fixed (grid) positions and 30 at random. The tow duration is 30 min, with a trawl speed of 3.5 knots, during day light. The winter groundfish survey plan comprises 75 fishing stations, 66 at fixed (grid) positions and 9 at random; the tow duration is 60 min, with a trawl speed of 3.5 knots, during day light.

7.4 References

ICES. 2007a. Report of the Baltic International Fish Survey Working Group (WGBIFS), 26–30 March 2007, Rostock, Germany. ICES CM 2007/LRC:06. 574 pp.

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

ICES. 2008a. DATRAS User Requirement Specification. ICES Data Center. 37 pp.

ICES. 2008b. Report of the Workshop on Beam Trawl Data Delivery to DATRAS (BTDATRAS), 18 - 20 February 2008, ICES, Copenhagen, Denmark. 19 pp.

ICES. 2008c. Report of the Workshop on Implementation in DATRAS of Confidence Limits Estimation of, 10–12 May 2006, ICES Headquarters, Copenhagen. 53 pp.

ICES. 2008d. Report of the workshop on Sexual Maturity Staging of Cod, Whiting, Haddock and Saithe (WKMSCWHS), 13–16 November 2007, Copenhagen, Denmark. ICES CM 2008/.. (not yet published)

8 Data quality in surveys and DATRAS (ToR e)

ToR e) Improve the quality of future and historic IBTS data by: (i) the production and dissemination of identification keys for IBTS groundfish surveys; (ii) the examination of DATRAS data, i.e. to analyse size distributions, geographical distributions, and consistency of taxonomic use, and to correct data where possible.

The increased use of IBTS data for studies on fish assemblages and diversity has resulted in the requirements for improved data checking to ensure high quality of the data, and the IBTSWG considered these issues in the recent past and present. The ongoing work is described in the following sections.

A general remark is that most surveys use established identification guides (e.g. Whitehead *et al*., 1984-1986) for identifying fishes, as well as regional/national guides. Many of these books are currently out of print. Recent books with useful information that are still available include Quero *et al.* (2003) and Louisy (2002).

8.1 Species identification issue: Smoothhounds *Mustelus* spp.

Two species of smoothhound (common smoothhound *Mustelus mustelus* and starry smoothhound *Mustelus asterias*) occur in the ICES area. These two species can be difficult to distinguish, and the genus as a whole is taxonomically problematic. Indeed Compagno (1984) stated "*Members of the genus* Mustelus *are unusually difficult to separate from one another, particularly without the use of internal characters. Many of the morphological, morphometric and meristic characters that distinguish species partially overlap and considerable variation occurs within species. The following key should be used with EXTREME CAUTION, as not every individual of a given species may fit the criteria given*."

There are several potential differences between the two species in the ICES area (Table 8.1.1.), and the differences in fin placement illustrated in Figure 8.1.1.

Ongoing scientific studies on smoothhounds should better elaborate on useful characteristics for separating these two species.

Table 8.1.1. Identification of smoothhounds in the ICES area (adapted from Compagno, 1984; Quero *et al.*, 2003). Body dimensions as a percentage of total length (LT).

CHARACTERISTIC	STARRY SMOOTHHOUND	COMMON SMOOTHHOUND
Pectoral fins	Posterior margin of pectoral fin approximately under the midpoint of the base of the first dorsal fin	Posterior margin of pectoral fin approximately under the origin of the first dorsal fin
Internarial space	Narrow (2-2.6% LT)	Broad (2.4-3% LT)
Pre-pectoral length	13-17% of LT	17-21% LT
Buccopharyngeal denticles	Cover almost the entire oral cavity (palate and floor of mouth)	Confined to extreme front of mouth
Precaudal centra	90-100	70-93
Maximum total length	140 cm	164 cm
Spots	Usually present, and can be vivid	Generally absent, but some faint spots may be present
Denticles	Lateral trunk denticles reported to be broad	Lateral trunk denticles usually lanceolate (narrower)
Reproductive mode	Aplacental viviparity, 7-15 pups	Viviparity, 4-15 pups

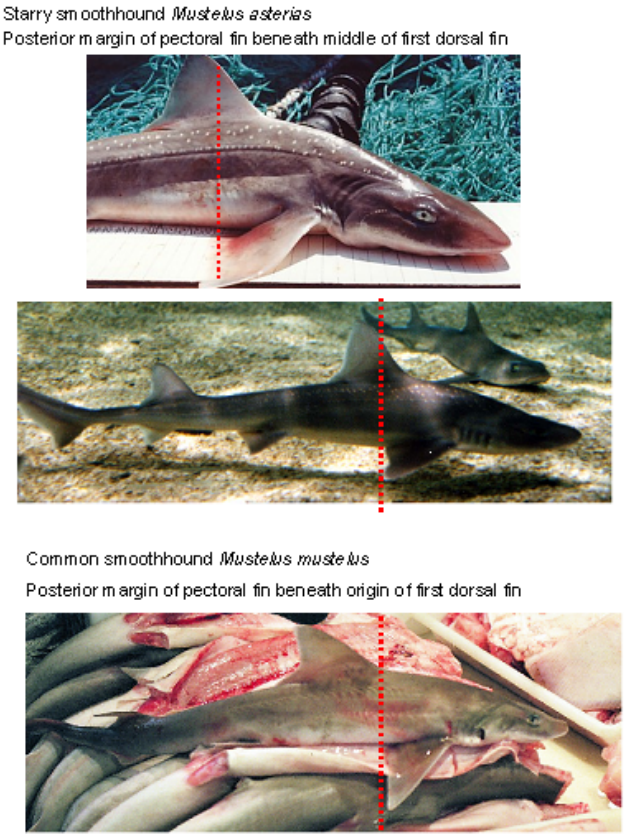


Figure 8.1.1: Differences in fin positions of common and starry smoothhounds (Note: fin placements, like other morphological characteristics of smoothhounds, can be variable).

8.2 Taxonomic irregularities in DATRAS

The problems with taxonomic data in DATRAS have been well documented (see ICES, 2007a, b). Here we discuss (a) irregularities and redundancy in higher taxa and (b) recommended protocols for combining data for studies on fish communities, based on ter Hofstede & Daan (2008, see Annex 4, WD2)

8.2.1 Consistent taxonomy

The idea of taxonomy, binomial classification and its analogous coding is to provide a unique interpretation of the particular taxon. Therefore, different taxa (and codes) that lead to the same interpretation must be avoided, because they suggest a non-existent difference.

If a genus is represented by a single species in a particular area, recordings at the genus level are redundant and records should only be provided and stored in the database at the species-level. The same applies to families represented by a single genus, in which case the family name is redundant and should be considered invalid.

The redundant taxa present in the North Sea IBTS dataset within DATRAS and their appropriate coding are given in Table 8.2.1. Before any global changes can be made in DATRAS, it is important that the provider of the data confirms that the record was of the particular species/genus in question (and not a coding error). Providing that the record is valid, these records should be amended to the more appropriate taxonomic level.

Table 8.2.1. List of invalid taxa currently reported in the North Sea IBTS DATRAS and their appropriate identification. Current records should be checked and amended, and DATRAS should not allow these taxa to be uploaded in the future. The applicability of these changes to other regional surveys in DATRAS is also discussed.

CURRENT DATRAS RECORD		PROPOSED CORRECTION(S)		COMMENTS
TSN	**Taxon**	**TSN**	**Taxon**	
159700	*Lampetra*	159719	*Lampetra fluviatilis*	There is currently only one valid species of Lampetra in the ICES area, and so fish identified as Lampetra may likely refer to L. fluviatilis.
		159697	*Petromyzontidae*	It should be recognised however that Petromyzon marinus had an earlier synonym of L. marina, and so some records of Lampetra may need to be amended to the family Petromyzontidae.
159721	*Petromyzon*	159722	*Petromyzon marinus*	There is currently only one valid species of Petromyzon in the ICES area, and so fish identified as this genus levels should refer to P. marinus.
		159697	*Petromyzontidae*	It should be recognised however that other lampreys (e.g. L. fluviatilis) have junior synonyms including Petromyzon fluviatilis, and so some records of Petromyzon may need to be amended to the family Petromyzontidae.
160846	*Raja*	160845	*Rajidae*	Records of Raja spp. (i.e. Unidentified skates) are no longer valid, as the family Rajidae has been revised, and there are now several genera recognised (e.g. Dipturus, Leucoraja, Rajella, Raja, Amblyraja). Hence, unspecified rajids should be recorded as Rajidae.
162057	*Argentinidae*	162061	*Argentina*	Within the North Sea, there is only one genus of argentine in the family Argentinidae. Hence, argentines should be reported at either the species level or as Argentina spp. Records at the family level can therefore be changed to genus. In the southern parts of the ICES area, another genus (Glossanodon) occurs within the family Argentinidae. Hence Argentina spp. and Argentinidae are both valid.
164771	*Gadiculus*	164772	*Gadiculus argenteus*	There is currently only one recognised species of Gadiculus in the ICES area, and records should therefore refer to silvery pout Gadiculus argenteus.
164789	*Merlucciidae*	164795	*Merluccius merluccius*	There is currently only one recognised species of hake (Merluccidae) in the North Sea, and records should therefore refer to European hake Merluccius merluccius. Other species of hake occur elsewhere in the ICES/CLOFNAM area, and so Merluccidae should be a valid code for other areas.
165255	*Lycodes*	165284	*Lycodes vahli*	There is currently only one recognised species of Lycodes in the North Sea, and records should therefore refer to Vahl's eel pout Lycodes vahli. Many other species in the genus occur further north (e.g. Arctic, Barents and Norwegian Seas), and so the records at a genus level should be valid for other areas.
		165215	*Zoarcidae*	It should be noted that other species of eelpout currently in another genus (e.g. Sars' eelpout Lycenchelys sarsii) have junior synonyms using Lycodes. Hence, some records may need to be re-allocated to Zoarcidae.

CURRENT DATRAS RECORD		PROPOSED CORRECTION(S)		COMMENTS
TSN	**Taxon**	**TSN**	**Taxon**	
166271	*Zeiformes*	166287	*Zeus faber*	The order Zeiformes contains only two species in the North Sea (John Dory Zeus faber in the family Zeidae and boarfish Capros aper in the family Caproidae). As these species are both distinctive, data should not be submitted at the Order level. Existing records should be checked and amended.
		166320	*Capros aper*	Elswhere in the ICES/CLOFNAM area, the Order Zeiformes contains four families and ten species, and so Zeiformes will be a valid code.
166309	*Caproidae*	166320	*Capros aper*	There is currently only one recognised species in the family Caproidae in the North Sea, and records should therefore refer to Boarfish Capros aper.
166438	*Syngnathoidei*	166443	*Syngnathidae*	These higher taxa both equate to unidentified pipefishes and seahorses, and only the Family should be considered valid.
170316	*Dicentrarchus*	170317	*Dicentrarchus labrax*	There is currently only one recognised species of Dicentrarchus in the North Sea, and so these records almost certainly refer to bass Dicentrarchus labrax. However, spotted seabass Dicentrarchus punctatus can occur in the English Channel. Given that some North Sea IBTS surveys may extend into VIId (many commercial species have VIId/IV stocks), the genus name may need to be considered valid, although nations should ensure that these species are identified accurately.
171335	*Anarhichadidae*	171336	*Anarhichas*	Within the North Sea (and wider ICES area), there is only one genus of wolf-fish (Anarhichas) in the family Anarhichadidae. Hence, wolf-fish should be reported at either the species level or as Anarhichas spp. and existing records at the family level can therefore be changed to genus.
171691	*Callionymidae*	171692	*Callionymus*	Within the North Sea there is only one genus of dragonet (Callionymus) in the family Callionymidae. Hence, dragonets should be reported at either the species level or as Callionymus spp. and existing records at the family level can therefore be changed to genus. In the southern parts of the ICES area, other genera occur within the family Callionymidae, and so both the genus and family are valid.
173020	*Buglossidium*	173021	*Buglossidium luteum*	There is currently only one recognised species of solenette (Buglossidium) in the North Sea, and records should therefore refer to Buglossidium luteum.
173022	*Microchirus*	173026	*Microchirus variegatus*	There is currently only one recognised species of Microchirus in the North Sea, and no other North Sea flatfishes have a junior synonym including Microchirus. Hence, these records should refer to Microchirus variegatus. Other species of Microchirus occur elsewhere in the ICES area, and so Microchirus should be a valid code for other areas.

CURRENT DATRAS RECORD		PROPOSED CORRECTION(S)		COMMENTS
TSN	**Taxon**	**TSN**	**Taxon**	
173000	*Solea*	173002	*Solea solea*	There is currently only one recognised species of Solea in the North Sea, although sand sole Pegusa lascaris has a junior synonym including Solea lascaris. Hence, these records should be checked, attributed to the correct species or to Soleidae. Now that there is only one species of Solea in the North Sea, Solea should be treated as an invalid code. Other species of Solea occur elsewhere in the ICES/CLOFNAM area, and so Solea should be a valid code for other areas.
173001	*Solea vulgaris*	173002	*Solea solea*	Solea vulgaris is a junior synonym of Solea solea, and so records of S. vulgaris should be corrected (see Wheeler, 1988)

8.2.2 Uncertain identification

Several fish species can only be accurately identified from closely related species by counting fin rays, gillrakers or scales, or on the basis of morphometric relationships (for which there is sometimes little time and/or lack of staff expertise on board to do this on a routine basis). Additionally, many distinguishing morphometric and meristic characters can be highly variable and overlap each other and there is some evidence that some closely related species can hybridise (Boisneau *et al.*, 1992; Maitland & Lyle, 2005), further hampering accurate identification.

Thus, even several of the more common fish groups (e.g. sandeels and gobies) may be reported differently, often depending on the expertise and/or interest of the scientist in charge. In this case, it would be appropriate not to change the DATRAS database, because some of these records have been assigned to the correct species. However, for routine community analyses, as well as for determining temporal and spatial trends by species groups, these species-specific records should be aggregated to a more realistic higher taxon (e.g. genus or family).

Problematic taxa and the more appropriate higher taxa for analyses are listed in Table 8.2.2, and DATRAS could provide the option of data outputs for the combined taxa and/or include the following table so that users can follow a comparable protocol for data manipulation prior to analysis.

Other taxa that DATRAS users should consider combining for analyses of fish communities include rocklings (especially 5-bearded and northern rocklings), clingfishes (Gobiesocidae), sea scorpions (Cottidae), grey mullets (Mugilidae), dragonets (*Callionymus* spp.), and topknots (*Phrynorhombus* spp. and *Zeugopterus* sp.).

Table 8.2.2. List of uncertain taxa currently reported in the North Sea IBTS DATRAS and their proposed identification for data analyses.

CURRENT DATRAS RECORD		PROPOSED CORRECTION(S)		COMMENTS
TSN	**Taxon**	**TSN**	**Taxon**	
160240	*Mustelus asterias*	160226	*Mustelus*	The commonly used feature of white spots on the sides is extremely variable and runs from hardly visible to pronounced white stars. It is not by itself considered a discriminating feature (see Section 6.2.3). In terms of data analyses, these two species should be combined at the genus level.
160242	*Mustelus mustelus*	160226	*Mustelus*	
161708	*Alosa alosa*	161701	*Alosa*	These two species are known to interbreed and species identified as Alosa alosa have seldom all the discriminating features. In terms of data analyses, these two species should be combined at the genus level.
161716	*Alosa fallax*	161701	*Alosa*	
572694	*Alosa agone*	161701	*Alosa*	
161996	*Salmo salar*	161994	*Salmo*	Occasional specimens of these species can show characters typical of the other species, and so identification can be problematic. Furthermore catches are very low. These two species should be combined at the genus level.
161997	*Salmo trutta*	161994	*Salmo*	
166463	*Syngnathus rostellatus*	166444	*Syngnathus*	These species can often be confused (especially Syngnathus rostellatus and Syngnathus acus). These species should be combined at the genus level. Data users should also give consideration for treating all pipefish as either 'Syngnathidae' or as 'Snake pipefish' and 'Other pipefish'
166464	*Syngnathus acus*	166444	*Syngnathus*	
166467	*Syngnathus typhle*	166444	*Syngnathus*	
171676	*Ammodytes tobianus*	171671	*Ammodytes*	Ammodytes spp. are difficult to distinguish, and if large numbers are caught, it is impractical to examine each individual fish. The two species of Hyperoplus are easily distinguished from other sand eels (i.e. Ammodytes and Gymnammodytes) and so sand eels should be either treated as 'Ammodytidae' or as 'Hyperoplus spp.' and 'Ammodytidae (other)'.
171677	*Ammodytes marinus*	171671	*Ammodytes*	
171680	*Gymnammodytes semisquamatus*	171671	*Ammodytes*	
171682	*Hyperoplus lanceolatus*	171681	*Hyperoplus*	Hyperoplus spp. can be difficult to distinguish (it is typically done by the presence of a black spot in front of the eye), and if very large numbers are caught, it is unlikely that each individual fish has been rigorously examined. Hence, analyses of DATRAS data should either combine these species as Hyperoplus spp. or as Ammodytidae (with other sand eel species)..
171683	*Hyperoplus immaculatus*	171681	*Hyperoplus*	
171978	*Pomatoschistus minutus*	171977	*Pomatoschistus*	Existing records of Pomatoschistus minutus are likely to include (locally) P. microps and P. lozanoi (and possibly P. norvegicus). Analyses should combine all sand gobies as Pomatoschistus spp., and several laboratories only report sand gobies at genus level
171980	*Pomatoschistus pictus*	171977	*Pomatoschistus*	

8.3 Corrections to DATRAS data

8.3.1 Norway

Corrections of the Norwegian IBTS data are done on a regular basis in the database held at the Institute of Marine Research. These changes include both corrections found by the institute's own quality control, and others that cover several of the issues listed under Section 10 of the 2007 report of IBTSWG (ICES, 2007b). However, some of these changes have not yet been uploaded to the DATRAS database.

Problems in the identification of skates (especially *Amblyraja radiata* and *Raja clavata*), as highlighted as a problem by WGEF (see Sections 14.6.1 and 15.6.2 in ICES, 2007c) will be addressed during future surveys, and historical data will be checked.

8.3.2 Sweden

So far, Sweden has, in accordance with the recommendations suggested by WKTQD, carried through the checking of CA-data (length, age, weight parameters) for all species collected through the time period of 1990-2006. The quality controlled data has been uploaded to DATRAS. Sweden is also controlling the rest of their biological database for Skagerrak and Kattegat (1976- 1989) but that information has not been uploaded to DATRAS at present. The checking of length distribution and species misidentification are being made and should be finalized by September this year and then re-submitted to DATRAS.

8.3.3 Denmark

As is has been recommended to put more focus on correct species identification during research vessel survey, the National Institute for Aquatic Resources (DTU-Aqua), Denmark has implemented new guidelines when sorting catches. One of the tasks for the cruise leaders during the surveys is to train the staff in proper species identification.

Furthermore, it has been implemented that all rare and uncommon species should be identified by more experienced staff members. New staff members are always working together with more experienced staff members, and focus has been put on neighbour training.

Plates with fish pictures have been made and they are mounted at the bulkhead in the fish laboratory at the vessel. If there is any doubt on identification some species digital pictures are taken.

Finally, more species identification keys have been purchased.

At DTU-Aqua work on revising/quality ensure the IBTS has been started. Data are to be revised in the national database and when finalised, the data will be re-uploaded to DATRAS.

8.3.4 Germany

Throughout the last years, corrections of the German IBTS data have continuously been implemented into the national database held at the Institute for Sea Fisheries. These changes include both, corrections that have been made using the institute's own quality assurance routines and others that cover several of the issues listed under section 10 of the 2007 report of IBTSWG (ICES, 2007b). However, these changes have not yet been uploaded to the DATRAS database to change the original data that were submitted to ICES.

8.3.5 The Netherlands

All Dutch length (HL-files) and station (HH-files) data have been corrected for all years (1965-2008) following the suggestions given in the working document "Quality check surveys: DATRAS North Sea IBTS" by ter Hofstede and Daan, attached to the IBTSWG report from 2006 (ICES, 2006), and the outcome of WKTQD (ICES, 2007a).

The age-data (CA-files) are still in the process of being corrected, which is expected to be finalized within a couple of weeks. As soon as all data have been corrected they will be uploaded in DATRAS.

8.3.6 UK (Scotland)

During the last year, FRS has undergone a transitional period where the experienced person handling the research vessel database left to take up new employment. As a result of this FRS had to prioritise his main duties with the initial emphasis being on a continuation of existing procedures for handling our current research vessel data, ensuring that the upload to DATRAS is completed effectively. Work relating to this aspect of FRS commitment has continued effectively.

Matters that were raised at last years IBTS meeting (ICES, 2007b) were initially acknowledged with a general timetable being agreed. However, the events described above have since resulted in this running over into the current year. Setting up the checking programs for uploading data from the Scottish Rockall Survey to DATRAS has been completed and upload of historic data will commence at the end of April 2008. During 2008, FRS will also address the issues raised at the 2007 meeting where inconsistencies in recording of length measurements were identified (e.g. possibly recorded as total length as opposed to other years where pre-anal fin length appears to have been recorded). FRS will continue to liaise with ICES with regards to the development of a (web based) look up table to indicate method of measurement for deep-water species.

8.3.7 UK (Northern Ireland)

The process of data screening and error checking of the two Northern Irish groundfish survey series was initiated in 2007. Several data checks prior to uploading the data onto the DATRAS database are being carried out on the AFBI database, which also include the issues raised at the 2007 IBTSWG meeting.

8.3.8 UK (England & Wales)

During the last 12 months, Cefas trawl data, including those surveys that are (or will be) included in the DATRAS database) have been subject to several data checks.

- Length-weight relationships have been plotted and outliers identified. These errors still need to be examined in order to identify the source of the error (e.g. length or weight);
- Length-distributions for all fish and shellfish species have been plotted and outliers (e.g. fish $< L_{min}$ or $> L_{max}$) identified. These errors can include incorrect lengths or species codes;
- Spatial distributions of survey stations (i.e. making sure the latitude and longitude are correct);
- Spatial distributions of all species have been plotted, with erroneous distributions/species records identified.

These errors have been catalogued, and will be corrected over the coming year. Future data checks will examine age data and problematic taxa (e.g. cottids, rocklings etc.) to check temporal and spatial consistency in surveys.

Survey reports now provide lists of the fish species caught, and make special mention of any unusual species. Survey protocols highlight that species of uncertain identification be returned to the lab and/or photographed to ensure correct identification.

8.3.9 Ireland

Currently the Irish Groundfish Survey data is undergoing a final quality review as part of it being migrated to a new SQLserver database, in part to facilitate Irish obligations to provide data to DATRAS. As such, some of the finer checks relating to spatial distribution of species will reviewed once data migration is complete. As regards other checks, a series of R-code and access queries are implemented during the cruise on a daily basis to flag outliers for all measured species in relation to length-weight, maturity, ratio of sample wt/catch wt for measured sample and recently otolith size in relation to length.

As regards species ID issues, a shortlist of 4-5 staff have been allocated to each of three faunal groups: i) shelf teleosts; ii) elasmobranchs & deepwater teleosts; and iii) invertebrates. A suitable senior staff member has also been allocated to each of these groups, except shelf teleosts so far, to coordinate and standardise species ID within the team, identify resource and training needs and act as a point of contact. The intended focus being to ensuring consistency of ID between staff participating in different survey legs, rather than necessarily expecting a small number of staff to undertake considerable study and sea time on top of core duties and risk fluctuating levels of data quality dependent on staff availability.

8.3.10 France

Some corrections have been made to the EVHOE data, mostly on measurements units for some individuals of *Nephrops*. Minor changes in raising factors have been made; they were due to different levels of rounding in sample and total weights. Data from 1987 to 1995 for the Bay of Biscay are presently in the process of being checked prior to integration in the Datras database.

Problems in the identification of North Sea skates (especially *Amblyraja radiata* and *Raja clavata* in 1998, and possibly other years), as highlighted as a problem by WGEF (see Section 15.6.2 of ICES, 2007c) still need to be addressed.

8.3.11 Spain

Data on IEO surveys are included on a database on board during the survey using the program CAMP, build in Clipper /Dbase III environment, which includes checks on weights vs. length distributions of the catches based on length-weight relationships for main commercial/abundant fish species. Data for the main commercial species (hake, both species of megrim, anglerfish, horse mackerel, *Nephrops*, blue whiting, elasmobranchs etc.) are also reviewed and corrected before being submitted to delegates assisting ICES assessment working groups.

During the last year, these data are being transferred to a new database system called SIRENO built in Oracle SQL system with its own checks for consistency on haul positions vs. stratification, gear behaviour regarding vertical/horizontal opening, species distribution by area, weights and numbers vs. length distribution data, etc.

This new system intends to comprehend all the data bases collected routinely on the IEO sampling programs, including data on catches and sampling from commercial catches on the harbour, from discard observers, hydrographical transects, etc.

Regarding bottom trawl surveys, for the moment, the databases in the new system only include data on hauls (haul information, positions, gear behaviour, ground temperature, etc), catches and length distributions of all fish species, *Nephrops*, a few additional crustaceans and cephalopods. Data on biological sampling containing maturity stages, otoliths and age readings for target species are still stored by the scientists in charge of those issues in their own databases. Nevertheless the databases for the biological sampling are prepared and being used for pelagic surveys and sampling. Demersal species and groundfish surveys are the next step, and are expected to be completed during 2008.

8.3.12 Portugal

Data from the Portuguese groundfish surveys are routinely corrected in the national database held at the IPIMAR, for the target species (hake, horse mackerel, blue whiting, mackerel, Spanish mackerel, megrim, monkfish and *Nephrops*). Additionally, some other species (e.g. elasmobranchs, Norway pout, blue jack mackerel) are also checked for other specific studies or projects and corrected when appropriate.

The Portuguese database (CRUZDEM) was created in 1990 at IPIMAR using a SQL relational database in PC-DOS system (software Rbase 2.0 later upgraded to Rbase 4.0). In 1996 this database was transferred to a windows environment using Microsoft Access 2.0 and in 1999 it was converted to Microsoft Access 97. Six main tables are part of this database, two of which contain the log sheet (haul information, positions, etc.), two containing species sheet (catch data) and two containing sample length distribution. Maturity stages, individual weights and otoliths are recorded in other tables for the target species. Three accessory tables were also adopted containing scientific and common names and the three letter FAO codes for the species, fixed station information (position and depth) and information collected with the SCANMAR equipment.

8.4 Maturity staging of cod, haddock, whiting and saithe

Since 1991 the IBTS maturity data of gadoids has been collected and reported according to a 4-grade scale. The four stages are classified as:

I. Immature

II. Maturing

III. Spawning

IV. Spent

These stages have been used to separate juvenile fish from the spawning stock for assessment purposes.

One of the outcomes of the WKMSCWHS (Workshop on Sexual Maturity Staging of Cod, Whiting Haddock and Saithe) was that it was found that the definitions describing the stages have been vague and confounding, leading to misinterpretation of the gonadal status and resulting in possible erroneous estimation of the maturity ogive. Furthermore, the workshop suggested an addition of a fifth stage comprising mature fish not contributing to the spawning biomass, often called “skip of spawning” as recent research has shown that in several species, a substantial part of

mature individuals from the younger age classes can omit spawning if energy resources are scarce (Jörgensen *et al.*, 2006). The current IBTS maturity key does not allow a distinct code for identifying these individuals.

The workshop also pointed out that the Stage III, which is named as spawning fishes, has been defined as fish in running condition only in the IBTS scale and, for all countries present at the workshop, used only for classifying fish with running eggs or milt. It is unfortunate that the present definition in Stage III suggests that spawning equals running, since catching a fish that is running is quite random. As gadoids are batch spawners they will release eggs several times over a period of time and will have hydrated eggs during the entire spawning period. Therefore the stage where the fish has hydrated eggs and the stage when the fish has recently spawned ought to be considered spawners and should be included in Stage III. At present, the stage with hydrated eggs is included in the maturing fish, which is irrelevant in regards to estimating SSB but counterproductive if you are working on temporal or spatial issues. The workshop did not consider how to deal with historical data in this respect.

During WKMSCWHS the participants complied with the 5-stage scale proposed by WKMAT but all agreed on adding a 6th stage. This stage comprises fish with abnormal gonadal development such as intersex and petrified roe, which seem to exist in all species. Whereas specimens in resting stage may constitute a significant proportion of the adult fishes, fishes in Stage VI are considered rare. However, both stages seem relevant as potential ecosystem state indicators. An increase in the proportion skipping spawning may indicate an unbalance, as well as a significant increase in abnormal specimens (e.g. the significant increase in intersex observed in eelpout males in some areas).

During the workshop, cod was used as a model for elaborating a common maturity scale and it was afterwards tested on saithe, haddock and whiting. The proposed common scale thus includes 6 stages (Figure 8.4.1):

I. Juvenile/Immature

II. Maturing

III. Spawning

IV. Spent

V. Resting/Skip of spawning

VI. Abnormal.

Common classification criteria for females and males are given below. The dashed line around Stage I and V in Figure 8.4.1 illustrates that larger immature specimens and resting specimens often are difficult to distinguish outside the spawning season, both macroscopically and histologically, because the tissue regenerates after spawning and resembles that of late Stage I.

The small circle illustrates resting specimens that skip spawning. Abnormal fishes in Stage VI in general show irreversible signs of degeneration of the gonad tissue and are thus perceived to leave the reproductive cycle.

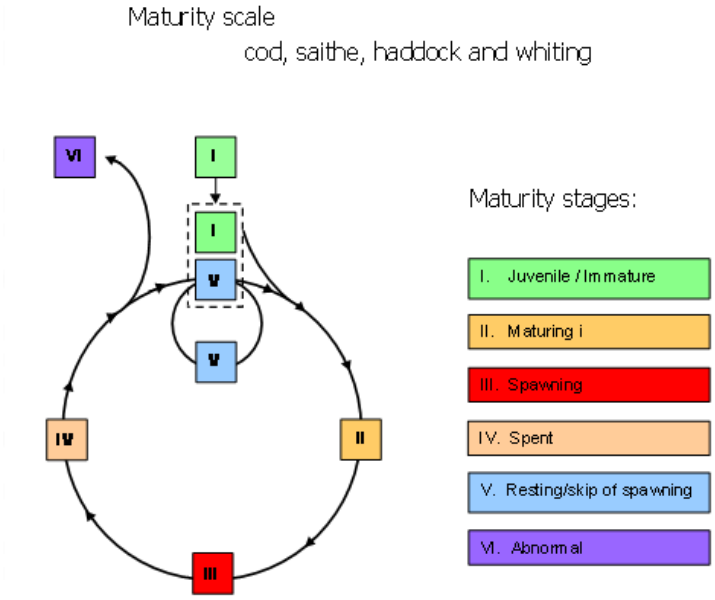


Figure 8.4.1. Proposed 6-stage maturity scale for cod, saithe, haddock and whiting.

The suggested scale facilitates the implementation of using spawning probability rather than a maturity ogive, taking into account that not all mature fish are part of the spawning stock. Using only the proportion of fish that will spawn as a basis for the assessment improves the accuracy of the SSB estimate as an index of the egg production for determinate spawners.

The estimation of the spawning probability (pS) should be pS = (n Stage II-III) / (n Stage I-VI) in the pre-spawning period and pS = (n Stage II-IV) / (n Stage I-VI) during the spawning period.

Specimens below 15 cm should in general not be sexed as sex determination of males below this size is uncertain, but their maturity should be interpreted as Stage I. This cut-off seems too high for whiting, as mature individuals particularly males below 15 cm have been observed. A preliminary limit at 11 cm for whiting was therefore suggested, but the lower limit should in general be checked in future sampling.

8.4.1 Stage description for females

Stage I – Juvenile/Immature

In this stage, the ovaries are small, transparent to translucent; the colour is pinkish to light orange and their wall thin and clear.

Oogonia are present in the tissue, and during development small oocytes with densely staining cytoplasm and a central nucleus with few, large peripheral nucleoli (PN) appear. A portion of the oocytes may have started the primary growth, characterized by a slight increase in size, both of the nucleus and of the entire cell, and by the presence of a light stained area around the nucleus, the so called circumnuclear ring (CNR). This ring indicates that cytoplasmatic changes occur and sexual maturation is approaching. Prior to vitellogenesis (i.e. formation of yolk), the circumnuclear ring moves towards the outer part of the cell.

Stage II – Maturing

The maturing ovaries become firm, coloration ranges from reddish orange to creamy orange with granulated/oocytes clearly visible in tissue. Blood vessels become larger and diversified.

The circumnuclear ring gradually disintegrates, while spherical and transparent vesicles (cortical alveoli, CA) appear in the peripheral part of the cytoplasm. During this stage, granules of yolk intensely stained (vitellogenic oocytes, VT), initially appear peripherally, but as they increase in number and size, they distribute throughout the cytoplasm and finally expands the cell. Towards the end of the vitellogenesis the shape of the nucleus becomes irregular, but the nucleus is still centrally located.

The occurrence of cortical alveoli and yolk granules show that the maturation process is in progress, and under normal conditions, the individual will develop within the current spawning season.

Stage III – Spawning

The ovaries have become distended; few to many hydrated eggs visible in tissue among vitellogenic oocytes, or hydrated eggs are present in lumen and are occasionally running at light pressure at the abdomen. In spawning specimens the ovary is often filled with viscous fluid.

Histologically, the final oocyte maturation is marked by the nuclear migration and the hydration process. The nucleus moves from the centre towards the micropyle and eventually breaks down when reaching it, before the ovulation, the yolk granules coalesce forming large irregular spheres (FM oocytes), yolk protein is hydrolysed and hydrated eggs (HYD) are formed. The hydrated egg is transparent and the cell content appears completely homogeneous. HYD tend to loose their round shape during the fixation procedure and often fall out when the tissue is sectioned. At the ovulation, oocytes are released into the lumen, while the ruptured follicles (post-ovulatory follicles, POF) remain in the ovary. Therefore at this step, three different developmental stages, oocytes in final maturation, hydrated eggs and/or POFs are all visible.

Stage IV – Spent

As spawning cease the ovary retracts and becomes slack with greyish cast, but is still rich in blood vessels.

The ovaries are dominated by post-ovulatory follicles (POF), marking the occurred ovulation, are abundant among perinuclear or circumnuclear stage oocytes. The development of vitellogenic oocytes sometimes fail and their maturation is not completed. These oocytes under intra-ovarian resorption are called “atresia”.

Stage V – Resting / Skip of spawning

The ovaries show no visible development and look similar to immature but the fish may be fairly large and the ovary may have a greyish cast. It is often useful to cut such ovaries open to make sure that vitellogenesis has not started, because it can be difficult to judge behind the cast.

The ovary is characterized by oocytes in PN and CNR stages. Atretic oocytes might occur. This stage should be interpreted as resting if observed outside the spawning season and skip of spawning if observed during the spawning season.

Stage VI – Abnormal

The ovaries may possess dark and hard parts (connective tissue), only one lope developed or other abnormal traits that causes at least partly reduced fecundity.

Some part of the ovary may show normal development similar to above stages. The parts filled with connective tissue may contain encapsulated, hydrated eggs that have not been spawned. Instead of resorption they have become encapsulated in connective tissue.

8.4.2 Stage description for males

Stage I – Juvenile/Immature

In juveniles and immature specimens where the sex can be determined, the testes are recognised as thin translucent strings which in late stage have developed small frills; coloration is reddish to whitish, vascularisation is limited.

This stage is characterised by the presence of 'germ cells' or spermatogonia (SG) which may be migratory, with elongate appearance and a lightly staining cytoplasm. Some germ cells may be located proximally near to or within inter-lobular walls but most are located distally. Singular germ cells eventually lodge within a 'cyst' and while undergoing transformation become rounded, increase in size and the nucleolus becomes more prominent. In Stage I reproductive tissue, such cells can be seen dividing mitotically giving rise to groups or 'cysts' of germ cells. Immature tissues in preparation will contain primary spermatocytes (SC1) which are the result of mitotic division of germ cells or spermatogonia. As division progresses, generations of cells are retained within the original cyst wall. Later as spermatogenesis progresses, cysts expand and gametes are retained between the inter-lobule walls of the distal tissue.

Stage II – Maturing

During the maturing stage testes change from reddish-white to almost opaque white, blood vessels more prominent; spermatoducts remains empty and transparent.

In the early stage few remaining singular germ cells are present but groups or 'cysts' of germ cells have divided and form primary spermatocytes (SC1). During the stage primary spermatocytes divide by mitosis and form smaller secondary spermatocytes. The numbers of both primary and secondary spermatocytes increase considerably. Lobules elongate and widen so the testes enlarges. By the end of the stage secondary spermatocytes undergo a meiotic division to produce smaller haploid spermatocytes and a mitotic division to form haploid spermatids (ST) which have a characteristic elliptical shaped nucleus. Spermatids develop flagella and become flagellate spermatozoa or sperm within distended lobules. The presence of flagellate spermatozoa in maturing tissues is not uncommon especially in more proximal tissues which develop more rapidly. By the end of Stage II, the numbers of spermatids and flagellate spermatozoa increases rapidly but no sperm is visible in the sperm duct. However, it must be remembered that for asynchronous species, cysts containing all stages of spermatogenesis may be present in ripening fish.

Stage III – Spawning

Testes appear opaque creamy white to reddish late in the stage, semen visible in spermatoducts, in the early stage milt may appear as a viscous droplet, later in the stage milt flows at light pressure at vent.

The number of spermatozoa increases rapidly, particularly proximally, in the beginning of the spawning stage. Cyst and lobule walls disappear so that long tubules of spermatozoa are formed proximally with tubules will contain masses of spermatozoa. Mature spermatozoa become aligned so that their flagella lie alongside each other and the heads face the interstitial tissue between the tubules. Few migrating germ cells are now visible except at the extreme distal edges and no mitotic division is observed in these cells. The sperm duct and proximal efferent duct system contains ripe spermatozoa. Distal cysts may still contain earlier products of spermatogenesis that will develop and be spawned in later batches depending on the reproductive strategy of the species.

Stage IV – Spent

After spawning the testes contract and appear empty with flabby lobules, colour deep pink to reddish-purple, bloodshot, potentially with greyish cast.

The most noticeable histological change in spent tissue, apart from the great reduction of sperm, is that the interlobular walls and the stroma of the testis increase in thickness. Towards the distal end of the tissue, thick septa of connective tissue can be seen as well as remaining germ cells. Atretic spermatozoa can be seen contained inside the collapsing efferent ducts, proximal tubules and in the sperm duct. These atretic spermatozoa loose the characteristic flagella and stain quite darkly. Dilated blood vessels may still be visible throughout the tissue but are in the process of resumption to original size. Scattered blood cells may also be visible.

Stage V – Resting/Skipped Spawning

No visible development, spermatoducts often with a greyish cast, similar to immature, early maturing.

In resting or skip of spawning tissue the tissue appears quite dense and a re-organisation of the tissue appears to be in progress. New cysts are being formed and lobule walls contain many migrating germ cells or spermatogonia. Resting cysts of spermatogonia or primary spermatocytes may also be visible. Relict atretic spermatozoa contained in lobules or tubules are reabsorbed by larger phagocytes which stain a lighter colour. The numbers of spermatogonia increase progressively in resting or skip of spawning tissue until the process of spermatogenesis begins again.

Stage VI – Abnormal

The reproductive tissue of testes may partly turn into adipose tissue giving the frills a dark yellow appearance, or only one lobe developed. Intersex occurs where part of the tissue contains oocytes or eggs.

Abnormal testicular tissue contains histological irregularities in the developmental process of spermatogenesis. Mass atresia of maturing or ripe structures may be visible in some or all tissue regions. Spatial heterogeneity may be evident in the maturation of abnormal tissues with maturation evident in some areas and not in others. Tissues may be irregularly composed of dense stroma and adipose cells. Normal zonation patterns in spermatogenesis may not be visible. Intersex may be apparent in some specimens; histologically both oogonia and spermatogonia may be visible in tissue sections as well as later development stages of both male and female reproductive tissue.

8.4.3 Implementation

The WKMSCWHS has recommended the following that is relevant to the IBTSWG:

- A common maturity scale including 6 stages is recommended for cod, saithe, whiting and haddock. For cod, saithe and haddock specimens below 15 cm and for whiting below 11 cm should not be sexed but labelled "blank" and staged as immature, because sex determination of particularly males below this size is uncertain.
- Adaptation of DATRAS to include 6 maturity stages is recommended.
- That sampling of maturity data for cod, saithe, whiting and haddock is conducted primarily during 1Q IBTS survey, but with increased intensity.
- No maturity data collection on cod, whiting, haddock and saithe should be carried out at the 3Q IBTS survey.
- That the preliminary manuals for cod and saithe are tested on IBTS cruises in 1Q 2009 and that supplementary sampling is carried out to complete the manuals.
- That in order to improve determination of reproduction pattern and routine sampling is recommended that additional sampling of haddock and whiting is conducted on ITBS cruises in 1Q during 2009 IBTS and supplementing sampling is carried out by harbour sampling or during at-sea sampling to obtain missing stages and to ascertain the spawning period.

The IBTSWG agreed to follow the recommendations made by the WKMSCWHS. Therefore:

- From 2008, no maturity data on cod, haddock, whiting and saithe will be collected during the 3Q North Sea IBTS 2008.
- Collection of maturity data on cod, haddock, whiting and saithe will be carried out during the 1Q North Sea IBTS using the new 6 stage scale.
- The draft manuals on maturity data collection on cod, haddock, whiting and saithe will be tested during the 1Q North Sea IBTS in 2009.
- Additional material to be used for finalizing the manuals will be collected during the 1Q North Sea IBTS 2009 (Rikke Hagstrøm Bucholtz, DTU-Aqua, Denmark will coordinate this additional sampling).
- The ICES secretariat will be asked to update the ICES DATRAS database to be able to handle a 6-stage maturity scale for the IBTS data.

8.5 Update of Zeus and other electronic field guides

In recent years there has been growing concern over the quality control of survey data (including species identification and proper recording of maturity stages). In order to facilitate the improved species identification of fish and epibenthic invertebrates, several laboratories that are involved in internationally coordinated surveys have photo-catalogues of fish and benthos. IMARES has taken the lead in the developing the ZEUS programme, a taxonomic catalogue to which several laboratories have now supplied photographs.

The setup of the photo collection held on ZEUS is based on a taxonomic tree-structure, using scientific species names, and with the option of giving names in other languages. Concise and relevant comments on distinguishing features of the species are included. The application is available on a CD-ROM and includes an installer.

The copyright of all photos remains with the photographer (or his/her laboratory). If someone wants to use the photos in a publication, the photographer has to be contacted for permission.

Photographs of some further species were provided during the meeting (Table 8.5.1, Figure 8.5.1), though there are still many species for which good photographic images are still required (Table 8.5.2). Members of the IBTSWG are requested to try supply photographs of these species if they are recorded in surveys. The protocol for the submission of the photos is as follows:

- In the right hand corner the name of the photographer should be included as embedded information: a copyright symbol, the name of the institute (acronym), the name of the photographer and the year, e.g. "© FRS Marine Laboratory/Finlay Burns/2004". This text should be in black or white, in italics, and in Arial 10.
- Apart from the name of the photographer there should be no text on the photo, but distinguishing features may be highlighted by arrows or circles.
- There is no preference for a particular background used, but preferably a cm-scale should be visible.
- The images should be JPEG files, with a critical resolution necessary for presentation on full screen: width of 15x20 cm, resolution 120, quality 7 (medium to high compression), and a size limit of approximately 150 kB.
- File names of fish or benthos species should consist of the scientific name and an image number, e.g.: Gadus_morhua_01.jpg.

Table 8.5.1. List of species for which photographs were supplied at the 2008 meeting.

SCIENTIFIC NAME	ENGLISH NAME
Hexanchus griseus	Sixgill shark
Isurus oxyrinchus	Shortfin mako
Scyliorhinus canicula	Lesser-spotted dogfish
Mustelus asterias	Starry smoothhound
Prionace glauca	Blue shark
Amblyraja radiata	Starry ray
Lophius budegassa / L. piscatorius	Black bellied angler fish and anglerfish
Zenopsis conchifer	Sailfin dory
Cyclopterus lumpus	Lumpsucker
Diplodus sargo	White seabream
Brama brama	Ray's bream
Callionymus lyra / C. reticulatus	Common and reticulated dragonets
Ammodytes tobianus / A. marinus	Sand eels
Lepidocybium flavobrunneum	Escolar
Ruvettus pretiosus	Oilfish
Xiphias gladius	Swordfish
Phrynorhombus norvegicus	Norwegian topknot
Zeugopterus punctatus	Common topknot

Figure 8.5.1. Overview of species from the Bay of Vigo which were supplied at the 2008 meeting.

Table 8.5.2. Preliminary list of fishes for which photos are required.

BISCAY - NORTH SEA SPECIES	SOUTHERLY FISH SPECIES	DEEP-WATER SPECIES
Anguilla anguilla		*Hydrolagus mirabilis*
Salmo salar	*Squalus blainvillei*	*Rhinochimaera atlantica*
Antonogadus macropthalmus	*Torpedo torpedo*	*Hexanchus griseus*
Gaidropsarus mediterraneus	*Muraena helena*	*Apristurus laurussoni*
Lepadogaster candollei	*Serranus cabrilla*	*Galeus murinus*
Lepadogaster lepadogaster	*Dicentrarchus punctatus*	*Pseudotriakis microdon*
Apletodon microcephalus	*Trachurus mediterraneus*	*Somniosus microcephalus*
Atherina boyeri	*Trachurus picturatus*	*Centrophorus granulosus*
Pungitius pungitius	*Seriola dumerili*	*Centrophorus squamosus*
Spinachia spinachia	*Taractichthys longipinnis*	*Centrophorus uyato*
Syngnathus typhle	*Pagrus pagrus*	*Dalatias licha*
Hippocampus hippocampus	*Pagellus bogaraveo*	*Etmopterus princeps*
Hippocampus ramulosus	*Pagellus erythrinus*	*Oxynotus centrina*
Nerophis lumbriciformis	*Dentex macropthalmus*	*Oxynotus paradoxus*
Nerophis ophidion	*Dentex dentex*	*Centroscyllium fabricii*
Trigla lyra	*Sparus pagurus*	*Centroscymnus coelolepis*
Aspitrigla obscura	*Mullus barbatus*	*Centroscymnus crepidater*
Liparis montagui	*Mugil cephalus*	*Scymnodon obscurus*
Liza ramada	*Coris julis*	*Echinorhinus brucus*
Liza aurata	*Acantholabrus palloni*	*Bathyraja pallida*
Centrolabrus exoletus	*Arnoglossus thori*	*Bathyraja spinicauda*
Ctenolabrus rupestris		*Notacanthus bonaparti*
Blennius ocellaris		*Notacanthus chemnitzii*
Ammodytes tobianus		*Synaphobranchus kaupi*
Ammodytes marinus	**Northerly fish species**	*Molva dypterygia*
Gymnammodytes semisquamatus	*Amblyraja hyperborea*	*Coryphaenoides rupestris*
Hyperoplus immaculatus	*Dipturus nidarosiensis*	*Coelorinchus coelorhinchus*
Gobius paganellus	*Rajella fyllae*	*Malacocephalus laevis*
Gobius gasteveni	*Dipturus lintea*	*Nezumia aequalis*
Crystallogobius linearis	*Artediellus europaeus*	*Trachyrhynchus trachyrhynchus*
Gobiusculus flavescens	*Myoxocephalus quadricornis*	*Trachyrhynchus murrayi*
Pomatoschistus minutus	*Taurulus lilljeborgi*	*Antimora rostrata*
Pomatoschistus pictus	*Cottunculus microps*	*Laemonema latifrons*
Pomatoschistus microps	*Lycenchelys sarsi*	*Mora moro*
Pomatoschistus norvegicus	*Lycodes vahlii*	*Lepidion eques*
Lesueurigobius friesii	*Lycodes esmarkii*	*Halargyreus affinis (H.johnsonii)*
Buenia jeffreysii	*Leptoclinus maculatus*	*Ophidion barbatum*
Thorogobius ephippiatus	*Anarhichas minor*	*Beryx splendens*
Arnoglossus imperialis	*Reinhardtius hippoglossoides*	*Trachyscorpia cristulata*
Phrynorhombus regius		*Hoplostethus atlanticus*
		Hoplostethus mediterraneus

8.6 References

Boisneau, P., Mennesson-Boisneau, C. & Guyomard, R. 1992. Electrophoretic identify between allis shad, Alosa alosa (L.), and twaite shad, A. fallax (Lacepede). Journal of Fish Biology, 40: 731–738.

ICES. 2006. Report of the International Bottom Trawl Survey Working Group (IBTSWG), 27-31 March 2006, Lysekil, Sweden. ICES CM 2006/RMC:03, Ref. ACFM. 298 pp.

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

ICES. 2007c. Report of the Working Group Elasmobranch Fishes (WGEF), 22–28 June 2007, Galway, Ireland. ICES CM 2007/ACFM:27. 318 pp.

Louisy, P. (2002). Guide d'Identification des Poissons Marins Europe et Méditerranée. Editions Eugen Ulmer, 430 pages, 800 colour photos, 1000 line drawings. ISBN-10: 2841381455.

Maitland, P.S & Lyle, A.A. 2005. Ecology of Allis Shad Alosa alosa and Twaite Shad Alosa fallax in the Solway Firth, Scotland. Hydrobiologia, 534: 205–221. Hofstede, R. ter & Daan, N. 2008. A proposal for a consistent use of the North Sea IBTS data. IBTSWG Working Document.

Quero, J.C., Porche, P. and Vayne, J.J. (2003). Guide les poissons de l'Atlantique europeen. Delachaux & Niestle, Paris, 465 pp.

Wheeler, A. 1988. The nomenclature of the sole, Solea solea (Linnaeus, 1758). Journal of Fish Biology, 33: 489-490.

Whitehead, P.J.P., Bauchot, M.-L., Hureau J.-C., Nielsen J., and Tortonese E. (eds) 1984-1986. Fishes of the North-Eastern Atlantic and the Mediterranean. 3 Vols, UNESCO, Paris 1,473 pp.

9 Review the outcome of SGSTS in respect to issues relevant to IBTS (ToR f)

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

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, SGSTS was working on the publication of an additional ICES Cooperative Research Report on GOV standardization, based on the work carried out by SGSTS (ICES, 2007). This CRR is expected to be finalised by July 2008. Therefore, the IBTSWG considers it to be more appropriated to wait for the CRR to study the protocols and tools provided, to consider their adoption within the IBTS standard protocols.

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

10 Agreed strata in the Eastern Atlantic (ToR g)

ToR g) Agree on strata and their definitions for surveys in the Eastern Atlantic (including shapefiles and supporting information; shapefiles to be completed inter-sessionally and prior to the Q4 survey).

10.1 Completion of the shapefiles

The IBTSWG agreed in 2005 on a stratification for the Celtic Sea and the Bay of Biscay and a description of the strata should was provided. In 2006 Similar information was made available for the area via west of Scotland. In 2007, shapefiles were provided for the north of Spain and the Gulf of Cadiz The Porcupine area stratification was also presented to the WG in 2002.

This year, Shapefiles for strata in the Irish Sea, West and North of Ireland up to 57°N were provided. However these have to be modified as follows:

- The depth contour has to be changed from 75 to 80 m and from 125 to 120 m in order to be consistent with the Agreed Celtic Sea stratification.
- The overlapping area with the Porcupine strata has to be redrawn after agreement.

Shapefiles for the Portuguese continental coast stratification were also provided in 2008. All available shapefiles to date are shown in Figure 10.1.1. This complete package of shapefiles was made available at the meeting. There is still the Area from 57°N to 60°N to be completed.

10.2 Extending stratification in the Eastern Channel

The design of the French CGFS survey was presented and discussed in this year meeting of the Working Group (Working Document 4, Annex 5). Concerns were raised about the inconsistencies in some of the indices presented to assessment Working Groups. Noting that some prime studies have been carried and published about habitat and fish assemblage in the area covered by the survey, the Working group recommends that a stratification based on the results from these studies be further investigated and used to compute abundance indices as this could increase precision and year to year consistency. Results of this investigation should be presented at the 2009 meeting of the Working Group prior to agreement of this stratification.

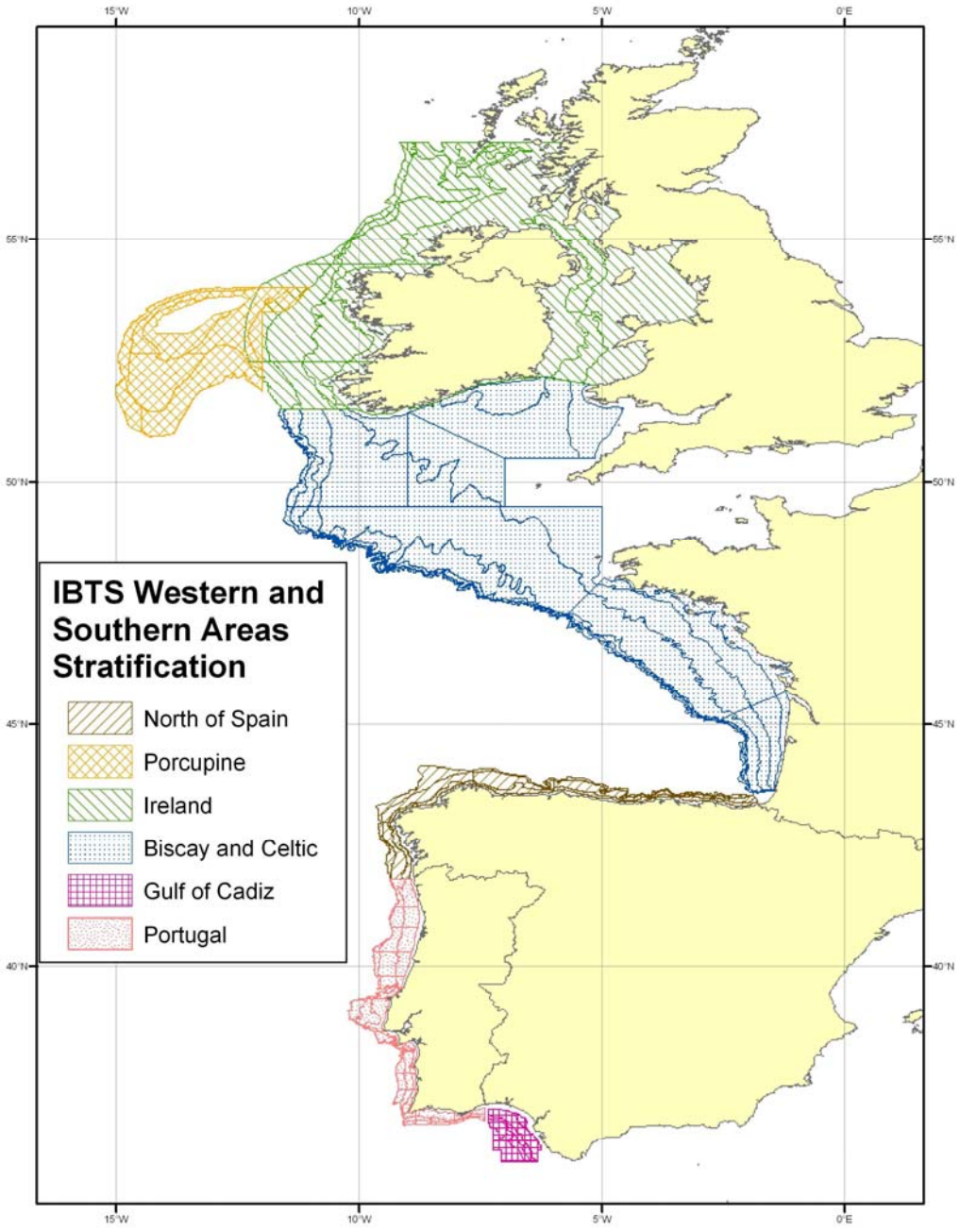


Figure 10.1.1: Western and Southern divisions stratification shapefiles.

11 Other business

11.1 Objectives of the IBTSWG

The objectives of the International Bottom Trawl Survey (IBTS) have not been clearly specified in previous reports of the IBTS Working Group (Heessen *et al*., 1997). It is generally accepted, however, that the main objective of the IBTS surveys is to provide recruitment estimates for several commercially important fish species and other data used for tuning stock assessments. IBTSWG recommends that the objective of the group is as follows:

"IBTSWG coordinates fishery-independent multi-species bottom trawl surveys within the ICES area. These surveys aim to provide ICES assessment and science groups with consistent and standardised data for examining spatial and temporal changes in (a) the distribution and relative abundance of fish and fish assemblages; and (b) of the biological parameters of commercial fish species for stock assessment purposes.

In terms of groundfish surveys coordinated by IBTS, the main objectives are to:

1) *To determine the distribution and relative abundance of pre-recruits of the main commercial species with a view of deriving recruitment indices;*
2) *To monitor changes in the stocks of commercial fish species independently of commercial fisheries data;*
3) *To monitor the distribution and relative abundance of all fish species and selected invertebrates;*
4) *To collect data for the determination of biological parameters for selected species;*
5) *To collect hydrographical and environmental information;*
6) *To determine the abundance and distribution of late herring larvae (February North Sea survey).*

For a survey to be considered to be coordinated under IBTSWG it should fulfil the following criteria:

a) *To be carried out in the ICES areas IIIa, or IV-IX.*
b) *A brief outline of the management need/context for the survey should be provided by an ICES assessment working group;*
c) *It is an otter trawl survey, but noting that there maybe other working groups better placed to coordinate some bottom trawl surveys;*
d) *The survey either has appropriate sampling methods and protocols (including gear descriptions) that conform to the standards encouraged by the IBTSWG, or that can be improved after joining IBTSWG;*
e) *The survey should aim to enhance existing IBTS surveys and improve data collection for important stocks. For example, proposed surveys for inclusion within IBTSWG should (i) overlap and extend existing survey areas using a comparable gear, or (ii) operate on more specific grounds/times of year with a gear more appropriate for the target species;*
f) *Store their data in the DATRAS database, and participate in data quality checking;*
g) *Attend and present data at the annual meetings of IBTSWG;*
h) *Assessment working groups should confirm (e.g. after a five year period) that any surveys targeting specific stocks and not using gears used in the standard IBTS*

surveys are still providing data of high quality that are used for assessment and provision of advice."

11.1.1 IBTS logo

Intersessionally, the IBTSWG has developed their own logo, which can be seen in the figure below. It displays the frontal opening of a bottom trawl net, which encompasses the North Sea, Skagerrak/Kattegat and Western and Southern Atlantic Waters.

Figure 11.1.1.1: IBTS logo.

11.2 Review of outcomes of the Ad-hoc experts meeting on the Ecosystem approach and impacts for the surveys coordinated by the IBTSWG

A Commission Staff Working Paper "Report of the Ad Hoc Meeting of independent experts on Indicators and associated data requirements to measure the impacts of fisheries on the marine ecosystem" was presented. This report presented the results that built on the earlier reports of two SGRN meetings (SGRN 05-03, SGRN 06-01) and outputs of EC funded projects Indicators of Environmental Integration (INDENT) (Anon 2006) and Development of Indicators of the Environmental Performance of the Common Fisheries Policy (INDECO) (Anon 2007).

The report provides precise specifications for indicators that are considered to be operational or may be made operational if changes are made to existing data collection procedures as described in the DCR. The report with appendices provide a recommended name for the indicator, define the indicator, list the data required for calculation of indicator values, describe how the indicator should be calculated, describe the expected precision of supporting data, describe the existing availability of data collected under the DCR and list any issues that need to be considered by the EC before the indicator is introduced. No references to specific surveys have been made.

Table 11.2.1. Specifications of proposed indicators and the associated data requirements.

Code/annex	Indicator	Data required	Precision level
1	Conservation status of fish species	Species, length and abundance from fisheries-independent research survey(s) for relevant marine region. Accurate reporting of these indicators require that all species that contribute to the indicator are consistently and reliably identified. Survey catches must be fully sorted (not sub-sampled) to ensure that all individuals of every species that contributes to the indicator are recorded.	Research survey should cover largest proportion of the marine region over the longest available time period. The indicator would be survey specific. The methods require that surveys are conducted annually in the same area with a standard gear.
2	Proportion of large fish		
3	Mean maximum length of fishes		

Code/annex	Indicator	Data required	Precision level
4	Size at maturation of exploited fish species	Individual measurements of age, length, sex and maturity from fisheries-independent research survey(s) for relevant marine region.	At least 100 individuals per age class but more fish will improve the power of this indicator.
5	Distribution of fishing activities	Position and vessel registration data based on VMS Available within two months of position reports being received, with all positions linked to the 6 level metier classification recommended in SGRN 06-03. This does not include vessels below 15 m.	Preference for position reports every half hour.
6	Aggregation of fishing activities		
7	Areas not impacted by mobile bottom gears		
8	Discarding rates of commercially exploited species (discarding can also include unwanted bycatch that is landed)	Species, length and abundance of catches and discards based on respectively logbooks and observer trips processed separately, economic data from regulation in draft. Data linked to the 6 level metier classification recommended in SGRN 06-03.	As specified in current discard regulation and (new DCR economic data collection)
9	Discarding rates in relation to landed value (discarding can also include unwanted bycatch that is landed)		
10	Fuel efficiency of fish capture	Value of landings and cost of fuel. Value calculated as the product of landings by species (revised DCR) and prices (revised DCR). Cost of fuel as defined in (new DCR economic data collection). The indicator would be calculated for each metier based on the six level classification recommended in SGRN 06-03 by marine region, quarter and year.	As specified in current DCR and proposed in (new DCR economic data collection)

ICES reviewed this report in October 2007 and welcomes the development of these indicators and the process to incorporate these indicators into the Data Collection Regulation (ICES, 2007). However, ICES notes that the additional monitoring of ecosystem approach indicators cannot come "free", or even necessarily particularly cheaply. ICES also has some concerns related to good coverage of the different ecosystem components (state indicators) and of necessary detailed information of the effort and metier of the fisheries, both spatially and temporally (pressure indicators).

In general the IBTSWG discussed the reports and fully supports the views of ICES. IBTSWG also made comments on the data requirements for indicators 1–4, with indicators 5–10 not considered.

The IBTSWG has the following comments:

Indicator 1 – 3

- The requirement for complete sorting of survey catches (not sub-sampled) to ensure that all individuals of every species that contributes to the indicator are recorded. This requirement cannot be implemented without consequences for costs (extension of survey time and increasing manpower demands) and efficiencies (less tows per day at sea).
- In pelagic surveys the catches are often large and complete sorting is not practical or in some cases physically possible.
- On groundfish surveys, the standard procedure for fish sorting is as follows:

i. If the catch is small and can be sorted in its entirety, this is undertaken. The constituent species are then either fully measured or, if a species is very abundant, a sub-sample of known weight is measured and this sub-sample raised to provide the length-distribution. In this case, if there are only small numbers of fish at certain size categories (e.g. very small and/or very large individuals) that may be missed in a sub-sample, then the species sample is graded prior to length sampling, so that the entire length range is included. Hence, these procedures give a full range of species and lengths in the catch.

ii. For those catches that would be too time-consuming to sort fully, experienced member(s) of scientific staff will decide on an appropriate "mix" of fish that can be sub-sampled. In these cases, a limited number of species would be sorted into baskets and all other fish/shellfish species removed. Such 'mixes' may also be undertaken for smaller catches of similar-looking species (e.g. small herring/sprat; poor cod/Norway pout) for which an accurate sorting of a smaller quantity is the more practical. That part of the catch that has been fully sorted is then processed as above. The remaining part of the sample is then weighed, randomly mixed, and an appropriate sub-sample sorted. Once again, this procedure gives a full sort of the species caught, with the numbers/biomass of a small number of abundant species estimated.

iii. Under very exceptional circumstances, some catches can be of such a large volume that it is not possible to sort the entire catch. In these circumstances, a proportion of the catch is sorted according to above. IBTSWG recognise that this type of sampling is not ideal for fish community studies and flags these data accordingly in DATRAS. Such sampling is only undertaken by a limited number of nations.

Hence, although procedures (i) and (ii) do not necessarily fully sample the catch for species and/or length compositions, the entire catch has been examined and the sub-sampling is deemed the most practical way of ensuring that the full species and size ranges are recorded without compromising the number of stations that can be fished in a day.

As those exceptionally large catches which have been sub-sampled in a way that means the entire catch has not been examined are flagged, this limited number of stations can easily be omitted from the calculation of ecosystem indicators.

Indicator 4

- The IBTSWG notes that many species are not aged during the survey. Age readings are often done in the laboratories at the national institutes after the survey.
- The sampling design for age and sexual maturity is based on length, and so it is not possible to guarantee 100 individuals per age class.
- A large number of fish and shell fish are not aged as it is not possible.
- It is not possible without significant cost implication to sample all exploited species for age and sexual maturity.

- The IBTSWG suggests that for the Q1 IBTS in the North Sea, Skagerrak and the Kattegat sampling of age and sexual maturity should only be carried out for: herring, sprat, cod, whiting, haddock, saithe, Norway pout, mackerel and plaice.
- The IBTSWG suggests that for the IBTS in the Western and Southern area, sampling of age and sexual maturity should only be carried out for the species currently targeted and required for provision of CNAA indices under the DCR, which is specific to each nation.

The ICES IBTSWG has for the last couple of years had several requests as to whether the surveys could be used as a platform for additional data collection. At the IBTSWG meeting in 2006 the working group held a joined session together with representatives from the ICES REGNS Study Group to discuss additional sampling during the IBTS surveys. At that meeting it was agreed that additional data collection related more to the needs of other sectoral interests, such as observations of seabirds and cetaceans, other measurements i.e. acoustic seabed mapping, towing for plankton and benthos, etc.

At the IBTSWG meeting in 2006 it was concluded that a coordinated programme of seabird and cetacean observers could be developed in the first instance without additional costs, providing that observers can collect valid data on variable cruise tracks (i.e. defined transects cannot be guaranteed). It should however, be mentioned that the present number of scientists onboard when conducting IBTS surveys will not be able to do this additional work, and not all institutes have scientists with the required identification skills for these taxa. Accommodating seabird and cetacean observers on the IBTS cruises would appear to be a relatively straightforward way of adding value to the cruise programme in the context of integrated assessment. The IBTSWG noted that for many fisheries research institutes work on birds and marine mammal's falls outside their field of responsibility.

Additional tows for plankton or benthos data are expensive additions in terms of time and effort. Other observations could be made at night (e.g. towed CTD, acoustic survey of seabed) but this would not be integrated into the IBTS survey per se. In terms of benthic studies, there are obviously important differences in the resources required for the ad hoc epibenthic sampling with steel 2m-beam trawl (as undertaken in the North Sea and parts of the Celtic Seas, requiring one extra member of staff with the right skills), or more dedicated benthic grab sampling (i.e. replicate grab sampling over a defined grid, which would require more staff and has more associated laboratory costs for sample identification).

11.3 Intercalibration experiments in the Eastern Atlantic

11.3.1 Introduction

Several intercalibrations experiments have been conducted during groundfish surveys in the ICES area coordinated by IBTS during the last years. The aim of those experiments was to compare the catchability of different bottom trawl gears or different research vessels using different type of bottom trawl nets in the surveys. These experiments are considered very important since they may allow to estimate conversion factors for the target species and then to estimate combined abundance and biomass indices, or to compare changes in the abundance estimates for each groundfish survey. At present there is a long list of experiments performed so it was considered useful to make available a summary with an overview of those experiments.

11.3.2 North Sea waters

Table 11.3.2.1. List of intercalibration experiments in the North Sea. Type of experiments: 1= between gears, 2 = between gears/vessels.

AREA	COUNTRY	INSTITUTE	YEAR	TYPE	GEARS	RES.VESSEL	CONTACT	REFERENCE
North Sea	Germany	SF	1986	2	GOV (2 versions of rigging)	Anton Dohrn/ Walther Herwig	Anne Sell	Doc 6
North Sea	Germany	SF	1994	2	GOV	Walther Herwig,/ Walther Herwig III	Anne Sell	Doc 7
North Sea	Scotland (UK)	FRS	1998	2	GOV	Scotia II/Scotia III	Rob Fryer	FRS – internal report, Doc 8
North Sea	Denmark Sweden	DTU-aqua + IMR	2005	2	GOV	Dana/ Argos	Joakim Hjelm	IBTS 2005 Doc 10
North Sea	Germany, Scotland	SF/FRS	2006	2	GOV	Walther Herwig III/ Scotia III	Anne Sell Ken Coull	Doc 14
North Sea	Germany	SF	2008	1	GOV	Walther Herwig III	Anne Sell	planned for Q3 2008
North Sea	Germany	SF	1994, 1995	1	GOV	Walther Herwig III	Anne Sell	IBTS 1996, Doc 9

11.3.3 Irish, English and French waters

Table 11.3.3.1: List of intercalibration experiments in Irish, English and French waters. Type of experiments: 1= between gears, 2 = between gears/vessels.

AREA	COUNTRY	INSTITUTE	YEAR	TYPE	GEARS	RES.VESSEL	CONTACT	REFERENCE
Bay of Biscay: VIIIc/VIIIb	Spain-France	IFREMER IEO	2006	2	GOV/ Standard Baca+	Thalassa/ Cornide de Saavedra	Jean-Claude Mahe / Francisco Velasco	On going yearly
Bay of Biscay: VIIIc/VIIIb	Spain-France	IEO IFREMER	1997	2	Standard Baca GOV	Cornide de Saavedra Old Thalassa	Francisco Sánchez / Jean-Claude Mahe	Doc 1, 2
Porcupine Survey, VIIbck	Spain-Ireland	IEO-Marine Institute	2005-7	2	Porcupine baca GOV	Vizconde de Eza Celtic Explorer	Francisco Velasco / Dave Stokes	IBTS 2006-2008
Porcupine Survey, VIIbck	Spain	IEO	2003	1	Porcupine baca/Mod Porcupine baca	Vizconde de Eza	Francisco Velasco	SGSTG 2004, Doc 12
Irish Sea	Scotland (UK) Ireland	FRS MI	2004	2	GOV	Scotia III Celtic Explorer	Finlay Burns D. Stokes	IBTS 2005, Doc 3
Rockall	Scotland	FRS	2006	1	GOV*	Scotia III	Dave Reid	Not yet
ICES VIIa and VIIb	France Ireland Scotland	IFREMER MI FRS	1999/2000	2	GOV 36/47 & GOV 28.9/37**	Thalassa CelticVoyager Scotia II	J.C. Mahé D. Stokes K. Coull	IPROST Study Doc 13

*** Intracalibration between a GOV 36/47 with groundgear C against an identical trawl with the newly developed groundgear D.**

**** The Irish vessel in this time series used a scaled down GOV 28.9/37 due to vessel power.**

11.3.4 Spanish and Portuguese waters

Table 11.3.4.1: List of intercalibration experiments in Spanish and Portuguese waters. Type of experiments: 1= between gears, 2 = between gears/vessels.

AREA	COUNTRY	INSTITUTE	YEAR	TYPE	GEARS	RES.VESSEL	CONTACT	REFERENCE
Portuguese waters - SW and South	Portugal	IPIMAR	1997/1998	1	NCT/GOV	Noruega	Fátima Cardador	Docs 2, 4
Portuguese waters - South & Spanish waters - Gulf Cadiz	Portugal /Spain	IPIMAR & IEO	1997/1998	2	NCT/Baca	Noruega & Cornide de Saavedra	Fátima Cardador & Francisco Sanchez	Doc 2,1
Cantabrian Sea, VIIIc	Spain	IEO	1997	1	Standard Baca /GOV	Cornide de Saavedra	Francisco Sanchez	Docs 4,2
Spanish waters Gulf of Cadiz	Spain	IEO	2000/2001	1	Baca / GOC 73	Cornide de Saavedra	Fernando Ramos	SGSTG 2003 Doc 11
Portuguese waters - SW and South	Portugal	IPIMAR	2005	2	NCT/CAR	Noruega & Capricornio	Fátima Cardador	Doc 5

11.3.5 References

Doc 1 Borges L., P. Panterne, F. Sanchez, F. Cardador, I. Sobrino, A. Fernandez, J-C. Mahé and P. Moguedet. 1999. Groundfish survey calibration in the SESITS project: Overlapping experiments with RV Noruega-RV Cornide de Saavedra and RV Cornide Saavedra-RV Thalassa.4p. WD to 1999 IBTS meeting, Lisbon.

Doc 2 Borges, L., Cardador, F., Fernández, A., Gil, J., Moguedet, P., Panterne, P., Poulard, J.C., Sánchez, F., Sobrino, I. 1999. Evaluation of Demersal Resources of Southwestern Europe from standardized groundfish surveys (SESITS). Final Report Study Contract 96-029, 195 pp.

Doc 3 Burns, F. and Stokes, D. 2005. Comparative Study between Celtic Explorer and Scotia during the Quarter 4 IBTS survey in area Via. WD to 2005 IBTS meeting, Hamburg, 101:118 pp..

Doc 4 Cardador F., L. Borges, F. Sanchez, I. Sobrino and A. Fernandez. 1999. NCT/GOV and BAKA/GOV calibration experiments in the SESITS project, 6p. WD to 1999 IBTS meeting, Lisbon .

Doc 5 Cardador, F. and Azevedo, M. 2006. Conversion factor to correct Hake indices of abundance estimated with RVCapricórnio (bottom trawl CAR) into RVNoruega (bottom trawl NCT). Working Document presented at ICES Working Group on International Bottom Trawl Surveys (IBTS), Lysekil, 27-31 March 2006, 9p.

Doc 6 Ehrich, S. (1991): Comparative fishing experiments by research trawlers by cod and haddock in the North Sea. - Journal du Conseil International pour l'Exploration de la Mer, 47: 275-283

Doc 7 Ehrich, S., Dahm, E., Dornheim, H., Lange, K., Mergardt, N. & Stein, M. (1994): Comparative Fishing with FRVs "Walther Herwig" and "Walther Herwig III". - ICES Council Meeting Papers, Fish Capture Comm., B 15: 14. [*]

Doc 8 FRS Internal Report

Doc 9 ICES 1996: Report of the International Bottom Trawl Survey Working Group.

Doc 10 ICES 2005. Report of the International Bottom Trawl Survey Working Group, Hamburg, 2005.

Doc 11 ICES. 2003. Report of the Study Group on Survey Trawl Gear for the IBTS Western and Southern Areas. Vigo February 12–14 February 2003. ICES CM 2003/B:01. 22 pp.

Doc 12 ICES. 2004. Report of the Study Group on Survey Trawl Gear for the IBTS Western and Southern Areas. Santander February 11–13 February 2004. ICES CM 2004/B:01. 23 pp.

Doc 13 International Program of Standardised Trawl Surveys (IPROSTS) - EU Study contract 98-057

Doc 14 Kafemann, R., Ehrich, S., Coull K.J. 2007. Results of a comparative fishing experiment of FRV “Walther Herwig III” and FRV “Scotia” in 2006. WD to 2007 IBTS meeting, Séte, 178:194 pp.

Doc 15 Peter Lewy, J. Rasmus Nielsen, and Holger Hovgård. 2004. Survey gear calibration independent of spatial fish Distribution. Can. J. Fish. Aquat. Sci. Vol. 61, 2004

11.4 Prioritisation of the Channel Ground Fish Survey

11.4.1 Background and use of CGFS

Each year in October since 1988, IFREMER carries out a bottom trawl survey named Channel Ground Fish Survey (CGFS), aiming at evaluating abundance indices of main commercial species for the Eastern English Channel. The Channel Ground Fish Survey is the only bottom trawl survey providing scientific data of this type and covering all the Eastern English Channel area (see Annex 5, Working Document 5).

These Indices are transmitted each year since 1988 to the expert of the working group “Assessment of Demersal Stock in the North Sea and Skagerrak” of the International Council for the Exploration of the Sea (ICES) for whiting, plaice and cod. Cod is under of a recovery plan. Moreover, this survey supplements the direct evaluation programme of flat fish stocks “Beam Trawl Survey” carried out by other Member States. Data collected during the CGFS are also used by the Working Group on assessment of New MoU Species to improve biological data and space distribution knowledge for species studied by this group (striped red mullet, dab, flounder, sea bass, gurnards, turbot, brill, lemon sole). In this context, a study to identify various stocks of striped red mullet from the Bay of Biscay to the north of the North Sea was proposed. It is based on a comparative study of the results given by a geometrical morphometry and genetic analyses. A general report on striped red mullet biological and fishing exploitation aspects was done in collaboration with fishermen committee (Mahé *et al.*, 2005)

In another context, the CGFS also contributes to research activities in ecology with the aim to describe and understand exploited ecosystems. This survey constitutes an essential support to the realisation of the CHARM project (Eastern Channel Habitat Atlas for Marine Resource Management whose first phase was to produce a habitats atlas of the main commercial fish species (Carpentier *et al.*, 2005). The second phase is to develop scientific tools to 5) manage current and future anthropic impacts. The CGFS is also essential to the impact study of the industrial activities on the marine environment (e.g. marine aggregate extraction, windfarms). Finally, in the context of

the Maritime Policy Blue book, the Channel Ground Fish Survey is one of the tools able to provide accurate physical and biological information on the Eastern English Channel. Indeed, in the Maritime Policy Blue book, five axes were proposed that allow reinforcing the sustainable development policy of the sea. In this context, the CGFS could contribute significantly to the ecological and biological knowledge through the identification of fish habitats, the study of their abundance fluctuations and the populations' behaviour.

These various studies aim to bring arguments to resources management, to identify the significant ecological zones in order to take decisions adapted to marine environmental sustainability. Recently Channel Ground Fish surveys were used to describe ecosystem in the Eastern English Channel in the setting of WGRED (Working Group for Regional Ecosystem Description) which took place at the end of February 2008.

11.4.2 Prioritisation by EU

The Data Collection Regulation survey eligibility is based on Subgroup on research needs STECF Sub-group on Research Needs (SGRN) which took place in Brussels February 12-16, 2007 This group defined criteria in order to compile a list of surveys at sea to be considered for co-funding by the new Data Collection Regulation. Channel Ground Fish Survey was not considered as a first priority survey because in table 2 of this group's report CGFS is considered not coordinated and harmonised through an internationally organised steering mechanism. The IBTSWG group notes that the French Channel Ground Fish Survey has been coordinated by the group since 1995. Although indices has been providing by CGFS for whiting and cod since the beginning of the survey those indices are not used because of their inconsistency. One of the reasons of these inconsistencies should be due to fish population exchanges between Eastern English Channel and their adjacent areas. The WGNSSK group welcomed to the idea of doing an internal workshop on this survey (re-reading of the otoliths, investigation on different means of deriving the indices). Until now indices were calculated using mean by ices rectangle, for this purpose, the IBTS group recommends to investigate the possibility to calculate indices using stratification based on the study by Vaz and al (ICES Journal of Marine Science, 64, 271–287). The result of this new calculation method should be presented during the next IBTS meeting.

11.4.3 References

Mahé K., Destombes A., Coppin F., Koubbi P., Vaz S., Leroy D., Carpentier A., 2005. Le rouget barbet de roche Mullus surmuletus (L. 1758) en Manche orientale et mer du Nord 186p.

Carpentier, A., Vaz, S., Martin, C. S., Coppin, F., Dauvin, J.- C., Desroy, N., Dewarumez, J.- M., Eastwood, P. D., Ernande B., Harrop, S., Kemp, Z., Koubbi, P., Leader-Williams, N., Lefèbvre, A., Lemoine, M., Loots, C., Meaden, G. J., Ryan, N., Walkey, M., 2005. Eastern Channel Habitat Atlas for Marine Resource Management (CHARM), Atlas des Habitats des Ressources Marines de la Manche Orientale, INTERREG IIIA, 225 pp

Vaz, S., Carpentier, A. & Coppin, F. (2007) Eastern English Channel fish assemblages: measuring the structuring effect of habitats on distinct subcommunities. ICES Journal of Marine Science, 64, 271–287

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Annex 2: IBTSWG terms of reference for the next meeting

The IBTSWG discussed the possibilities to meet in quarter 3 or 4, but due to e.g. the timing of the coordinated surveys, it was agreed to schedule the meeting around the first of April, as usual.

In order to stimulate working activities in between annual meetings, countries have committed themselves in plenary to prepare specific ToR's for the next meeting.

Table 1. Overview of the proposed ToR's for 2009 and the countries committed to take the lead in preparing them for next meeting.

TOR	LEAD	TOR	LEAD
A	Ireland, England, Netherlands	F	England
B	Ireland, Northern Ireland	G	Scotland
C	Sweden, England	H	France
D	ICES	I	Denmark
E	England, Netherlands, Germany	J	Spain, Ireland

The **International Bottom Trawl Survey Working Group** [IBTSWG] (chair: R. ter Hofstede, The Netherlands) will meet in Bergen, Norway, from 30 March–3 April 2009 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 and refine the standard reporting format.

b) Further evaluate and standardise criteria for ensuring quality and consistency in collection and reporting of survey data, including the review of abundance indices;

c) Examine gear performance issues by (i) reviewing the reporting procedures of trawl, vessel and environmental parameters and (ii) analyse net geometry readings to evaluate changes;

d) Review recent updates within DATRAS and prioritise further developments ;

e) Improve the quality of current IBTS data by: (i) the production and dissemination of identification keys for IBTS groundfish surveys, (ii) examination of DATRAS data to identify and correct erroneous length and distribution records, (iii) examine quality of age-length keys and (iv) ensure correct and consistent taxonomic use during IBTS surveys;

f) Review national progress in improving quality of historic IBTS data;

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

h) Review and if required update the shapefiles and supporting information for the agreed strata in the Eastern Atlantic;

i) Review the implications of new the EU DCR and implement changes where necessary;

j) Review the IBTS manuals and update as necessary.

Supporting Information

PRIORITY:	Essential.
SCIENTIFIC JUSTIFICATION AND RELATION TO ACTION PLAN:	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. It is 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, intercalibration work, and high quality of data. The development of a standard reporting format is intended to provide a brief, structured overview of the main results and difficulties from individual vessel surveys annually, and will provide a centralised and easily accessible overview of specific survey data sets, to those using the data. IBTSWG will continue to review feedback and implement modifications. b) In order to achieve the required level of quality in survey data, there is an urgent demand for clear international protocols on sampling strategies and data analysis, including defining the best adapted methods for computing indices. c) The standardised gear settings seem to differ amongst countries, therefore reporting protocols for trawl, vessel and environmental parameters have to be improved and detected changes in the settings have to be evaluated. d) The development of DATRAS needs to be evaluated. IBTSWG will comment on the new version of DATRAS and will recommend on desired further developments. e) and f) Detected errors in the database (e.g. DATRAS) should be corrected and protocols for the avoidance of misuse of existing data and for the prevention of future errors will be developed and implemented. 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. h) GIS *.shp files have now been made available for strata used by most of the surveys in the Eastern Atlantic area. The IBTSWG will further develop a scheme that will include all shapefiles, strata descriptions, computed areas and the information used for the strata definition. i) The new EU DCR (date) is expected to have implications for the current design of the surveys coordinated by the IBTSWG and the implementation of new requirements needs to be addressed. j) All changes in the protocols of the surveys coordinated by the IBTSWG coming from the above ToR's 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 are allocated. It would be highly beneficial to have the person responsible for the ICES DATRAS participating for some days.
SECRETARIAT FACILITIES:	None
FINANCIAL:	None
LINKAGES TO ADVISORY COMMITTEES:	ACOM

LINKAGES TO OTHER COMMITTEES OR GROUPS:	Assessment WG's, WGBEAM, WGBIFS g) Cooperation with SGSTS
LINKAGES TO OTHER ORGANIZATIONS:	IOC, GOOS
SECRETARIAT MARGINAL COST SHARE:	ICES: 100%

Annex 3: Recommendations

RECOMMENDATION	ACTION
1. IBTS North Sea Q1 and Q3 coordination – sections 4.1, 4.2. 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.	North Sea IBTS Q1 and Q3 participants
2. Extension of NS-IBTS Q1 into the Eastern Channel – section 4.1.5.2. The IBTSWG recommends that the extension of the North Sea IBTS programme with 5 rectangles into the Eastern Channel will also take place in 2009, however emphasizes that the first priority must be given to GOV hauls and MIK samples as required in the IBTS protocol, and that additional surveying (e.g. acoustics, CUFES samples) are carried out only if it does not delay the regular IBTS programme.	IFREMER and IMARES
3. Roundfish area 10 – sections 3.7 and 4.1.5.1. The IBTSWG recommends to name the area "roundfish area 10" (see section 4.1.5.1), in addition to the other 9 roundfish areas that are covered by the North Sea IBTS.	ICES Datacenter
4. International workshop on the identification of clupeid larvae - section 4.1.5.4 The IBTSWG recommends a workshop on the identification of fish larvae and eggs to ensure data quality and especially deal with possible misidentifications of sprat, herring and other clupeid larvae.	PGHERS, HAWG, IBTSWG
5. Measuring mesh size – section 6.2 The IBTSWG recommends that for quality control of survey gear with respect to the control of mesh size, stretched mesh measurement protocol should be used.	All national institutes
6. DATRAS User Group – section 7.1.5 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.	ICES Datacenter
7. Maturity staging of 4 gadoid species – section 8.4 The IBTSWG agreed to follow the recommendations made by the WKMSCWHS. Therefore: • From 2008, no maturity data on cod, haddock, whiting and saithe will be collected during the 3Q North Sea IBTS 2008. • Collection of maturity data on cod, haddock, whiting and saithe will be carried out during the 1Q North Sea IBTS using the new 6 stage scale. • The draft manuals on maturity data collection on cod, haddock, whiting and saithe will be tested during the 1Q North Sea IBTS in 2009. • Additional material to be used for finalizing the manuals will be collected during the 1Q North Sea IBTS 2009 (Rikke Hagstrøm Bucholtz, DTU-Aqua, Denmark will coordinate this additional sampling). • The ICES secretariat will be asked to update the ICES DATRAS database to be able to handle the reporting of 6 maturity stages.	All national institutes, ICES Datacenter
8. Stratification CGFS – section 10.2 The IBTSWG recommends that a stratification based on the results from studies about habitat and fish assemblage in the area covered by the CGFS should be further investigated and used to compute abundance indices as this could increase precision and year to year consistency. Results of these investigation should be presented at the 2009 meeting of the IBTSWG prior to agreement of this stratification.	IFREMER
9. Objectives IBTSWG – section 11.1 The IBTSWG proposes a definition of their remits, including a set of criteria as drafted last year, and asks RCM for its approval.	RCM

Annex 4: Maps of species distribution

Table 1. Species for which distribution maps have been produced, with length split for pre-recruit (0-group) and post-recruit (1+ group) where appropriate. Asterisk (*) denotes extended species map covering North Sea Q3 surveys along with Western Area Q4 data.

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	28	
Galeus melastomus	Blackmouted Dogfish	DBM	32	
Lepidorhombus boscii	Four Spot Megrim	LBI	15	
Lepidorhombus whiffiagonis	Megrim	MEG	14	
Leucoraja naevus	Cuckoo Ray	CUR	26	
Lophius budagassa	Black-bellied Anglerfish	WAF	17	
Lophius pscatorius	Anglerfish (Monk)	MON	16	
*Marlangius merlangus**	Whiting	WHG	20 – 21	20
*Melanogrammus aglefinus**	Haddock	HAD	4 – 5	20
Merluccius merluccius	European Hake	HKE	8 – 9	20
Micromeisistius poutassou	Blue Whiting	WHB	22 – 23	19
Mustelus asterias	Starry Smoot Hound	SDS	29	
Mustelus mustelus	Smooth Hound	SMH	33	
Nephrops norvegicus	Norway Lobster	NEP	24	
*Pleuronectes platessa**	European Plaice	PLE	18 – 19	12
Raja clavata	Thornback Ray (Roker)	THR	30	
Raja microocellata	Painted/Small Eyed Ray	PTR	34	
Raja montagui	Spotted Ray	SDR	35	
Raja undulata	Undulate Ray	UNR	36	
*Scomber scombrus**	European Mackerel	MAC	12 – 13	24
Scyliorhinus canicula	Lesser Spotted Dogfis	LSD	25	
Scyliorhinus stellaris	Nurse Hound	DGN	37	
Squalus acanthias	Spurdog	DGS	27	
Trachurus picturatus	Blue Jack Mackerel (Blue Scad)	JAA	31	
Trachurus trachurus	Horse Mackerel (Scad)	HOM	10 - 11	15

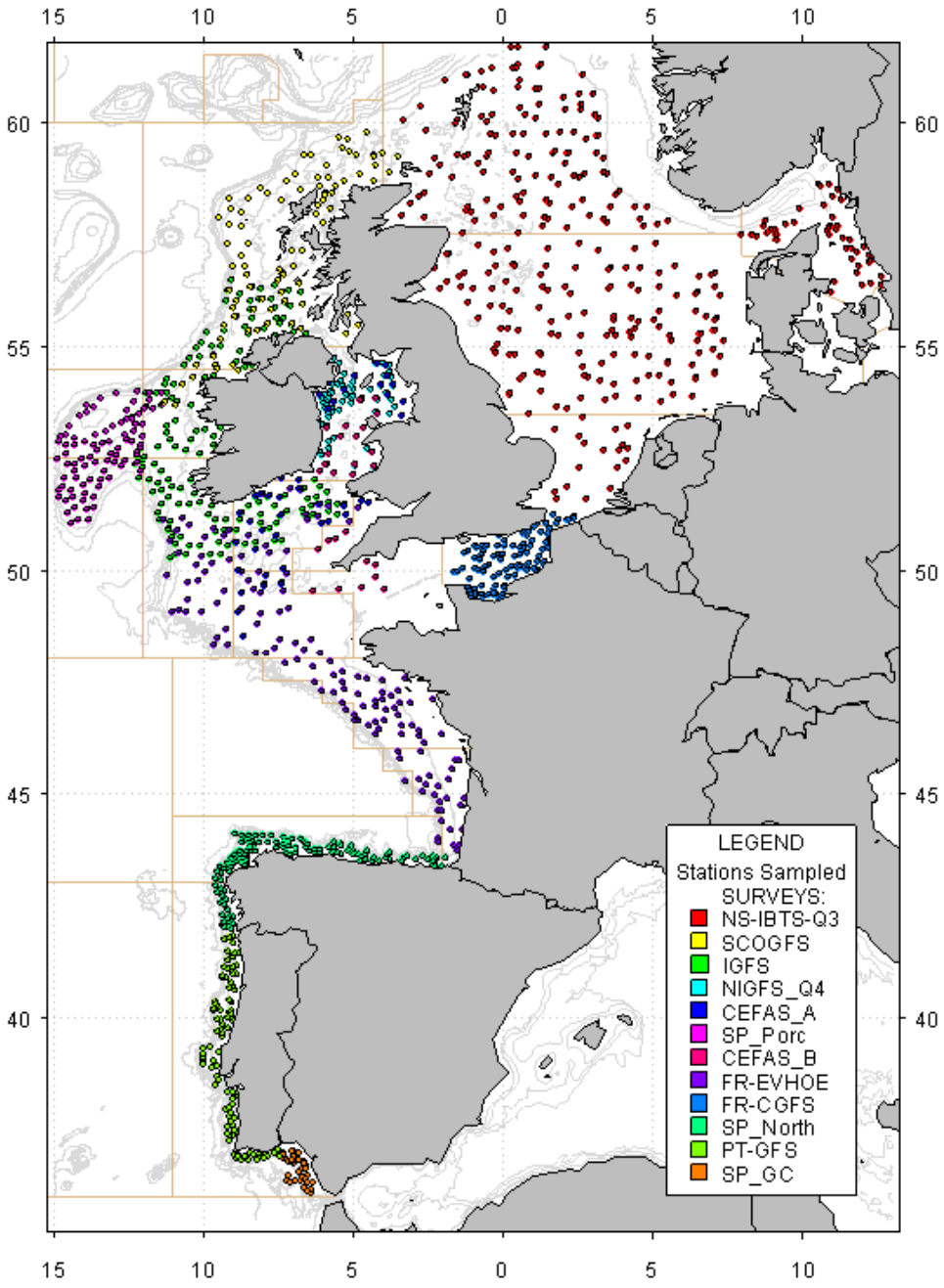

Figure 1: Station positions for the IBTS Surveys carried out in the Western and North Sea Area in the autumn/winter of 2007.

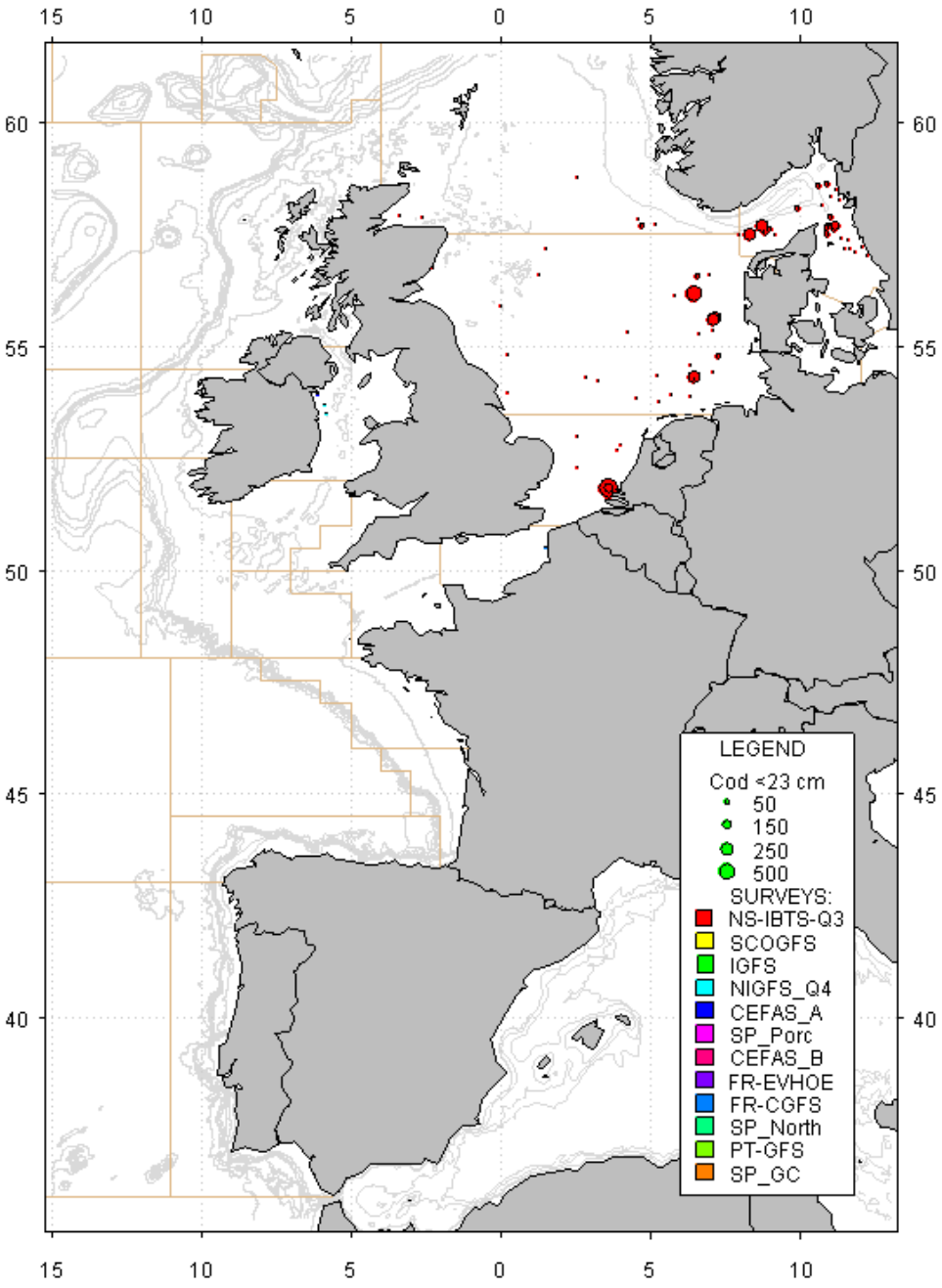

Figure 2: Catches in numbers per hour of 0-group Cod, *Gadus morhua* (<23cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

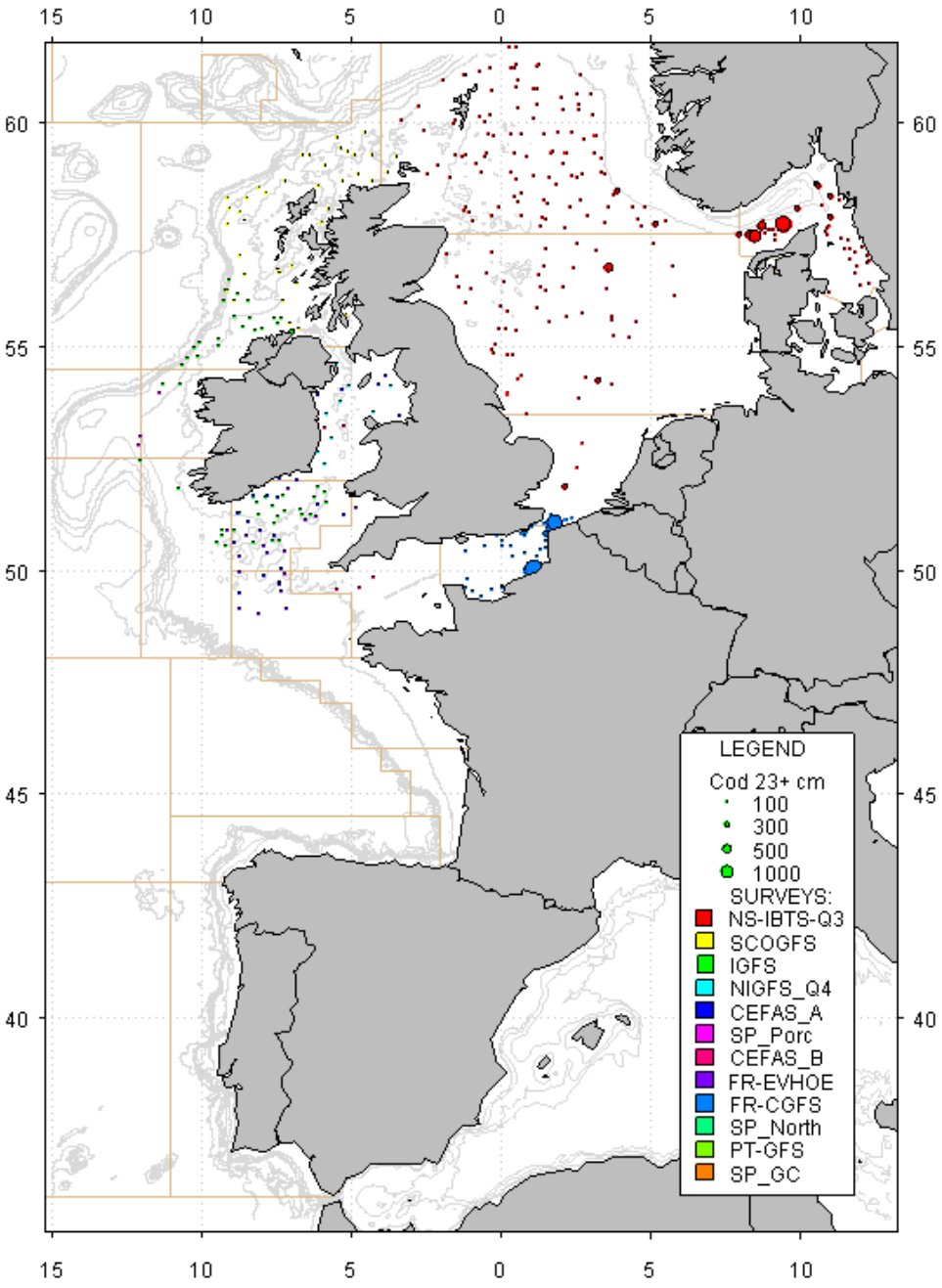

Figure 3: Catches in numbers per hour of 1+ cod, *Gadus morhua* (≥23cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

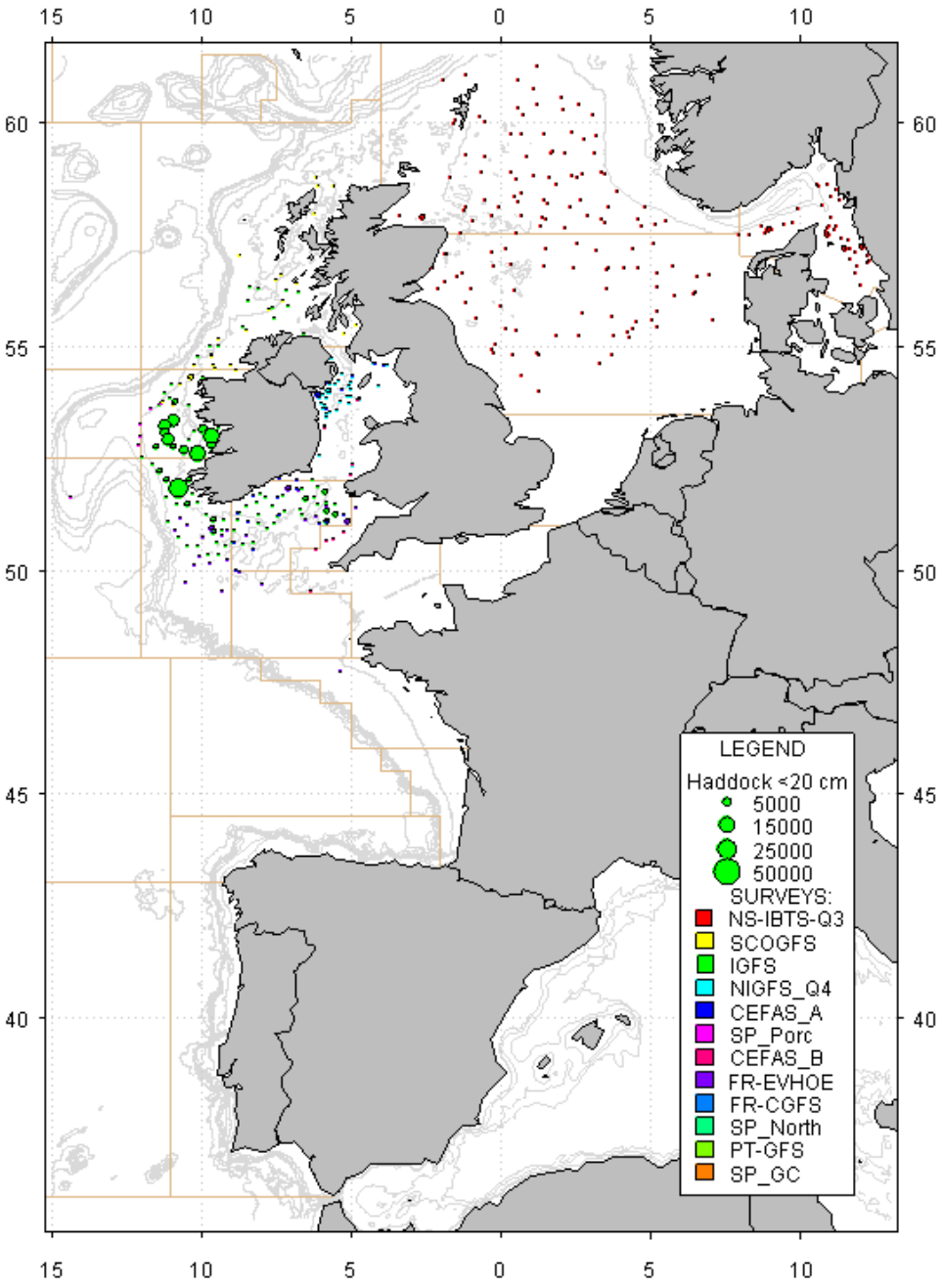

Figure 4: Catches in numbers per hour of 0-group haddock, *Melanogrammus aeglefinus* (<20cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

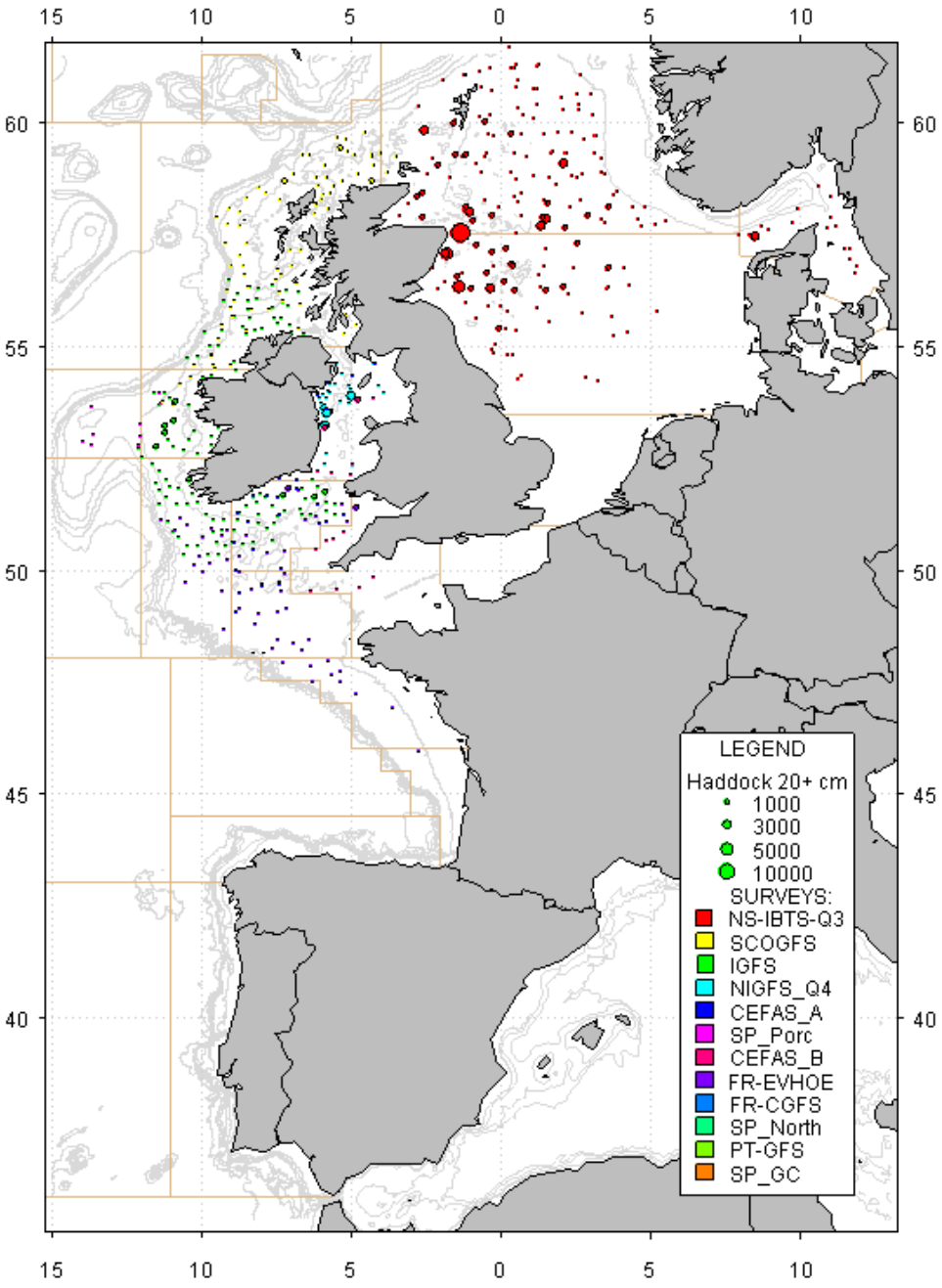

Figure 5: Catches in numbers per hour of 1+ group haddock, *Melanogrammus aeglefinus* (≥20cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

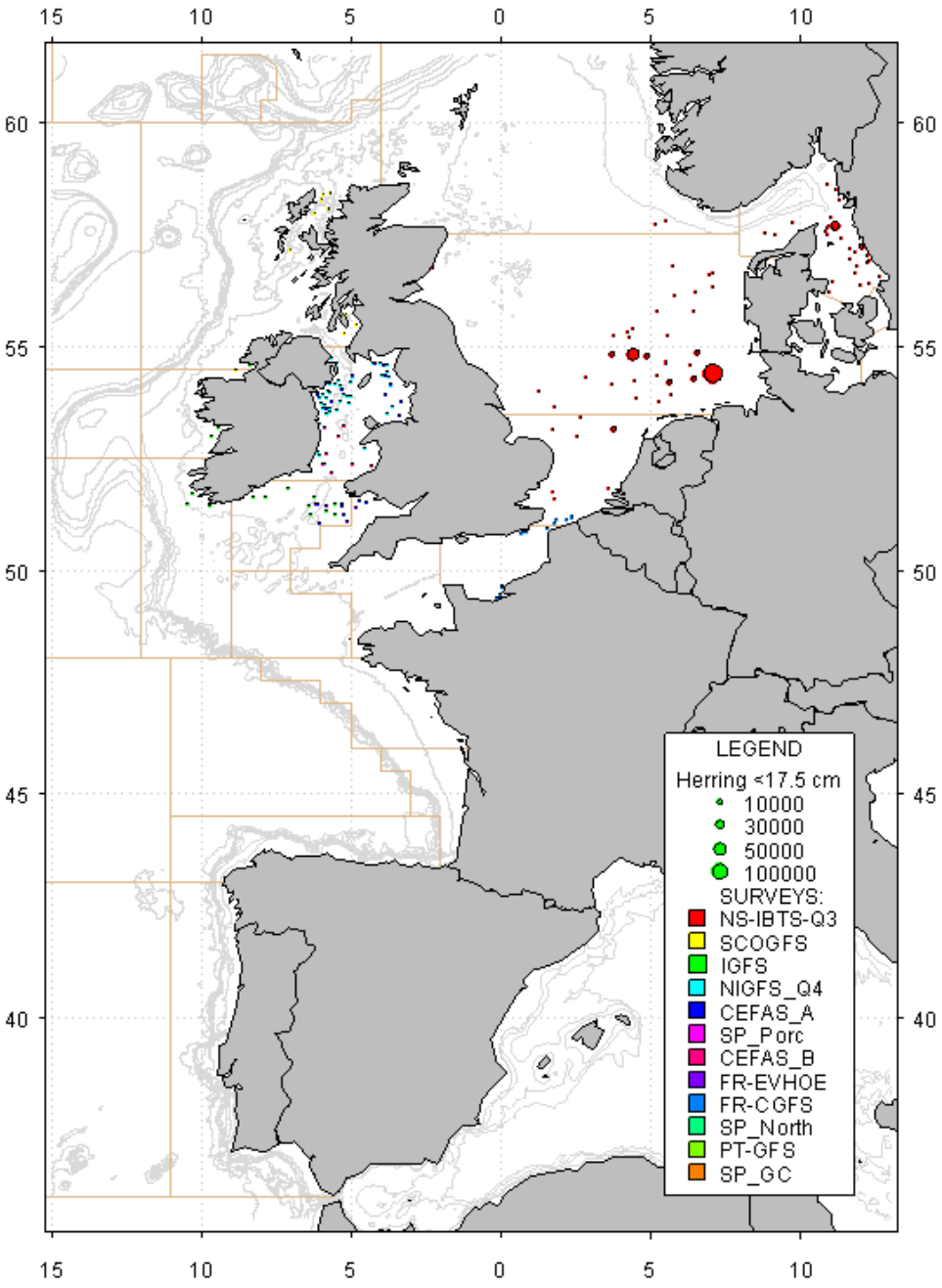

Figure 6: Catches in numbers per hour of 0-group herring, *Clupea harengus* (<17.5 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

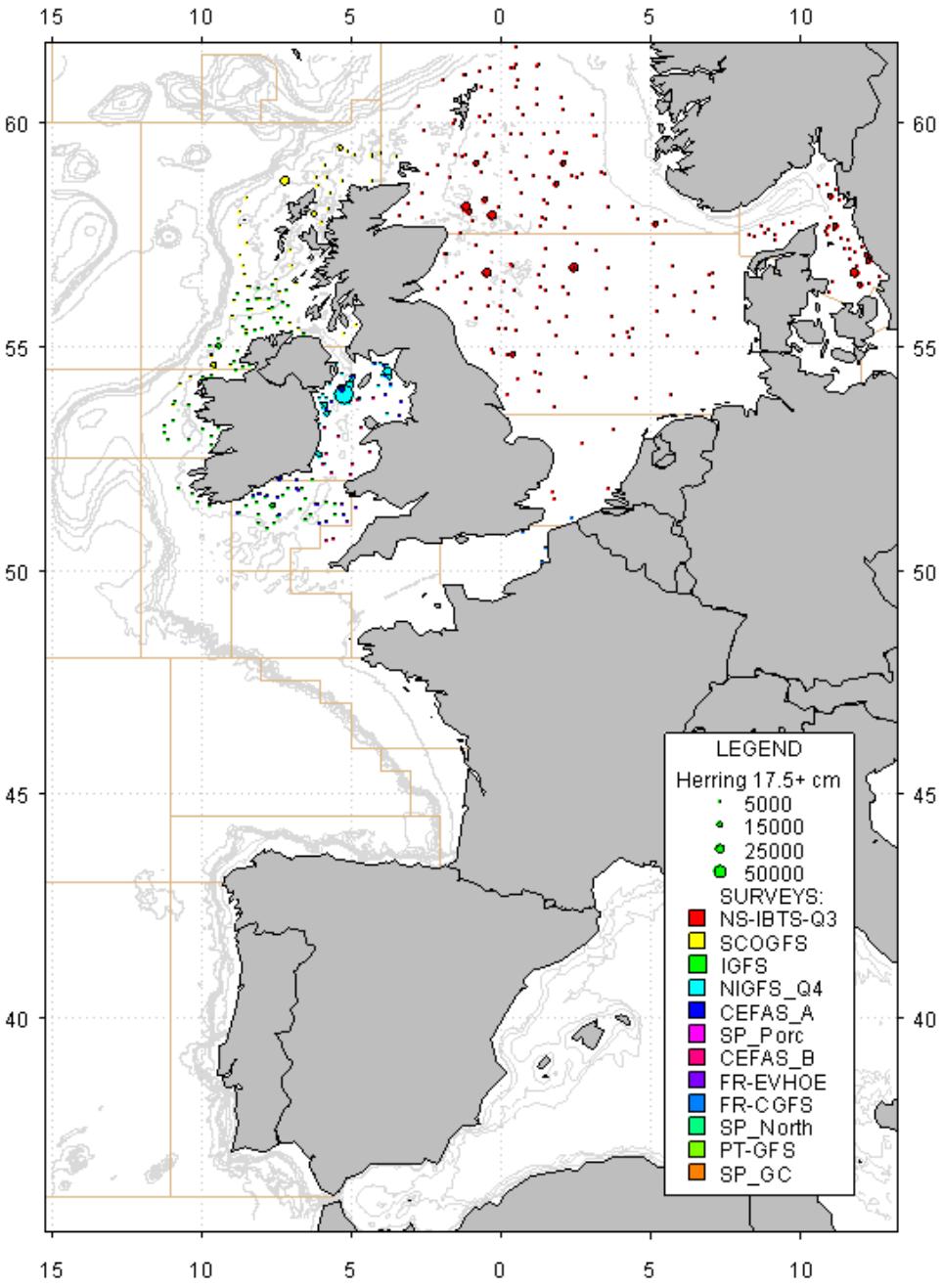

Figure 7: Catches in numbers per hour of 1+ group herring, *Clupea harengus* (≥17.5 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

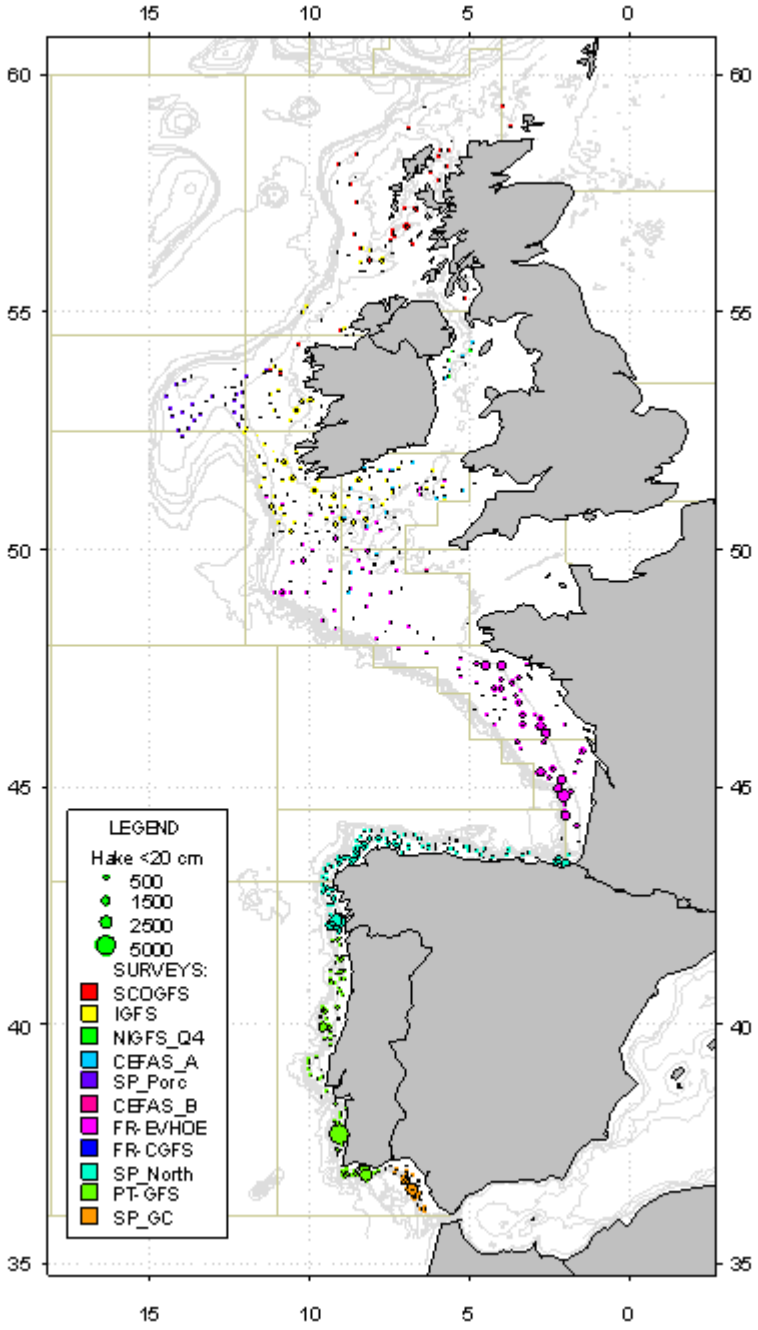

Figure 8: Catches in numbers per hour of 0-group hake, *Merluccius merluccius* (<20 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

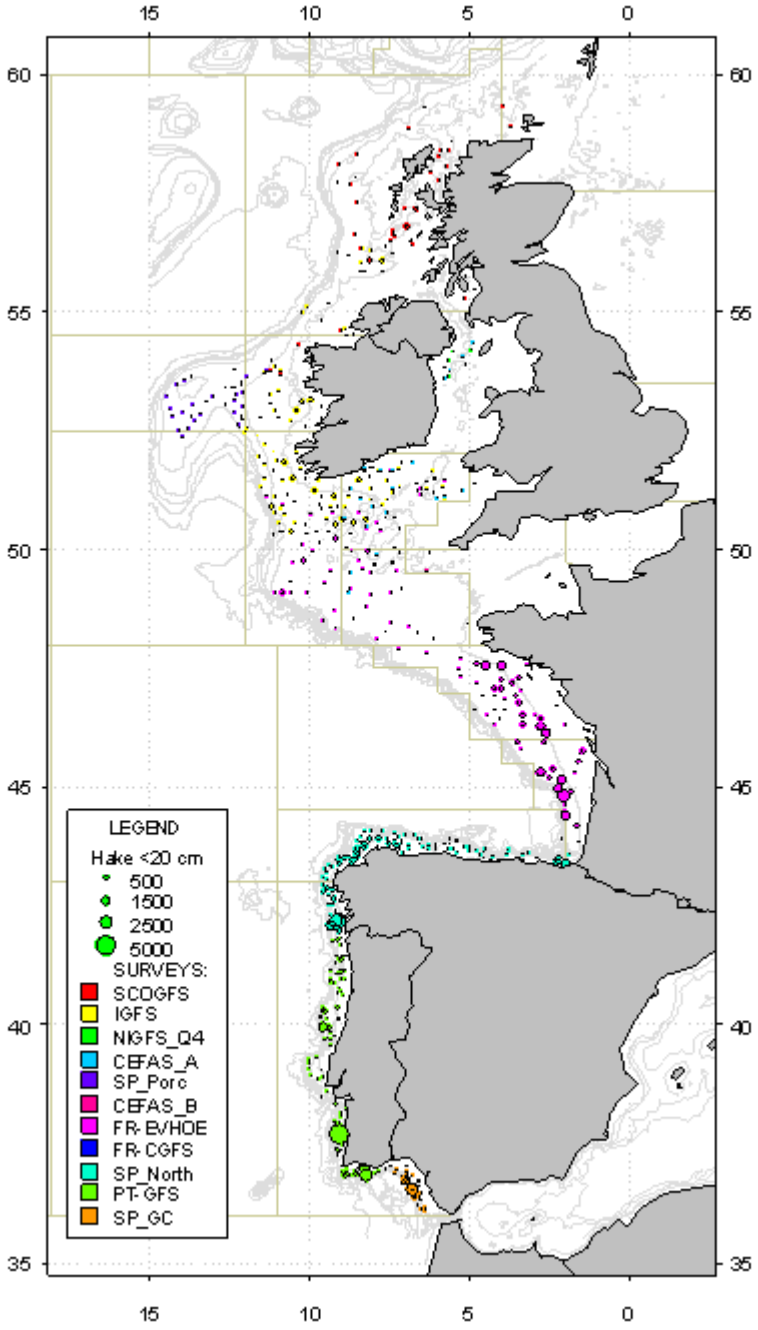

Figure 9: Catches in numbers per hour of 1+ group hake, *Merluccius merluccius* (≥20 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

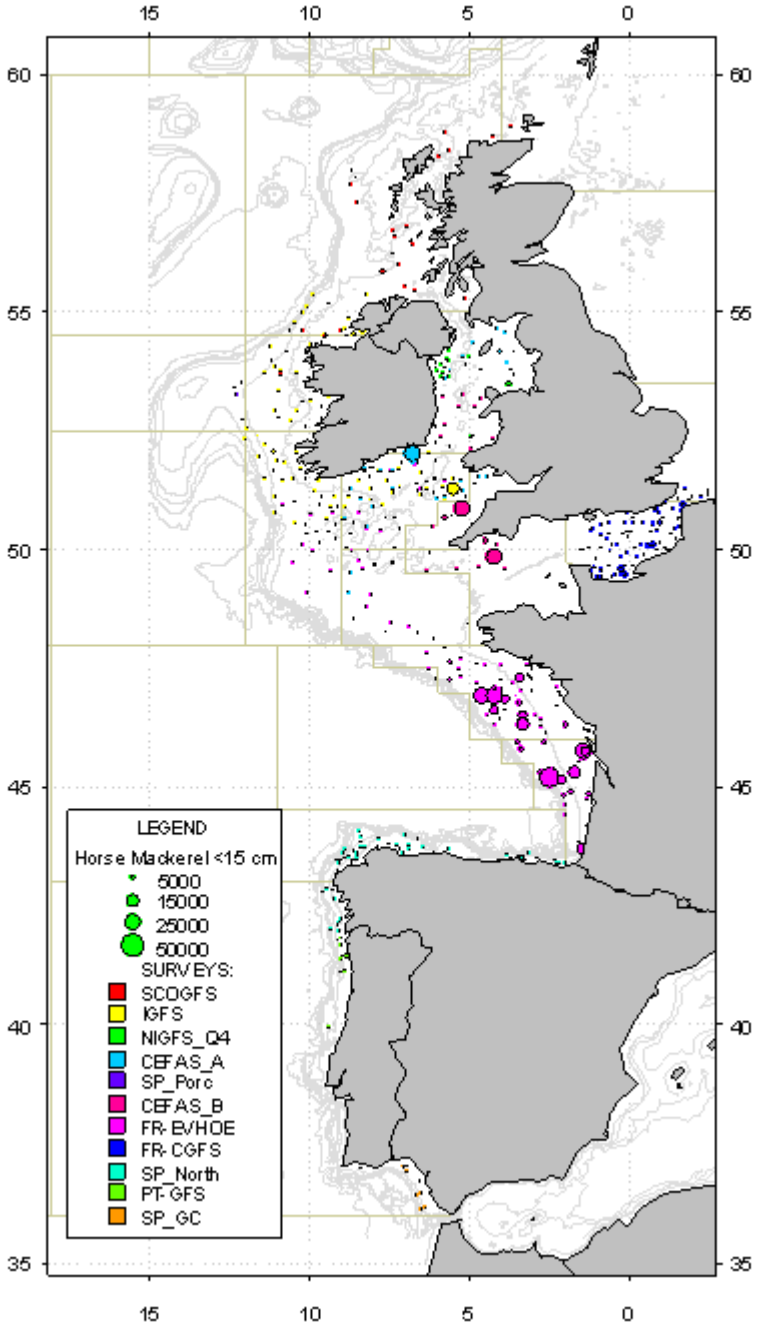

Figure 10: Catches in numbers per hour of 0-group horse mackerel, *Trachurus trachurus* (<15 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

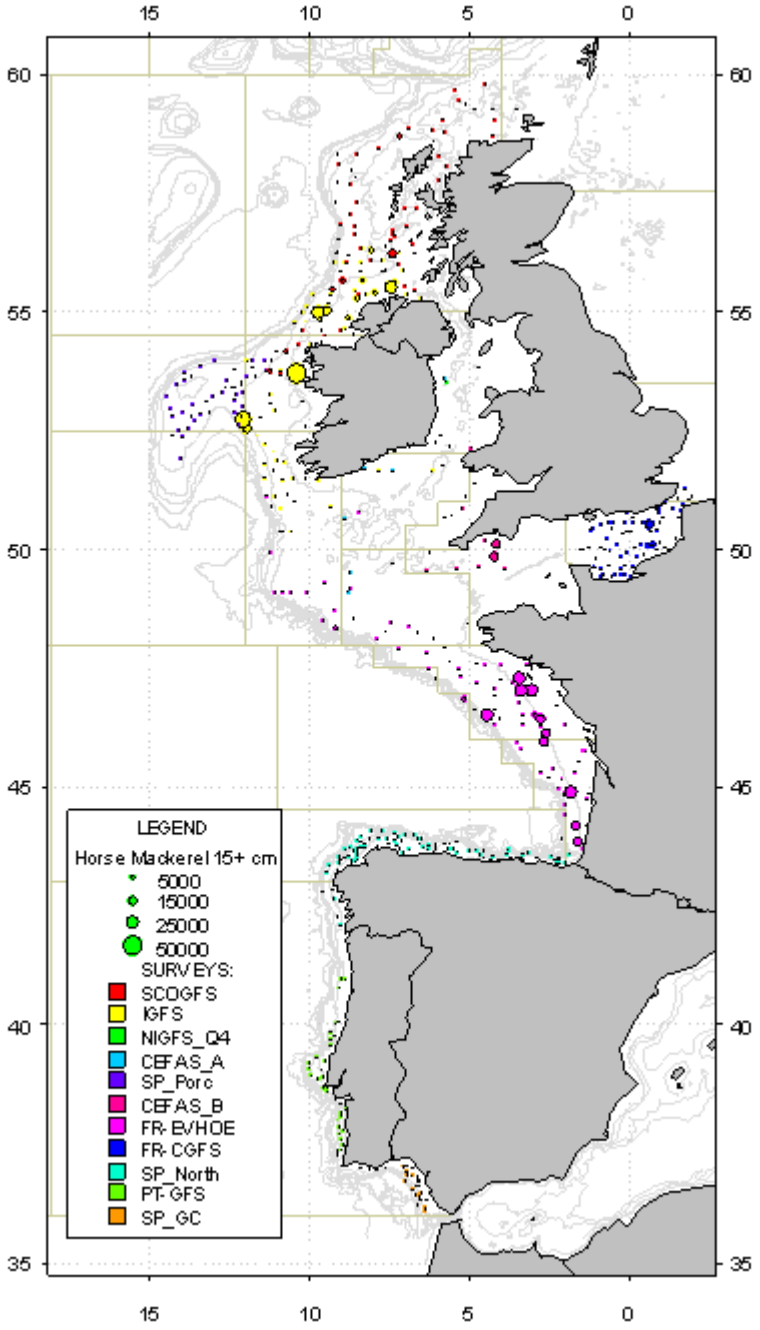

Figure 11: Catches in numbers per hour of 1+ group horse mackerel, *Trachurus trachurus* (≥15 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

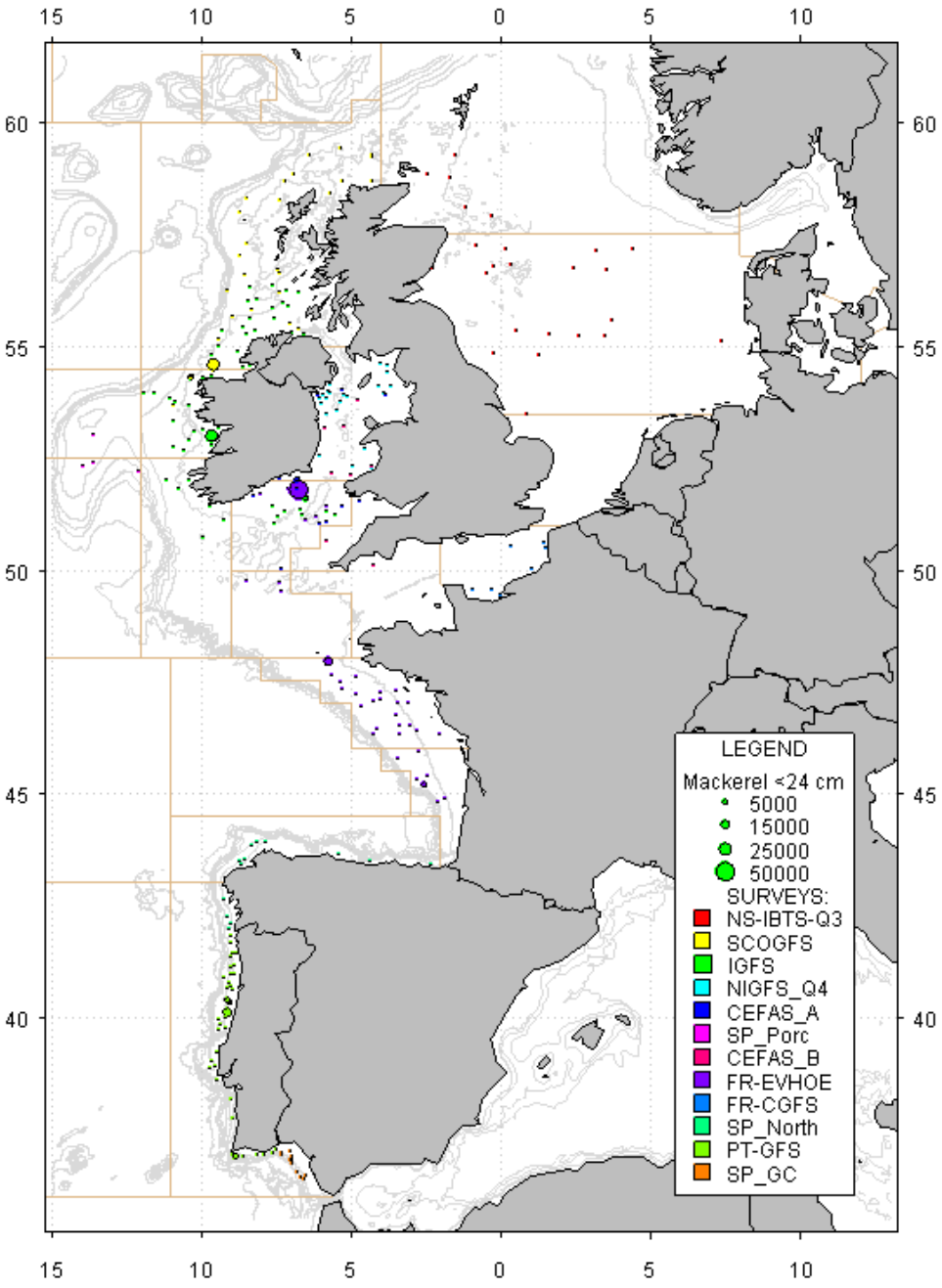

Figure 12: Catches in numbers per hour of 0-group mackerel, *Scomber scombrus* (<24 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

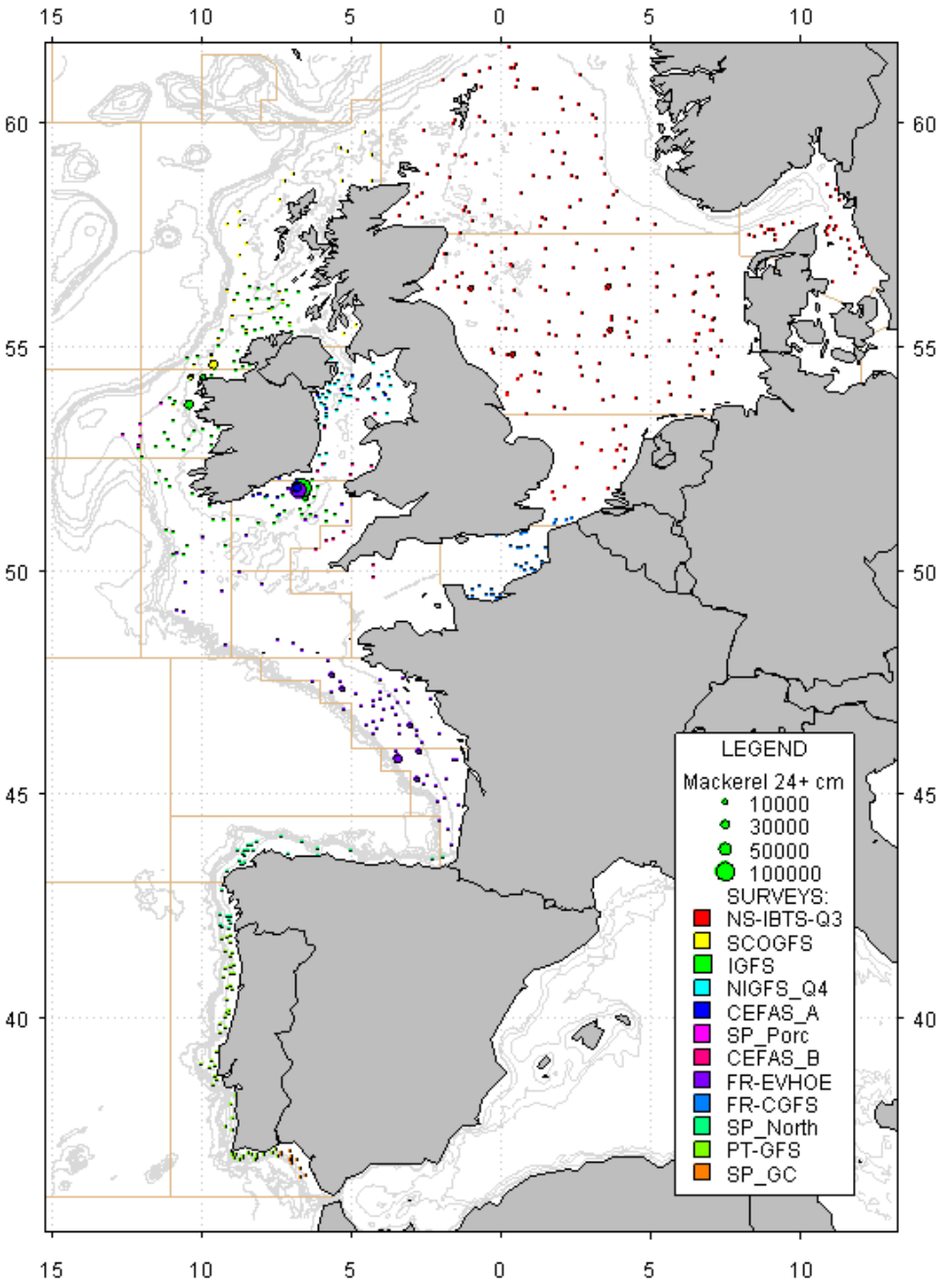

Figure 13: Catches in numbers per hour of 1+ group mackerel, *Scomber scombrus* (≥24 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

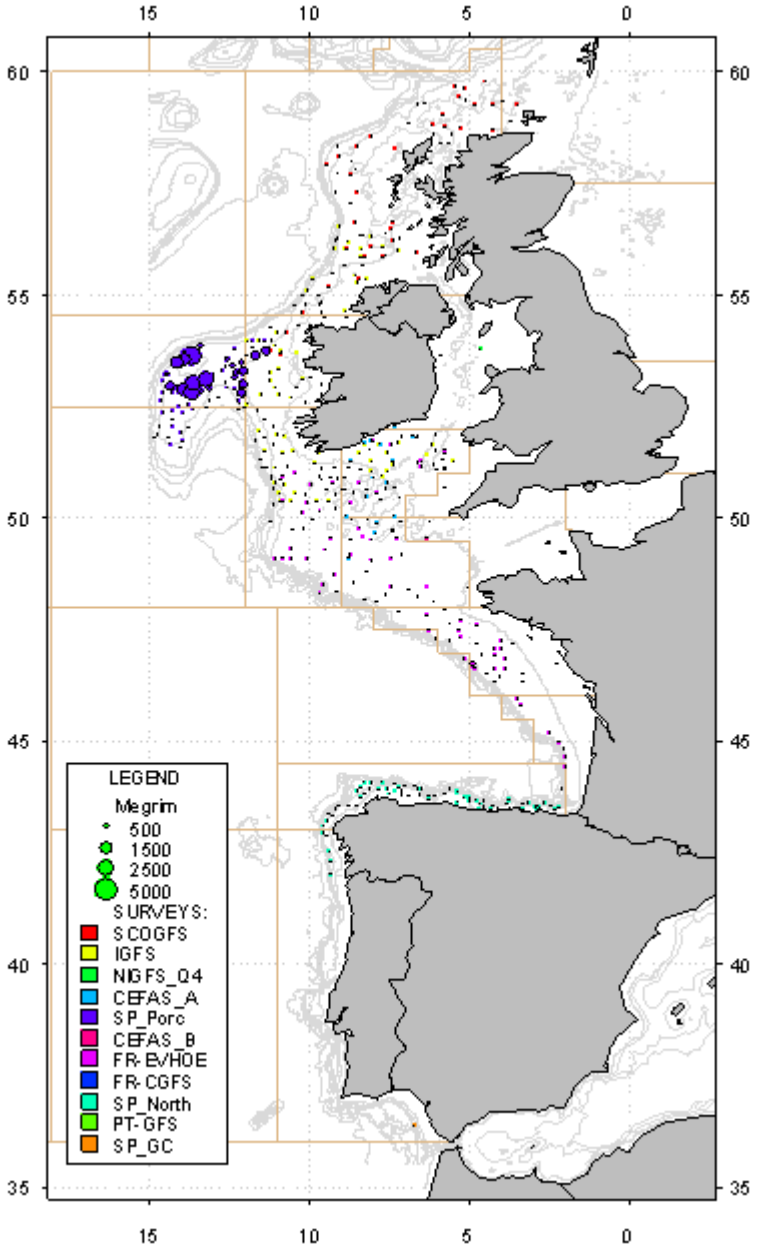

Figure 14: Catches in numbers per hour of megrim, *Lepidorhombus whiffiagonis*, in autumn/winter 20067IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

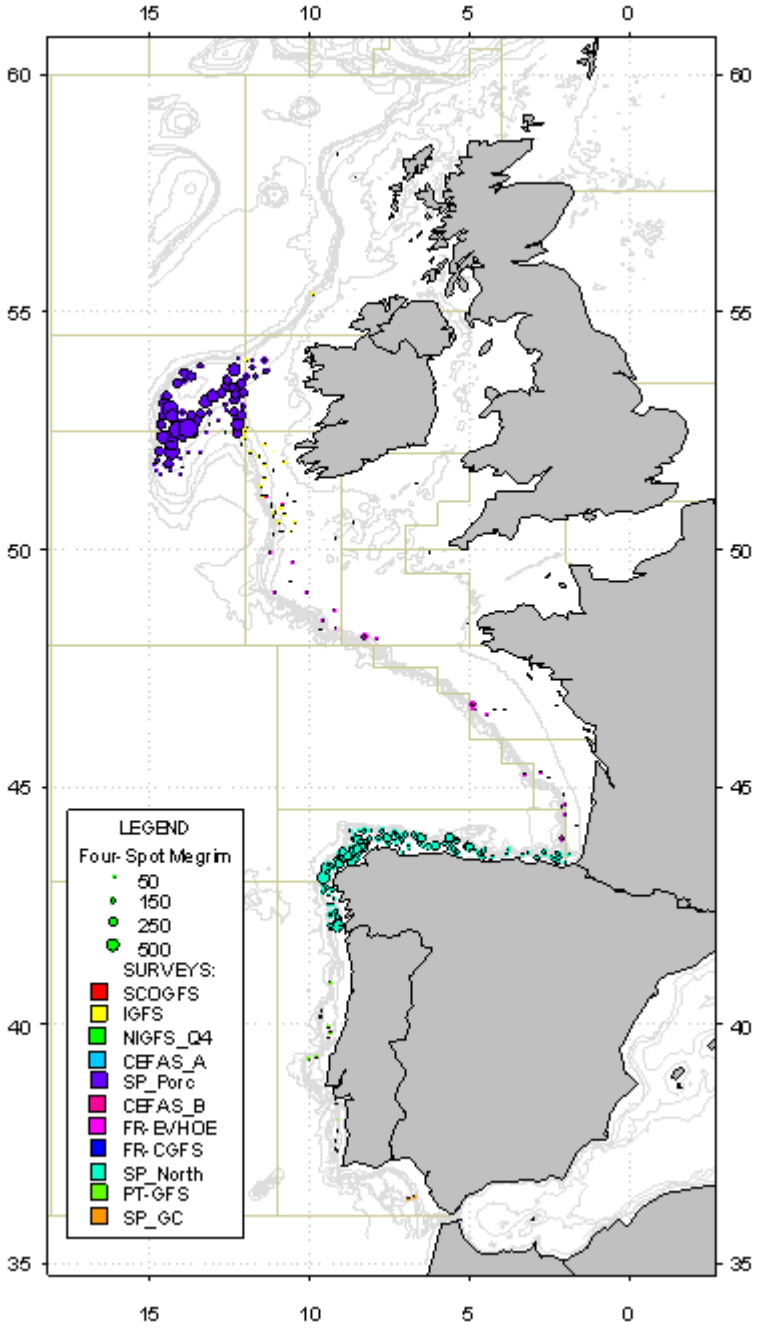

Figure 15: Catches in numbers per hour of four-spotted megrim, *Lepidorhombus boscii*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

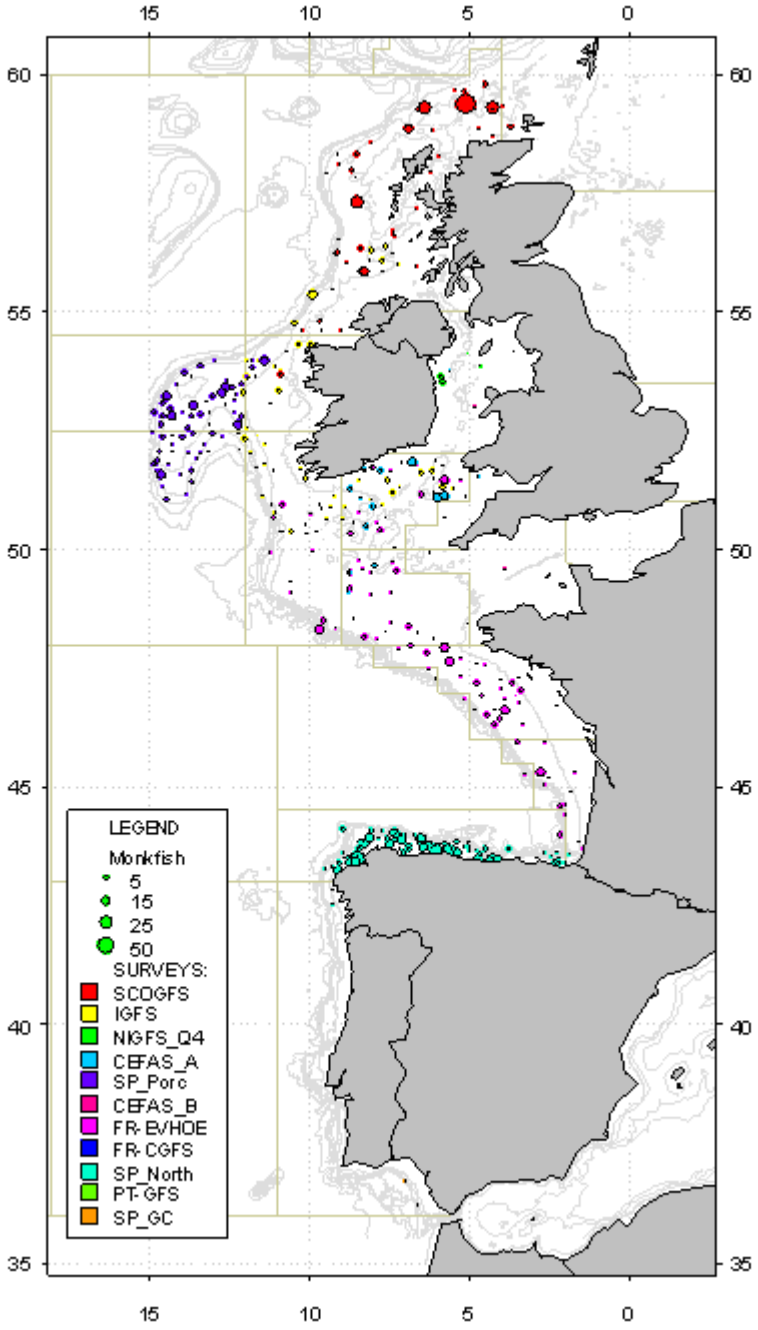

Figure 16: Catches in numbers per hour of monkfish, *Lophius piscatorius*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

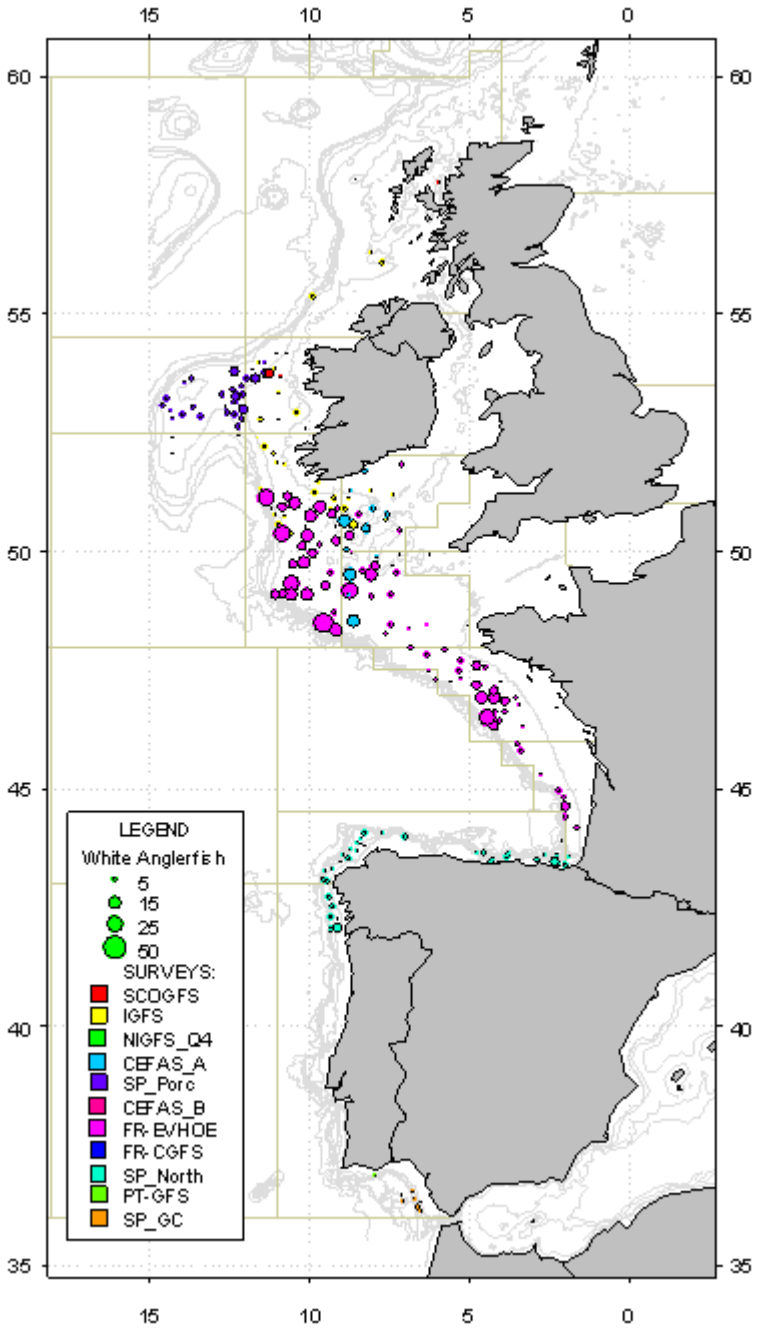

Figure 17: Catches in numbers per hour of black anglerfish, *Lophius budegassa*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

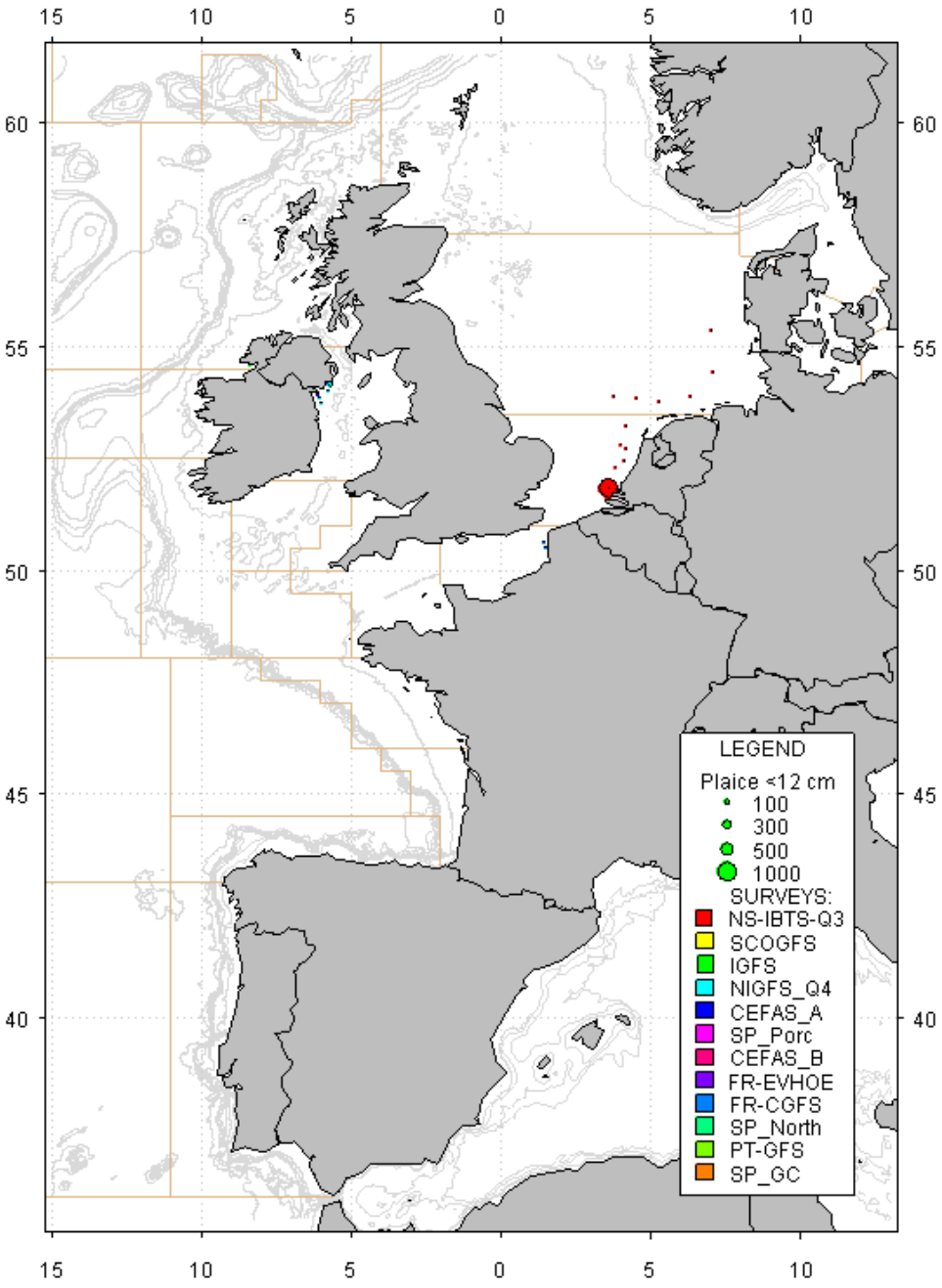

Figure 18: Catches in numbers per hour of 0-group plaice, *Pleuronectes platessa* (<12 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

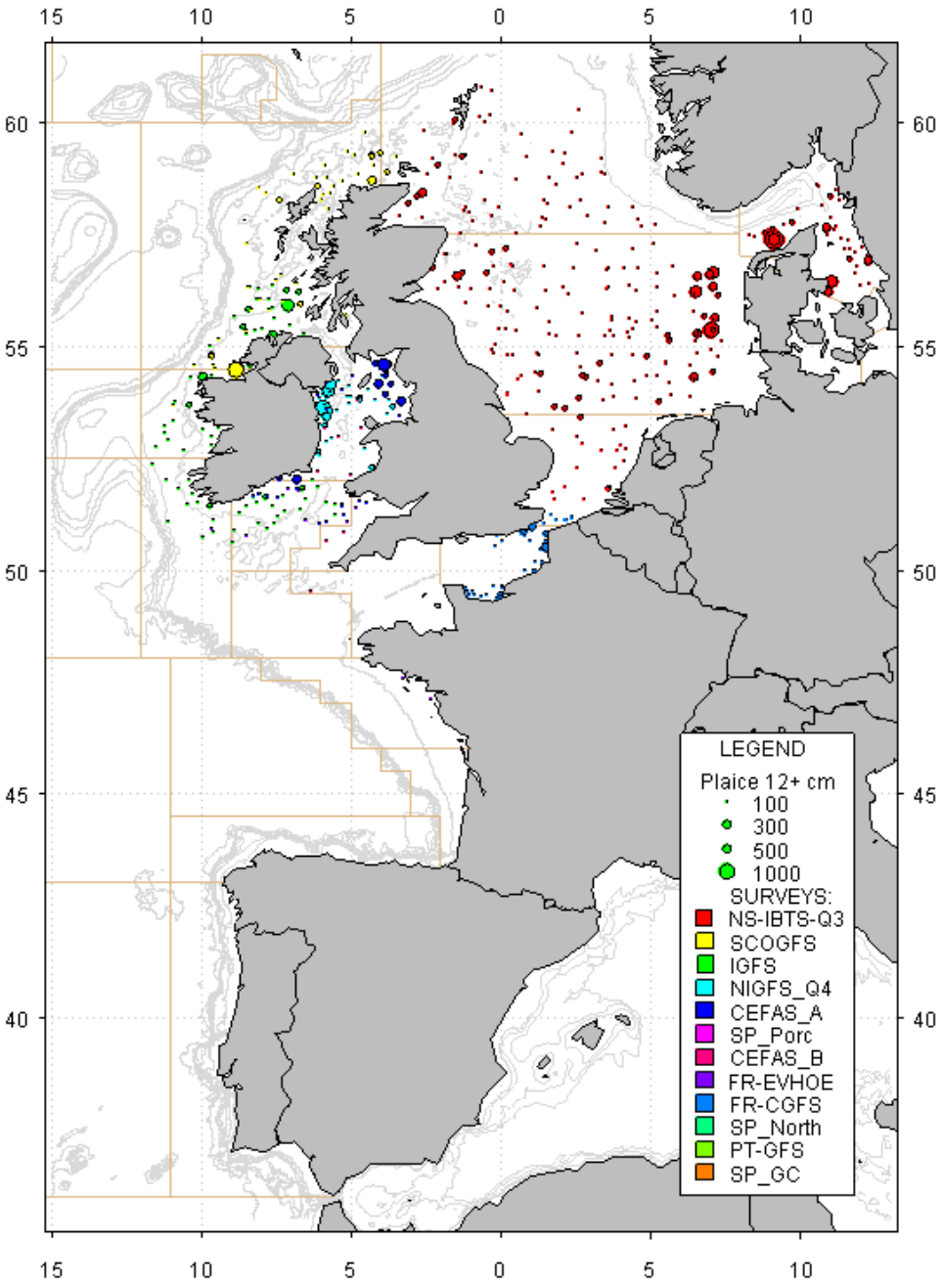

Figure 19: Catches in numbers per hour of 1+ group plaice, *Pleuronectes platessa* (≥12 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

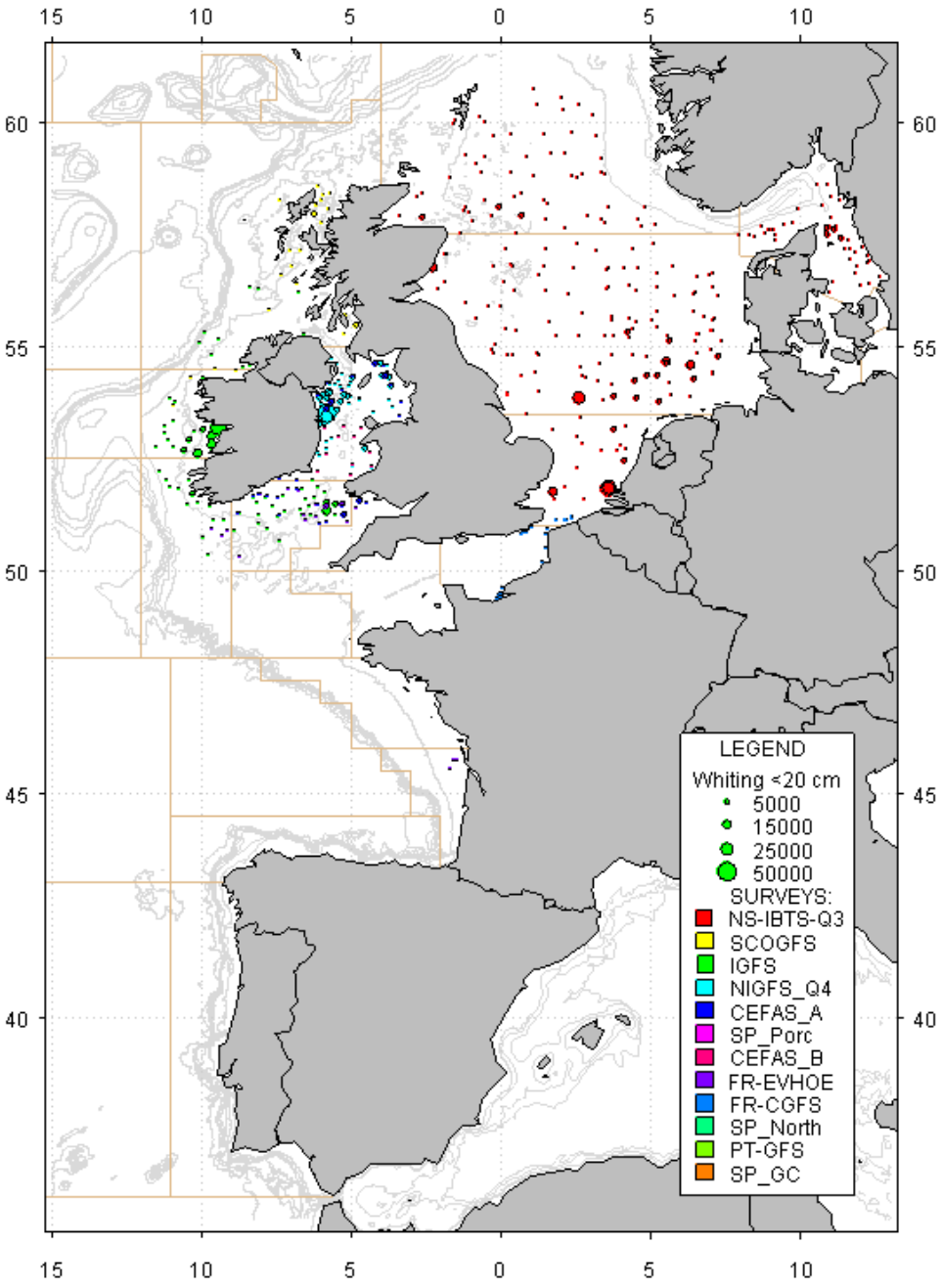

Figure 20: Catches in numbers per hour of 0-group whiting, *Merlangius merlangus* (<20 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

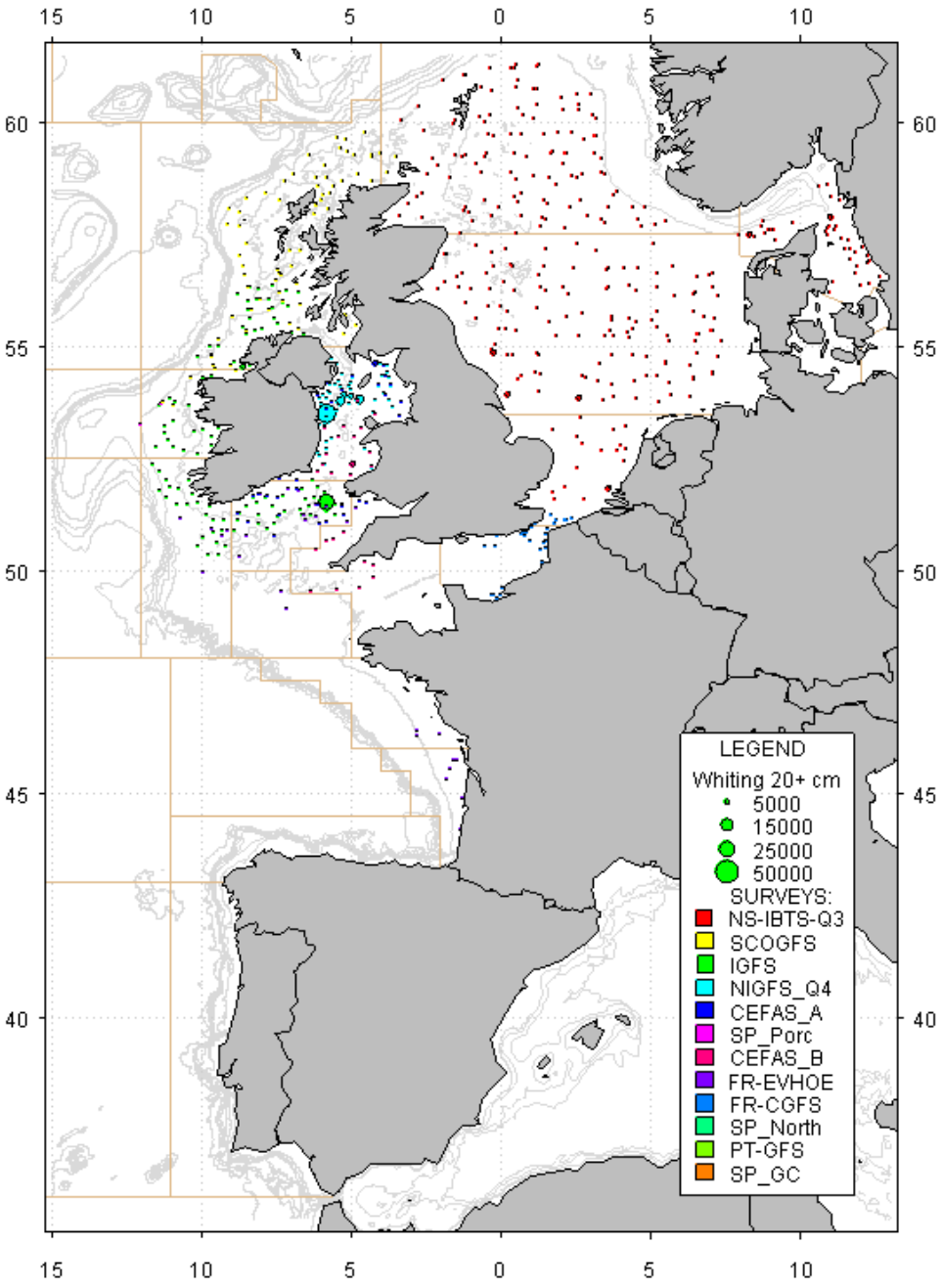

Figure 21: Catches in numbers per hour of 1+ group whiting, *Merlangius merlangus* (≥20 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

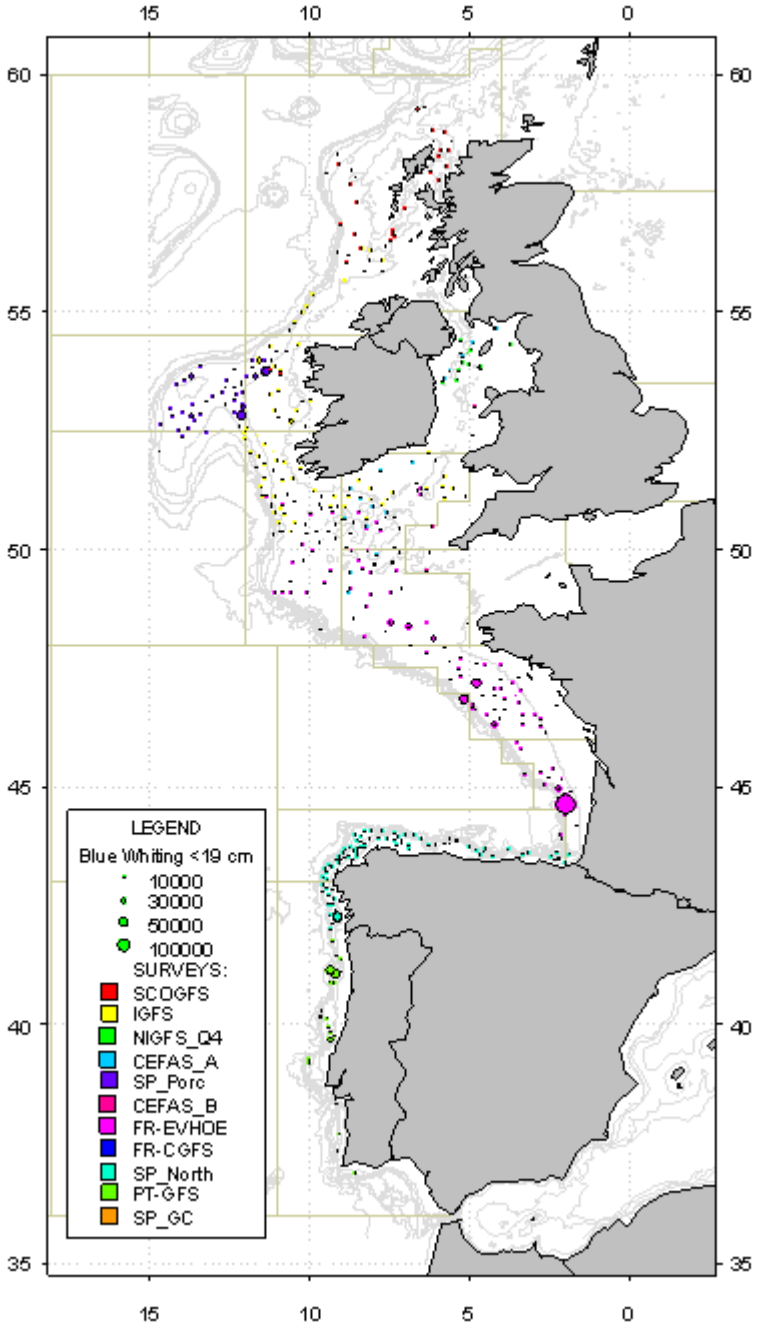

Figure 22: Catches in numbers per hour of 0-group blue whiting, *Micromesistius poutassou* (<19 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

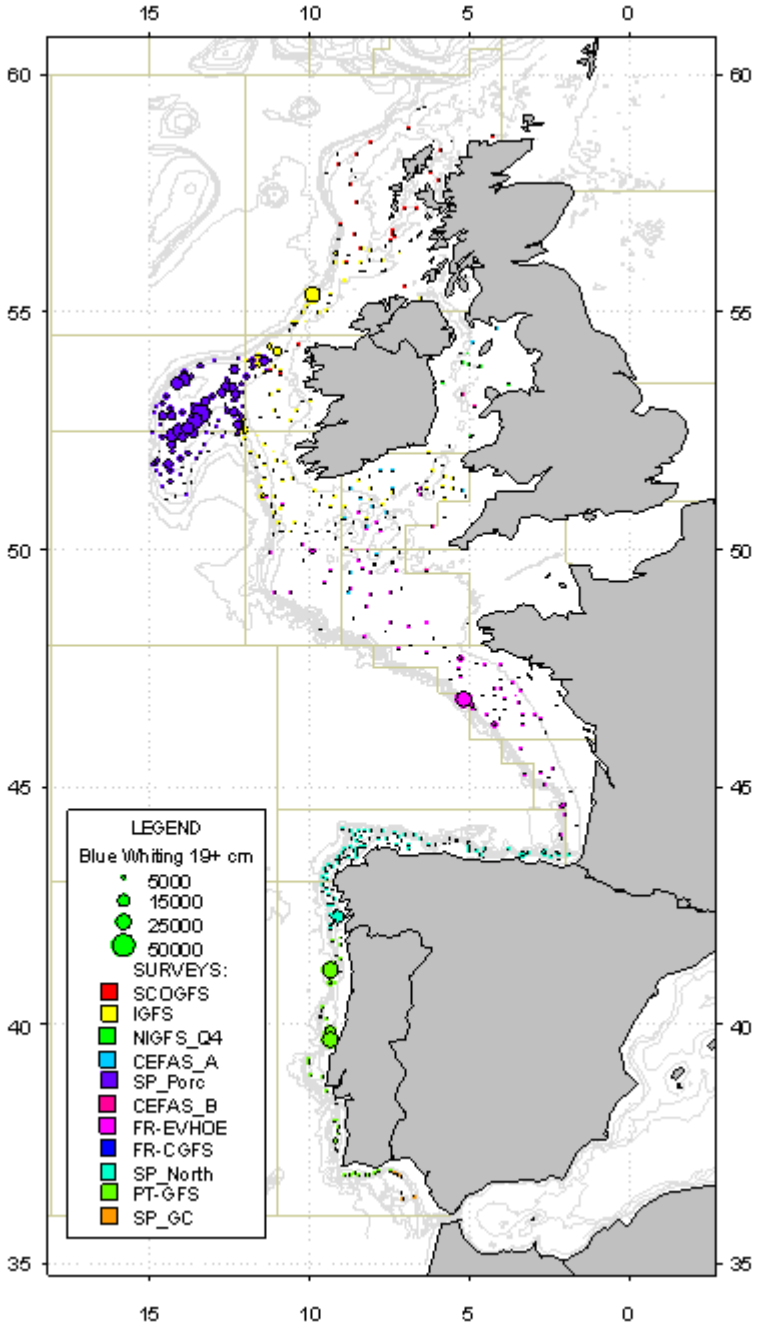

Figure 23: Catches in numbers per hour of 1+ group blue whiting, *Micromesistius poutassou* (≥19 cm), in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

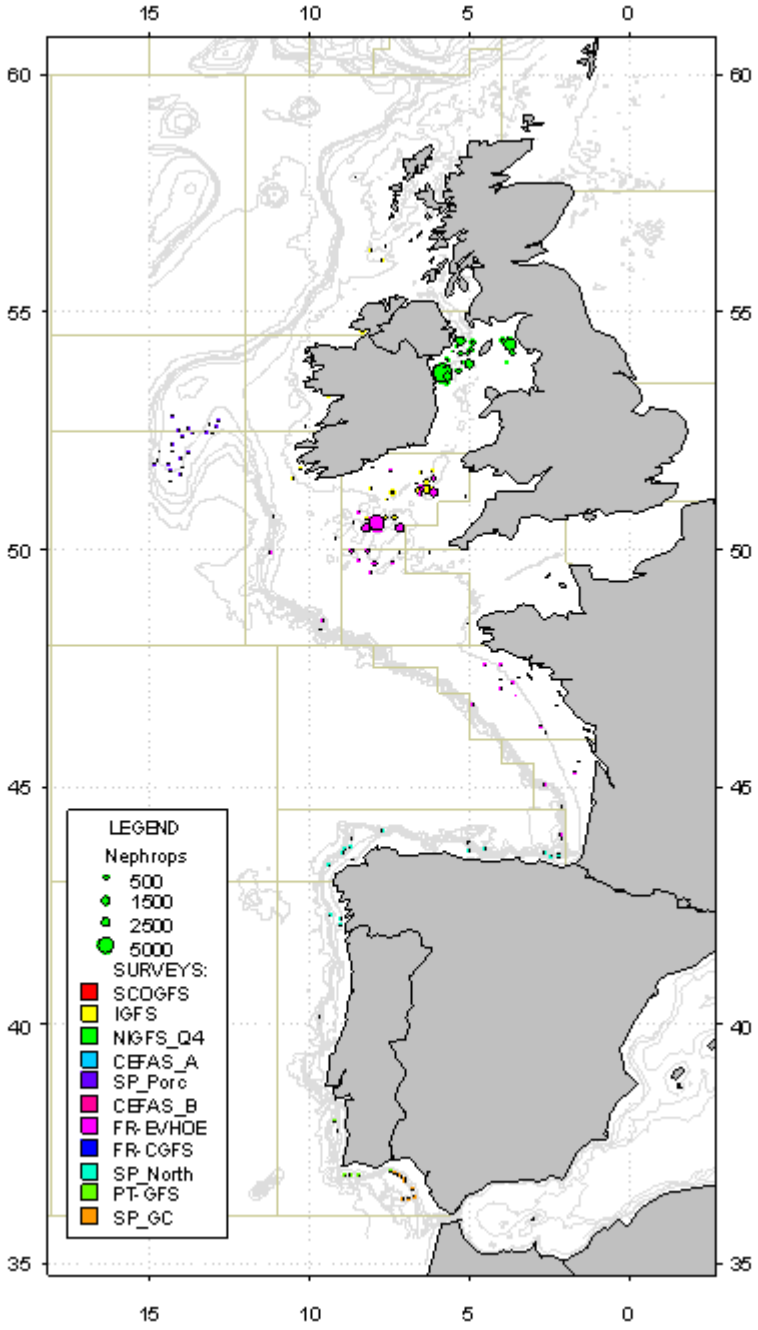

Figure 24: Catches in numbers per hour of Nephrops, *Nephrops norvegicus*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

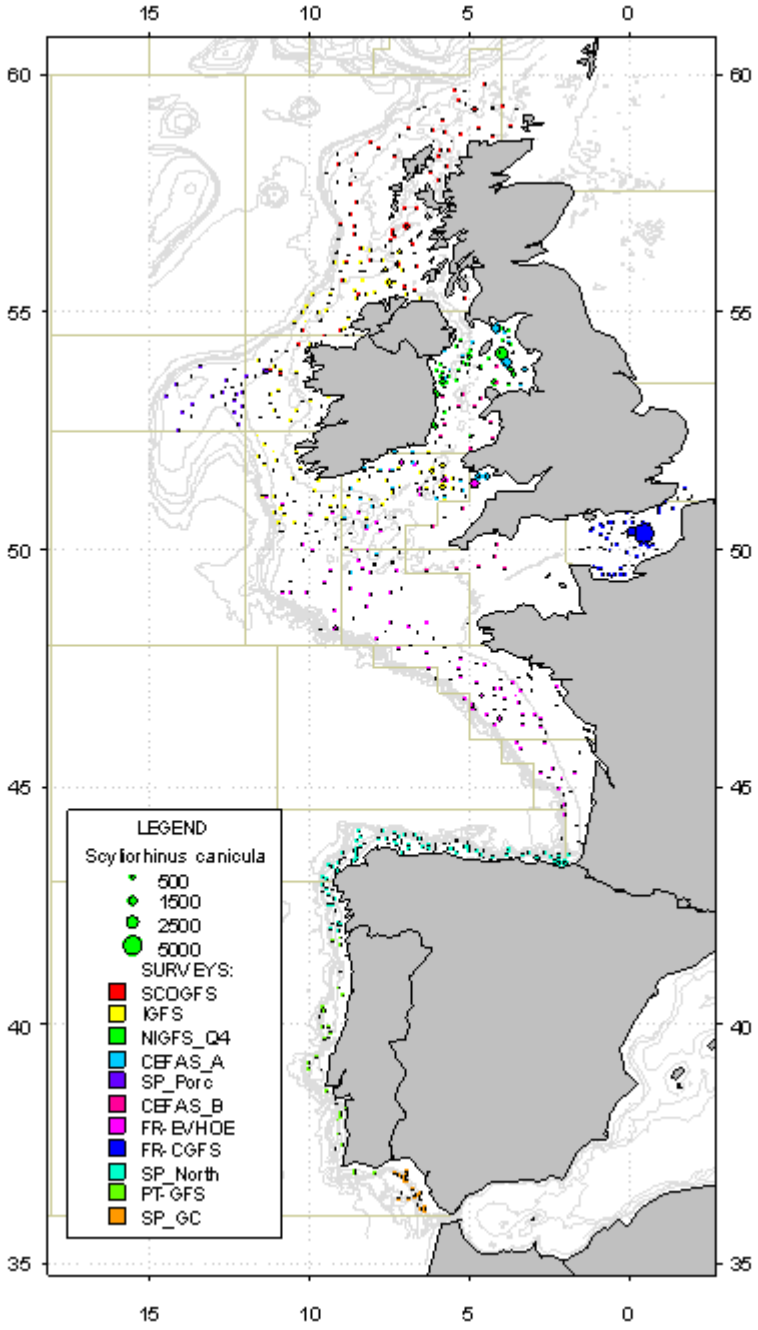

Figure 25: Catches in numbers per hour of lesser spotted dogfish, *Scyliorhinus canicula*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

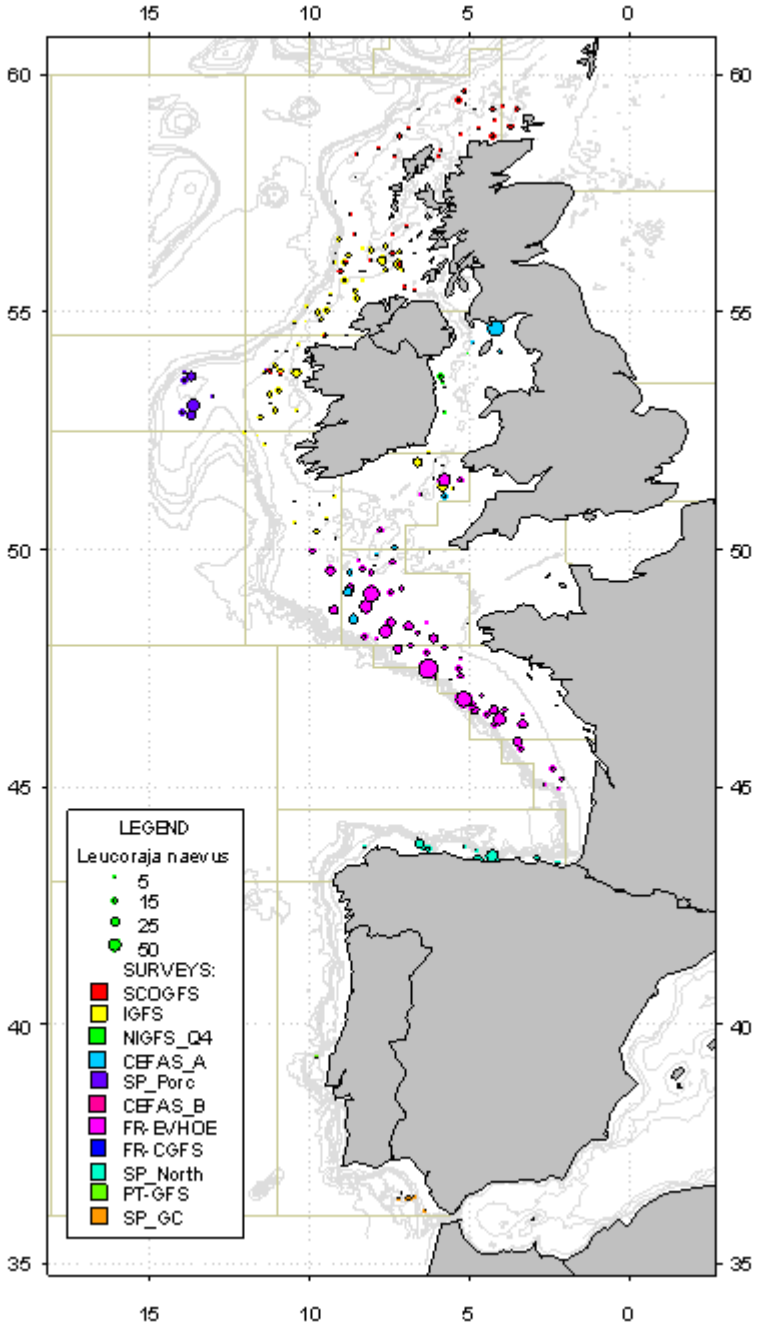

Figure 26: Catches in numbers per hour of cuckoo ray, *Leucoraja naevus*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

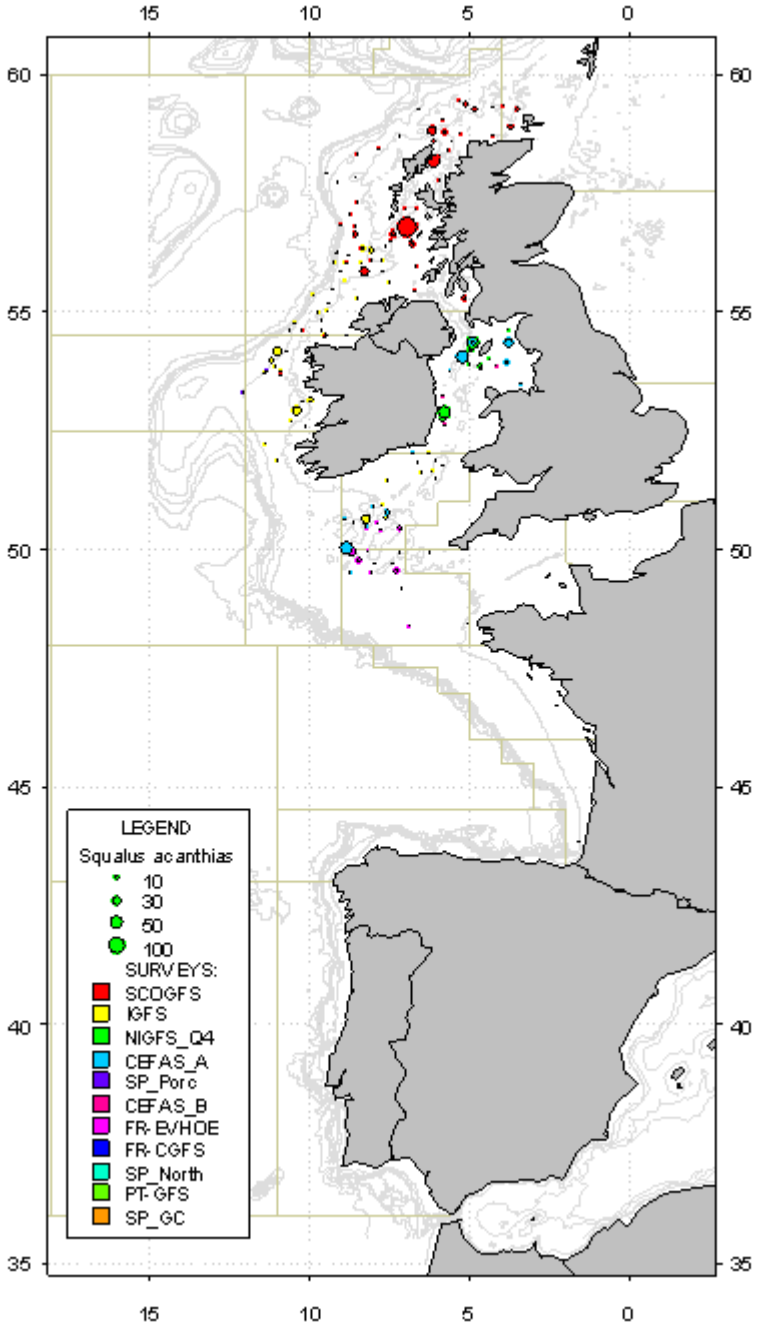

Figure 27: Catches in numbers per hour of spurdog, *Squalus acanthis*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

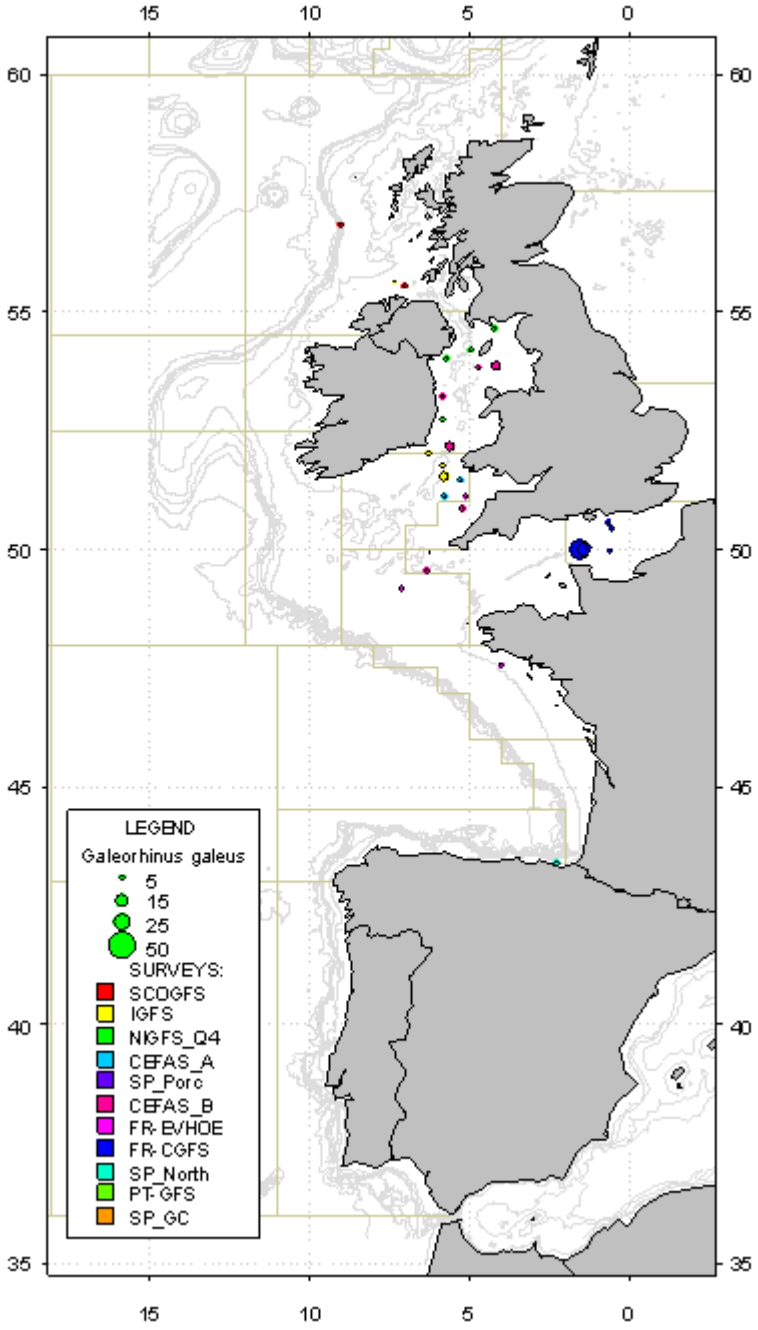

Figure 28: Catches in numbers per hour of tope, *Galeorhinus galeus*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

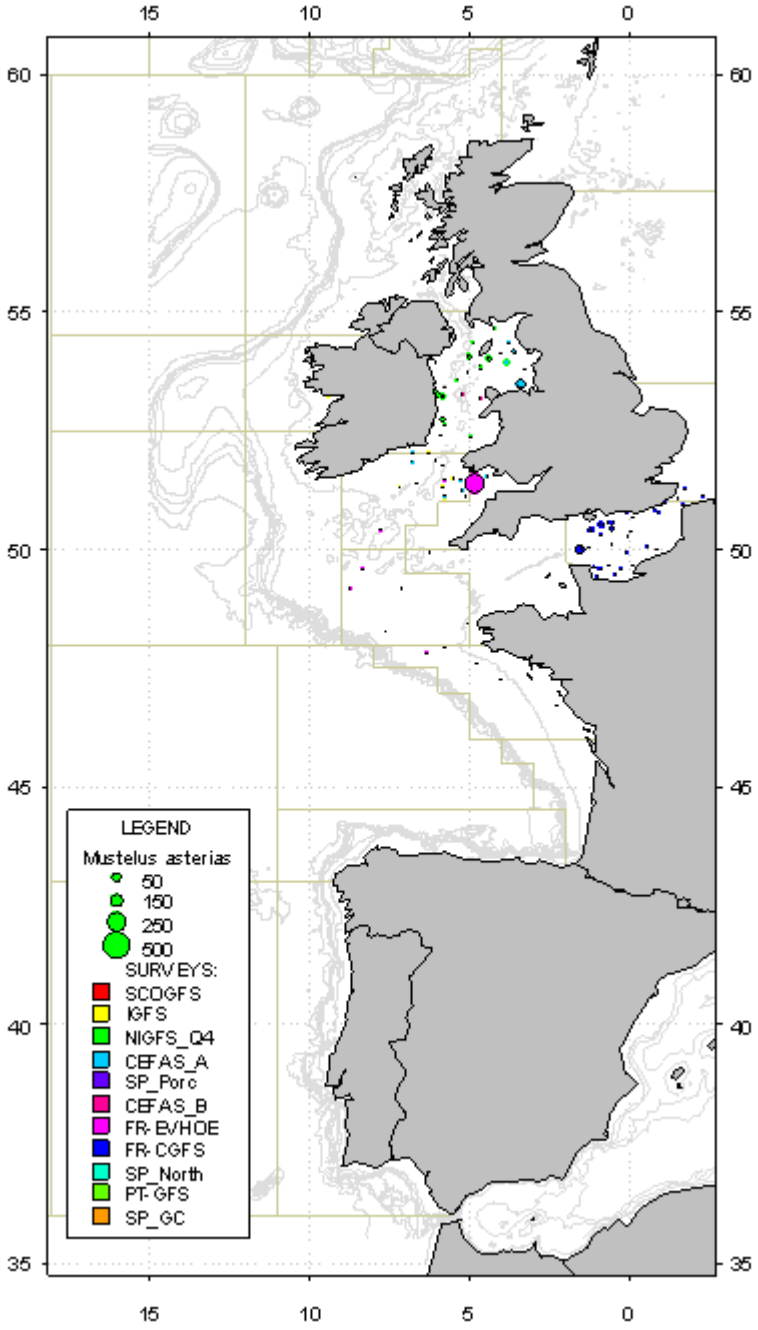

Figure 29: Catches in numbers per hour of starry smooth hound, *Mustelus asterias*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

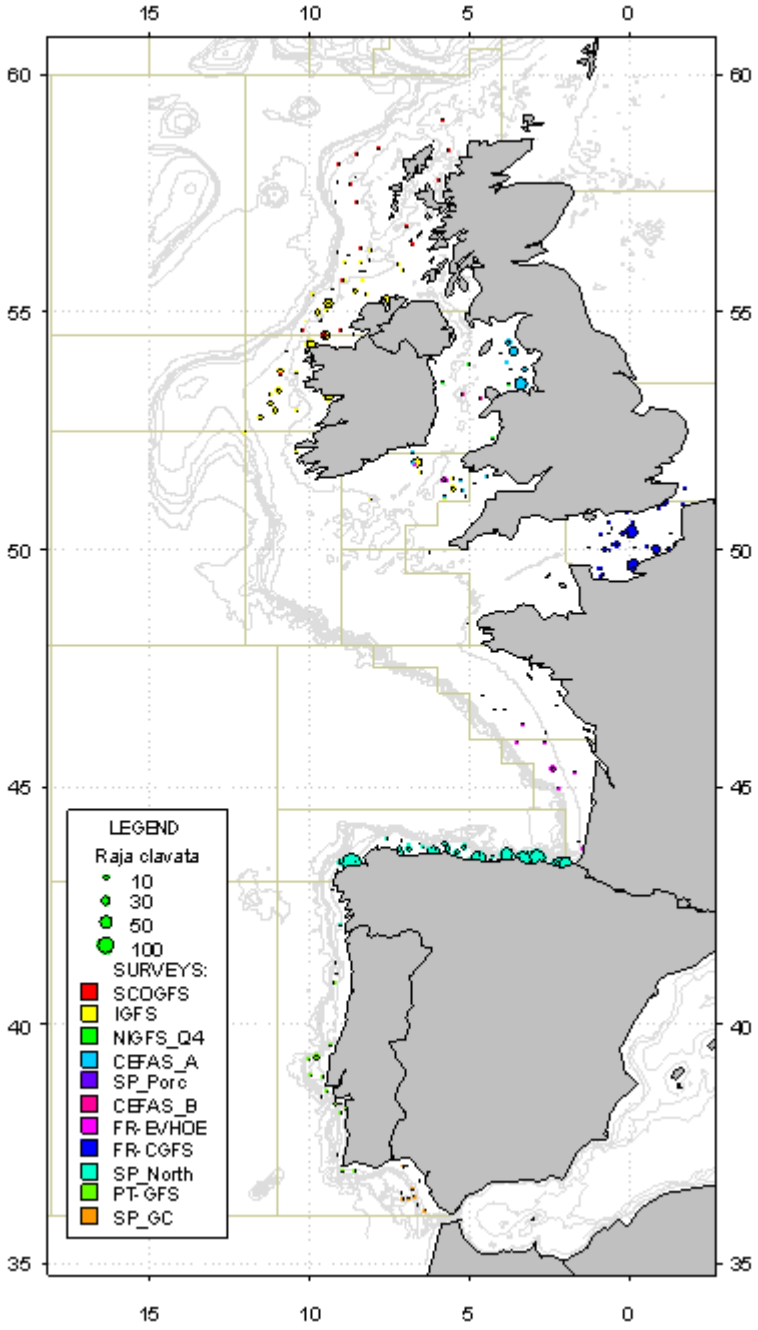

Figure 30: Catches in numbers per hour of thornback ray, *Raja clavata*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

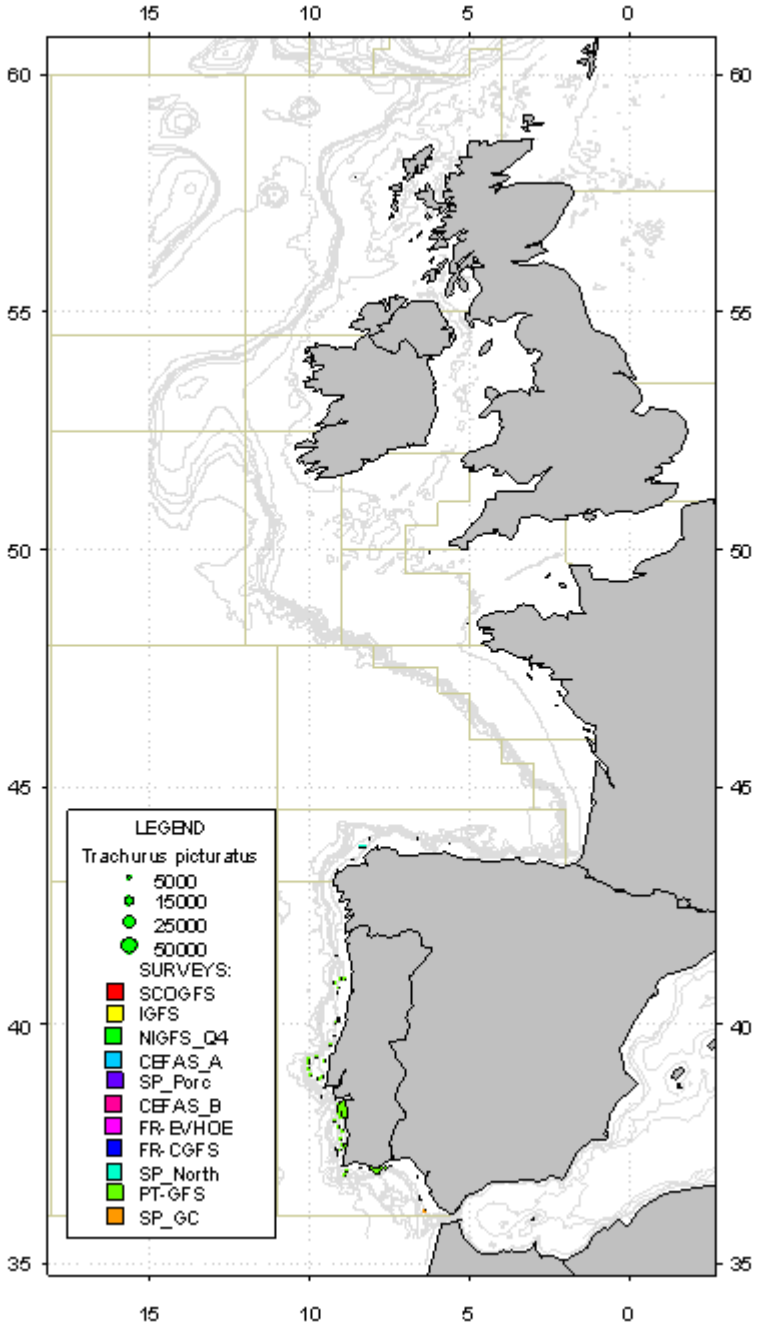

Figure 31: Catches in numbers per hour of blue jack-mackerel, *Trachurus picturatus*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

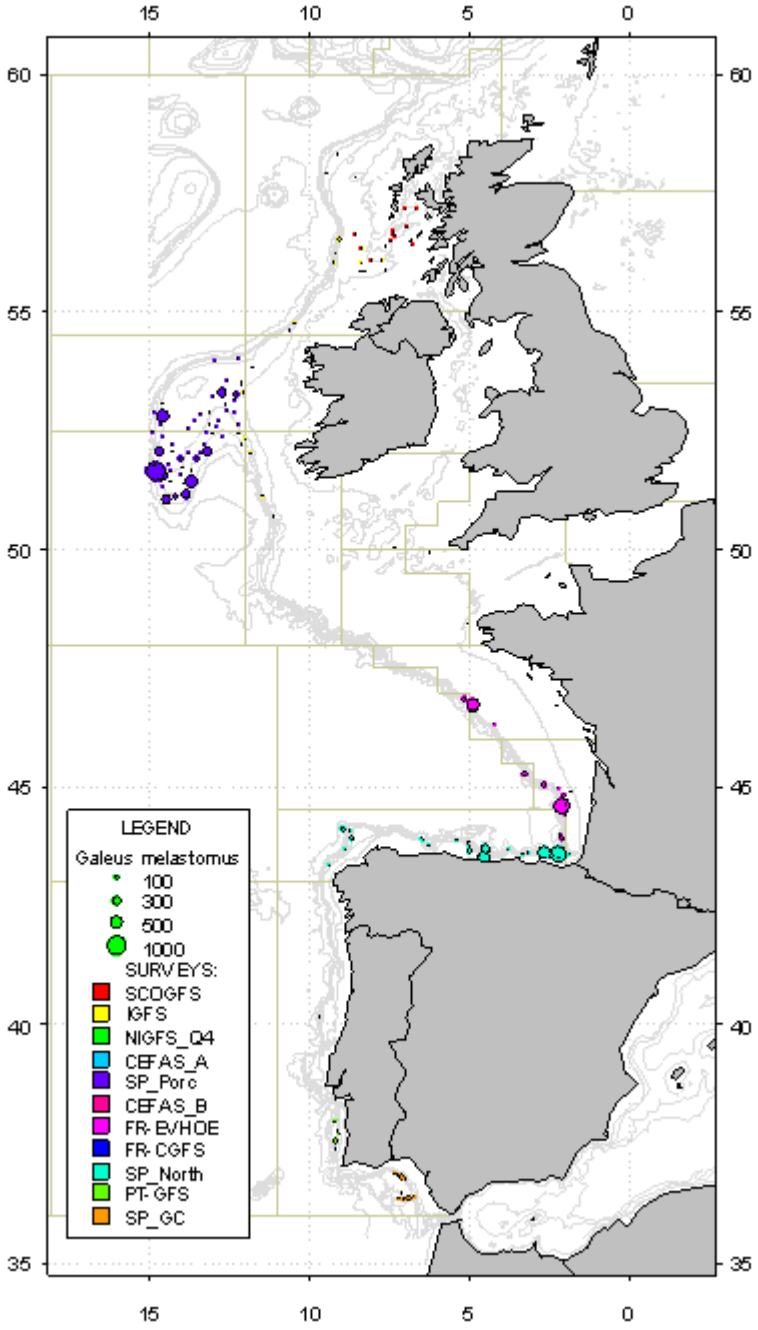

Figure 32: Catches in numbers per hour of black-mouthed dogfish, *Galeus melastomus*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

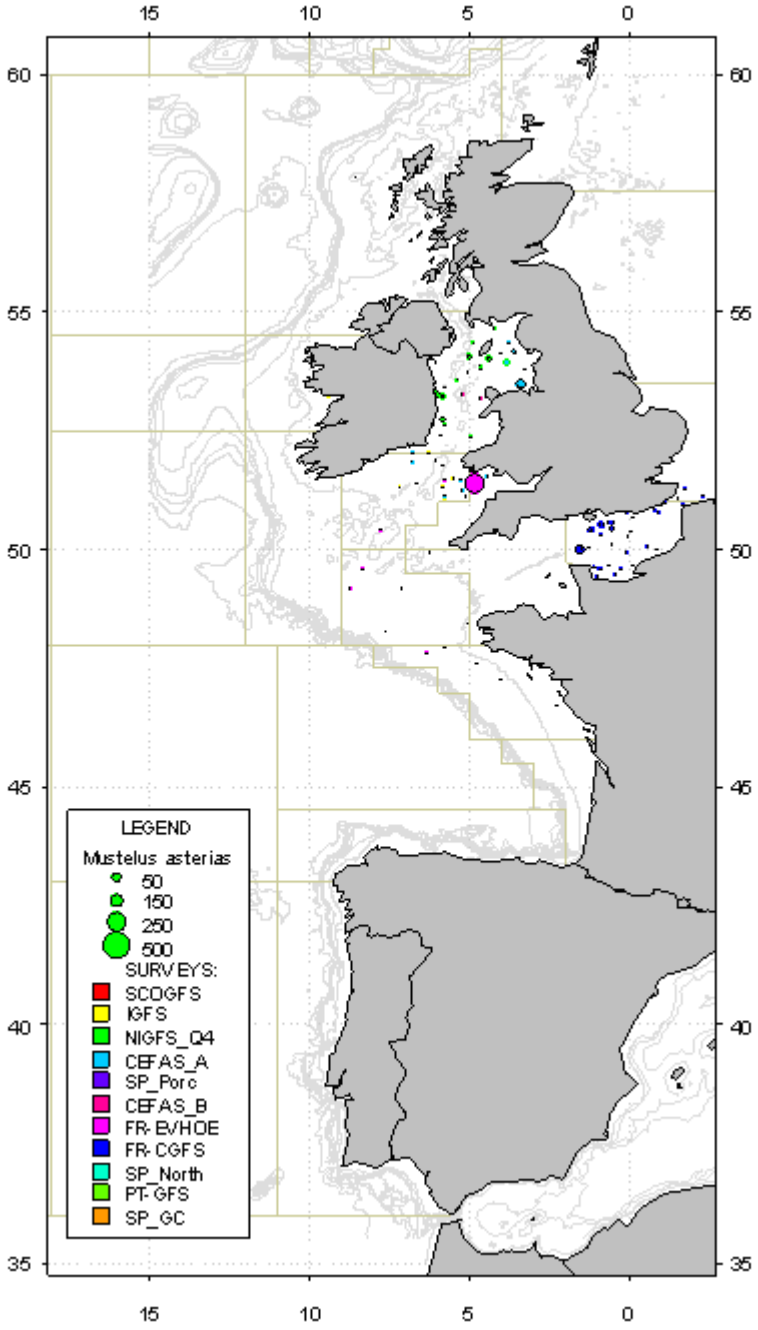

Figure 33: Catches in numbers per hour of starry smooth hound, *Mustelus mustelus*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

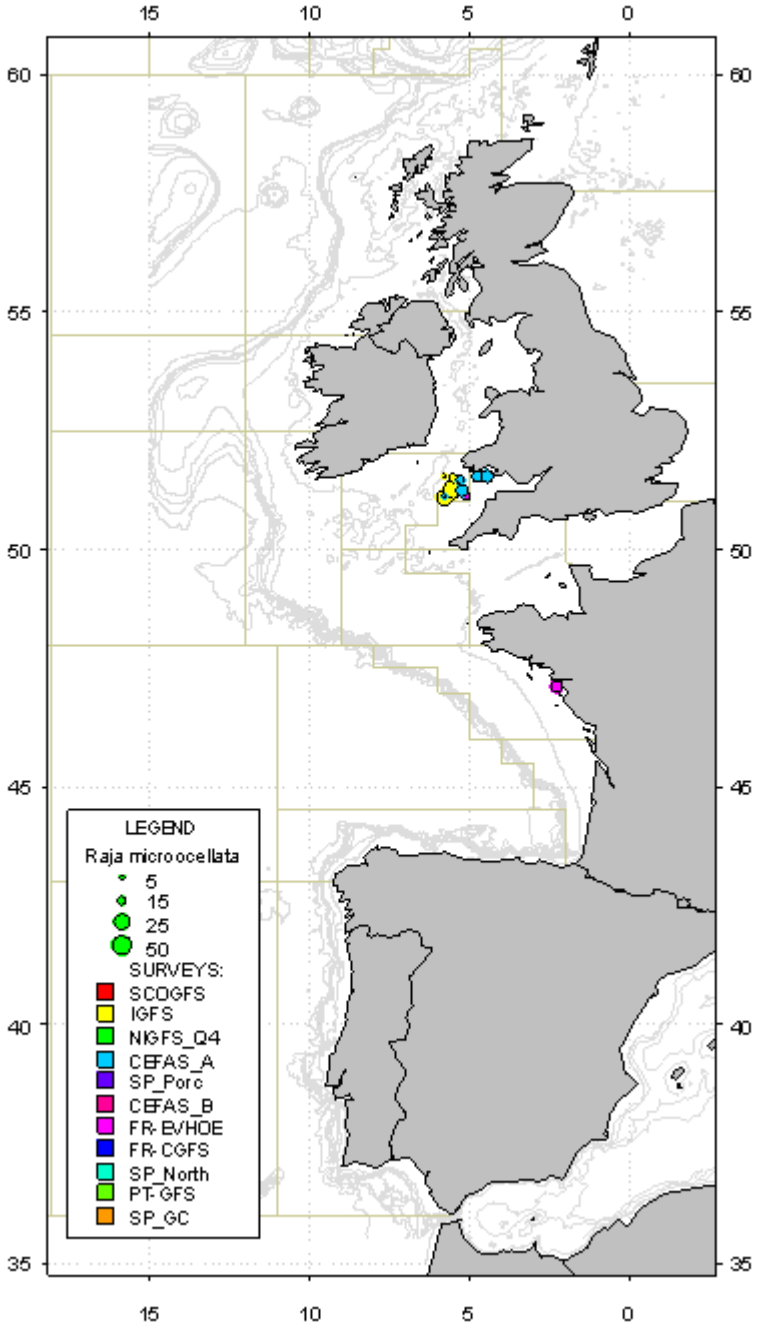

Figure 34: Catches in numbers per hour of painted (small eyed) ray, *Raja microocellata*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

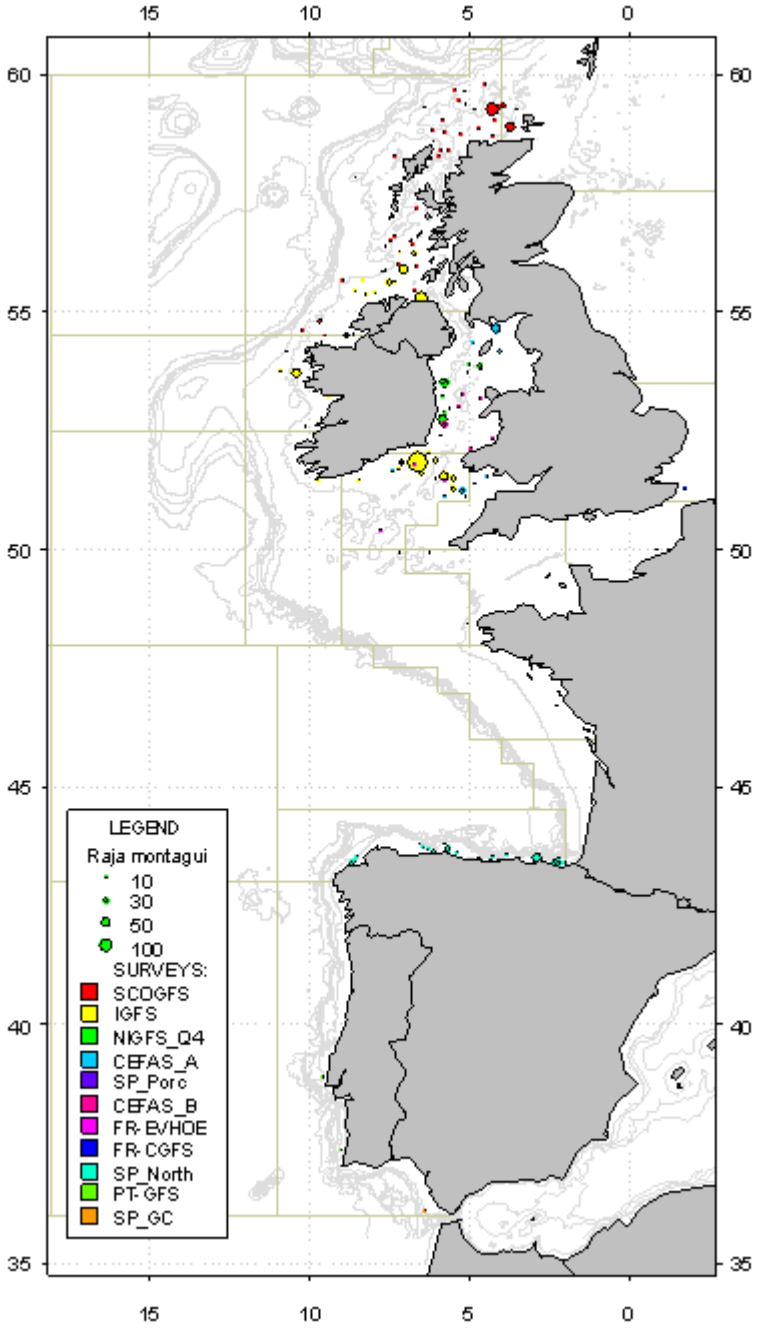

Figure 35: Catches in numbers per hour of spotted ray, *Raja montagui*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

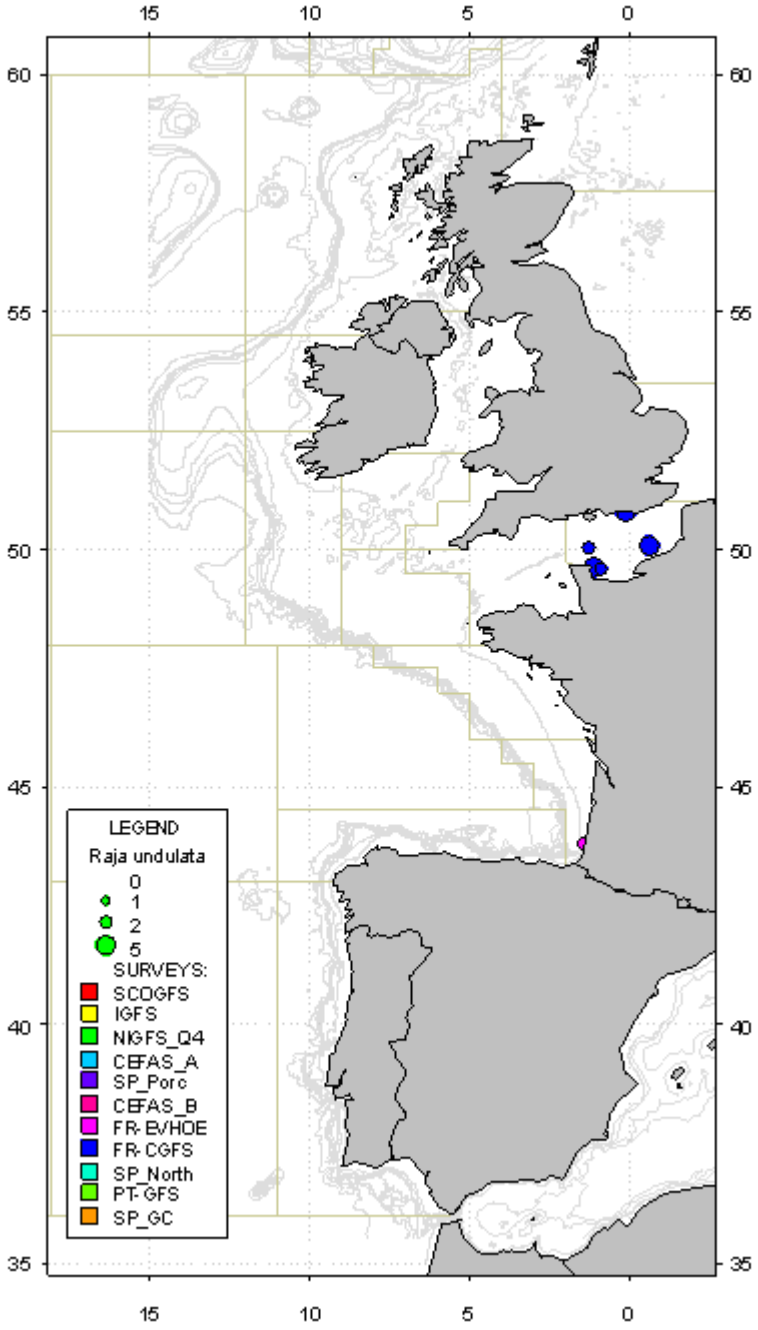

Figure 36: Catches in numbers per hour of undulate ray, *Raja undulata*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

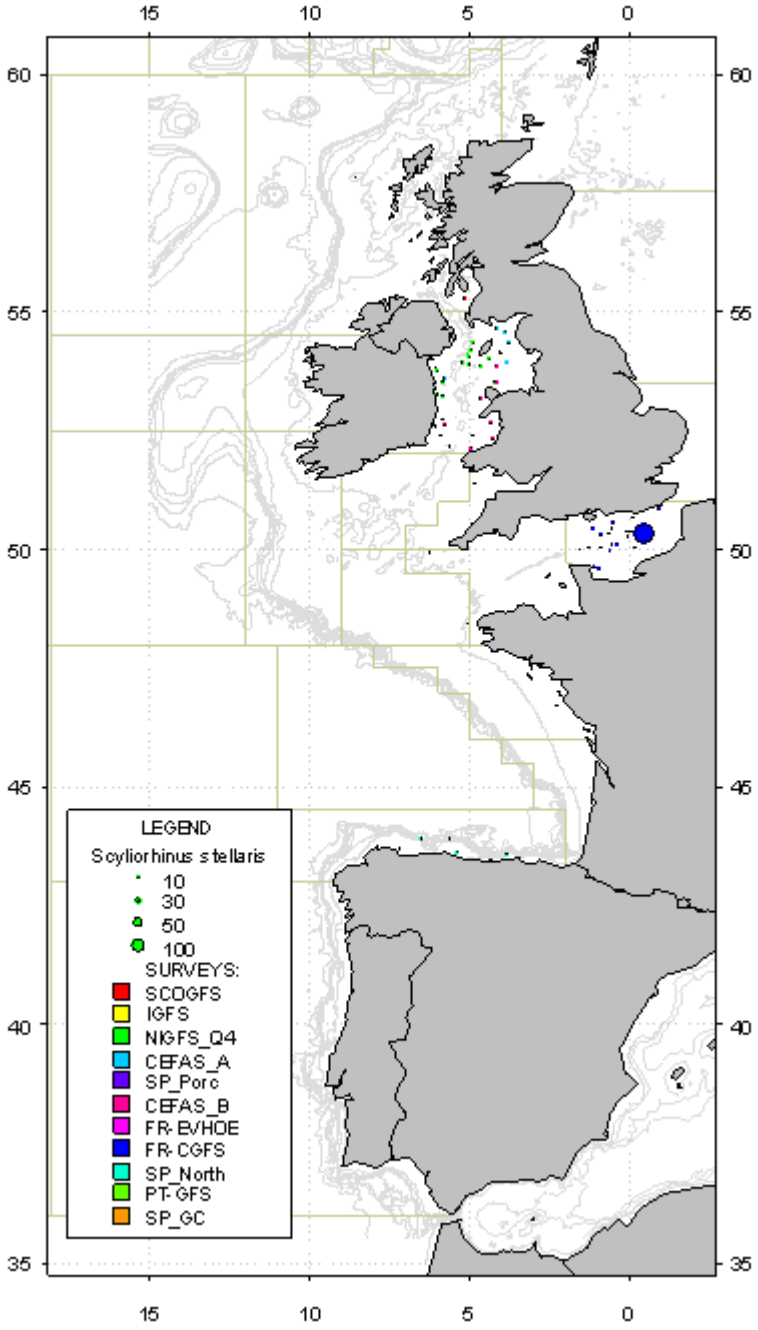

Figure 37: Catches in numbers per hour of nurse hound, *Scyliorhinus stellaris*, in autumn/winter 2007 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

Annex 5: Working documents presented to the IBTSWG 2008

WD1: Mahé, J.C., Mortreux S. 2008. Quality Control – Review of measurement protocols for mesh size and effect of intensive professional use on the initial characteristics.

WD2: Hofstede, R. ter, Daan, N. 2008. A proposal for a consistent use of the North Sea IBTS data.

WD3: Cardador, F., Chaves, C., Morgado, C. 2008. Changes in Blue Jack Mackerel *(Trachurus picturatus)* abundance and distribution in Portuguese continental waters (ICES Division IXa)

WD4: Damme, C. van. 2008. International workshop on the identification of clupeid larvae.

WD5: Coppin, F., Le Roy, D., Schlaich, Y. 2008. Channel Ground Fish Survey handbook.

WD6: Hjelm, J. 2008. Ecosystem based management in the Baltic Sea – The importance of planktivorous fish regulating ecosystem stability.

WD1: Mahé, J.C., Mortreux S. 2008. Quality Control – Review of measurement protocols for mesh size and effect of intensive professional use on the initial characteristics

Working document to be presented at the 2008 IBTSWG meeting and at the 2008 MEDITS meeting

Gear Quality Control – Review of measurement protocols for mesh size and effect of intensive professional use on the initial characteristics

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Introduction

Quality control of survey gear is a recommendation of the ICES IBTS Working Group and the MEDITS coordination committee. However, there are still no references to tolerance levels to be used to qualify the results of the controls nor defined protocols to do the control. This is particularly true for the mesh size specifications, that is to say the main factor affecting selectivity. In some cases, it is mentioned that the net should be changed after a certain number of tows to avoid drifts in selectivity and catchability. On the other hand, it is a fact that since the first GOV drawings and constructions, twine characteristics readily available from manufacturers have changed to new standards. IFREMER has started to work on the implementation of survey gear quality control and is now checking on an annual basis its groundisfh survey gears. The results of the first year of work has lead to a new and more field adequate design for the gear checking form and the development of a control protocol. In 2007, an experiment was carried in order to 1) compare different ways of measuring mesh size in relation to the manufacturer's characteristics and 2) monitor any change in those characteristics after different periods of heavy uses by commercial fish nets.

Material and methods

The tests have been done with polyamide sheet net samples fastened for different time periods on a bottom trawl used aboard a professional fishing trawler. The experiment has been carried out on boats working on the shelves of the Gulf of Lions (Mediterranean Sea), between April and May 2007.

The different material and experimental protocol

A selection of 5 different mesh size and polyamide twine diameters combinations have been selected for this experiment. For each combination 4 samples of 25 x 10 meshes were selected. These samples were mounted on a commercial net (4 panels, 37 m headrope and 4 m vertical opening) at different locations (table 1 and figure 1).

Table 1. Characteristics and location of the different types of net samples used in the experiment.

MESH SIZE (MM)	TWINE STRENGTH (M/KG)	LOCATION ON THE TRAWL (FIG.1)
120	280	A
120	400	B
80	600	C
40	600	D
40	280	E

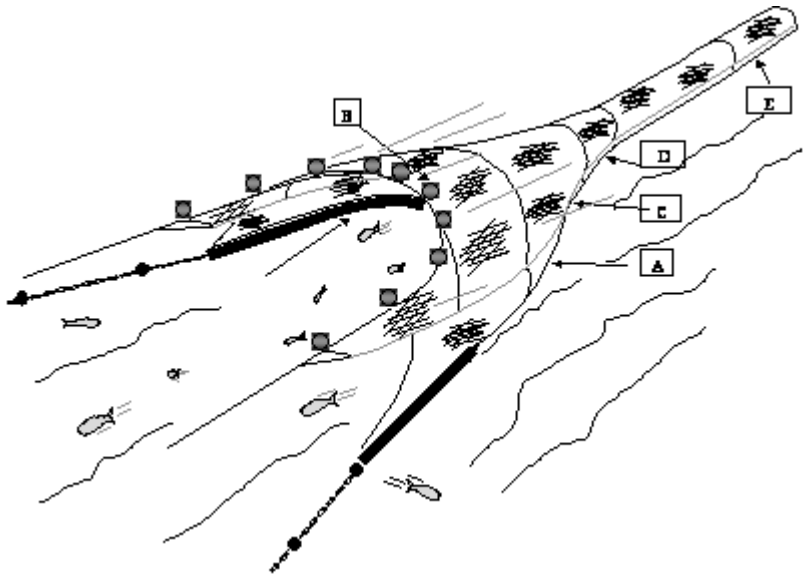

Figure 1. Location on the commercial trawl of the different types of net samples used in the experiment.

For each of the 5 types of net material, the 4 samples of 25x10 meshes were used as follows. One sample was kept as reference and the 3 other mounted on the trawl and taken out for control after respectively 28, 60 and 200 hours of towing.

The measurement protocol

There are 3 ways of measuring mesh size (fig. 2): (i) The stretched mesh being measured as the distance between 2 facing knots, taken from the centre of the knots, (ii) the mesh opening, taken from the inside of the mesh and (iii) the mesh side, half the value of the stretched mesh.

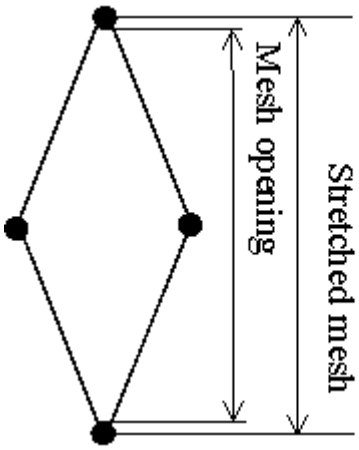

Figure 2. Different mesh size measurements.

The stretched mesh measurements were taken using a rule, the mesh being just stretched manually with no extra force added.

The mesh opening measurements were taken using the Omega gauge and the protocol described in the gauge's user manual and project report (Anon. 2005) with stretching force value as follows:

For meshes:	< 35 mm	20 N
	≥ 35 mm and < 55mm	50 N
	≥ 55 mm	125N

Each value was obtained by averaging 20 measurements of adjacent meshes.

The mesh side measurement (between two adjacent knots) was disregarded, as it is not internationally recognised.

Before being installed on the trawl, each net sample was measured dry, wet (after 24 h of soaking inn sea water) and dried (after 24h of drying at room temperature).

These measurements sequences were repeated for the samples after 28, 60 and 200 h of working time on the commercial trawl.

For the stretched mesh measurements, 4 persons made each a series of 20 measurements on the same meshes for each of the 5 samples of different net types in order to evaluate any reader related measurement error.

Results and discussion

Checking the samples with reference to the manufacturer's nominal value

Before putting the sample on the professional trawl, all samples were measured with the different protocols. This would give some information on the best method and tolerance to be used when checking new nets with respect to the compliance with original specifications.

Note that these results are for polyamide twine that is stretchier than polyethylene.

The results in relative values are given in table2.

Table 2. Differences between the observed values of mesh size and the manufacturer's reference values for different mesh sizes and method of measurement. Values are averaged between the 5 samples of each category.

Type of measurement	Mesh size	120mm, 280 m/Kg	120mm, 400 m/Kg	80mm, 600 m/Kg	40mm, 280 m/Kg	40mm, 600 m/Kg
Ruler (stretched mesh)	Wet	2.6%	3.3%	3.8%	5.8%	4.9%
	Dry 24 hr	0.1%	2.0%	0.3%	3.3%	3.1%
	Fully dry	1.0%	1.2%	0.7%	0.8%	2.9%
Omega gauge (mesh opening)						
Opening power setting		125 Newtons			50 Newtons	
	Wet	8.0%	**12.0%**	**20.2%**	-3.0%	6.8%
	Dry 24 hr	3.2%	6.6%	**14.5%**	-9.4%	1.9%
	Fully dry	1.3%	3.9%	**10.2%**	-9.9%	-1.6%

The results show that the values closest to the original specifications are obtained on dry material and with stretched mesh measurements with a ruler (+1% on average). The Omega gauge measurements on dry material depend very much on the combination of opening power setting and strength of the wire. While showing larger values than on the dry material, the measurements on wet material with the stretched mesh ruler protocol are still on average close to the nominal value (< 5 % in most cases). For the Omega gauge, the values vary much more with a range up to 23 %.

For routine quality check of survey gear, the ruler measurement on wet material combines regularity and practicality, as it is easier to wet a trawl than to fully dry it. The values obtained on a wet net give on average measures 5% higher than the nominal value. This is probably a manufacturer's choice to avoid any legal problem with fishing officer's control since shrinkage is known to occur with polyamide twine when used on bottom trawl.

Knowing that reading a ruler may cause variation depending on the reader, measurement of the same sample and meshes was made by 4 different readers. Results are given in table 3

Table 3. Measurements reported by different readers for the 5 types of net used in the experiment using a ruler on stretched mesh. Maximum differences and CV in % are given for each net type.

	120mm, 280 m/Kg	120mm, 400 m/Kg	80mm, 600 m/Kg	40mm, 280 m/Kg	40mm, 600 m/Kg
Reader 1	119.3	120.9	78.9	40.3	40.3
Reader 2	120.4	120.7	79.0	40.8	40.8
Reader 3	119.4	120.3	78.7	40.4	40.4
Reader 4	119.7	120.6	79.7	40.3	40.2
maximum difference	0.9%	0.5%	1.3%	1.4%	1.6%
CV	0.4%	0.2%	0.6%	0.6%	0.7%

Measurement CVs of less than 1% were observed, less than the resolution of the ruler (1mm).

Evolution of the meshes characteristics with time under heavy use

The five samples of nets were checked after 28, 60 and 200 hours of heavy use on a professional trawler with the same protocols. A summary of the evolution of the mesh size measurements is given in Figure 2. A majority of the results shows that as known, polyamide twine shrinks with soak time and that it reaches its minimum in 60 hours. This shrinkage is detected on all dry net measurements. On a wet net, it is

only well detected using the Omega gauge, and not so obvious with ruler measurements (fig 2 a & b). Also for the Omega gauge measurements on a 24 hour dried material (fig 2 c), the shrinkage shows further shrinking after 200 hours of use.

With respect to evaluation of the effect of heavy use on trawl characteristics, especially selectivity, the results one would look at are changes in mesh opening under some tension and on wet material. Then figure 2 shows that even after 200 hours of use (equivalent to 400 standard survey tows in most of the IBTS and MEDITS surveys), the shrinking on average remains stable around 6 %, a value reached already after a few hours of use.

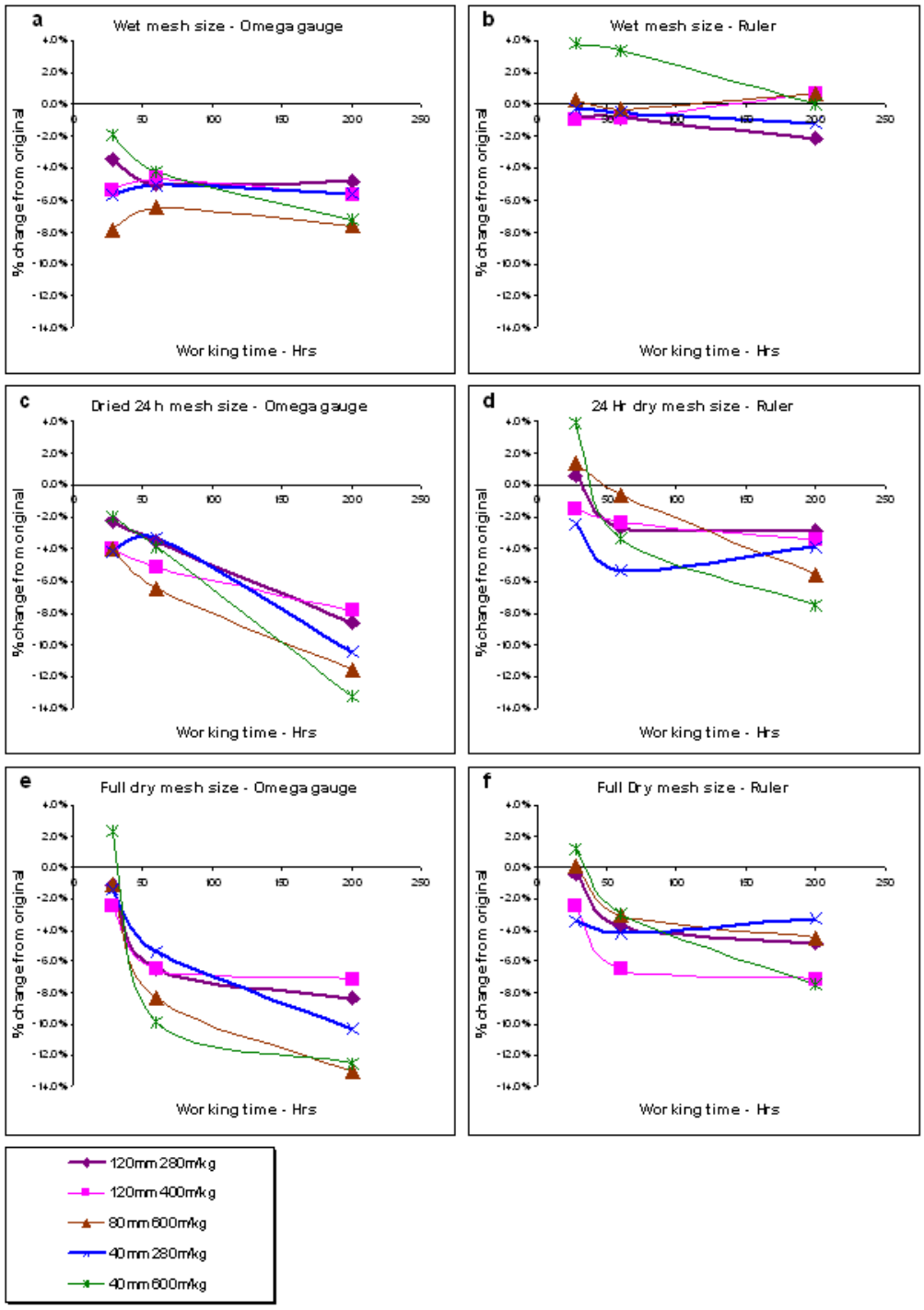

Figure 2. Evolution of mesh size with time of use for the different types of net and measurement protocols.

Conclusion

The Omega gauge was designed primarily for inspection of net conformity with legislation. The protocol was defined with a major goal as to give consistent results with the other standard measurement protocols and tools in use. It is therefore a tool adapted for assessing selectivity as it measures mesh opening under tension, which is close to the operating condition of trawls. However, this experiment has shown that, when the objective is to controlling net characteristics with reference to

manufacturer's specifications, the simple stretched mesh measurement on a wet net appears as a most adequate method even if values are on average 5% higher than manufacturer's specifications, probably a manufacturer's choice to avoid legal problem related to twine shrinkage. If this +5% value can be taken into account when checking gear conformity, other measures on different manufacturer are needed to make sure it is a stable characteristic of fishing trawl material.

The results of the experiment on assessing working time on net characteristics show that some shrinking is observed on the mesh opening shortly after the first use of the net and that, even after 200 hours of trawling, no detectable changes are observed. If we want to answer the question "When do we have to change our survey trawl?", then we have to take into consideration other factors than deterioration of selectivity under normal use after X number of hours. Amount and extent of repair after damage to the gear should be extensively recorded in a file attached to the gear control forms. Visual inspection of the twine by experienced staff to detect abnormal deterioration of the twine material is essential. All this must be taken into consideration during standard gear control operations.

Note that these conclusions are for polyamide (nylon) twine only; further experimentation is needed for polyethylene twine.

References

Anon, 2005. Final Report of the OMEGA Project "Development and testing of an objective mesh gauge" (Contract N° Q5CO – 20002-01335).

WD2: Hofstede, R. ter, Daan, N. 2008. A proposal for a consistent use of the North Sea IBTS data

A proposal for a consistent use of the North Sea IBTS data

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Abstract

The ICES DAtabase for TRAwl Surveys (DATRAS) stores data from several international groundfish surveys in the north-eastern Atlantic area and is used as a major data source for many studies assessing the status of stocks and changes in the structure, functioning and diversity of commercial and non-target fish species and assemblages. Hence, it is essential that the data are of high quality and fully reliable for studies of the wider fish community. However, it has been highlighted before that DATRAS suffers from many problems associated with input errors, the misidentification of specific taxa, and inconsistent reporting at a range of taxonomic levels (species, genus or family). Besides correcting identified errors, the only way to improve the consistent use of the database among subsequent analyses is to develop a protocol for a standard correction procedure of problematic records that should be followed by all users. We provide a first proposal for a standard correction procedure of one component of DATRAS, namely the data from the International Bottom Trawl Survey covering the North Sea, Skagerrak and Kattegat (North Sea IBTS).

Keywords: data quality, misreporting, biodiversity, DATRAS, IBTS, North Sea

Introduction

Goundfish survey data are not only becoming increasingly more important for assessing the status of commercial and non-target fish species, they also provide the major data source for large-scale spatial and temporal analyses of fish assemblages in continental shelf waters, and for the derivation of metrics with which to assess changes in the structure, functioning and diversity of these assemblages. Hence, the strict implementation of species-identification and sampling protocols of such surveys must ensure that data collection is appropriate for studies of the wider fish community.

ICES has created a common DAtabase for TRAwl Surveys (DATRAS) for storing data from several bottom- and beam trawl surveys in the north-eastern Atlantic area (Piet, 2004). Such an international database facilitates the use of the survey data by ICES working groups for stock assessments and ecosystem studies that sustain ICES advice, but they may also be used by other parties. Clearly, extensive quality control of the data entering DATRAS is an essential part of the process. All data are thoroughly checked by the national institutes before they are submitted to ICES, and upon entering the data ICES performs a comprehensive checking routine. However, as any database, DATRAS is not free of errors, especially not so in the older records. Daan (2001) highlighted potential problems associated with (a) input errors and (b) the misidentification of specific taxa. The evidence for inconsistencies in reporting by different countries has only been supported by subsequent analyses (ICES, 2006). For instance, several species or genus are sometimes reported at higher taxonomic levels (genus or family), even if there can be little doubt as to the actual species or genus

involved, because others are extremely unlikely within the area surveyed. This may affect the utility of survey data for fish-assemblage studies if such discrepancies are not corrected for (e.g. in studies of biodiversity and other metrics for fish communities).

It should be emphasized that so far progress in identifying inconsistencies in the reporting of various taxa has been restricted to the International Bottom Trawl Survey covering the North Sea, Skagerrak and Kattegat (North Sea IBTS), which represents only one component of DATRAS. These studies on the quality of the North Sea IBTS dataset have provided an extensive though not exhaustive inventory of problematic records (Daan, 2001; ter Hofstede and Daan, 2006). For all other surveys, similar systematic analyses have not yet been conducted, but there is no reason to assume that the situation would be any different.

The North Sea IBTS dataset has been used at face value in a variety of studies on fish communities and their responses to human activities and global warming (e.g. Jennings *et al.*, 2002; Callaway *et al.*, 2002; Beare *et al.*, 2004). However, neglecting unmistakable errors raises questions about the reliability of their results. Analyses have sometimes been limited to only a part of the dataset that has been considered consistent and trustworthy, for example using only national data (e.g. Perry *et al.*, 2005; Maxwell and Jennings, 2005; Greenstreet and Rogers, 2006). This is unfortunate because it undermines the idea of developing a comprehensive survey data set. More importantly, it does not solve the problem since individual countries have been shown to be inconsistent in their reporting over time (ICES, 2005, 2007). Several studies that have used the North Sea IBTS data do refer to a priori corrections (Daan *et al.*, 2005; Hiddink and ter Hofstede, 2007). However, there has been no agreed protocol for dealing with obvious mistakes, problematic taxa and unlikely records. Therefore, different authors may arrive at different results and it may be virtually impossible for other scientists to reproduce the results obtained. This is an awkward situation, particularly for ICES working groups when using these data for providing management advice.

One way to improve the situation is for ICES to agree on a protocol for a standard correction procedure of problematic records that should be followed by all working groups in order to ensure consistency among subsequent analyses. This protocol should also be brought to the attention of individual scientists requesting access to DATRAS for specific analyses. Although ICES can obviously not enforce the use of a fixed protocol on such users, the guardian of DATRAS does have a responsibility for facilitating its proper use.

Elaborating on DATRAS quality issues dealt with during the ICES Workshop on Taxonomic Quality Issues in the DATRAS Database (WKTQD; ICES, 2007), we developed a first proposal for a standard correction procedure.

North Sea IBTS

The North Sea International Bottom Trawl Survey has since its start in 1965 as a specific International Young Herring Survey gradually evolved into a general demersal fish survey (Heessen *et al.*, 1997). It has been carried out annually during the first quarter up till the 1990s, on a quarterly basis in the period 1991-1996, and twice per year (1st and 3rd quarter) since 1997. During each quarter, 6-8 countries sampled a total of more than 300 hauls in the North Sea (between 51-62° latitude), Skagerrak and Kattegat, leading to a dataset with information on catches in over 24 000 hauls. The survey design is random stratified according to a grid of ICES

rectangles (0.5° latitude; 1° longitude; approximately 56 x 56 km). In principle, each rectangle is sampled by two different countries during each survey. Gears have varied among years and vessels initially, but since 1983 a standard bottom-trawl net (chalut à Grande Ouverture Verticale, GOV-trawl) has been used by all countries. This gear has been designed specifically to sample fish that live close to the seabed. The catch is sampled to provide the length-frequency distributions for all fish species caught. Details of the gear and sampling strategies can be found in the manual for the North Sea IBTS, revision VII (ICES, 2006).

Methods

Analyses have been made using all available data in the DATRAS section "North Sea International Bottom Trawl Survey" (1965-2007; last modified on 11 May 2007) to get a complete list of taxa recorded. Based on previous work by Daan (2001), ter Hofstede & Daan, (2006) and WKTQD (ICES, 2007), we made a list of all taxa that have been reported inconsistently over all years and therefore need a global correction. This concerns two types of inconsistencies: i) redundant taxa, i.e. genus or families that are represented only by one species and genus, respectively, and therefore should have been reported as that particular species or genus; and ii) species of which the correct identification is highly uncertain, because this requires specialist taxonomic knowledge that is not routinely available on board.

Results

i) Consistent taxonomy

The idea of taxonomy (and its coding in one system or another) is to provide a unique interpretation of the code used. Therefore, different taxa (and codes) that lead to the same interpretation must be avoided, because they suggest a non-existent difference. If a genus is represented by a single species in a particular area, recordings at the genus level are redundant and records should only be stored in the database at the species-level. The same applies to families represented by a single genus, in which case the family name is redundant and should be considered invalid. The redundant taxa present in the North Sea IBTS dataset within DATRAS and their appropriate coding are given in Table 1. We suggest making the appropriate changes within DATRAS rather than to the output, because there would be no loss of information involved.

ii) Uncertain identification

Large irregularities in reporting may result from superficial distinguishing features being insufficient. Several North Sea fish species can only be identified by counting fin rays, gillrakers or scales and there is usually no time on board to do this on a routine basis. Thus, even several of the more common species such as sandeels and gobies may be reported differently by different scientists in charge. Rather than accepting reports on individual species within these groups at face value, we suggest to raise all the historically collected species information to the genus level (see Table 2). In this case, it would be appropriate not to change the data base, because a small part of the records may have been appropriately assigned to species. However, for routine community analyses as well as for determining temporal and spatial trends by species these records cannot be trusted and therefore the higher taxa should be provided in the DATRAS output.

Discussion

During explorative analyses of the North Sea IBTS section in DATRAS, obvious errors and inconsistencies have been encountered that can result in a major bias on the results of various community analyses as well as on temporal trends and spatial distribution maps of the species involved. This may obviously lead to misinterpretation of the survey results. In case the reliability of specific records is mistrusted on the basis of available trusted taxonomic and biological information, these records should be adjusted before they are used, particularly in the context of providing management advice. Using the proposed protocol for reaching consistency in taxonomy (Table 1) and for avoiding the use of highly uncertain identifications (Table 2) can be considered as a first step towards a more uniform exploitation of the North Sea IBTS dataset.

A problem within DATRAS that has not been addressed here is related to unreliable subsets. Annual inconsistencies in reporting are known to occur in particular vessel-year subsets, due to insufficient experience from the responsible crew members with the identification of specific species, for instance because certain species are rarely seen in the area covered by the vessel, or since the scientist on board (and their experience) vary over time. Daan (2001), ter Hofstede & Daan, (2006) and ICES (2007) have listed many of these inconsistencies based on inter-vessel and inter-year comparisons of reported catches of several species. These errors are most difficult to deal with, because raising all species to a higher taxonomic level would result in the loss of a large amount of reliable information. The only solution to this problem is that individual countries regularly check their own data carefully against those of others fishing in the same area, make the appropriate corrections (change either the species code or use the appropriate genus code), and submit a new set of corrected data to DATRAS.

For community analyses, records referring to a higher taxon in specific subsets have to be split into the appropriate lower taxa, because both deleting and including the record would bias the results. An appropriate protocol for dealing with e.g. genus records would be to use the reliable species information available within the data base as the basis for decomposing genus records in the relevant species. To obtain the most likely species composition, it would seem appropriate to use a stepwise procedure, incorporating reliable records on catches of other vessels, in neighbouring ICES rectangles, or in preceding and following years. However, the development of such an algorithm goes beyond the scope of this paper.

The analyses performed so far have by no means been exhaustive and we realise that the proposed corrections given here may not solve all problems of the North Sea IBTS data within DATRAS. Still, accepting the proposed protocol would mean an important step forward to reach a uniform use of the dataset, and our propositions as given in Tables 1 and 2 should clearly lead to more consistency in the output from DATRAS. Therefore, we plea for endorsement of the suggested protocol by ICES, both regarding the use of DATRAS by ICES working groups and as a recommended guideline for external users.

Our propositions can also be used to amend other North Sea datasets, such as those from the beam-trawl surveys, but the appropriate set of invalid taxa for other areas still needs to be determined. We recommend that initiatives should be taken within ICES to carry out comprehensive checks on data sets for other regions or survey types as well, because it seems only likely that the problems identified are not restricted to the North Sea IBTS.

Acknowledgements

Special thanks go to the participants of the ICES Workshop on Taxonomic Quality Issues in the DATRAS Database (WKTQD), from which workshop this proposed protocol is a spin-off.

References

Beare, D.J., Burns, F., Greig, A., Jones, E.G., Peach, K., Kienzle, M., McKenzie, E., and Reid, D.G. 2004. Long-term increases in prevalence of North Sea fishes having southern biogeographic affinities. Marine Ecology Progress Series, 284: 269-278.

Callaway, R., Alsvaag, J., de Boois, I., Cotter, J., Ford, A., Hinz, H., Jennings, S., Kroencke, I., Lancaster, J., Piet, G., Prince, P., and Ehrich, S. 2002. Diversity and community structure of epibenthic invertebrates and fish in the North Sea. ICES Journal of Marine Science, 59(6): 1199-1214.

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

Daan, N., Gislason, H., Pope, J.G., and Rice, J.C. 2005. Changes in the North Sea fish community: evidence of indirect fishing? ICES Journal of Marine Science, 62: 177-188.

Greenstreet, S.P.R., and Rogers, S.I. 2006. Indicators of the health of the North Sea fish community: identifying reference levels for an ecosystem approach to management. ICES Journal of Marine Science, 63(4): 573-593.

Heessen, H.J.L., Dalskov, J., and Cook, R.M. 1997. The international bottom trawl survey in the North Sea, the Skagerrak and Kattegat. ICES CM 1997/Y:31. 25 pp.

Hiddink, J.G., and ter Hofstede, R. 2007. Climate induced increases in species richness of marine fishes. Global Change Biology. accepted.

ter Hofstede, R., and Daan, N. 2006. Quality check surveys: DATRAS North Sea IBTS. In: ICES. 2006. Report of the International Bottom Trawl Survey Working Group (IBTSWG), 27-31 March 2006, Lysekil, Sweden. ICES CM 2006/RCM:03, Ref. ACFM, 298 pp.

ICES. 2006. Report of the International Bottom Trawl Survey Working Group (IBTSWG), 27-31 March 2006, Lysekil, Sweden. ICES CM 2006/RCM:03, Ref. ACFM, 298 pp.

ICES. 2007. 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.

Jennings, S., Greenstreet, S.P.R., Hill, L., Piet, G.J., Pinnegar, J.K., and Warr, K.J. 2002. Long-term trends in the trophic structure of the North Sea fish community: Evidence from stable-isotope analysis, size-spectra and community metrics. Marine biology, 141(6): 1085-1097.

Maxwell, D.L., and Jennings, S. 2005. Power of monitoring programmes to detect decline and recovery of rare and vulnerable fish. Journal of Applied Ecology, 42: 25-37.

Perry, A.L., Low, P.J., Ellis, J.R., and Reynolds, J.D. 2005. Climate Change and Distribution Shifts in Marine Fishes. Science, 308: 1912-1915.

Piet G. (2004) Development of a central database for European trawl survey data (DATRAS). Final report. DGXIV(European Commission, Brussels) EC project QLRT-2001-00025. 70 pp.

Table 1. List of invalid taxa currently reported in the North Sea IBTS DATRAS and their appropriate identification.

TSN	TAXON STORED	TSN	PROPOSED USE
159700	*Lampetra*	159719	*Lampetra fluviatilis*
159721	*Petromyzon*	159722	*Petromyzon marinus*
160846	*Raja*	160845	*Rajidae*
162057	*Argentinidae*	162061	*Argentina*
164771	*Gadiculus*	164772	*Gadiculus argenteus*
164789	*Merlucciidae*	164795	*Merluccius merluccius*
165255	*Lycodes*	165284	*Lycodes vahli*
166271	*Zeiformes*	166287	*Zeus faber*
166309	*Caproidae*	166320	*Capros aper*
166438	*Syngnathoidei*	166443	*Syngnathidae*
170316	*Dicentrarchus*	170317	*Dicentrarchus labrax*
171335	*Anarhichadidae*	171336	*Anarhichas*
171691	*Callionymidae*	171692	*Callionymus*
173000	*Solea*	173001	*Solea vulgaris*
173002	*Solea solea*	173001	*Solea vulgaris*
173020	*Buglossidium*	173021	*Buglossidium luteum*
173022	*Microchirus*	173026	*Microchirus variegatus*

Table 2. List of uncertain taxa currently reported in the North Sea IBTS DATRAS and their proposed identification.

TSN	TAXON STORED	TSN	PROPOSED USE
160240	*Mustelus asterias*[1)]	160226	*Mustelus*
160242	*Mustelus mustelus*[1)]	160226	*Mustelus*
161708	*Alosa alosa*[2)]	161701	*Alosa*
161716	*Alosa fallax*[2)]	161701	*Alosa*
572694	*Alosa agone*	161701	*Alosa*
161996	*Salmo salar*	161994	*Salmo*
161997	*Salmo trutta*	161994	*Salmo*
166463	*Syngnathus rostellatus*	166444	*Syngnathus*
166464	*Syngnathus acus*	166444	*Syngnathus*
166467	*Syngnathus typhle*	166444	*Syngnathus*
171676	*Ammodytes tobianus*	171671	*Ammodytes*
171677	*Ammodytes marinus*	171671	*Ammodytes*
171680	*Gymnammodytes semisquamatus*[3)]	171671	*Ammodytes*
171682	*Hyperoplus lanceolatus*	171681	*Hyperoplus*
171683	*Hyperoplus immaculatus*	171681	*Hyperoplus*
171978	*Pomatoschistus minutus*[4)]	171977	*Pomatoschistus*
171980	*Pomatoschistus pictus*	171977	*Pomatoschistus*

1) The commonly used feature of white spots on the sides is extremely variable and runs from hardly visible to pronounded white stars. It is not by itself considered a discriminating feature.

2) These two species are known to interbreed and species identified as *Alosa alosa* have seldom all the discriminating features.

3) Including *Gymnammodytes* under the genus *Ammodytes* is a practical solution, because the two genus are difficult to distinguish, but as a group they can be readily distinguished from *Hyperoplus*. Formally, the taxon should be Ammodytidae excluding *Hyperoplus*.

***4) Pomatoschistus minutus* is likely to include locally *P. microps* and *P. lozanoi*.**

WD3: Cardador, F., Chaves, C., Morgado, C. 2008. Changes in Blue Jack Mackerel (Trachurus picturatus) abundance and distribution in Portuguese continental waters (ICES Division IXa)

Changes in Blue Jack Mackerel (Trachurus picturatus) abundance and distribution in Portuguese continental waters (ICES Division IXa)

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Introduction

Blue jack mackerel (*Trachurus picturatus*) is a Carangidae, and it is a pelagic fish with a wide distribution from Bay of Biscay (France) to southward to Morocco including Azores, Madeira, Canary Islands and eastward in the Mediterranean Sea (Karaiskou *et al.*, 2003; Fish base online). In 2005, in Portuguese continental waters, high catches has been recorded in the autumn Portuguese Groundfish survey, with an increase in its frequency and since then abundance and biomass indices seems to remain high. Landings of this species from the Portuguese commercial fleets had also increased in recent years which are consistent with the abundance increase detected from the surveys.

The main objective of this working document is to show important changes in the abundance and distribution of Blue jack mackerel (*Trachurus picturatus*) in Portuguese continental waters. The explanation of this event is not analyzed but there is some hypothesis that it might be related to global warming.

Material and methods

Data analyzed were collected during autumn and winter Portuguese groundfish surveys with the RV "Noruega". Autumn surveys data are from 1900 to 2007 and winter data from 2005 to 2007. The main objective of the autumn surveys is to monitor the abundance and distribution of hake and horse mackerel recruitment, while the winter survey aims to monitor the abundance and distribution of hake in spawning season. Additionally these surveys estimate (i) abundance indices and biomass of the most important commercial species, (ii) biological parameters, e.g. maturity, ages, sex-ratio, weight, food habits, (iii) biodiversity of the sampling area. The primary species are hake, horse mackerel, blue whiting, mackerel, Spanish mackerel, anglerfish, megrim and Norway lobster. (IBTS, 2007; Cardador and Chaves, 2007).

Both surveys cover the Portuguese continental waters (ICES Division IXa), from 20 to 500 m depth. The autumn groundfish survey plan comprises 96 fishing stations, 66 at fixed (grid) positions and 30 at random. The tow duration is 30 min, with a trawl speed of 3.5 knots, during day light. The bottom trawl net used is the NCT (Norwegian Campbell Trawl) with rollers in the groundrope. The mean horizontal opening between the wings is 14.7 m, the mean vertical opening is 4.4 m and the codend mesh size is 20 mm. The winter groundfish survey plan comprises 75 fishing stations, 66 at fixed (grid) positions and 9 at random; the tow duration is 60 min, with a trawl speed of 3.5 knots, during day light. The gear used is a CAR bottom trawl gear type FGAV019 without rollers in the groundrope. The mean horizontal opening between the wings is 25 m, the mean vertical opening is 2.5 m and the codend mesh size is 20 mm.

Abundance (number per hour) and biomass (kg per hour) estimation and their standard deviations were computed for the whole surveyed area and based on the methodology presented by Cochran (1977) for calculation of estimators for the stratified random sampling. In the present study it was assumed that both trawl nets have the same catchability for blue jack mackerel.

Data on landings were based on the statistical data published by the Portuguese Fisheries Administration (DGPA) reports for 1997-2007 (http://www.dgpa.min-agricultura.pt/).

Results

Portuguese Landings

Blue jack mackerel has a low commercial importance in the Portuguese fishery (0.30 € per kg in the auction in 2007). Landings of this species from the Portuguese commercial fleets had increased in recent years, from 300 t in 1999 to 2700 t in 2007 (Figure 1) which is consistent with the increase detected on biomass and abundance indices from the groundfish surveys. The landings are mainly from the trawl fleet; during 1997-2007 landings from the trawl fleet comprised 58% (500 t) of the total landings, purse-seine and other gears (gillnets, etc) contributed, each one, with around 20% of the landings.

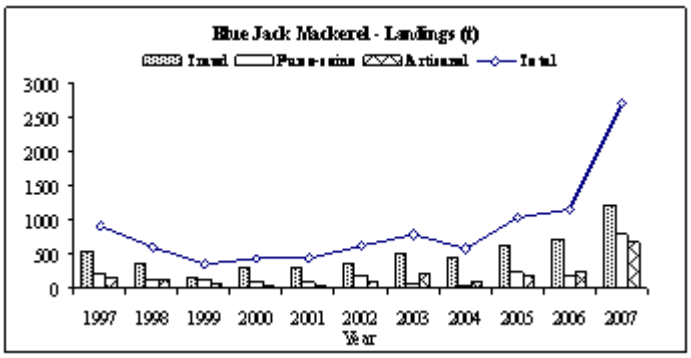


Figure 1: Portuguese landings of blue jack mackerel in Portuguese continental waters ***(from: http://www.dgpa.min-agricultura.pt.)***

In 2007, Portuguese landings of blue jack mackerel represented 2% of the total landings from the Portuguese fleet in continental harbours; landings from the trawl fleet have contributed with 7.5% of the total trawl landings.

Blue jack mackerel surveys occurrence

The occurrence (number of positive hauls divided by the total number of valid hauls) of this species in groundfish surveys is shown in Figure 2. It indicates a decrease from 48% in autumn 1992 to 13% in winter 2005; however since autumn 2005 it has increased from 55% to a maximum of 81% in winter 2007. A decrease in autumn 2007 was observed (47%), but still above the average occurrence of the overall series (33%).

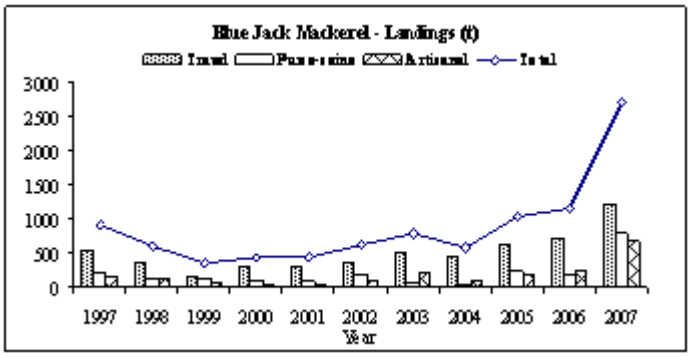


Figure 2: Percentage of occurrence (number of positive hauls divided by the total number of valid hauls) of blue jack mackerel in Portuguese groundfish surveys.

Biomass indices

Biomass indices from groundfish surveys are shown in Figures 3 and 4 showing a high increase, from 0.1 kg/hour in winter 2005 to 6.8 kg/hour in autumn 2005. In the following years the biomass indices estimated increased in winter 2006 (5.5 kg/hour) and in autumn 2006 reached the highest estimate with 174.0 kg/hour. In 2007, in winter and autumn surveys, a slight decrease in the biomass indices were estimated but still higher than the average. This catch rates represents an increase of 60 times of the average catch rates for the whole 1990-2004 period.

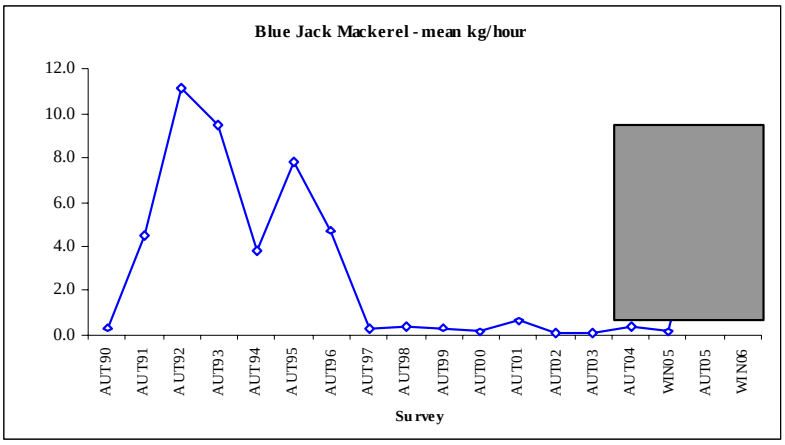


Figure 3: Biomass indices of blue jack mackerel in the Portuguese groundfish surveys during 1990-2006. (*The shadow box represent the same period in both Figures 3 and 4*)

Figure 4: Biomass indices of blue jack mackerel in the Portuguese groundfish surveys during 2004-2007. ***(The shadow box represent the same period in both Figures 3 and 4).***

Geographical distribution

The distribution and biomass indices (mean kg per hour tow) of blue jack mackerel along the Portuguese continental coast for the period 1990-2004 are shown in Figure 5. High catches were recorded in the South region, with a maximum value of 77 kg/h tow. The southwestern area presents lowest catches and as the latitude increases the catches diminishes to some sparse occurrence in the Northern region. However since 2005, winter, (Figure 6 a) is sparse and the highest catch (5.5 kg/h) was recorded in the Southwest region. In autumn (Figure 6 b), the catches has increased to a maximum of 230 kg/h in one tow in the southern region and the distribution area has extended to shallow waters (20–100 m) in the Northern region where the occurrence was considered as rare.

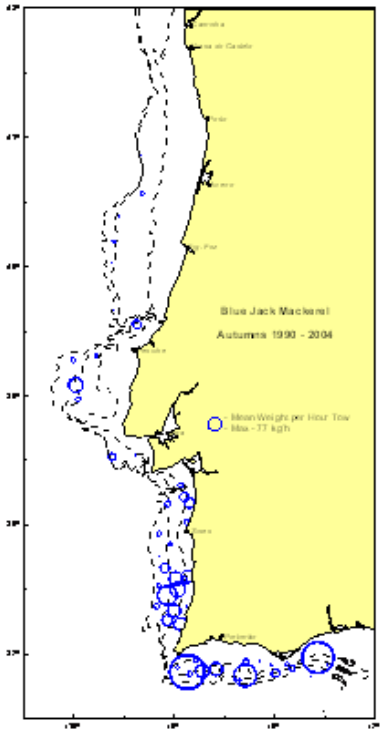
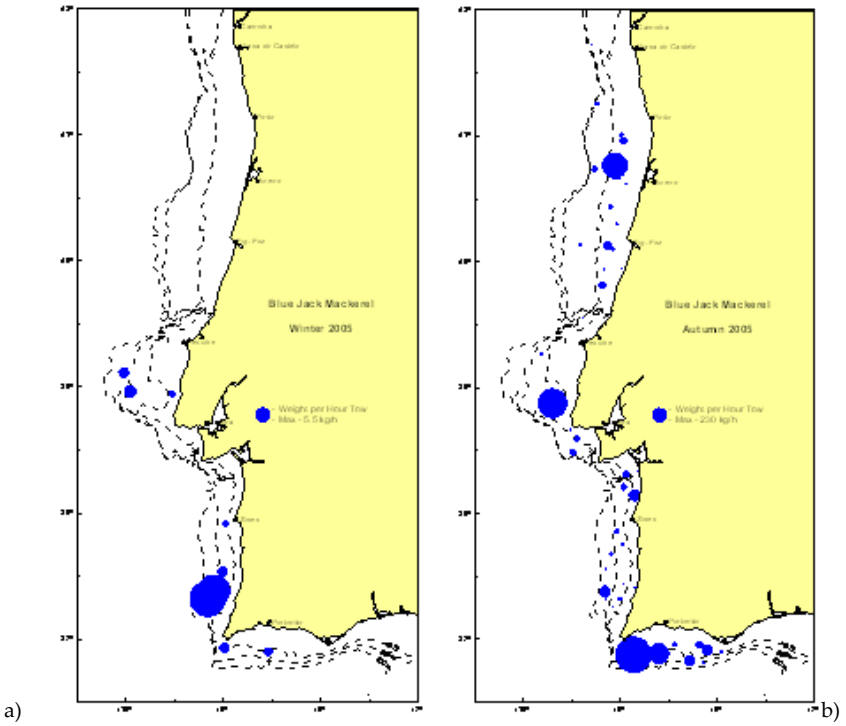
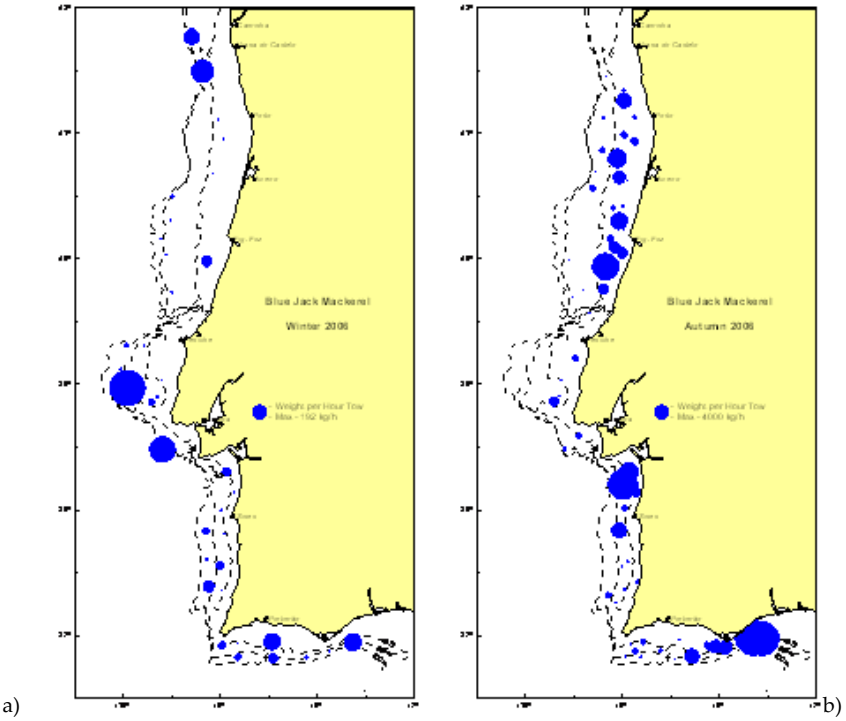


Figure 5: Distribution of blue jack mackerel in the autumn series of Portuguese groundfish surveys during the 1990–2004.



a) b)

Figure 6: Distribution of blue jack mackerel in the 2005 Portuguese groundfish surveys (winter a) and autumn b)).



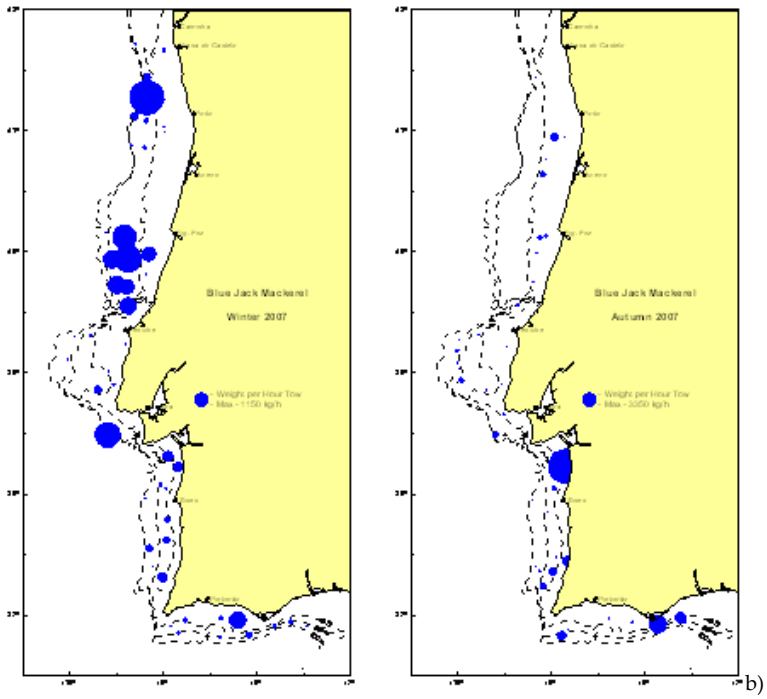
a) b)

Figure 7: Distribution of blue jack mackerel in the 2006 Portuguese groundfish surveys (winter a) and autumn b)).

The distribution in the winter 2006 survey (Figure 7a) is quite similar to the one in the autumn 2005. Blue jack mackerel was caught in the northern region, and the highest catches were recorded in the southwest with 192 kg/h. The autumn 2006 survey (Figure 7b) shows a wide distribution of the blue jack mackerel along the whole

Portuguese continental coast. It presented catches of 4 tonnes per hour tow in the waters confluent with the Gulf of Cadiz. The presence in the north region was the highest for the whole series and its presence remained in shallowest waters (20-100 m).

In the winter 2007 (Figure 8a), the catches reduced to 1/3 of the level in autumn 2006. The catch rates remains high in the northern region but in deeper waters (101-200 m). The autumn 2007 (Figure 8b) survey recorded one high catch in the southwest region with 3350 kg/h.



a) b)

Figure 8: Distribution of blue jack mackerel in the 2007 Portuguese groundfish surveys (winter a) and autumn b)).

Depth Distribution

The variation in depth distribution of blue jack mackerel is showed in Figure 9, with a wider range distribution in the winter surveys than in autumn.

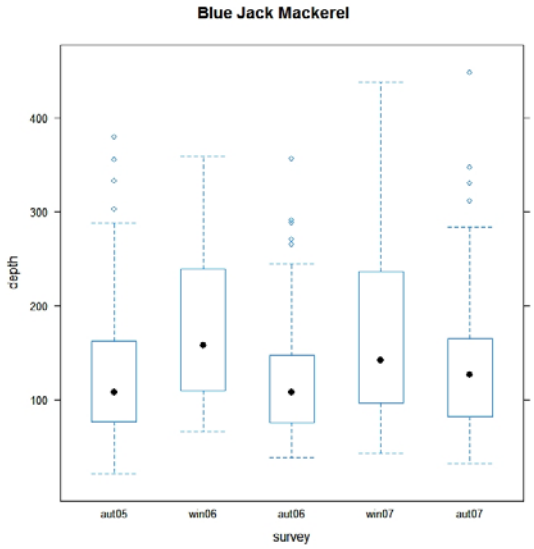


Figure 9: Depth distribution of blue jack mackerel in 2005-2007 groundfish surveys– Median, lower and upper quartiles.

Abundance indices by length

The total length range of blue jack mackerel caught in the Portuguese groundfish surveys was 11- 48 cm.

Abundance indices as mean number/hour by 1 cm length class are shown in Figure 10 for the most recent surveys. The high abundance index in autumn 2006 (around 7000 fish/hour, 174 kg/hour) is mainly composed of small individuals, with a mean length of 14.7 cm, which may correspond to a very high strong year class. The mean length decreases from a maximum of 34.8 cm in autumn 2001 to a minimum of 14.7 cm in autumn 2006 (Figure 11) In autumn 2005 and 2006 two modal classes can be observed; one very abundant at length group 14-16 cm and the second at length group 28-29 cm. In winter 2006 the most abundant modal class is at 15-18 cm which should correspond to the same age group as the first modal class of autumn 2005. In winter 2007 the same modal classes are detected although the first one is stronger than the one in 2006, due to the higher abundance of autumn 2006. In autumn 2007 the important modal class is observed at 18-19 cm.

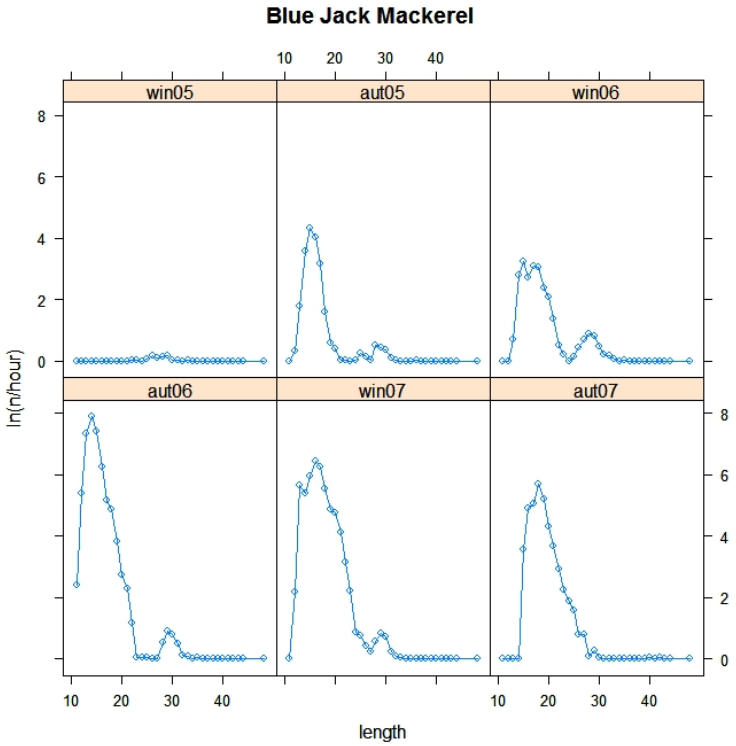


Figure 10: Abundance indices (log) of blue jack mackerel for 2005-2007 groundfish surveys, by length class.

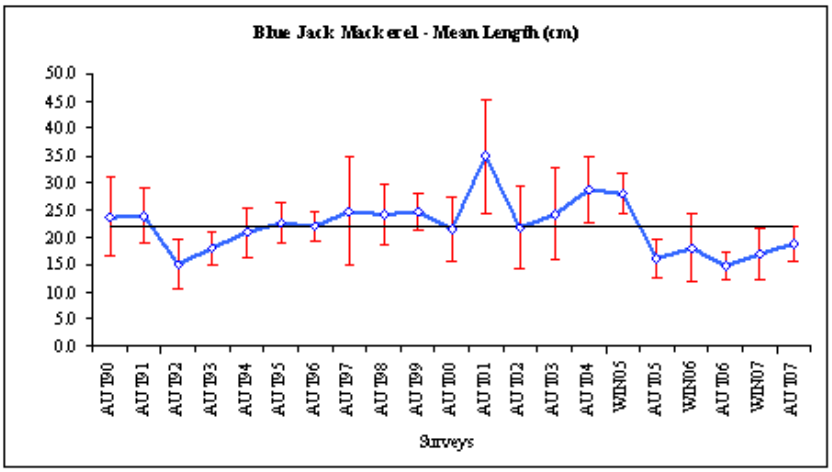


Figure 11: Mean Length (+- 2 sd) of blue jack mackerel for 1990-2007 groundfish surveys.

Main Conclusions

The biomass indices of blue jack mackerel increased in 2005, reaching in 2006 the highest indices estimated for the Portuguese continental waters;

In 2007 the biomass index has decreased but to levels above the average of the years previous of 2005;

The geographical distribution of blue jack mackerel is not steady; however the southwest and the south of the Portuguese waters are the preferred areas;

Recruitment of blue jack mackerel to the fishing grounds takes place in autumn;

In autumn 2006 a very strong recruitment was observed while in autumn 2007 the recruitment was lower;

Abundance indices in other areas than the Portuguese waters may provide information to understand the change of abundance and distribution of this species;

Environmental changes as global warming (IPCC, 2007) are probably the reason of this phenomenon which should be investigated.

Acknowledgments

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References

Cardador, F., Chaves, C. 2007. Portuguese Groundfish Surveys for Hake (PESCADA-BD). Working document presented at 2007 IBTS meeting, 5pp.

Cochran, W.G.1977. Sampling Techniques. John Wiley and Sons, New York, third edition. 428pp.

ICES. 2007. Report of the International Bottom Trawl Survey Working Group (IBTSWG), 27–30 March 2007, Sète, France, ICES Resource Management Committee, ICES CM 2007/RMC:05,Ref. ACFM, 197pp.

IPCC, 2007. Climate change 2007: synthesis report. Contribution to Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pauchauri, R.K. and Reisenger, A. (eds.)] IPCC Geneva, Switzerland, 104pp.

Karaiskou, N.; A. P. Apostolidis; A. Triantafyllidis; A. Kouvatsi and C. Triantaphyllidis. 2003. Genetic identification and phylogeny of three species of the Genus Trachurus based on mitochondrial DNA analysis. Marine Biotechnology, 5: 493-505.

WD4: International workshop on the identification of clupeid larvae

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Introduction

Up till now an international workshop on the identification of clupeid larvae has never taken place. For reasons of quality assurance it is advisable to organise such a workshop. In recent years new as well as the experienced technicians have worked up the herring larvae samples at IMARES. But so far the quality of the determination of the clupeid larvae is not known. At IMARES a workshop (of one day) was conducted to calibrate determination of the larvae within the institute (see the report below on the IMARES workshop). The results show that agreement in the determination of clupeid larvae is reasonable but could be improved.

We would therefore want to propose to conduct an international workshop on the identification of clupeid larvae, to calibrate identification of the larvae and to standardise descriptions and pictures/drawing used for the identification and to standardise the working up of the samples. For a successful workshop the participation of all technicians and researchers involved in the working up of samples of the herring larvae surveys (also the Baltic spring spawners?) as well as the MIK samples would be required.

IMARES workshop on identification of clupeid larvae

Workshop

On 21 March a workshop on the determination of clupeid larvae was organised at IMARES for reasons of quality assurance. All those participating in sorting and determination of the herring larvae surveys samples participated in the workshop. A total of 4 IMARES employees participated in the workshop (called participant A to D in the remainder of the document).

Method

12 samples out of all the 2006-2007 herring larvae and IBTS survey were randomly selected out of the samples containing a high number of larvae. From these samples 5 larvae were randomly selected for the workshop. In total 47 different larvae were looked at by each participant.

All larvae were kept in separate in a petridish and numbered, so each larva could be identified. Each participant looked at all the larvae under one of the three 'new' dissecting microscopes. Therefore no influences of the dissecting microscopes can be expected. Each participant counted the myotomes of each larva, from head to tail and from head to anus. Based on these counts larvae were identified to species and length measured.

Results were compared to the original determination as well as comparison amongst participants. A modal species was determined for all larvae based on the results of all participants and the original determination. The tables in the results section show; A) the number of larvae per species should have been identified based on the modal species; B) the number of larvae per species that has been identified; C) under- or

overestimation of the number of larvae per species; D) agreement of determination per species.

Results

Figure 1 shows the number of larvae per species that were identified during the original determination and by each participant in the workshop. Results of species determination for all larvae are shown in table 1, the results for the separate herring larvae and IBTS are shown in table 2 and 3 respectively.

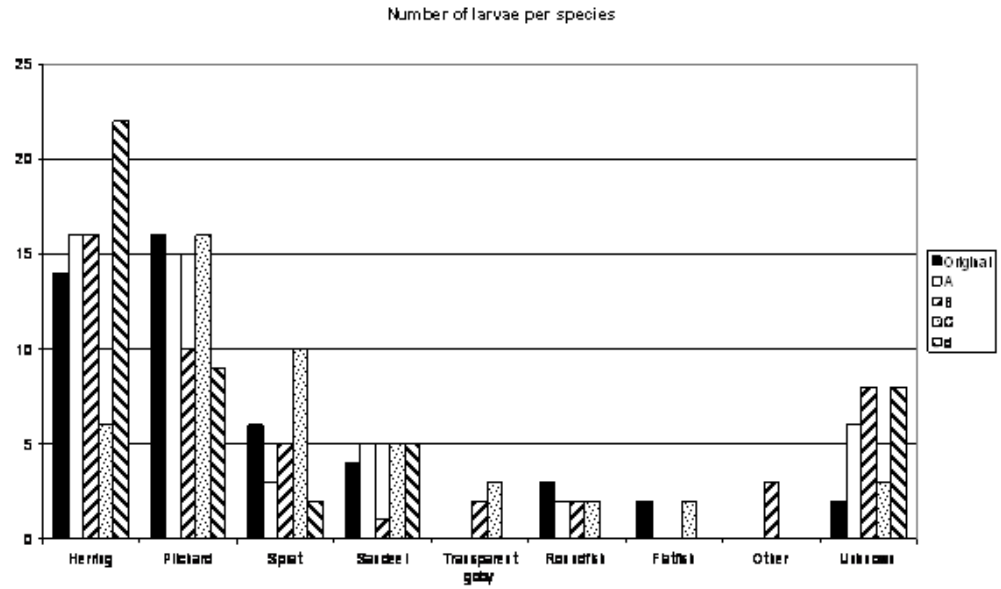


Figure 1. Number of larvae per species. Original is the determination as is registered in the database.

Overall agreement is low, only 48.3% (table 1). However agreement for the clupeids is much higher, 77% for herring, 62% for pilchard and 60% for sprat. Agreement for the larvae from the herring larvae survey (table 2) was even higher for the herring 86%, however for pilchard agreement was lower, only 56%, while sprat remained at 60%. Agreement for the larger IBTS larvae (table 3) is lower for herring, only 69%, but for pilchard agreement was higher at 65%. According to the modal species composition for the IBTS samples sprat larvae were not present in these samples (table 3A). However, almost every participant identified sprat larvae (table 3B). Participants agreed that the quality of the larvae from the IBTS samples was low and these larvae were difficult to identify. The low quality of the larvae could be the reason for the lower agreement.

Results show that agreement for the target species of these surveys, clupeids, is OK, but can be improved.

Table 4 shows the under- and overestimation of the counted number of myotomes against the average number of myotomes. For each larva the average number of myotomes is calculated. For each participant the difference from the mean is calculated. For the larvae from the herring larvae survey agreement between participants is high. However for the IBTS the difference between the participants is high. This is probably also due to the lower quality of the IBTS larvae.

There is no difference in agreement between the number of myotomes from head to anus or from head to tail.

No larvae of fertilisation experiments were used in this workshop, therefore the result only show the agreement amongst participants.

Table 1 The species compositions based on modal/actual species reflecting the best estimates based on only those eggs that were used for species identification by the participant (A), the species compositions as obtained per participant (B), the percentages over- and underestimation (C) and the percentages agreement with modal species or actual species (D)are shown per species by participant and for the whole group that took part in the species identification excercise on fish eggs. A weighte mean percent agreement is given by person and all persons combined.

SPECIES IDENTICATION first determination Larvae determination Workshop, IJmuiden, 21 March 2007

A Species compositions using modal/actual species (second last column input table)

Modal or actual species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	TOTAL
Herring	1	14	14	14	14	14	70
Pilchard	2	18	18	18	18	18	90
Sprat	3	1	1	1	1	1	5
Sandeel	4	5	5	5	5	5	25
Transparent goby	5	-	-	-	-	-	-
Roundfish	6	2	2	2	2	2	10
Flatfish	7	2	2	2	2	2	10
Other	8	-	-	-	-	-	-
Unknown	9	4	4	4	4	4	20
Total	1-9	47	47	47	47	46	234

B Species compositions as estimated per participant and whole group

Species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	TOTAL
Herring	1	14	16	16	6	22	74
Pilchard	2	16	15	10	16	9	66
Sprat	3	6	3	5	10	2	26
Sandeel	4	4	5	1	5	5	20
Transparent goby	5	-	-	2	3	-	5
Roundfish	6	3	2	2	2	0	9
Flatfish	7	2	0	0	2	0	4
Other	8	-	-	3	-	-	3
Unknown	9	2	6	8	3	8	27
Total	1-9	36	34	31	32	33	166

C Percentage overestimation / underestimation

Modal or actual species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	ALL
Herring	1	0%	14%	14%	-57%	57%	6%
Pilchard	2	-11%	-17%	-44%	-11%	-50%	-27%
Sprat	3	500%	200%	400%	900%	100%	420%
Sandeel	4	-20%	0%	-80%	0%	0%	-20%
Transparent goby	5	-	-	-	-	-	-
Roundfish	6	50%	0%	0%	0%	-100%	-10%
Flatfish	7	0%	-100%	-100%	0%	-100%	-60%
Other	8	-	-	-	-	-	-
Unknown	9	-50%	50%	100%	-25%	100%	35%

D Percentage agreement in species identification per species

Modal or actual species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	ALL
Herring	1	86%	86%	93%	36%	86%	77%
Pilchard	2	72%	78%	50%	67%	44%	62%
Sprat	3	100%	100%	100%	0%	0%	60%
Sandeel	4	80%	100%	20%	100%	100%	80%
Transparent goby	5	-	-	-	-	-	-
Roundfish	6	100%	50%	50%	100%	0%	60%
Flatfish	7	100%	0%	0%	100%	0%	40%
Other	8	-	-	-	-	-	-
Unknown	9	25%	100%	75%	75%	75%	70%
Weighted mean	1-9	55.3%	57.4%	48.9%	36.2%	43.5%	48.3%

Table 2 The species compositions based on modal/actual species reflecting the best estimates based on only those eggs that were used for species identification by the participant (A), the species compositions as obtained per participant (B), the percentages over- and underestimation (C) and the percentages agreement with modal species or actual species (D)are shown per species by participant and for the whole group that took part in the species identification excercise on fish eggs. A weighted mean percent agreement is given by person and all persons combined.

SPECIES IDENTICATION first determination Larvae determination Workshop, IJmuiden, 21 March 2007

A Species compositions using modal/actual species (second last column input table)

Modal or actual species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	TOTAL
Herring	1	7	7	7	7	7	35
Pilchard	2	5	5	5	5	5	25
Sprat	3	1	1	1	1	1	5
Sandeel	4	5	5	5	5	5	25
Transparent goby	5	-	-	-	-	-	-
Roundfish	6	2	2	2	2	2	10
Flatfish	7	2	2	2	2	2	10
Other	8	-	-	-	-	-	-
Unknown	9	3	3	3	3	3	15
Total	1-9	25	25	25	25	24	124

B Species compositions as estimated per participant and whole group

Species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	TOTAL
Herring	1	6	7	7	6	8	34
Pilchard	2	3	5	1	5	4	18
Sprat	3	5	2	5	3	-	15
Sandeel	4	4	5	1	5	5	20
Transparent goby	5	-	-	-	-	-	-
Roundfish	6	3	2	2	2	0	9
Flatfish	7	2	0	0	2	0	4
Other	8	-	-	3	-	-	3
Unknown	9	2	4	6	2	7	21
Total	1-9	14	14	13	14	12	67

C Percentage overestimation / underestimation

Modal or actual species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	ALL
Herring	1	-14%	0%	0%	-14%	14%	-3%
Pilchard	2	-40%	0%	-80%	0%	-20%	-28%
Sprat	3	400%	100%	400%	200%	-	200%
Sandeel	4	-20%	0%	-80%	0%	0%	-20%
Transparent goby	5	-	-	-	-	-	-
Roundfish	6	50%	0%	0%	0%	-100%	-10%
Flatfish	7	0%	-100%	-100%	0%	-100%	-60%
Other	8	-	-	-	-	-	-
Unknown	9	-33%	33%	100%	-33%	133%	40%

D Percentage agreement in species identification per species

Modal or actual species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	ALL
Herring	1	86%	86%	86%	71%	100%	86%
Pilchard	2	40%	80%	20%	60%	80%	56%
Sprat	3	100%	100%	100%	0%	0%	60%
Sandeel	4	80%	100%	20%	100%	100%	80%
Transparent goby	5	-	-	-	-	-	-
Roundfish	6	100%	50%	50%	100%	0%	60%
Flatfish	7	100%	0%	0%	100%	0%	40%
Other	8	-	-	-	-	-	-
Unknown	9	33%	100%	100%	67%	100%	80%
Weighted mean	1-9	36.0%	44.0%	32.0%	32.0%	45.8%	37.9%

Table 3 The species compositions based on modal/actual species reflecting the best estimates based on only those eggs that were used for species identification by the participant (A), the species compositions as obtained per participant (B), the percentages over- and underestimation (C) and the percentages agreement with modal species or actual species (D)are shown per species by participant and for the whole group that took part in the species identification excercise on fish eggs. A weighte mean percent agreement is given by person and all persons combined.

SPECIES IDENTICATION first determination Larvae determination Workshop, IJmuiden, 21 March 2007

A Species compositions using modal/actual species (second last column input table)

Modal or actual species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	TOTAL
Herring	1	7	7	7	7	7	35
Pilchard	2	13	13	13	13	13	65
Sprat	3	-	-	-	-	-	-
Sandeel	4	-	-	-	-	-	-
Transparent goby	5	-	-	-	-	-	-
Roundfish	6	-	-	-	-	-	-
Flatfish	7	-	-	-	-	-	-
Other	8	-	-	-	-	-	-
Unknown	9	1	1	1	1	1	5
Total	1-9	22	22	22	22	22	110

B Species compositions as estimated per participant and whole group

Species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	TOTAL
Herring	1	8	9	9	-	14	40
Pilchard	2	13	10	9	11	5	48
Sprat	3	1	1	-	7	2	11
Sandeel	4	-	-	-	-	-	-
Transparent goby	5	-	-	2	3	-	5
Roundfish	6	-	-	-	-	0	-
Flatfish	7	-	0	0	-	0	-
Other	8	-	-	-	-	-	-
Unknown	9	-	2	2	1	1	6
Total	1-9	22	20	18	18	21	99

C Percentage overestimation / underestimation

Modal or actual species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	ALL
Herring	1	14%	29%	29%		100%	14%
Pilchard	2	0%	-23%	-31%	-15%	-62%	-26%
Sprat	3	-	-	-	-	-	-
Sandeel	4	-	-	-	-	-	-
Transparent goby	5	-	-	-	-	-	-
Roundfish	6	-	-	-	-	-	-
Flatfish	7	-	-	-	-	-	-
Other	8	-	-	-	-	-	-
Unknown	9		100%	100%	0%	0%	20%

D Percentage agreement in species identification per species

Modal or actual species		Original Reader 1	A Reader 2	B Reader 3	C Reader 4	D Reader 5	ALL
Herring	1	86%	86%	100%	0%	71%	69%
Pilchard	2	85%	77%	62%	69%	31%	65%
Sprat	3	-	-	-	-	-	-
Sandeel	4	-	-	-	-	-	-
Transparent goby	5	-	-	-	-	-	-
Roundfish	6	-	-	-	-	-	-
Flatfish	7	-	-	-	-	-	-
Other	8	-	-	-	-	-	-
Unknown	9	0%	100%	0%	100%	0%	40%
Weighted mean	1-9	77.3%	72.7%	68.2%	40.9%	40.9%	60.0%

Table 4. Under- and overestimation of the number of myotomes counted by ach participant.

	Myotomes from head to anus				Myotomes from head to tail			
	A	B	C	D	A	B	C	D
Mean overall	0	0	2	-1	-1	0	2	-2
STDEV overall	1.2	1.7	2.2	1.6	1.5	2.3	2.4	2.1
Mean HELA	0	0	1	-1	-1	1	1	-1
STDEV HELA	1.3	1.2	1.8	1.0	1.3	1.4	1.4	1.8
Mean IBTS	-1	-1	3	-1	-1	0	4	-3
STDEV IBTS	1.2	2.0	1.9	1.9	1.6	2.9	2.3	2.1

WD5: Coppin, F., Le Roy, D., Schlaich, Y. 2008. Channel Ground Fish Survey handbook

Channel Ground Fish Survey handbook

Responsible laboratory: Fishing resources of Boulogne-sur-mer

Scientific leader: Frank Coppin

Phone : 03 31 99 56 14
E-mail: franck.coppin@ifremer.fr

This protocol has been applied in its entirety to the survey CGFS since 1997. From 1988 to 1996, the control system of trawling parameters "Scanmar" and the hydrological probe "Micrel" were not used.

Introduction

The Eastern English Channel is an area characterised by the preponderance of its socio-economic activities in relation to the marine environment. Indeed, it constitutes, with the Dover Strait, one of most important area of international exchange, accounting for approximately 20% of the world traffic. Bordered by the first European port for sea products treatment and first French fishing port, Boulogne-sur-mer, it is a zone strongly influenced by sea and fisheries activity. This maritime boundary between France and the UK is mainly exploited by mixed trawlers and inshore fishing boats. This fleet represents more than 80% of the quantities declared by all the countries working in this sector. The ecological impact of such exploitation of fishing resources on this fragile ecosystem must be measured so that fishing can remain a sustainable activity that considers resource limits and its effects on the environment.

For this purposes, each year in October since 1988, IFREMER carries out an experimental trawling survey named Channel Ground Fish Survey (CGFS), aiming at evaluating abundance indices of main commercial species for the Eastern English Channel. The Channel Ground Fish Survey is the only survey providing scientific data of this type and covering all the Eastern English Channel area. The STECF Sub-group on Research Needs (SGRN) which took place in Brussels during February 12-16, 2007 defined criteria for surveys at sea in order to compile a list of surveys at sea to be considered for co-funding by the new Data Collection Regulation. In response to the first criterion, the surveys must be coordinated and harmonised through an internationally organised steering mechanism. Indeed, the Channel Ground Fish Survey is already coordinated by the IBTS working group. In this context, it answers all the criteria defined in paragraph 12.2 (Coordination of new trawl survey) of ICES IBTSWG report 2007 (Tab. 1).

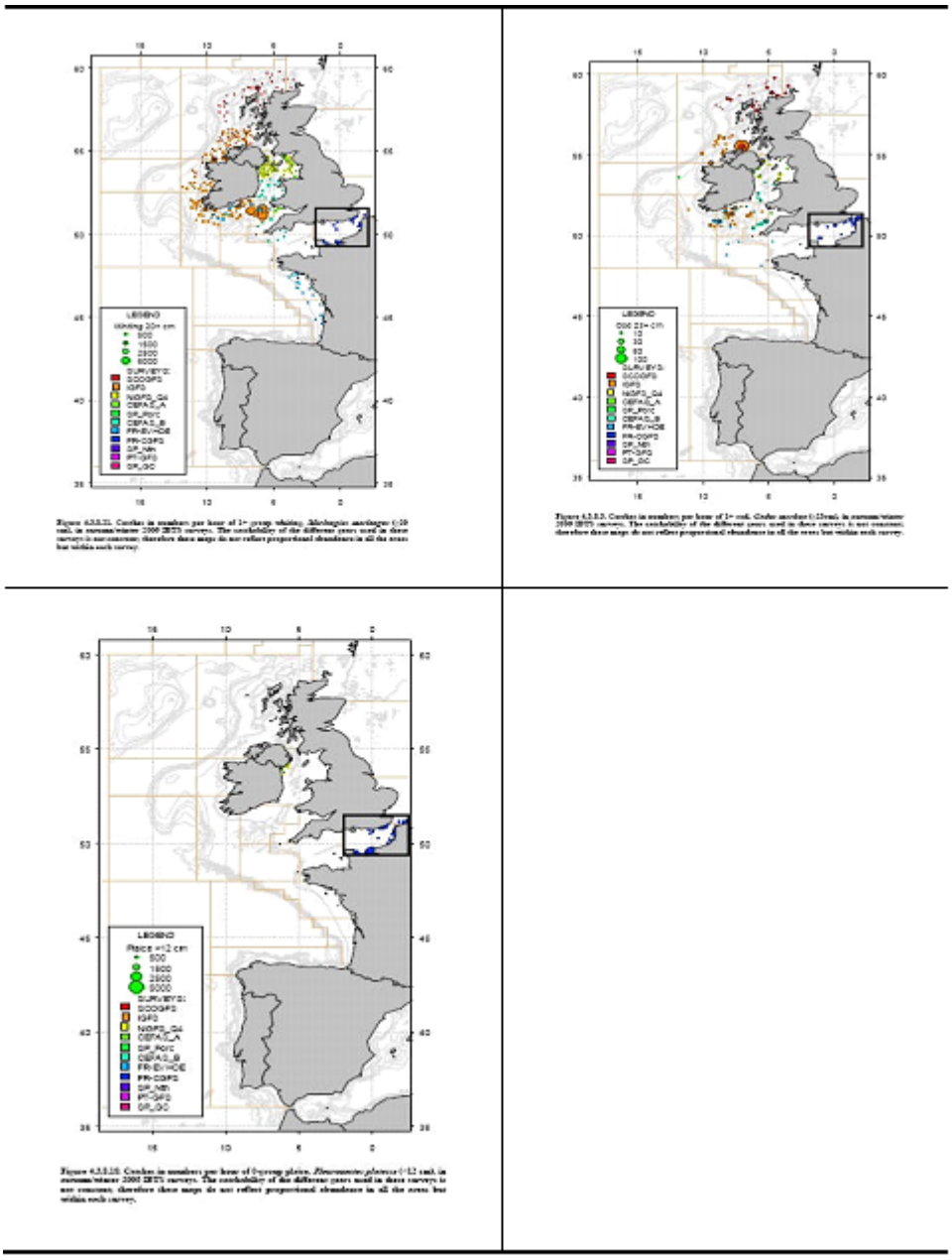
Table 1. IBTS working group criteria to facilitate coordination of new trawl surveys.

CRITERIA'S DESCRIPTION	CHANNEL GROUND FISH SURVEY	ANSWER TO THE CRITERION
A brief outline of the management need/context for the survey provided by the assessment working group	Paragraph 6.3.3, 6.3.4, 6.4, 6.8, 6.11, tables, figures and stock annexes of the ICES WGNSSK Report 2007 (ICES CM 2007\ACFM:18 and 30) for Plaice in VIId. Paragraph 5.4.1, 7.4 of ICES WGNEW REPORT 2007 (ICES CM 2007 ACFM : 01 Ref. LRC)	Yes
It is a bottom trawl survey	A bottom trawl is used for this survey. It has the same characteristics as IBTS trawl tacking into account the power of the vessel (Chapter 4)	Yes
The survey either has appropriate sampling methods and protocols (including gear descriptions) that conform to the standards encouraged by the IBTSWG, or that can be improved after joining IBTSWG	The sampling methods and protocol are the same as IBTS survey (Chapter 5 and 6) in the North sea	Yes
The survey should aim to enhance existing IBTS surveys and improve data collection for important stocks. For example, proposed surveys for inclusion within IBTSWG should overlap and extend existing surveys and use comparable gear	Gears and protocol between IBTS and CGFS are comparable. The Channel ground fish survey is the only bottom trawl survey which covers all the Eastern English Channel	Yes
Submit their data to the DATRAS database	Haul characteristics and catch data were integrated to DATRAS Database in 2007.	Yes (Must be completed)
Attend and present data at the annual meetings of IBTSWG;	ICES IBTSWG REPORT 2007 ICES CM 2007/RMC:05 ref. ACFM	Yes
Assessment working groups should confirm (e.g. after a five year period) that any surveys targeting specific stocks and not using gears used in the standard IBTS surveys are still providing data of high quality and use to the assessment	Index by age are provided to the WGNSSK working group for whiting, cod and plaice	Yes Partially used. Must to be improved

The Channel Ground Fish Survey provides recruitment indices in response to the second criterion defined by the SGRN (inform management decisions). These index are transmitted each year since 1988 to the expert of the working group "Assessment of Demersal Stock in the North Sea and Skagerrak" of the International Council for the Exploration of the Sea (ICES) for whiting, plaice and cod. Cod is the object of a recovery plan. Moreover, this survey supplements the direct evaluation programme of flat fish stocks "Beam Trawl Survey" carried out by other Member States. Data collected during the CGFS are also used by the Working Group on assessment of New MoU Species to improve biological data and space distribution knowledge for species studied by this group (striped red mullet, dab, flounder, sea bass, gurnards, turbot, brill, lemon sole). In this context, a study to identify various stocks of striped red mullet from the Bay of Biscay to the north of the North Sea was proposed. It is

based on a comparative study of the results given by a geometrical morphometry and genetic analyses.

The Channel Ground Fish Survey completely answers to the third criterion retained by the SGRN (use of the data collected during the surveys and access of data to the scientific community). In fact, CGFS data are used in many projects (ann. 2) and are recorded and accessible through the Datras Database.



In another context, the CGFS also contributes to research activities in ecology with the aim to describe and understand exploited ecosystems. This survey constitutes an essential support to the realisation of the CHARM project (Eastern Channel Habitat Atlas for Marine Resource Management whose first phase was to produce an habitats atlas of the main commercial fish species. The second phase is to develop scientific tools to manage current and future anthropic impacts. The CGFS is also essential to the impact study of the industrial activities on the marine environment (e.g. marine aggregate extraction, windfarms). Finally, in the context of the Maritime Policy Blue

book, the Channel Ground Fish Survey is one of the tools able to provide accurate physical and biological information on the Eastern English Channel. Indeed, in the Maritime Policy Blue book, five axes were proposed that allow reinforcing the sustainable development policy of the sea. In this context, the CGFS could allow improving the ecological and biological knowledge through the identification of fish habitats, the study of their abundance fluctuations and the populations' behaviour.

These various studies aim to bring arguments to resources management, to identify the significant ecological zones in order to take decisions adapted to marine environmental sustainability. Recently Channel Ground Fish were used to describe ecosystem in the Eastern English Channel in the setting of WGRED (Working Group for Regional Ecosystem Description) which took place at the end of February 2008.

Objectives

The objectives of the CGFS are in adequacy with the Common Fisheries Policy priorities, namely to acquire the necessary data allowing to estimate the resources' state by a direct evaluation of the abundance of stocks and of their distribution, in association with the biological sampling of commercial catches.

The objectives during these surveys are to collect mainly the following data:

- distribution and apparent fishing abundance;
- abundance index by age group for the principal commercial species;
- direct estimate of recruitment and its variations;
- ichthyologic populations knowledge;
- growth parameters for the principal commercial species;
- hydrological data (temperature and salinity);
- abundance indices for the ICES working group "Assessment of Demersal Stock in the North Sea and Skagerrak";
- localisation of nurseries and estimation of their importance;
- space distribution and abundance of benthic populations

General Strategy of the survey

Eighty two hauls are planned in the original protocol. The sampling area covers the whole of the Eastern English Channel (ICES Subdivision VIId), extending from the southern part of the North Sea (Northern latitude 51°20', Belgian border) to the longitude of the Cotentin Peninsula (Western 2°00'). The rocky seabeds located at the north of Cherbourg are not sampled because they are inaccessible to the trawl used (fig. 1). The whole of the zone was divided into rectangles of 15' latitude and 15' longitude, and sampling design is of the systematic type. (Tab.2). From 1997 to 2006, the sampling of the zones of potential whiting spawning grounds (bay of the Seine, bay of Veys and bay of Rye) was reinforced

Table 2. Haul numbers per sampling rectangle.

RECTANGLE	HAUL NUMBER PER	RECTANGLE	HAUL NUMBER PER	RECTANGLE	HAUL NUMBER PER
1D	1	4C	1	6F	1
1E	2	4D	1	6G	1
1F	2	4F	1	6H	1
1G	2	4G	1	6I	1
1H	2	4H	1	6J	1
1I	2	4I	1	6K	1
2B	1	4J	1	6L	1
2D	2	4K	1	6M	1
2E	1	4L	1	6N	1
2F	1	4M	2	6O	2
2G	2	4N	2	7G	1
2H	1	5D	1	7H	1
2I	2	5E	1	7K	1
3B	1	5F	1	7L	2
3D	1	5G	1	7M	1
3E	1	5H	1	7N	1
3F	1	5I	1	7O	2
3G	1	5J	1	8M	1
3H	1	5K	1	8N	1
3I	1	5L	1	8O	1
3J	1	5M	1	8P	2
3K	1	5N	2	8Q	2
3L	1	5O	1	8R	2
3M	1	6E	1		

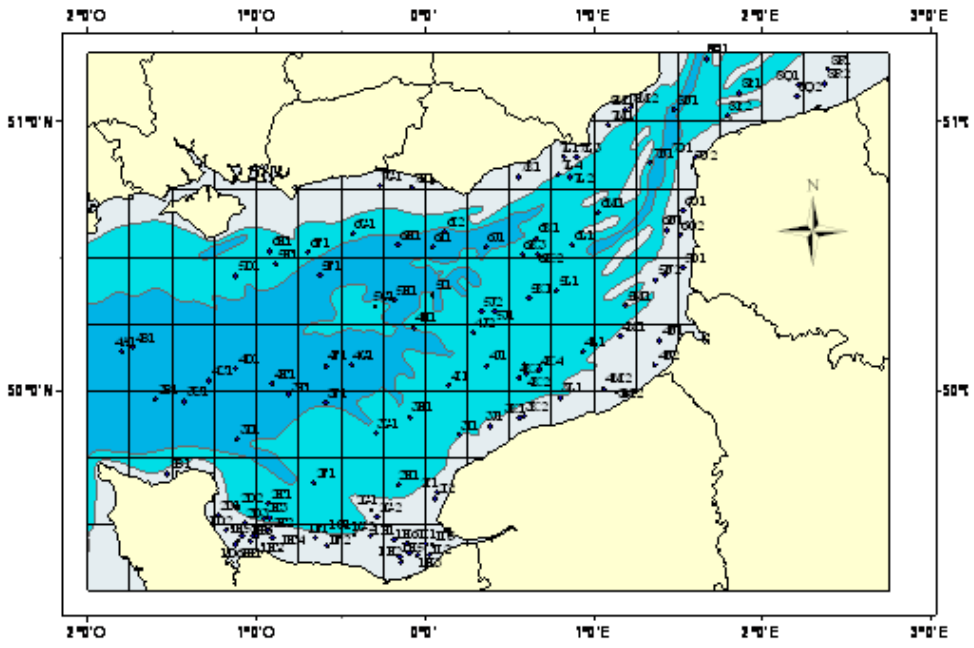


Figure 2: Hauls average position in CGFS.

During each haul, the hydrological parameters (temperature and salinity) are recorded. The acquisition procedure is described in chapter 7

Sampling gear characteristics

The fishing gear used is a basic trawl with large vertical opening (GOV) selected in priority for the capture of demersal species (fig. 2). Its dimensions are of 19.70 m (headline) on 25.90 m (groundrop) and the codend mesh size is 10mm (20 mm stretched), to catch young individuals (Tab.3). It is a polyvalent gear adapted for the various types of seabed of the studied area. It is slightly under-dimensioned in order to facilitate its implementation and to obtain an ideal efficiency according to the power of the boat.

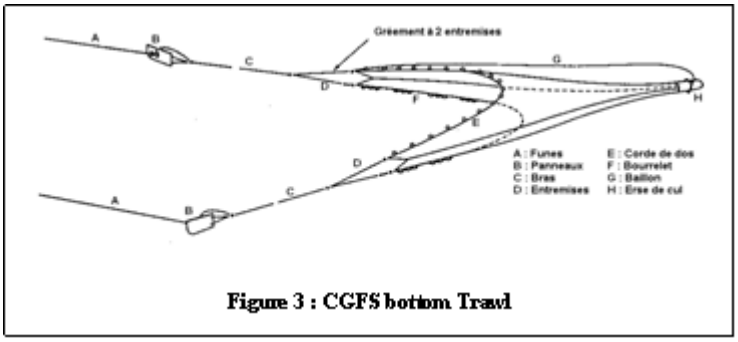


Figure 3 : CGFS bottom Trawl

Table 3. General characteristics of the gear.

Gear type	Bottom trawl
Warp diameter	18
Wings length	50
Vertical opening	3
Horizontal opening	10
Door Type	Rectangular
Door surface	2 m²
Door Weight	200 kg
Floats number	32
Headline length	19.7 m
Groundrop weight	300 kg
Codend mesh size	10
Tickler chain	No
Rig type	3 legs

GWEN - DREZ

CHALUT G O V 19.70 - 25.90

CORDE DE DOS:

Fil d'acier en inox de diam 9 m/m fourré en PP.
Une cosse poire à chaque extrémité.
19.70 m de corde de dos en trois morceaux, les ailes 8.40 m chacune et le carré 2.90 m.
Jonction des morceaux par connecteur de 10/8.
Montage du filet :
Dans le carré, l'amarrage tous les 7.1 cm.
Sur les ailes, l'amarrage tous les 15.8 cm.

BOULAGE DU CHALUT:

32 boules de 4 Lt de flottabilité.
Ailes : 12 boules dont les trois dernières en bout ; espacement, 0.76 m.
Carré : 8 boules dont une à chaque coin, espacement, 0.41 m.

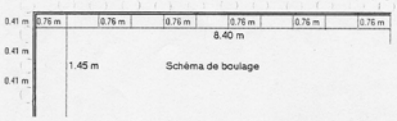


Schéma de boulage

CORDE DE BETE:

Filin mixte de diam 16 m/m.
Une cosse poire à chaque extrémité.
25.90 m de corde de bête en trois morceaux, les ailes 11.50 m chacune et le carré 2.90 m.
Jonction par connecteur de 12/8.
Montage du filet :
Dans le carré, l'amarrage tous les 6.3 cm avec 4 mailles pincées dans chaque coin.
Sur les ailes, l'amarrage tous les 15.5 cm.

COLLLAGE:

Grand dos / petit dos : recrues 3 ème et 4 ème maille.
Petit dos / gorget : 2 ème et 3 ème maille.
Ventre / ailes de ventre : 3 ème et 4 ème maille.
Ventre / gorget : 2 ème et 3 ème maille.

BAILLON :

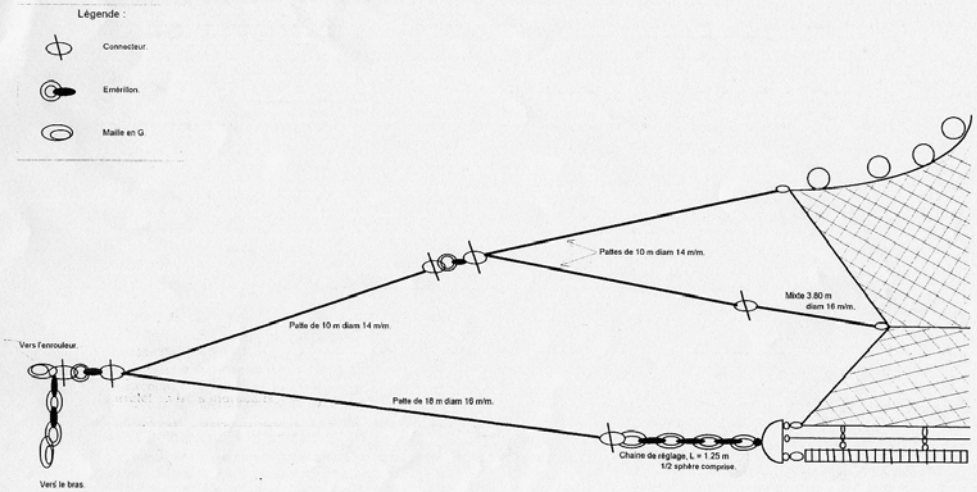
Nylon cordé de diam 20 m/m L = 16 m.

COUPE CUL:

Nylon cordé de diam 22 m/m L = 5 m.

GWEN-DREZ
26 Octobre 1995

GREEMENT DU CHALUT G O V 19.70m / 25.90m

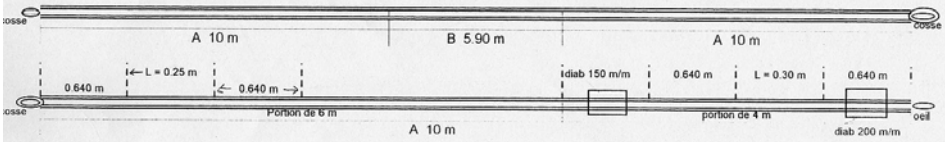


GWEN-DREZ

GWEN - DREZ

BOURRELET du CHALUT G O V 25.90 m

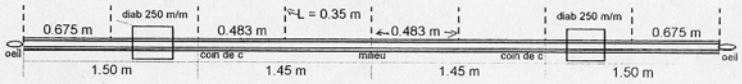
Bourrelet en trois morceaux, (A = 10 m B = 5.90 m A = 10 m), une cosse poire à chaque extrémité.



Portion de 6 m:
* Cable d'acier diam 20 m/m, une cosse à l''extrémité.
* Rondelle diam 110 m/m.
* Espacement des chaînes garcettes: 0.640 m.
* 10 garcettes de 0.25 m dont une en extrémité.

MORCEAU A :

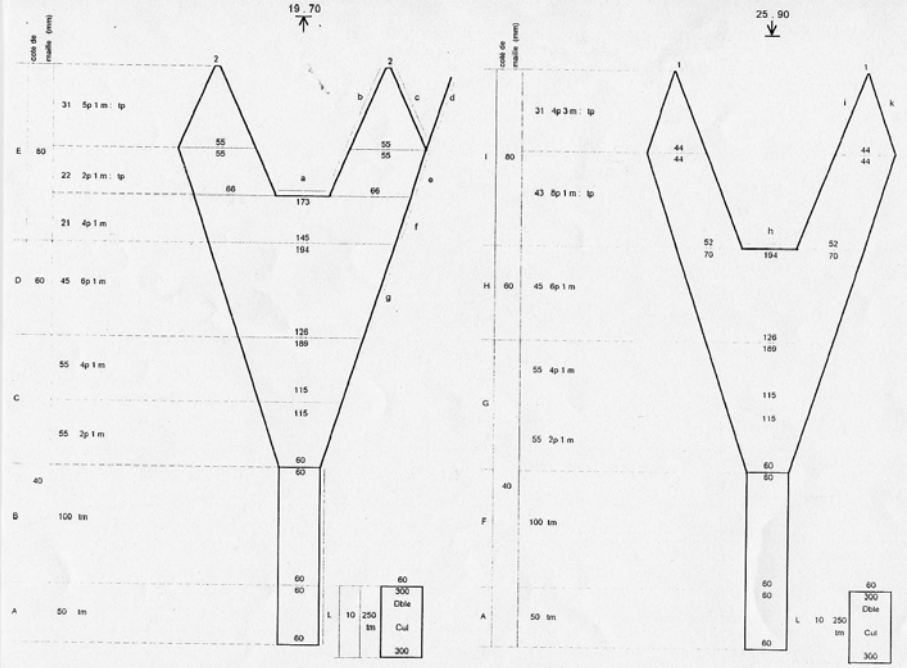
Portion de 4 m
* Oeil simple à l'extrémité de la portion de 4 m.
* 6 garcettes de L= 0.30 m dont une en extrémité.
* Répartir 4 diabolos 2 de diam 150 m/m et 2 de 200 m/m.



MORCEAU B :
* Cable d'acier diam 22 m/m, oeil simple à chaque extrémité.
* Rondelle diam 110 m/m avec 6 diabolos de 250 m/m répartis sur la longueur.
* Espacement des garcettes 0.675 m dans les extrémités et 0.483 m dans le carré.
* 11 garcettes de L = 0.35 m dont une à chaque extrémité
  * Impératif une garcette au milieu et une dans chaque coin de carré. (Carré = 2.90 m)

MATERIEL UTILISE
Cable d'acier, diam 20 m/m.
Cable d'acier, diam 22 m/m.
Deux cosses poires diam 20 m/m.
20 garcettes en chaine L = 0.25 m.
12 garcettes en chaine L = 0.30 m.
11 garcettes en chaine L = 0.35 m.
Rondelle de pneu, diam 110 m/m.
4 diabolos en rondelle, diam 150 m/m.
4 diabolos en rondelle, diam 200 m/m.
6 diabolos en rondelle , diam 250 m/m.

GWEN - DREZ



NOTA :
* Trois mailles de couture de chaque coté, sont à ajouter aux largeurs indiquées.
* Quatre mailles pincées à chaque coin de carré de ventre.
* Trente deux flotteurs diam 200 avec trou central.
* Montage du double cul. 5 mailles de 10 pour 1 maille de 40 m/m.

RALINGUES

	LONG	MATERIAUX	DIAM
a	2.90 m	Acier Inox	9.00
b	8.40 m	Acier Inox	9.00
c	4.60 m	PA	14.00
d	3.80 m	Mixte	16.00
e	3.30 m	Mixte	16.00
f	3.10 m	Mixte	16.00
g	0.00 m	PP	16.00
h	2.90 m	Mixte	14.00
i	11.50 m	Mixte	14.00
k	4.85 m	Mixte	16.00

FORCE FIL PAR ZONE

A	40.0 m/m	180m/kg	PA
B	40.0 m/m	400m/kg	PA
C	40.0 m/m	400m/kg	PA
D	60.0 m/m	400m/kg	PA
E	80.0 m/m	400m/kg	PA
F	40.0 m/m	280m/kg	PA
G	60.0 m/m	280m/kg	PA
H	80.0 m/m	280m/kg	PA
I	80.0 m/m	280m/kg	PA
L	10.0 m/m	Sans noeuds	PA

IFREMER - Boulogne
Service Technologie des Pêches
150 quai Gambetta, BP 699
62321 Boulogne sur mer tél : 21 . 99 . 56 . 00

Ref : F 178 e
DATE 24 / 10 / 95

CHALUT 19 . 70m. / 25 . 90m.
TYPE GOV
Espèces :
ORIGINE : GWEN - DREZ

1 . 01 BATEAU
350 ch
SURFACE FIL
PD ALEZES

Sampling methodology

Sampling design

The trawling stations are systematically done at the same position each year. They were randomly selected from professional hauls at the time of the survey program implementation. All the information concerning the haul characteristics are recorded by the commanding officer on the "Fiche passerelle" (ann.1)

Gear and tools implementation

The fishing operations take place during the day, from sun rise to sun set. The standard haul duration is fixed at 30 minutes. In the event of problem resulting in the interruption of a fishing operation before term, only the hauls longer than 15 minutes are kept. The trawling speed ranges between 2.5 and 4 knots. A haul begins when the parameters of opening raised by the SCANMAR are stable and stops when the winch is coupled. The haul orientation is not systematic: it is related to the weather conditions encountered and to the force of the current.

Gear geometry control and probe positioning

So as to check the reliability of various index calculations, it is essential to control the trawl's behaviour and, generally, the geometrical variations of the fishing trawl gear. To record the principal parameters, a system named SCANMAR was used: it is a cordless system made of sensors positioned on the various parts of the fishing gear. These sensors directly transmit information to a desk installed in the vessel's deck, via a hydrophone placed in the hull of the vessel. The transmission is carried out by acoustic signals, the frequency of recording being chosen by the user. For the Channel Ground Fish Survey, the selected recording frequency is 15 seconds, thus providing about 120 lines of information per haul. Six sensors were installed (fig.4): 2 located on the doors (D) and 2 on the points of wings (W), allowing to measure the distance between the doors and the horizontal opening (i.e. the distance between the wings). Finally, one sensor and the probe are positioned on the headline to record, respectively, the vertical opening (VO) and hydrological parameters (P).

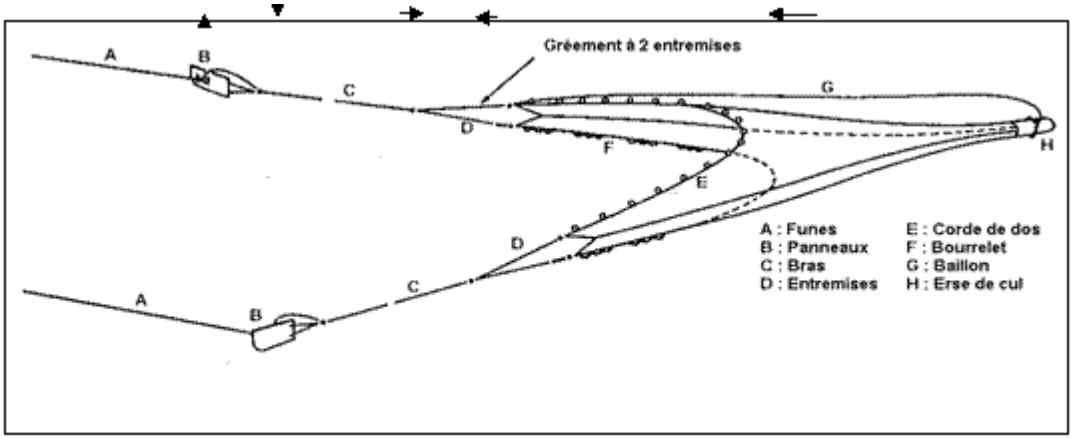


Figure 4: Position of trawl gear control system.

Catch analysis

Samples

At each sampling station, all the species caught are sorted, weighed and then counted or measured. Otholiths or scales are sampled for some of them (Tab.4). The common squids (*Loligo vulgaris*), the veined squids (*Loligo forbesi*) and the common cuttlefish (*Sepia officinalis*) have been measured since 2005. From 2006, benthic invertebrates are sorted and recorded.

Table 4: Numbers of otolithes or scales taken.

SPECIES		OTOLITHS
WHITING (*Merlangius merlangus*)	maturity	20/cm starting from 18 cm
		30/cm starting from 30 cm
COD (*Gadus morhua*)	maturity	15/cm (all starting from 50 cm)
PLAICE (*Pleuronectes platessa*)	maturity	10/cm starting from 12 cm
STRIPED RED MULLET (*Mullus surmuletus*)	maturity	12/cm starting from 10 cm

Biological parameters

The analyses carried out on each selected species can be found in appendix 2

Hydrological parameters collection

The apparatus used for the hydrological parameters acquisition is a probe (MICREL Sensor TPS 100) able to record parameters for immersion ranges between 0 and100 metres. Sensor TPS is attached to the bottom trawl headline and records data continuously. The parameter set up and data download are carried out through an optic pen connected to the series socket of a computer.

The characteristics of the various sensors of the probe are as follows:

- **temperature:**
  measurement range -5°C to +45°C
  maximum resolution 0.02°C
  precision ±0.1°C in range 0 with +35°C
- **salinity**:
  calculated from conductivity and temperature
  range 5 to 40 ppt
  precision ±0.2 ppt
- **depth**:
  precision ±0.5%
  maximum resolution 4.4 cm, overloads acceptable 250 m
- **mechanical characteristics:**
  overall dimensions: length 330mm, ∅ 57mm
  weight: in the air 1.8kg - in water 1.2kg
  maximum immersion 120m.

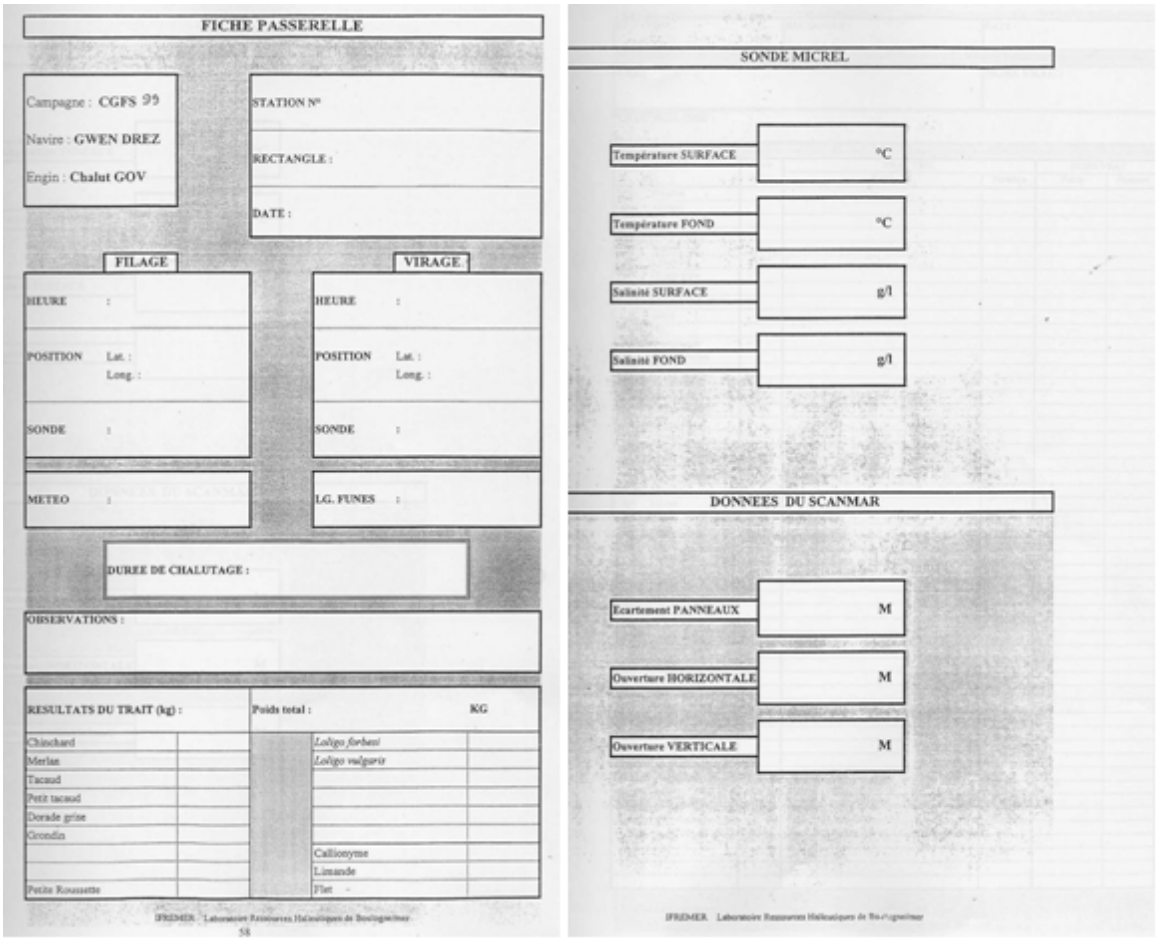
The probe was parameterised to record data every 15 seconds. Sampling begins and stops at 1 metre below the surface, which allows detecting the shooting and hauling

surface temperatures and salinities. Bottom temperature is calculated by averaging data collected during the fishing operation. The software used to record these data (WINMEMO) generates an ASCII file. It is transferred to an Excel spreadsheet in order to calculate bottom salinity and temperature averages. All hydrological parameters obtained are recorded in the deck sheet (ann.1).

Validation of information

The device SCANMAR allows for the monitoring of the gear's behaviour. The implementation procedure is described in chapter 5 paragraph C. The acquisition software (OSACA) used for data management allows checking the validity of the information collected. The data checked are: haul duration, trawling distance, geographical positions, the stratum concerned and the adequacy between fish species and the size measurements. All biological data collected are checked at the end of the survey.

Appendix 1: Deck sheet



FICHE PASSERELLE

Campagne : CGFS 99
Navire : GWEN DREZ
Engin : Chalut GOV

STATION N°
RECTANGLE :
DATE :

FILAGE		VIRAGE	
HEURE	:	HEURE	:
POSITION	Lat. : Long. :	POSITION	Lat. : Long. :
SONDE	:	SONDE	:
METEO	:	LG. FUNES	:

DUREE DE CHALUTAGE :

OBSERVATIONS :

RESULTATS DU TRAIT (kg) :		Poids total :	KG
Chinchard		*Loligo forbesi*	
Merlan		*Loligo vulgaris*	
Tacaud			
Petit tacaud			
Dorade grise			
Grondin			
		Callionyme	
		Limande	
Petite Roussette		Flet	

IFREMER Laboratoire Ressources Halieutiques de Boulogne/mer
58

SONDE MICREL

Température SURFACE	°C
Température FOND	°C
Salinité SURFACE	g/l
Salinité FOND	g/l

DONNEES DU SCANMAR

Ecartement PANNEAUX	M
Ouverture HORIZONTALE	M
Ouverture VERTICALE	M

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Appendix 2: Type of analyses per species

Common name	measurement Code *	Measurement step	Otolithe or scale	Sexed
Picked dogfish	4	Centimeter	Not	yes
Twaite shad	4	half Centimeter	Not	not
Allis shad	4	half Centimeter	Not	not
Anchovy	4	half Centimeter	Not	not
European eel	4	Centimeter	Not	not
Spider crab	2		Not	not
Small european argentine	4	Centimeter	Not	not
Arnoglossus	4	Centimeter	Not	not
European silverside	4	Centimeter	Not	not
Athérinidés	4	Centimeter	Not	not
Gray triggerfish	4	Centimeter	Not	not
European sea-bass	4	Centimeter	yes	not
Brill	4	Centimeter	not	not
Anglerfish	4	Centimeter	not	not
Blenniidés	4	Centimeter	not	not
Solenette	4	Centimeter	not	not
Dragonet	2	Centimeter	not	not

Common name	measurement Code *	Measurement step	Otolithe or scale	Sexed
Horse mackerel	4	Centimeter	not	not
Conger	4	Centimeter	not	not
Common scallop	2		not	not
Common shrimp	4		not	not
Deepwater rose shrimp	4		not	not
Gilthead seabream	4	Centimeter	not	not
Haddock	4	Centimeter	not	not
Common smoothhound	4	Centimeter	not	yes
Picked smoothhound	4	Centimeter	not	yes
Common squid	4	half centimeter(2005)	not	not
Veined squid	4	half centimeter(2005)	not	not
Velvet crab	2		not	not
Flounder	4	Centimeter	not	not
Gobiidés	4	Centimeter	not	not
Nursehound	4	Centimeter	not	yes
Greater weever	4	Centimeter	not	not
Black bream	4	Centimeter	Yes	not
Gray gurnard	4	Centimeter	not	not
Tub gurnard	4	Centimeter	not	not
Red gurnard	4	Centimeter	yes	not
Rock gurnard	4	Centimeter	not	not
Herring	4	half centimeter	not	not
Lobster	2		not	not
Labridés	4	Centimeter	not	not
Lampreys	4	Centimeter	not	not
European sandeel	2	Centimeter	not	not
Pollack	4	Centimeter	not	not
Common dab	4	Centimeter	not	not
Lemon sole	4	Centimeter	not	not
Ling	4	Centimeter	not	not
Loligo (squid ?)	4		not	not
Common mackerel	4	Centimeter	not	not
Whiting	4	Centimeter	yes	not
Poutassou	4	Centimeter	not	not
Cod	4	Centimeter	yes	not
Rocklings (five bearded)	4	Centimeter	not	not
Rocklings (four bearded)	4	Centimeter	not	not
European mullet	4	Centimeter	not	not
Mulett lippu	4	Centimeter	not	not
Mulett pig	4	Centimeter	not	not
Garfish	4	Centimeter	not	not
Common pandora	4	Centimeter	not	not
Stingray	4	Centimeter	not	yes

Common name	measurement Code *	Measurement step	Otolithe or scale	Sexed
Poor cod	4	Centimeter	not	not
Dogfish	4	Centimeter	not	yes
Small weever	2	Centimeter	not	not
Common plaice	4	Centimeter	yes	not
Roker	4	Centimeter	not	not
Skates nei	4	Centimeter	not	yes
Spotted ray	4	Centimeter	not	yes
Cuckoo ray	4	Centimeter	not	yes
Small-eyed ray	4	Centimeter	not	yes
Tope	4	Centimeter	not	yes
Triped red mullet	4	Centimeter	yes	not
John dory	4	Centimeter	not	not
European pilchard	4	half centimeter	not	not
Common cuttlefish	4	half centimeter(2005)	not	not
Common sole	4	Centimeter	yes	not
Thickback sole	4	Centimeter	not	not
Sand sole	4	Centimeter	not	not
Hooknose	2	Centimeter	not	not
Sprat	4	half centimeter	not	not
Syngnathidés	2	Centimeter	not	not
Pounting	4	Centimeter	yes	not
Common oil cake	2		not	not
Trout	4	Centimeter	not	not
Turbot	4	Centimeter	not	not
Common wrasse	4	Centimeter	not	not

*** 1 counted, 2 counted and weighed, 3 measured, 4 weighed and measured**

Appendix 3: Main bibliographical references

Anon., 2000. Report of the Working Group on the assessment of demersal stocks in the North Sea and Skagerrak. 11-20 October 1999, ICES CM2000/ACFM:7, 597p.

Anon., 2001. Report of the Working Group on the assessment of demersal stocks in the North Sea and Skagerrak. 3-12 October 2000, ICES CM2001/ACFM:07, 520p.

Baudoux L., Giroud A., Poisson S. et A. Vienne, 2001. Campagne expérimentale de chalutage en Manche orientale, estimation des données manquantes ; outil d'aide à la décision. Mémoire de troisième année, ISA Lille, 42p + annexes.

Bertrand et al.(2004). L'état des communautés exploitées au large des côtes de France.37p. + annexes

Bonnart AL., Dewas V., Decaux C. et O. Godinot, 2000. Campagne expérimentale de chalutage en mer du Nord et Manche orientale. Mémoire ISA, Lille, 35p + annexes.

Braud S., 2001. Premières estimations de la diversité et de la structure quantitative de la mégafaune de la Manche orientale et du sud de la mer du Nord. DSR, UST Lille. 79p + annexes.

Braud S., 2002. Structure et fonctionnement des communautés benthiques dans le sud de la mer du Nord. Rapport de stage, DEA Biodiversité Ecosystèmes Fossiles et Actuels, Océanologie biologique, UST Lille, 31p + annexes.

Carpentier A. et F. Coppin, 2000. Campagnes expérimentales de chalutage en Manche orientale. Les campagnes CGFS 1997 & 1998. Ifremer, Direction des Ressources Vivantes, Département des Ressources Halieutiques, RST DRV-RH 2000-03, 174p.

Carpentier A. et F. Coppin, 2000. Analyse interannuelle de campagnes de chalutage en Manche orientale. Premières Rencontres de l'Ichtyologie en France : RIF 2000, poster.

Carpentier A. et F. Coppin, 2000. La morue en Manche orientale. Résultats des campagnes de chalutage CGFS de 1997 et 1998. INFOMER, 10p.

Carpentier A. et F. Coppin, 2000. Le grondin rouge en Manche orientale. Résultats des campagnes de chalutage CGFS de 1997 et 1998. INFOMER, 10p.

Carpentier A., 2005. Atlas des habitats des ressources marines de la Manche orientale. Projet Interreg IIIA CHARM. Colloque Mesh-Malo, 8-9 oct. St Malo (communication orale + poster).

Carpentier, A., C. Warembourg, F. Coppin, L. Curet, J.-C. Dauvin, J.-P. Delpech, N. Desroy, J.-M. Dewarumez, L. Dupuis , P.D. Eastwood , B. Ernande , M. Fischer, A. Foveau, C. Garcia, P.R. Just, P. Koubbi , N. Leader-Williams, A. Lefebvre , S. Mackinson, C.S. Martin, G.J. Meaden, J. Morin, Y. Ota, S. Rogers, R.J. Smith, N. Spilmont, S. Vaz, C. Villanueva and S. Harrop. Eastern Channel Habitat Atlas for Marine Resource Management (CHARM) - From a descriptive approach (phase I) to a process-oriented approach (phase II). ICES CM 2007 / R

Carpentier, A., C. Warembourg, F. Coppin, L. Curet, J.-C. Dauvin, J.-P. Delpech, N. Desroy, J.-M. Dewarumez, L. Dupuis , P.D. Eastwood , B. Ernande , M. Fischer, A. Foveau, C. Garcia, P.R. Just, P. Koubbi , N. Leader-Williams, A. Lefebvre , S. Mackinson, C.S. Martin, G.J. Meaden, J. Morin, Y. Ota, S. Rogers, R.J. Smith, N. Spilmont, S. Vaz, C. Villanueva and S. Harrop. Interreg IIIA CHARM. Atlas des habitats des ressources marines de la Manche orientale.VIIème Congrès Maghrébin des Sciences de la Mer et du Premier Congrès Franco-Maghrébin de Zoologie et d'Ichtyologie, Nov 2007, El Jadida (Maroc).

Carpentier, A., Vaz, S., Martin, C. S., Coppin, F., Dauvin, J.- C., Desroy, N., Dewarumez, J.- M., Eastwood, P. D., Ernande B., Harrop, S., Kemp, Z., Koubbi, P., Leader-Williams, N., Lefèbvre, A., Lemoine, M., Loots, C., Meaden, G. J., Ryan, N., Walkey, M., 2005. Eastern Channel Habitat Atlas for Marine Resource Management (CHARM), Atlas des Habitats des Ressources Marines de la Manche Orientale, INTERREG IIIA, 225 pp

Coppin F., Carpentier A., Delpech JP. et I. Schlaich, 2002. Manuel des protocoles de campagnes halieutiques, campagnes CGFS. Version 1, avril 2002, Ifremer, 40p.

Coppin F., Le Roy D., Schlaich I., 17 novembre 2006. Evaluation des ressources halieutiques de Manche orientale. La gazette officielle de la pêche et de l'eau. 2p.

Coppin F., Le Roy D., Schlaich I., 17 décembre 2006. Manche est: l'ifremer évalue les ressources. La manche libre. 1p.

Coppin F., Le Roy D., Schlaich I., 2006. Guide du chef de mission de la campagne CGFS. 42 p

Damboise G., 2001. Conception d'une base de données commune aux campagnes de recherche halieutique : réalisation d'un outil de saisie. Projet de fin d'études, IUT Calais Boulogne.

Delpech JP. et A. Carpentier, 2000. Le rouget barbet de roche Mullus surmuletus (Mullidae) en Manche orientale : les fluctuations d'abondance d'un poisson noble. Premières Rencontres de l'Ichtyologie en France : RIF 2000, poster.

Delpech JP., Coppin F., Garren F., Manten ML. et M. Hanquiez, 2001. Projet d'implantation d'éoliennes offshore de Mardyck, caractéristiques biologiques et activités halieutiques. Rapport de contrat Eoliennes Nord/Pas-de-Calais, 32p + annexes.

Delpech JP. et F. Coppin, 2002. Le grondin rouge (Aspitrigla cuculus) de Manche et sud mer du Nord (divisions CIEM VIIde et IVc). In Les nouvelles de l'Ifremer, Le Marin n°38, juillet 2002.

Denis V., 2000. Variations spatio-temporelles d'abondance des céphalopodes exploités depuis les côtes atlantiques françaises et influence des paramètres environnementaux. Thèse Université de Caen.

Destombes A., 2003. Appréciation des habitats optimaux du merlan Merlangius merlangus en Manche orientale. Rapport de stage. DEA Interface et Dynamique en Environnement, Ecosystèmes littoraux et côtiers, interface continent-océan. Université du Littoral Côte d'Opale, 32p + annexes.

Destombes A., Carpentier A., Villeminot O. et P. Koubbi, 2003. Appréciation des habitats optimaux du merlan Merlangius merlangus en Manche orientale. Poster pour la conférence francophone ESRI SIG, 1er et 2 octobre 2003 au Palais des Congrès d'Issy-les-Moulineaux. Premier prix dans la catégorie Posters pédagogiques.

Forest A., coordonnateur , 2001. Ressources halieutiques hors quotas du Nord Est Atlantique : bilan des connaissances et analyse de scénarios d'évolution de la gestion. Contrat Ifremer/MAPA – Réf. 99-I1-03-01, rapport final.

Galgani F. and al., 2000. Litters on the Sea Floor Along European Coasts. Marine Pollution Bulletin Vol. 40, No. 6, pp. 516-527.

ICES. 2008. Report of the Working Group for Regional Ecosystem Description (WGRED), 25- 29 February 2008, ICES Headquarters, Copenhagen. ICES CM 2008/ ACOM.

Koubbi P., Carpentier A., Duhamel G., Destombes A. et O. Villeminot, 2003. Modélisation biogéographique des habitats optimaux des poissons par Arcview 8. Présentation à la conférence francophone ESRI SIG, 1er et 2 octobre 2003. (sous presse).

Le Pape O., Morin J., Rogers S., Riou P., Coppin F., Carpentier A. et M. Lemoine , 2000. Nursery grounds in the coastal zone of the Eastern Channel : typology and management measures. Rapport final de contrat DG XIV 97/0030, 65p.

Le Pape O., Morin J., Riou P., Foucher E., Carpentier A. et F. Coppin, 2000. Les nourriceries côtières en Manche Est. Influence de l'estuaire de la Seine. Manchette-Manche Ouest : journal du Comité Régional des Pêches de Basse Normandie, 28, 3p.

Magali Prigent, Marie-Joëlle Rochet, Jacques A. Bertrand, André Carpentier, Franck Coppin, Jean-Paul Delpech, Guy Fontenelle, Eric Foucher, Kelig Mahé, Emilie Rostiaux, Verena M. Trenkel. Comparing fishers perceptions and scientific descriptions of recent trends in the Eastern Channel ecosystem and fisheries. ICES CM 2007 / O:05

Mahé, K., Delpech, J.P., Coppin, F. & S. Vaz, 2006. Evaluation de la ressource halieutique en Manche orientale par les campagnes scientifiques françaises. Convention Ifremer-Ministère de l'Industrie n° 2006-0000708, 55p.

Mahé K., Destombes A., Coppin F., Koubbi P., Vaz S., Leroy D., Carpentier A., 2005. Le rouget barbet de roche Mullus surmuletus (L. 1758) en Manche orientale et mer du Nord 186p.

Martin, C. S., A. Carpentier, F. Coppin, P. D. Eastwood, G. J. Meaden, M., Walkey, S. Harrop, Z. Kemp and S.Vaz, 2004. A Digital Atlas for the Physical Environment of Eastern English Channel (CHARM Project). ICES CM 2004/P:42, POSTER.

Martin, Corinne S., S. Vaz, B. Ernande, J. R. Ellis, P. D. Eastwood, F. Coppin, S. Harrop, G. J. Meaden and A. Carpentier, 2005. Spatial distributions (1989-2004) and preferential habitats of thornback ray and lesser-spotted dogfish in the Eastern English Channel. ICES CM 2005/N:23

Pavoine S., 2006. Comparaison de méthodes de modélisation appliquées à une espèce cible : le merlan (Merlangius merlangus) en Manche Orientale.

Rochet, Marie-Joëlle, Verena Trenkel, Robert Bellail, Franck Coppin, Olivier Le Pape, Jean-Claude Mahé, Jocelyne Morin, Jean-Charles Poulard, Ivan Schlaich, Arnauld Souplet, Yves Vérin and Jacques Bertrand., 2004. Is the impact of fishing on the fish communities around France increasing? Poster.

Rochet, Marie-Joëlle, Verena Trenkel, Robert Bellail, Franck Coppin, Olivier Le Pape, Jean-Claude Mahé, Jocelyne Morin, Jean-Charles Poulard, Ivan Schlaich, Arnauld Souplet, Yves Vérin and Jacques Bertrand, 2005. Combining indicator trends to assess ongoing changes in exploited .sh communities: diagnostic of communities of the coasts of France. ICES Journal of Marine Science, 62: 1647e1664 (2005) doi:10.1016/ icesjms.2005.06.009, 18p

Roel B.A., Engelhard G.H., Royer J., Coppin F., Legrand . and J.-P. Robin. 2006. The English Channel Sepia officinalis stock : can biomass dynamic models and survey indices help to understand the increase in landings? Symposium du CIAC (Cephalopod International Advisory Council). Hobart du 6 au 10 février. Communication orale

Royer J., 2002. Modélisation des stocks de céphalopodes de Manche. Thèse de doctorat d'état, Université de Caen.

Suquet M., Omnès MH, Normant Y., Petton B., Sevère A., Fauvel C., Barone H., Quemener L., Buchet V., Pasco L., Menard E. and JL. Gaignon, 2002. Cod (Gadus morhua) rearing attempts in France. Poster pour le congrès de l'European Aquaculture Society à Trieste, 15 octobre 2002.

Vaz S., Carpentier A., Loots C., Koubbi P. (2004) Modelling Fish Habitat Suitability in the Eastern English Channel: Application to community habitat level. ICES CM 2004/P : 26.

Vaz, S., C.S. Martin, B. Ernande, F. Coppin, S. Harrop and A. Carpentier, 2005. Using geostatistics to quantify annual distribution and aggregation patterns of fishes in the Eastern English Channel. ICES CM 2005/L:21

Vaz, S., J. Martin, Y. Verin, D. Le Roy, 2006. Mapping benthic invertebrate assemblages from bottom trawl hauls observations.ICES Annual Science Conference. Maastricht. Netherlands. ICES CM 2006/D:15. Poster.

Vaz, S., S. Pavoine, P. Koubbi, C. Loots, F. Coppin, 2006. Comparative study of habitat modelling strategies to investigate marine fish life cycle: A case study on whiting in the Eastern English Channel. ICES Annual Science Conference. Maastricht. Netherlands. ICES CM 2006/O:06

Vaz, S., C. Warembourg, S. Pavoine, P. Koubbi, C. Loots, F. Coppin. Comparaison de méthodes de modélisation d'habitat pour étudier le cycle de vie des poissons : quelques exemples en Manche Orientale. VIIème Congrès Maghrébin des Sciences de la Mer et du Premier Congrès Franco-Maghrébin de Zoologie et d'Ichtyologie, Nov 2007, El Jadida (Maroc).

Vaz, S., C.S. Martin, P.D. Eastwood , B. Ernande ,A. Carpentier, G.J. Meaden, and Coppin, F. 2008. Modelling species distributions using regression quantiles. Journal of Applied Ecology 2008, 45, 204–217

Vérin Y., Coppin F., Delpech JP., Dufour JL. et A. Carpentier, 2001. Campagnes d'évaluation des ressources halieutiques en mer du Nord et Manche orientale, les campagnes 1999 et 2000. Contrat BIOECO n° 98/058, 47 + 120pp.

WD6: Hjelm, J. 2008. Ecosystem based management in the Baltic Sea – The importance of planktivorous fish regulating ecosystem stability

Ecosystem based management in the Baltic Sea – The importance of planktivorous fish regulating ecosystem stability

A short summary, Background and overall aim

In a response to the global deterioration of marine fish stocks and the negative impact of fishing beyond the target species in marine ecosystems, the Reykjavik Declaration (2001) states that the scientific advice on fisheries management shall be based on an "Ecosystem Approach" by 2010 . Although available definitions of an ecosystem approach are numerous and varying, the underlying requirements can be summarised to: a sound scientific base, adjustment to altering conditions, collaboration with various stakeholders and interest groups and a continuing commitment to the health of the ecosystem and its users (the Addis Ababa principles for the sustainable use of biodiversity). The long term aim of this project is to contribute to the requirements towards an ecosystem based management of predatory fish in the Baltic Sea coastal and offshore ecosystem. While climatic effects and eutrophication have had negative effects on higher trophic levels in the ecosystem, as well as positive impacts on fish production, decades of intensive fishing of large predators have also resulted in ecosystem changes, including further elevated eutrophication symptoms, which in turn have had negative effects on predator stocks. The presence of such ecological feedbacks mediated by species interactions clearly emphasises the need for an ecosystem based management of fisheries resources.

Ecosystem effects by predatory interactions involving three or more trophic levels have been termed trophic cascades. Trophic cascades are well-studied in limnic systems and severe indirect ecosystem changes caused by a loss of predatory fish have been observed in a range of marine ecosystems from coastal kelp forests to offshore pelagic systems.

The decline in predatory fish catches and resulting trophic cascades in offshore and outer coastal areas of the Baltic Proper are eminent. The cod stock has decreased dramatically since 1980s, most likely due to direct overfishing and unfavourable spawning conditions. The decrease of cod resulted in predation release on sprat, and the once cod dominated ecosystem has consequently been replaced by a sprat dominated system. The dramatic increase of sprat, strengthened by a marked climate change favouring sprat recruitment has had a negative affect not only the growth and abundance of predators and zooplanktivores (sprat and herring) and the breeding success of the fish-eating common guillemot, but has also had cascading effects to zooplankton and phytoplankton. Primary production alone is estimated to have more than doubled in the Baltic Sea since the 1920-40s, evident primarily by "blooming" cyanobacteria and subsequent oxygen deficiencies. Although decreasing eutrophication is of major importance in controlling primary production, the reestablishment of a predatory dominated ecosystem may be equally important.

Parallel with the shift in the offshore ecosystem, the landings of the main coastal predators perch and pike have declined during the last two decades in coastal areas of the Baltic Proper most likely due to recruitment failure caused by larval starvation but possible also due the increased abundance of seabirds, in particular cormorants, which predation pressure can have great consequences for individual population

sizes of perch. Although an ecosystem shift, similar to the one in the open sea, has not been defined, the observed ecosystem changes over the last two decades, including increased abundances of seals and seabirds decrease in large predators pike and perch, increase in zooplanktivores (sprat and stickleback), decrease in benthic grazers and the structural changes from large, habitat-forming macro vegetation to ephemeral, filamentous algae indicate a shift in the ecosystem also on the coast. Thus, the structural changes in the Baltic coastal ecosystem that have usually been attributed to eutrophication may partly be explained by cascading effects from changes in predatory fish stocks. Indeed, small-scale experiments in the Baltic Sea suggest that removal of coastal top-predatory fish results in top-down effects similar to those of nutrient enrichment, namely an increasing production of bloom-forming filamentous macroalgae.

Increasing evidence suggests that the likelihood of ecosystem shifts to an alternative stable state, may increase when anthropogenic disturbance reduce the resilience of the system. Disturbances such as, waste emissions, pollutants, climate change and fishing may lower the resilience of an ecosystem by removing response diversity, whole functional groups of species, or even whole trophic levels. These combined and often synergistic effects may result in a sudden ecosystem shift, from one state to another, with new capacities and ecosystem services. An ecosystem with alternative stable states can simply be defined as a system that that can persist in either state for an indefinite period under the same environmental conditions or level of anthropogenic disturbance. It is the formation of feedback mechanisms, (such as positive density dependence, e.g. the Allee effect) that may lock the system in a state even though the environmental condition (or disturbance) has passed the critical point at which the shift among states occurred. The potential occurrence of ASS in a range of marine ecosystems is supported by both mathematical models and empirical data. However, manipulative experiments are needed for direct empirical evidence of ASS in marine ecosystems. Understanding the presence of, and the feedback mechanisms behind ASS is crucial for a successful ecosystem based management.

Project objectives and hypotheses

In light of the i) observed structural changes of the coastal and open sea ecosystems in the Baltic Sea, ii) the increasing evidence of trophic cascades with negative consequences for both biota and human activities, iii) the accumulating evidence for ecosystems to exhibit alternative stable states that may result in unfavourable ecosystem services, the need for an ecosystem based management in the Baltic Sea is clear. In order to contribute to this long-term goal this project has two main objectives:

a) To investigate how we can reinstate fish predator dominated coastal and offshore ecosystems in the Baltic Sea?

b) To identify the indirect ecosystem effects of changing the abundances of predatory fish in the coastal and offshore ecosystems?

We address each of these objectives with a number of hypotheses. Although we expect a high level of connectedness between the open ocean and coastal ecosystems, we have for structure and clarity specified separate hypotheses for the two systems.

The work within this project is structured into in five work packages (WPs), broadly based on the different methodologies used to address the main objectives and specific questions.

1) Natural experiments (and monitoring?) will investigate the occurrence and strengths of trophic cascades at different spatial and temporal scales and the mechanisms linking the open sea system with the coastal system.

2) Field experiment will examine if the state of the coastal system can be altered by manipulating zooplanktivore or piscivore density and what zooplanktivore species may be responsible for the low zooplankton density and thus, starvation of perch and pike larvae.

3) Laboratory experiments will compare the growth, foraging capacity, intra/interspecific competition and predation between fish species. This will provide data necessary for modelling.

4) Modelling will be used to identify and analyse the driving mechanisms and feedback relations that govern the potential for alternative stable community states and trophic cascades in the Baltic Sea coastal and offshore ecosystems.

5) Syntheses and Risk analyses will be performed to contribute towards a scientific platform necessary for an ecosystem-based fisheries management (EBFM) of Baltic Sea piscivore stocks. Project synthesising will be performed using risk analytical modelling combined with socio-economic analyses to explore different management scenarios.

The project extends over 6 years (2008 – 2013). The work within WPs 1–4 are highly interconnected and will overlap in time. The first three WPs will produce information that is fundamental for the development of models in WP 4. The information from all the WPs, in particular WP 4 will subsequently be synthesised in WP 5.