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

27-31 March 2006

Lysekil, Sweden

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

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H.C. Andersens Boulevard 44-46
DK-1553 Copenhagen V
Denmark
Telephone (+45) 33 38 67 00
Telefax (+45) 33 93 42 15
www.ices.dk
info@ices.dk

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Contents

Executive summary

The International Bottom Trawl Working Group (IBTSWG) met in Lysekil, Sweden from 27–31 of March 2006. There were 24 participants from 11 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 2006 meeting are given below:

NS IBTS manual version VII

There has been an intersessional revision of the IBTS manual and its new version (VII) is included in Annex I.

Extension of the NS IBTS survey area

The pattern of seasonal distribution of winter spawning Downs's herring stock seems to have changed as according to French fishermen observations.

If a change in the distribution area of the Downs herring occurs an extension of the IBTS 1st quarter survey area in the Eastern English Channel area could be considered. Therefore, the IBTSWG agreed that the Chair of the Herring Assessment Working Group for the Area South of 62° N (HAWG) should be contacted in order to get feed back from the WG on the idea of extending the survey area. If the HAWG supports the idea it would be implemented at the 1st quarter IBTS in 2007. (See Section 13.2)

A standardised presentation of individual survey results

Individual surveys coordinated by IBTSWG are presented using a first version of a reporting format bearing information on survey design, coverage and aggregated results (in weight and number per tow) for the most important species are given with an estimate of precision. Eastern Atlantic surveys data cannot be aggregated yet due to the different gear used according to the different type of ground covered and the lack of some conversion factors. The 2005 raw survey results are also presented by mean of maps of abundance per haul in order to provide some preliminary information on distribution of adults and juveniles (for most commercial species) to assessment Working Groups.

Overlapping surveys in the southern and western areas

While for most of these areas there is some overlap and comparative fishing carried out regularly, there is no overlapping area between the sampling of the surveys carried out in the Southern Bay of Biscay by IFREMER and IEO and between the Spanish North coast survey and the Portuguese ground fish survey, though these surveys border on one another. Therefore the WG recommends that each of IFREMER, IEO and IPIMAR dedicates 1 day each year in their surveys to start building a data series of inter-calibration hauls.

Datras database and data access policy

The working group reviewed the new ICES data policy. In general the working group is positive towards an open data policy as it will encourage use of data. However, the group found that the policy did not take into consideration the problems that an open policy could create for the data providers as expressed in previous IBTS reports. (See Section 9.1).

Monitoring of important components of the marine ecosystem through the IBTS surveys

A presentation was given by members of the REGNS - Regional Ecosystem Study Group for the North Sea which is being undertaken. The purpose of this joint session was to investigate whether the IBTS can serve as a backbone for the monitoring of important components of the marine ecosystem.

In order of priority we concluded that a coordinated programme of seabird and cetacean observers could be developed in the first instance, followed by nutrients and chlorophyll analysis of the water samples collected for salinity analysis on the CTD casts and finally the collection of sediment and water samples for contaminants analysis.

See Section 12 for details.

Coordinating sampling of biological parameters

The IBTSWG has reviewed the reports from the EU organized Regional Coordinating Meeting for data collection (RCM's) held in 2005 as well as the report from the ICES Planning Group on Commercial Catch, Discards and Biological Sampling (PGCCDBS) 2006 meeting for information or recommendation that could be of importance for the coordination of the IBTS surveys. One important issue is the lack of coordination of sampling of "Other biological parameters". In order to ensure coordination of collection of the species which only should be collected triennially or six annually, the IBTS have agreed to improve the coordination of this data collection.

1 Terms of Reference and participation

The **International Bottom Trawl Survey Working Group** [IBTSWG] (Chair: J.-C. Mahé, France) will meet in Lysekil, Sweden, from 27 – 31 March 2006 to:

a) coordinate and plan North Sea and North-Eastern Atlantic surveys for the next twelve months;

b) agree on a standard reporting format for survey results , and provide this information to the WGNSDS, WGSSDS, WGHMM) and WGNSSK in collaboration with the ICES secretariat;

c) further develop standardization of all sampling strategies, computation of indices and estimation of precision;

d) To discuss and propose the extent to which adjacent and overlapping surveys in the southern and western IBTS areas can ensure sufficient overlap incorporating fixed stations, for future comparison of catches;

e) review the findings from the a) SGSTS and b) WKSAD in respect to issues relevant to IBTS and respond;

f) review progress made in DATRAS database with respect to the computation of indices and data access policy;

g) complete the shapefiles and supporting information for the agreed strata in the Eastern Atlantic;

h) coordinate the production and dissemination of identification keys for North Sea, and southern and western IBTS Groundfish surveys;

i) Identify, in collaboration with members from other ICES WG (including REGNS, WGSE, WGMM), important components of the marine ecosystem that can be better monitored during internationally coordinated surveys and to determine the practicalities of collecting standardized data for oceanography, benthic fauna, sea birds and surface observation of marine fauna (marine mammals, sea turtles, pelagic fishes and jellyfishes).

IBTSWG will report by 30 April 2006 for the attention of the Resource Management Committee.

A complete list of the participants who attended the meeting in Lysekil, Sweden can be found in Annex 4 of the report.

2 Introduction

The International Bottom Trawl 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 of the year. 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.

Over the last few months there has been some amount of discussion about the lack of communication between surveys coordinators and assessment working groups about the survey data used in assessments. Already last year the IBTSWG had started to modify the structure of the report to be more informative about the latest survey results. In this year report, in addition to general distribution maps for species of interest to assessment working group in the western divisions, main results for each survey are given using the same formatted template and include some estimate of precision.

Cooperation with other working groups dealing with ecosystem studies and integrated assessment has been initiated and possible monitoring of important components of the ecosystem through the IBTS surveys identified.

3 Review of IBTSWG 2005 recommendations

3.1 ½ hr vs 1hr tow in Portuguese surveys

The Working Group in 2004 and 2005 recommended carrying additional parallel tows of 1 hour versus ½ hour duration during the Portuguese Groundfish Survey, noting that this will require additional ship time. At present this recommendation it is not applicable.

Background and Justification:

A Portuguese experimental survey was conducted in July 2002 to evaluate the effects on the catches by reducing the tow duration from 60 to 30 minutes. The results were presented in 2004 IBTS WG showing that there are no significant differences in CPUE between different duration tows for hake and horse mackerel, but for blue whiting significant differences were found. Both the mean length and the length distribution analyses showed significant effects for blue whiting and horse mackerel due to different tow durations. In the case of horse mackerel tows with 60 minutes duration catch larger fish than the 30 minutes tow. Considering that the number of calibration hauls could have been insufficient to assess the effect of tow duration on the relative length composition of the catches, the WG in 2004 recommended carrying additional tows of 1 hour versus ½ hour duration during the Portuguese Groundfish Surveys.

However, in view that the autumn surveys are directed to evaluate the recruit's abundance, particularly of hake and horse mackerel, the 30 minutes tow was considered valid to be adopted in these surveys and no future recommendation is needed.

3.2 Exclusion of rectangles from the North Sea quarter 1 sampling

The Working Group recommends to exclude rectangles 37E9 and 38E8 from the IBTS quarter 1 GOV-program in the future due to rough grounds.

This recommendation was implemented.

3.3 Further exploration of the difference between Dana and Argos

The Working Group recommends Sweden to explore the difference between Dana and Argos further. The suggestion is that Argos will be allowed to do more calibration hauls with Dana during the Q1 survey 2006. During these calibration trials it was suggested that the trawls and trawl doors should be exchanged between the two ships in order to explore the vessel effect compared to trawl gear effects. Furthermore, the WG suggested that the parallel hauls should also be made with Argos slightly ahead of Dana.

The Working Group was informed that this recommendation is in process of being implemented.

3.4 Intercalibration study

The Working Group recommends that FRS and MI continue to build on this limited inter-calibration study whilst also attempting to address the issues raised during the exercise. While recognising that opportunities for this sort of exercise are limited, (due mainly to constraints *on resources) IBTS strongly encourages other participating countries to consider such exercises where survey area overlap exists.*

This recommendation is implemented.

3.5 Section 5.3.2

IBTSWG recommends that the national fisheries laboratories take all necessary measures to ensure that appropriate levels of expertise in fish taxonomy and identification are maintained.

The Working Group was informed that this recommendation is in process to be implemented.

3.6 Section 5.3.5

In certain circumstances, however, some vessels may not be able to process all large catches as above, and may only sort a sample that is considered appropriate for estimating the relative abundance of the dominant species. In these circumstances, the entire catch is not examined for "rare" species and these data may not be appropriate for biodiversity studies. IBTS recommend that this method should be avoided wherever possible, and if particular catches are sorted by this method, then these catches is flagged accordingly. Hence, IBTS also recommend that the DATRAS database contains a field to highlight those catches that may be com-promised for community studies.

The Working Group was informed that this recommendation is in process to be implemented.

3.7 Section 5.3.6

To assist in the correct taxonomic identification of fish and marine invertebrates in the ICES areas, it was recommended that the IBTS manual contains a new appendix listing useful reference works for various taxa.

This recommendation is implemented.

3.8 Section 8

The IBTS should review a number of existing survey reporting formats with a view to proposing a standard format for IBTS surveys for next year.

Institutes should include precision estimates in conjunction with reported indices of abundance.

It is recommended that an estimate of precision in the form of relative standard area be incorporated into the ICES Datras database.

The Working Group was informed that this recommendation is in process to be implemented.

The potential for a simple multivariate analysis of gear parameters and possibly environmental factors to be used as a measure of survey catchability be discussed at WKSAD and SGSTS by IBTS participants. This may flag a survey year, or number of stations within a survey that have high precision, but be biased or inaccurate due to a number of confounding gear or environmental parameters.

See section 6.

3.9 Sampling strategy in the Skagerrak

The Working Group recommends Sweden to change their sampling design in the Skagerrak in their Q3 survey for three years and thereafter re-analyse the indices as a quality measure. The

WG also suggest that Sweden analyse the relationship between species composition, bottom types and the proposed depth strata.

This recommendation is implemented.

4 North Sea and Eastern Atlantic Surveys (ToR a)

4.1 Q1 North Sea

Seven vessels participated in the quarter 1 survey in 2006: "Argos" (Sweden), "Dana" (Denmark), "Håkon Mosby" (Norway), "Scotia" (Scotland), "Thalassa" (France), "Tridens" (Netherlands) and "Walter Herwig" (Germany). The survey covered the period 10 January to 24 February (see Tables 4.1.1–4.1.3). In total, 386 GOV and hauls 632 MIK hauls were carried out (see Figure 4.1.1). Most rectangles were covered by the desired two or more GOV hauls. The number per rectangle of MIK hauls was often below the intended 4 hauls, 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 2006.

SURVEY:	NORTH SEA IBTS Q1	DATES:	10 JANUARY – 24 FEBRUARY 2006
Nation:	Vessel:	Period:	
Denmark France Germany Netherlands Norway Scotland Sweden	Dana Thalassa Walter Herwig 3 Tridens 2 Håkon Mosby Scotia Argos	1 February – 18 February 2006 28 January – 21 February 2006 18 January – 17 February 2006 23 January – 24 February 2006 10 January – 31 January 2006 26 January – 16 February 2006 30 January – 16 February 2006	

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 and at one hydrographical section 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), with ground gear A or B. Herring larvae are sampled with a MIK-net (Methot Isaac Kidd).
Notes from survey (e.g. problems, additional work etc.):	DENMARK: The cruise plan was fulfilled as planned in good weather conditions Scanmar data was collected during the hauls. Additional work: Collection gonads of cod for the University of Århus. Collection cephalopod for an institute in Spain. DANA has covered square 42F7 for the Norwegian ship (one trawl haul and 2 MIK). FRANCE: No major damage to GOV trawl was reported during this survey. As additional work, the CUFES device (Continuous Underwater Fish Eggs Sampler) was used during day and night; samples collected will be analysed at the laboratory in order to modelize spawning areas. GERMANY: 77 rectangles were allocated to W.H.II, but 7 could not be fished due to rough fishing grounds (around Shetlands) and to shallow waters off the isle of Sylt (Germany). Up to 50 specimens of snake pipefish *Entelurus aequoreus* were caught in one MIK-trawl, especially in the north-western North Sea. NETHERLANDS: No problems encountered Remarkably regular catches of snake pipefish in north-western North Sea. NORWAY: Rough weather in the first week. Additional work included plankton sampling on the hydrographical section and sampling of cod gonads. SCOTLAND: Weather was very good for the majority of the survey. No problems encountered. Ship's thermosalinigraph was run continuously throughout the cruise. SWEDEN: No problems during the survey, except one haul in Skagerrak invalid. Additional sampling: a) cod gonads (~90 samples) from Skagerrak and Kattegat for

	analysing gonad stage development (Anders Bang, Univ of Aarhus, Denmark), b) Herring and cod samples to CEFAS, Lowestoft for radioactivity analyse.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 100 species of fish were recorded during the survey. Unusual species caught included eel *Anguilla anguilla*, tope *Galeorhinus galeus*, and black seabream *Spondyliosoma cantharus*.

Table 4.1.2: Overview of the number of hauls and used gear during the North Sea IBTS Q1 survey in 2006.

GEAR	VESSEL	ICES DIVISIONS	TOWS PLANNED	VALID	VALID WITH ROCK-HOPPER	ADDIT-IONAL	INVALID	% STATIONS FISHED	COMM-ENTS
GOV	ARG	III	48	47	-	0	1	98	
GOV	DAN2	IV	37	38	-	-	-	103	
Rockhopper	DAN2	IV	3	-	3	-	-	100	
GOV	HAV	IV	40	38	-	0	2	95	
GOV-b	SCO3	IVa	32	32	-	0	1	100	
GOV-a	SCO3	IVb	15	15	-	0	0	100	
GOV-b	SCO3	IVb	3	3	-	-	1	100	
GOV	THA2	IVb	46	46	-	-	-	100	
GOV	THA2	IVc	25	24	-	-	-	96	
GOV	TRI2	IV	49	70	-	-	-	143	
GOV	WAH3	IV	77	70	-	-	-	89	
		TOTAL	375	383	3			103	
MIK	ARG	III	-	50				-	
	DAN2	IV	80	82				103	
	HAV	IV	56	54				96	
	SCO3	IV	100	100				100	
	THA2	IV	114	109				91	
	TRI2	IV	98	97				99	
	WAH3	IV	154	140				91	
		TOTAL	602	632				105	

Table 4.1.3: Overview of the biological samples taken during the North Sea IBTS Q1 in 2006.

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):								
Species	GER	NOR	SCO	DEN	NED	SWE	FRA	**Total**
Clupea harengus	560	100		820	486	1257	402	**3625**
Gadus morhua	160	134	128	184	55	535	174	**1370**
Melanogrammus aeglefinus	960	181	929	179	346	232	413	**3240**
Merlangius merlangus	770	107	718	520	606		1084	**3805**
Pleuronectes platessa				446		838	664	**1948**
Pollachius virens	233	151	7			30		**421**
Scomber scombrus	296	88		8				**392**
Sprattus sprattus	199			418	164	833	222	**1836**
Trachinus vipera					43			**43**
Trisopterus esmarki	251	45	214	74	75	108	77	**844**
**Lepidorhombus whiffiagonis*			17					**17**
**Leucoraja naevus*			15					**15**
**Lophius piscatorius*			13					**13**
**Merlangius merlangus*			718					**718**
**Merluccius merluccius*			40					**40**
**Microstomus kitt*			288					**288**
**Mullus barbatus*			11					**11**
**Pleuronectes platessa*			151					**151**
**Raja montagui*			3					**3**
**Raja radiata*			38					**38**
**Scophthalmus rhombus*			1					**1**
**Trachurus trachurus*			26					**26**

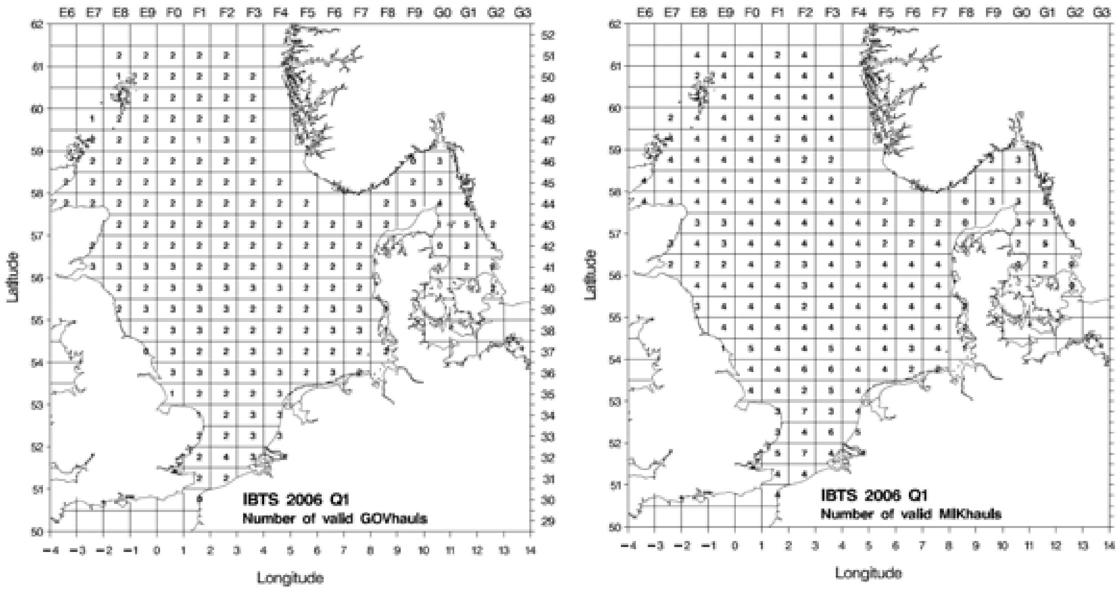


Figure 4.1.1: Number of hauls per ICES-rectangle with GOV (left) and MIK (right) during the IBTS Q1 2005.

4.1.1 Recruitment of commercial species

The preliminary indices for the 2006 quarter 1 survey are shown in Figure 4.1.2. According to these preliminary results, Haddock, Norway pout and Mackerel have produced good year classes in 2005, well above the long-term average since 1980. Especially for Haddock and Norway pout this is a positive development, since the four preceding year classes were very low for these two species.

The indices of the other four species were in 2006 all well below the long-term average of the past 26 years. The estimated catch of 1-group herring was as low as in 2004 and 2005, and accordingly again far below the average. The recruitment of sprat shows a fall back, contrarily to preceding years, and is in 2006 much lower than the long term average. The catches of young whiting are for the fourth time in a row disappointing, and the recruitment cod has remained far below the average, as it is for a long time now.

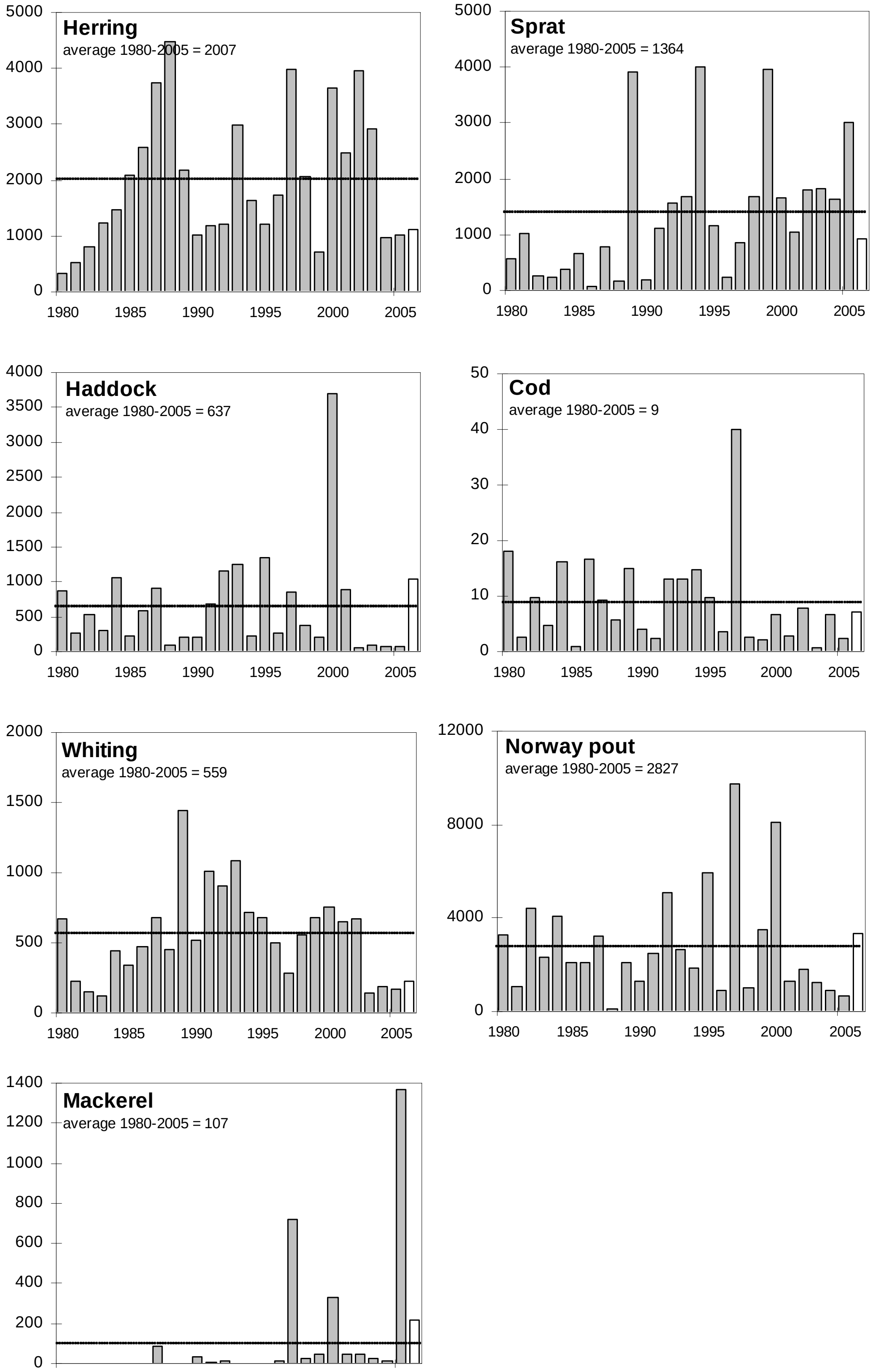


Figure 4.1.2 Time series of indices for 1-group (1-ring) fish caught during the quarter 1 IBTS survey in the North Sea, Skagerrak and Kattegat. Indices for the last year are preliminary, and based on a length split of the catches.

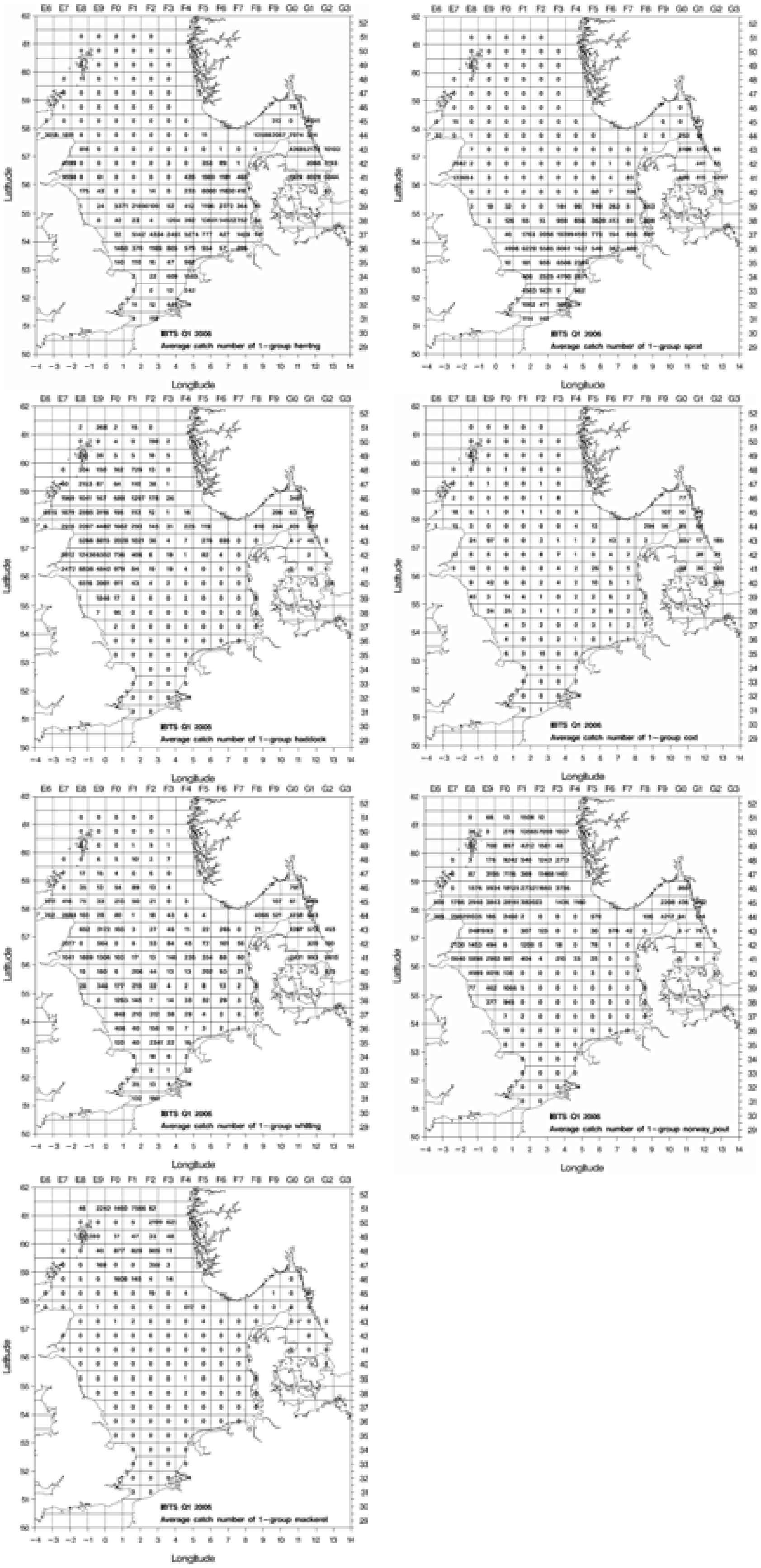


Figure 4.1.3: (Preliminary) distribution of 1-group (1-ring) fish caught during the IBTS Q1 2006 in the North Sea, Skagerrak and Kattegat.

4.1.2 MIK sampling

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 for herring and sprat. Sampling at night with fine-meshed nets (MIK; Methot Isaac Kidd) was implemented from 1977 onwards, and the catch of herring larvae has been used for estimation of 0-ringer abundance in the survey area.

The estimate of the index of 0-ringer recruitment (MIK-index) in 2005 indicates a low recruitment, of the same order as estimated for the last three year classes, 2002, 2003 and 2004 (see figure 4.1.4). The 0-ringers were distributed westerly and southerly in the North Sea with highest concentrations in the southwestern areas (see figure 4.1.5). Compared to the preceding two year classes, it is remarkable that in 2006 only little 0-ringers have been caught in front of the Dutch coast.

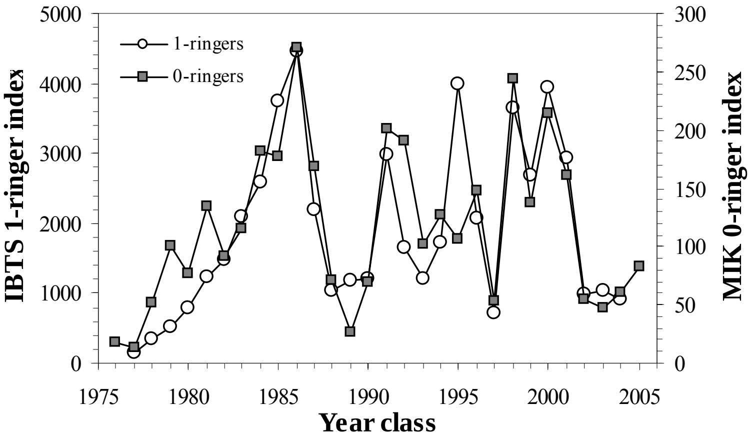


Figure 4.1.4: North Sea herring. Time series of 0-ringer and 1-ringer indices. Year classes 1976 to 2005 for 0-ringers, year classes 1977-2004 for 1-ringers.

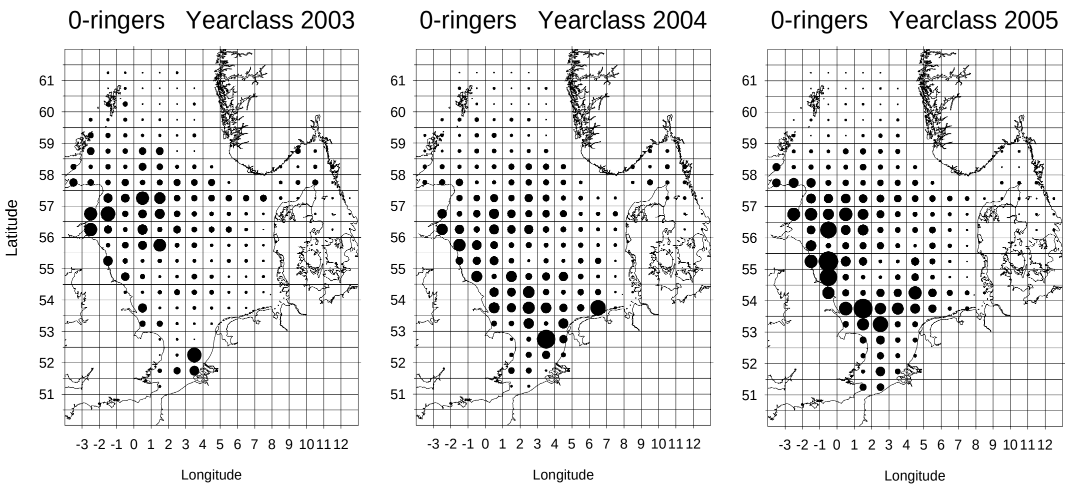


Figure 4.1.5: North Sea herring. Distribution of 0-ringer herring, year classes 2003-2005. Abundance estimates of 0-ringers within each statistical rectangle are based on MIK catches during IBTS in February 2004-2006. Areas of filled circles illustrate densities in no m^{-2}, the area of a circle extending to the border of a rectangle represents 1 m^{-2}.

4.1.3 Participation in 2007

As yet, there are no signals that effort will decrease in 2007. The timing of the surveys in 2006 has been rather widespread from week 2 up to week 8 (see Figure 4.1.1). Due to this, there was no overlap in timing for some vessels, as Norway was already finished, while Denmark, France and Sweden had not even sailed out. The Working Group recommends for 2007 that participants of the North Sea IBTS Quarter 1 survey will aim to perform their cruise during the month February, in order to guarantee good overlap in the timing of the surveys.

4.2 Q3 — North Sea

Six vessels participated in the quarter three survey in 2005: “Dana” (Denmark), “Walter Herwig III” (Germany), “Håkon Mosby” (Norway), “Argos” (Sweden), “CEFAS Endeavour” (England) and “Scotia” (Scotland). In all, 343 valid GOV hauls were made, allowing full coverage of the survey area. The North Sea, Skagerrak and Kattegat quarter 3 surveys have now completed 16 years in its coordinated form. Table 4.2.1 shows the effort ascribed to this survey over the time series. Good coverage of the area had continued until 2000 when, unfortunately Sweden withdrew their vessel at very short notice. As a consequence the Skagerrak and Kattegat were not surveyed that year. Up to the present only data from the separate Scottish and English elements of this survey have been used each year in the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK).

Table 4.2.1: Number of valid hauls and days at sea per country for quarter 3 surveys 1991-2005 and number of days proposed for 2006.

Year		Denmark	France	Germany	Netherlands	Norway	Sweden	UK England	UK Scotland	Total
1991	Days				19		15	27	20	81
	Hauls				73		52	87	90	302
1992	Days		17	12	11		15	31	20	106
	Hauls		61	48	32		52	72	87	353
1993	Days		19		17		15	27	20	98
	Hauls		70		65		53	71	87	346
1994	Days		19		10		15	23	20	87
	Hauls		55		42		53	73	89	312
1995	Days				9		15	30	20	74
	Hauls				34		53	74	89	250
1996	Days		32	8	5		15	27	20	107
	Hauls		56	32	17		53	79	85	323
1997	Days			8	8		15	26	20	77
	Hauls			32	18		46	74	88	258
1998	Days	14		8			15	28	18	83
	Hauls	51		28			48	74	77	278
1999	Days	15		9		26	15	28	21	114
	Hauls	53		32		75	47	74	83	364
2000	Days	15		7		21		28	18	89
	Hauls	60		26		69		75	87	317
2001	Days	16		8		20	15	28	22	109
	Hauls	56		29		49	46	74	87	341
2002	Days	18		13		28	15	32	23	129
	Hauls	47		32		57	46	75	85	342
2003	Days	18		10		26	23	32	26	134
	Hauls	46		29		61	48	75	86	345
2004	Days	18		11		30	15	29	27	130

Year		Denmark	France	Germany	Netherlands	Norway	Sweden	UK England	UK Scotland	Total
	Hauls	46		29		56	46	75	87	339
2005	Days	18		11		30	15	32	27	130
	Hauls	46		32		55	49	74	87	343
*2006**	*Days*	*18*		*11*		*30*	*18*	*32*	*25*	*134*

***Preliminary.**

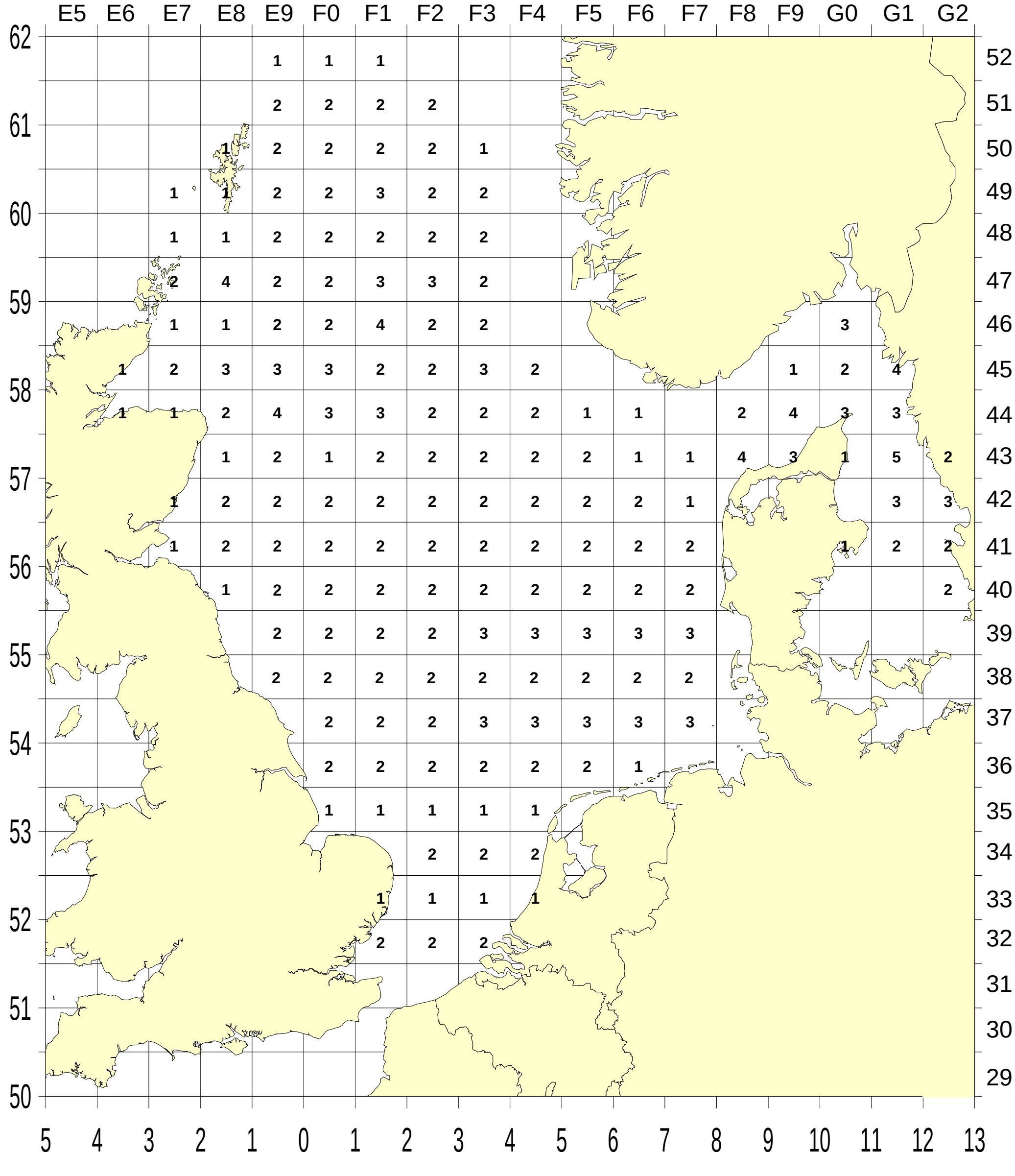


Figure 4.2.1: Plot of number of stations fished by rectangle by all participants of the 3rd Quarter IBTS survey 2005.

4.2.1 Survey summaries

In order to satisfy a request from WGNSDS, and to standardise the summary reports within this Working Group report, the survey summaries for all cruises are now provided in a standard form. In addition to this, a table is now provided showing variance in combined mean catch rates (Stock area IV, excludes Swedish data (IIa)) and estimates of sampling precision, for selected species.

Variance in catch rates and estimates of sampling precision						
Species	Stock Area	Valid tows	Mean CPUE (hr)	SE	RSE	Comments
Gadus morhua	IV	294	12.4	2.4	19.5	
Melanogrammus aeglefinus	IV	294	970.2	217.0	22.4	
Merlangius merlangus	IV	294	457.0	78.8	17.2	
Pollachius virens	IV	294	17.9	6.4	35.6	
Scomber scombrus	IV	294	113.6	33.4	29.3	
Clupea harengus	IV	294	2462.7	575.3	23.4	
Pleuronectes platessa	IV	294	45.0	7.2	15.9	
Trisopterus esmarki	IV	294	1713.6	396.6	23.1	
Sprattus sprattus	IV	294	8883.2	2276.1	25.6	

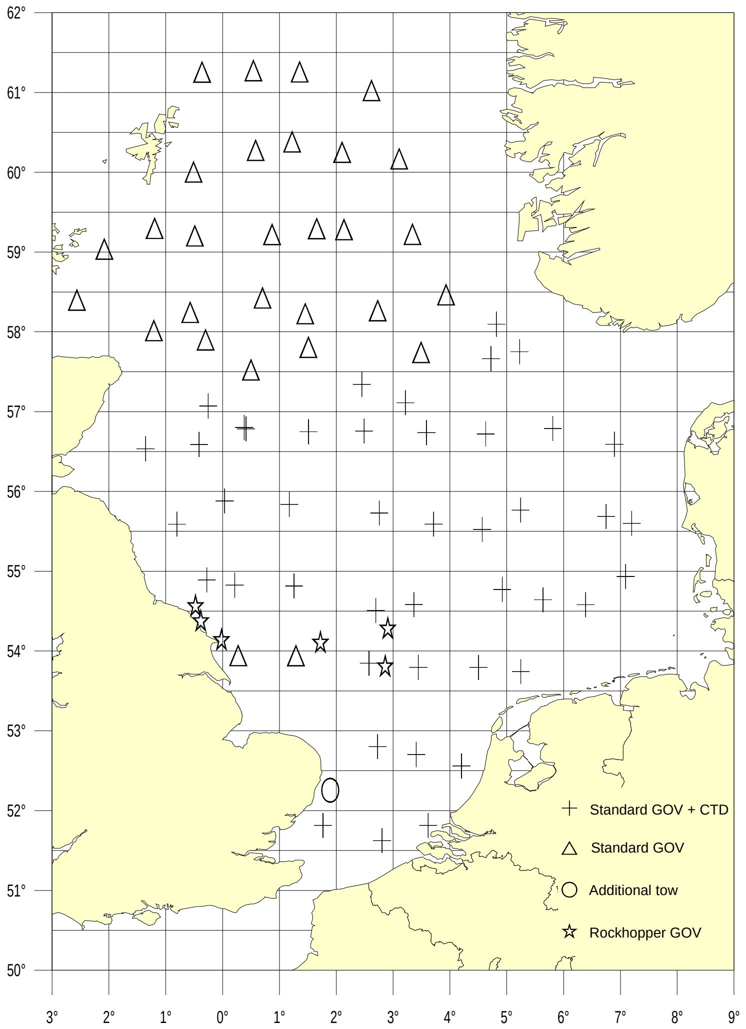
Nation:	**UK (England and Wales)**	Vessel:	Cefas Endeavour
Survey:	13/05	Dates:	9 August – 26 September 2005

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.):	At the start of the second half of the survey, the main net drum brake was damaged during shooting of the first haul. It could not be fixed at sea. It was finally fixed three weeks later and the survey was completed. Due to these problems only 73 of the 75 standard stations were fished however an extra tow in 33F1 was fished and the survey finished two weeks later than planned.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 75 species of fish were recorded during the survey. Unusual fish species caught included 5 individual specimens of Allis shad *Alosa alosa* and one specimen of blue-mouth redfish *Helicolenus dactylopterus*.

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

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	Comments
IV	N/A	Standard	75	73	7	1	97	6 additional stations fished with rock-hopper ground gear D
	TOTAL		75	73	7	1	97	

Number of biological samples (maturity and age material, *maturity only):			
Species	Age	Species	Age
Clupea harengus	216	*Limanda limanda*	398
Gadus morhua	363	*Lophius piscatorius*	45
Melanogrammus aeglefinus	1212	*Scomber scombrus*	379
Merlangius merlangus	1340		
Pollachius virens	265	**Leucoraja naevus*	27
Sprattus sprattus	216	**Amblyraja radiata*	211
Scophthalmus maximus	14	**Raja clavata*	3
Trisopterus esmarki	320	**Raja montagui*	6
Microstomus kitt	272		
Pleuronectes platessa	665		



VARIANCE IN CATCH RATES AND ESTIMATES OF SAMPLING PRECISION						
Species	Stock Area	Valid tows	Mean CPUE (hr)	SE	RSE	Comments
Gadus morhua	IV	74	10.1	2.2	21.3	
Melanogrammus aeglefinus	IV	74	1022.5	37.9	35.0	
Merlangius merlangus	IV	74	643.6	246.7	38.3	
Pollachius virens	IV	74	37.1	16.7	44.9	
Scomber scombrus	IV	74	153.9	44.0	28.6	
Clupea harengus	IV	74	1139.3	313.7	27.5	
Pleuronectes platessa	IV	74	56.7	21.7	38.3	
Trisopterus esmarki	IV	74	2171.9	712.4	32.8	
Sprattus sprattus	IV	74	3897.8	1565.9	40.2	

NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	1005s	Dates:	21 July – 12 August 2005

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 ground gear B on stations north of 57deg 30min North and ground gear A on 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 and a CTD deployed at each station.
Number of fish species recorded and notes on any rare species or unusual catches:	Although the cod index (0+) shows the numbers for 2005 to be the highest on record, these figures are heavily influenced by the catches of three particular stations (42E7, 44E6 & 44E7). Unfortunately, these stations are not covered by other participating countries. A total of 67 species were recorded during the survey with a total weight of 34,260 kgs.

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

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	comments
IVa	N/A	GOV – A	37	37	-	0	0	100	
IVb	N/A	GOV - B	50	50	-	0	0	100	
	TOTAL		87	87	-	0	0	100	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
Species	Age	Species	Age
Clupea harengus	Na	**Trachuurs trachurus*	125
Gadus morhua	171	**Lophius piscatorius*	20
Melanogrammus aeglefinus	1348	**Hippoglossus hippoglosus*	4
**Merlangius merlangus*	1199	**Anarichas lupus*	1
**Merluccius merluccius*	40	*Scomber scombrus*	Na
**Psetta maxima*	2	**Leucoraja naevus*	17
Pollachius virens	298	**Raja batis*	1
Trisoperus esmarki	346	**Raja radiata*	73
**Microstomus kitt*	807	**Raja montagui*	30
**Pleuronectes platessa*	543		
**Lepidorhombus whiffiagonis*	83		

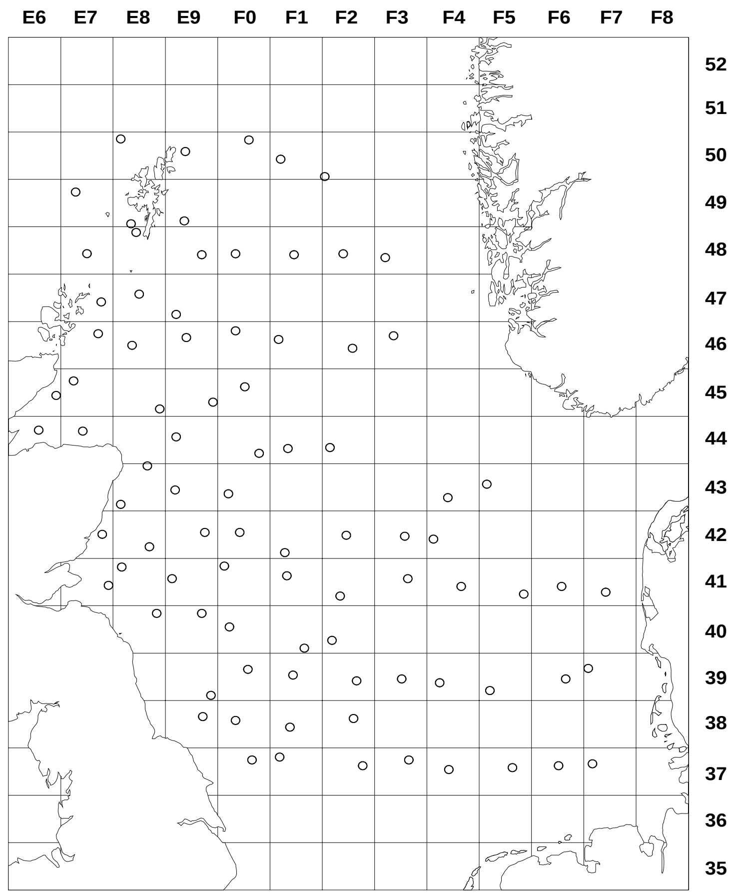


Figure 1

VARIANCE IN CATCH RATES AND ESTIMATES OF SAMPLING PRECISION						
Species	Stock Area	Valid tows	Mean CPUE (hr)	SE	RSE	Comments
Gadus morhua	IV	87	15.9	7.1	44.7	
Melanogrammus aeglefinus	IV	87	1798.8	584.1	32.5	
Merlangius merlangus	IV	87	485.2	98.5	20.3	
Pollachius virens	IV	87	28.4	16.2	57.0	
Scomber scombrus	IV	87	92.5	22.7	24.6	
Clupea harengus	IV	87	3074.4	1077.7	35.1	
Pleuronectes platessa	IV	87	19.5	3.7	19.2	
Trisopterus esmarki	IV	87	3564.9	1161.5	32.6	
Sprattus sprattus	IV	87	5348.3	2059.0	38.5	

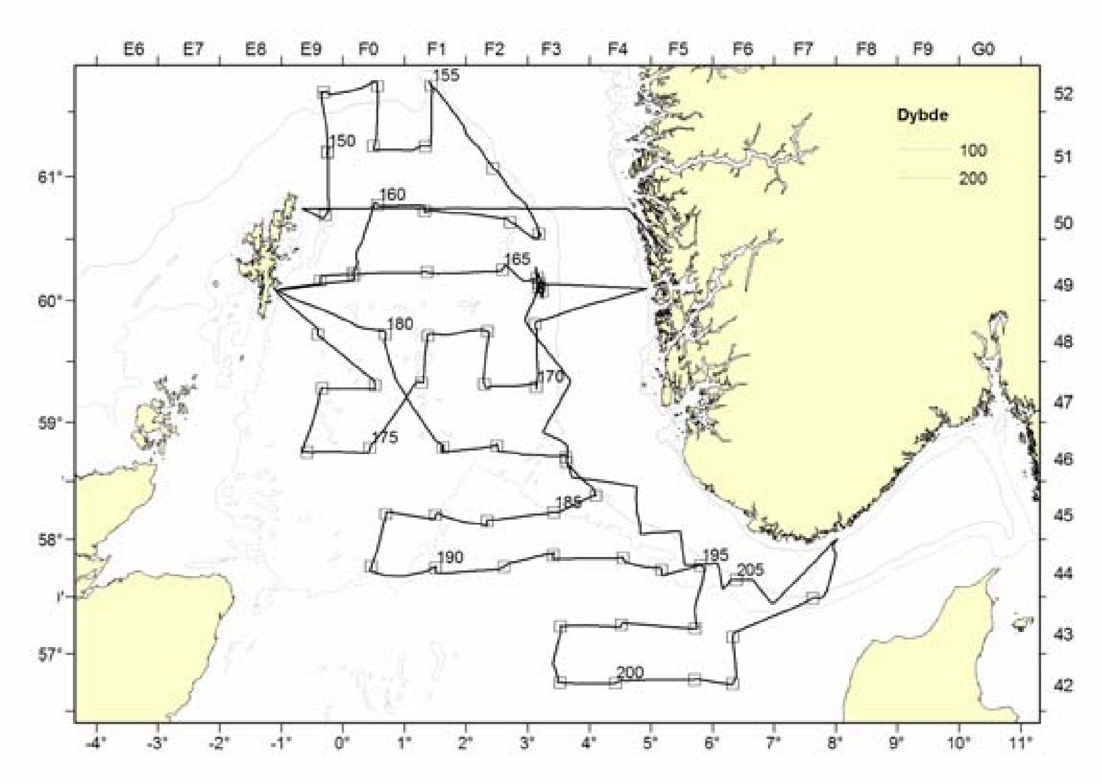
NATION:	NORWAY	VESSEL:	"HÅKON MOSBY"
Survey:	2005617	Dates:	11 July – 31 July 2005

Cruise	IBTS quarter 3/Saithe acoustics. The RV "Håkon Mosby" started at 11 July and completed a total of 60 GOV stations. CTD was deployed at each station and at one hydrographical section to collect temperature and salinity profiles One of the main objectives of the survey is acoustic measurement of the saithe stock. Acoustic measurements are taken continually through the survey.
Gear details:	GOV with ground gear A using six Balmoral floats instead of the kite.
Notes from survey (e.g. problems, additional work etc.):	Tagging of anglerfish was carried out during the survey and on 14 extra hauls.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 54 species of fish were recorded.

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

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	Comments
IV	N/A	Standard	55	55	-	16	2	100	
	TOTAL		55	55		16	2	100	

Number of biological samples (maturity and age material, *maturity only):			
Species	Age	Species	Age
Clupea harengus	200	*Merluccius merluccius*	32
Gadus morhua	168	*Pollachius virens*	146
Melanogrammus aeglefinus	130	*Trisopterus esmarki*	57
Merlangius merlangus	90	*Lophius piscatorius*	9



VARIANCE IN CATCH RATES AND ESTIMATES OF SAMPLING PRECISION						
Species	Stock Area	Valid tows	Mean CPUE (hr)	SE	RSE	Comments
Gadus morhua	IV	55	7.7	2.1	27.0	
Melanogrammus aeglefinus	IV	55	169.1	52.0	30.8	
Merlangius merlangus	IV	55	44.3	9.2	20.9	
Clupea harengus	IV	55	359.2	159.2	44.3	
Pleuronectes platessa	IV	55	135.6	18.3	31.4	
Pollachius virens	IV	55	-	-	-	Zero catch
Scomber scombrus	IV	55	0.2	-	-	Caught at only 1 haul
Trisopterus esmarki	IV	55	546.5	184.8	33.8	
Sprattus sprattus	IV	55	3.7	1.0	26.9	

NATION:	GERMANY	VESSEL:	WALTHER HERWIG III
Survey:	277	Dates:	19 July – 17 August 2005

Cruise	The objectives of that cruise were to participate in the Q3 IBTS in the North Sea and to monitor the fish fauna and the benthic epifauna in 6 small areas (part of the German Small-Scale Bottom Trawl Survey; GSBTS). North Sea IBTS Q3 survey aims to collect data on the distribution and relative abundance and biological information of commercial fish in Subareas IVa, b and c. The primary species are cod, haddock, whiting, saithe, Norway pout, herring, sprat and mackerel. Data also collected for other demersal fish (e.g. anglerfish, plaice,) within the scope of the DCR.
Gear details:	Standard GOV with ground gear A (standard) was used.
Notes from survey (e.g. problems, additional work etc.):	At the allocated 29 and 3 additional stations of IBTS Q3 survey, the GOV in the standard version was used and a CTD combined with a water sampler was deployed to get temperature and salinity profiles and data on nutrients. The 2m-beamtrawl and the "van Veen" grab were also used to sample the benthic epifauna and to get information on sediment. Additionally 2 bird watchers joined the cruise. With a mean wind speed of 9.5m/sec during the fishing operations it was the most windy summer cruise of the last ten years.
Number of fish species recorded and notes on any rare species or unusual catches:	Increasing catches of Twaite shad (*Alosa fallax*) in the German Bight and of snake pipefisch (*Entelurus aequoreus*) in the northern North Sea

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

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	VALID WITH ROCK-HOPPER	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
IV	N/A	Standard	29	29	-	3	0	100	
	TOTAL		29	29		3	0	100	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
Species	Age	Species	Age
Clupea harengus	460	*Scomber scombrus*	201
Gadus morhua	219	*Sprattus sprattus*	210
Melanogrammus aeglefinus	572	*Trachurus trachurus*	168
Merlangius merlangus	348	*Trisopterus esmarki*	58
Pollachius virens	17		

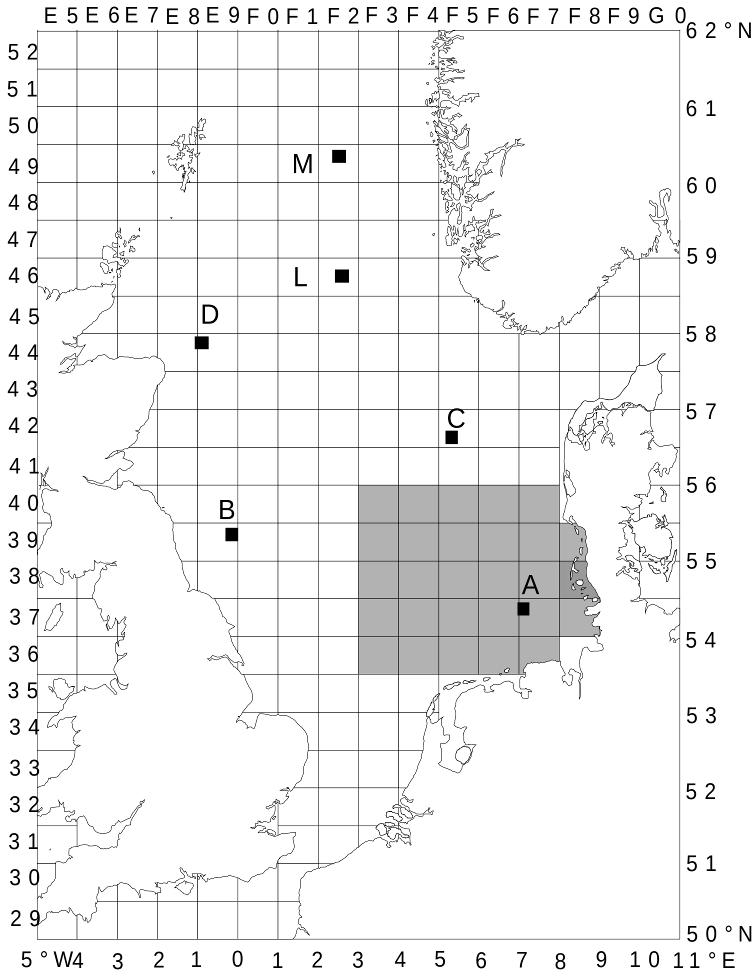


Fig. 1: „Walther Herwig III". Cruise no. 277. Area of investigation and boxes

VARIANCE IN CATCH RATES AND ESTIMATES OF SAMPLING PRECISION						
Species	Stock Area	Valid tows	Mean CPUE (hr)	SE	RSE	Comments
Gadus morhua	IV	32	32.6	8.1	34.1	
Melanogrammus aeglefinus	IV	32	130.0	59.0	45.3	
Merlangius merlangus	IV	32	334.0	139.6	41.8	
Pollachius virens	IV	32	1.2	0.6	48.9	
Scomber scombrus	IV	32	405.1	280.0	69.1	
Clupea harengus	IV	32	8356.8	1477.3	30.3	
Pleuronectes platessa	IV	32	27.1	5.3	19.6	
Trisopterus esmarki	IV	32	300.2	53.1	59.1	
Sprattus sprattus	IV	32	36293.8	15617.9	43.0	

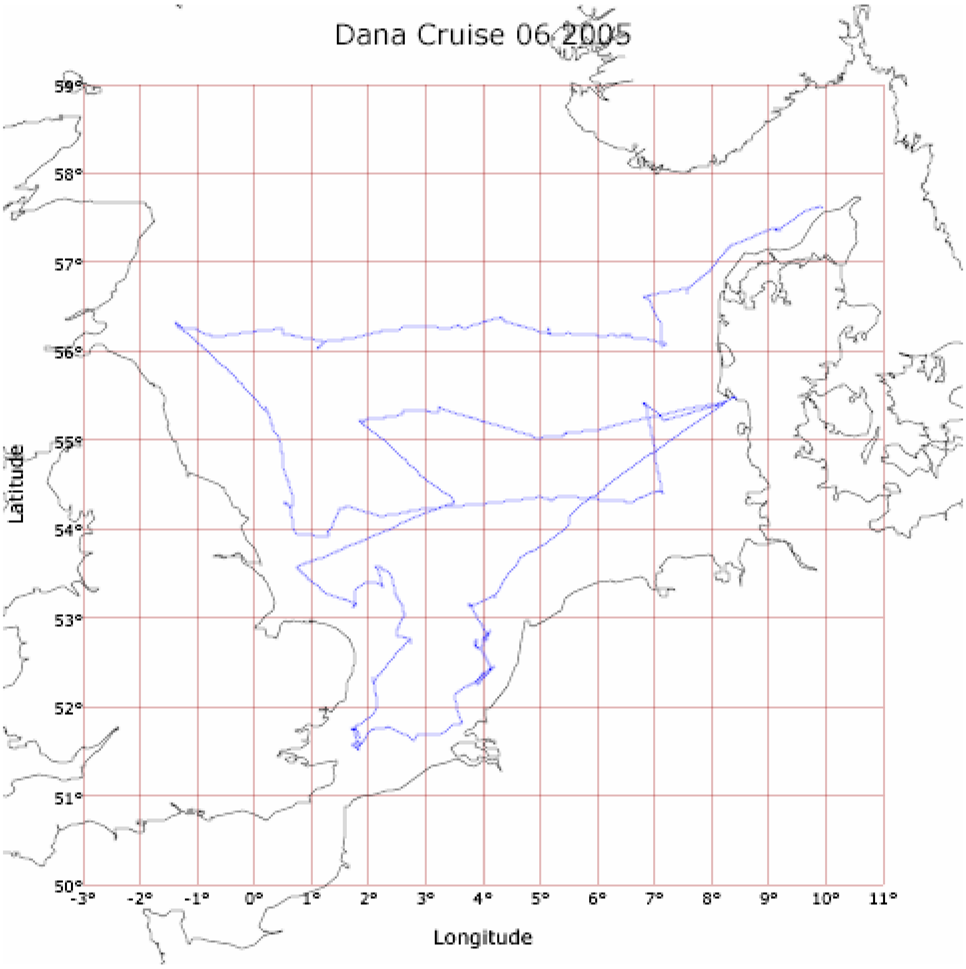
Nation:	**Denmark**	Vessel:	Dana
Survey:	6/05 IBTS 3Q 2005	Dates:	1 September – 18 September 2005

Cruise	Q3 NS IBTS. To collect data to estimate year-class strength of the cod, haddock, whiting, Norway pout, herring, sprat, saithe and mackerel stocks in the North Sea, Skagerrak and Kattegat. The survey is coordinated by ICES and is carried out in cooperation with research vessels from England, Germany, Norway, Scotland and Sweden. The survey is carried out as a bottomtrawl survey using the GOV-trawl as the standard gear. To monitor water temperature and salinity at all trawl stations using CTD.
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, at station 75 ICES sq 32F1 51 44 458 N 1 44 792 E we lost our GOV trawl gear in an underwater obstruction, maybe a top of clay, we were searching for it for one and a half day without any results. Scanmar data was collected during the hauls.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 64 species of fish were recorded during the survey.

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

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Addit-ional	Invalid	% stations fished	Comments
IVb-c	N/A	Standard	43	43			1	100	
	N/A	Rock hopper	3		3			100	
	TOTAL		46	43	3		1	100	

Number of biological samples (maturity and age material, *maturity only):			
Species	Age	Species	Age
Clupea harengus	628	*Sprattus sprattus*	256
Gadus morhua	103	*Tricepterus esmarkii*	3
Melanogrammus aeglefinus	397	*Pleuronectes platessa*	542
Merlangius merlangus	666	*Pollachius virens*	2
Scomber scombrus	220		



Variance in catch rates and estimates of sampling precision						
Species	Stock Area	Valid tows	Mean CPUE (hr)	SE	RSE	Comments
Gadus morhua	IVb-c	46	7.5	3.1	40.8	
Melanogrammus aeglefinus	IVb-c	46	861.5	574.0	66.6	
Merlangius merlangus	IVb-c	46	682.5	218.7	32.0	
Pollachius virens	IVb-c	46	-	-	-	Zero catch
Scomber scombrus	IVb-c	46	23.7	6.3	26.4	
Clupea harengus	IVb-c	46	4267.0	2806.3	65.8	
Pleuronectes platessa	IVb-c	46	71.3	17.3	24.3	
Tricepterus esmarkii	IVb-c	46	-	-	-	Zero catch
Sprattus sprattus	IVb-c	46	15137.3	7808.5	5.6	

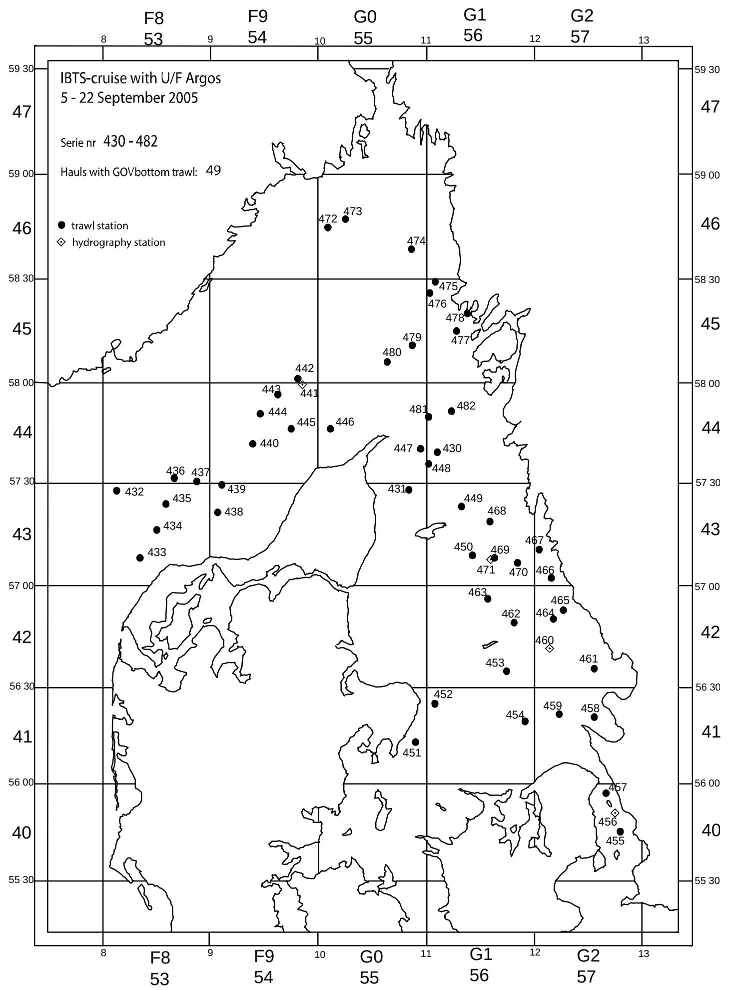
NATION:	SWEDEN	VESSEL:	ARGOS
Survey:	13/05	Dates:	5 to 22 September 2005

Cruise	Q3 IBTS To collect data to estimate year-class strength of the cod, haddock, whiting, Norway pout, herring, sprat, saithe and mackerel stocks in the North Sea, Skagerrak and Kattegat. The survey is coordinated by ICES and is carried out in cooperation with research vessels from England, Germany, France, Norway, the Netherlands, Scotland and Sweden. The survey is carried out as a bottomtrawl survey using the GOV-trawl as the standard gear.
Gear details:	GOV with ground gear A. No damaged on the trawl during the survey.
Notes from survey (e.g. problems, additional work etc.):	No problems during the survey. Additional sampling: a) Herring from Kattegat toxicity analysis Swedish Museum for Natural History, Stockholm, b) Herring and cod samples to CEFAS, Lowestoft for radioactivity analysis. On this survey we used a semi random stratified sampling design for the first time in the Skagerrak. The reason for this change is because the typography in the area is more divers compared to the rest of the North Sea. In this first survey approximately 65 % of the hauls were the same as the fixed station previously used.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 58 species of fish were recorded during the survey.

Stations fished (aims: to complete 49 valid tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	VALID WITH ROCK-HOPPER	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VII a	Skag	Standard	28	28	-	0	0	100	
	Katt	Standard	19	19	-	0	0	100	
	Sound	Standard	2	2	-	0	0	100	
	TOTAL		49	49		0	0	100	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
Species	Age	Species	Age
Clupea harengus	1123	*Pollachius virens*	168
Gadus morhua	814	*Trisopterus esmarcki*	128
Melanogrammus aeglefinus	300	*Pleuronectes platessa*	741
Sprattus sprattus	773		



VARIANCE IN CATCH RATES AND ESTIMATES OF SAMPLING PRECISION						
Species	Stock Area	Valid tows	Mean CPUE (hr)	SE	RSE	Comments
Gadus morhua	IIa	49	297.9	100.9	33.9	
Melanogrammus aeglefinus	IIa	49	982.6	431.9	40.9	
Merlangius merlangus	IIa	49	701.7	380.5	17.5	
Pollachius virens	IIa	49	19.6	16.4	54.7	
Scomber scombrus	IIa	49	98.1	1.7	53.2	
Clupea harengus	IIa	49	2551.9	814.2	26.4	
Pleuronectes platessa	IIa	49	54.8	27.6	24.4	
Trisopterus esmarki	IIa	49	1564.8	228.4	34.0	
Sprattus sprattus	IIa	49	9629.7	4343.3	30.8	

4.2.2 0-group plots

Plots of mean numbers of 0-group catches for cod, haddock, whiting, Norway pout, saithe, sprat and mackerel were produced from preliminary data obtained from individual institutes.

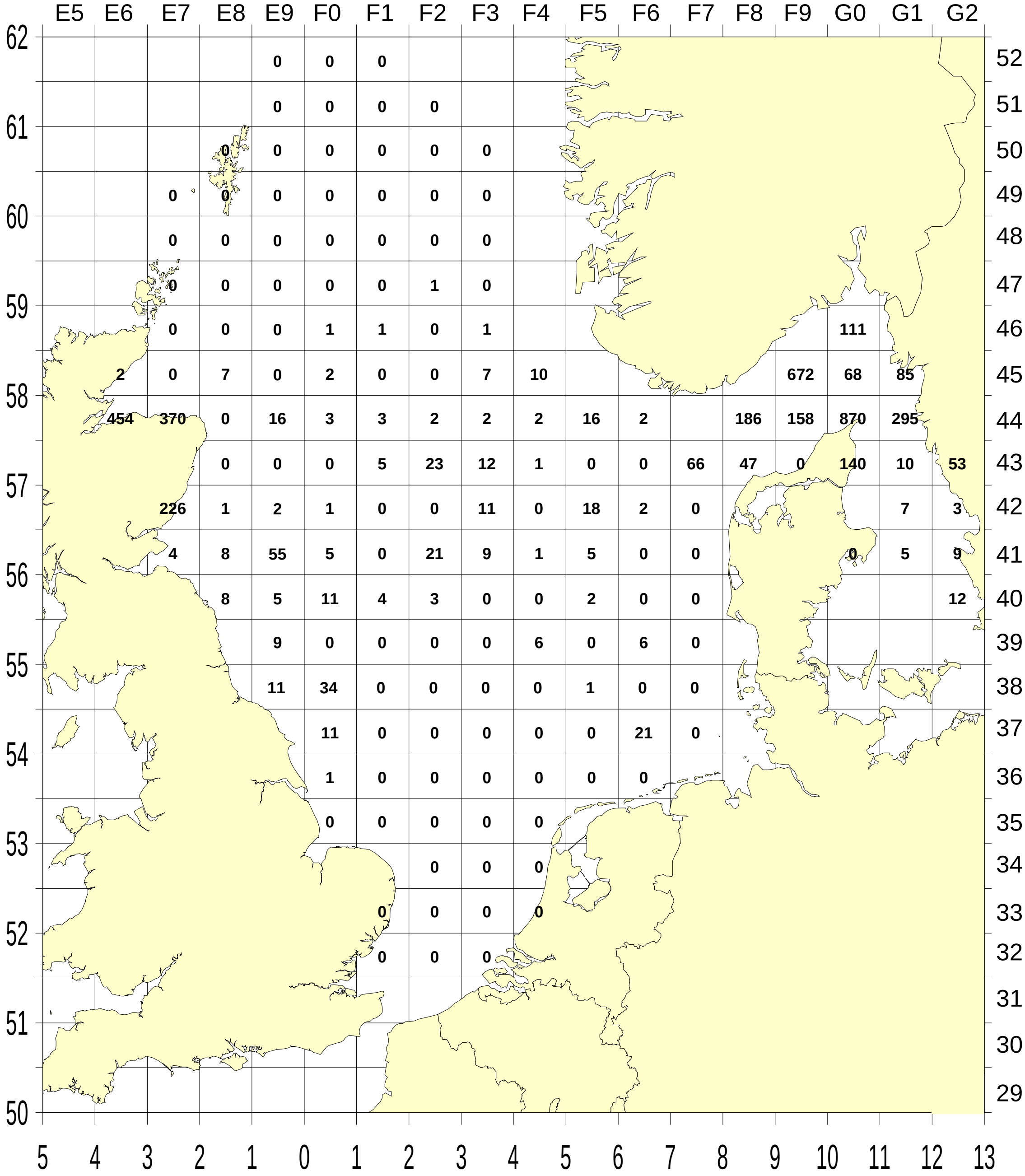


Figure 4.2.2: Plot of mean catch numbers per hour of O-group cod by rectangle.

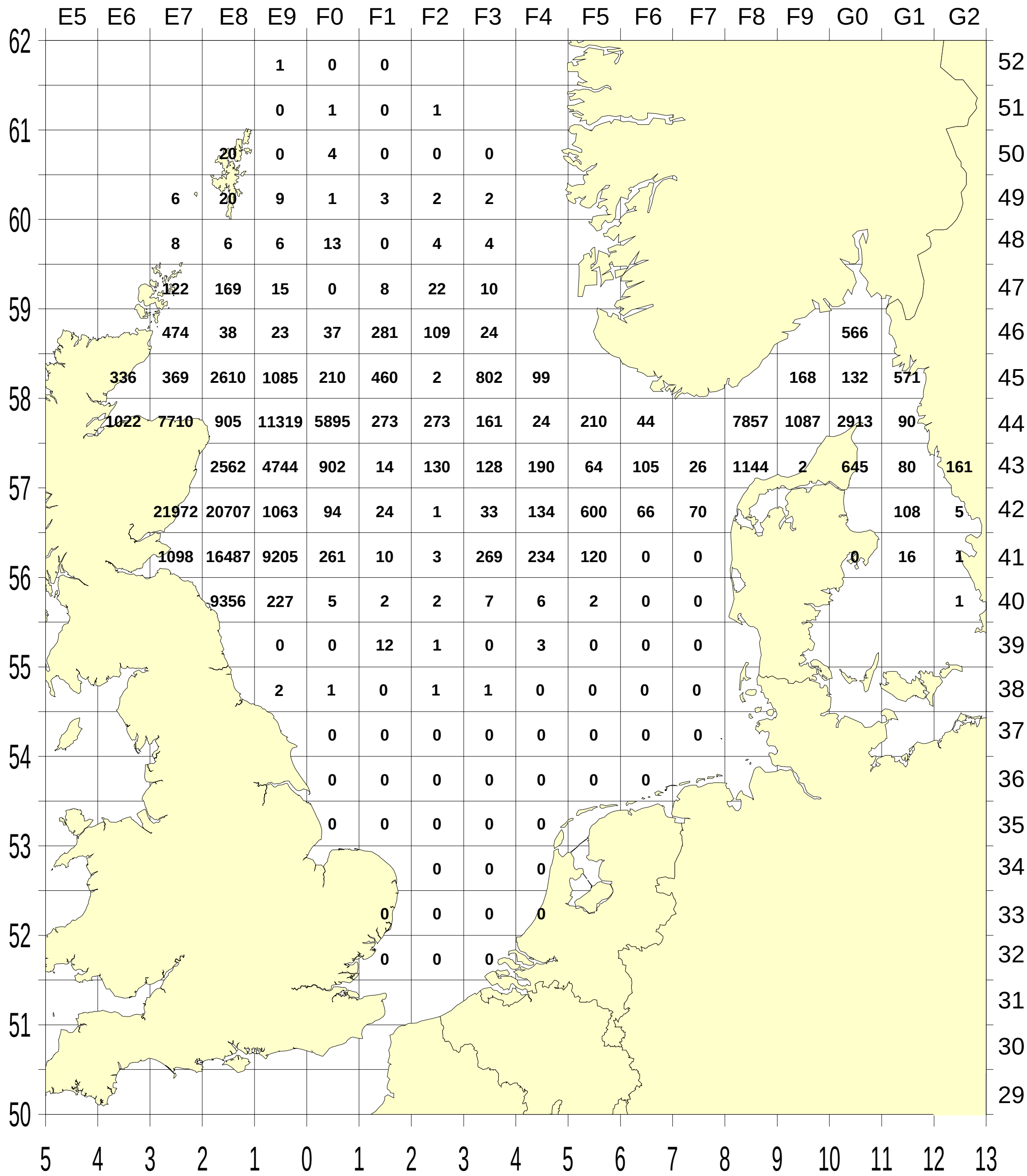


Figure 4.2.3: Plot of mean catch numbers per hour of O-group haddock by rectangle.

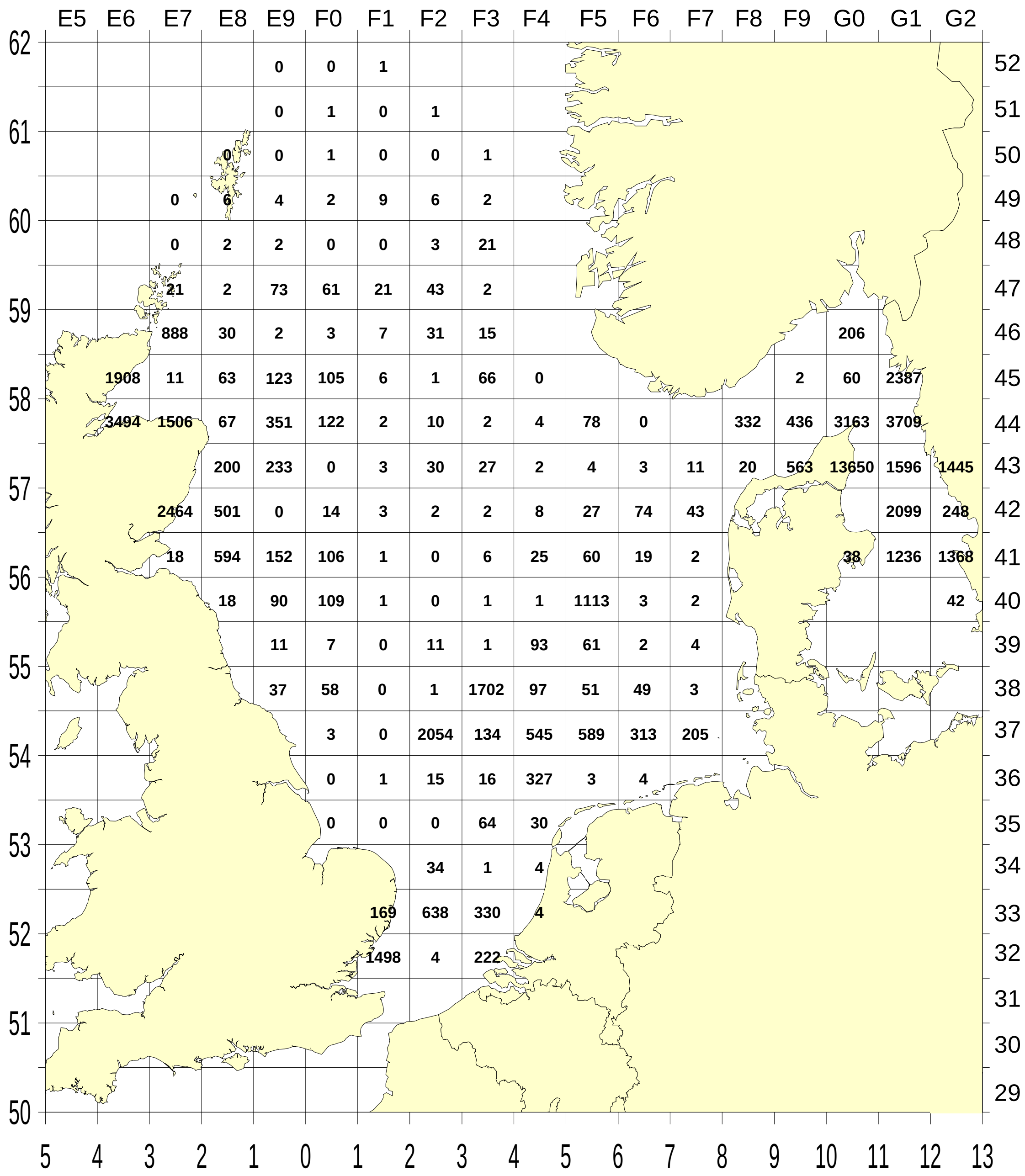


Figure 4.2.4: Plot of mean catch numbers per hour of O-group whiting by rectangle.

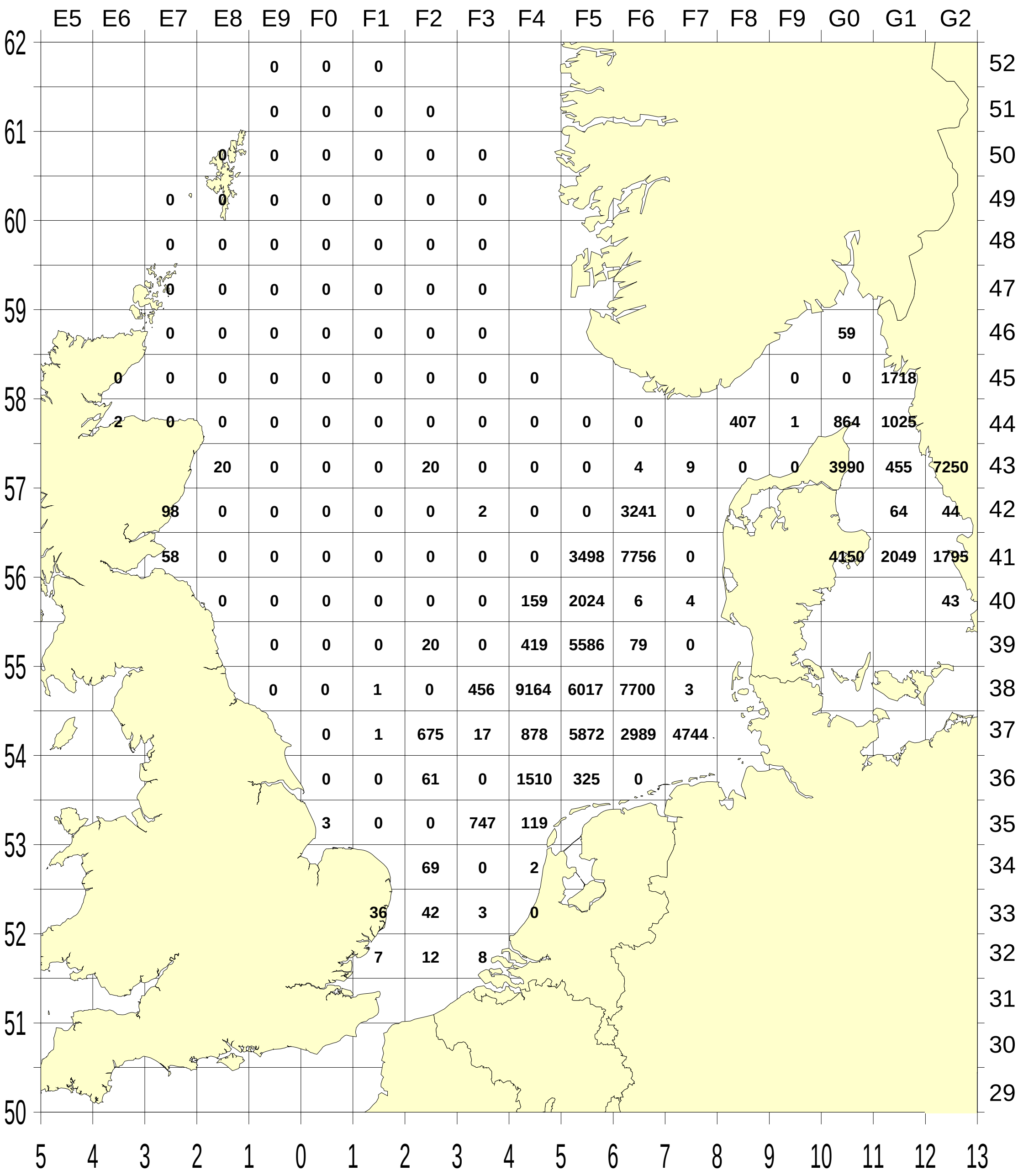


Figure 4.2.5: Plot of mean catch numbers per hour of O-group herring by rectangle.

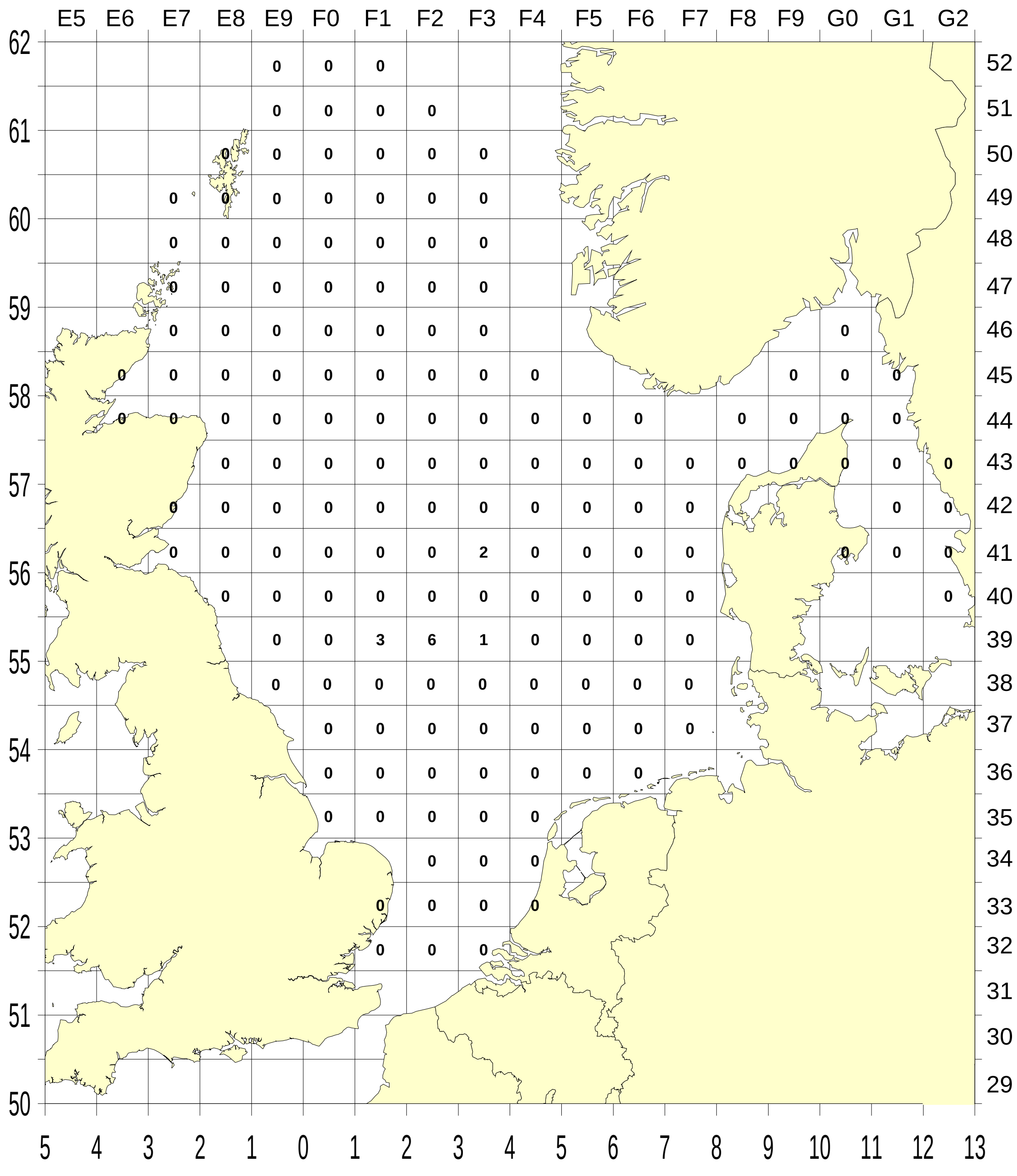


Figure 4.2.6: Plot of mean catch numbers per hour of O-group mackerel by rectangle.

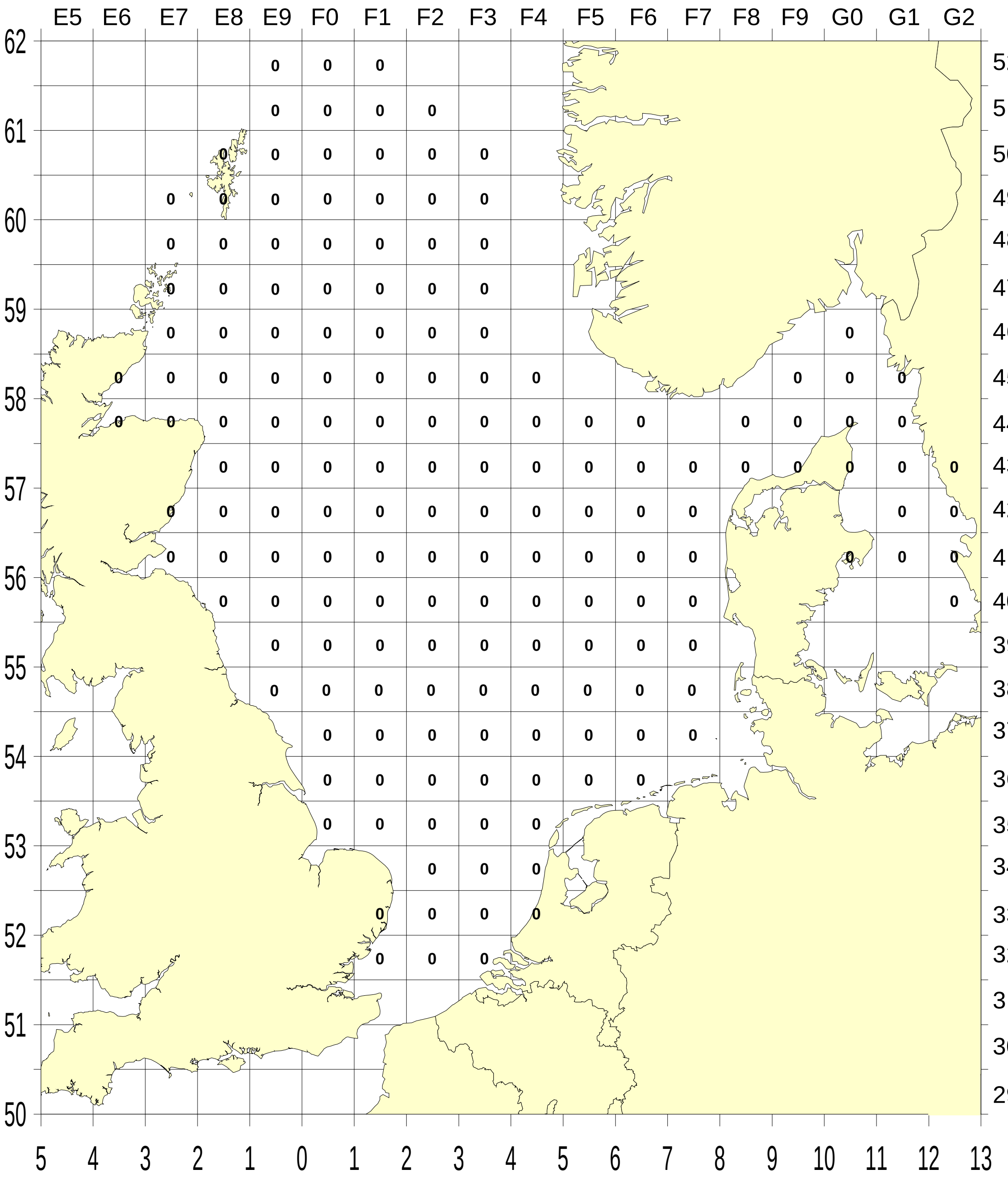


Figure 4.2.7: Plot of mean catch numbers per hour of O-group sprat by rectangle.

4.2.3 Participation in 2006

All the participants of the third quarter 2005 survey have advised that they will be participating fully in the programme in 2006. The timing of the surveys will be broadly in line with recent years except for Norway who will be starting their survey on 1 July and Denmark who will be starting their survey on 25 July, but still covering their allotted areas. Although a staff exchange occurred between UK (Scotland) and UK (England and Wales) in August 2005, due to mechanical failure on board Cefas Endeavour, the opportunity to observe the working practices was not realised. The 2 institutes are still willing to participate in an exchange of staff between their IBTS surveys in 2006 with a member of Cefas joining the quarter 4 IBTS survey in the west of Scotland in November 2006, therefore satisfying recommendations from earlier IBTSWG reports.

4.3 Eastern Atlantic

In 2005 a total of 13 IBTS Groundfish surveys were carried out in the ICES Western and Southern Area of the Eastern Atlantic, with a total of 1,131 valid tows. None of the surveys reported significant loss of time due to bad weather in 2005. The UK, however, reported extensive damage to the GOV A-gear in the Celtic Sea and were forced to revert to their modified Rockhopper gear, although actual loss of tows was minimal.

Ireland ceased fishing all VIIa strata on foot of discussions at IBTS 2005, and transferred those stations to new shelf edge strata (200–600 m) in order to cover more of the monkfish and megrim distributions effectively. Survey effort is now less duplicated in VIIa with partial coverage by Scotland and complete coverage by the UK, and a more comprehensive coverage has been implemented on the Irish west coast relative to target species distribution in the area.

A five days intercalibration was carried out between the IEO Porcupine Survey and the MI IGF Survey which provided 14 valid tows. This is planned again for 2006 which should provide some useful comparative calibration data.

In response to discussions at IBTS 2005 and requests from a number of assessments Working Group members for background information on surveys in relation to catchability and precision a more structured reporting format has been proposed for each survey summary. This includes the percentage of tows completed and lost (due to damage or weather) in each. There is also, where available at short notice this year, estimates of abundance of target species in number and or weight and their associated Relative Standard Errors (RSE). These are reported by survey or stock area depending on what was readily available, but following feed back from the relevant data users this format should be standardised for 2007.

4.3.1 Surveys overview

4.3.2 UK-Scotland

Western Division Bottom Trawl Survey - Quarter 4 2005 (1705S)

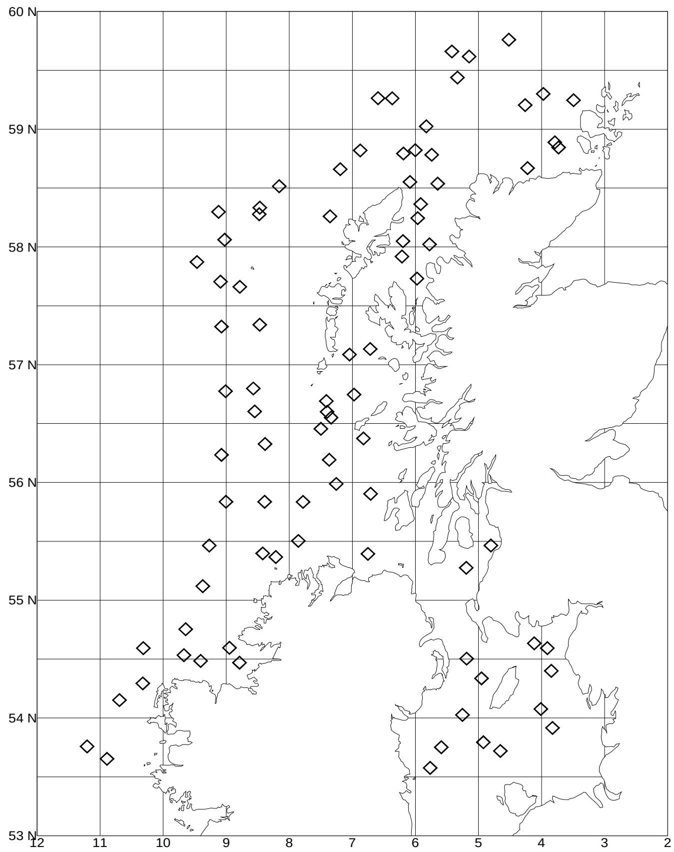
NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	1705S	Dates:	16 November – 7 December 2005

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 and VIIa. Age data was collected for Cod, Haddock, Whiting, Saithe, Herring, Mackerel and Sprat.
Gear details:	GOV with ground gear C for all stations other than those located in the Irish Sea and Clyde areas, where GOV with ground gear A was used.
Notes from survey (e.g. problems, additional work etc.):	Weather conditions were favourable throughout the survey and no survey time was lost as a result. Additional work undertaken included the collection of temperature and salinity data from the seabed and surface at each trawl station, sampling of Herring for presence of viral haemorrhagic septicaemia virus (VHSV), sampling of Cod and Anglerfish to determine levels of specific parasitic fauna and the identification and quantification of all benthic species caught.
Number of fish species recorded and notes on any rare species or unusual catches:	A total of 85 different species were encountered during the survey with a total catch weight of 28,918kgs.

Stations fished (aim to complete 83 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid With rock-hopper	Addit-ional	Invalid	% stations fished	Comments
VIa		GOV - C	65	65	-	4	0	106.15	
VIIa		GOV - A	12	12	-	0	0	100	
VIIb		GOV - C	6	6	-	0	0	100	
	TOTAL		83	83	-	4	0	104.82	

Number of biological samples (maturity and age material, *maturity only):			
Species	Age	Species	Age
Clupea harengus	Na	**Lophius budegassa*	9
Gadus morhua	47	**Lophius piscatorius*	110
Melanogrammus aeglefinus	1455	**Raja brachyura*	13
Merlangius merlangus	962	*Pollachius virens*	48
**Merluccius merluccius*	375	*Scomber scombrus*	Na
**Psetta maxima*	2	**Leucoraja naevus*	65
**Molva molva*	13	**Dipturus batis*	20
**Lepidorhombus whiffiagonis*	186	**Raja clavata*	65
**Trachurus trachurus*	268	**Glyptocephalus cynoglossus*	1
**Scopthalmus aquosus*	4	**Raja montagui*	123



Map of Western Division Bottom Trawl Survey Q4.

West of Scotland Deepwater Survey – 2005 (1205S)

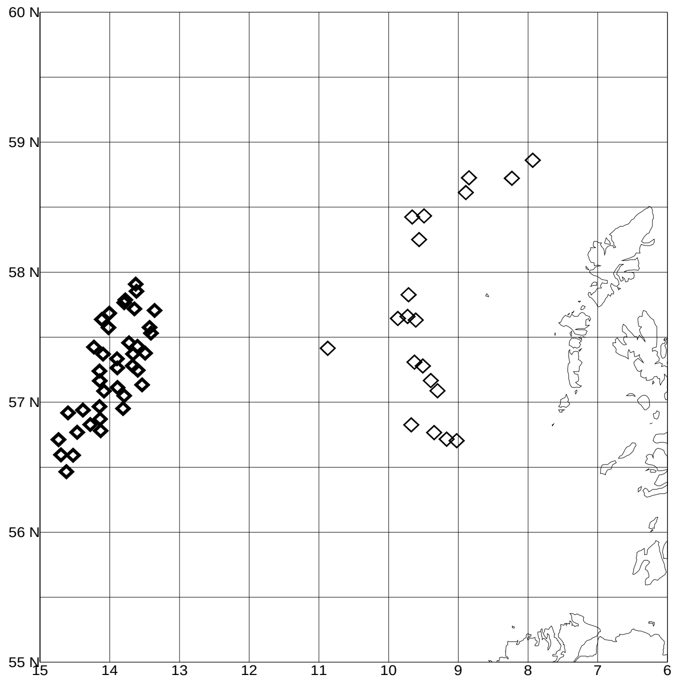
NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	1205S	Dates:	2 – 21 September 2005

Cruise	Q3 Rockall / Shelf Edge 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 the Rockall Bank and Shelf Edge sea areas. Age data was collected for Cod, Haddock, Whiting, Saithe, Norway Pout, Herring and Mackerel.
Gear details:	GOV with ground gear C was used for the Rockall Bank part of the survey and a 'Jackson' Deepwater trawl (BT 184) was used for the Shelf Edge stations.
Notes from survey (e.g. problems, additional work etc.):	Weather was not a significant problem for this survey and only half of a day was lost as a result. Additional work undertaken included the collection of temperature and salinity data from the seabed and surface at each trawl station, evaluation of the NOAA bottom contact sensor and the identification and quantification of all benthic species caught. The occurrence of *Nephrops* was investigated on the Rockall plateau and Shelf Edge using TV sledge and camera drop frame equipment. Observation work was undertaken on the Anton Dohrn seamounts's *Lophelia* beds using camera drop frame equipment. Biological samples and morphometric digital images were collected from key species on the Shelf Edge and seamount areas to investigate the possibility of an isolated and distinct seamount community
Number of fish species recorded and notes on any rare species or unusual catches:	(number of fish species recorded not available) Whiting catches at Rockall are rare, with only 2 fish being caught for the duration of the time series. This year, 22 O-group Whiting were caught at 11 different trawl stations. Another unusual capture not normally associated with Rockall was a solitary 8 year old Herring; a species seen only once before in 1995.

Stations fished (aim to complete 59 valid tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	VALID WITH ROCK-HOPPER	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
Rockall		GOV- C	42	38	-	0	1	92.86	
Shelf Edge		BT 184	17	17	-	4	1	123.53	
	TOTAL		59	55	-	4	2	101.69	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
Species	Age	Species	Age
Clupea harengus	1	**Centroscymnus crepidator*	268
Gadus morhua	6	**Centroscyllium fabricii*	155
Merlangius merlangus	21	**Etmopterus princeps*	77
Merlanogrammus aeglefinus	1174	**Centrophorus sqamosus*	44
**Lepidorhombus whiffiagonis*	159	**Deania calceus*	39
Pollachius virens	1	**Centroscymnus coelolopis*	39
**Raja fullonica*	1	**Lophius piscatorius*	64
Scomber scombrus	Na	**Hexanchus griseus*	2
**Apristurus aphyodes*	9	**Raja batis*	1
**Scymnorhincus licha*	4		



Map showing west of Scotland Deepwater Survey.

Western Division Bottom Trawl Survey – Quarter 1 2005 (0405S)

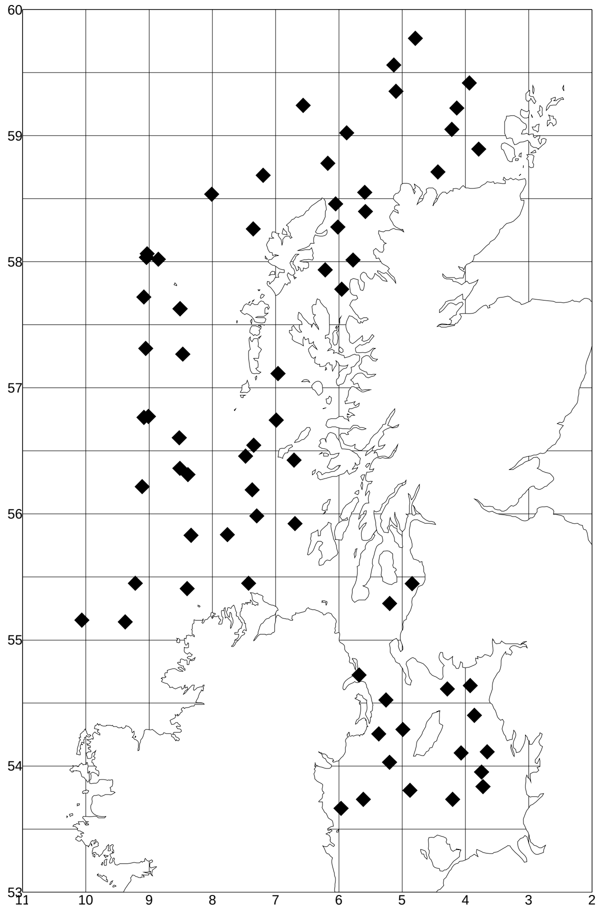
NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	0405S	Dates:	11 – 31 March 2005

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 and VIIa. Age data was collected for Cod, Haddock, Whiting, Saithe, Norway Pout, Herring, Mackerel and Sprat.
Gear details:	GOV with ground gear C.
Notes from survey (e.g. problems, additional work etc.):	Weather was not a significant problem for this survey and only one day was lost as a result. Additional work undertaken included the collection of temperature and salinity data from the seabed and surface at each trawl station, evaluation of the NOAA bottom contact sensor and the identification and quantification of all benthic species caught.
Number of fish species recorded and notes on any rare species or unusual catches:	(not available)

Stations fished (aim to complete 63 valid tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	VALID WITH ROCK-HOPPER	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VI a		GOV- C	47		-	4		108.51	
VIIa		GOV-C	16		-	0		100	
	TOTAL		63	65	-	4	2	106.35	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
Species	Age	Species	Age
Clupea harengus	Na	**Lophius budegassa*	*3*
Gadus morhua	49	**Lophius piscatorius*	*31*
Melanogrammus aeglefinus	1030	*Trisopterus esmarki*	*147*
Merlangius merlangus	789	*Pollachius virens*	*36*
**Merluccius merluccius*	276	*Scomber scombrus*	*Na*
**Psetta maxima*	1	**Leucoraja naevus*	*22*
**Molva molva*	7	**Dipturus batis*	*4*
**Lepidorhombus whiffiagonis*	57	**Raja clavata*	*39*
**Trachurus trachurus*	136	**Glyptocephalus cynoglossus*	*1*
**Scopthalmus aquosus*	2	**Raja montagui*	*45*
**Brosme brosme*	1	**Hippoglossus hippoglossus*	*1*



Map showing Western Division Bottom Trawl Survey Q1.

4.3.3 Ireland

Irish Groundfish Survey Q4 – IGFS05

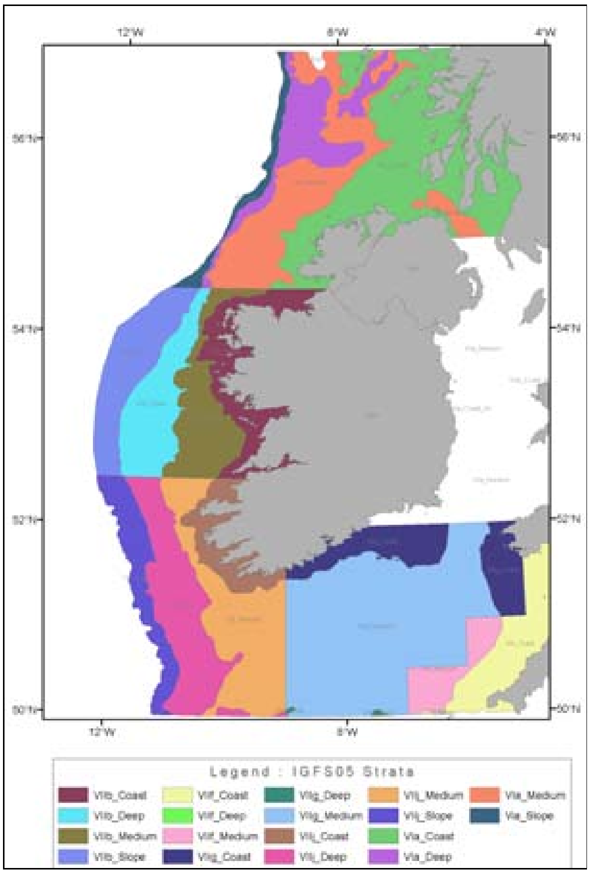
NATION:	IRELAND	VESSEL:	CELTIC EXPLORER
Survey:	IGFS	Dates:	24th October – 28th November

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 similar data 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” and “D” modified to reduce the traditional gap between the footrope and fishing line from 30cm to 10cm (described in SGSTG 2004, IBTS 2005). The D gear was a response severe damage encountered in the first year of the time series (IGFS03) as well as catchability concerns and is adopted throughout Via. The A gear is used throughout the remainder of the survey.
Notes from survey (e.g. problems, additional work etc.):	Gear damage and poor weather, especially in VIIg cost a couple of days, but further loss of time and damage was minimal. Following agreement at IBTS 2005 (see report) effort from VIIa was re-allocated to the shelf edge as an additional strata (200-600m) to better cover distributions of hake, monkfish and megrim. Additional work ongoing includes CTD transects for MI oceanography section, acquisition of multibeam data for seabed and habitat mapping (incl. EU MESH project), various national and international research sample requests.
Number of fish species recorded and notes on any rare species or unusual catches:	In 2005 approximately 94 species of fish and 16 elasmobranch species were encountered. Rarer appearances included *Scomberesox saurus, Brama brama*, *Beryx decadactylus*, *Haoplostethus mediteraneus* and XX.

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

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VIa	All	D	50	32	1	1	64	
VIIb	All	A	38	40	0	0	105	
VIIg	All	A	37	28	0	5	76	
VIIj	All	A	43	40	0	1	93	
	TOTAL		168	140	1	7	83	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
Species	No.	Species	No.
Clupea harengus	190	*Lophius budegassa*	91
Gadus morhua	130	*Lophius piscatorius*	275
Melanogrammus aeglefinus	1357	*Molva molva*	36
Merlangius merlangus	973	*Solea solea*	106
Merluccius merluccius	1350	*Scomber scombrus*	475
Micromesistius poutassou	652	*Trachurus trachurus*	485
Pollachius virens	22	**Raja brachyura*	12
Lepidorhombus whiffiagonis	1017	**Raja clavata*	88
Microstomus kitt	634	**Leucoraja naevus*	148
Pleuronectes platessa	417	**Raja montagui*	209



Map of stratification for Q4 Irish Groundfish Survey.

VARIANCE IN CATCH RATES AND ESTIMATES OF SAMPLING PRECISION						
Species	**Strata**	**Mean No. hr^{-1}**	**RSE**	**Mean Kg hr^{-1}**	**RSE**	**Comments**
Gadus morhua	All	3.31	34.45	2.43	18.19	
Melanogrammus aeglefinus	All	371.83	18.60	44.28	13.26	
Merlangius merlangus	All	267.50	18.18	32.16	18.20	
Merluccius merluccius	All	99.02	36.27	6.19	11.80	
Pollachius virens	All	1.26	10.07	1.15	23.71	
Lepidorhombus whiffiagonis	All	15.65	9.71	1.85	8.18	
Pleuronectes platessa	All	15.08	30.34	2.60	26.09	
Lophius piscatorius	All	2.86	8.31	2.93	9.53	
Solea solea	All	2.41	17.66	0.76	28.24	

4.3.3.1 UK – England

Western Groundfish Survey Q4 – 19/05

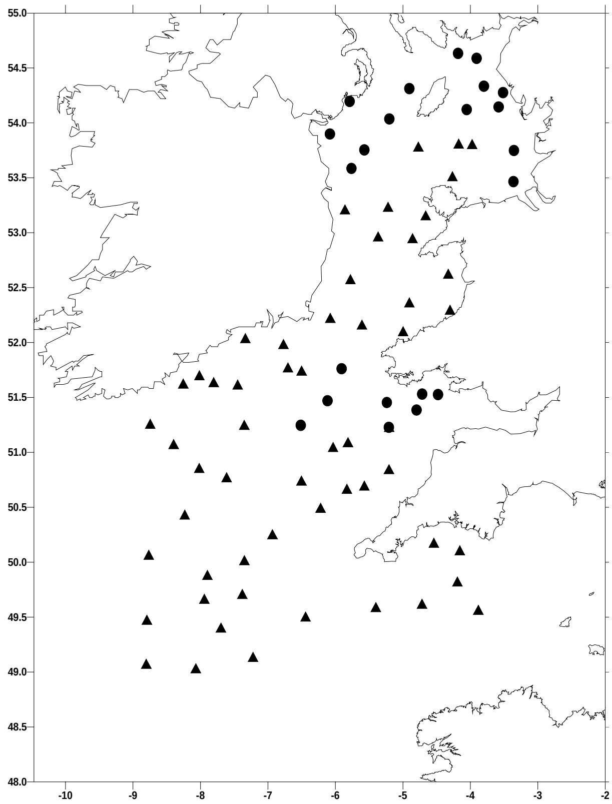
NATION:	UK (ENGLAND AND WALES)	VESSEL:	CEFAS ENDEAVOUR
Survey:	19/05	Dates:	13 November – 13 December 2005

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 and whiting, with data also collected for other demersal fish (e.g. anglerfish, megrim, plaice) and pelagic fish (herring and mackerel). Data on the distribution and relative abundance of non-target fish and benthic bycatch are also recorded.
Sampling design	Sampling is undertaken over a fixed grid, with prime station numbers identified with an alpha-numeric code, reflecting the various strata surveyed.
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 (extra floats instead of kite and toggle chains set to 10 cm)
Notes from survey (e.g. problems, additional work etc.):	After major damage to GOV trawls with ground gear A in the Celtic Sea, the survey reverted to the modified GOV with rockhopper ground gear. Fishing operations were not unduly delayed by weather, despite poor weather conditions. Additional work undertaken included grab sampling at some trawl stations, epibenthic sampling (with 2m-beam trawl) in the Celtic Sea, and tagging of various species of dogfish. One comparative tow was made with RV "Thalassa" (UK station 98, prime E13).
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 84 species of fish were recorded during the survey. Unusual fish species caught included individual specimens of allis shad *Alosa alosa* and twaite shad *Alosa fallax*. One specimen of river lamprey *Lampetra fluviatilis* was recorded in the eastern Irish Sea. A large catch of mature female spurdog *Squalus acanthias* was made off the Lleyn Peninsula.

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

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	Comments
VII a	A-B	Standard	9	8	-	1	1	89	
	C	Standard	4	4	-	0	0	100	
	H	Rockhopper	15	15	-	1	0	100	
VII e-h	D-E	Standard	19	6	13	0	1	100	Reverted to rockhopper
	F	Standard	15	0	15	0	0	100	Reverted to rockhopper
	G	Rockhopper	10	12	-	0	0	120	
	TOTAL		72	45	28	2	2	100	

Number of biological samples (maturity and age material, *maturity only):			
Species	Age	Species	Age
Clupea harengus	225	*Lophius budegassa*	5
Gadus morhua	131	*Lophius piscatorius*	37
Melanogrammus aeglefinus	603	*Dicentrarchus labrax*	89
Merlangius merlangus	625	*Mullus surmuletus*	11
Merluccius merluccius	266	*Scomber scombrus*	137
Psetta maxima	7	**Leucoraja naevus*	9
Scophthalmus rhombus	5	**Raja brachyura*	8
Lepidorhombus whiffiagonis	97	**Raja clavata*	210
Microstomus kitt	131	**Raja microocellata*	120
Pleuronectes platessa	651	**Raja montagui*	71
Solea solea	129		



Map of survey area indicating stations fished with GOV with ground gear A (●) and modified GOV with rockhopper ground gear (▲).

Variance in catch rates of commercial stocks						
Species/stock	Stock area	Area surveyed	Gear	Valid tows	Mean catch (no.h-1)	RSE
G. morhua	VII a	VII a	A	12	15.3	72.0
			D	15	3.1	55.4
	VII e-k	VII e-h	A	6	2.1	53.1
			D	38	1.4	24.7
M. aeglefinus	VII a	VII a	A	12	380.1	65.5
			D	15	146.5	56.7
	VII e-k	VII e-h	A	6	231.6	99.1
			D	38	724.1	45.1
M. merlangus	VII a	VII a	A	12	4043.3	26.6
			D	15	694.5	38.1
	VII e-k	VII e-h	A	6	2710.9	44.0
			D	38	397.8	54.8
M. merluccius	North	VIIa, e-h	A	18	4.2	45.7
			D	53	54.6	30.5
L. piscatorius	VIIb-k, VIIIa,b	VII e-h	A	6	5.0	52.4
			D	38	0.7	29.7
S. acanthias	NE Atlantic	VIIa, e-h	A	18	3.5	54.8
			D	53	41.8	94.3

Notes:

- **Two stations off south-eastern Ireland that are at the southern edge of VIIa were included within VII e-h**
- **Due to gear damage to the standard GOV during the 2005 survey, fewer stations than hoped were fished with ground gear A**
- **The high RSE of spurdog is influenced by one exceptionally large catch.**

4.3.4 France

EVHOE Groundfish Survey Q4 – EVHOE2005

NATION:	FRANCE	VESSEL:	THALASSA
Survey:	EVHOE 2005	Dates:	20 October – 6 December 2005

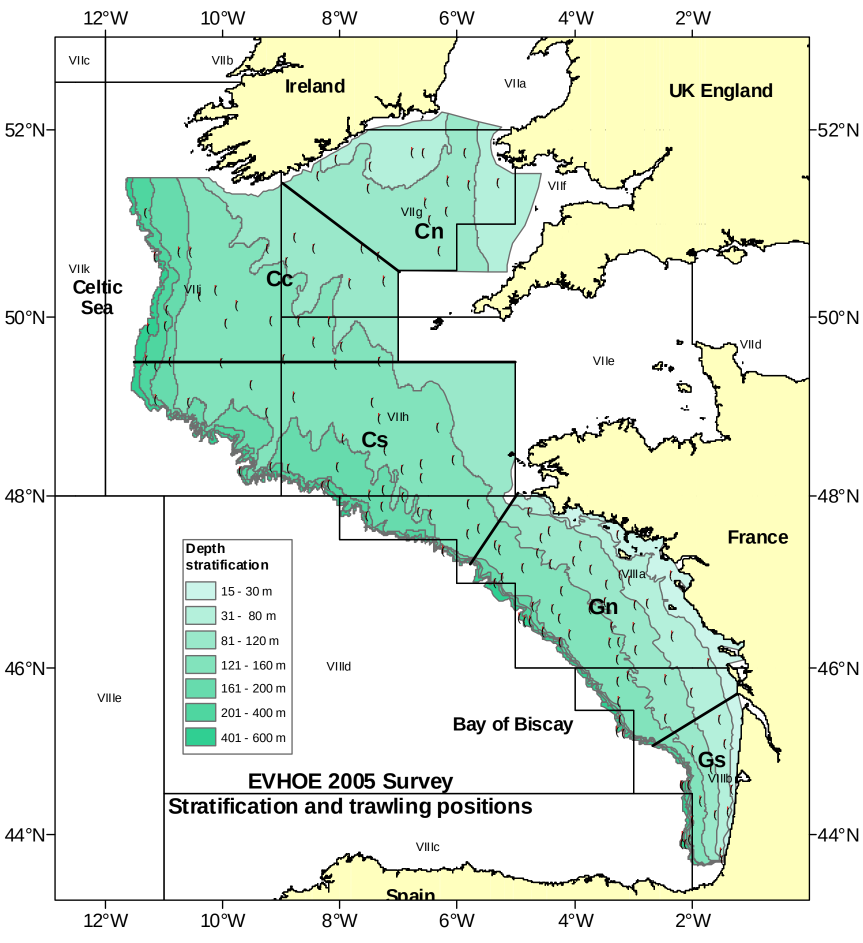
Cruise	EVHOE Groundfish survey aims to collect data on the distribution and relative abundance, and biological information of all fish and selected commercial invertebrates in subareas VIIf-j VIIIa,b. The primary species are hake, monkfishes, anglerfishes, megrim, cod, haddock and whiting, with data 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.):	92% of the initial program was achieved. Due National defence restrictions some modification to the initial sampling program had to be made but this will have no effect on the results.
Number of fish species recorded and notes on any rare species or unusual catches:	148 species encountered. Unusual catches of *Entelurus aequoreus* in the Celtic Sea.

Stations fished

ICES DIVISIONS	STRATA	TOWS PLANNED	VALID	ADDITIONAL	% STATIONS FISHED	COMMENTS
VII	Cc3	9	7		78%	
	Cc4	20	13		65%	
	Cc5	3	2		67%	
	Cc6	3	3		100%	
	Cc7	2	2		100%	
	Cn2	7	5		71%	
	Cn3	7	7	2	100%	
	Cs4	20	20		100%	
	Cs5	10	10		100%	
	Cs6	3	3		100%	
	Cs7	2	2		100%	
VIII	Gn1	3	3		100%	
	Gn2	4	4		100%	
	Gn3	16	16		100%	
	Gn4	21	19		90%	
	Gn5	3	3		100%	
	Gn6	2	2		100%	
	Gn7	2	2		100%	
	Gs1	3	3		100%	
	Gs2	3	3		100%	
	Gs3	3	3		100%	
	Gs4	3	3		100%	
	Gs5	2	2		100%	

	Gs6	2	2		100%	
	Gs7	2	2		100%	
TOTAL		155	141	2	91%	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *AGE ONLY):			
Species	Age	Species	Age
Merluccius merluccius	964*	*Lophius budegassa*	134*
Gadus morhua	33	*Lophius piscatorius*	245*
Melanogrammus aeglefinus	395	*Solea solea*	92*
Merlangius merlangus	488	*Pleuronectes platessa*	27*
Lepidorhombus whiffiagonis	381*		



Map showing stratification for EVEHOE Survey

SPECIES	AREA	VALID TOWS	KG/SET	RSE	NB/SET	RSE	COMMENTS
Merluccius merluccius	Cn, Cc, Cs, Gn, Gs	143	5.35	6.2%	65.91	10.3%	
Merlangius merlangius	Cn, Cc, Cs	76	7.51	28.1%	76.00	37.6%	
Melanogrammus aeglefinus	Cn, Cc, Cs	76	15.30	29.7%	155.98	43.4%	
Gadus morhua	Cn, Cc, Cs	76	1.32	38.6%	0.42	28.66%	
Lepidorhombus whiffiagonnis	Cn, Cc, Cs, Gn, Gs	143	1.42	8.5%	10.3	10.8%	
Lophius budegassa	Cn, Cc, Cs, Gn, Gs	143	0.51	19.6%	1.02	10.8%	
Lophius piscatorius	Cn, Cc, Cs, Gn, Gs	143	2.93	15.0%	2.16	13.9%	
Scomber scombrus	Cn, Cc, Cs, Gn, Gs	143	20.49	48.5%	116.69	38.3%	
Tcrachurus trachurus	Cn, Cc, Cs, Gn, Gs	143	119.69	27.4%	2885.4	20.2%	
Scylorhinus canicula	Cn, Cc, Cs, Gn, Gs	143	8.09	23.0%	28.02	28.9%	
Leucoraja naevus	Cn, Cc, Cs, Gn, Gs	143	1.26	13.5%	1.51	13.9%	
Raja clavata	Cn, Cc, Cs, Gn, Gs	143	0.84	60.7%	0.33	48.5%	
Nephrops norvegicus	Cn, Cc, Cs	76	1.59	36.5%	58.42	42.0%	
Nephrops norvegicus	Gn, Gs	67	0.33	30.3%	17.69	34.4%	

The Channel Groundfish Survey - CGFS

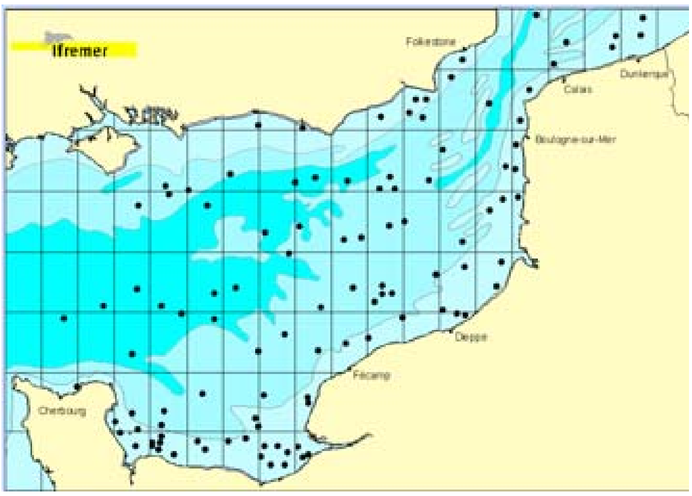
NATION:	FRANCE	VESSEL:	GWEN DREZ
Survey:	CGFS	Dates:	2 October – 31 0ctober 2005

Cruise	Channel Ground Fish Survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in VIId. Main species are cod, whiting, red gurnard, red mullet and plaice with data also collected for all other demersal and pelagic fish (mackerel). This survey is carried out every year since 1986. The Eastern Channel and the southern part of the North sea (Divisions VIId and IVc4) are divided in 15' latitude and 15' longitude squares. In each square, the same hauls (two in coastal waters and one offshore) are fished every year. The haul duration is 30 minutes; temperature and salinity are recorded during each haul.
Gear details:	A GOV 19,70/25,90 bottom trawl with a 20mm mesh size double codend was used.
Notes from survey (e.g. problems, additional work etc.):	109 hauls were made during this survey. Temperature and salinity were also recorded at each haul. Additional work : A French-English Interreg III-A project has been achieved in 2005 called CHARM (Eastern Channel Habitat Atlas for Marine Resource Management). The objective of this project was characterizing main species habitats in the Eastern Channel and particularly in the strait of Dover. Main results of this European project are available: http://charm.canterbury.ac.uk
Number of fish species recorded and notes on any rare species or unusual catches:	Overall 69 species were recorded during this survey. No rare species were caught during this survey.

Stations fished (aim to complete 118 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	Comments
VIId		GOV	118	107			2		

Number of biological samples (maturity and age material, *maturity only):			
Species	Age	Species	Age
Mullus surmuletus	191	*Gadus morhua*	27
Merlangius merlangus	418	*Pleuronnectes Platessa*	510



Map showing the Channel Groundfish Survey.

4.3.5 Spain

The Porcupine Groundfish Survey Q3 – P05

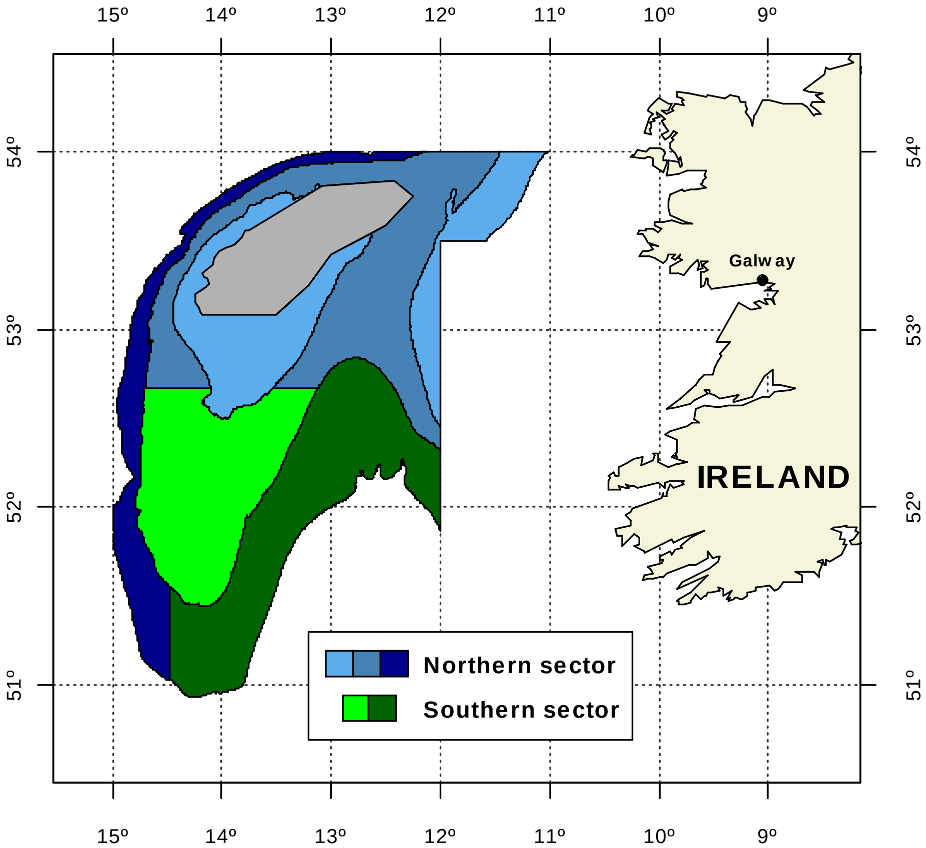
NATION:	SP (SPAIN)	VESSEL:	VIZCONDE DE EZA
Survey:	P05	Dates:	3 September – 3 October 2005

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, and 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. 14 paired hauls with the Celtic Explorer were carried out during the survey starting a data series that will allow exploring intercalibration. Due to bad weather conditions stations number was reduced from 80 planned to 76 valid.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 86 species of fish were recorded during the survey.

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

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	VALID WITH ROCK-HOPPER	ADDIT-IONAL	INVALID	% STATIONS FISHED	COMMENTS
VIIb-k	All	Porcupine baca 39/52	80	76	-	2	5	95%	Also available by depth and geographical strata
	TOTAL		80	76	-	2	5	95%	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
Species	Age	Species	Age
Merluccius merluccius	1003	*Lepidorhombus boscii*	341
Lepidorhombus whiffiagonis	643	*Lophius budegassa*	18
Lophius piscatorius	129	*Scomber scombrus*	77



Map of stratification scheme for Porcupine Survey.

Variance in catch rates and estimates of sampling precision							
Species	Strata	Valid tows	M catch Kg/.5h	RSE	M catch no./.5h	RSE	Comments
Merluccius merluccius	All	76	11.80	10.49	23.20	18.26	
Lepidorhombus whiffiagonis	All	76	8.28	13.21	170.17	15.51	
Lepidorhombus boscii	All	76	7.10	14.16	93.94	16.36	
Lophius budegassa	All	76	0.51	32.80	0.24	29.07	
Lophius piscatorius	All	76	8.56	10.55	2.55	9.74	
Micromesistius poutassou	All	76	310.2	11.7	4516.1	14.7	
Nephrops norvegicus	All	76	0.45	27.53	6.97	25.88	

Spanish North Coast Survey – N05

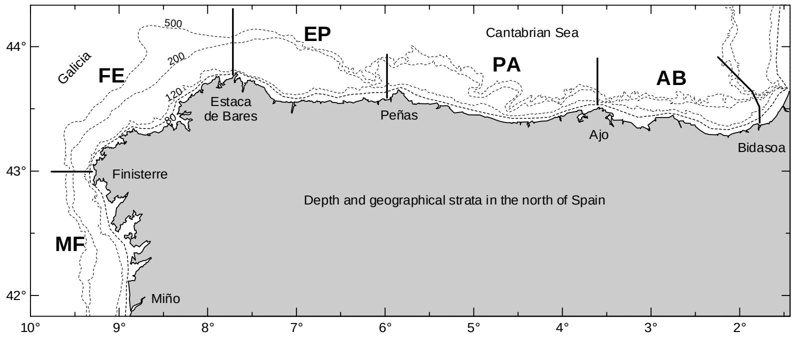
Nation:	SP (Spain)	Vessel:	Cornide de Saavedra
Survey:	N05	Dates:	17 September – 20 October 2005

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. Three additional hauls were done to cover shallow stations between 30 and 70 m, and another 8 hauls to sample deeper stations between 500 and 700 m.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 92 species of fish were recorded during the survey.

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

ICES Divisions	Strata	Gear	Tows planned	Valid	Addit-ional	Invalid	% stations fished	Comments
VIIIc-IXa	All	Standard baca	116	116	11	0	100	Also available by depth and geographical strata
	TOTAL		116	116	11	0	100	

Number of biological samples (maturity and age material, *maturity only):			
Species	Age	Species	Age
Merluccius merluccius	N/A		
Lepidorhombus whiffiagonis	N/A		
Lepidorhombus boscii	N/A		
Lophius budegassa	N/A		
Lophius piscatorius	N/A		
Trachurus trachurus	N/A		
Micromesistius poutassou	N/A		
Scomber scombrus	N/A		



Map of Stratification for North of Spain Survey.

VARIANCE IN CATCH RATES AND ESTIMATES OF SAMPLING PRECISION??????????						
Species	**Strata**	**Valid tows**	**Mean catch (kg/.5h)**	**SD**	**RSE**	**Comments**
Merluccius merluccius	All	116	6.455	0.532	8.242	
Merluccius merluccius	All	116	344.8	32.17	9.33	
Lepidorhombus whiffiagonis	All	116	1.29	0.21	16.50	
Lepidorhombus whiffiagonis	All	116	9.76	1.73	17.70	
Lepidorhombus boscii	All	116	3.84	0.41	10.65	
Lepidorhombus boscii	All	116	62.92	6.16	9.79	
Lophius budegassa	All	116	0.64	0.20	30.37	
Lophius budegassa	All	116	1.62	0.30	18.61	
Lophius piscatorius	All	116	3.05	0.54	17.62	
Lophius piscatorius	All	116	2.04	0.19	9.10	
Nephrops norvegicus	All	116	0.03	0.01	38.26	
Nephrops norvegicus	All	116	0.84	0.46	54.30	
Micromesistius poutassou	All	116	69.94	10.57	15.11	
Micromesistius poutassou	All	116	2564.3	492.9	19.2	
Trachurus trachurus	All	116	22.01	5.60	25.46	
Trachurus trachurus	All	116	893.3	605.5	67.8	

Spanish Gulf of Cadiz Bottom Trawl Survey – GC05

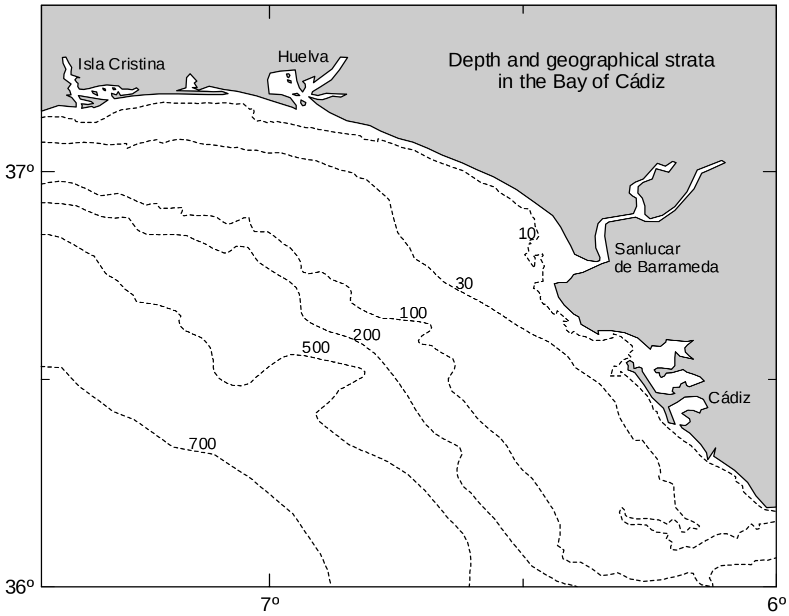
NATION:	SP (SPAIN)	VESSEL:	CORNIDE DE SAAVEDRA
Survey:	GC05	Dates:	4 – 17 November 2005

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 25 additional CTD stations apart from one at every trawl stations.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 136 species of fish, 42 of crustacean and 40 of mollusca were recorded during the survey.

Stations fished (aims: to complete 42 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	Comments
IXa	All	Standard baca 36/40	42	42	-	-	-	100%	Also available by depth
	TOTAL		42	42	-	-	-	100%	

Number of biological samples (maturity and age material, *maturity only):			
Species	Age	Species	Age
Merluccius merluccius	372	*Loligi vulgaris**	314
*Parapenaeus longirostris**	1129	*Loligo forbesi**	272
*Octopus vulgaris**	586	*Sepia officinalis**	228
*Eledone moschat**	322		



Map showing stratification for Gulf of Cadiz Survey.

Variance in catch rates and estimates of sampling precision							
Species	Strata	Valid tows	M catch Kg/hour	RSE	M catch no./hour	RSE	Comments
Merluccius merluccius	ALL	42	6.68	0.20	120	4.85	
Micromesistius poutassou	ALL	42	5.3	0.31	107	7.1	
Nephrops norvegicus	ALL	42	0.74	0.039	28	1.7	
Parapenaeus longirostris	ALL	42	0.79	0.037	172	7.7	
Octopus vulgaris	ALL	42	7.56	0.23	19	0.79	
Loligo vulgaris	ALL	42	1.77	0.09	8	0.41	
Sepia officinalis	ALL	42	2.44	0.09	6	0.21	

4.3.6 Portugal

Winter Groundfish Survey – Winter 2005

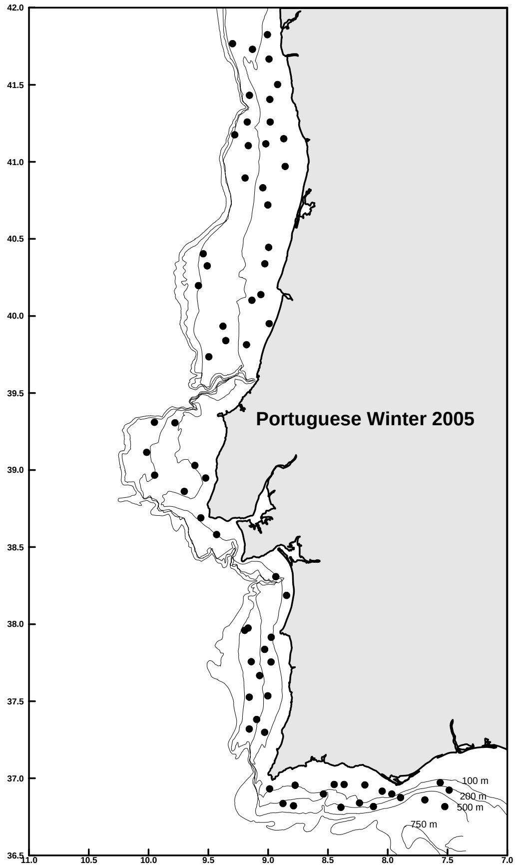
NATION:	PORTUGAL	VESSEL:	NORUEGA
Survey:	Winter 2005	Dates:	2 March – 31 March 2005

Cruise	Winter Groundfish survey aims to: (i) to estimate distribution and abundance of hake in spawning season, (ii) to estimate indices of abundance and biomass of the most important commercial species, (iii)to estimate biological parameters, maturity, sex-ratio, weight, food habits, (iv) to estimate the 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, 50 at fixed (grid) positions and 25 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 was 2.5 m. Codend mesh size 20 mm.
Notes from survey (e.g. problems, additional work etc.):	6 hauls were conducted with the NCT gear due to a long time taken to repair damage in the CAR fishing net.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 113 species of fish, 16 of cephalopods and 28 of crustaceans were recorded during the survey.

Stations fished (aim to complete 75 tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	INVALID	% STATIONS FISHED	COMMENTS
IXa	ALL	CAR	75	70	2	93	

NUMBER OF BIOLOGICAL SAMPLES		
Species	Samples	Otoliths
Merluccius merluccius	66	1541
Trachurus trachurus	52	479
Micromesistius poutassou	12	213
Scomber japonicus	19	*185*
Scomber scombrus	39	*200*
Lophius budegassa	7	*na*
Lophius piscatorius	6	*na*
Lepidorhombus whiffiagonis	4	*na*
Lepidorhombus boscii	30	*na*
Nephrops norvegicus	8	



Map showing Portuguese Winter Groundfish Survey hauls positions

VARIANCE IN CATCH RATES AND ESTIMATES OF SAMPLING PRECISION							
Species	Strata	Valid tows	Mean catch n/hour	RSE	Mean catch kg/hour	RSE	Comments
Merluccius merluccius	ALL	70	350.1	11.3	16.1	11.0	
Trachurus trachurus	ALL	70	492.0	34.9	13.2	20.6	
Micromesistius poutassou	ALL	70	861.6	61.3	51.2	60.9	
Scomber japonicus	ALL	70	42.0	40.5	4.0	36.8	
Scomber scombrus	ALL	70	57.0	39.5	11.1	42.8	
Lophius budegassa	ALL	70	0.1	37.4	0.5	43.1	8 ind. caught
Lophius piscatorius	ALL	70	0.2	42.4	0.3	47.4	11 ind. caught
Lepidorhombus whiffiagonis	ALL	70	0.1	48.1	0.0	55.5	5 ind. caught
Lepidorhombus boscii	ALL	70	7.9	11.0	0.6	14.9	
Nephrops norvegicus	ALL	70	3.3	71.5	0.1	61.5	

RSE is defined as: 100% × standard error / estimate (Jessen, 1978).

Autumn Groundfish Survey – autumn 2005

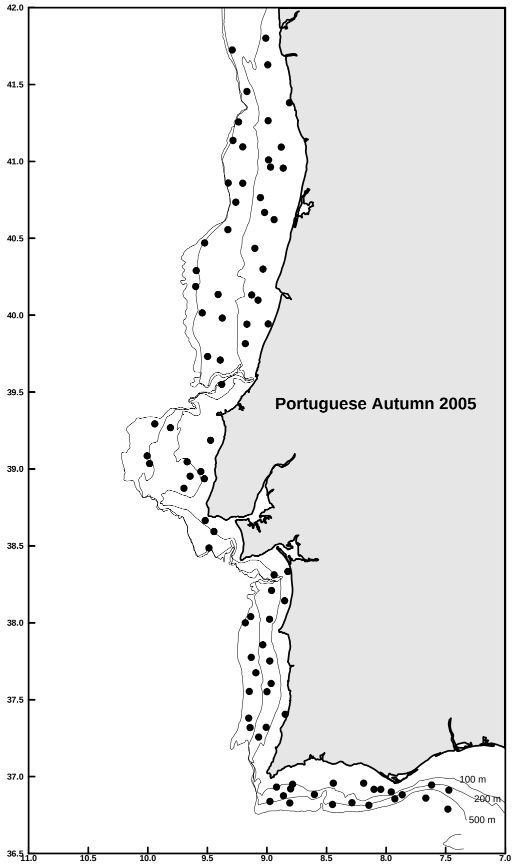
NATION:	PORTUGAL	VESSEL:	NORUEGA
Survey:	Autumn 2005	Dates:	6 October – 6 November 2005

Cruise	Autumn Groundfish survey aims (i) to estimate the abundance and distribution of hake and horse mackerel recruits, (ii) to estimate indices of abundance and biomass of the most important commercial species (iii) to estimate biological parameters, e.g. maturity, ages, sex-ratio, weight, food habits. 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	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 was 14.7 m and the mean vertical opening was 4.4 m. Codend mesh size 20 mm.
Notes from survey (e.g. problems, additional work etc.):	Temperature was recorded with a TDR (Temperature Depth Record) device in the first part of the survey. In the second part CTD (Conductivity, Temperature, and Depth) equipment was available to be used.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 103 species of fish, 17 of cephalopods and 23 of crustaceans were recorded during the survey.

Stations fished

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	INVALID	% STATIONS FISHED	COMMENTS
IXa	all	NCT	96	89	4	93	Bad weather second part

NUMBER OF BIOLOGICAL SAMPLES		
Species	Samples	Otoliths
Merluccius merluccius	81	1007
Trachurus trachurus	61	630
Micromesistius poutassou	43	408
Scomber japonicus	*37*	**207**
Scomber scombrus	46	**250**
Lophius budegassa	1	1
Lophius piscatorius	2	2
Lepidorhombus whiffiagonis	1	1
Lepidorhombus boscii	12	12
Nephrops norvegicus	19	



Map showing Portuguese Autumn Groundfish Survey hauls positions

VARIANCE IN CATCH RATES AND ESTIMATES OF SAMPLING PRECISION							
Species	Strata	Valid tows	Mean catch n/hour	RSE	Mean catch kg/hour	RSE	Comments
Merluccius merluccius	ALL	89	213.7	11.0	18.9	10.1	
Trachurus trachurus	ALL	89	2234.0	18.4	49.0	16.7	
Micromesistius poutassou	ALL	89	1217.5	40.5	78.9	52.6	
Scomber japonicus	ALL	89	60.9	60.1	3.9	50.1	
Scomber scombrus	ALL	89	77.2	28.7	3.4	25.3	
Lophius budegassa	ALL	89	0.015	57.7	0.00	57.7	1 ind. caught
Lophius piscatorius	ALL	89	0.05	61.7	0.13	62.6	2 ind. caught
Lepidorhombus whiffiagonis	ALL	89	0.03	75.6	0.07	75.6	1 ind. caught
Lepidorhombus boscii	ALL	89	0.6	35.3	0.05	40.9	
Nephrops norvegicus	ALL	89	0.5	13.3	0.02	14.0	

4.3.7 Maps of species distribution

Although differences in catchability cannot at present be corrected by use of calibration/conversion factors, raw numbers per hour are provided. The main target species are presented using a length split to indicate approximate pre- and post-recruit abundance.

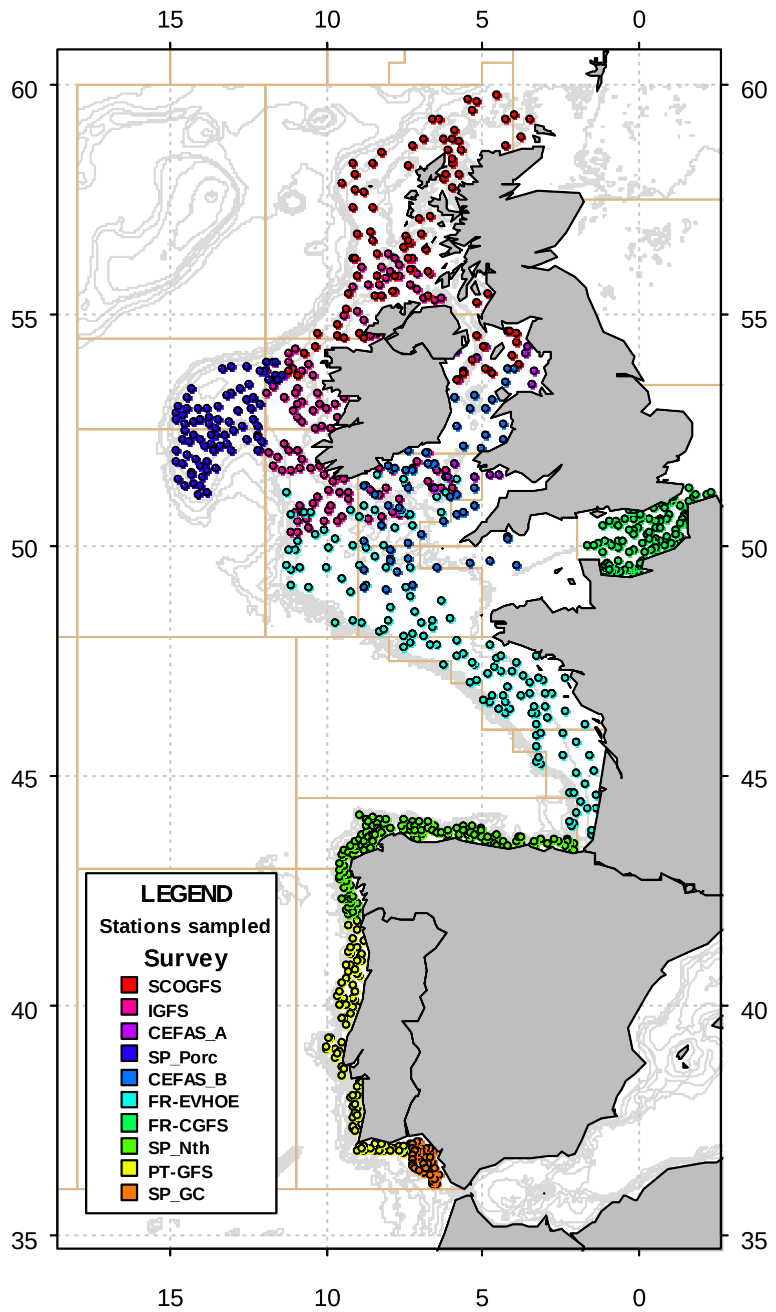


Figure 4.3.2.1: Station positions for the IBTS Surveys carried out in the Western and Southern Area in the autumn/winter of 2005.

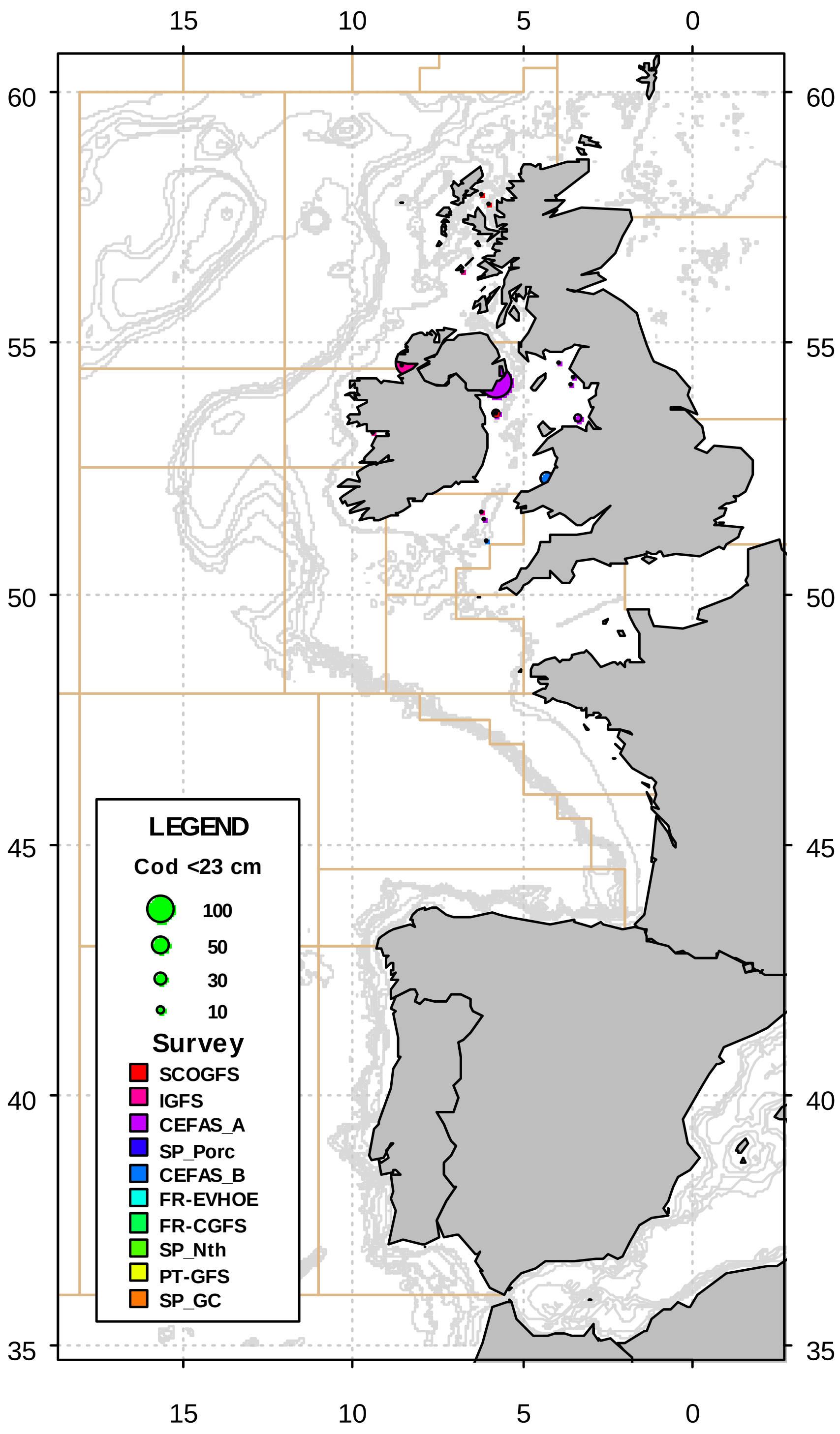


Figure 4.3.2.2: Catches in numbers per hour of 0-group Cod, *Gadus morhua* (<23cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

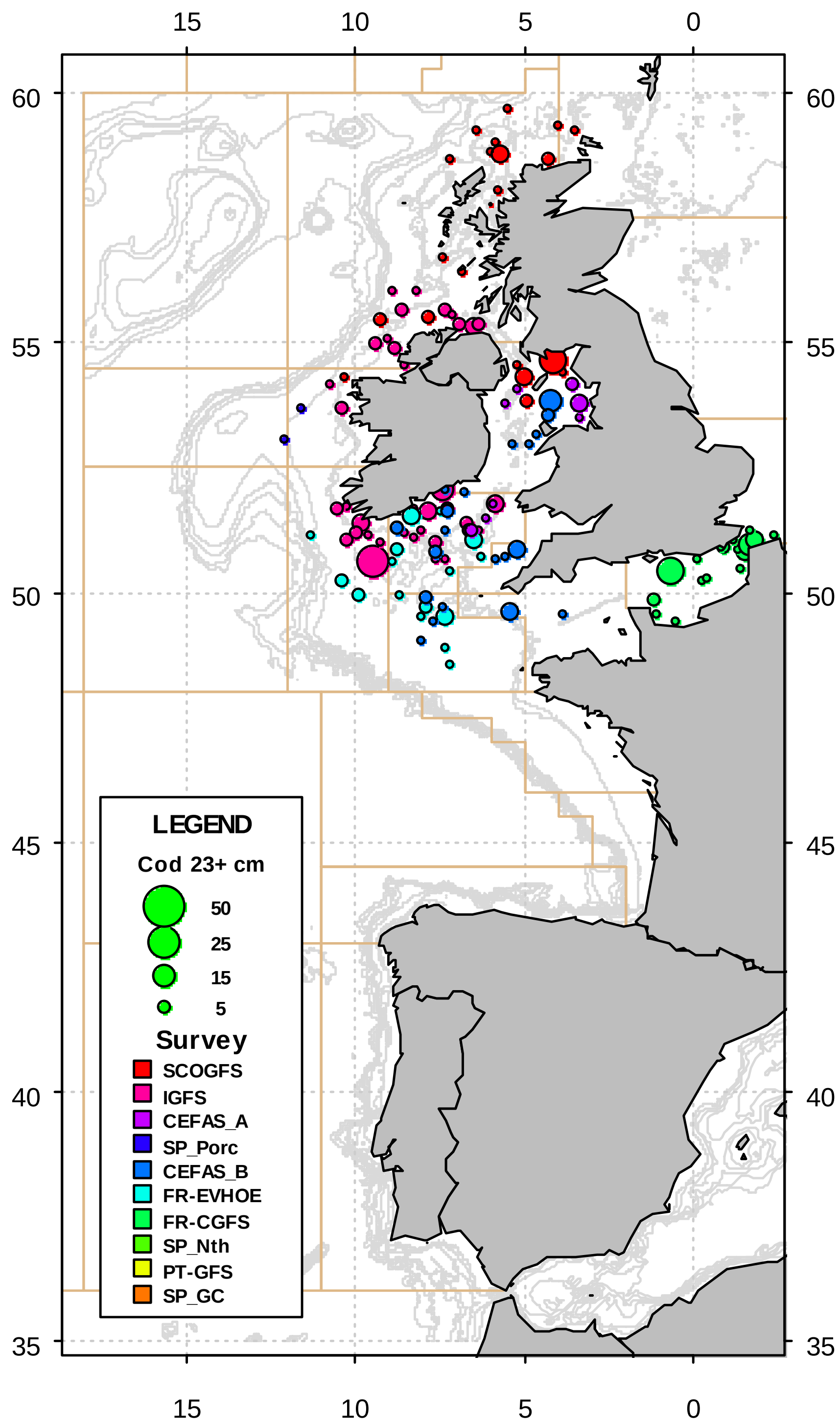


Figure 4.3.2.3: Catches in numbers per hour of 1+ cod, *Gadus morhua* (≥23cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

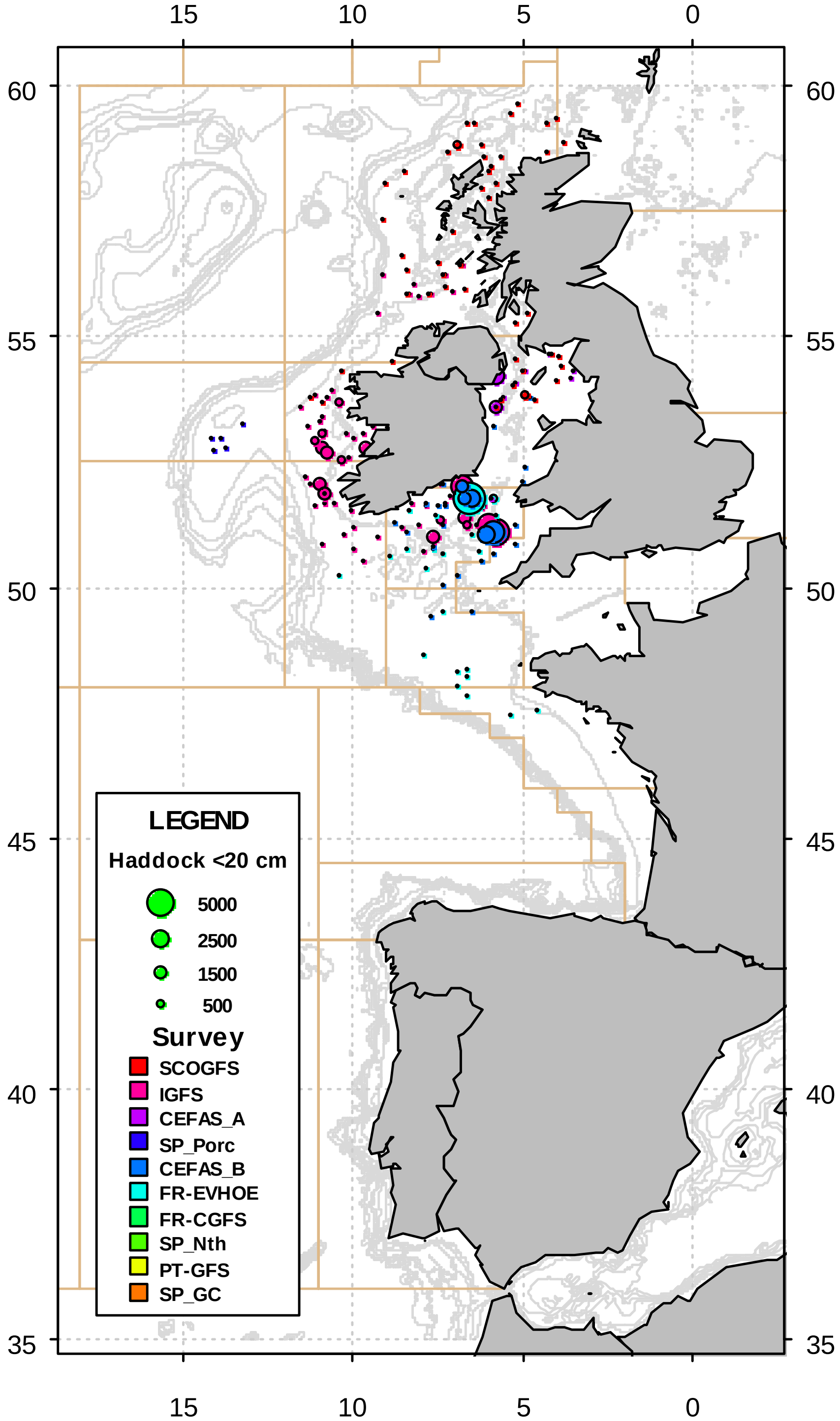


Figure 4.3.2.4: Catches in numbers per hour of 0-group haddock, *Melanogrammus aeglefinus* (<20cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

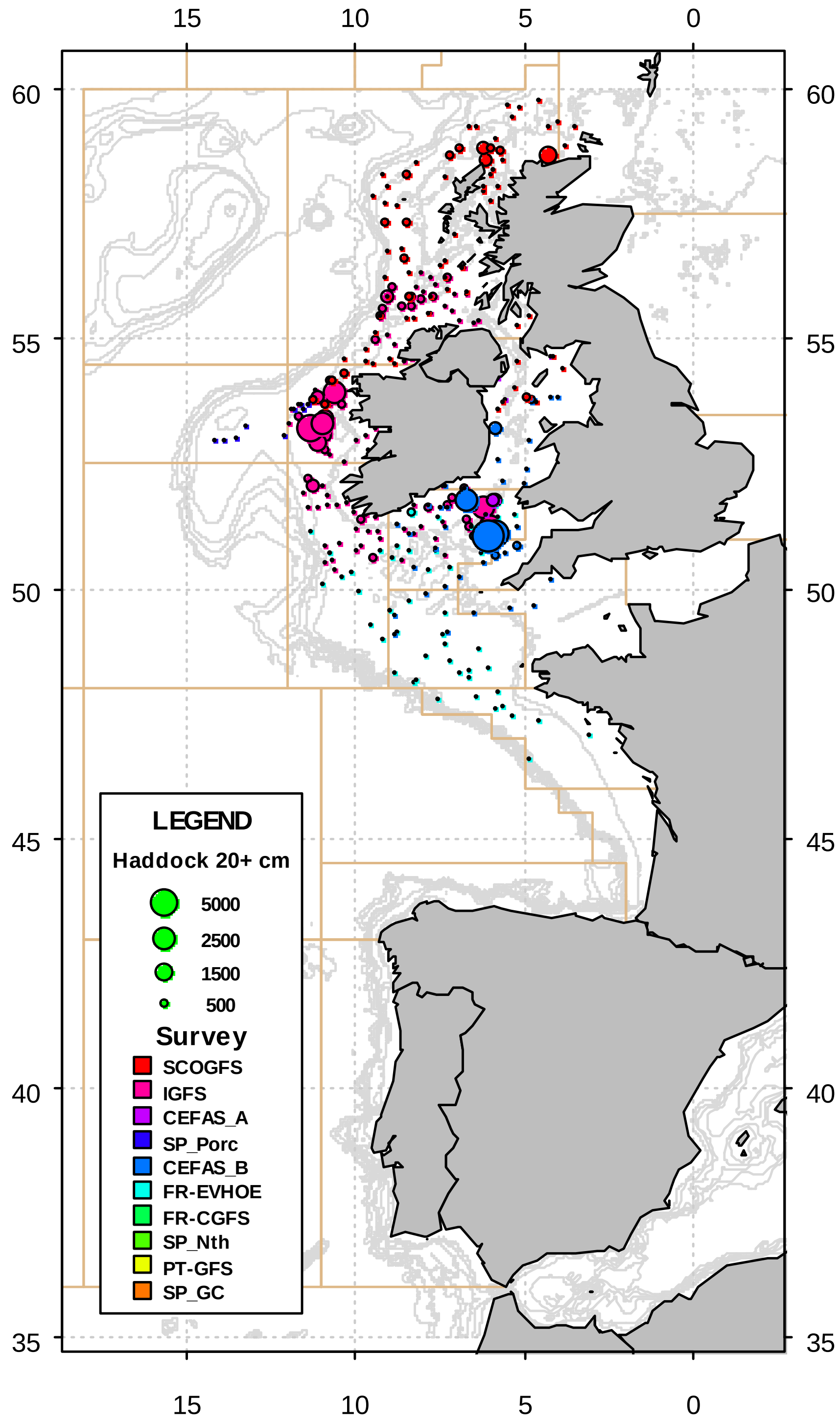


Figure 4.3.2.5: Catches in numbers per hour of 1+ group haddock, *Melanogrammus aeglefinus* (≥20cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

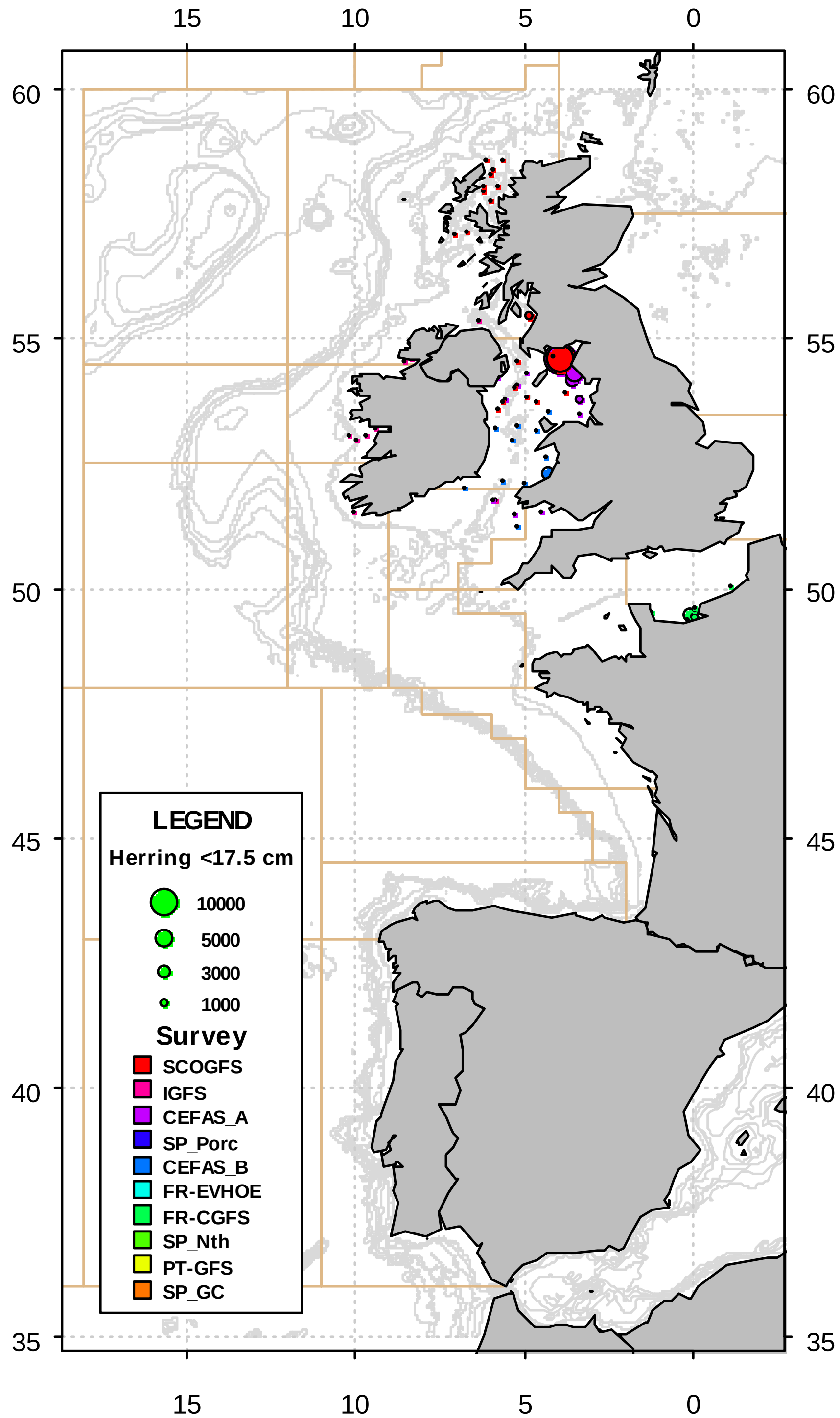


Figure 4.3.2.6: Catches in numbers per hour of 0-group herring, *Clupea harengus* (<17.5 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

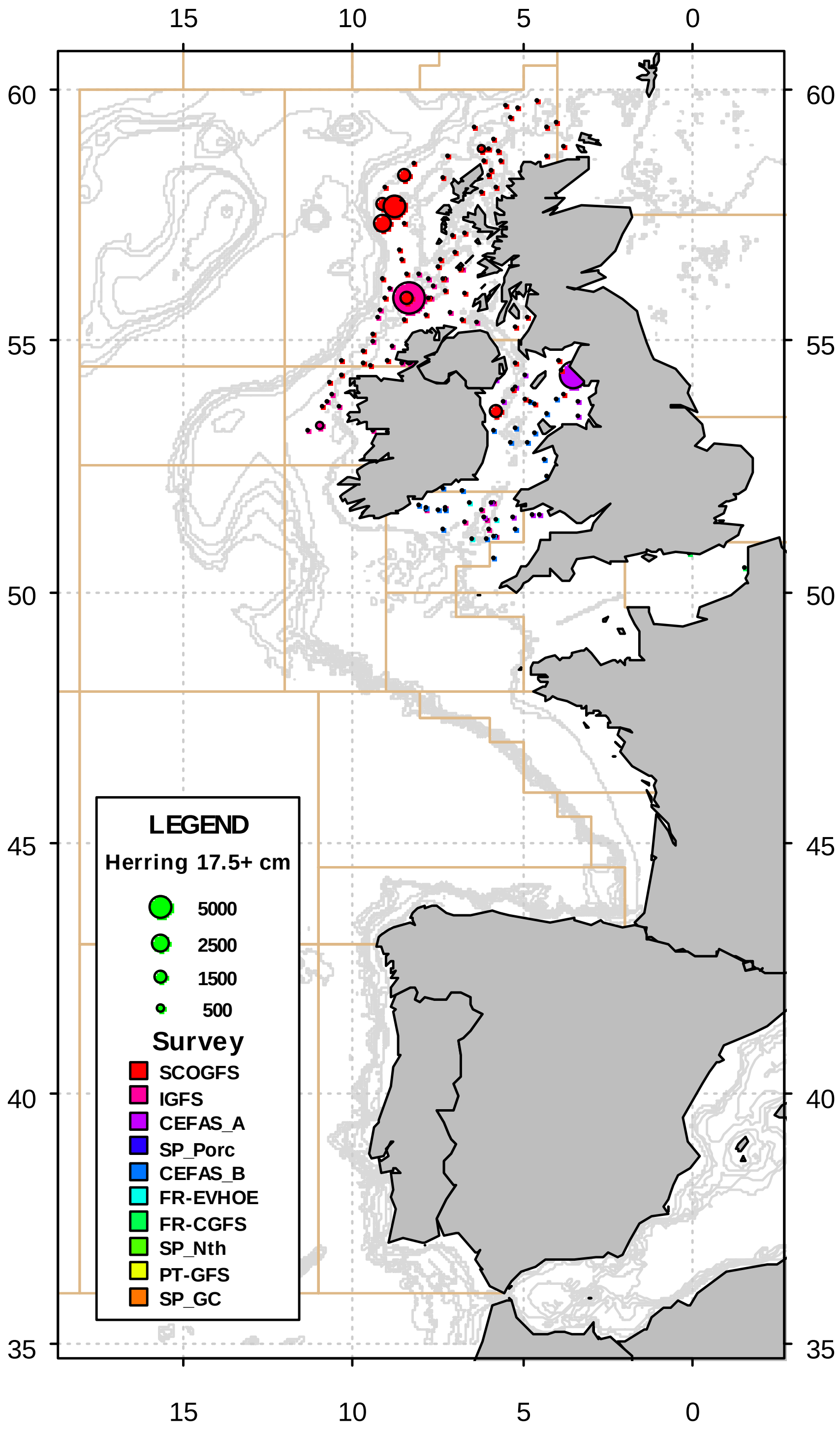


Figure 4.3.2.7: Catches in numbers per hour of 1+ group herring, *Clupea harengus* (≥17.5 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

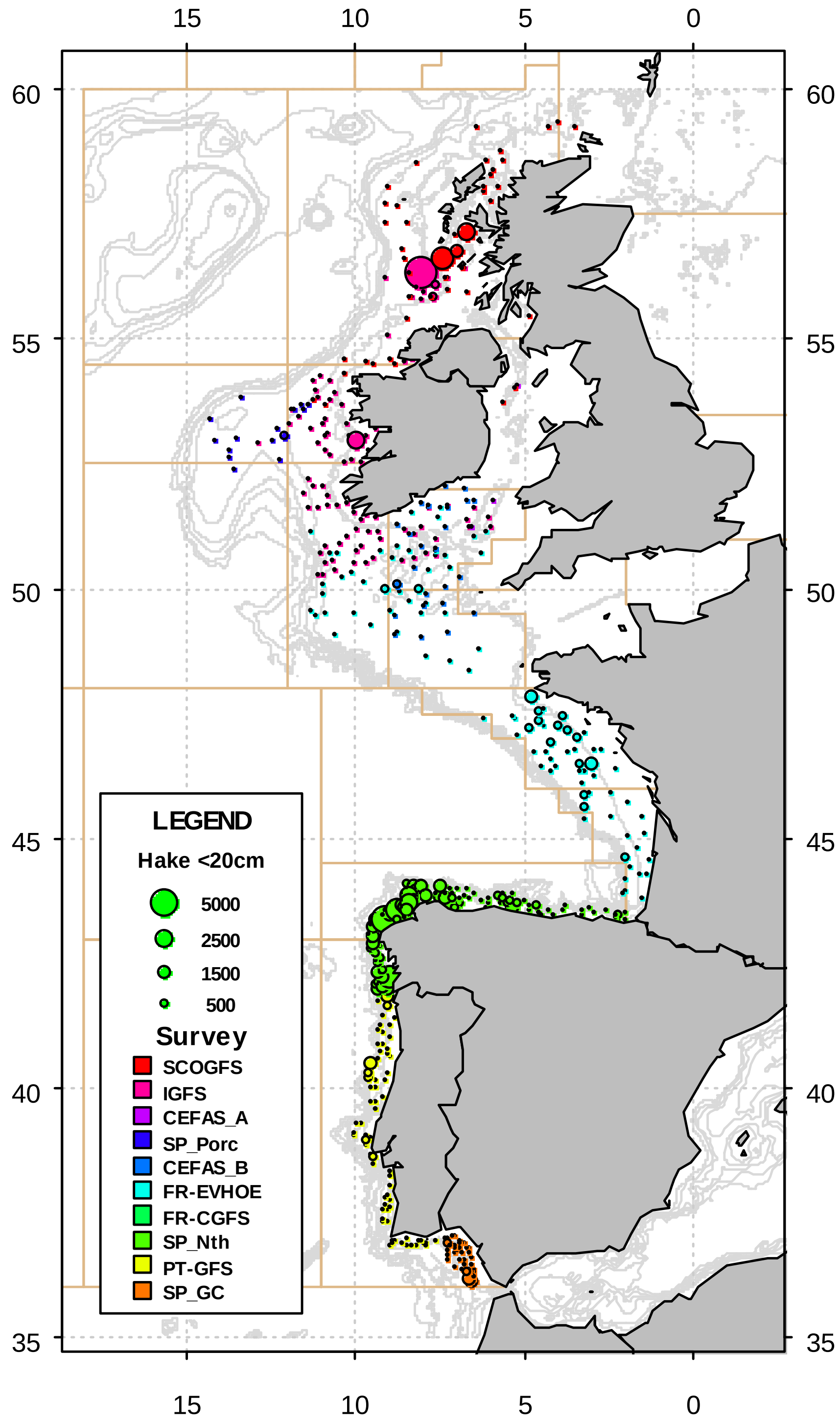


Figure 4.3.2.8: Catches in numbers per hour of 0-group hake, *Merluccius merluccius* (<20 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

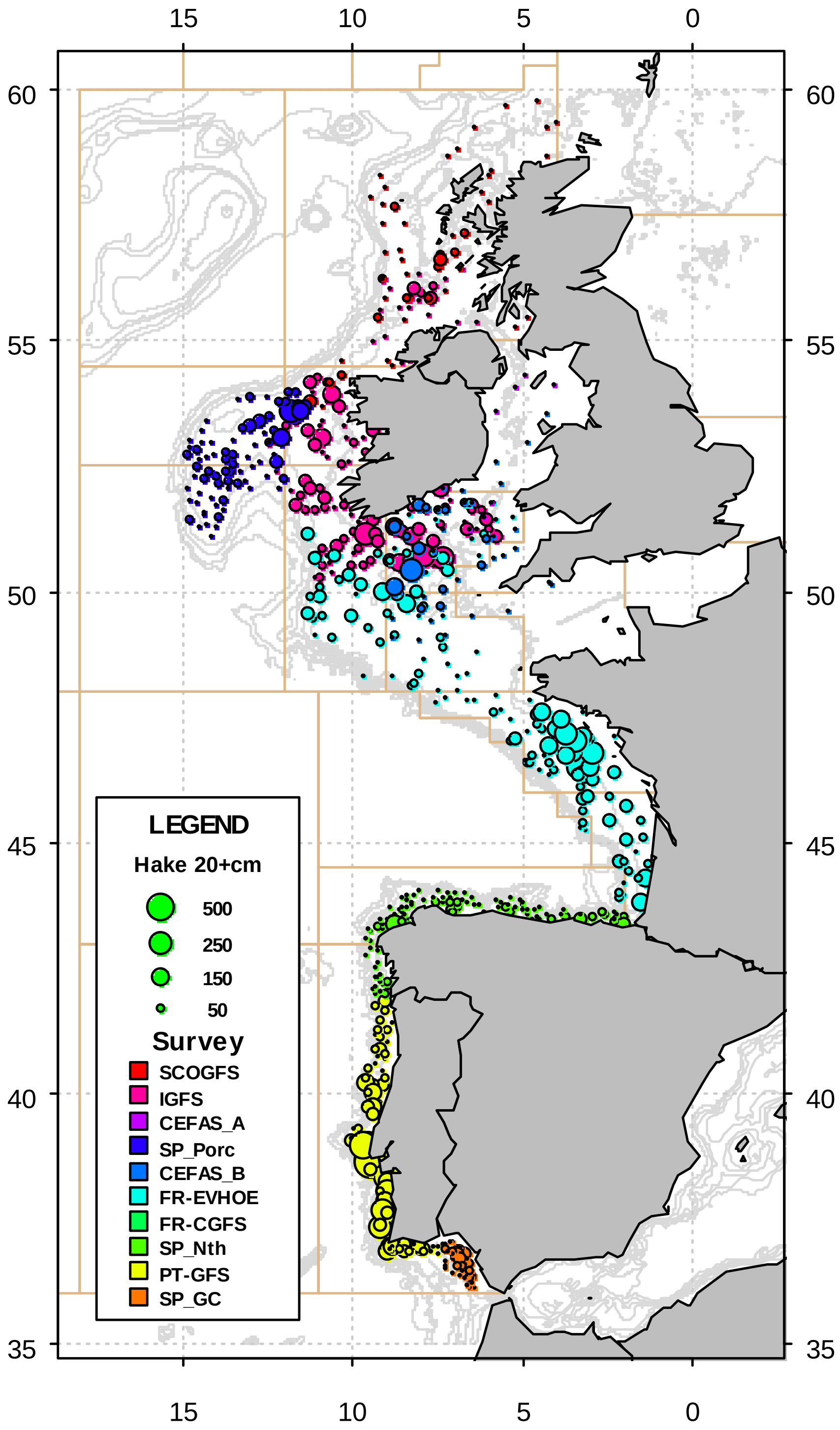


Figure 4.3.2.9: Catches in numbers per hour of 1+ group hake, *Merluccius merluccius* (≥20 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

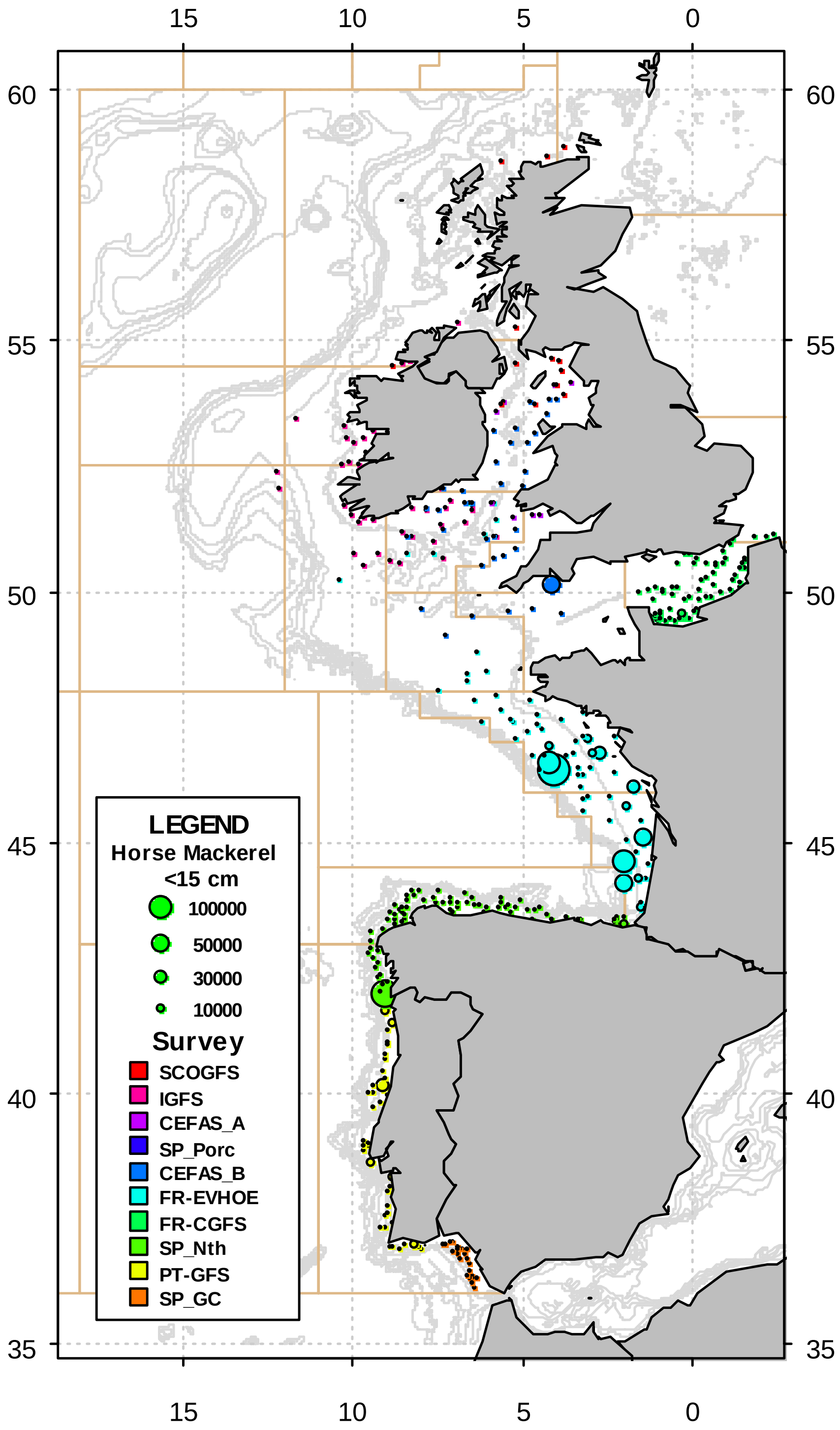


Figure 4.3.2.10: Catches in numbers per hour of 0-group horse mackerel, *Trachurus trachurus* (≥15 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

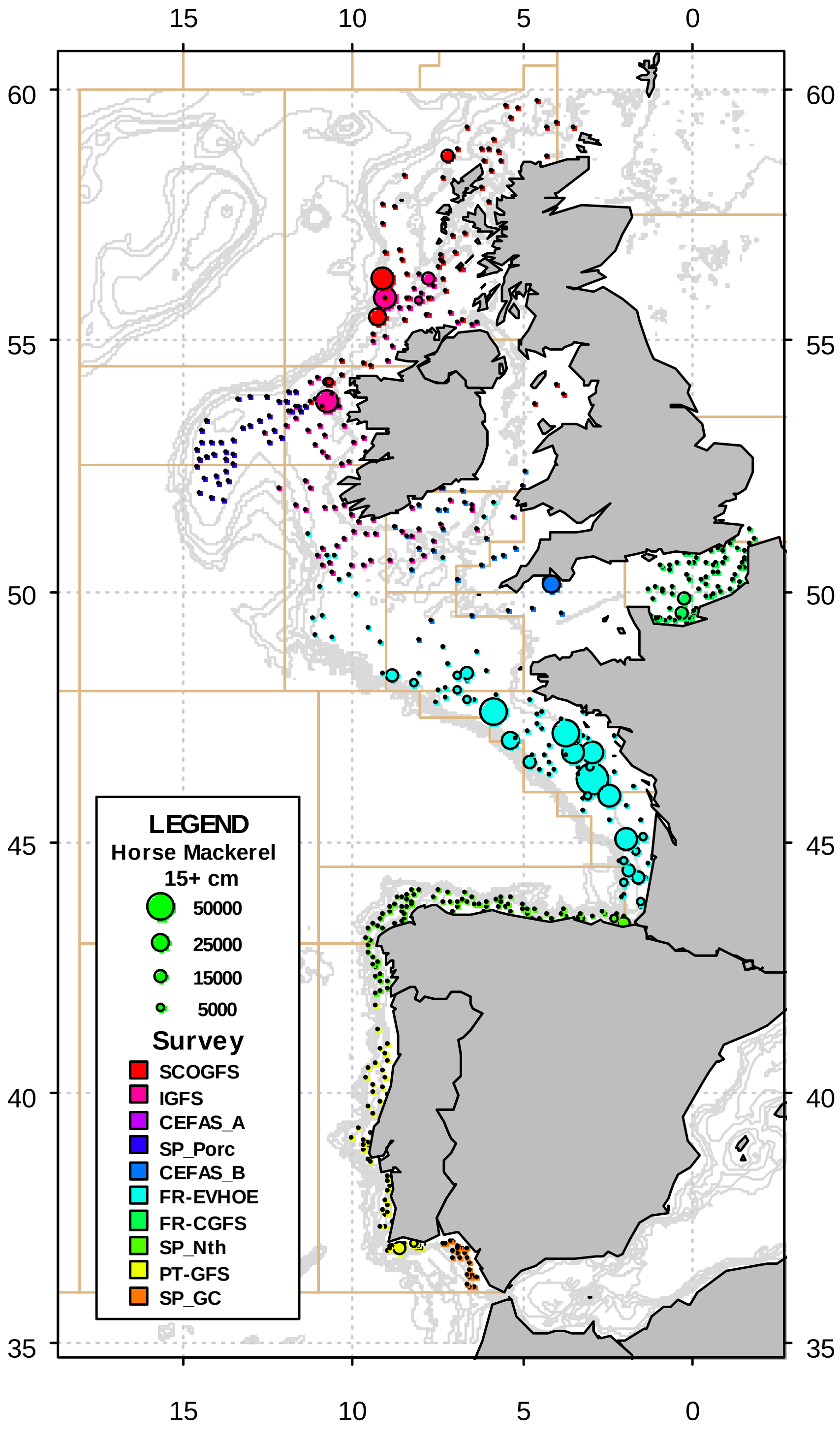


Figure 4.3.2.11: Catches in numbers per hour of 1+ group horse mackerel, *Trachurus trachurus* (≥15 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

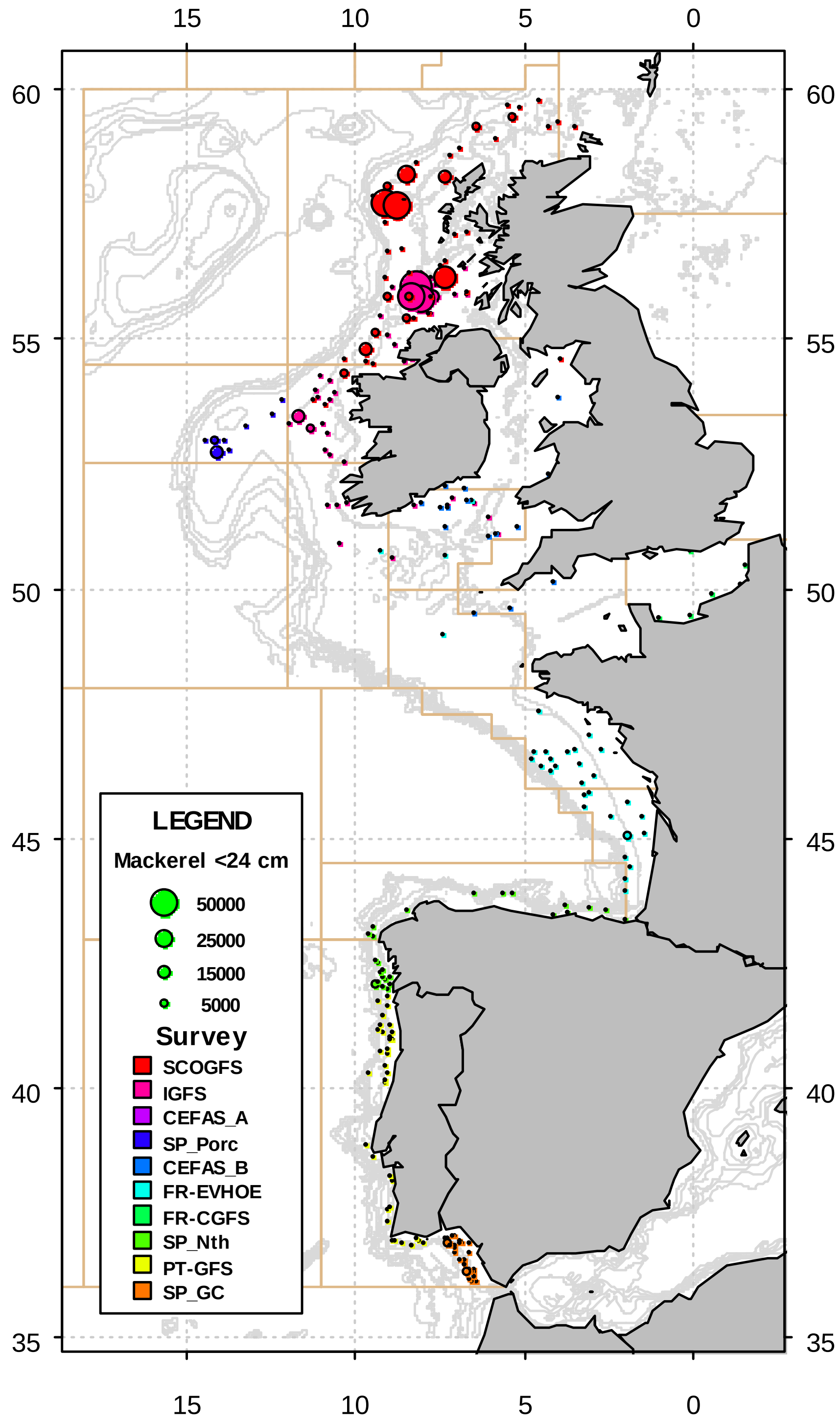


Figure 4.3.2.12: Catches in numbers per hour of 0-group mackerel, *Scomber scombrus* (<24 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

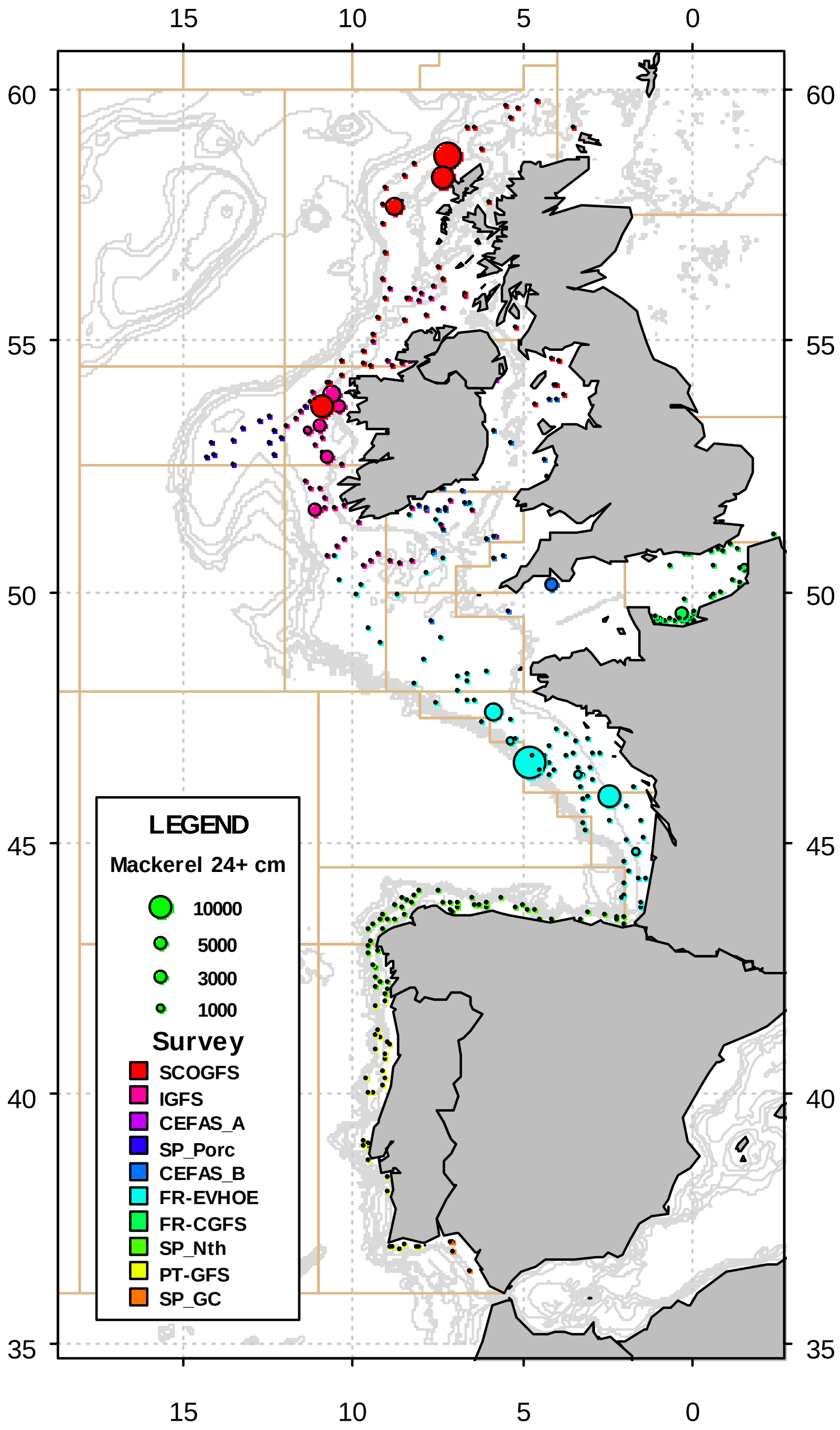


Figure 4.3.2.13: Catches in numbers per hour of 1+ group mackerel, *Scomber scombrus* (≥24 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

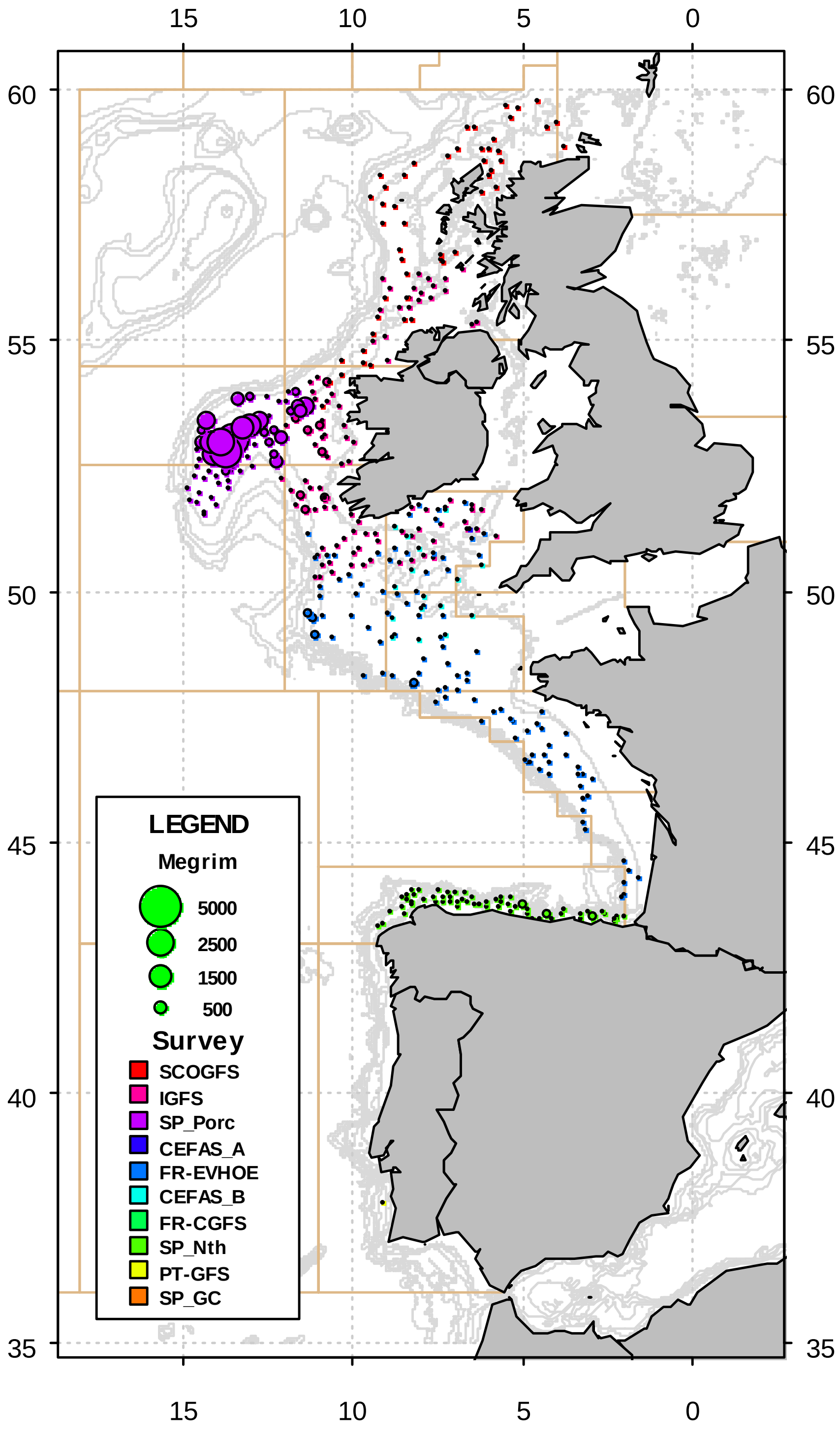


Figure 4.3.2.14: Catches in numbers per hour of megrim, *Lepidorhombus whiffiagonis*, in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

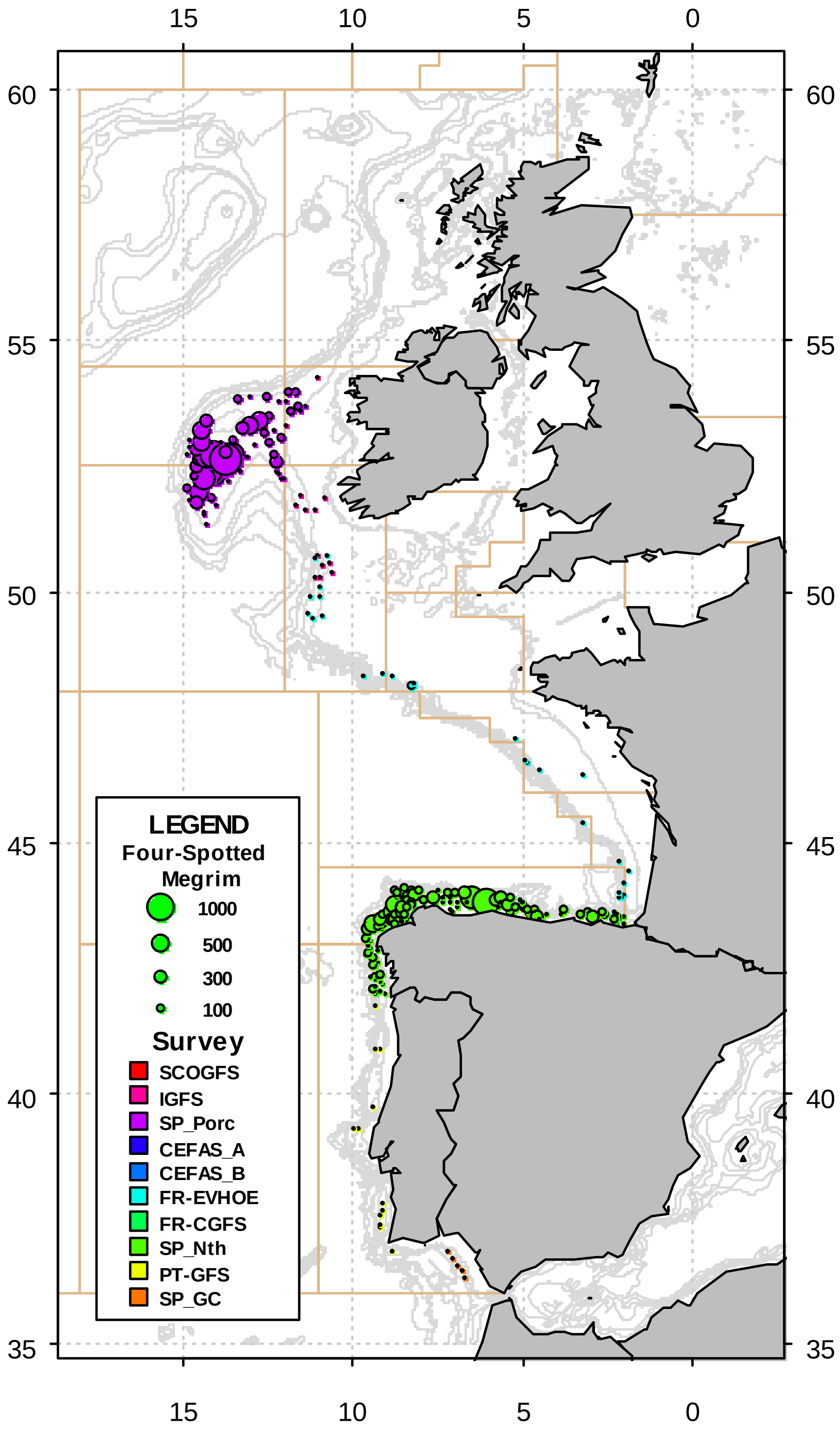


Figure 4.3.2.15: Catches in numbers per hour of four-spotted megrim, *Lepidorhombus boscii*, in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

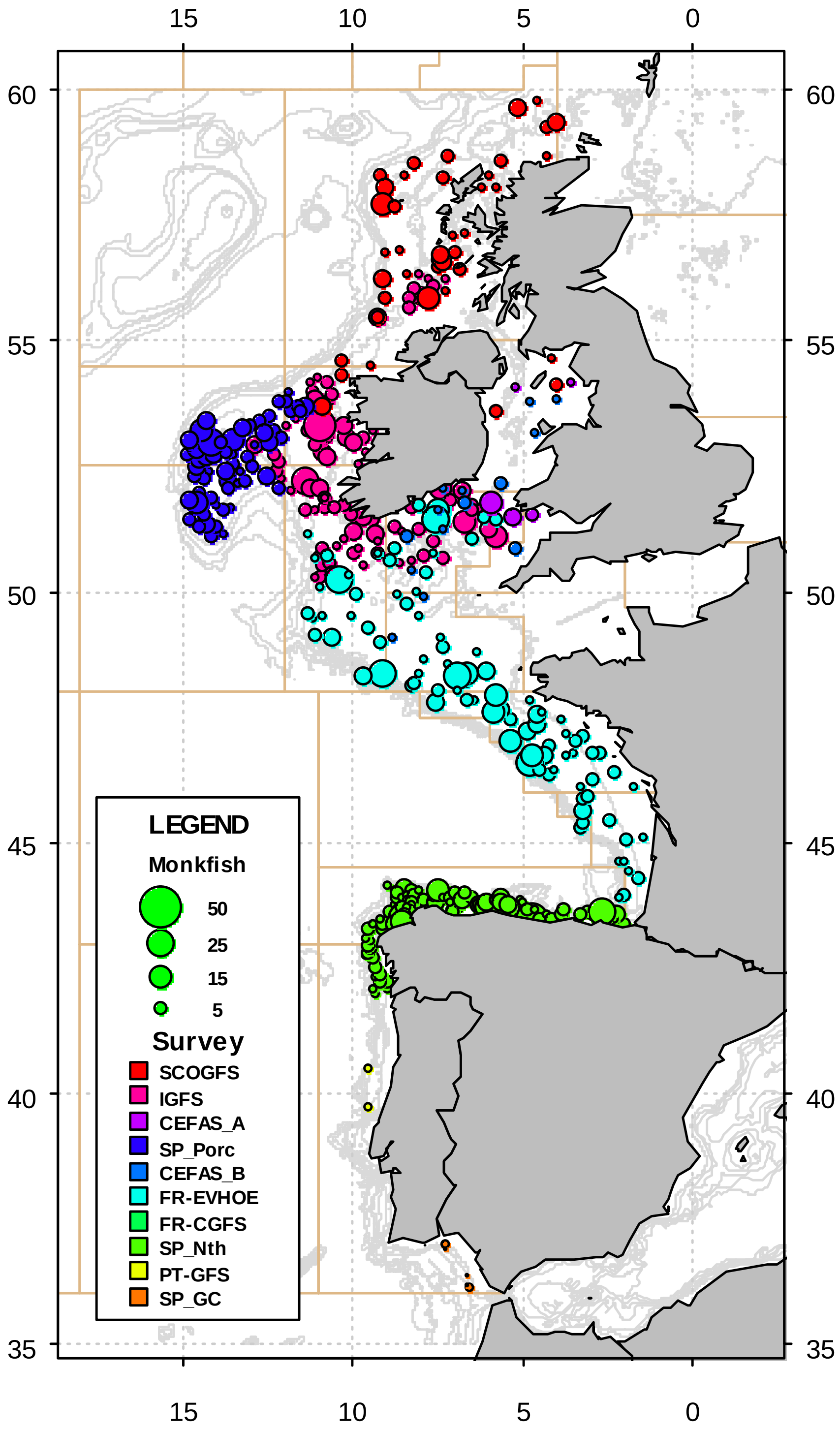


Figure 4.3.2.16: Catches in numbers per hour of monkfish, *Lophius piscatorius*, in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

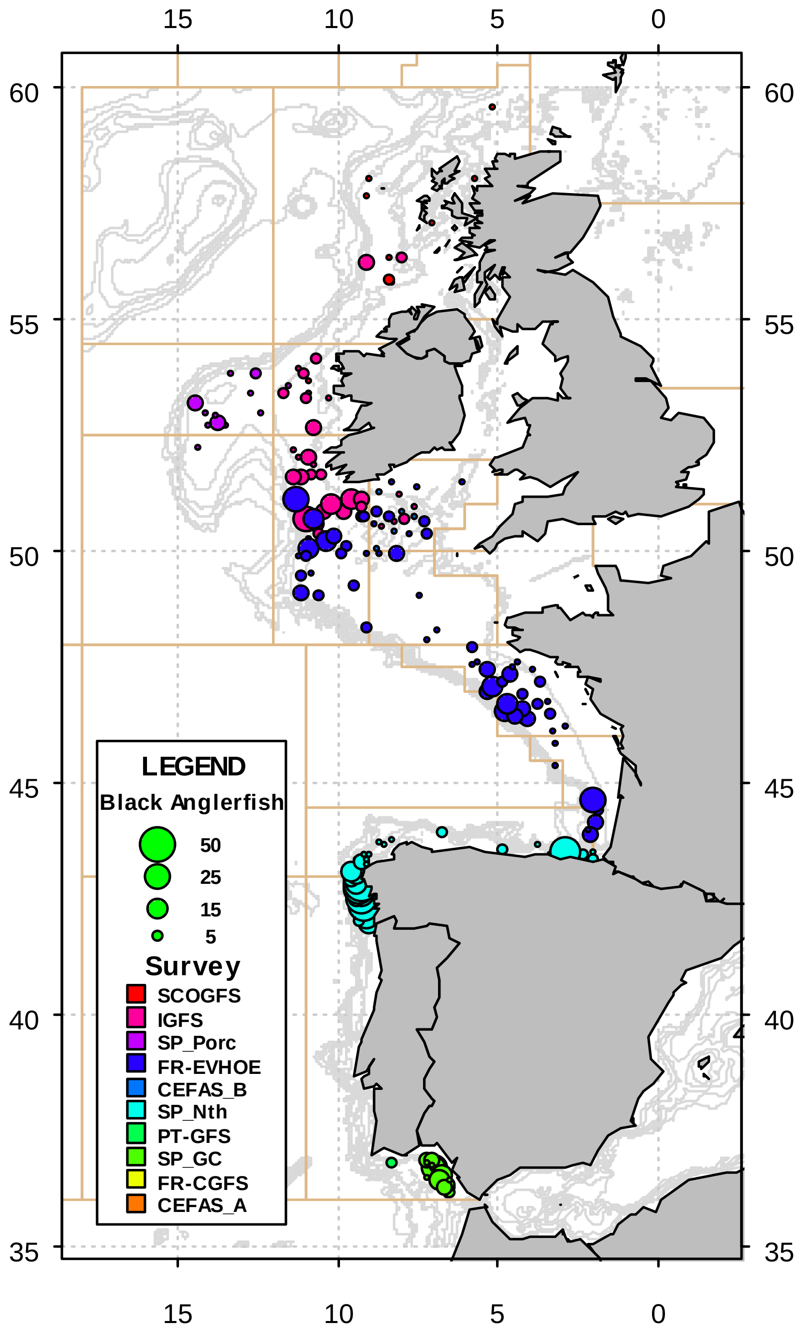


Figure 4.3.2.17: Catches in numbers per hour of black anglerfish, *Lophius budegassa,* in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

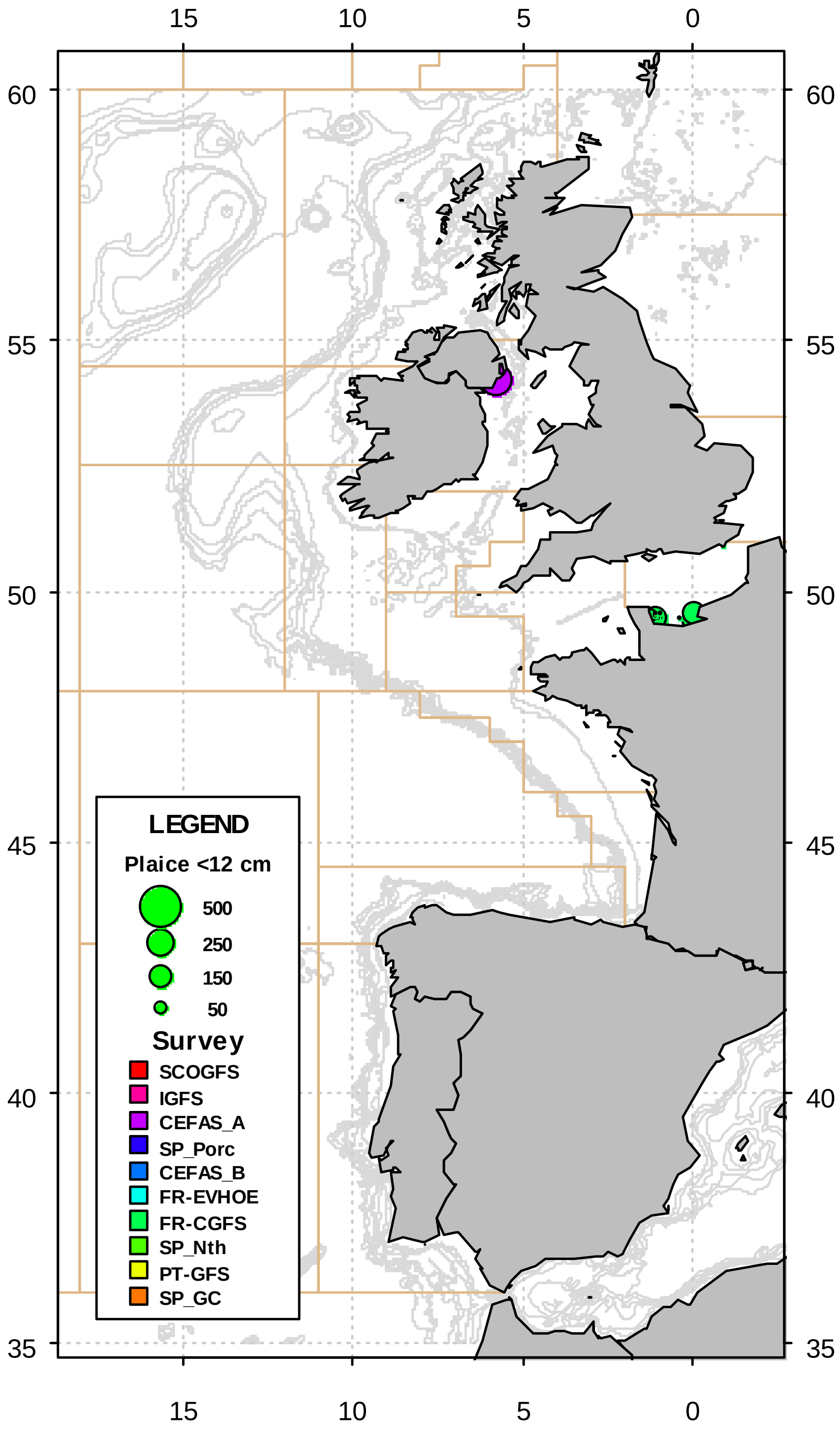


Figure 4.3.2.18: Catches in numbers per hour of 0-group plaice, *Pleuronectes platessa* (<12 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

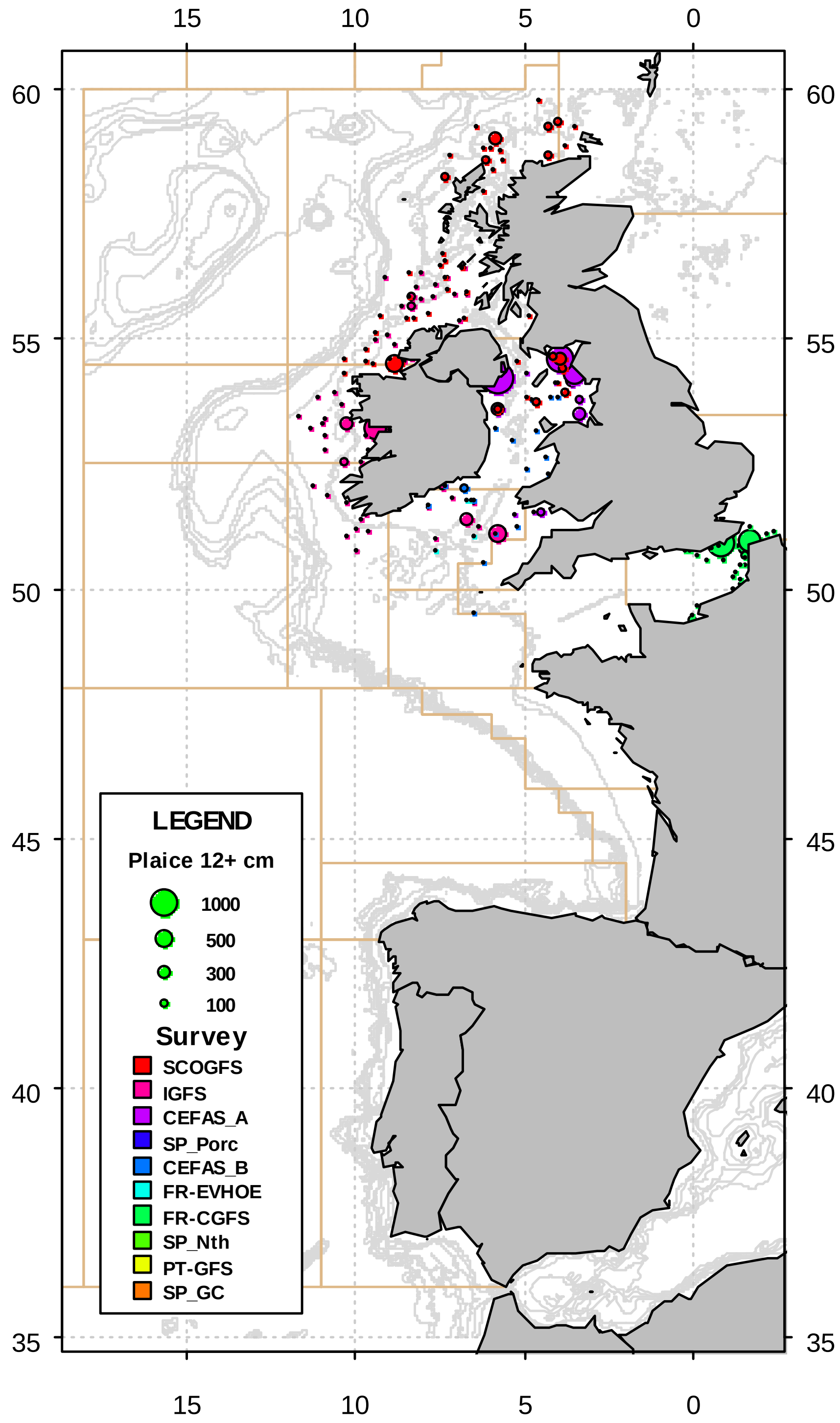


Figure 4.3.2.19: Catches in numbers per hour of 1+ group plaice, *Pleuronectes platessa* (≥12 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

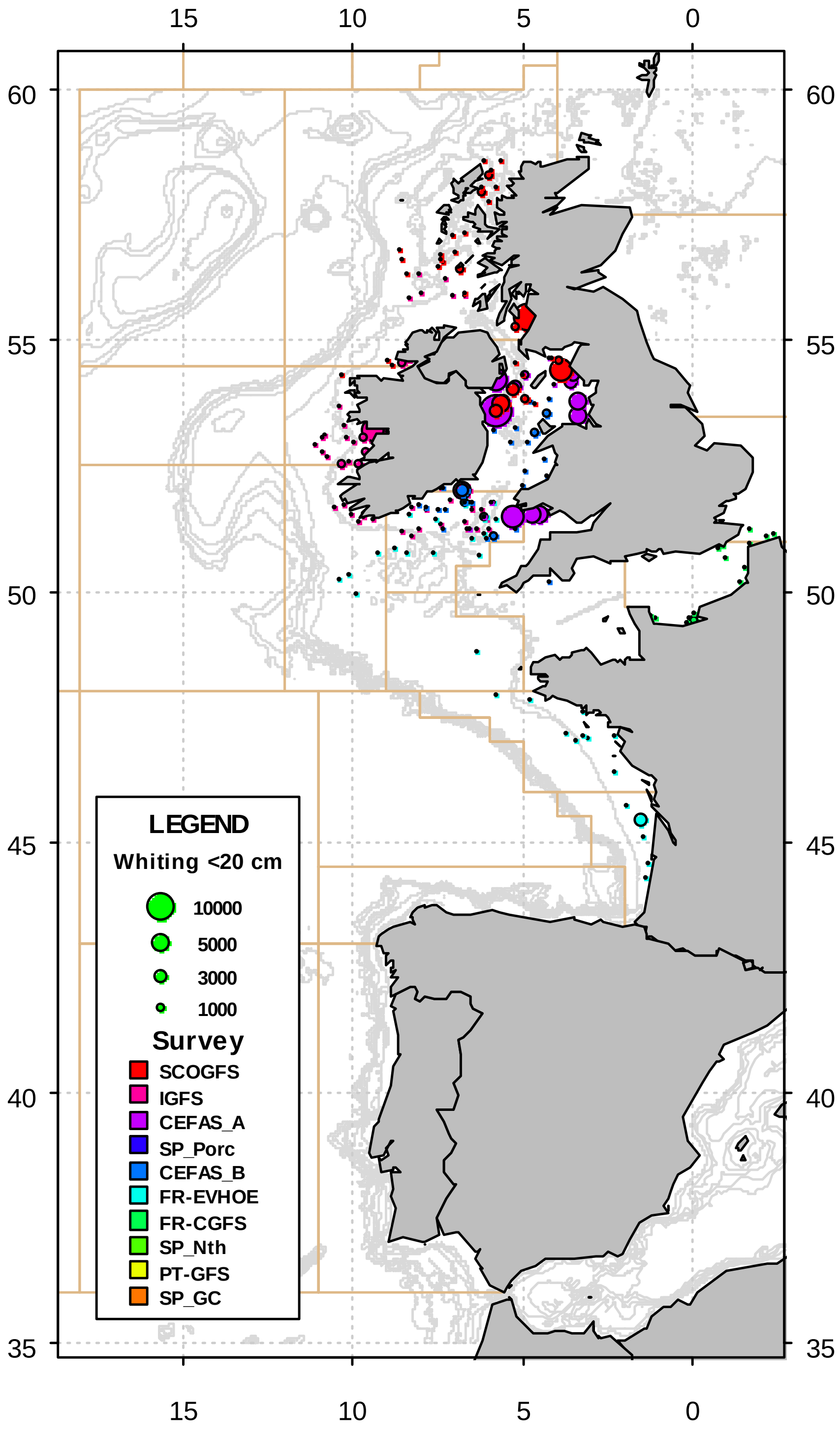


Figure 4.3.2.20: Catches in numbers per hour of 0-group whiting, *Merlangius merlangus* (<20 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

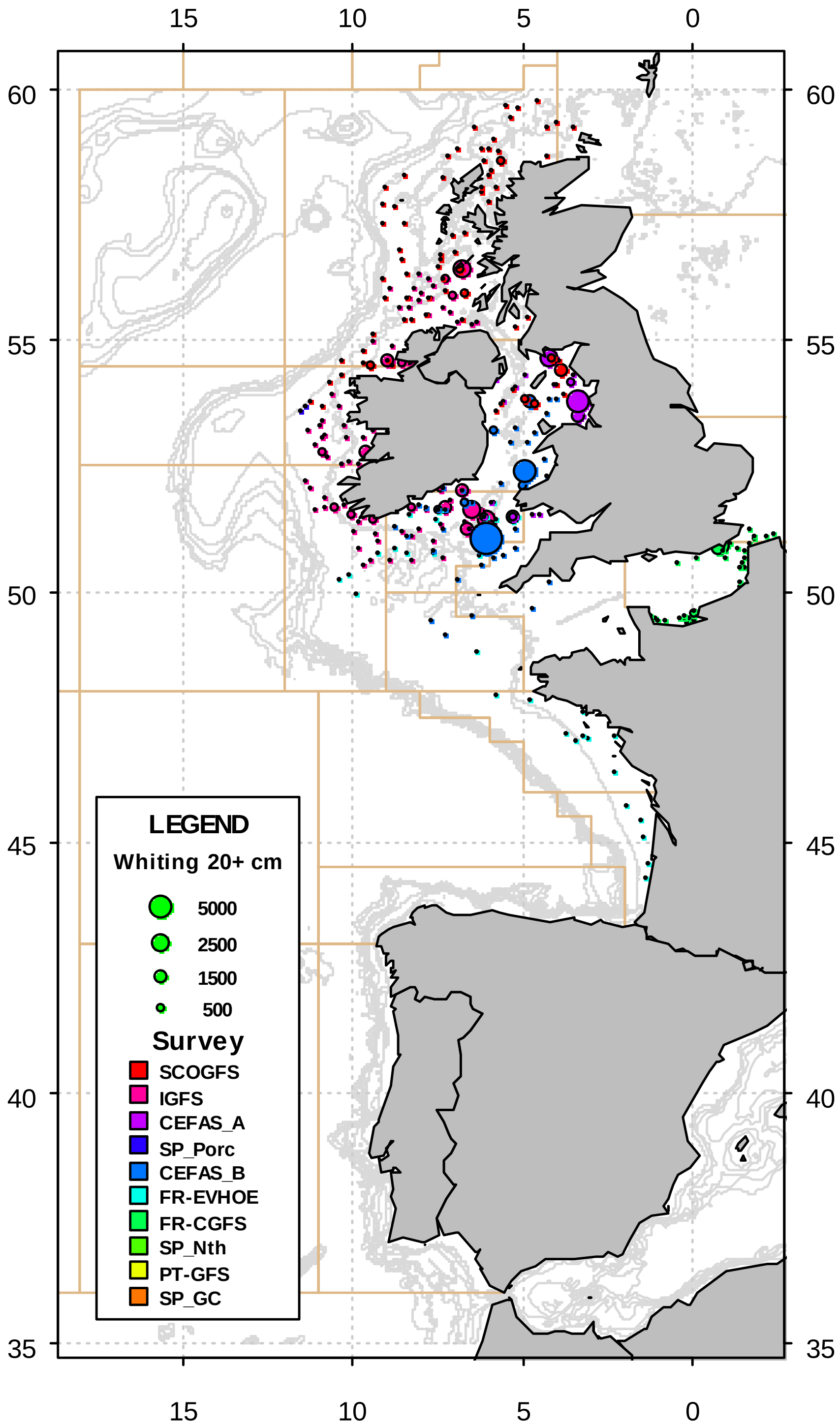


Figure 4.3.2.21: Catches in numbers per hour of 1+ group whiting, *Merlangius merlangus* (≥20 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

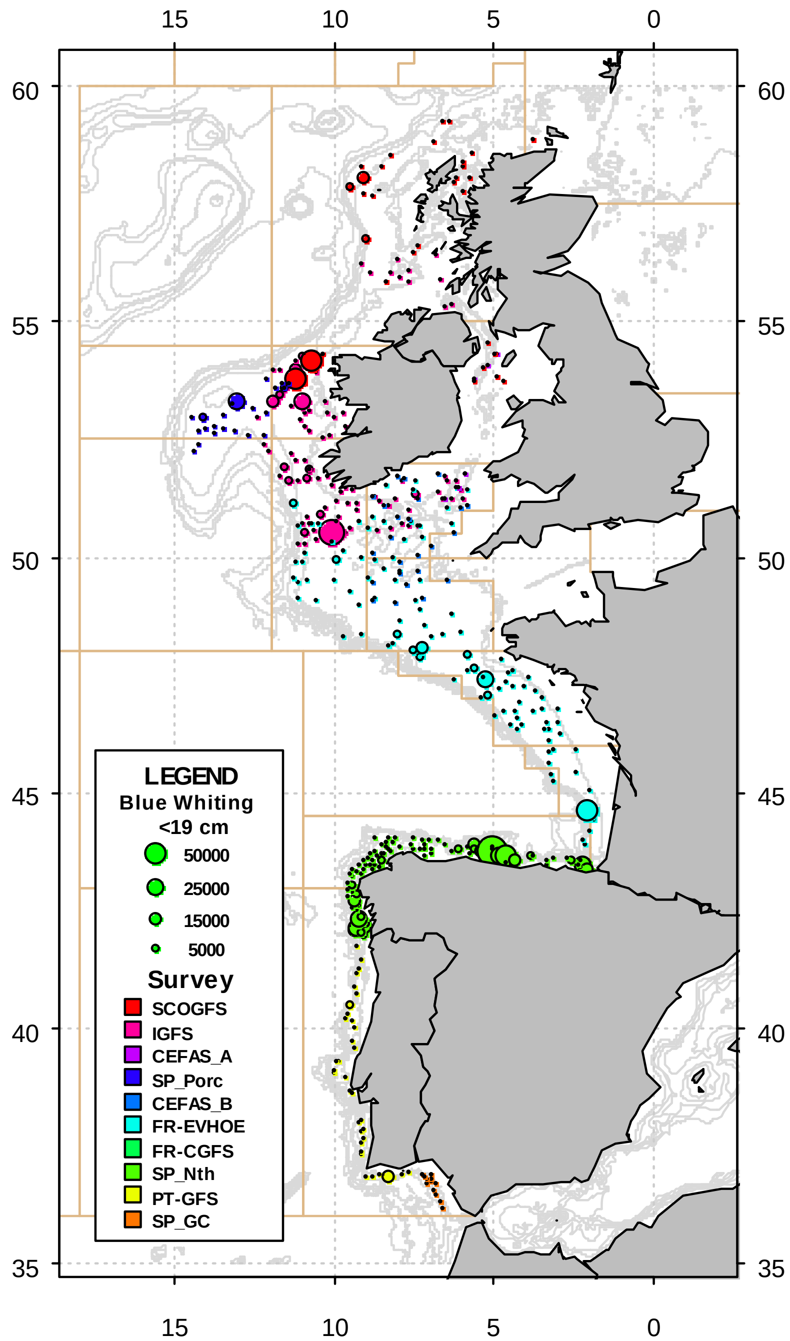


Figure 4.3.2.22: Catches in numbers per hour of 0-group blue whiting, *Micromesistius poutassou* (<19 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

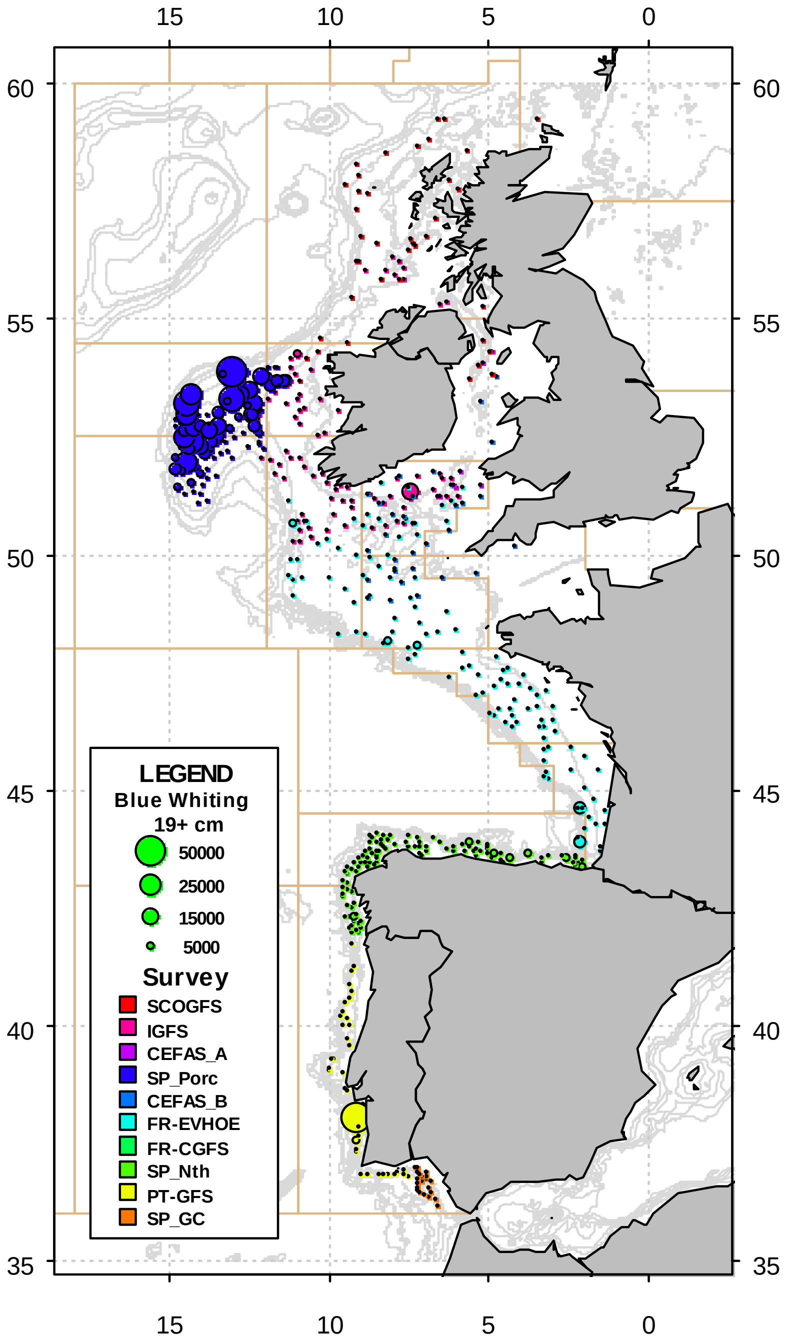


Figure 4.3.2.23: Catches in numbers per hour of 1+ group blue whiting, *Micromesistius poutassou* (≥19 cm), in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

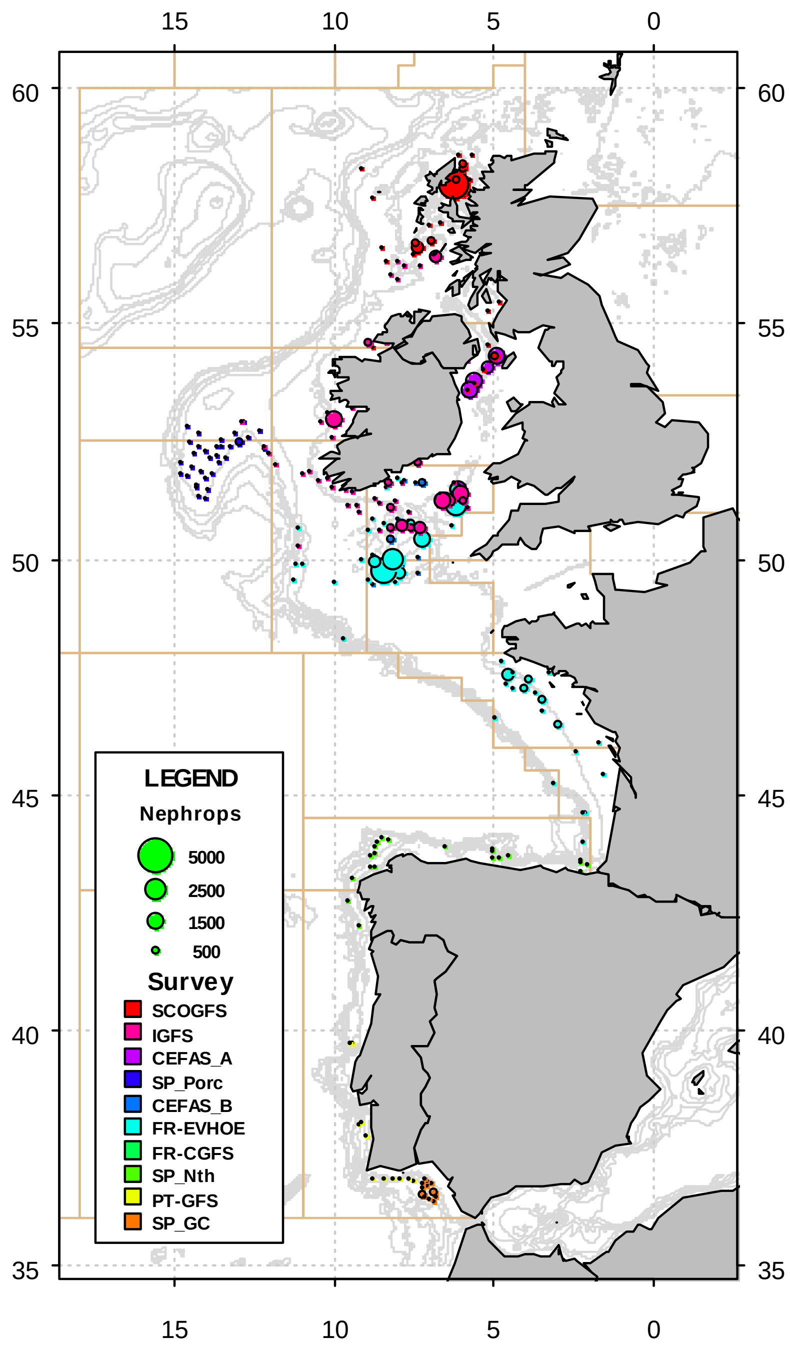


Figure 4.3.2.24: Catches in numbers per hour of Nephrops, *Nephrops norvegicus*, in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

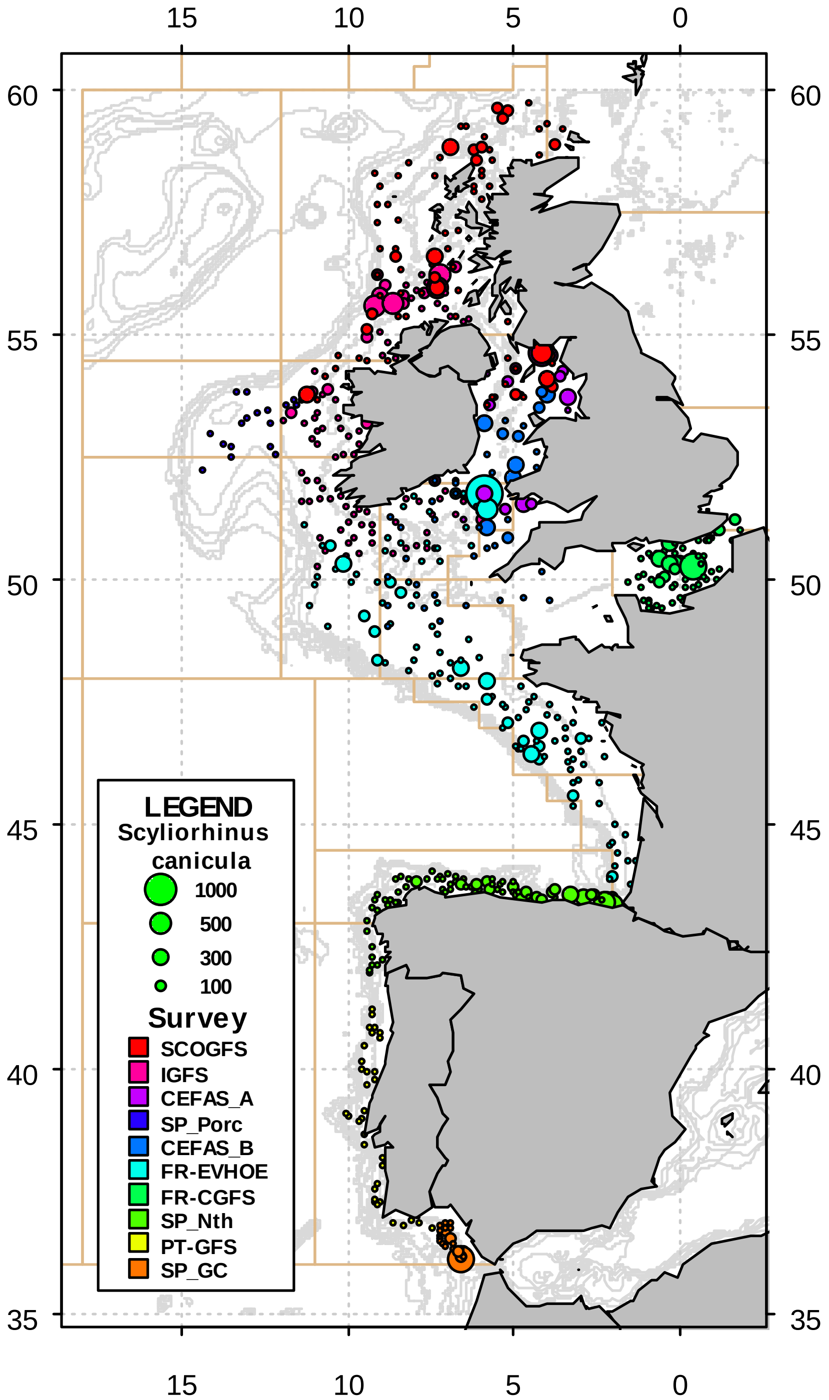


Figure 4.3.2.25: Catches in numbers per hour of lesser spotted dogfish, *Scyliorhinus canicula*, in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

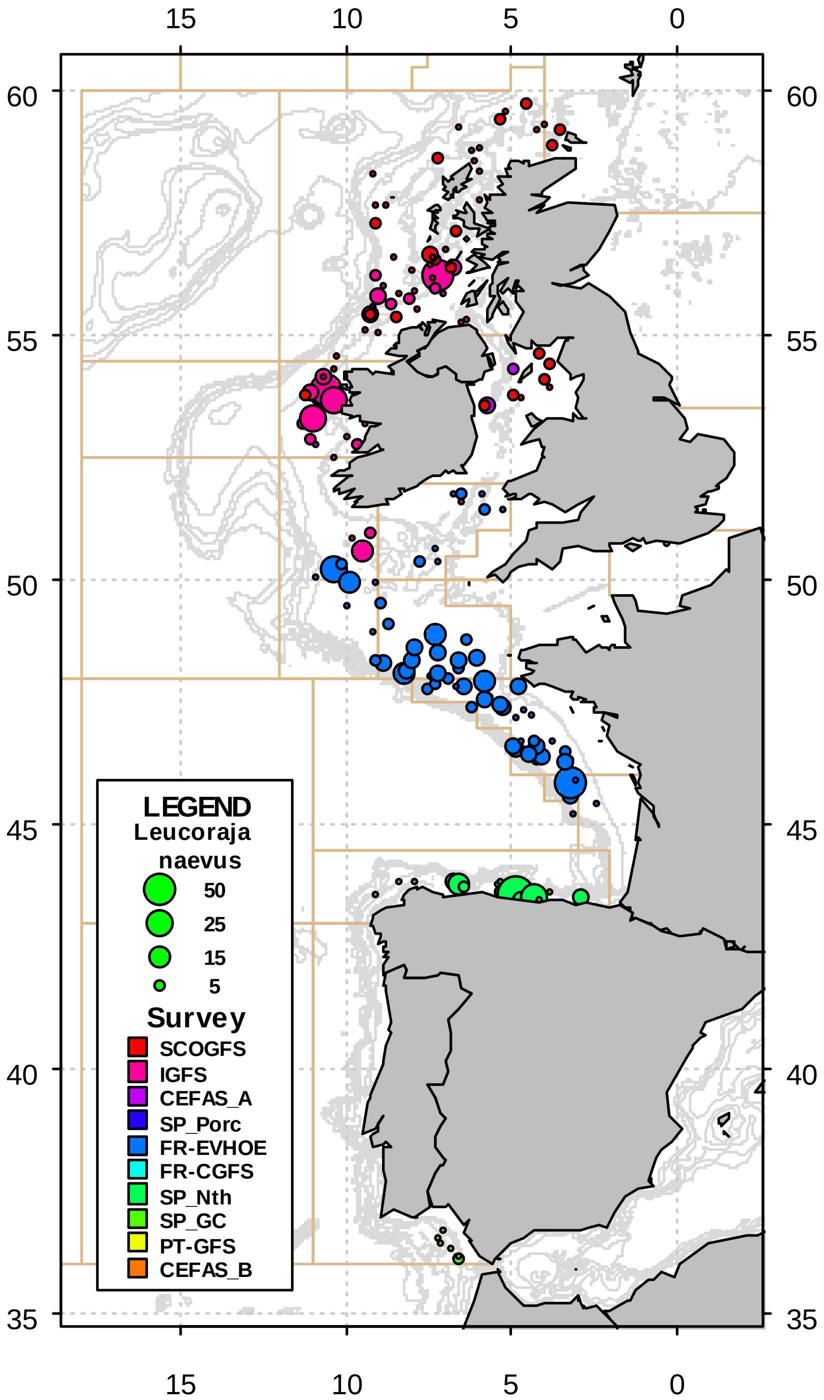


Figure 4.3.2.26: Catches in numbers per hour of cuckoo ray, *Leucoraja naevus*, in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

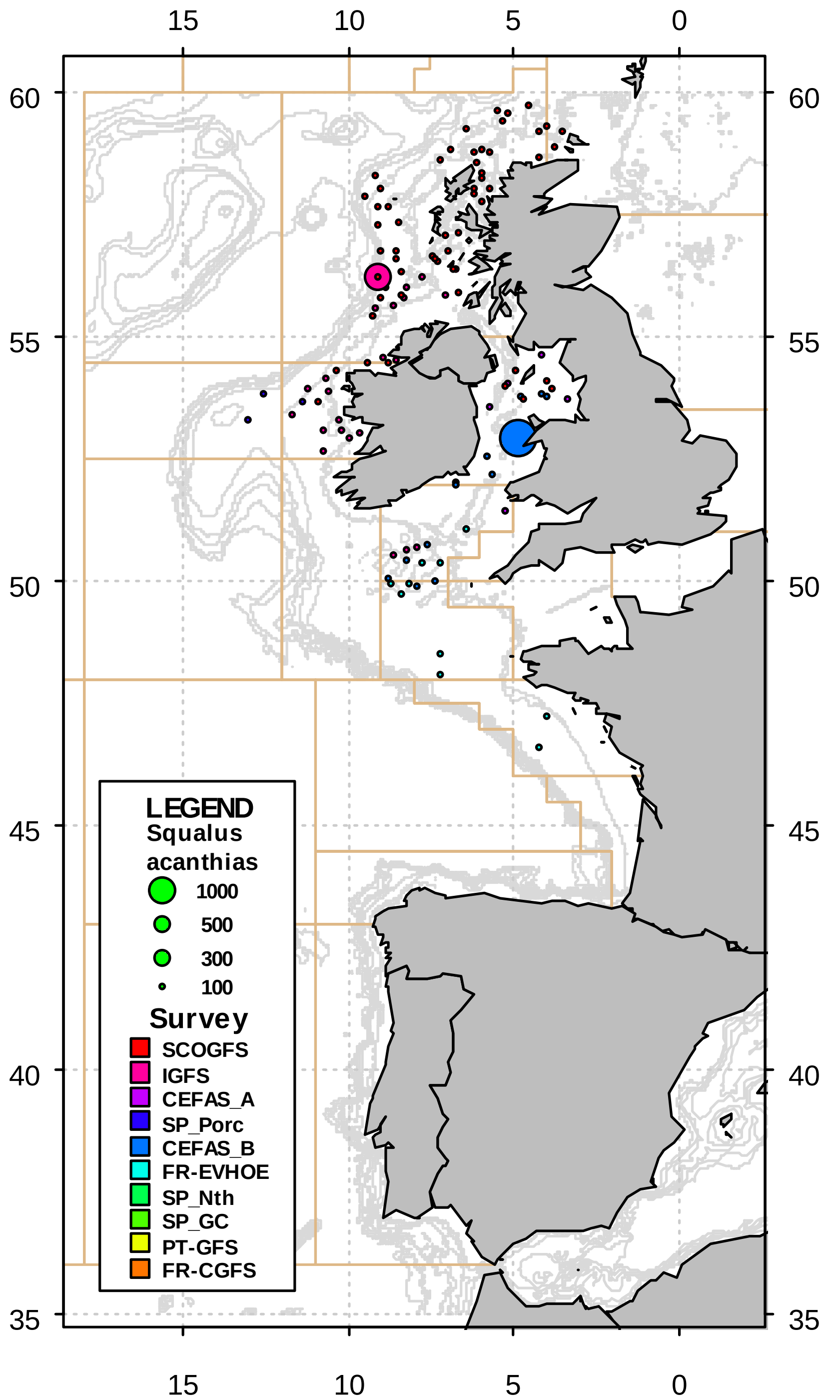


Figure 4.3.2.27: Catches in numbers per hour of spurdog, *Squalus acanthis*, in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

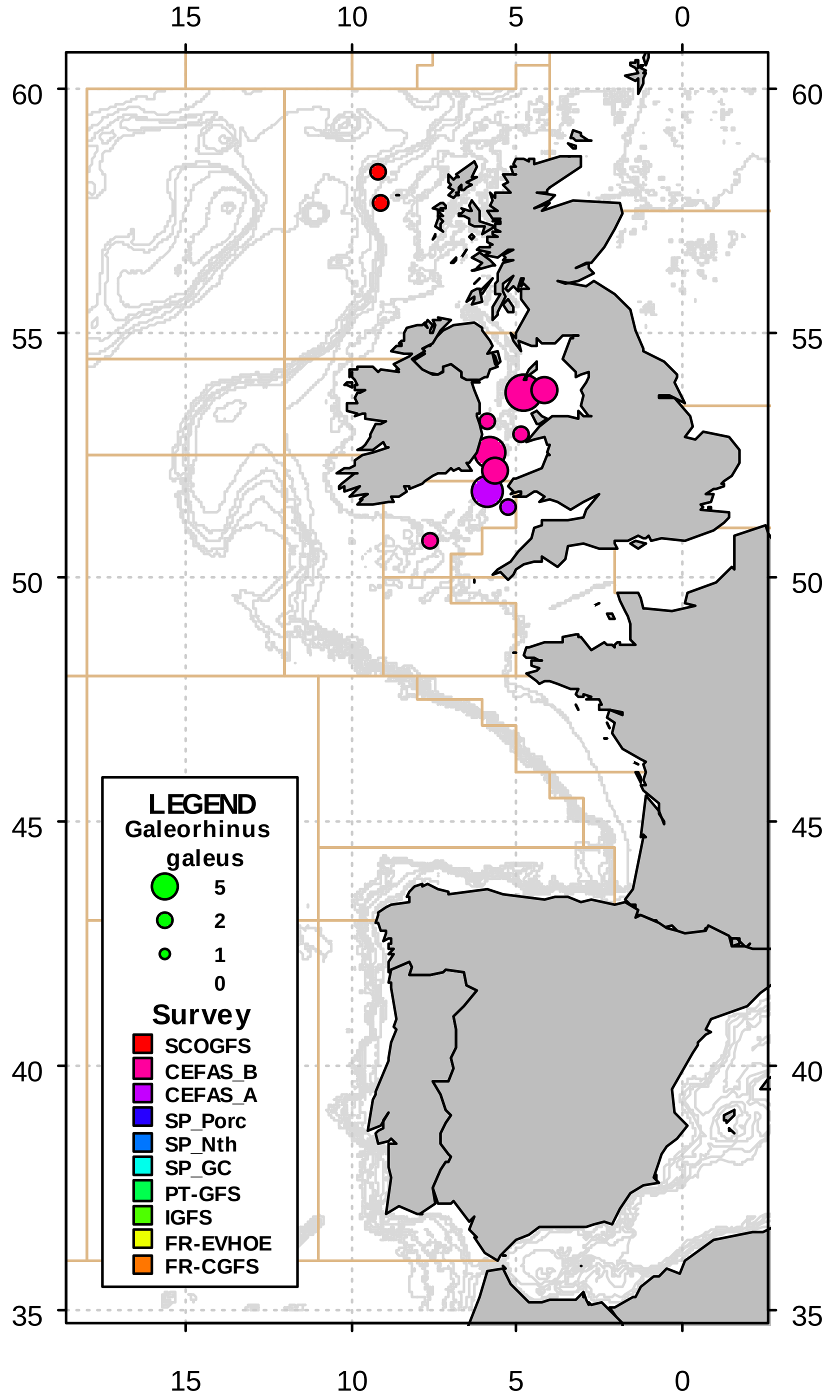


Figure 4.3.2.28: Catches in numbers per hour of tope, *Galeorhinus galeus*, in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

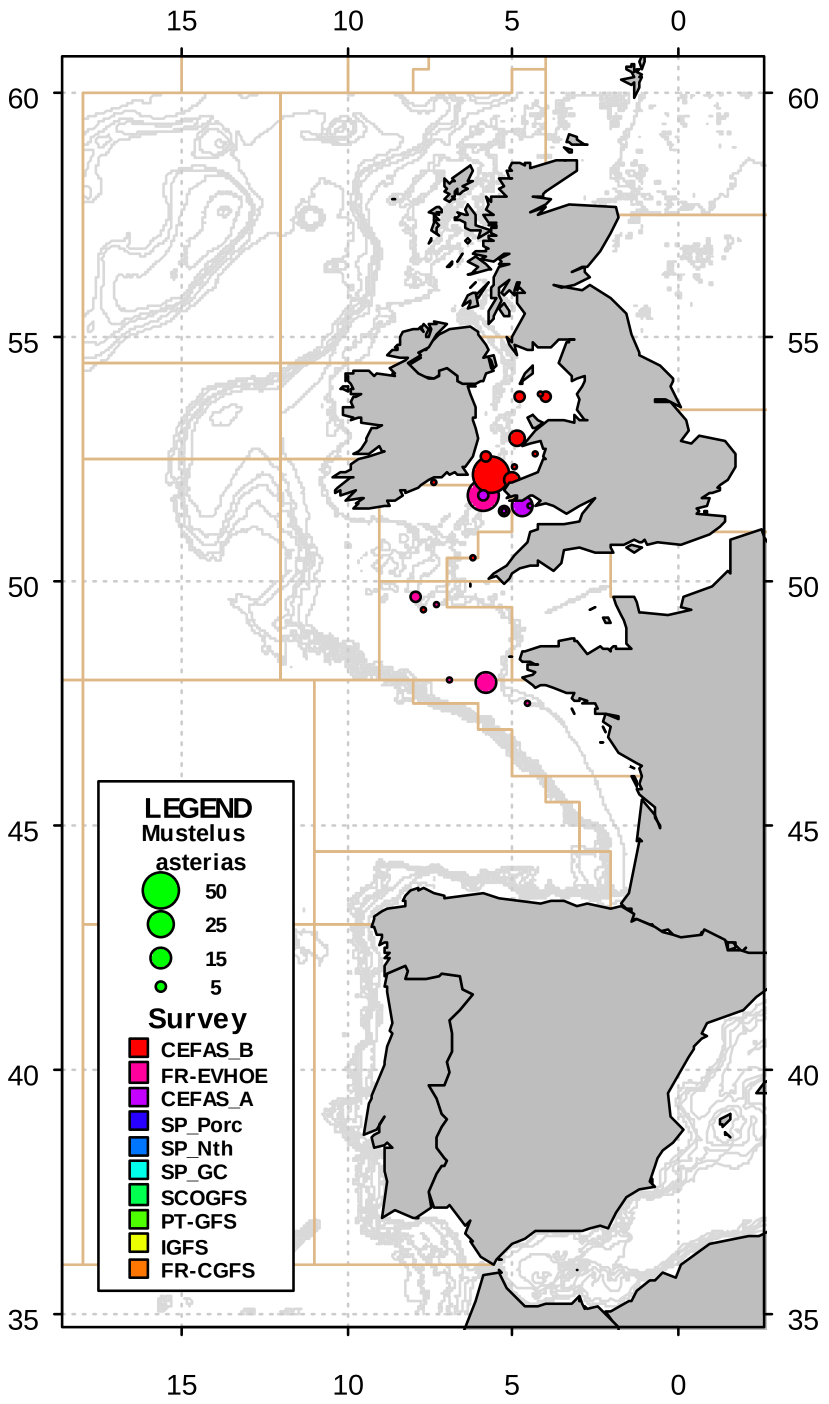


Figure 4.3.2.29: Catches in numbers per hour of starry smooth hound, *Mustelus asterias*, in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

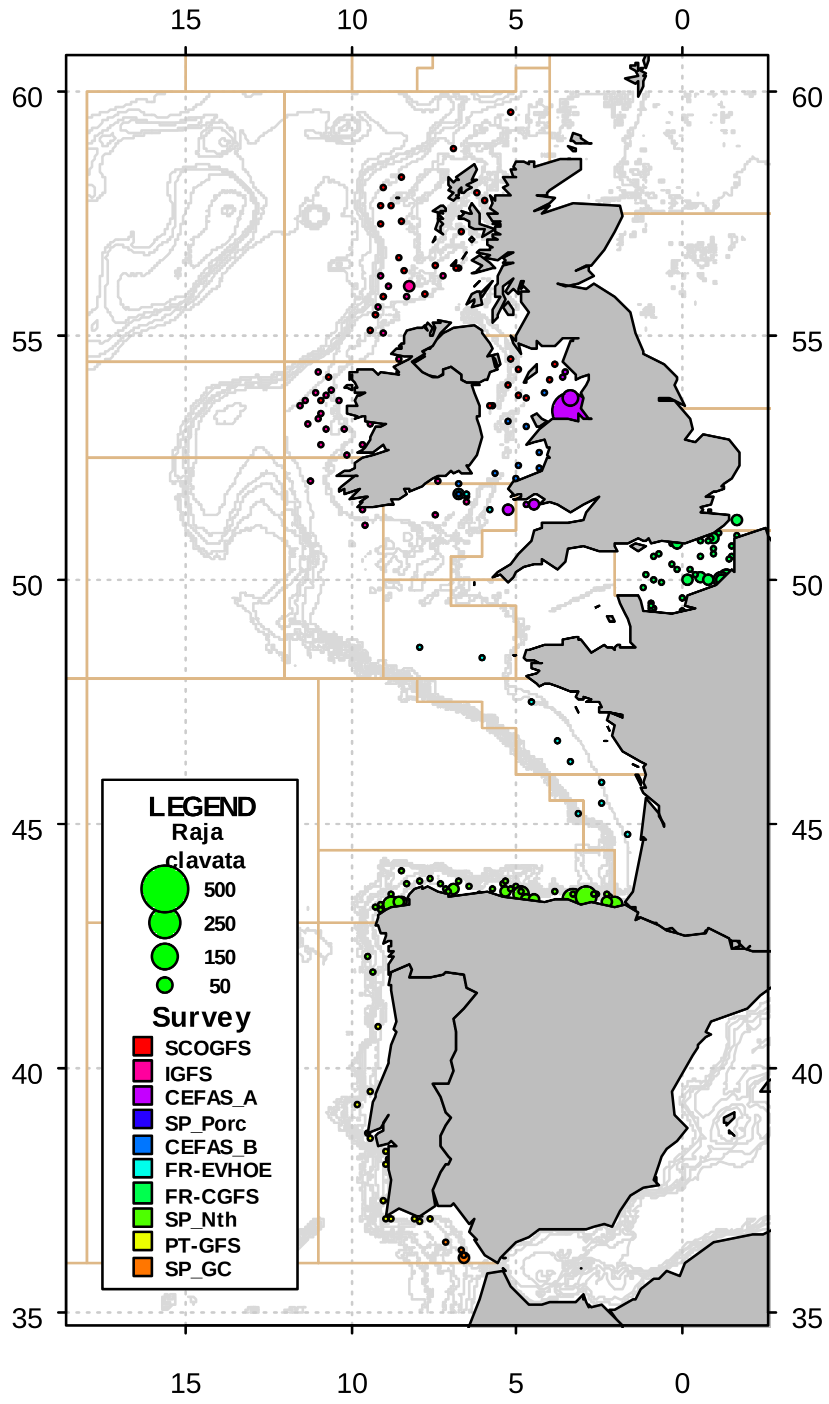


Figure 4.3.2.30: Catches in numbers per hour of thornback ray, *Raja clavata*, in autumn/winter 2005 IBTS surveys. The catchability of the different gears used in these surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.

4.3.8 Intercalibration in Portugal

A calibration survey was conducted in July 2005 to estimate conversion factors to correct abundance indices estimated with RV "Capricórnio" (bottom trawl CAR) into RV "Noruega" (bottom trawl NCT). A working document was presented to this IBTS meeting (Cardador & Azevedo) and is included in annex 3 (WD 1).

WG comments

The IBTSWG recognised the importance of the Portuguese Groundfish survey data to the Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk and Megrim (WGHMM) in providing abundance indices for hake. The intercalibration study clearly demonstrated strong catchability differences between the NCT and CAR trawls. There is, therefore, a demonstrable requirement to scale or convert the data for juveniles in particular in order to maintain continuity in this important time series of age abundance indices.

The group felt that presentation of the variability on a haul-by-haul basis of raw data would be beneficial in confirming the degree of inter-haul variability and leverage of any particular hauls. While a good fit was achieved with the reported model using the relationship of overall catch ratio as a function of length, further exploration of alternative methods to avoid summation of the data across tows, along with their associated variances, would be desirable. Alternatively some text to address the suggestion that selectivity cannot be assumed constant across hauls (e.g. (Fryer 1991; Millar 1993; Fryer, Zuur *et al*., 2003) and therefore must be accounted for when data is being combined.

4.3.9 Schedule for 2006

SURVEY	CODE	STARTING	ENDING	NO. EXPECTED HAULS	INTERCAL.*
UK-Scotland Rockall & Deep Water	-	8 Sep	29 Sep	58	None
UK-Scotland Western (autumn)	SCOGFS	16 Nov	7 Dec	80	IR
UK-Scotland Western (spring)	-	9 Mar	29 Mar	58	None
UK-North Ireland	NIRGFS	Not available information			
Ireland – Groundfish Survey	IGFS	22 Oct	02 Dec	170	SP-PO
UK-England & Wales	CEFAS	06 Nov	06 Dec	72	None
France - EVHOE	EVHOE				
France - Western Channel	CGFS				
Spain - Porcupine	SP-P0	03 Sept	03 Oct	80	IGFS
Spain - North Coast	SPGFS	25 Sept	28 Oct	116	None
Spain - Gulf of Cádiz (Autumn)	SPGFP	2 Nov	14 Nov	42	None
Spain - Gulf of Cádiz (Spring)	SPGFP	8 Mar	19 Mar	42	None
Portugal - Winter	PGFS_W	07 March	03 April	75	None
Portugal - Autumn	PGFS_A	21 Sept	20 Oct	96	None

4.4 IBTS Manual version VII

At the IBTS Working Group meeting in 2003 it was apparent that the sixth revision of the IBTS North Sea manual needed to be updated in order to better describe the history of the IBTS, the new checking procedures and SOPs that were in place in many of the countries participating in the IBTS and the new exchange format that was now needed due to the newly developed DATRAS database for survey data at the ICES Secretariat. Many of the revisions were made at the Working Group meeting in 2004 (Lisbon 25–29 March) and this seventh revision was ready for use by all participating countries by August 2004. However some relevant documentation and figures were not readily available for this version VII to be included in the IBTSWG 2005's report. It is now completed and included as annex 1 to this year's report.

5 Surveys reporting format (ToR b)

In 2005, the Working Group decided that there was a need to provide more information on the various surveys under its coordination. The best practical way to do so is to provide the information through a standard formatted support including general information on the survey program and particular information on the latest survey's results. Inter-sessionnally, there was a demand from assessment Working Group to provide some estimate of precision for the indices used in the assessment process. Taking all that into consideration, the WG agreed on a firs draft reporting format that has been used in section 4 dealing with survey's overview. Due to the time available, the level of information concerning estimation of precision is not equal for all survey and the estimates are given in RSE for raw mean number and Kg per set but the aim of the WG is to provide in the very next future estimate by age for all relevant species. Meanwhile the WG welcomes all feedback from assessment WG on what extra information would be needed.

6 Standardization of sampling strategies, computation of indices and estimation of precision (ToR c)

6.1 Comparison between "Scotia" and "Walther Herwig III"

Referred to the standardization of sampling it was planned to carry out a comparison fishing experiment between the Scottish vessel "Scotia" and the German vessel "Walther Herwig III" to detect possible differences in the fishing power of both vessels. Within the German Small Scale Bottom Trawl Survey the "W. Herwig III" will fish for 3 to 4 days (28.7. – 31.7.2006) in a small fixed area of 10 to 10 nm (standard box) under North Sea IBTS protocol conditions. During that period the "Scotia" will join the "W.Herwig III" for 2 extra days within the IBTS Q3 survey.

Box D in the northern North Sea off the Scottish coast is selected being an area where high catches with relatively low variability for cod, haddock and whiting are expected on the basis of previous experiments. Both vessels will fish independently on randomly selected stations and towing directions to smoothen out the effects of weather, current and tides on the catch. Both vessels will use the standard GOV-trawl rigged with the standard rubber disc groundrope (type A) and sweep lengths of 100m.

6.2 Integrated approach to trawl monitoring

A key aspect of research surveys is standardisation of the unit of effort. Several study groups have been established in recent years to help address issues around standardisation of trawl gear and survey protocols (SGSTG and SGSTS) as well as survey design, analysis and the sources of variability within surveys (WKSAD). All confirm the importance of gear monitoring and recommendations extend to the inclusion of more recently developed sensors such as ground contact sensors.

Discussion is less conclusive, however, in relation to how one should define a valid versus invalid haul from the individual parameters being measured and whether the tolerances for some of these reported parameters in the IBTS manual, such as headline height, are still appropriate. What duration of loss of bottom contact can be tolerated before a tow is abandoned for instance?

Similarly, how changes or combinations in a range of gear parameters, possibly in combination with weather or other measures of the environment, might usefully be examined in a multivariate way to provide a broad proxy value for individual haul quality or even an overall *relative* survey catchability. The latter of these being of importance in addressing not only the interests of the survey managers, but also the requirements of some assessment working groups as summarised by the points raised by AMAWGC2006.

Several multivariate approaches to interpreting a range of gear and environmental parameters has been explored recently (Hjelm unpublished) and discussed within IBTS. In order to progress towards a possible standardised approach to addressing these questions the parameters that are currently available for routine collection are tabulated below (Table 6.2.1 & 6.2.2) to help evaluate what might usefully be collected on a routine basis.

Table 6.2.1: Trawl Parameters, North-Eastern Atlantic area.

			Trawl Parameters – if collected enter sensor/method details in boxes												
Survey	**Code**	**Vessel**	**Door Spread**	**Door Angle**	**Wing Spread**	**Headline Height**	**Bottom Contact**	**Symmetry**	**Speed OTG**	**Speed TTW**	**Light / Lux**	**Sunrise / sunset**	**Warp Length**	**Warp Tension**	**Wave Heave**
UK-Scotland Deep Water	-	Scotia	DST	-	DST	TS	yes	-	GPS	-	-	-	Auto Trawl	Auto Trawl	-
UK-Scotland Western (autumn)	SCOGFS	Scotia	DST	-	DST	TS	yes	-	GPS	-	-	-	Auto Trawl	Auto Trawl	-
UK-Scotland Western (spring)	-	Scotia	DST	-	DST	TS	yes	-	GPS	-	-	-	Auto Trawl	Auto Trawl	-
Ireland – Groundfish Survey	IGFS	Explorer	DST	-	DST	TS	TEY	TSP	GPS	ADCP TSP	-	Sodena	Auto Trawl	Auto Trawl	DPS
UK-England & Wales	CEFAS	Endeavour	DST	-	DST	TS	-	-	Transas	-	-	Leica Nav Master	Auto Trawl	Auto Trawl	-
France - EVHOE	EVHOE	Thalassa	DST	-	-	TS	-	-	GPS	GPS	-	-	Auto Trawl	Auto Trawl	-
France - Western Channel	CGFS	Gwen Drez	DST	-	DST	TS	-	-	GPS	GPS	-	-	-	-	-
Spain - Porcupine	SP-P	Vizconde de Eza	DST	-	-	TS	TEY	-	GPS	-	-	-	Auto Trawl	Auto Trawl	DPS
Spain - North Coast	SPGFS	Cornide Saavedra	DST	-	-	TS	TEY	-	GPS	-	-	-	On Brakes	-	-
Spain - Gulf of Cádiz (Autumn)	SPGFP	Cornide Saavedra	DST	-	-	TS	TEY	-	GPS	-	-	-	On Brakes	-	-
Spain - Gulf of Cádiz (Spring)	SPGFP	Cornide Saavedra													
Portugal	PGFS	Noruega	DST	-	DST	TS	-	-	-	-	-	-	On Brakes	Auto Trawl	-

Table 6.2.2: Trawl Parameters – North Sea Surveys.

			Trawl parameters – if collected enter details of sensor/method in relevant box												
Country	**Vessel**	**Survey Code**	**Door Spread**	**Door Angle**	**Wing Spread**	**Headline Height**	**Bottom Contact**	**Symmetry**	**Speed OTG**	**Speed TTW**	**Light / Lux**	**Sunrise / Sunset**	**Warp Length**	**Warp Tension**	**Wave Heave**
France	Thalassa		DST	-	-	TS	-	-	GPS	GPS	-	-	Auto Trawl	Auto Trawl	-
Netherlands	Tridens		DST	-	-	TS	-	-	GPS	GPS	-	Rise and set	Auto Trawl	-	-
Germany	W. Herwig III		DST	-	DST	TS	Starting 06	-	GPS		-	Rise and set	Auto Trawl	Auto Trawl	-
Denmark	Dana		DST	-	-	TS	-	-	-	GPS	-	Rise and set	Auto Trawl	-	-
Norway	H. Mosby, J. Hjort		DST	-	-	DST	-	-	GPS	-	-	Rise and set	Auto Trawl	Auto Trawl	-
Sweden	Argos		DST	-	-	TEY (ht)	TEY	TSP	GPS	TSP	-	-	Scantrol	Scantrol	-
UK Eng	Endeavour		DST	-	DST	TS	-	-	Transas	-	-	Navmaster	Auto Trawl	Auto Trawl	-
UK Scot	Scotia		DST	-	DST	TS	-	-	GPS	-	-	Rise and set	Auto Trawl	Auto Trawl	-

The acronyms above relate to the method of measurement which for trawl geometry relates to Scanmar sensors: DST = Distance Sensor; TEY = Trawl Eye Sensor; TS = Trawl Sounder; HT = Height Sensor; TSP = Trawl Speed Sensor; ADCP = Acoustic Doppler Current Profiler; DP = Dynamic Positioning System.

7 Overlapping surveys in the southern and western IBTS areas

7.1 Introduction

IBTSWG were asked to '*discuss and propose the extent to which adjacent and overlapping surveys in the southern and western IBTS areas can ensure sufficient overlap incorporating fixed stations, for future comparison of catches'*.

In terms of existing/potential overlap of adjacent surveys, the following survey combinations have been identified and examined:

- Irish Sea (VIIa): UK (England and Wales) and UK (Scotland)
- West of Ireland and NW Scotland (VIa, VIIb): UK (Scotland) and Ireland
- Celtic Sea: France, UK (England and Wales) and Ireland
- South-west Ireland: Spain (Porcupine Bank) and Ireland
- Southern Bay of Biscay: France and Spain (Northern)
- Portugal and Galicia: Spain (Northern) and Portugal
- Gulf of Cadiz and Algarve: Portugal and Spain (southern)

7.2 Irish Sea (VIIa): UK (England and Wales) and UK (Scotland)

Both Cefas and FRS surveys operate in the northern parts of the Irish Sea, and both surveys sample at fixed stations. Though RV "CEFAS Endeavour" and FRV "Scotia" have not as yet undertaken any comparative fishing, the two surveys currently have eight stations (Cefas prime stations A1, B1, B3, B4, C1-C4) in common that are either the same tows or in close proximity (Figure 7.1), and these sites are all fished using ground gear A.

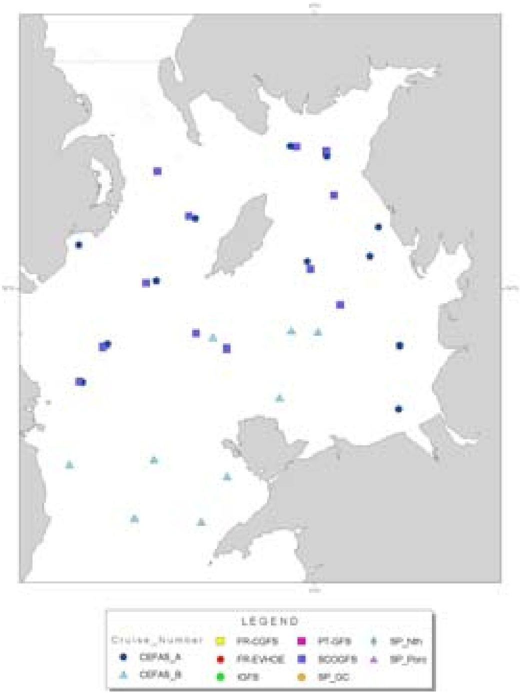


Figure 7.1: Irish Sea survey positions fished by FRS (SCOGFS) and Cefas (A and B) during the Q4 westerly IBTS survey.

7.3 West of Ireland and NW Scotland (VIa, VIIb): UK (Scotland) and Ireland

Both FRS and MI currently sample off the northern and western coasts of Ireland, with FRS sampling a fixed grid, and MI having a stratified random sampling grid. Nevertheless, there is a high spatial overlap of stations in the latitudinal band 53.5°N to 56.5°N, involving about 25 fixed stations fished by FRS (Figure 7.2), and so there should be scope for comparing these surveys. Additionally, FRS and MI have undertaken preliminary studies of comparative fishing (see Annex 2 of ICES, 2005a).

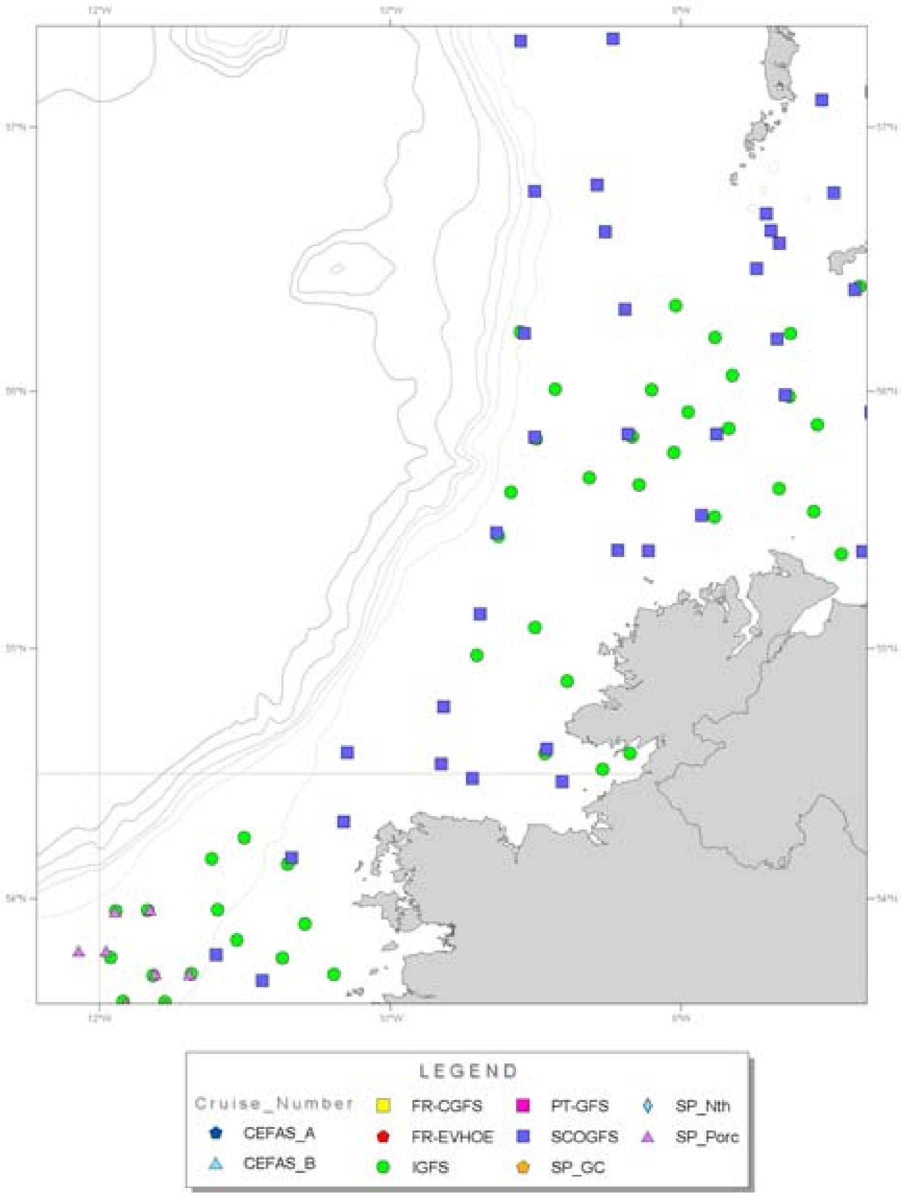


Figure 7.2: Areas of northern and western Ireland fished by FRS (SCOGFS) and MI (IGFS) during the Q4 westerly IBTS survey.

7.4 Celtic Sea: France, UK (England and Wales) and Ireland

Three nations currently sample in the Celtic Sea, with Cefas sampling a fixed grid, and IFREMER and MI having stratified random sampling grids. Nevertheless, there are several stations that are fished by either two or three vessels, and there is a high degree of spatial overlap (Figure 7.3), with all three nations sampling in the latitudinal band 50.5°N to 52°N, and between 5.5°W and 9°W, which gives scope for comparing these surveys in the future. There is more overlap between the Cefas and IFREMER sampling areas, extending southwards to 48°N. RV “CEFAS Endeavour” and RV “Thalassa” have attempted to meet up for comparative tows where possible, though these data are very limited at the present time.

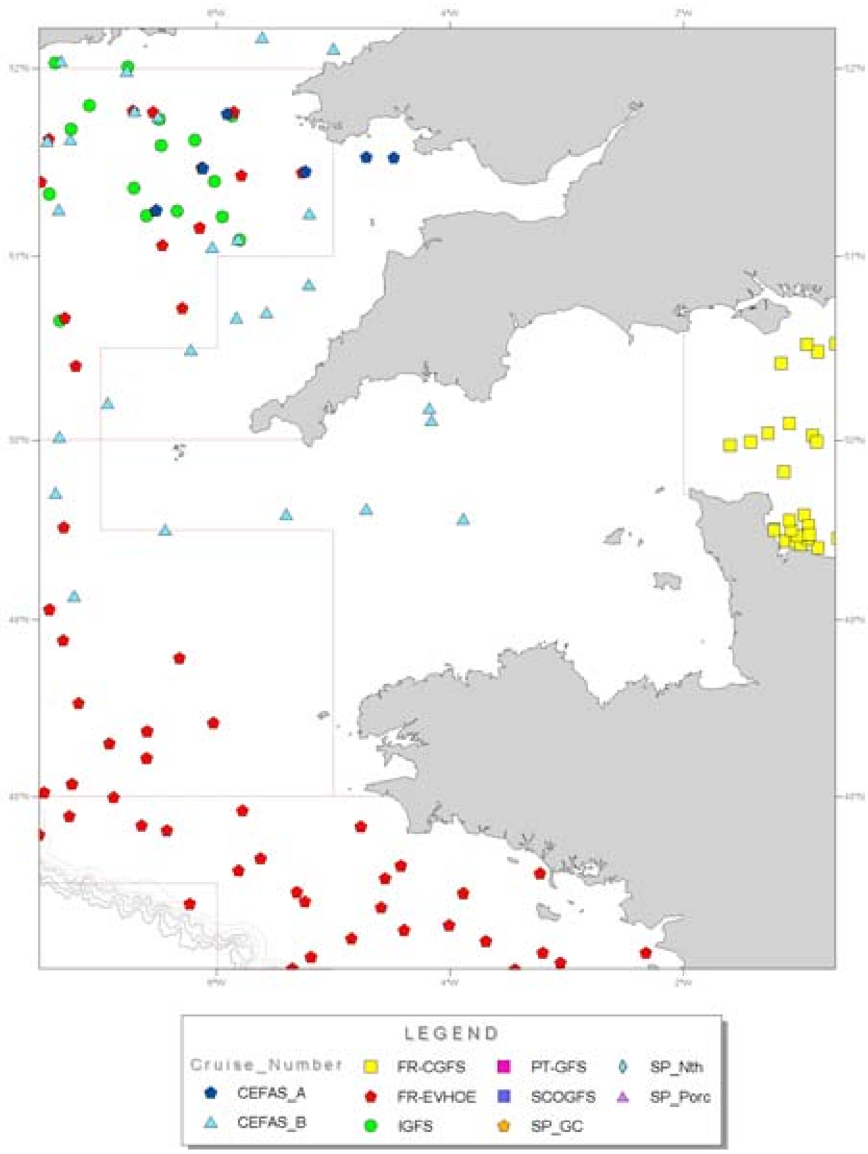


Figure 7.3: Celtic Sea survey positions fished by IFREMER (FR-EVHOE), MI (IGFS) and Cefas (A and B) during the Q4 westerly IBTS survey.

7.5 South-west Ireland: Spain (Porcupine Bank) and Ireland

MI and IEO currently sample on the western shelf off Ireland, but until 2005 there was no overlap between these surveys, since the 200 m depth contour defined the sample limit for both surveys. Nevertheless, since 2005 MI has extended its sampling area up to 600 m and therefore there is an overlapping area between both surveys and this has already been used to perform the first series of intercalibration hauls this year. Both surveys have a random stratified sampling, but there is spatial overlap of stations in the latitudinal band 52.0°N to 54.0°N in depths of 200-600 m (Figure 7.4), and so, with continued coordination, there is scope for undertaking further comparative fishing.

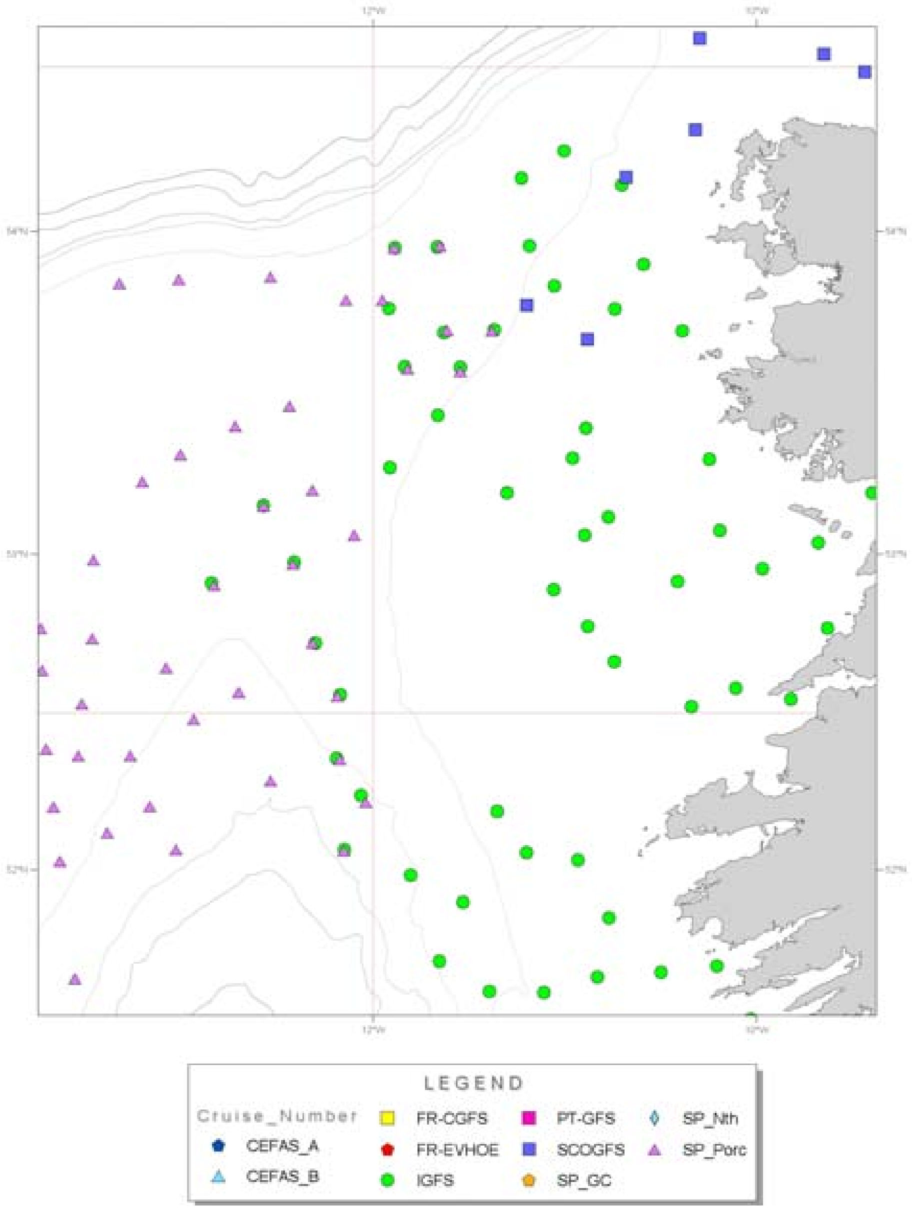


Figure 7.4: South-west Ireland: positions fished by IEO (SP-Porc) and MI (IGFS) during the Q4 westerly IBTS survey.

7.6 Southern Bay of Biscay and Iberian waters: France, Spain (Northern) and Portugal

Currently there is no overlapping area between the sampling areas of the surveys carried out in the Southern Bay of Biscay by IFREMER and IEO (Figure 7.5). Nevertheless the surveys are adjacent and if one extra day for each survey were available, it would be possible to carry out some intercalibration hauls (around 8) each year. This, in the long-term, would allow comparisons and would help to standardize these surveys, as recommended by the IBTSWG and the SGSTS (ICES, 2005b). This overlapping border and procedure was already used during the SESITS project to intercalibrate the GOV with the standard baca (Sánchez, 1999).

Similarly, no overlapping area exists between the Spanish North coast survey and the Portuguese ground fish survey, though once again these surveys border on one another. Once again, one extra day per survey could allow the survey areas to overlap, and could be used to start building a data series of intercalibration hauls that would help standardization of these surveys of the Western IBTS area.

Therefore the WG **recommends** that each of IFREMER, IEO and IPIMAR dedicates 1 day each year in their surveys to start building a data series of intercalibration hauls.

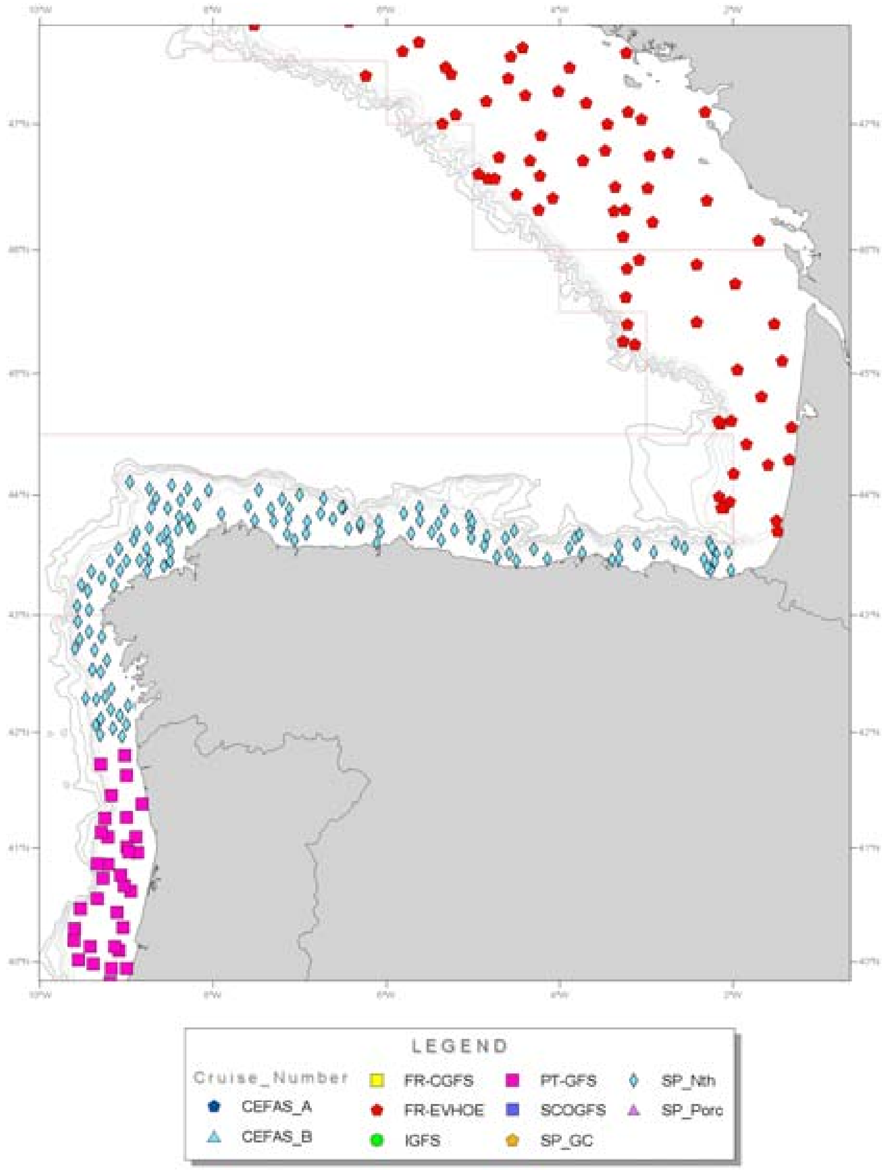


Figure 7.5: Southern Bay of Biscay and Portugal and Galicia: positions fished by IFREMER (FR-EVHOE), IEO (SP-Nth) and IPIMAR (PT-GFS) during the Q4 westerly IBTS survey.

7.7 Gulf of Cadiz and Algarve: Portugal and Spain (southern)

As above, there is no overlapping area between the Spanish Gulf of Cadiz ground fish survey and the Portuguese survey. Nevertheless, these surveys border on one another (Figure 7.6), and given one extra day per each of the surveys, it would be possible to start building a data series of intercalibration hauls to help standardization of these surveys. As in the case of the border between the French and the Spanish North Coast survey, this procedure was used within the SESITS project to intercalibrate between the Standard baca and the Campelen gear used by IPIMAR in Portuguese surveys (Sánchez, 1999).

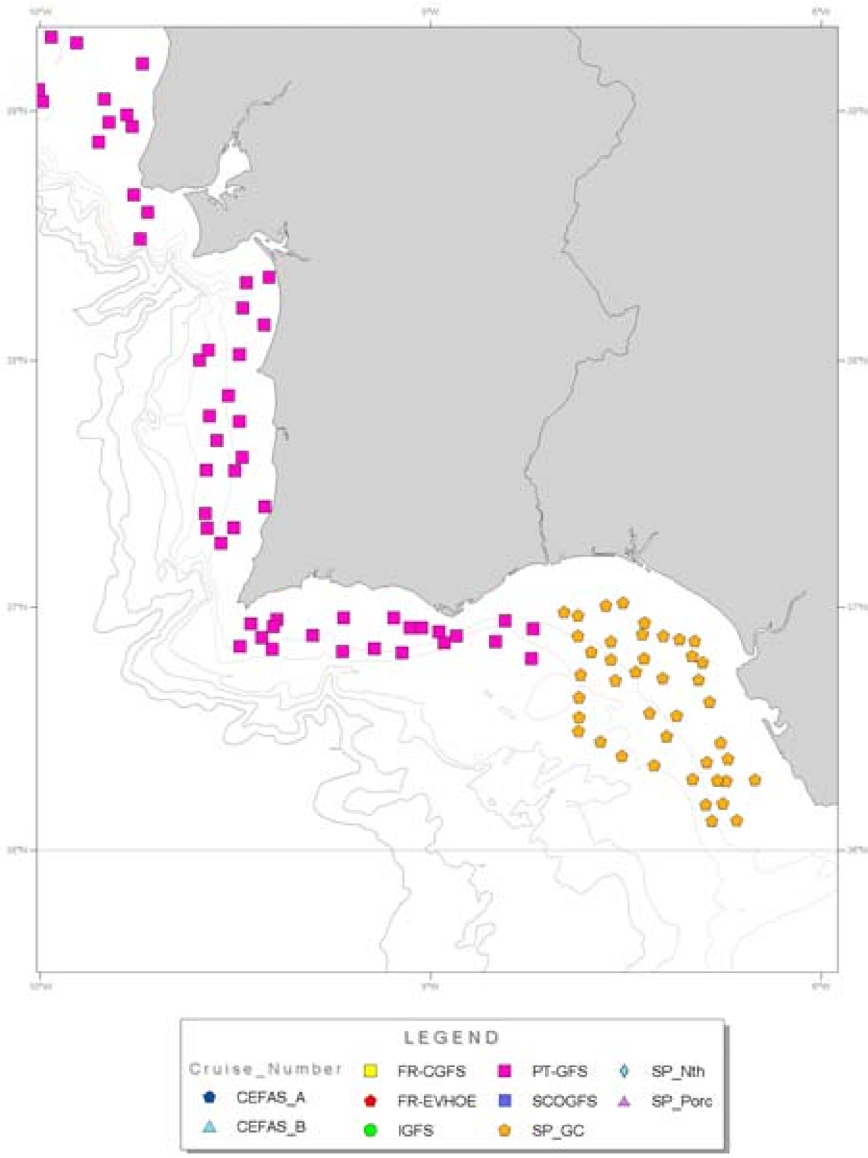


Figure 7.6: Gulf of Cadiz and Algarve: Portugal and Spain (southern): positions fished by IEO (SP_GC) and IPIMAR (PT-GFS) during the Q4 westerly IBTS survey.

8 Review the findings from the SGSTS and WKSAD in respect to issues relevant to IBTS and response (ToR e)

8.1 Study Group on Survey Trawl Standardisation (SGSTS)

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. Among its Terms of Reference there were two passed by IBTSWG, namely ToRs c) investigate the adequacy of some fishing protocol defined in the IBTS manual from ancient studies with respect to the most recent data available from modern monitoring of gear performances; and d) review the GOV specifications with respect to the actual material available for construction.

8.1.1 Standard gear

The group reviewed the characteristics of the ideal standard survey trawl provided by SGSTG (ICES, 2004) and emphasized some of them as follows:

- **Basic Design**: Emphasis was placed on a gear that was easy to deploy correctly and which was insensitive to minor rigging changes.
- **Ground gear contact**: Good bottom contact that was easy to maintain under the normal operating conditions was emphasised
- **Herding**: Ideally the net should not herd the fish at all, to remove the variance due to behavioural differences under different conditions.
- **Vertical opening and horizontal opening**: Fixed geometry under all routine conditions, especially for different depths was emphasised

The SGSTS also added two additional characteristics to the existing list:

- **Selectivity**: The net should have minimal mesh selection and also ground gear selection.
- **Speed of deployment**: The net should allow fast deployment and recovery to allow the maximum number of stations to be occupied.

Based on these parameters, the study group agreed that, in general, none of the existing survey gears were able to meet these criteria. As discussed by SGSTG, the most obvious candidate in the future would be the outcome of the Norwegian Survey Trawl project. Regarding this model, a full scale model has been tested at the end of 2005 in the N/O “Thalassa”, this model presented some minor changes from the original concept, as a result of the tests done on a flume tank in 2004 and a 1:2 scale model with the M/S “Fangst” (50’ trawler) in spring of 2005. Previous trials of self spreading ground-rope compared to a 14’’ rockhopper both rigged on a campelen showed that under trawl escapement of cod was significantly reduced. These convincing results combined with encouraging practical experiences from commercial testing of self spreading plated ground gear explains why the new gear concept includes the plated gear concept.

8.1.2 Monitoring net geometry and performance

A key aspect of standardization in trawl surveys is the monitoring of the trawl deployment in the field. Even if all institutes were able to deploy identical nets, it would still be possible to introduce considerable variation due to different net performance. Bearing this in mind the Study Group reviewed both the parameters usually monitored in most of the IBTS Surveys (headline height, door spread and speed over the ground OTG, together with wingspread), and the new parameters that now can be recorded and logged using new sensors. Among these there was a revision of the possible impact on trawl performance of bottom contact, door angle, speed through the water (TTW), trawl symmetry, trawl position relative to vessel, warp tension and length-out related with the use of new trawl computer control of the winches that regulates the tension during the trawl. Other factors reviewed regarding their possible impact on trawl performance were weather conditions and surface-waves

Only headline height, door spread, speed-OTG, and duration are generally routinely recorded. Of these tolerance recommendations only exist for headline height and door spread. Research work exists to suggest that speed-TTW, wing spread, bottom contact, door angle and wave heave are all important measures that should be recorded and should be part of a suite of trawl surveillance parameters for which tolerances and QA recommendations should be developed.

Integrated approach to trawl surveillance

Because the data are reported as a mean value per station, it is not possible to use this database to examine the trawl performance in any more detail. An average value could conceal a period when some parameter fell outside guidelines. It also allows no appreciation of variance around that mean.

One solution is to construct a mathematical model using the raw trawl monitoring data for each station including bottom contact. Rules for weighting each dataset could then be applied. The first steps will be to collate detailed raw monitoring datasets to evaluate weighting rationales for each parameter. A Principle Component Analysis (PCA) could also initially be used to reduce the dimensionality in the data. This approach was going to be tested by FRS using data from recent IBTS surveys in the North Sea and the results of the analysis will be reported to the next SSGSTS meeting.

8.1.3 Generic ICES survey trawl standardization programme

Fishery-independent indices of stock abundance are a primary product of groundfish trawl surveys used by stock assessment models. The quality of these estimates relies heavily upon a survey's ability to ensure constancy in the sampling efficiency of the trawl between stations and over time. This constancy can be achieved by ensuring constancy in the construction and repair of the trawl and the procedures used in its operation. The study Group, after reviewing the available examples agreed that the best one to work from would be that developed by DFO for the Campelen in Canada and used this as basis to present what should be included in a reference manual for standardisation of surveys and survey gears.

A Survey Trawl Standardization Program should entail detailed, precise and unambiguous trawl plans, a quality control program enforcing manufacturing and construction tolerances and an ergonomically designed fishing gear checklist as elements designed to ensure a high level of conformity to a standardized survey operations. The reference manual should be designed as the definitive reference guide for procurement officers, contractors, research vessel crews and scientific staff, ensuring consistency at all stages from design to deployment. According to the SGSTS, the main points that should be addressed by such a manual are the following:

- A consistent and understandable set of standard net drawings based on the ICES 1999 specifications
- Standardized protocols for net procurement and construction
    - Standardization of construction specifications
    - Parts list
    - Tolerances to each key specification
- Standardized protocols for net rigging prior to survey
    - Inspection at the begging and at intervals during the survey (specially after mending)
  - Standardized protocols for net repair at sea and on return

- Standardized protocols for operating life of the net
- Training of crew and scientists
  - Scientists about gear technology
  - Gear technicians and fishing crew about survey scientific purposes and uses.

8.1.4 Operational requirements to be used in intercalibration studies, and develop protocols to be followed when changes are made to the survey gear:

Advice on intercalibration procedures developed from WKSAD

- Paired parallel tows carried out with small distances between vessels,
- Paired sequential tows carried out over the same ground
- Modelling of abundance indices over time, e.g. as year-class curves, with a gear-change factor included in the model is a further option.
- Gradual incorporation of a new gear into a survey may be another way of inter-calibrating.
  - For multi-vessel surveys, several days should be allowed for paired tows by each pair of vessels so far as logistically feasible.
  - If possible, twin trawling should be used for paired tow studies (symmetry)
  - Factors that are difficult to control should be randomised as far as possible.

8.1.5 What and when to intercalibrate

The group noted that such changes fall into three categories:

- Improvements designed to allow better compliance with the standards already agreed for the survey: (e.g. incorporation of Scanmar equipment to ensure consistent net geometry; Bottom contact sensors to ensure that the full tow length is effective; Improved specifications for procurement and repair of nets; Adjustments to improve net configuration in different depths; Improved fixing of fishing line to groundrope; More accurate position fixing with GPS)

  The group did not think that this category of change to a survey should necessitate an intercalibration study because there is no guarantee that an estimated factor for a small change in protocol would provide a more accurate time-series of indices.

- Changes that depart significantly from agreed standards for the survey: (e.g.: deliberately to allow an improved net to be used; Standard equipment is no longer available; Insufficient attention has been given to net specifications, The standards are too difficult or too expensive to apply in some circumstances; The standards are thought to be defective or unsuitable)

  For this level of change, it is recommended that full intercalibrations be carried out at the time of the change, although several changes could be saved up to be covered by one intercalibration factor, as for the third category below.

- Minor changes or departures from agreed standards whose effects are individually hard to estimate.
- *Since intercalibrations are generally very costly and detract from the precision of a series of abundance indices, it is recommended that such minor changes be saved up and are implemented all at once so that their effects can be assessed with just a single intercalibration procedure.*

8.1.6 Evaluation of differences between currently used GOV nets in the North Sea IBTS and each other and the agreed standard

Regarding the term or reference d) passed by the IBTSWG in 2005, it was agreed by the SGSTS to carry out a study to determine which materials and methods are currently used by Scotland, England, Ireland and France in the construction of their GOV (36/47) survey trawls. The purpose of the study is to investigate how present GOV's differ from the perceived standard net specification being developed for the IBTSWG and to be given in ICES (2005) Net plans which detail the netting and frame wire materials actual being use are to be provided by representatives from the four institutes. These plans will then be drawn up into a standard format using IFREMER net drawing package DynamiT©. This will allow comparisons to be made of changes in construction which deviate from the Standard Net specification since many components used in its original construction are no longer available. Furthermore it was agreed that this would be an issue which would have to be addressed for any long term survey gear.

8.2 WKSAD

The Workshop on Survey Design and Data Analysis [WKSAD] (Co-Chairs: P.G. Fernandes, UK, and M. Pennington, Norway) met in Sète, France, from 9–13 May 2005 to:

- a) evaluate alternate analyses of estimates of the abundance, associated variance, and density maps, from surveys of a simulated fish population whose abundance is known and then expand this to several actual survey datasets;
- b) review the state of knowledge regarding the effect of trawl duration on fish catch rate with a view to considering a reduction in sample trawl duration;
- c) evaluate analyses of covariate data which could provide improved precision of abundance estimates;
- d) review methods for combining surveys of the same resource using different methods;
- e) evaluate the sensitivity of methods to estimate biological parameters in terms of analytical assumptions and measurement error.

8.2.1 Simulated surveys

A simulation exercise was conducted whereby a variety of trawl survey designs and design types were applied to two simulated fields of fish density. As expected this exercise demonstrated the advantage of using more systematic designs in the presence of more autocorrelation. However, the exercise also showed how random surveys can perform better when combined with route optimisation algorithms which, in a fixed time, allow for more trawl samples to be taken than a systematic design; the latter only occurs when the autocorrelation is low.

A decision tree

As a result of the simulations and subsequent discussions a decision tree (Figure 8.2.1) was proposed with the objective of providing advice on the best survey design to implement given the objective of deriving a precise estimate of the abundance of a marine resource. Generally, the decisions are aided by knowledge of the spatial distribution of the fish: the more autocorrelation there is in the distribution, the greater the advantage of introducing some form of regular spacing to the survey design.

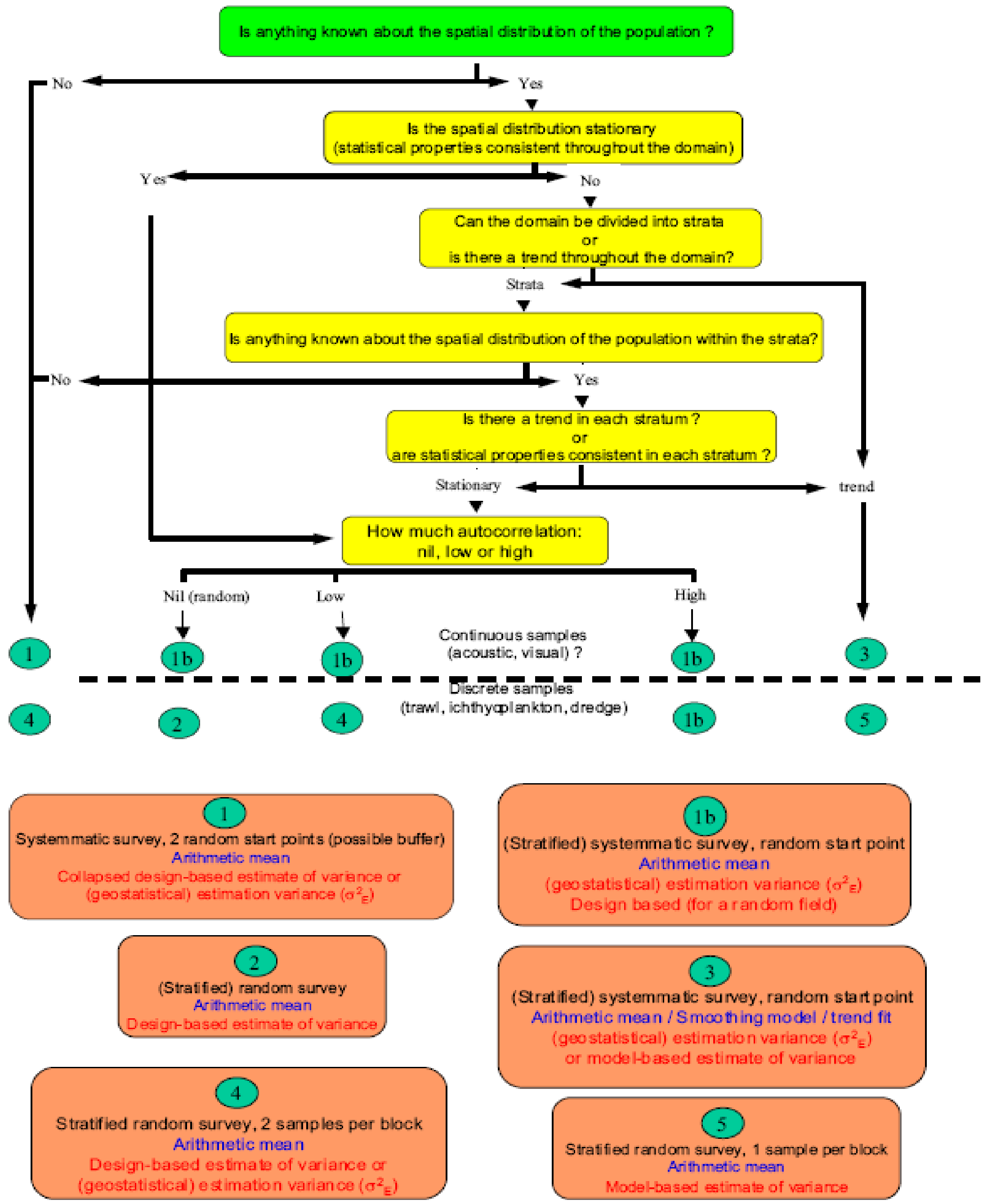


Figure 8.2.1: A decision tree for designing a survey in marine resource.

8.2.2 Tow duration

In many cases, distinct advantages can be gained from reducing the duration of a trawl tow. These include: an increase in survey precision; less wear on gear; less sorting time, providing more time to take other biological measurements. Such advantages may be specific to certain conditions so the possibility of reducing the tow duration should be examined by conducting experiments. If and when it can be demonstrated that reducing tow duration increases survey precision, then that reduced tow duration should be employed.

8.2.3 Use of covariates

Covariate information can be used to improve both survey design and analysis, as well as provide useful information on possible causes of inter-annual variation in mean abundance and other parameters. An example was described where survey design and wind conditions explained about half the interannual variation in survey density indices.

8.2.4 Combining surveys

Where the relationship between acoustic data and trawl catch data is strong, the between-station acoustic data can be used to extrapolate fish abundance and improve the overall index of bottom trawl surveys. Independently derived indices can be combined according to a weighting scheme derived directly from the observed sampling variability in the indices: an example was given of a (herring) stock assessment model which uses this.

8.2.5 Biological sampling

The effective sample size to determine biological parameters such as a length distribution can be much smaller than the number of samples taken. This has implications for the efficiency of the sampling process and should be examined more widely.

Further development of coherent mapping of biological parameters would be desirable.

8.2.6 Recommendations from WKSAD

The spatial distribution of the fish should be considered when designing and analysing surveys. A decision tree has been provided to assist in the choice of methods available. Survey planners should be fully aware of the assumptions allied to any model-based estimation technique.

The survey specific effect of tow duration should be investigated in individual surveys. Shorter tows should be implemented if found to provide an improvement in the precision of the survey.

Covariates should be used, if available, where they provide an improvement in the precision of the survey. Be aware that the covariates must have a good relationship with the response and be available over the entire sample space (not just the sampled area).

Inverse variance weighting should be considered to combine survey data. When combining indices of the same resource, the inverse variance of the individual indices is a useful weighting scheme.

The effective sample size to determine biological parameters should be investigated. The effective sample size of fish selected for ageing, measuring, etc. can be much smaller than the actual number of animals sampled, it is, therefore, important to account for this when reporting information on biological parameters. In cases where this can demonstrated to be smaller than current sample sizes more effort can be incorporated into sampling other species (including non-fish species) for consideration of an ecosystems approach (e.g. to compile community- based indicators).

Quantiles of individual distributions can be used to map biological data rather than interpolating a summary statistic (e.g. mean length).

Further meetings of ICES WKSAD: The group does not recommend meeting until such time as certain analyses have been carried out which demonstrate progress and can form the basis of further discussion. The following areas require further investigation and participants are encouraged to pursue appropriate studies in:

- Simulations to determine the levels of autocorrelation required for optimal survey design strategies.
- The effect of reduced tow duration (and subsequent increased sample size) on the precision of the survey.
- The effective sample size of biological (trawl) samples:
  - Methods for incorporating covariates which improve the estimation of fish abundance.
  - Methods to interpolate statistical distributions, for the purposes of, for example, improving the interpolation of acoustic survey data.
  - Methods of determining the total precision in surveys

8.2.7 Comments from the IBTSWG

During this second meeting of WKSAD an important part of the discussion focused on theoretical aspects of survey designs and the most informative output of the meeting to IBTSWG is the decision tree. From this and in answer to the question "how to compute variance of our estimates in our IBTS surveys?" the output lies mostly on two choices, model based estimate (cf, Cochan, 1977) or geostatistical estimate. For the estimate itself, the arithmetic mean is to be used in all cases except when a trend can be identified in the domain.

In the other four points (tow duration, use of covariate, combining surveys and biological sampling) there was no agreement on any conclusions that could support firm recommendations. One interesting study however in the use of weather condition as a covariate but which did not seem to be welcomed as it should have to some participants (Poulard, Trenkel, 2005 presented at the ICES ASC and submitted to Canadian Journal of Fisheries and Aquatic Science).

9 DATRAS database (ToR f)

9.1 Data policy

The Working Group reviewed the new ICES data policy. In general the Working Group is positive towards an open data policy as it will encourage use of data. The group evaluated the use of IBTS data in 2003 (IBTSWG report CM 2003/D:05) and found that the IBTS data already was extensively used to the benefit to the scientific community and the use of the data is expected to increase in the coming years.

However, the group found that the policy did not take into consideration the problems that an open policy could create for the data providers as expressed in previous IBTS reports. The main concerns being that data can be misinterpreted by users not knowing the survey, gear and changes made during the overall time series, and that the existing database contains some errors that have not as yet been corrected. The group fears that, if all data are available in the public domain, data suppliers may have to spend large amounts of time on verifying the results and interpretation of studies undertaken outside the ICES community. This can be especially problematic if a misinterpretation is published or publicised, where it is not transparent how they have reached their conclusions.

The group also raised the question; "*who is responsible for refuting any claims based on a misinterpretation of the data, ICES, the IBTSWG or the individual institutes*?"

With an open policy the group also fear that data could be copied and published with a web front-end for downloading of the data other places than in ICES. This would result in more than one version of the DATRAS database on the Internet. It should therefore not be possible to publish the data with download facilities on the Internet unless it is in corporation with ICES, where ICES are providing regularly updates or direct link to the database.

The discussion on open data access is not unique to ICES but is also taking place in relation to the new EU fishery data collection regulation. The IBTSWG therefore recommends that each institute discusses the issue internally and find out what legislations applies to data in their country.

The group would prefer that ICES implement the access levels that the group proposed last year. This policy covered the groups concerns and at the same time opened up access to the data. The group recommends that each institute accept this access policy.

If the open access has to be accepted due to national and international legislations, the group still wants to be informed about who is using the data and for what purpose. This could be implemented in the next version of DATRAS. One possibility could be that before downloading data through the internet the person requesting data has to fill in a web form explaining what the data will be used for, where it will be published and some back ground information on the person who requests data. This information should be send automatically by email to the survey coordinator from each institute to keep them informed.

One of the main reservations about making all data publicly available is the misidentification of species (see WD 3 in Annex 5). A way to resolve this could be to only release data for problematic taxa on a family or genus level, and only provide data for these taxa at species levels for requests from the ICES community. DATRAS does not currently have this capability, though it could be built in.

On the DATRAS download page there is a 'health warning' explaining what to be aware of when using the survey data. This health warning should be accepted before data are downloaded and it should be placed at the top of the download file in order to ensure that data users see and hopefully read the health warning.

9.2 DATRAS next version

ICES has made an agreement with the EU to develop variance estimations of the survey indices and improve and further develop DATRAS.

The development of the next version of DATRAS starts in April 2006 and will be in two phases:

1. Deadline 1 November 2006:
    a. Finalise indices calculations for BTS, EVHOE and Scottish Northern IBTS
    b. Calculate variance estimates for all indices
    c. All data should be provided before Aug.
2. Deadline 1 November 2007:
    a. Improve existing functionalities in DATRAS
    b. Add functionalities to the existing DATRAS system
    c. GIS mapping of data
    d. Improve data checking
    e. Update DATRAS so the system can accommodate the new ICES data policy

9.2.1 First phase:

EU has requested that ICES include variance estimation of the indices in the DATRAS database and provide them with a report by 1st November describing the performance of the surveys. To describe and decide how the variance estimation should be created a group of expert will be invited to ICES in May. The group of expert is expected to consist of the Chairs of the survey working groups (IBTSWG, WGBIFS and WGBEAM) and a statistician.

The first DATRAS project incorporated the French EVHOE, the Dutch BTS and the Scottish Northern IBTS survey into the database. However, the abundance estimation procedures were not fully implemented for these three surveys. In order to calculate the variance these indices have to be developed in the first phase of project.

The data from the three surveys EVHOE, BTS and Scottish Northern IBTS is not up to date and these data have to be in ICES before August in order to be included in the analysis.

9.2.2 Second Phase

The second phase will be updating and improving the current version of DATRAS as described below.

9.2.2.1 Improve existing functionalities in DATRAS

DATRAS have now been running for 2 years, and it has been the experience that:

- non-standard procedures for abundance estimation for species that are not fully covered in time and space is needed;
- Downloading functionalities are not optimal; these are found to be inflexible;

In order to solve the first problem it should be possible to calculate the output by:

- year and quarter (e.g. update the data warehouse with the latest survey without recalculating all data);
- just one species in a sub-area of the survey area (e.g. plaice in Division IIIa in the NS_IBTS survey);
- Exclude output for one species in some years if data are missing (e.g. do not create age depended output for saithe in 1974 + 1975 in the NS-IBTS survey)

In order to meet the requirement from the users the download through the web facility has to be improved and made more user-friendly:

- Expand the download of data through the web. This should include pivot tables and more flexibility with regard to combined datasets. In the current web application the following dataset can be downloaded:
- Exchange format
- Age CPUE by haul for standard species
- Length CPUE by haul for all species
- Mean CPUE by length by sub area
- Mean CPUE by age by sub area
- SMALK data

In addition to these dataset, DATRAS produce:

- Mean length by sub area
- CPUE by age and length for standard species

- Mean CPUE by age by area

These datasets are not available on the Internet, but should be.

- Provide conversion factors and index settings information on the web
- Provide information on updates made to the calculations/database and the data.
- Documentations on calculations etc.

Since the first DATRAS project started the .NET technology has been introduced and become the state-of-the-art technology. If the DATRAS code at any stage should be moved from ACCESS to .NET it would be most cost efficient to do this together with the modification of the code that will make the calculations and the output more flexible. Moving the code to .NET will significantly improve the future possibility for further development of new functionality.

The web front-end needs to be expanded. It should be possible to view the different dataset through pivot tables and it should be possible to download all datasets either by species or by country for a given survey, year and quarter.

9.2.2.2 Add functionalities to the existing DATRAS system

The first DATRAS project did only produce the same data product as the old IBTS system did. However, requests from the ICES assessment working groups on standard outputs are increasing and in order to get the optimal out of the collected and stored data these output should be produced.

The outputs requested are:

1) Maturity ogive weighted by CPUE
2) Weight by age and length weighted by CPUE

9.2.2.3 GIS mapping of data

EU has funded the FishMap project that is based on the NS-IBTS and BTS data in the DATRAS database. This project provides a GIS presentation of the survey data. However, when this project was set up no funding was provided for a direct link – transfer of data - between FishMap and DATRAS. A direct link between the GIS database residing at CEFAS and the DATRAS database at ICES will provide the mapping functionalities requested for the NS-IBTS and BTS data. At the same time establishing this link will make it easy to expand the FishMap project to cover other ICES areas.

9.2.2.4 Improve data checking

Within the first DATRAS project a data screening utility (DATSU) was developed based on the former COBOL data screening program. The overall goal was that the new DATSU should at least provide the same standard for quality assurance as the old COBOL program. However, it should be web-based and so flexible that it could include other formats than just the IBTS dataset.

DATSU was developed and have been used for data screening for all the survey data in ICES for the last 3 years. However, as the system have been used the submitters find that more facilities could be included to make the data quality even better and to improve user-friendliness.

DATSU need to be improved in the following areas:

- Description of fields on the web;

- Provide graphs etc. on the web where users can view outliers;
- Flag-functionality showing when exchange format have changed.

ICES has already undertaken parts of these improvements. The description of fields is already available in the DATSU database and there is a page on the web showing the format with the fields. The web part will therefore need to be updated with a link to the field description stored in the database.

The flag-functionality to highlight changes should be added within the database and be provided on the web together with the format page, in order for the data submitters and others to be aware of updates.

9.2.2.5 Update DATRAS so the system can accommodate the new ICES data policy

In 2005 ICES have agreed on a new data policy for all data types stored in ICES. The policy is opening up the access to data and unless a data submitting country specifically denies access to their data, their data will be publicly available. This is a large change from the data policy that the trawl survey data have worked under previously where the rights were defined by the survey group and the same for all countries. This means that the security system developed during the last DATRAS project do not meet the new requirements and need to be updated.

This will be done by combining DATRAS with the Database on Accessions and Documentation, which is ICES' newly developed administrative database for data submission and access rights.

As noted above, it may be preferable to ensure that public access to data is restricted to higher taxonomic levels for those taxa where misidentifications and inconsistencies in reporting level exist, and such functionality should also be built into the DATRAS system.

10 Shape files and supporting information for the agreed strata in the Eastern Atlantic (ToR g)

10.1 Stratification west of Scotland

Following on from the presentation of geographical and bathymetric strata for the Bay of Biscay and Celtic Sea at WGIBTS 2005, FRS conducted a similar exercise in relation to ICES area VIa (West of Scotland). The working document (Burns, 2006) describing the process is provided in Annex 5 (WD 2) to this Working Group report.

This study aimed to construct meaningful species groupings based on the aggregated fish data from the quarter 4 Scottish Groundfish Survey over the period 1998 - 2004. The study highlighted several species groupings which appear to correlate especially well with both sediment type and depth. A limited proportion of stations were sampled as part of the HABMAP project between 2001 and 2004 and in addition to sediment analysis, beam trawls were also conducted to sample the epibenthos and are in the process of being analysed.

10.1.1 GIS Shapefiles

A series of meaningful biological strata were created which incorporated the findings of the study, particularly the correlation of species assemblage with depth and sediment type. The following geographic and bathymetric strata were developed for ICES area VIa; which is the target area for the Scottish Groundfish surveys in quarter 1 and quarter 3. The current GIS Shapefiles were made available to WGIBTS. A description of the four geographical strata as well as the bathymetric strata can be found in Table 10.1.1. The distribution of the strata is illustrated in Figure 10.1.1.

10.1.2 Further work

In addition to incorporating the epibenthos information, FRS will liaise with other countries to ensure that the depth information used is the most appropriate. The revised work will be presented to WGIBTS in 2007.

Table 10.1.1: Description of Geographical and Bathymetric strata.

GEOGRAPHICAL STRATA	BATHYMETRIC STRATUM
North East Via	31 - 80m
Outer Hebrides Via	81 – 120m
Minch	121 – 160m
South VIa	161 – 200m
	201 – 300m
	301 – 400m
	401 – 500m

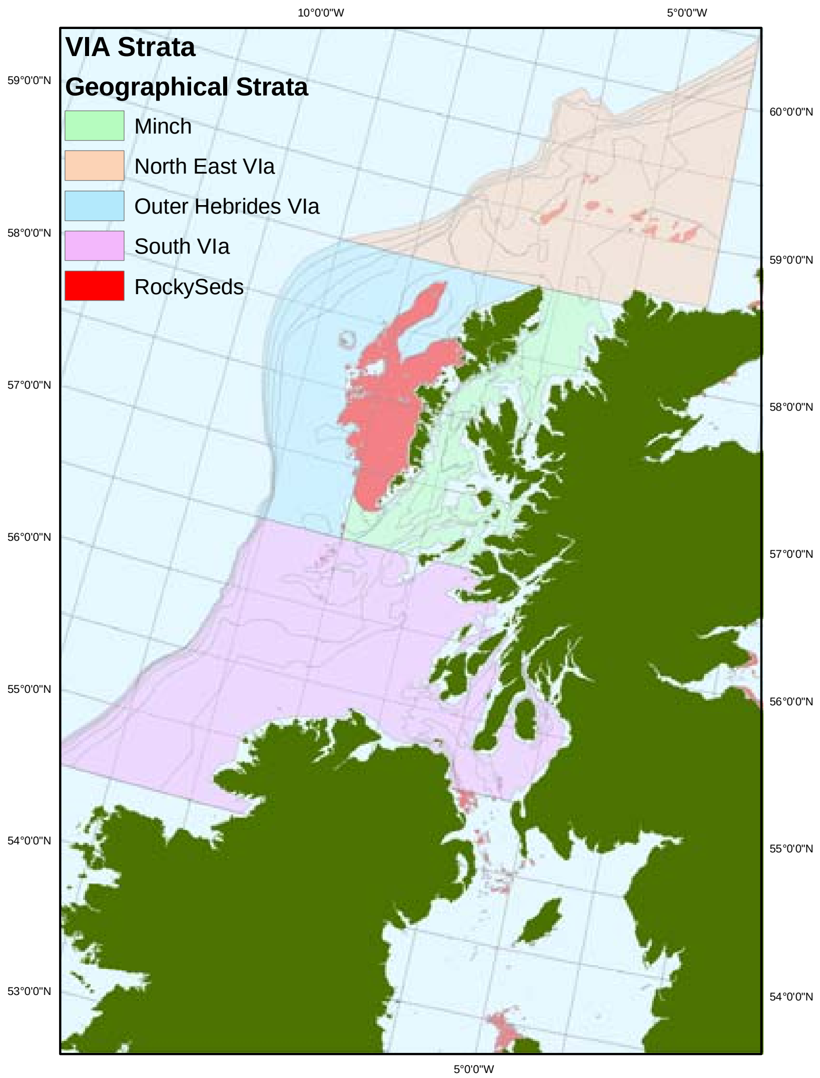


Figure 10.1.1: Map showing 4 primary geographical strata for ICES area VIa.

11 Identification keys for North Sea, and southern and western IBTS groundfish surveys (ToR h)

11.1 Introduction

Groundfish surveys provide the most appropriate data for the examination of large-scale spatial and temporal analyses of fish assemblages for continental shelf waters of the North-eastern Atlantic, and therefore for the derivation of metrics with which to assess changes in the structure, function and diversity of fish assemblages. Groundfish survey data are becoming increasingly important for assessing the status of commercial and non-target fish species and fish communities as a whole. Hence, many aspects of IBTS surveys (e.g. catch sampling and sub-sampling protocols, and fish identification) should ensure that data collection is appropriate for studies of the wider fish community.

It has been highlighted that the IBTS has potential problems associated with (a) input errors and (b) the misidentification of selected taxa, especially with several taxa of non-target fish species (Daan, 2001; ICES, 2005). Additionally, there are several taxa that member states report at a range of taxonomic levels (species, genus or family), which may affect the utility of survey data for fish assemblage studies (e.g. biodiversity studies and metrics for fish communities).

The problematic taxa in the North Sea and in the southern and western IBTS surveys include:

- Lampreys (*Petromyzontiformes*)
- Smoothhounds (*Mustelus* spp.)
- Skates and rays (*Rajidae*)
- Shads (*Alosa* spp.)
- Argentines (*Argentina* spp.)
- Rocklings (*Gadidae, Lotinae*)
- Clingfishes (*Gobiesocidae*)
- Sticklebacks (*Gasterosteidae*)
- Seahorses and pipefish (*Syngnathidae*)
- Redfish (*Sebastes* spp.)
- Scorpion fish (*Scorpaena* spp.)
- Sea scorpions (*Cottidae*)
- Horse mackerel (*Trachurus* spp.)
- Sea breams (*Sparidae*)
- Mullets (*Mugilidae*)
- Wrasse (*Labridae*)
- Eelpouts (*Zoarcidae*)
- Snake blennies (*Stichaeidae*)
- Blennies (*Blennidae*)

- Sand eels (*Ammodytidae*)
- Dragonets (*Callionymus* spp.)
- Gobies (*Gobidae*)
- Topknots (*Phrynorhombus* sp. and *Zeugopterus* sp.)
- Scaldfish (*Arnoglossus* spp.)
- Soles and tonguefishes (e.g. *Bathysolea* and *Diclogoglossa*)

Additionally, those surveys operating on the edge of the continental shelf may sample many other problematic taxa, such as deep-water sharks (Squalidae), rat-tails (Macrouridae), myctophids (Myctophidae), hatchet fish (*Sternoptychidae*), *Beryx* spp. and *Hoplostethus* spp.

11.2 Taxonomic problems in the DATRAS database

The DATRAS database is now very extensive and contains all information collected during the North Sea IBTS from 1965 onwards. The use of these data for analyses on the main commercial species is relatively safe, since these specific data are used and checked regularly and may therefore be considered reliable. However, using the dataset for studies on non-commercial fish species can be problematic, since the dataset contains some inconsistent and incorrect species identifications (Daan, 2001; ICES, 2005). This is due to the fact that species identification is the responsibility of the participants of the surveys and submitted data are assumed to be correct.

A quality check has been undertaken on data in DATRAS (North Sea International Bottom Trawl Survey, for the years 1965-2005, last modified on 6 February 2006), and this is described in WD 3 (Annex 5). This working document deals with several topics concerning misreporting, namely:

- Reporting at a range of taxonomic levels (species, genus or family), which may affect the utility of survey data for studies of fish assemblages (e.g. biodiversity studies and metrics for fish communities);
- Length records for some species of fish that exceed the theoretical maximum lengths;
- Detailed analyses to identify possible errors of selected species that are suspicious

11.3 Identification keys

The European Register of Marine Species (ERMS) provides a checklist of the marine flora and fauna occurring in European seas and also provides a bibliography of important identification guides for marine taxa (Costello *et al*., 2001). Those field guides that are considered useful for identifying fishes and epifauna in IBTS surveys are summarised below:

Fishes:

Wheeler, A. (1969). The fishes of the British Isles and North West Europe. Michigan State University Press, 613pp.

Wheeler, A. (1978). Key to the Fishes of Northern Europe. Frederick Warne, London. 380pp.

Whitehead, P.J.P., Bauchot, M.L., Hureau, J.-C., Nielsen, J. and Tortonese, E. (Eds.) (1984). Fishes of the North-eastern Atlantic and the Mediterranean, Vol. 1-3. UNESCO, Paris, 1473pp.

Marine invertebrates (general):

Hayward, P.J. and Ryland, J.S. (1990) The Marine Fauna of the British Isles and North-West Europe (two volumes). Clarendon Press, Oxford, 996pp.

Hayward, P.J. and Ryland, J.S. (1995) Handbook of the Marine Fauna of North-West Europe. Oxford University Press, 812pp.

Cnidarians:

Cornelius, P.F.S. (1995a) North-West European hydroids and their medusae Part 1. Synopses of the British Fauna (New Series) No. 50, 347pp.

Cornelius, P.F.S. (1995b) North-West European hydroids and their medusae Part 2. Synopses of the British Fauna (New Series) No. 50, 386pp. Manuel (1988) British Anthozoa. Synopses of the British Fauna (New Series) No. 18

Crustaceans:

Crothers, J. and Crothers, M. (1983) A Key to the Crabs and Crab-like Animals of British Inshore Waters. AIDGAP/Field Studies Council.

Falciai, L. and Minervini, R. (1995) Guia de los crustaceos decapodos de Europa. Ediciones Omega, Barcelona, 299pp.

Ingle, R.W. (1996) Shallow-water Crabs. Synopses of the British Fauna (New Series) No. 25, 243pp.

Naylor, E. (1972) British Marine Isopods. Synopses of the British Fauna

Mauchline, J (1984) Euphausiid, Stomatopod and Leptostracan Crustaceans. Synopses of the British Fauna (New Series) No 30, 91pp. Smaldon, G. Holthuis, L.B. & Fransen, C.J.H.M. (1993) Coastal Shrimps and Prawns. Synopses of the British Fauna (New Series) No. 15, 142pp.

Molluscs:

Graham, A. (1988) Molluscs: Prosobranch and Pyramidellid gastropods. Synopses of the British Fauna (New Series) No. 2 (Second Edition), 662pp.

Jones, A.M. and Baxter, J.M. (1987) Molluscs: Caudofoveata, Solenogastres, Polyplacophora and Scaphopoda. Synopses of the British Fauna (New Series) No. 37, 123pp.

Tebble, N. (1976) British Bivalve Seashells. BMNH

Thompson, T.E. (1988) Molluscs: Benthic Opisthobranchs . Synopses of the British Fauna (New Series) No 8, 356pp.

Picton, B.E. and Morrow, C. (1994) A Field Guide to the Nudibranchs of the British Isles. Marine Conservation Society, Immel Publishing Ltd., 128pp.

Echinoderms:

Mortensen, T. (1977) Handbook of the echinoderms of the British Isles. Clarendon Press, Oxford, 471pp.

Picton, B.E. (1993) A Field Guide to the Shallow Water Echinoderms of the British Isles Marine Conservation Society, Immel Publishing Ltd., 88pp.

Other taxa:

Gibbs, P.E. (1977) British Sipunculans. Synopses of the British Fauna. 35pp.

Millar, R.H. (1970) British Ascidians. Synopses of the British Fauna, 92pp.

11.4 ZEUS Species Identification Software

In recent years, there has been a growing concern for the quality control of survey data. Important aspects of concern include the correct species identification and proper recording of maturity stages. In order to facilitate this, several laboratories that are involved in internationally-coordinated surveys have set up photo-collections of fish, benthos and maturity stages. During the 2004 meeting of the IBTSWG in Lisbon, it was agreed that a workshop should be held to discuss the possibility to combine these photo collections into one international set. This Workshop was held at RIVO (IJmuiden, Netherlands) later that year. The participants decided to create a "simple" application that can be used to easily show photos to help with taxonomic identification (of fish, shellfish and benthos) and standardisation of maturity stages. RIVO has taken the lead in the development of this application. A first version named ZEUS 1.0 was launched in May 2005 and was distributed among IBTSWG members.

The setup of the photo collection 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 (Figure 11.1). Over time, ZEUS aims to cover the entire survey-area of all IBTS-members, from Portugal to Norway. The application is available on a CDROM 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.

All members of the IBTSWG are requested to provide comments and photos to RIVO in order to improve and expand ZEUS. Photographs of some species were provided during the meeting (Table 11.1), though there are still many species for which good photographic images are not available (Table 11.2). 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:

Instructions for photos:

- 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.

Instructions for file names:

- 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

- • File names for maturity stages should consist of the scientific name, sex, stage, number, e.g.: Gadus_morhua_M_1_01.

Figure 11.1: Example of a window displayed by the program ZEUS on species level:

Table 11.1: List of species for which photographs were supplied at the 2006 meeting.

SCIENTIFIC NAME	ENGLISH NAME
Alopias vulpinus	Thresher shark
Scyliorhinus stellaris	Nursehound
Squalus acanthias	Spurdog
Squatina squatina	Angel shark
Dipturus batis	Grey skate
Leucoraja circularis	Sandy skate
Raja microocellata	Smalleyed ray
Raja undulata	Undulate ray
Pteroplatytrygon violacea	Pelagic stingray
Maurolicus muelleri	Pearl side
Naucrates doctor	Pilot fish
Diodon hystrix	Porcupinefish

Table 11.2: Preliminary list of fishes for which photos are required.

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

11.5 Summary

The ICES Working Group on Fish Ecology (WGFE) recently recommended that a one-off workshop be convened to address taxonomic data quality issues in the existing DATRAS database (ICES, 2006). Examples of topics that need to be addressed are:

1) The identification and correction of taxonomic mis-identifications and input errors in DATRAS.

2) Development of protocols for ensuring the appropriate treatment of data reported at higher taxonomic levels.
3) Development of improved protocols to ensure that species identification in trawl surveys is appropriate for fish community studies, including the development of photo-ID keys for nations participating in surveys.

IBTSWG considered that such a workshop should be convened and post-hoc corrections made where possible, including cataloguing data amendments and notifying data suppliers. In order to ensure that future data submitted to DATRAS are of as high a quality as possible, IBTSWG also recommend that this workshop

4) Develop protocols for (a) improving quality control during the submission of data to DATRAS and (b) the future checking and quality assurance of DATRAS data.

IBTSWG fully support the WGFE proposal that such a workshop (with Niels Daan invited to be the Chair) should be held at ICES headquarters as soon as possible, and should be attended by:

- Taxonomists with expert knowledge of fish in the North-eastern Atlantic and adjacent seas
- Survey scientists and field ecologists with a knowledge of the surveys and species distributions
- Database experts to update potential errors and catalogue corrections

11.6 References

Costello, M. J., Emblow, C., and White, R. (Ed.). 2001. European register of marine species: a check-list of the marine species in Europe and a bibliography of guides to their identification. Collection Patrimoines Naturels, 50. Muséum national d'Histoire Naturelle: Paris, France. 463 pp.

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

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12 Monitoring of important components of the marine ecosystem through the IBTS surveys (ToR i)

12.1 Introduction

A presentation was given by members of the REGNS Study Group on the North Sea Integrated Assessment which is being undertaken. The assessment framework they have adopted recognises a number of data sets which cover the whole North Sea and have long time series. These data sets (mainly dealing with oceanographic and fish stock assessment determinands) have been preliminarily assessed by REGNS to reveal broad scale trends in space and time. The oceanographic data underpinning this assessment is largely derived from the ICES data centre and from observations already undertaken by the IBTS programme. The purpose of this joint session is to investigate whether the IBTS can serve as a backbone for the monitoring of important components of the marine ecosystem, to look at possible improvements, including standardising the methods, for the collection of existing determinands, and to prioritise any potential future requirements.

Table 12.1 summarises the existing set of determinands monitored on surveys coordinated by the IBTSWG. It clearly shows that hydrographic features such as profiles of temperature, salinity (conductivity) and depth (pressure) are routinely collected at the beginning or end of each trawl. The main requirement for this is highlighted in Table 12.2, but essentially it does not cause any disruption to the core IBTS effort and adds value to the analysis undertaken by fisheries biologists.

Additional determinands relate more to the needs of the other sectoral interests, such as observations of seabirds and cetaceans (section 12.2), nutrients and eutrophication (section 12.3), contaminants monitoring (section 12.4), or other measurements i.e. acoustic seabed mapping, towing for plankton and benthos, etc. (section 12.5). An important part of the discussion recognised that there are different levels of coordination and integration of these parameters within the IBTS, some are more practical and cost effective than others, but in all cases additional funding outside the IBTS would be needed to cover the time and effort required for such observations. We discussed the concept of 3 levels of integration: level 1 represents the existing position with minimal disruption to the survey; level 2 would require additional observations and effort, although this is happening already in some cases (e.g. benthos in trawl); and, level 3 would require significant additional effort and close coordination with other fisheries and oceanographic fieldwork. In order of priority we concluded that a coordinated programme of seabird and cetacean observers could be developed in the first instance, followed by nutrients and chlorophyll analysis of the water samples collected for salinity analysis on the CTD casts and finally the collection of sediment and water samples for contaminants analysis. Additional tows for plankton or benthos data are expensive additions in terms of time and effort required and is therefore unlikely to be funded at this stage. Other observations could be made at night (e.g. towed CTD, acoustic survey of seabed) but this would not be part of the integrated IBTS survey.

12.2 Seabirds and Cetaceans

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.

12.2.1 Seabirds

Seabird surveys at sea have been conducted over the NW European shelf for more than 25 years; all countries with a seaboard in this area co-operate to ensure that the data are, as far as possible, collected using standardised methods; the data are hosted in a customised database (the European Seabirds at Sea, ESAS, database), periodically updated. This database is a shared resource among various stakeholder institutions and individuals in Europe and has already been the focus of analyses within the REGNS initiative. Possibilities exist to also host the data within other applications, such as the REGNS database, the ICES data centre and, indeed, other global initiatives. Of course, proper protocols for data access by third parties would need to be formulated, and there are various models for this, including the IBTS database itself.

Assuming that berth space is available, little in the way of other resources is required of IBTS; seabird observations are made while the vessel is steaming, ideally from the bridge wing, monkey platform, or other suitably high position as far forward as possible. A purpose-built observation box may be required to be place at the viewing platform. Ideally, there needs to be access (not necessarily continuous) to the vessel's GPS.

Cetacean

Cetacean (and other taxa that break the sea surface) observations are also recorded opportunistically during seabirds at sea surveys. The ESAS database also hosts the cetacean data, although these again are accommodated within another resource shared with various partners - the Joint Cetacean Database. Although cetacean sightings in the past have been recorded in the same way as seabird sightings, a slight modification of the method would be applied on the IBTS cruises – a method aimed at improving the usefulness of the data in assessing relative abundance of the animals. Again, the requirements here are minimal and have no impact on IBTS protocols. A simple angle board would be the only additional piece of equipment required. However, if there were scope to tow hydrophones on 200m cables this would improve the power of the survey as a monitoring tool for these animals. This might be better seen as a longer term aim, however.

Observers

The success of the ESAS initiative relies on a pool of expert observers. All new data that are accommodated within the ESAS database must be collected by ESAS accredited observers, and there is a training scheme in operation to ensure the highest possible standard of data collection. These observers are not only skilled in identifying seabirds (species, age, sex, behaviour) at sea but also cetaceans. Not surprisingly, the ESAS (co-ordinating) group is comprised to a large extent of members who are also members of ICES WGSE. In ideal circumstances two seabird and cetacean observers would be accommodated on IBTS cruises. This would maximise the time available for recording as well as allow appropriate division of labour when either or both group is particularly abundant.

Integration in IBTS

In the aftermath of the WG IBTS meeting in Lysekil 2006 the delegates of REGNS would propose that the possibility of placing seabird/mammal observers on board IBTS cruises be referred to ICES WGSE (and thereby ESAS) and WGMME. Assuming an agreement in principle for such accommodation and co-operation, WGSE needs to devise a strategy for utilizing the IBTS cruise programme to maximise its value for investigating dispersion patterns of seabirds and other taxa at sea. Such a strategy needs to be tempered with consideration of the available or potentially available resources. Direct liaison with the appropriate IBTS cruise leaders over the feasibility and practical application of this strategy would be the stage just prior to its realisation at sea.

The adoption of a seabird/cetacean component to the IBTS programme creates an important precedent within ICES. It is a practical application of the REGNS process and one that contributes directly to an integrated (regional) assessment. It also establishes cross-cutting work among three WGs – IBTS WG, WGSE and WGMME. Such a model of working is essential in future if proper ecosystem assessment, monitoring and management are to be effected.

12.3 Nutrients and eutrophication

The availability and distribution of nutrients provide the means of primary production and hence supports the whole marine food web. Clearly nutrients represent an important ecosystem component which needs to be included in ecosystem-based fisheries management or other form of integrated assessment. In addition to oceanic inputs, river catchments provide conduits for nutrients resulting from natural run-off and human activity (fertilizer, sewage) and these may give rise to enhanced concentrations in coastal seas. This in turn may result in eutrophication, defined as '…. enrichment of water by nutrients causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned.' (www.ospar.org). This is regulated under the OSPAR Common Procedure. The presence of enhanced concentrations may not lead to eutrophication, for example in areas where growth is light-limited, so an understanding of the receiving environment is critical.

Nutrient measurements, and associated measurements such as chlorophyll/fluorescence and dissolved oxygen, are not routinely collected on IBTS surveys by all participants. However, technically it would be quite straight forward to include these using water bottle samples and/or underway samples, given suitable protocols being in place. The main challenge is to fund the analysis. We would expect to make use of remote sensing information and use the measurements for 'sea-truthing'.

12.4 Contaminants monitoring

The collection of samples for contaminants monitoring could form part of an integrated IBTS survey. Collection of water samples might be accommodated in the existing water sampling efforts and sediment sampling could be achieved using a simple grab sampler at night, if time is available. However, additional staff and in some cases days at sea would be required and there are significant implications for funding the analysis of such samples which would need to be addressed prior to implementing an extension to the survey. In addition, some contaminants monitoring requires particular sampling techniques or sample treatments so that the objectives, target contaminants and protocols would have to be very clearly defined.

12.5 Additional measurements

A number of other measurements were discussed. Of these improved underway sampling would be likely to be of most benefit, although there are cost implications and the need to establish strict protocols to maintain monitoring equipment. One solution would be to adopt the Ferrybox system (e.g. nutrients, turbidity, temperature, conductivity, chlorophyll).

Night time observations could include additional measurements of salinity and temperature (CTD casts or towed bodies) in relation to particular features such as measurements of the structure of the thermocline or across frontal systems. Acoustic seabed mapping could also be included, dependent on equipment availability, with associated grab sampling or operation of other devices such as Sediment Profile Imaging cameras. These measurements would be making use of the ship as a platform rather than forming part of an agreed integrated IBTS survey.

Finally we discussed the possibility of towing additional gear for plankton or epibenthos, and of including infaunal analysis. It was agreed that it would not be practical to include such measurements within the existing IBTS surveys. A significant amount of additional sea time, staff and analytical effort would be required. Such observations would need to be undertaken on separate RV cruises.

Table 12.1: Additional biological Investigations during regular IBTS-surveys.

Nation	Vessel	Area	Duration [d]	Quarter	Oceanographic measurements: Surface/ bottom (mini CTD on trawl)	Oceanographic measurements: Vertical profile (CTD)	Oceanographic measurements: Continuous thermosalino graph	Oceanographic measurements: DO	Oceanographic measurements: nutr.	Oceanographic measurements: chlor.	Plankton: phyto	Plankton: Fish-MIK	Plankton: Continuous egg sampling	Plankton: zoo	Benthos: Epif. (main)	Benthos: Epif. (other)	Benthos: Inf.	Litter	Mamm.	Bird
Denmark	Dana	North Sea	18	1		x	x	x				x								
	Dana	North Sea	18	3		x	x	x												
UK-England	CEFAS Endeavour	North Sea	32	3	x	x	(x)								x			x	(x)	
	CEFAS Endeavour	Western Area	32	4	x										x	x			(x)	
France	Thalassa	North Sea	24	1		x	x			(x)		x	x							
	Thalassa	Northern Celtic Sea	14	4		x	x			(x)										
	Thalassa	Southern Celtic Sea and Northern Bay of Biscay	14	4		x	x			(x)										
	Thalassa	Southern Bay of Biscay	14	4		x	x			(x)										
Germany	WH III	North Sea	31	1		x	x		x			x								
	WH III	North Sea	11	3		x	x		x							x	(x)		(x)	(x)
Ireland	Celtic Explorer	Eastern Atlantic	42	4	x		x								x			(x)	(x)	x
Netherlands	Tridens	North Sea	24	1		x	x		x			x			x					
Norway	Hakon Mosby	North Sea	30	1		x			(x)		(x)	x		(x)					(x)	
	Johan Hjort	North Sea	30	3		x			(x)		(x)			(x)					(x)	
Portugal	Noruega	Portuguese Continental waters	30	1		x									x			x		
	Noruega	Portuguese Continental waters	30	4		x									x			x		
Spain	Vizconde de Eza	Porcupine Bank	30	4		x									x			x		
	Cornide de Saavedra	Northern Spanish coast	33	4		x									x			x		
	Cornide de Saavedra	Gulf of Cadiz	10	1	x	x									x			x		
	Cornide de Saavedra	Gulf of Cadiz	10	4	x	x									x			x		
UK-Scotland	Scotia	North Sea	23	1		x	x		x			x			x					
	Scotia	North Sea	25	3		x	x								x	(x)				
	Scotia	VI, VIIa	21	1		x	x								x					
	Scotia	VI, VIIa	22	4		x	x								x	(x)				
	Scotia	Rockall, deep water	22	3		x	x								x					
Sweden	Argos	Skagerak, Kategat	15	1		x	x	x	x	x		x								
	Argos	Skagerak, Kategat	15	3		x	x	x	x	x										

Table 12.2: Additional requirements for data collected during the IBTS surveys – priority level, relevance and implications.

Determinand	Priority for REGNS	Relevance	Capability	Implications	Level
Surface/ bottom temp & conductivity/salinity	**1**	Oceanographic data fundamental for understanding ecosystem, CTD casts of most importance, (Drivers: climate change)	Currently recorded in all surveys, mostly using CTD casts that also provide vertical profiles, though some nations have mini-CTDs attached to the main trawl. Data are stored on the ICES oceaonographic database	basic level observations already embedded in IBTS programme; real-time logging and sampling on basis of observations might require additional staff; U-tow &/or repeated profiles would require more staff; improved underway sampling (e.g. Ferrybox) would require initial & continuing funding	1
DO	**2**	important determinand for assessing eutrophication (Drivers: OSPAR)	Not routinely collected, though it could be recorded during the surveys	additional staff time, protocols, funding for analysis	2
nutrients	**1**	Important ecosystem component (productivity etc.) and also important for assessing eutrophication (Drivers: OSPAR, EU Marine Strategy)	Collected in some surveys, but not routinely collected in other surveys	additional staff time, protocols, funding for analysis	2
chlorophyll	**1**	Important ecosystem component (productivity etc.) and also important for assessing eutrophication (Drivers: OSPAR, EU Marine Strategy)	Collected in some surveys, but not routinely collected in other surveys	additional staff time, protocols, funding for analysis	2
phytoplankton	**1**	Important ecosystem component (productivity/food webs etc.) and also important for assessing eutrophication (Drivers: OSPAR, climate change, EU Marine Strategy)	not routinely collected,	significant effort required both for sampling (e.g. replacing gears) and especially analysis	3
zooplankton	**1**	Important ecosystem component (productivity/food webs etc.) (Drivers: climate change, EU Marine Strategy)	not routinely collected,	significant effort required both for sampling (e.g. replacing gears) and especially analysis	3
Epifauna (main trawl)	**2**	important ecosystem component at interface of pelagic/benthic compartments & indicator of state (Drivers: Habitats Directive, EU Marine Strategy)	routinely collected	modest additional effort	1 to 2
Epifauna (other gear)	**2**	important ecosystem component at interface of pelagic/benthic compartments & indicator of state (Drivers: Habitats Directive, EU Marine Strategy)	not routinely collected,	significant effort required both for sampling (e.g. replacing gears) and especially analysis	2
Infauna	**2**	important ecosystem component at interface of pelagic/benthic compartments & indicator of state (Drivers: Habitats Directive, EU Marine Strategy)	not routinely collected,	significant effort required both for sampling (e.g. replacing gears) and especially analysis	2
Litter	**3**	indicator of state	not collected by all	modest additional effort	2
Mammals	**2**	important ecosystem component & indicator of state (Drivers: Habitats Directive, EU Marine Strategy)	not routinely collected	requires observers	2
Birds	**1**	important ecosystem component & indicator of state (including fish stocks) (Drivers: Birds Directive, EU Marine Strategy)	not routinely collected	requires observers	2
seabed acoustic surveys	**2**	important ecosystem component	not routinely collected	equipment availability & skilled staff - funding	2
Jellyfish	**2**	indicator of state	not routinely collected	requires observers	2

13 Other business

13.1 Coordinating sampling of other biological parameters

The IBTSWG has reviewed the reports from the EU organized Regional Coordinating Meeting for data collection (RCM's) held in 2005 as well as the report from the ICES, PGCCDBS 2006 meeting for information or recommendation that could be of importance for the coordination of the IBTS surveys. One important issue is the lack of coordination of sampling of "Other biological parameters".

At this WG meeting it became obvious that the information level of maturity data was too low and discussion on future task sharing was needed. Analysis made on the maturity data sampled for sole and place (EU North Sea RCM report 2005) indicated that the accuracy of the data needs to be improved. Concerns has been raised about the accuracy of determining the maturity stages outside the spawning period, the potential effect of the area of sampling on age at maturation and the usefulness of low levels of samples which are required collected by some countries under the EU DCR (EU Data Collection Regulation). Maturity data for roundfish can only be collected through surveys (and to a minor extent by observers onboard commercial vessels) because they are gutted before being landed by fishermen. In contrast, market sampling can readily collect flatfish data. The survey-based sampling usually gives a good coverage of the spatial stock distribution but may lead to misinterpretation if samples are not analysed in the pre-spawning period; outside the spawning season, maturity stages are difficult to assess and the proportion of mature fish sampled may be biased. Market-based sampling enables the right period for collecting maturity information to be selected, but may lead to bias regarding spatial coverage. Moreover, sex-ratio and growth rate are both area and time dependent and this variation may influence the quality of Age-Length Keys used in the stock assessments.

The Data Collection Regulation (Regulation 1639/2001 and 1581/2004) requires collection of data on maturity, sex-ratios and growth on a triennial basis and the fecundity of herring on a 6-yearly basis. For the majority of species, the collection of such data is either based on market sampling or on scientific surveys and the individuals used are those also used for collecting otoliths for ageing purposes. The number of individuals collected is related to the volume of landings of that species. For a number of species, maturity data does not exist or is very scarce. This is because these species are not abundant and we simply do not encounter enough individuals of these species in the current sampling programs. Some species are sampled in specific sampling programs that require 3 years before sufficient numbers for a useful analysis of maturity ogives are sampled. For Nephrops dedicated studies are carried out every 6 years. The results also showed that the numbers of samples collected by some countries added little to the overall level of sampling. For all species of which stocks are assessed annually, intensive maturity sampling programs exist that collect data on a routine basis.

The WG welcome the recommendation from the North Sea RCM on establishing a workshop for analysing exciting maturity data in order to set up guidelines for future maturity data collection. Furthermore, the WG fully support the recommendations from the PGCCDBS on establishing:

- Establishing a workshop dealing with the methodological approach in setting up the most effective sampling programme for maturity (venue and time to be decided);
- Establishing two workshops for standardisation of maturity staging;
    - Hake and anglerfish in Lisbon, Portugal in 2007
    - Cod, haddock, whiting, saithe in Copenhagen, Denmark in 2007

At the workshop on standardisation of maturity staging images will be used as the basis material. Therefore, the IBTSWG recommends that all countries at their surveys in 2006 and first half year of 2007 take as many images of gonads and testis for hake, anglerfish, cod, haddock, whiting and saithe as possible. Collection of images of other main commercial species would be welcomed. Images should be sent to Remment ter Hofstede for inclusion in the Zeus database.

In order to ensure coordination of collection of the species which only should be collected triennially or six annually, the IBTS have agreed to improve the coordination of this data collection. Annex XVI of the DCR (Commission Regulation 1581/2004) has been used as the starting point. The time of the year where maturity data can be collection taken the spawning time into account has been listed for each area and species as well as the first attempt to identify the relevant coordination body for each species and area (see Table 13.1.1).

The IBTSWG recommend that 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 13.1.1).

The following data collection in 2007 is recommended:

IBTS North Sea and Division IIIa

Hake – Sole – Black-bellied angler – Anglerfish – Lemon sole – Plaice – Turbot – Horse mackerel.

IBTS Western and Southern areas

Hake – Sole – Black-bellied angler – Anglerfish – Plaice – Horse mackerel – Megrim.

It was also agreed that the survey coordinators; IBTS North Sea and Division IIIa Q1: Remment ter Hofstede, IBTS North Sea and Division IIIa Q3: Brian Harley and IBTS Western and Southern area: David Stokes will incorporate a maturity data collection plan for each of respective surveys.

Table 13.1.1: Other biological sampling of growth, maturity, fecundity and sex ratio.

Species		Area/Stock	Growth		Maturity		Fecundity		Sex ratio		Maturity sampling season	Year of sampling	Sampling platform
			Length	Weight	Length	Age	Length	Age	Length	Age			
North Sea (Skagerrak) ICES area IIIa (north)													
Sandeel	Ammodytidae	IIIa N	T	T	T	T			T	T	Q4		
Eel	Anguilla anguilla	IIIa N	T	T									
Herring	Clupea harengus	IV, VIId, IIIa/22-24, IIIa	T	T	T	T			T	T	Q1 and Q3	Every year	IBTSWG/ PGHERS
Cod	Gadus morhua	IV, VIId, IIIa	T	T	T	T			T	T	Q1	Every year	IBTSWG
Haddock	Melanogrammus aeglefinus	IV, IIIa N	T	T	T	T			T	T	Q1	Every year	IBTSWG
Hake	Merluccius merluccius	IIIa, IV, VI, VII, VIIIab	T	T	T	T			T	T	Q1	**2007**	IBTSWG
Blue whiting	Micromesistius poutassou	I-IX, XII, XIV	T	T	T	T			T	T	Q1		PGNAPES
Norway lobster	Nephrops norvegicus	Functional unit	S	S	S				T				
Northern shrimp	Pandalus borealis	IIIa, IVa east	T	T	T				T				
Plaice	Pleuronectes platessa	IIIa	T	T	T	T			T	T	Q1	Every year	IBTSWG
Saithe	Pollachius virens	IV, IIIa, VI	T	T	T	T			T	T	Q1	Every year	IBTSWG
Mackerel	Scomber scombrus	IIIa, IVbc, VIId	T	T	T	T			T	T	Q1	Every year	IBTSWG
Sole	Solea solea	IIIa	T	T	T	T			T	T	Q1	**2007**	IBTSWG
Sprat	Sprattus sprattus	IIIa	T	T	T	T			T	T	Q3	Every year	IBTSWG
Norway pout	Trisopterus esmarki	IV, IIIa	T	T	T	T			T	T	Q1	Every year	IBTSWG
ICES area III (excluding Skagerrak) including Baltic													
Eel	Anguilla anguilla	IIIa (excluding IIIaN)	T	T									
Herring	Clupea harengus	22-24/25-29, 32/30/31/Golf of Riga	T	T	T	T			T	T	Q1 and Q3	Every year	WGBIFS
Flounder	Platichthys flesus	IIIb-d	T	T	T	T			T	T	Q1		WGBIFS
Cod	Gadus morhua	IIIa S/22-24, IIId/25-32	T	T	T	T			T	T	Q1 and Q3	Every year	IBTSWG and WGBIFS
Norway lobster	Nephrops norvegicus	Functional unit	S	S	S				T				
Plaice	Pleuronectes platessa	IIIa S	T	T	T	T			T	T	Q1	Every year	IBTSWG
Salmon	Salmo salar	IIIb-d, 22-31/32	T	T	T	T			T	T			
Sea trout	Salmo trutta	IIIb-d	T	T	T	T			T	T			
Sole	Solea solea	IIIa	T	T	T	T			T	T	Q1	**2007**	IBTSWG and WGBIFS
Sprat	Sprattus sprattus	IIIa S/IIIb-d	T	T	T	T			T	T	Q3	Every year	IBTSWG and WGBIFS
North Sea and Eastern Channel ICES areas IV, VIId													
Sandeel	Ammodytidae	IV	T	T	T	T			T	T			
Eel	Anguilla anguilla	IV, VIId	T	T									
Argentine	Argentina spp.	IV	T	T	T	T			T	T			
Herring	Clupea harengus	IV, VIId, IIIa	T	T	T	T			T	T		Every year	IBTSWG/ PGHERS
Shrimp	Crangon crangon	IV, VIId	T	T	T				T		Q3	Every year	DYFS
Sea bass	Dicentrarchus labrax	IV, VIId	T	T	T	T			T	T			
Cod	Gadus morhua	IV, VIId, IIIa	T	T	T	T			T	T	Q1	Every year	IBTSWG
Four-spot megrim	Lepidorhombus boscii	IV, VIId	T	T	T	T			T	T			
Megrim	Lepidorhombus whiffiagonis	IV, VIId	T	T	T	T			T	T	Q1	*Every year*	IBTSWG
Black-bellied angler	Lophius budegassa	IV, VIId	T	T	T	T			T	T	Q1	**2007**	IBTSWG
Anglerfish	Lophius piscatorius	IV, VI	T	T	T	T			T	T	Q1	**2007**	IBTSWG
Haddock	Melanogrammus aeglefinus	IV, VIId	T	T	T	T			T	T	Q1	Every year	IBTSWG
Whiting	Merlangius merlangus	IV, VIId	T	T	T	T			T	T	Q1	Every year	IBTSWG
Hake	Merluccius merluccius	IIIa, IV, VI, VII, VIIIab	T	T	T	T			T	T	Q1	**2007**	IBTSWG
Blue whiting	Micromesistius poutassou	I-IX, XII, XIV	T	T	T	T			T	T	Q1		PGNAPES
Lemon sole	Microstomus kitt	IV, VIId	T	T	T	T			T	T	Q1 and Q3	**2006/2007**	IBTSWG
Mullet	Mullus barbatus	IV, VIId	T	T	T	T			T	T	Q1		
Red mullet	Mullus surmuletus	IV, VIId	T	T	T	T			T	T	Q1	*Every year*	IBTSWG
Norway lobster	Nephrops norvegicus	Functional unit	S	S	S				T				
Northern shrimp	Pandalus borealis	IIIa, IVa east/IVa	T	T	T				T		Q1		
Plaice	Pleuronectes platessa	IV/VIId	T	T	T	T			T	T	Q1	**2007**	IBTSWG
Saithe	Pollachius virens	IV, IIIa, VI	T	T	T	T			T	T	Q1	Every year	IBTSWG
Turbot	Psetta maxima	IV, VIId	T	T	T	T			T	T	Q1	**2007**	IBTSWG
Thornback ray	Raja clavata	IV, VIId	T	T	T				T				IBTSWG
Spotted ray	Raja montagui	IV, VIId	T	T	T				T				IBTSWG
Cuckoo ray	Raja naevus	IV, VIId	T	T	T				T				IBTSWG

Table 13.1.1 (Continued): Other biological sampling of growth, maturity, fecundity and sex ratio.

North-east Atlantic and Western Channel ICES areas II, V, VI, VII (excluding d) VIII, IX, X, XII, XIV

Eel	Anguilla anguilla	all areas	T	T									
Scabbardfish	Aphanopus spp.	IXa, X	T	T	T	T			T	T		*Every year*	WGDEEP
Argentine	Argentina spp.	All areas											
Alfonsinos	Beryx spp.	X	T	T	T	T			T	T			Market
Edible crab	Cancer pagurus	All areas	T	T	T				T				Market
Gulper shark	Centrophorus granulosus	All areas	T	T	T				T			*Every year*	WGDEEP
Leafscale gulper shark	Centrophorus squamosus	All areas	T	T	T				T			*Every year*	WGDEEP
Portuguese dogfish	Centroscymnus coelolepis	All areas	T	T	T				T			*Every year*	WGDEEP
Herring	Clupea harengus	VIa, VIaN/VIaS/VIIbc/VIIa/VIIj	T	T	T	T			T	T	Q1 and Q4	Every year	IBTSWG
Conger	Conger conger	X	T	T	T	T			T	T		*Every year*	IBTSWG and WGDEEP
Roundnose grenadier	Coryphaenoides rupestris	All areas	T	T	T	T			T	T		*Every year*	WGDEEP
Sea bass	Dicentrarchus labrax	All areas, excluding IX	T	T	T	T			T	T			
Anchovy	Engraulis encrasicolus	IXa (only Cadiz)	T	T	T	T	T	T	T	T			
Anchovy	Engraulis encrasicolus	VIII	T	T	T	T	Y	Y	Y	Y			
Cod	Gadus morhua	Va, Vb, VIa, VIb, VIIa, VIIe-k	T	T	T	T			T	T	Q1	Every year	IBTSWG
Bluemouth rockfish	Helicolenus dactylopterus	IXa, X	T	T	T	T			T	T		*Every year*	WGDEEP
Lobster	Homarus gammarus	All areas	T	T	T				T			*Every year*	Market
Orange roughy	Hoplostethus atlanticus	All areas	T	T	T	T			T	T			
Four-spot megrim	Lepidorhombus boscii	VIIIc, IXa	T	T	T	T			T	T		*Every year*	IBTSWG and WGDEEP
Megrim	Lepidorhombus whiffiagonis	VI/VII, VIIIabd/VIIIc, IXa	T	T	T	T			T	T	Q1	**2007**	IBTSWG
Common squid	Loligo vulgaris	VIIIc, IXa	T	T	T				T				
Black-bellied angler	Lophius budegassa	IV, VI/VIIb-k, VIIIabd/VIIa/VIIb-k	T	T	T	T			T	T	Q1 and Q4	**2007**	IBTSWG and WGDEEP
Anglerfish	Lophius piscatorius	IV, VI/VIIb-k, VIIIabd/VIIa/VIIb-k	T	T	T	T			T	T	Q1 and Q4	**2007**	IBTSWG and WGDEEP
Haddock	Melanogrammus aeglefinus	Va/Vb, VI, XII, XIV/VIa/VIb/VIIa/VIIb-k	T	T	T	T			T	T		Every year	IBTSWG
Whiting	Merlangius merlangus	VIII/IX, X	T	T					T				
Whiting	Merlangius merlangus	Vb/VIa/VIb/VIIa/ VIIe-k	T	T	T	T			T	T	Q1	Every year	IBTSWG
Hake	Merluccius merluccius	IIIa, IV, VI, VII, VIIIab, VIIIc, IXa	T	T	T	T			T	T	Q1	**2007**	IBTSWG
Blue whiting	Micromesistius poutassou	I-IX, XII, XIV	T	T	T	T			T	T			Market
Blue ling	Molva dypterygia	X	T	T	T	T			T	T		*Every year*	WGDEEP
Ling	Molva molva	All areas	T	T	T	T			T	T		*Every year*	IBTSWG
Red mullet	Mullus surmuletus	All areas	T	T	T	T			T	T		*Every year*	IBTSWG
Norway lobster	Nephrops norvegicus	Functional unit	S	S	S				T				
Common octopus	Octopus vulgaris	VIIIc, IXa	T	T	T				T				
White shrimps	Parapenaeus longirostris	IXa	T	T	T				T				
Forkbeard	Phycis phycis	X	T	T	T	T			T	T			
Plaice	Pleuronectes platessa	VIIa, VIIe-g	T	T	T	T			T	T	Q1	Every year	IBTSWG and WGBEAM
Saithe	Pollachius virens	Va/Vb/IV, IIIa, VI/VII, VIII	T	T	T	T			T	T	Q1	Every year	
Wreckfish	Polyprion americanus	X	T	T	T	T			T	T		*Every year*	IBTSWG
Blond ray	Raja brachyura	All areas	T	T	T				T			*Every year*	IBTSWG
Thornback ray	Raja clavata	All areas	T	T	T				T			*Every year*	IBTSWG
Spotted ray	Raja montagui	All areas	T	T	T				T			*Every year*	IBTSWG
Cuckoo ray	Raja naevus	All areas	T	T	T				T			*Every year*	IBTSWG
Other rays and skates	Rajidae	All areas	T	T	T				T			*Every year*	IBTSWG
Greenland halibut	Reinhardtius hippoglossoides	V, VI, XIV	T	T	T	T			T	T			
Sardine	Sardina pilchardus	VIIIabd,/VIIIc, IXa	T	T	T	T	T	T	T	T			
Spanish mackerel	Scomber japonicus	VIII, IX	T	T	T	T			T	T			

13.2 Extension of the IBTS area in the Eastern Channel (Division VIId)

In the eastern English Channel Winter spawning Downs herring stock is exploited by different fleets mainly at the end of the year during its migration. The rest of the year, this stock component is mixed with the overall population of North Sea herring. This pattern seems to have changed as according to French fishermen observations unusual herring shoals were seen until March in 2005 and 2006 while their catches in the North Sea were very low.

After the 2006 IBTS survey, the French RV "Thalassa" during its trip to Brest, France recorded acoustics data. These recordings confirmed the fishermen observations. Shoals of significant size were observed in coastal waters in the ICES rectangle 30F1 and some trawl hauls were made and the catches consist of herring with mean length of 25 cm.

During IBTS 2006, 4 additional MIK samples were done by RV "Thalassa" in ICES rectangle 30F1 as recommended in the Manual for International Bottom Trawl Survey (Revision VII). The larval abundance in this rectangle seemed high.

If a change in the distribution area of the Downs herring occurs an extension of the IBTS 1st quarter survey area in the Eastern English Channel area could be considered. If additional GOV hauls were carried out this would provide more information on Downs herring and its distribution at this period of the year.

The IBTSWG found it possible that RV "Thalassa" could to take some additional trawl hauls when it start its IBTS cruise at the end of January from Brest on its way through the English Channel before going to the North sea. However, a redistribution of hauls between the 1st quarter IBTS participants could be the consequence in order to keep at least 2 hauls in each rectangles.

Therefore, the IBTSWG agreed that the Chair of the ICES, HAWG should be contacted in order to get feed back from the HAWG on the idea of extending the survey area. If the HAWG support the idea it would be implemented at the 1st quarter IBTS in 2007.

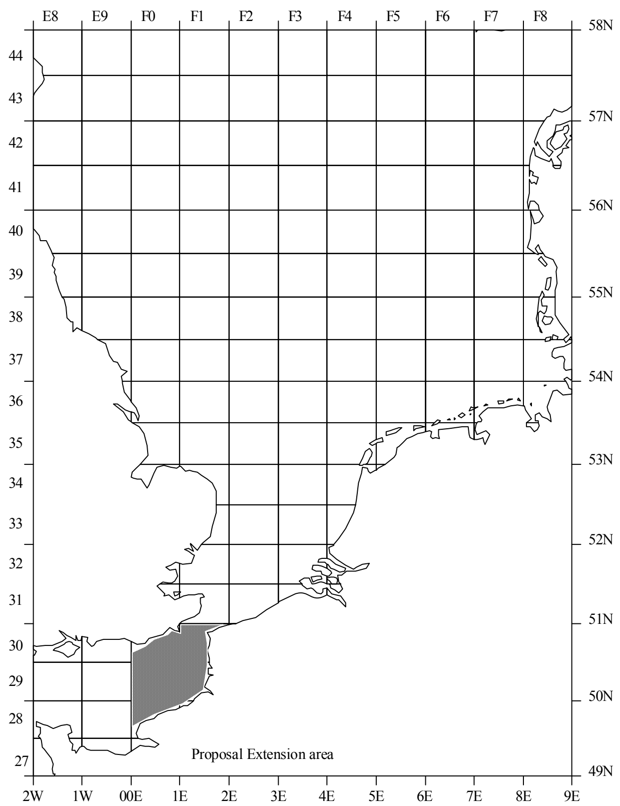

Figure 13.2.1: Proposal extension area in the Eastern Channel.

13.3 Atlas North Sea ICES Fish Map

ICES-FishMap (http://www.ices.dk/marineworld/ices-fishmap.asp) is an electronic atlas of 15 North Sea fish species that uses data collected during the North Sea IBTS in the period 1983-2004. It is the outcome of an EU-funded project under the same name, and was a cooperative exercise involving the Netherlands Institute for Fisheries Research (RIVO), the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), and the Secretariat of the International Council for the Exploration of the Sea (ICES).

The advantage of an electronic atlas is that it allows an annual update and that it is flexible in selecting periods to allow changes in the fish fauna to be studied. The ICES-Fishmap is considered to be a preliminary update of the 1993 Atlas of North Sea Fishes (Knijn *et al.*, 1993), and so far covers 15 species. The ultimate aim is to produce an electronic and paper atlas for a much larger area than the North Sea that provides information on preferably all fish species present.

ICES-FishMap allows the creation of distribution maps (North Sea, Skagerrak and Kattegat) for the 15 fish species, by selecting on years, quarters, ages and size-classes. These data are derived from the DATRAS survey database kept at the ICES Secretariat in Copenhagen and will be updated annually.

ICES-FishMap also offers a short summary of relevant information for each of the 15 species (basic pages), and a detailed section by species on the distribution, life history and exploitation (pdf files). In addition, ICES-FishMap supplies information on the surveys used, the factors affecting the distribution, the fish communities, and the limitations of the data presented.

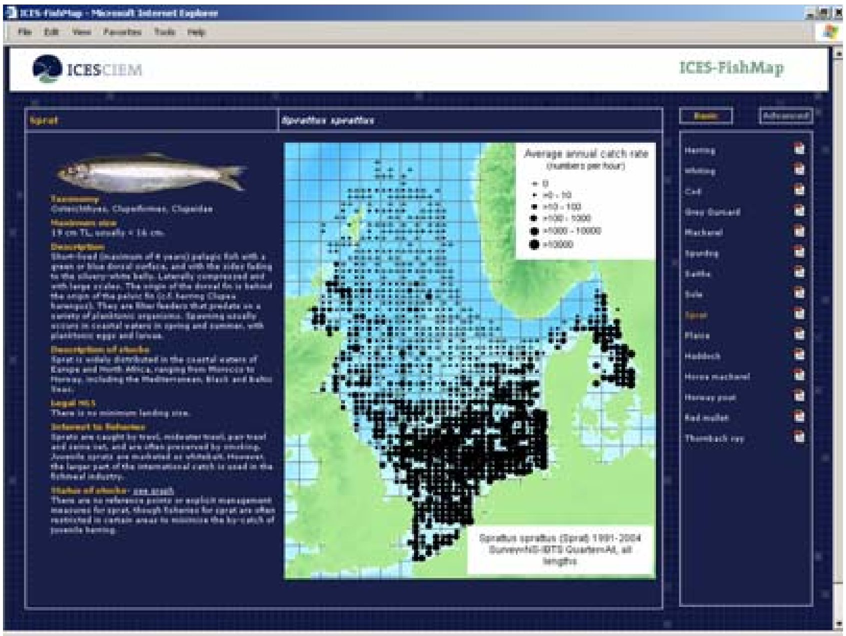

Figure 13.3.1: Example of the layout of ICES-FishMap.

13.4 References:

Knijn, R.J., Boon, T.W., Heessen, H.J.L., and Hislop, J.R.G. 1993. Atlas of North Sea Fishes. ICES Cooperative Research Report. No. 194. (http://www.ices.dk/pubs/crr/crr194/CRR194.PDF)

14 Nominations for a new Chair

Jean-Claude Mahé having served as Chair for the period of three years and a new Chair will be designated in September 2006. The situation was discussed within the Working Group and two members presented themselves as nominees for the vacant post. A vote was held and Remment ter Hofstede (RIVO) was selected as the Group's preferred choice for new Chair. This selection will be presented to the Resource Management Committee for ratification in September 2006.

15 Suggested ToRs for 2007

The **International Bottom Trawl Survey Working Group** [IBTSWG] (Chair: R. ter Hofstede, Netherlands) will meet in Sète, France (to be confirmed), from 27 to 30 March 2007 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 most recent surveys for species of interest to assessment WG according to their response.

c) further develop standardization of all sampling strategies, computation of indices and estimation of precision;

d) review the findings from the SGSTS in respect to issues relevant to IBTS and respond;

e) review progress made in the updated DATRAS database and data access policy;

f) complete the shapefiles and supporting information for the agreed strata in the Eastern Atlantic;

g) coordinate the production and dissemination of identification keys for North Sea, and southern and western IBTS groundfish surveys.

16 References

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Annex 1: IBTS North Sea Manual – Version VII

MANUAL FOR THE INTERNATIONAL BOTTOM TRAWL SURVEYS

REVISION VII

The International Bottom Trawl Survey Working Group

International Council for the Exploration of the Sea

Conseil International pour l'Exploration de la Mer

Palægade 2–4 DK–1261 Copenhagen K Denmark

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1 INTRODUCTION

The International Bottom Trawl Survey Working Group, formerly known as the International Young Fish Survey Working Group, has the responsibility of coordinating various research vessel surveys conducted within certain ICES areas. The first survey to be coordinated was the International Young Fish Survey (IYFS) that was conducted in the North Sea and Skagerrak/Kattegat in February of each year starting in the late 1960's. A procedural manual was produced for the use of scientists involved in this survey and subsequently two revised editions were produced as international co-operation developed. In 1991 this co-operative programme was expanded to include the three other quarters in the North Sea and Skagerrak/Kattegat. This necessitated major alterations to the manual and the revised edition was published as ICES CM 1992/H:3.

During the Annual Science Conference in St. John's, Newfoundland in 1994 the recommendation was made that the International Bottom Trawl Survey Working Group should also incorporate the coordination of bottom trawl surveys in ICES Sub-Areas VI, VII and VIII and Division IXa (these areas are designated as the western and southern areas).

In 1995 the manual was revised for a fifth time in order to clarify certain aspects of the surveys in the North Sea and Skagerrak/Kattegat. At the same time the opportunity was taken to review the manual to establish whether the same procedures could be applied to Sub-Areas VI, VII and VIII and Division IXa. It was decided that some aspects of the manual applied equally to all areas but some procedures required dedicated text. At the same time it was decided that a manual for the western and southern areas required further discussion and input from countries closely associated with these areas but who were unable to attend the meeting. Consequently procedures unique to the western and southern areas were provided in Appendix XI, of the fifth revision, as a draft awaiting approval by all participants.

At the IBTS Working Group meeting in 1999 (Lisbon 7–10 April) it became apparent that a single manual covering such an extensive area was inappropriate. As corrections and amendments were outstanding for the North Sea IBTS Manual, the opportunity was taken to revise this document (the sixth revision).

A separate manual for the western and southern waters was produced for the IBTS meeting in Dublin, in 2001, and is available separately.

At the IBTS Working Group meeting in 2003 (Lorient 7–10 April) it was again apparent that the sixth revision needed to be updated in order to better describe the history of the IBTS, the new checking procedures and SOPs that were in place in many of the countries participating in the IBTS and the new exchange format that was now needed due to the newly developed DATRAS database for survey data at the ICES Secretariat. Many of the revisions were made at the Working Group meeting in 2004 (Lisbon 25-29 March) and this seventh revision was ready for use by all participating countries by August 2004.

This manual seeks to describe the survey and it’s history, paying particular attention to the current gears and practises in place. Description of gears, areas covered and data collected is described in detail along with information helpful to anyone participating in the surveys or interested in them.

2 IBTS SURVEY

2.1 History of the Survey

The following account has been adapted from Heessen *et al.* (1997).

In the spring and autumn of the years 1960 and 1961 a series of four large international research vessel trawl surveys were organised under the auspices of ICES, to map the distribution of juvenile herring *Clupea harengus* in the North Sea and to investigate the links between herring nursery grounds and the adult populations (ICES, 1963).

In the following years most of the countries participating in the former exercise continued similar surveys. From 1966 onwards these surveys were conducted annually with the objective of obtaining annual recruitment indices for the combined North Sea herring stocks. Gradually more countries started to participate in the survey, which was named the International Young Herring Survey (IYHS). For the first few years, sampling was restricted to the southern and central North Sea and, beginning in 1969, the Skagerrak and Kattegat.

Although the emphasis from the start of the surveys focused mainly on herring, data collected for whiting *Merlangius merlangus* were also analysed. In the course of the 1970s it was realised that the IYHS could provide recruitment indices not only for herring, but also for roundfish species such us cod *Gadus morhua*, haddock *Melanogrammus aeglefinus* and whiting. This growing interest resulted in a northwards extension of the survey area to cover the entire distribution of juvenile haddock in the North Sea, and also that of Norway pout *Trisopterus esmarki*. The whole North Sea, Skagerrak and Kattegat have been surveyed since 1974.

In 1981 the survey was renamed the International Young Fish Survey (IYFS), the first manual was produced (ICES, 1981b), and in 1984 the ICES 'Working Group on Young Herring Surveys' and the 'Gadoid 1-Group Working Group' were combined to form the International Young Fish Survey Working Group.

In 1990 the IYFS Working Group evaluated the usefulness of a number of bottom trawl surveys in the North Sea, Skagerrak and Kattegat (ICES, 1990). Apart from the international IYFS, these surveys were comprised of at least seven national surveys. The IYFS WG proposed to combine the IYFS and the national surveys in Quarterly Co-ordinated Surveys in the North Sea, Skagerrak and Kattegat, which were to be called the International Bottom Trawl Surveys (IBTS). It was recommended that quarterly surveys should run for a period of five years. These surveys should provide a full description of the seasonal distribution of the stocks sampled, which was considered urgently necessary for the further improvement of multispecies assessments and the development of spatially disaggregated assessment models.

This proposal resulted in a series of six years with quarterly surveys, which, with a few exceptions, covered the whole survey area in the North Sea, Skagerrak and Kattegat (ICES, 1996a). Subsequently, it has proved impossible to maintain these high levels of research vessel effort, especially as research budgets have decreased in most countries and, from 1997, the majority of countries have only carried out a survey twice a year; a first quarter survey (January-February) and a third quarter survey (August-September).

Appendix I shows the timeline of significant events in the history of the IBTS.

Having evolved from a herring survey, when only pelagic data was collected, the IBTS survey dataset is now made up of data collected on all finfish species. However, this current level of sampling has evolved gradually. In the manual revision VI, sampling was defined by two groups, 'standard' and 'closed by-catch'. Because all participants now sample all finfish species in one way or another, these have not been defined in this revision.

2.2 History of the Survey Gear

Before the IBTS was co-ordinated fully, there were many survey gears used. In 1960 the Netherlands used a Dutch Herring Trawl, in 1966 Germany started a survey in the North Sea and used a Herring Trawl. In 1967, UK (England) and UK (Scotland) join in and used the Dutch herring Trawl. By 1969, three different rigged Dutch Herring trawls and one Herring Trawl were being used in the North Sea to carry out the herring surveys. As the surveys moved away from concentrating on just herring, there was a move away from the herring trawls to a more multipurpose gear. In 1976 six different survey gears were being used by eight different nations. Then, in 1978, one multipurpose gear started to be used by more and more nations, and by 1983 all nations participating in the quarter 1 IYFS were using the GOV 36/47, albeit with slightly different rigging configurations of the sweep lengths. Since then, the GOV has been the recommended standard gear of the IBTS. By 1992, the GOV has been used in all quarters of the IBTS.

2.3 Survey Design

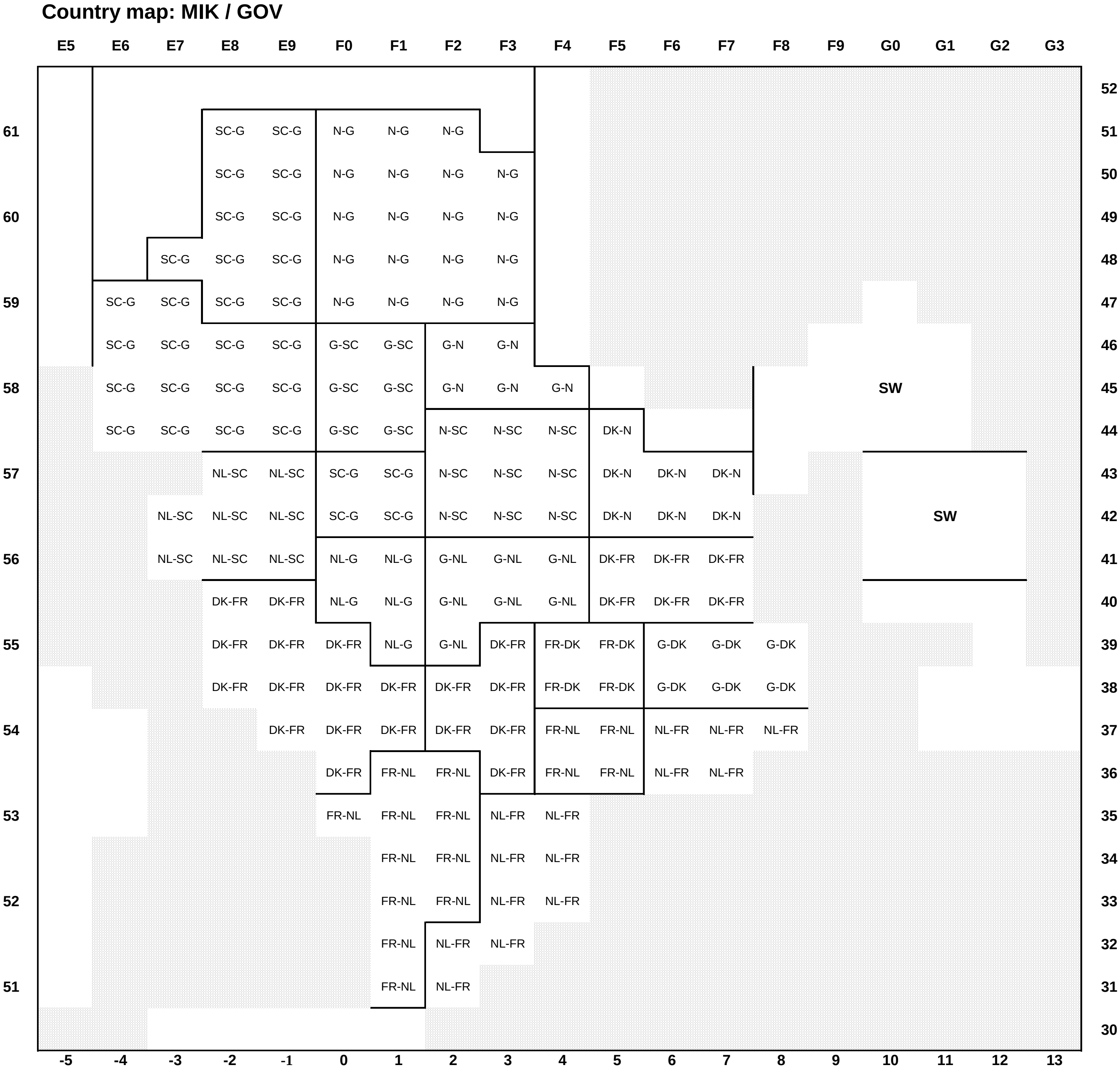
The stratification of the survey grid has always been based on ICES statistical rectangles (one degree longitude x 0.5 degree latitude). Each rectangle is usually fished by the ships of two different countries, so that at least two hauls are normally made per rectangle.

The design of the quarter 1 survey has gradually changed over the years. In 1974 the survey was still very much a herring survey (ICES, 1974). In that year the IYHS WG decided to use three strata, which depended on the amount of herring caught in the former years. This would result in a total of 214 hauls. After some years this system was dropped and for several years four hauls per rectangle were made in the south-eastern North Sea, the most important area for juvenile herring (between 50º30' and 57ºN, and 4º and 8ºE), and two hauls per rectangle in the remaining area. In 1991, at the start of the quarterly surveys, part of the research vessel effort from quarter 1 was shifted to the other quarters and from that year on the target was to make at least two hauls per rectangle over the whole survey area.

The allocation of stations to IBTS participants has changed slightly over the years. The latest main reallocation occurred in 1991, but it was then tried to keep at least one vessel in every sub-area, which had fished there over the most recent years. A typical allocation of the different vessels during the quarter 1 survey is shown in Figure 2.1, and quarter 3 surveys in Figure 2.2.1 to 2.2.7.

For the other quarters three different grids were introduced (ICES, 1990): the 'coarse' grid based on the routine in the English Groundfish Surveys which covers half of the rectangles in the North Sea, the ' complementary coarse grid' covers the other half, and a grid that consists of all the neighbouring rectangles in a certain area (as used for example in the Scottish Groundfish Surveys). The idea was that in every quarter at least 4 vessels should participate: one vessel should fish the coarse grid, one the complementary coarse grid, one should fish all the rectangles in the southern half of the North Sea and one in the Northern half. In this way all rectangles should be fished twice, by two different vessels. As discussed above, only the quarter 3 surveys have had this coverage since 1997.

Figure 2.1 – IBTS Quarter 1 Proposed Survey Grid All Participants



DK – Denmark, FR – France, G – Germany, N – Norway, NL – Netherlands, SC – Scotland, SW – Sweden.

Figure 2.2.1 - IBTS Quarter 3 Proposed Survey Grid All Participants

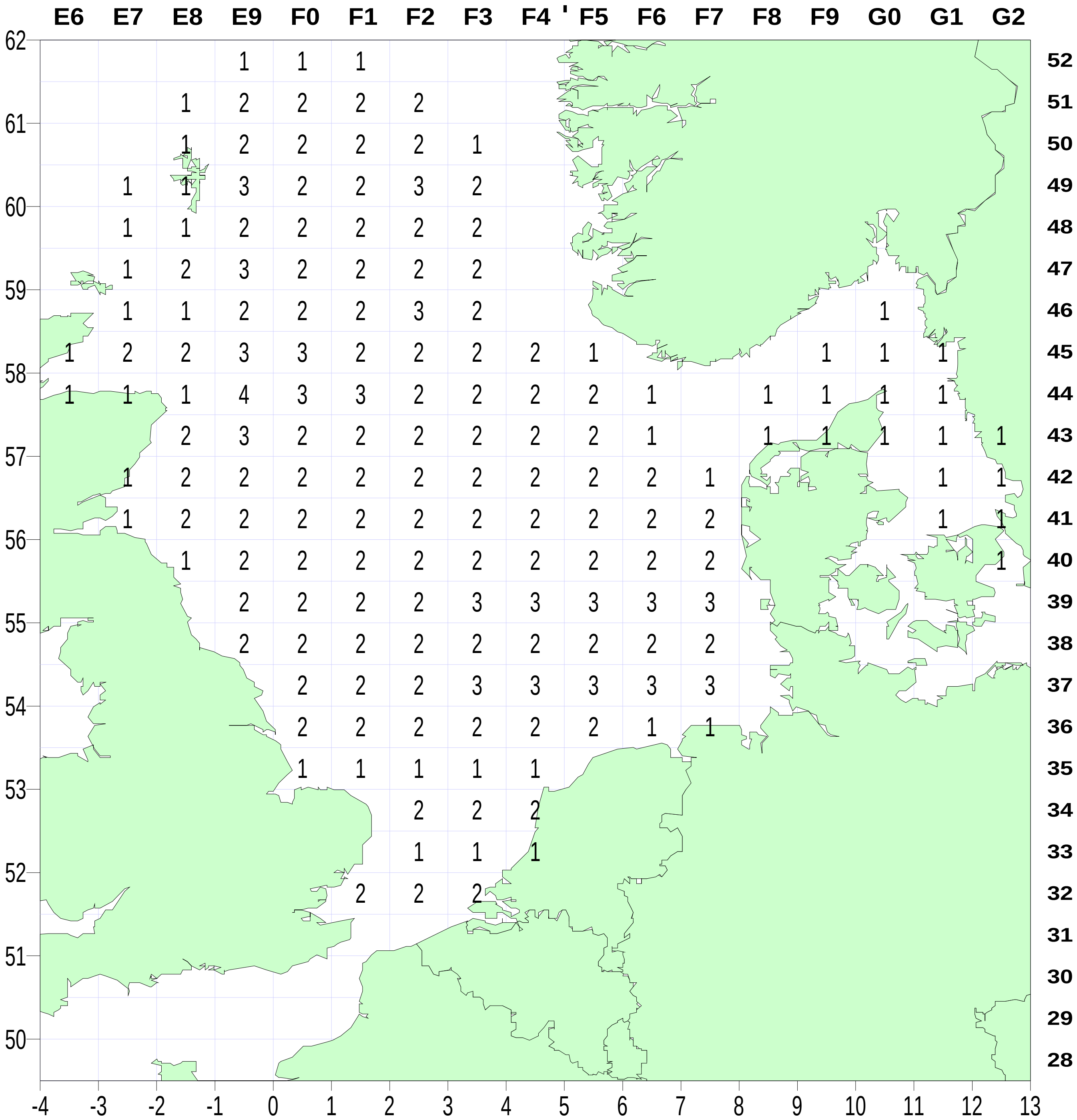


Figure 2.2.2 - IBTS Quarter 3 Proposed Survey Grid - Denmark

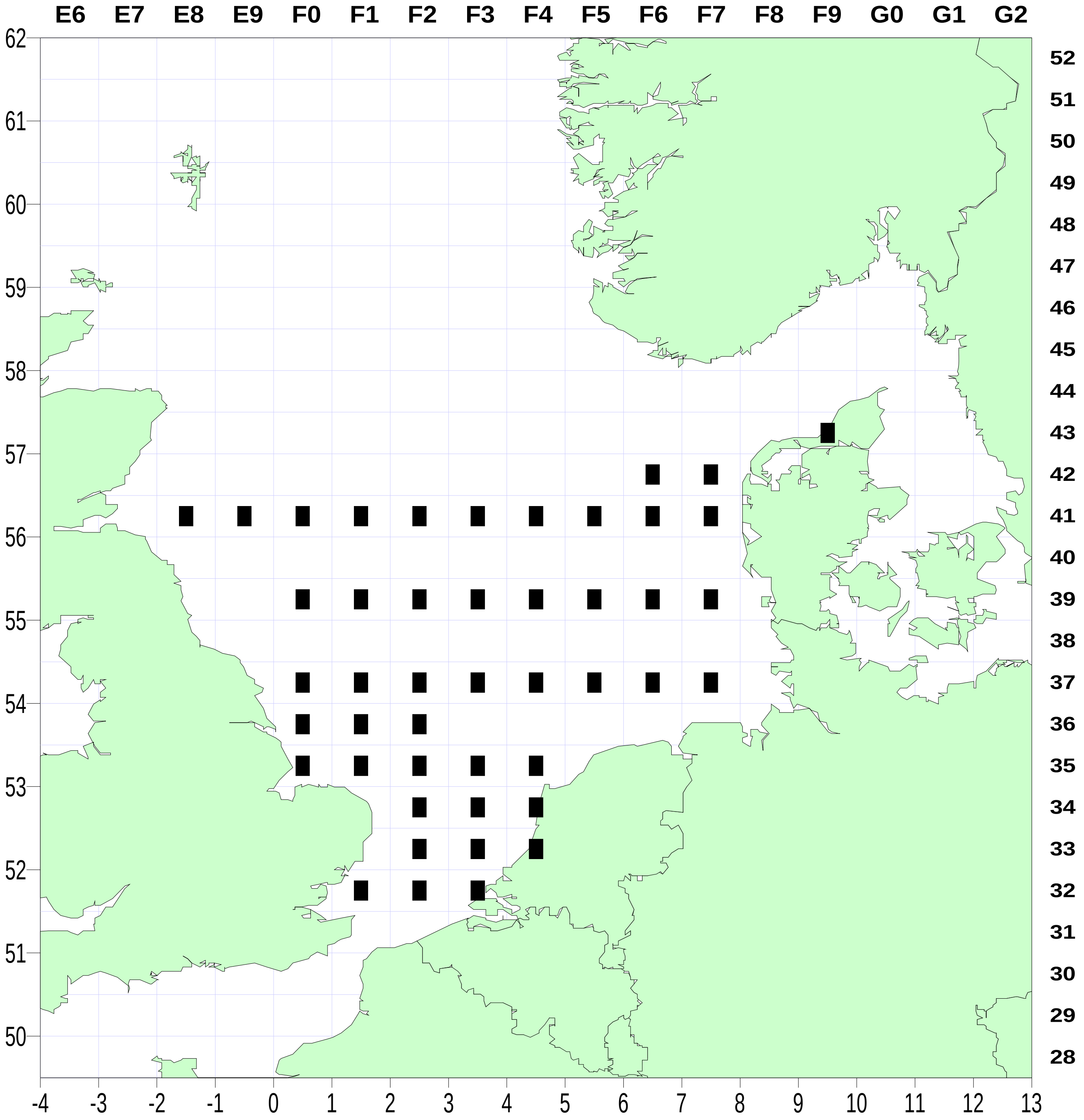


Figure 2.2.3 - IBTS Quarter 3 Proposed Survey Grid - England

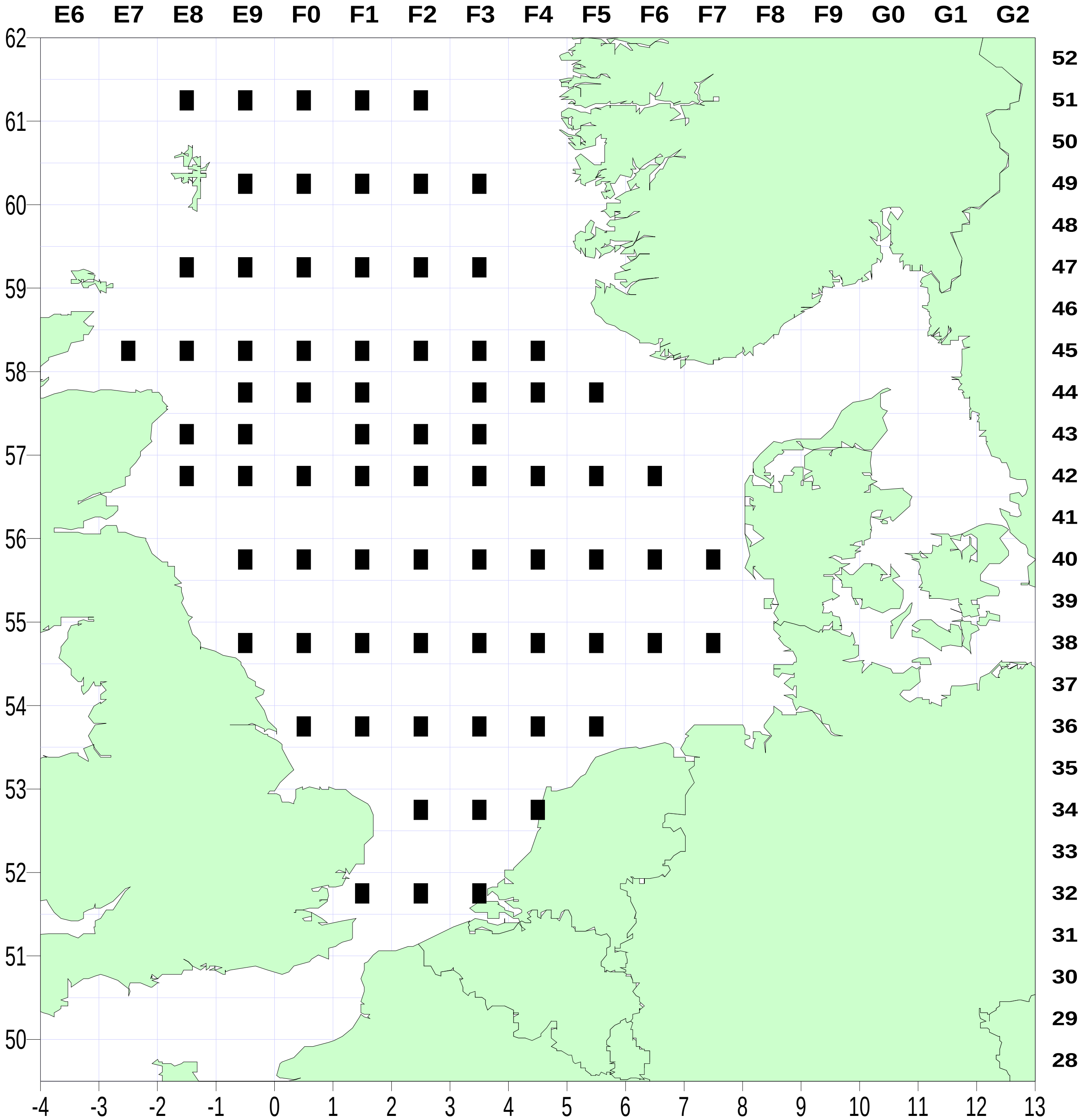


Figure 2.2.4 - IBTS Quarter 3 Proposed Survey Grid - Germany

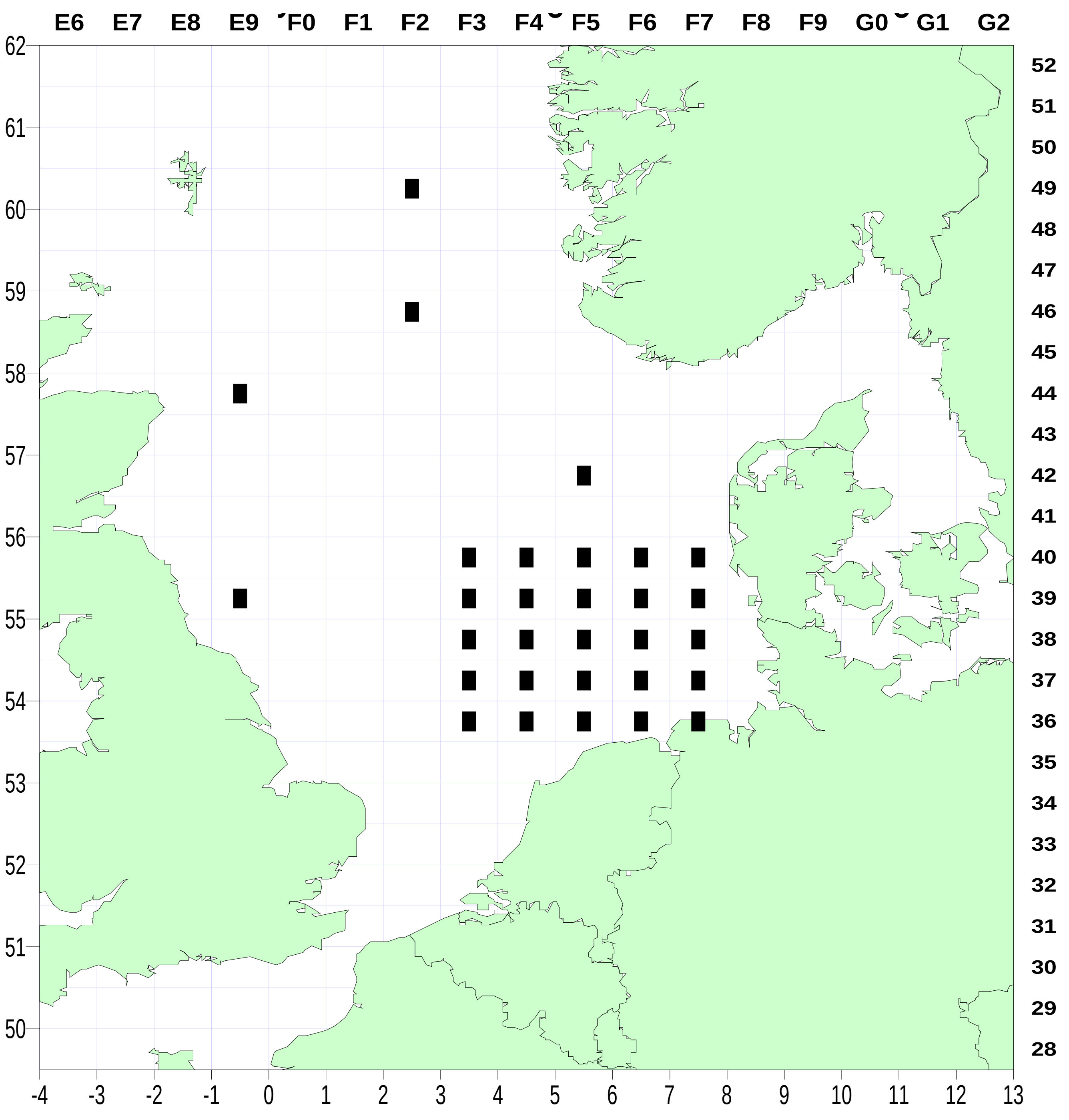


Figure 2.2.5 - IBTS Quarter 3 Proposed Survey Grid - Norway

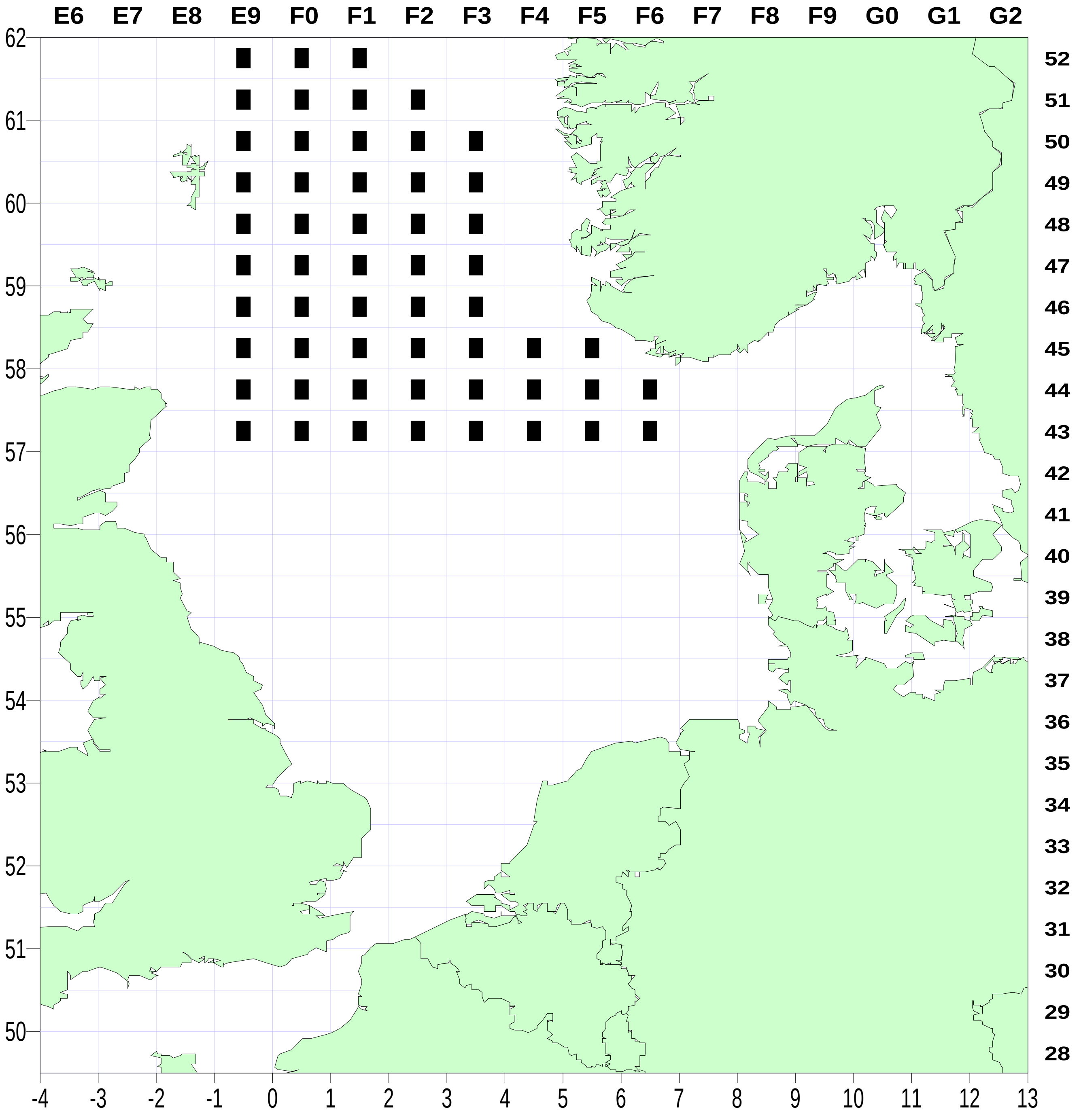


Figure 2.2.6 - IBTS Quarter 3 2004 Proposed Survey Grid - Scotland

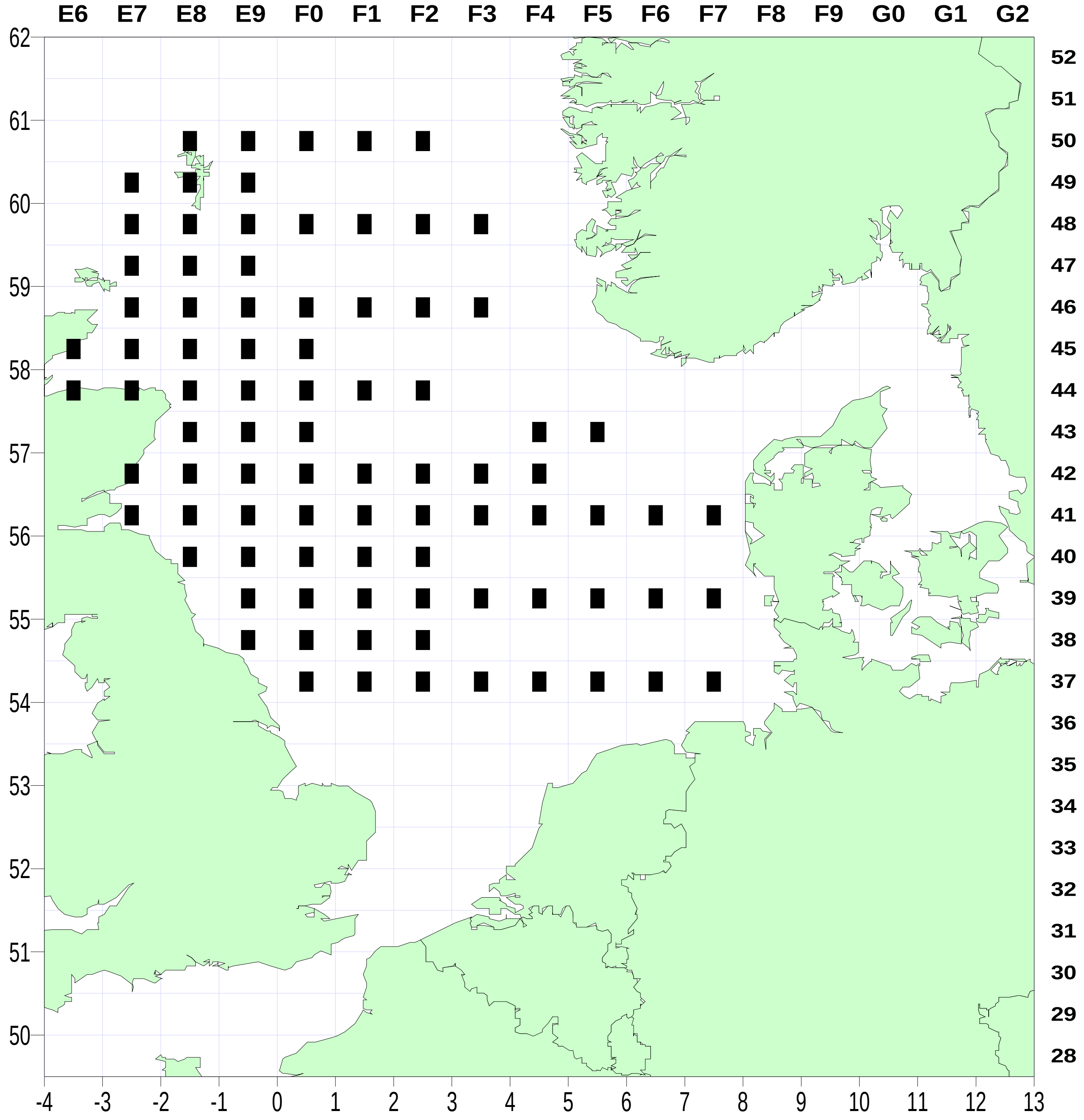
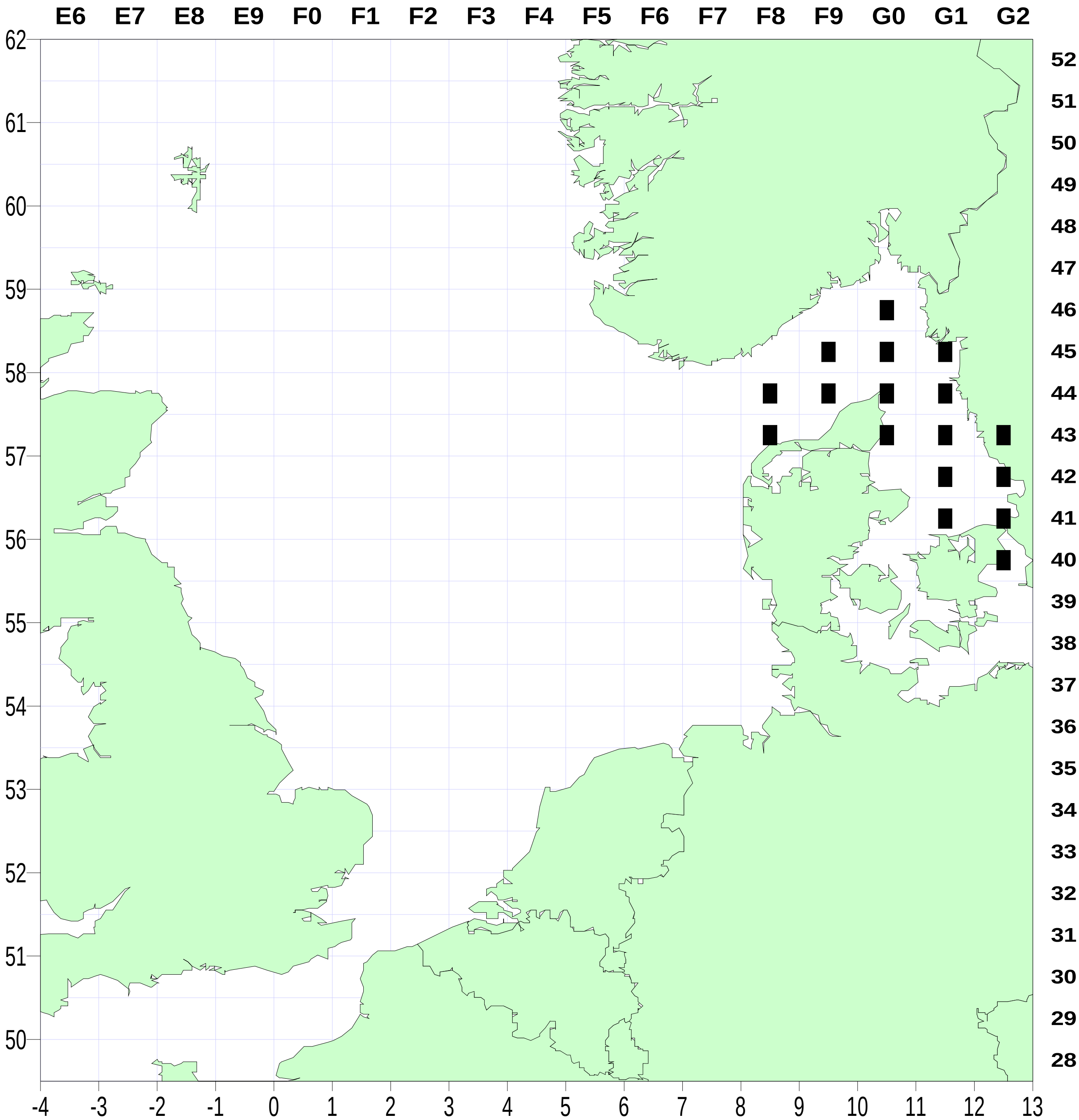


Figure 2.2.7 - IBTS Quarter 3 Proposed Survey Grid - Sweden



Initially one-hour hauls were made, but in 1976 with gadoid outburst contributing to increased catches and in order to allow for the opportunity to carry out more hauls in a day some participants changed to 30-minute tows. This was then made a recommendation at the Working Group in 1977 and all countries (with the exception of Scotland) reduced the standard haul duration to 30 minutes during the surveys in 1978. The Scottish institute continued to make one-hour hauls until 1998 when they changed to a new vessel and standardised to 30 minutes.

2.4 GOV-Trawl Construction

The construction of the 36/47 GOV-trawl is shown in Figure 2.3. A set of check sheets should be used to maintain a standard rigged GOV. These should be used to check all dimensions of the GOV and to ensure that it is rigged correctly on the vessel. When a new net is delivered check sheets 1 (Appendix II) and 2 (Appendix III) should be filled in to ensure that the net is manufactured to the correct specification.

Special attention is drawn to the lining of the cod-end. This lining should consist of 400 stretched meshes of 20 mm each, giving a total length of 8m. The total circumference of the lining should be 600 meshes.

Details of the "Exocet" kite and suggestions how to attach the kite to the trawl are shown in Figure 2.4. Five floats with a buoyancy of 2.9 kg each should be attached to the kite. If a kite other than the recommended one is used then the lift of this kite should be the same as of the Exocet kite so that the configuration of the net conforms to expected parameters. Figures 2.9 and 2.10 illustrate the expected warp out / headline height ratio and the warp out / door spread ratio.

Total buoyancy of the floats on the net should be 172 kg. The floats should be spread as evenly as possible over the wings and the square.

2.5 GOV Trawl Rigging

The rigging is given in Figure 2.5. On board the vessel when attaching the trawl to the bridles and doors, check sheet 3 (Appendix IV) should be used.

During the first quarter survey the length of the sweeps should depend on the bottom depth:

- 60m sweeps (including backstrops) are used in water depths less than 70 m,
- 110m sweeps (including backstrops) are used in deeper waters.

In the other quarters a sweep length of 60 m (including backstrops) is used throughout the survey area.

The standard groundrope with rubber discs (ground gear ‘A’) as shown in Figure 2.6 should be used throughout the survey area. However, since 1985 Scotland have used a hard ground gear ‘B’ on all stations north of 57° 30” North (figure 2.7). Again a check sheet (Appendix Va and Vb) should be used to ensure the ground gear is to specification. The extra weights in the groundrope are 70 kg in the square, 35 kg in each quarter and 35 kg in each forward wing-end. These weights should be evenly spread over the appropriate length of groundrope and this can be achieved by wrapping chain externally around the groundrope or, preferably, by interspersing the groundrope rubber discs with steel discs of the same diameter. Approximate weight in air is given for each section of the groundrope.
It is very important to achieve good bottom contact over the whole groundrope and this should be checked regularly. A proper contact of the net could be indicated by acoustic devices, wearing on chains and presence of benthic organisms and flatfish in the catch. The contact of the net with the bottom can also be greatly influenced by changing the length of the adjustment chain between the lower leg and the bumper bobbin. The normal length of this chain is 2 metres but on rough ground it can be shortened to 1.7 metres; if the gear is fishing too light it can be lengthened to 2.2 metres.

For a proper performance of the net it is essential that the four upper bridles are of identical length, and regular checks should be made to ensure this. It is also recommended that a total check of the trawl is carried out prior to the survey.

2.6 Standard Fishing Method

Standard fishing speed is 4 knots measured as trawl speed over the ground. The recommended speed is set as a target and actual (ground) speed and distance towed should be monitored and reported. It is also recommended that the speed of the trawl through the water should be monitored and reported.

Each haul lasts 30 minutes. Start time is defined as the moment when the vertical net opening and doorspread are stable at a trawl speed of 4 knots. Stop time is defined as the start of pull back.

Vertical net opening and doorspread should be monitored at 30-second intervals and mean values should be reported. It is recommended that wingspread is also measured.

The recommended warp/depth ratio for the GOV trawl is shown in Figure 2.8. A minimum warp length of 150 m should be used as below this length the gear becomes unstable and insufficient spread is achieved. Maximum fishing depth in the North Sea is 200 m and in Division IIIa 250 m.

It is preferable to only conduct trawling operations during daylight hours although it is recognised that some institutes may wish to trawl both during the day and night. It is however strongly recommended that during the February survey the trawling in the old herring standard area (see Figure 6.4) is carried out during daytime only. In the morning the net should not be shot earlier than 15 minutes before sunrise. At the end of the day, the net must be hauled within 15 minutes after the time of sunset. A software package that calculates sunrise and sunset, called RiseAndSet, is available from RIVO. In order to make a quick calculation, the daylight hours for various periods can be calculated with reference to current latitude and the text table below:

Daylight period in UTC at 0 degrees longitude:

Dates		**South of 57° 30' N**			**North of 57° 30' N**		
01-10	Jan	08.09	-	15.58	08.45	-	15.25
10-20	Jan	08.01	-	16.17	08.31	-	15.45
21-31	Jan	07.47	-	16.35	08.15	-	16.07
01-10	Feb	07.29	-	16.58	07.49	-	16.36
11-20	Feb	07.08	-	17.20	07.23	-	17.05
21-28	Feb	06.47	-	17.41	06.55	-	17.30
01-10	Mar	06.27	-	17.57	06.32	-	17.50
11-20	Mar	06.03	-	18.18	06.05	-	18.15
21-31	Mar	05.35	-	18.38	05.32	-	18.39
01-10	Jul	03.15	-	20.55	02.28	-	21.40
11-20	Jul	03.26	-	20.47	02.49	-	21.24
21-31	Jul	03.41	-	20.33	03.08	-	21.03
01-10	Aug	04.00	-	20.12	03.34	-	20.38
11-20	Aug	04.19	-	19.50	03.59	-	20.09
21-31	Aug	04.37	-	19.26	04.23	-	19.42
01-10	Sep	04.57	-	19.00	04.48	-	19.09
11-20	Sep	05.16	-	18.34	05.12	-	18.38
21-30	Sep	05.35	-	18.08	05.35	-	18.08

Source: 'The Times Atlas' 1972, p 33.

For each degree longitude west, 4 minutes should be added and for each degree longitude east, 4 minutes should be subtracted.

2.7 Fishing Positions

Most statistical rectangles contain a number of possible tows that are deemed to be free of obstruction and vessels are free to choose any of these positions in the rectangles that they are surveying. In some rectangles sampling may be further stratified due to significant changes in seabed depth, which may, in turn, cause variations in the fish population.

In rectangles or strata that are to be sampled more than once by the same vessel it is recommended that valid hauls are separated by at least one day or by at least 10 miles wherever this is possible. Tows in adjacent rectangles should also be separated by at least 10 miles.

Fish shoals located by sonar or echo sounder should not influence fishing.

The exchange of clear tow and invalid tow positions is to be encouraged and this may be in the form of data formatted for immediate entry into a ship's navigational system or, alternatively, as an ASCII file as specified in Appendix VI. CEFAS, Lowestoft, currently act as coordinators for this information and maintain a database of towing positions, which can be accessed on request.

2.8 Monitoring net geometry

All countries are using electronic equipment to monitor net geometry (e.g. SCANMAR). All institutes are recording headline height and door spread. It is recommended that wingspread also be recorded. The manual that is supplied with the units gives the correct way of attaching the units to the gear.

During the tow it is imperative that headline height and wing/door spread readings are monitored. If these readings are outside the recommended values (figure 2.9 and figure 2.10) for an unacceptable period of time it could mean that the gear has become fouled or damaged and should be hauled in.

It is recommended that the data stream should be saved to computer to allow mean values to be calculated and entered into the individual institutes databases. These values should be calculated from the time the gear has stabilised on the bottom to the time the gear is hauled.

2.9 Current Objectives

The current objectives of the IBTS are:

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;

4. To collect data for the determination of biological parameters for selected species;

5. To determine the abundance and distribution of late herring larvae (February survey)

6. To collect hydrographical and environmental information

During the February survey information is collected on distribution and abundance of late herring larvae, used in the herring assessment. For hydrographical research the February survey provides a unique time series.

Coverage of the whole survey area was almost complete from every quarter of the years 1991-1996. In quarters 2 and 4 in 1997, however, the total effort was at a much lower level than in the six preceding years due to various national constraints, and since then only surveys in quarters 1 and 3 were continued on an international basis.

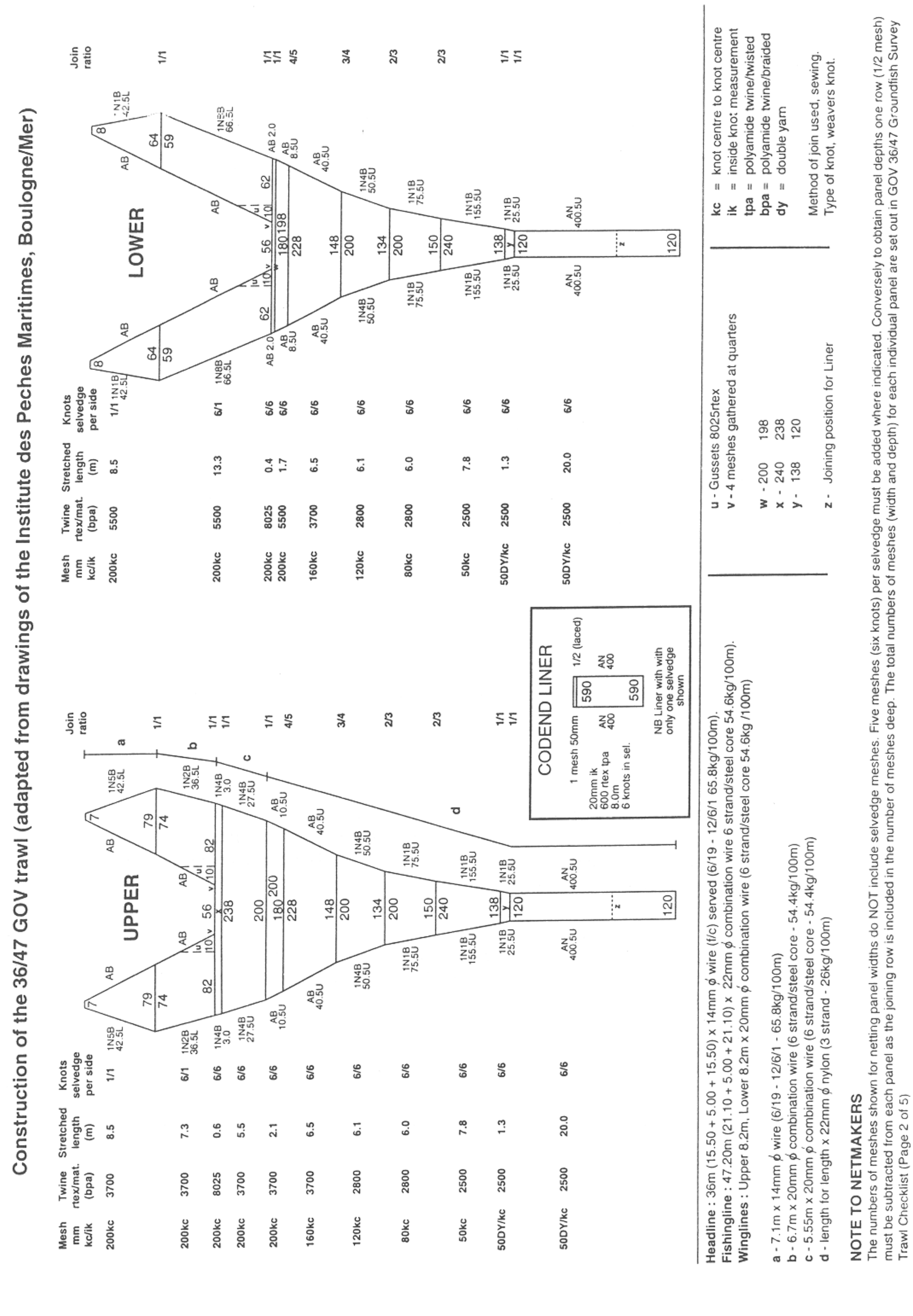


Figure 2.3 Construction of the 36/47 GOV Trawl

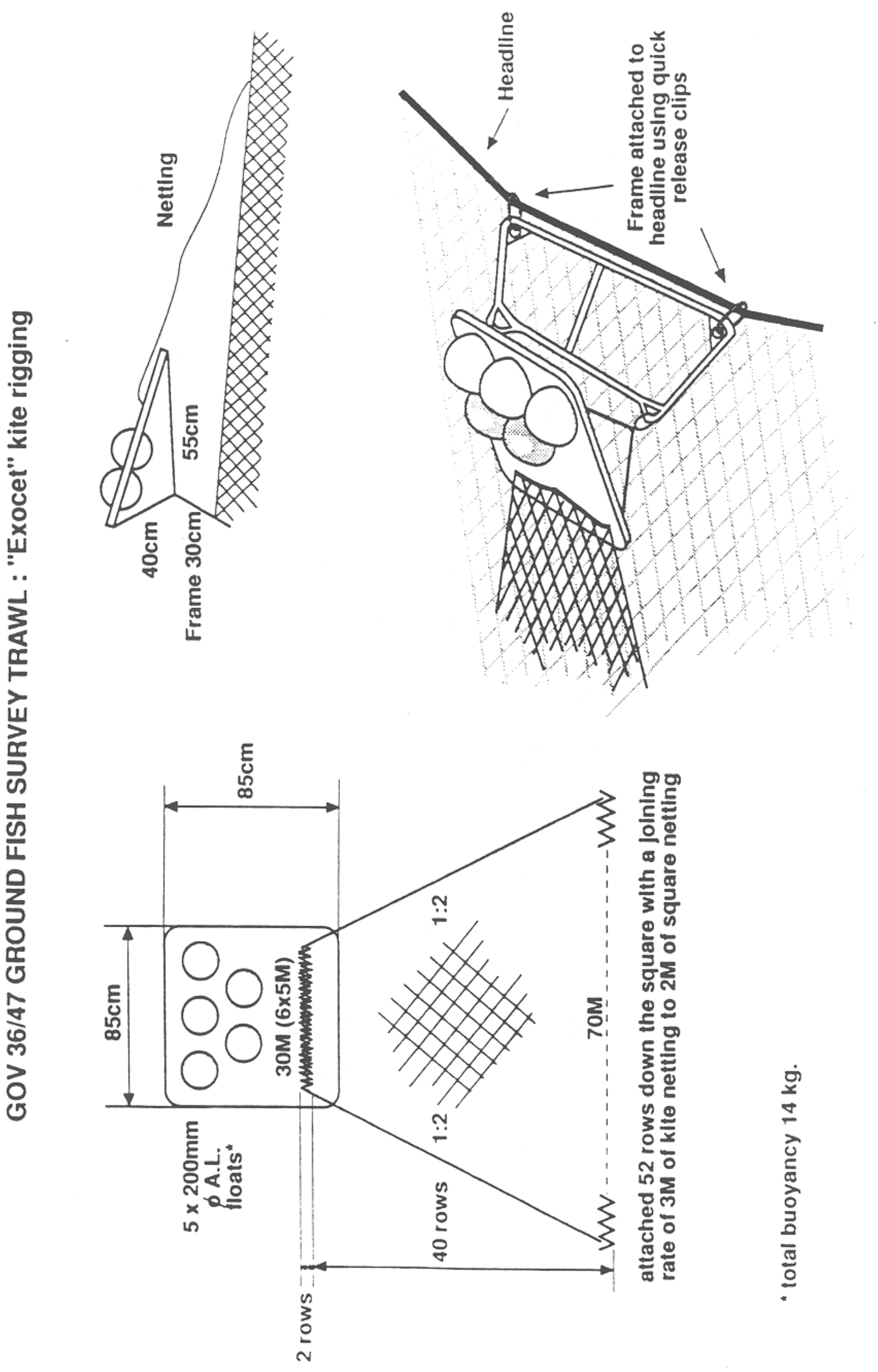


Figure 2.4 "Exocet" Kite for the 36/47 GOV Trawl

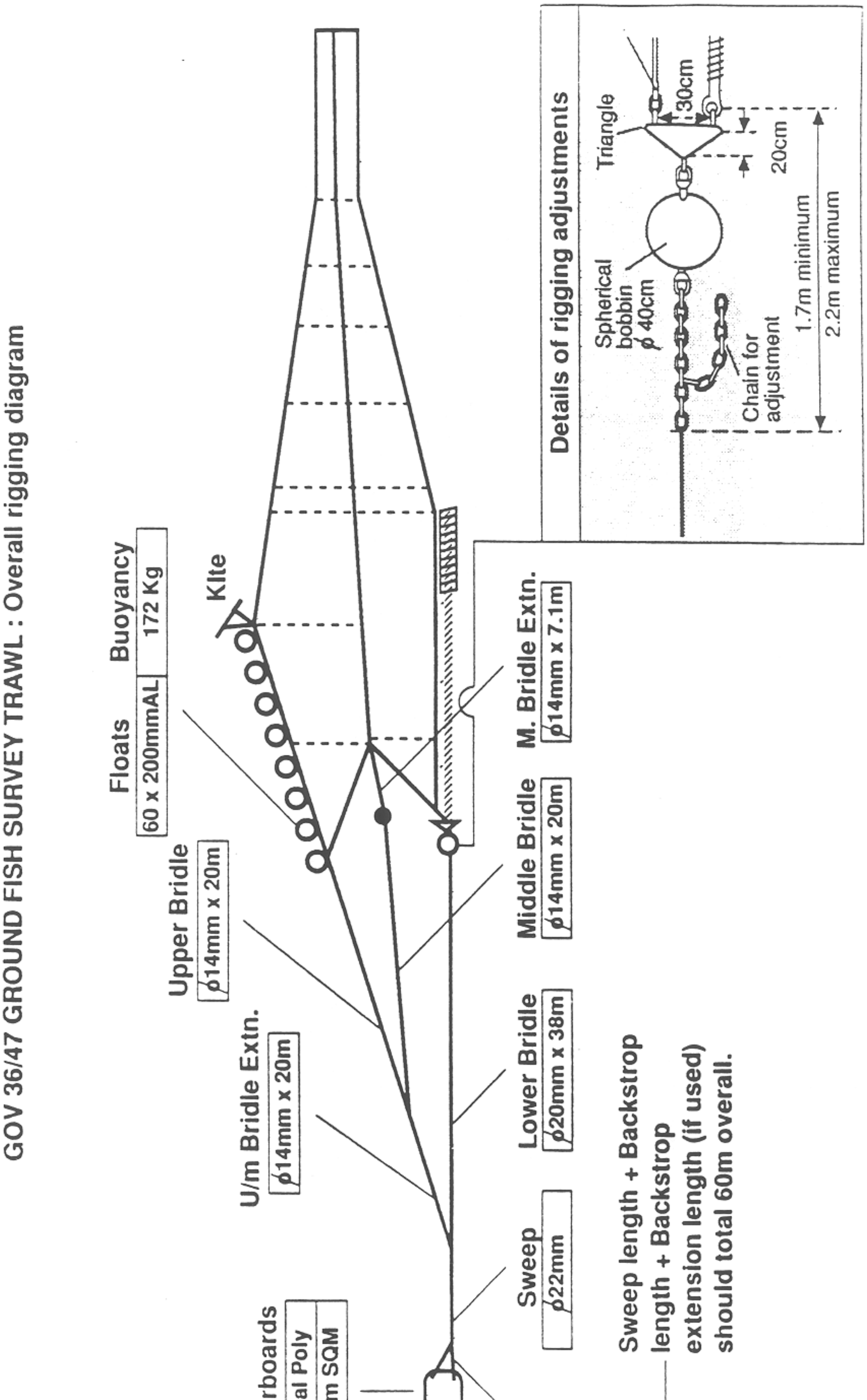


Figure 2.5 Rigging of the 36/47 GOV Trawl

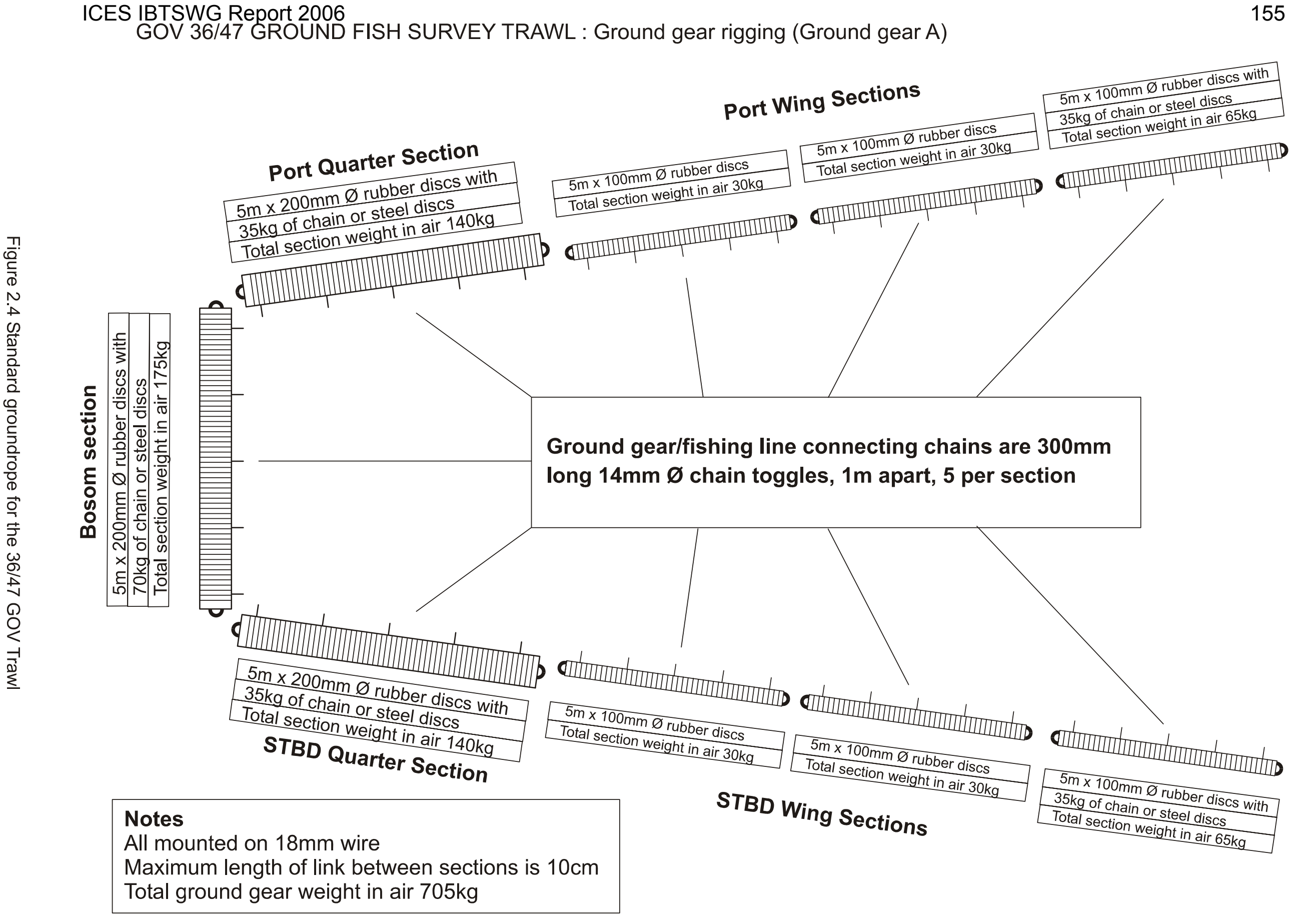
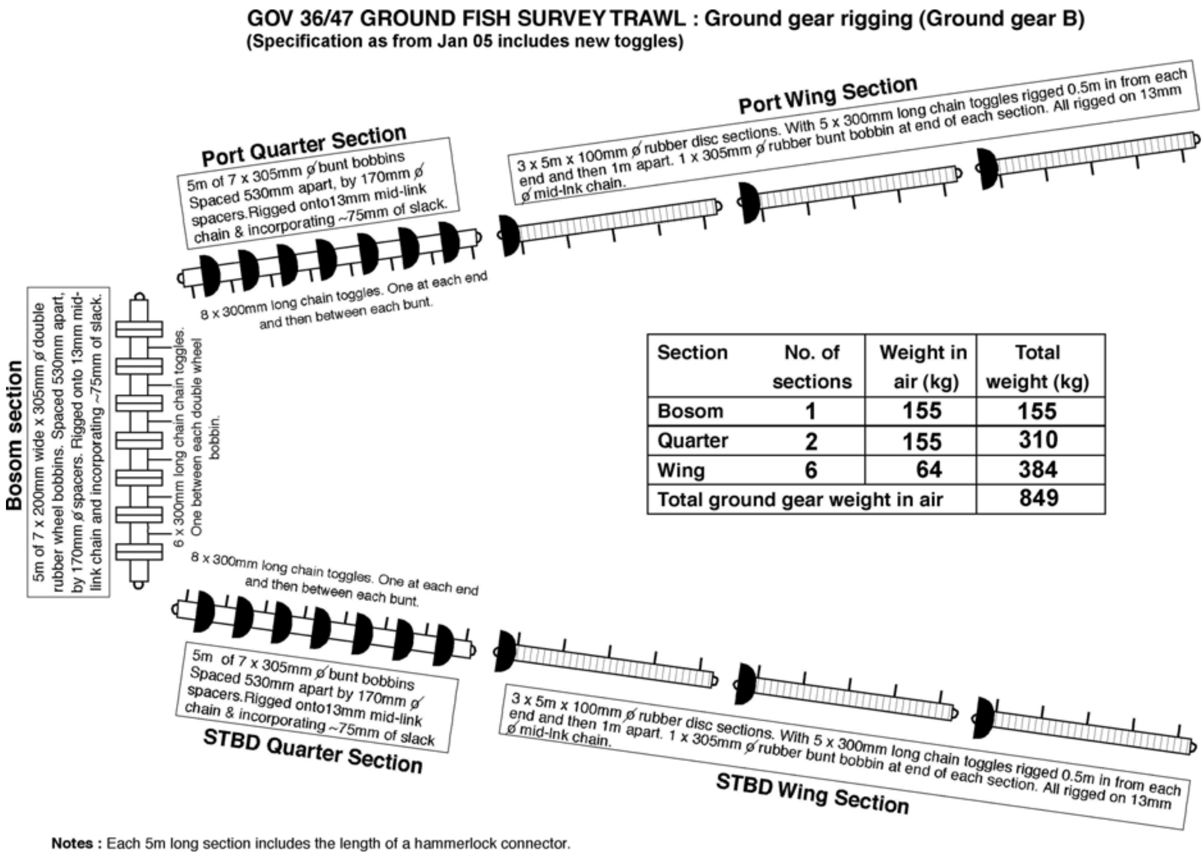


Figure 2.6 Standard groundrope for the 36/47 GOV trawl ground gear 'A'



Section	No. of sections	Weight in air (kg)	Total weight (kg)
Bosom	1	155	155
Quarter	2	155	310
Wing	6	64	384
Total ground gear weight in air			849

Figure 2.7 Standard groundrope for the 36/47 GOV trawl ground gear 'B'.

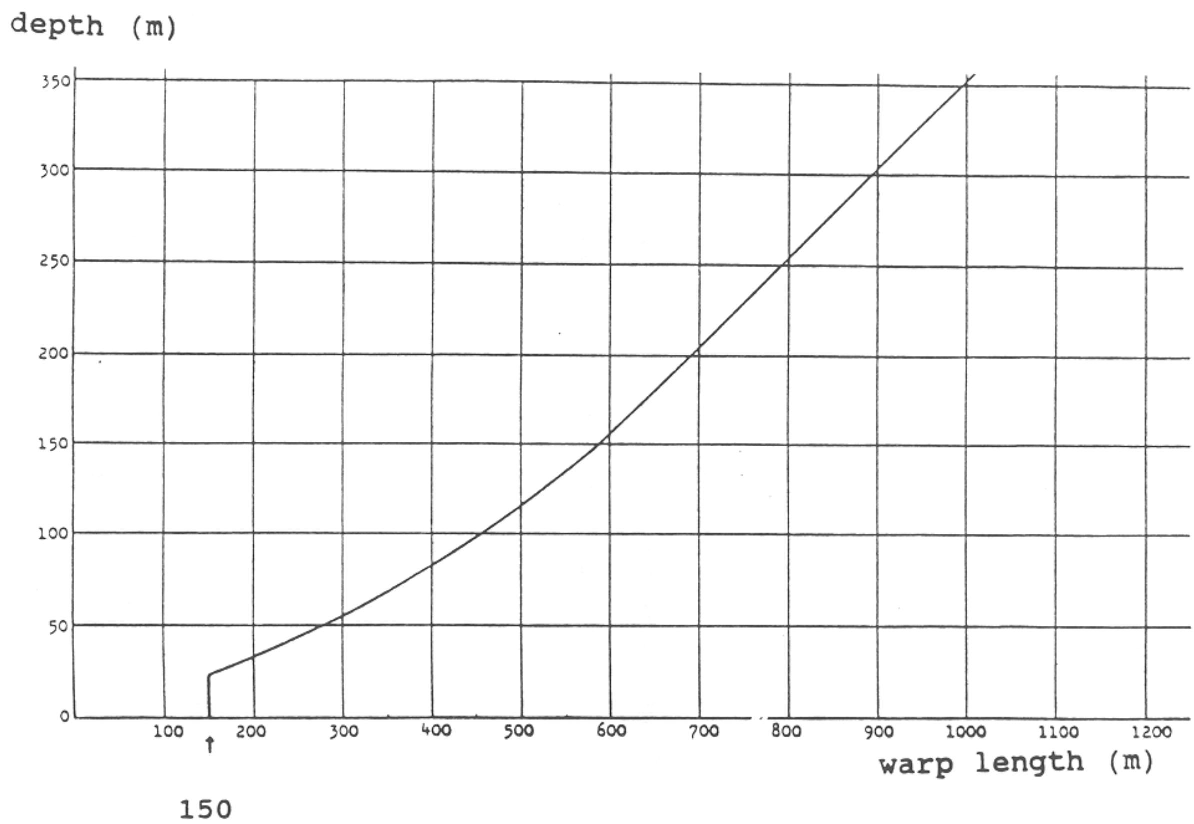


Figure 2.8 Warp/Depth ratios for the 36/47 GOV Trawl.

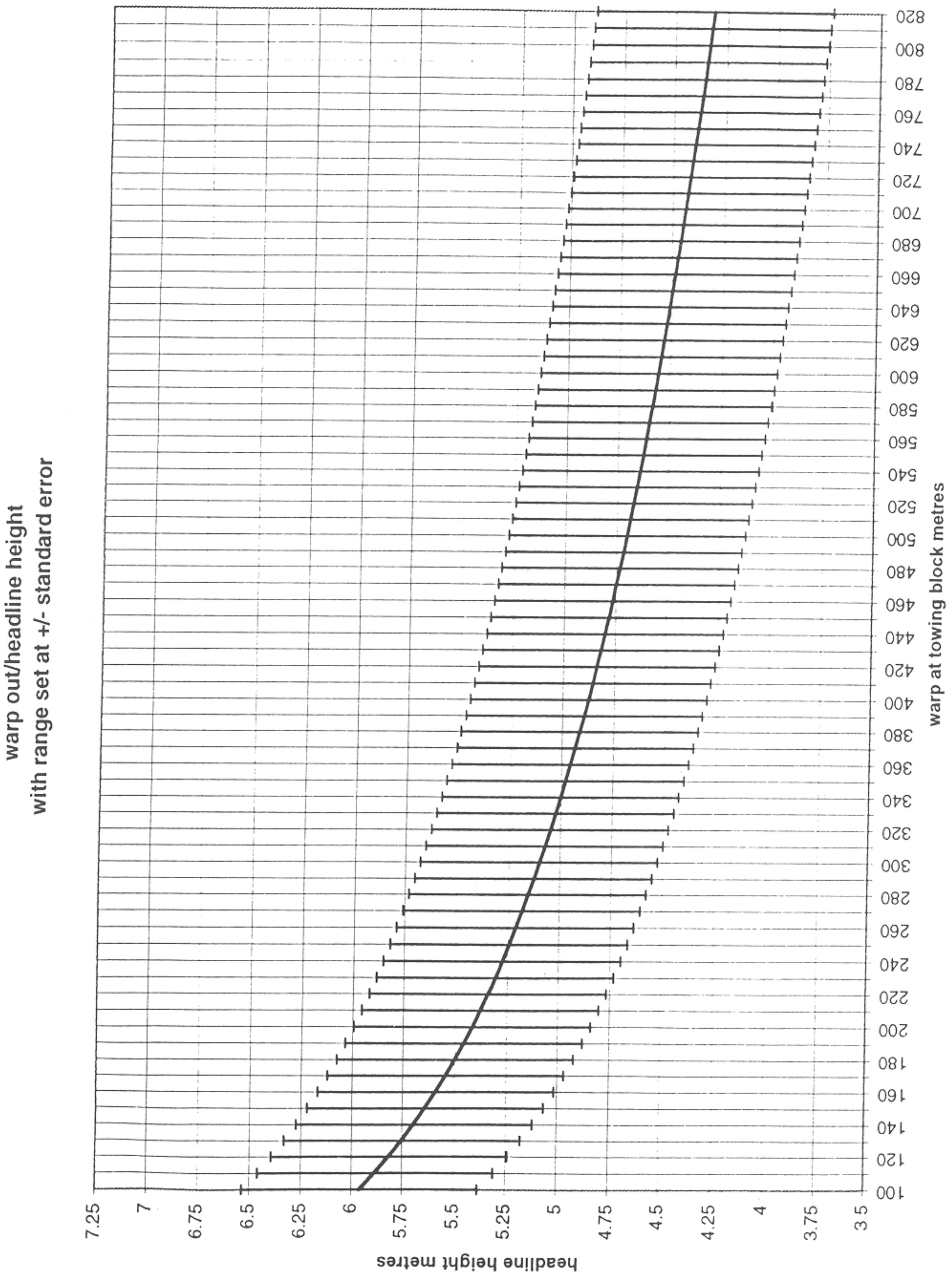


Figure 2.9 Expected warp out / headline height ratio.

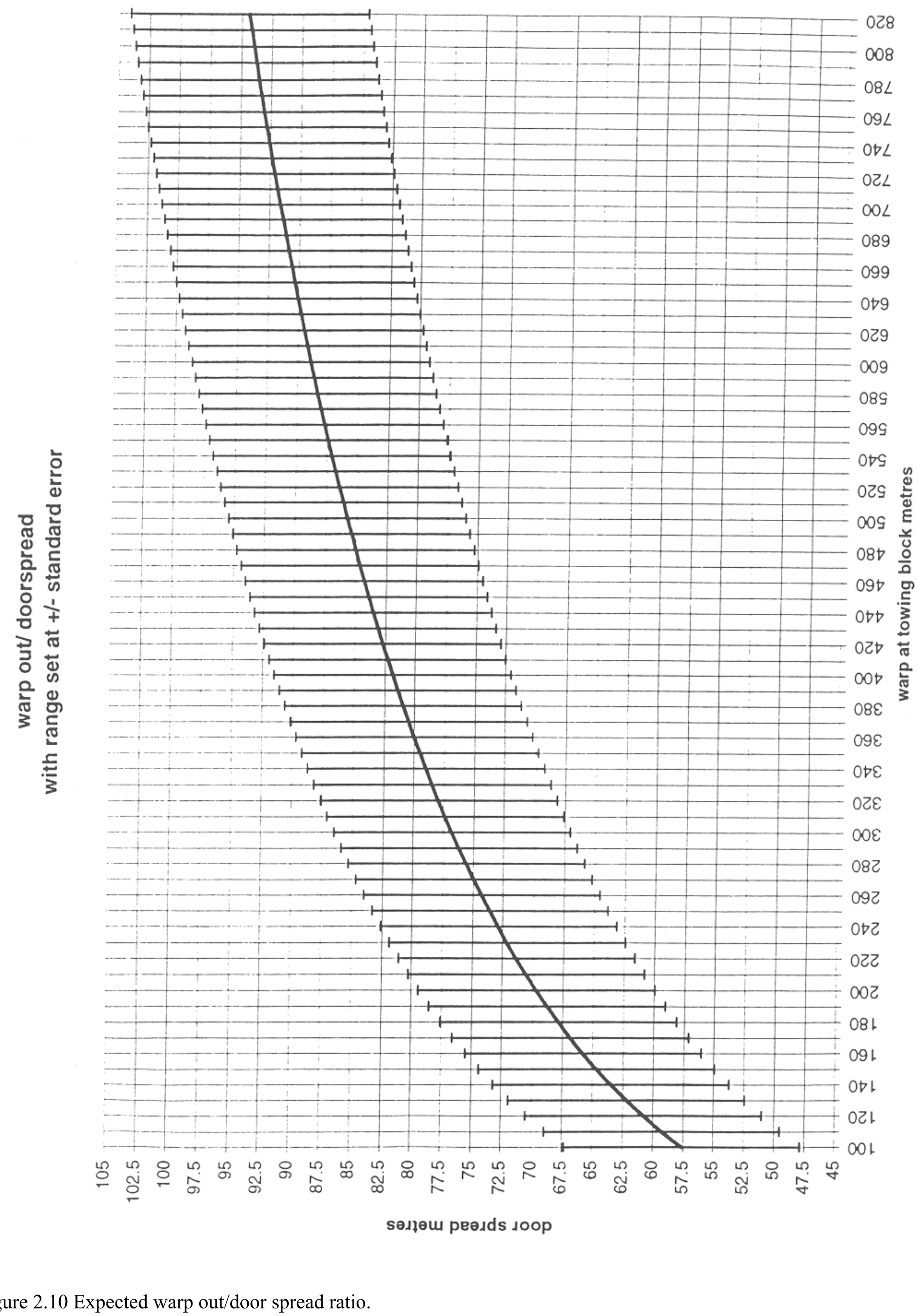


Figure 2.10 Expected warp out/door spread ratio.

3 SAMPLING OF GOV-TRAWL CATCHES

3.1 Catch sorting

It is recommended that the catch from all valid hauls be sorted fully were practicable. Wherever possible, the entire catch is sorted, with fish and shellfish species identified to the lowest taxonomic level possible. In the case of larger catches a selection of species/size categories of species may be identified as being sufficiently abundant that they can be sub-sampled, appropriately. If the entire catch cannot be sorted through then the data should be flagged accordingly when submitted to the DATRAS database.

Appendices VII and VIII show tables of catch processing procedures (from Report of the International Bottom Trawl Survey Working Group, ICES 2002).

3.2 Length composition

Length distributions are recorded for all fish species caught. Length is defined as total length (measured from tip of snout to tip of caudal fin). Length is measured to 0.1cm below for shellfish, to 0.5 cm below for herring and sprat, and to 1 cm below for all other species. When measuring shellfish species, figures 3.1 to 3.4 should be consulted to ensure the correct carapace measurement is taken.

It is recommended that elasmobranch fishes should be measured and weighed by sex.

After sorting the catch into species or species/sex, we need to obtain a length distribution for each catch category that accurately represents the length distribution. Where the numbers of individuals are too large for them all to be measured (due to time constraints etc) a representative sub-sample is selected of at least 75 fish, although sampling a very limited length range could be adequately achieved with less. In the event that a truly representative sub-sample cannot be selected, it will be necessary to further sort the species into two or more size grades or categories. The following two examples are used to describe incidences when grading or categorisation may be required but are by no means exhaustive.

Example 1 - A catch element consists of 999 fish in the length range 18 - 26cm and one fish at 40cm. It is evident that a single sub-sample of 100 fish when raised up will give either 10 or zero fish at 40cm. The correct approach is to remove the one large fish and measure it separately, treating that sample as category 1, and take a sub-sample from the remaining 999 fish (category 2). When measured and raised this provides an accurate assessment of the numbers caught at each length for this element of the catch.

Example 2 - A catch element consists of 994 fish in the length range 18-26cm and 3 fish in the length range 10-12cm and 3 fish in the length range 38-40cm. It is evident that a single raised sub-sample of 100 fish could give anything between zero and 10 fish in the length ranges 10-12cm and 38-40cm. The correct approach is to remove the small and large fish and measure them as category 1, and then take a sub-sample from the remaining 994 fish (category 2). When measured and raised this provides an accurate assessment of the numbers caught in each length group for this element of the catch

In case of large catches (n > 1000) of any species, the minimum sample size given above should be doubled.

Fish should be identified to the species level. Only if this proves impossible may some be grouped by genus or larger taxonomic group (e.g. Pomatoschistus, Ammodytidae).

3.3 Sampling for Age, Sex and Maturity

Otolith samples are collected within 9 specified sampling areas as illustrated in Figure 6.2. For all species the same areas are used but care should be taken not to extract otoliths from fish that exhibit length deformities.

For the target species the following minimum sampling levels should be maintained for each sampling area:

herring	:	8 otoliths per $^1/_2$ cm group
sprat	:	16 otoliths per $^1/_2$ cm group 8.0-11.0cm
		12 otoliths per $^1/_2$ cm group >11.0cm
mackerel	:	8 otoliths per 1 cm group
cod	:	8 otoliths per 1 cm group

haddock	:	8 otoliths per 1 cm group
whiting	:	8 otoliths per 1 cm group
Norway pout	:	8 otoliths per 1 cm group
saithe	:	8 otoliths per 1 cm group

For the smallest size groups, that presumably contain only one age group, the number of otoliths per length class may be reduced. Conversely more otoliths per length are required for the larger length classes.

Participants are encouraged to collect age samples also from other commercially important species such as plaice and IIIa sole.

Sex and maturity data should be reported for all the target species for which age data are collected. Maturity stages should be reported according to the maturity scale given in Appendix VII and VIII.

Targets should be set to ensure that data are collected from the entire survey area.

Figure 3.1 Measurement and sexing of *Cancer pagurus*

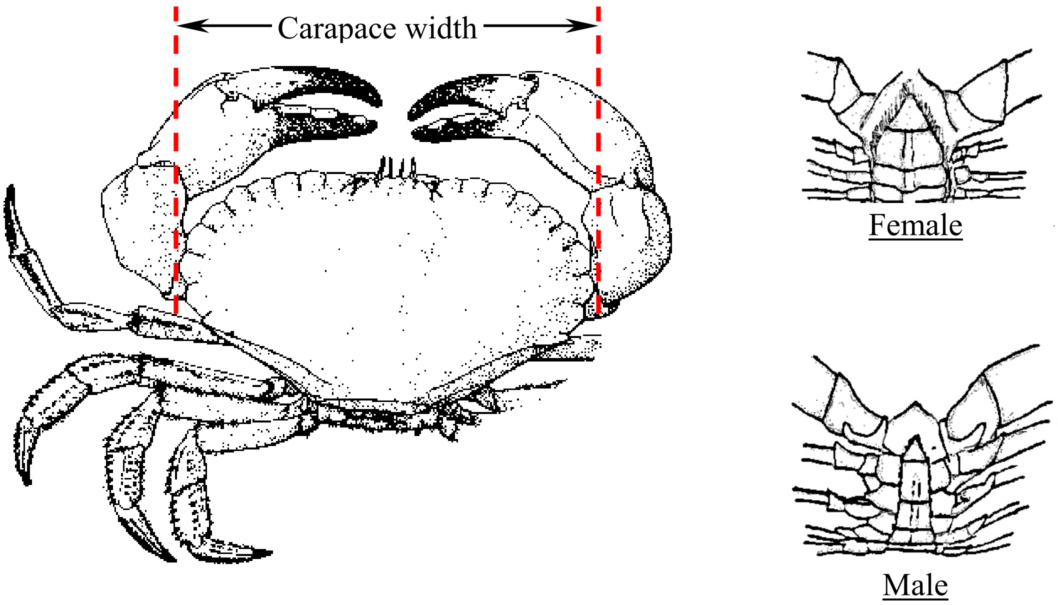


Figure 3.2 Measurement and sexing of *Maia squinado*

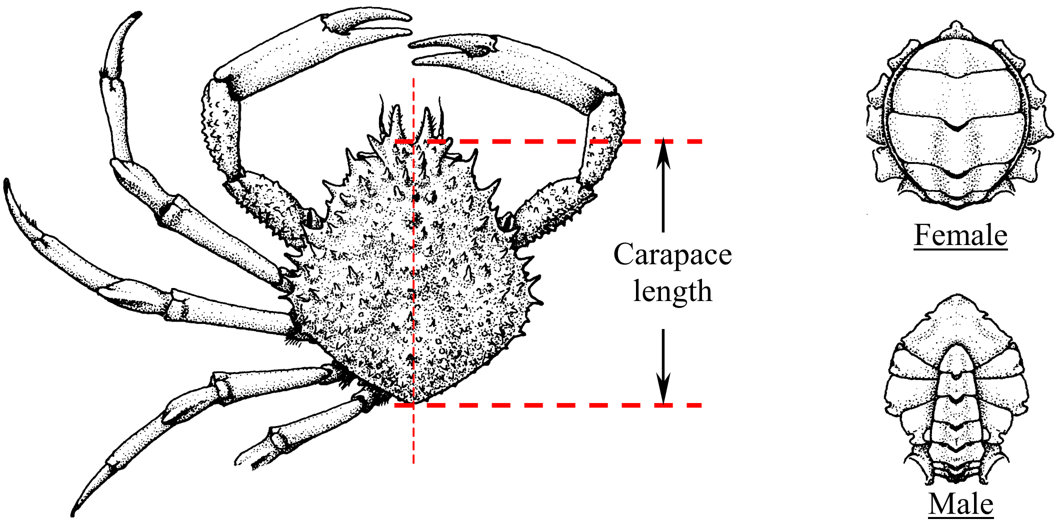


Figure 3.3 Measurement and sexing of *Nephrops norvegicus* and *Homarus gammarus*

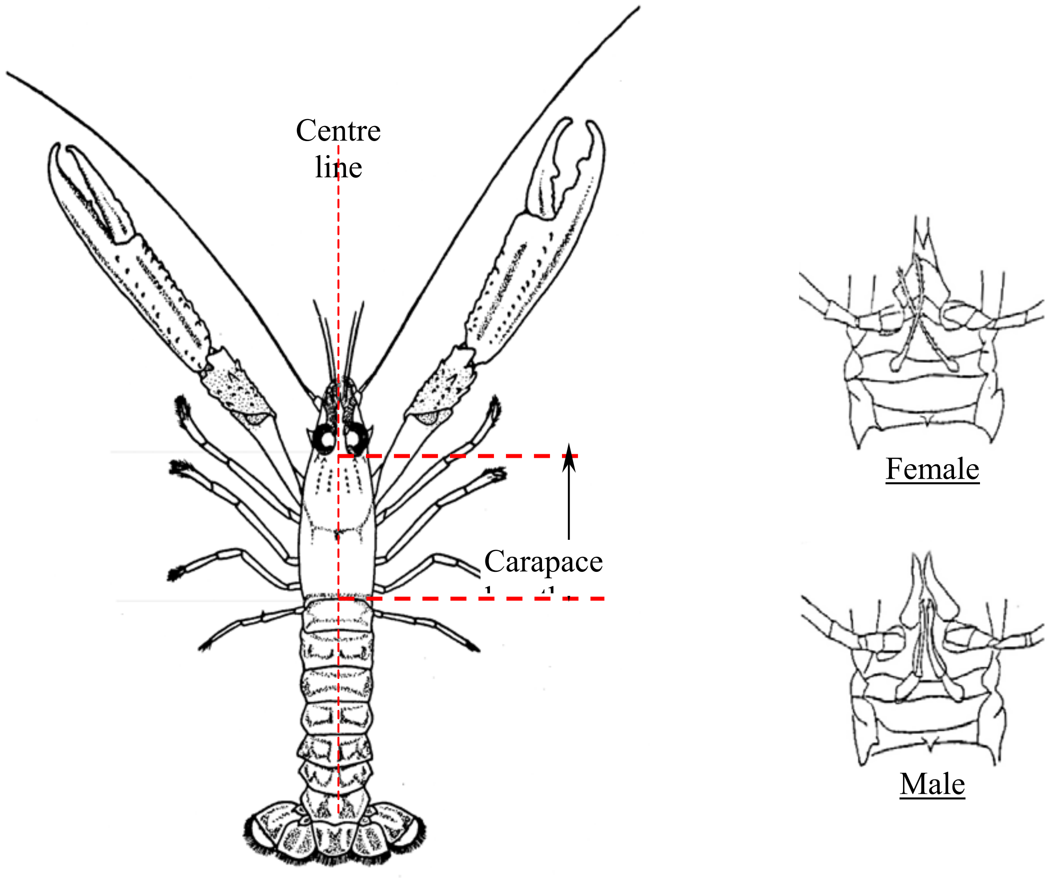
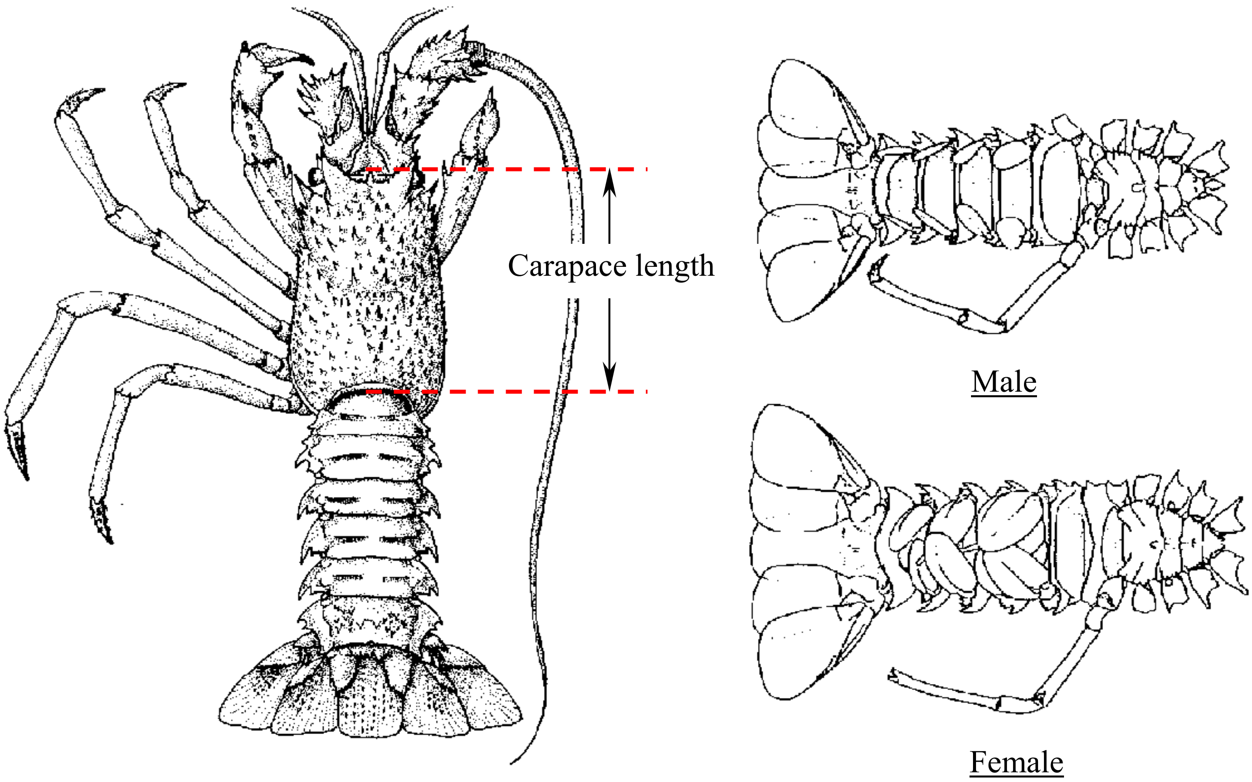


Figure 3.4 Measurement and sexing of Palinurus Spp



4 METHOT ISAAC KIDD NET

4.1 Construction and Rigging

The Methot Isaac Kidd (MIK) net is a midwater ring trawl and is the standard gear for the sampling of fish larvae during the International Bottom Trawl Survey in the first quarter.

The parts of the gear, as shown in Figures 4.1 and 4.2 are:

a) Ring of 2 meter diameter

b) Black net of 1.6 mm pore, 13 meter long, strengthened by nylon straps. In the last meter of the net a 500 mm net is inserted (b1)

c) Bolts for mounting the net on the ring

d) Saddle shaped weight of 25kg approx; weight dependent on weight of the 2m ring.

e) Pair of 10 meter long bridles to the gear

f) Pair of 3.0 meter long bridles to the weight

g) Bucket (Ø 11 cm) for collection of the plankton sample

h) Flow meter mounted on a string crossing the ring, positioned in the centre of the ring

4.2 Fishing Method

Because of the length of the bridles it is necessary to haul them through the block; thus a strong block is necessary, and the connection between bridle and hauling wire ought to be relatively small.

In order to monitor the distance of the gear to the bottom an echo sounder should be mounted, optionally wireless echo and/or depth sounder (e.g. SCANMAR) should be used. This should be placed in the lower part of the ring.

If no wireless sounder is available the transmitting cable could be relieved by use of a second, 9-10 meter long, pair of bridles as shown in Figure 4.3.

When the gear is put out the net should float freely, and the weight should be under water before the ring is lowered under water.

4.3 Sampling Procedure

Hauls should only be made during the period between 30 minutes past sunset to 30 minutes before sunrise (see table in section 2.3 for the definition of sunrise and sunset). If there is no cloud cover, i.e. the daylight period has been extended, and then fishing should not begin until 60 minutes after sunset and cease 60 minutes before sunrise.

Fishing speed is 3 knots through the water.

The haul profile is oblique to 5 meter above the bottom (i.e. measured from the lower part of the ring). Maximum depth of tow should, however, be 100 meter. If the haul duration of a single oblique haul is less than 10 minutes a double oblique haul must be made.

The wire is paid out at a speed of 25 meter per minute and retrieved at 15 m/min.

The flowmeter is read before and after each haul.

The duration and distance towed must be recorded.

The position of sampling is the shooting position.

On deck the hindmost part of the net (the 500 mm netting) is washed into the bucket.

4.4 Sample and Data Treatment

The samples should be preserved in either 4% formalin in fresh water or in 96% ethanol. Type of preservation should be indicated on the standard form (Figure 4.4).

It is recommended that lengths of larvae are measured after preservation. If measurements are made before preservation this should be indicated on the standard form (Figure 4.4).

Herring and sprat larvae should be identified, and their standard length (see Figure 4.5) measured to the millimetre below. If larvae are preserved in ethanol, approximately 30 minutes in fresh water will soften them, making measuring easier.

Catches of eel and volume of krill should also be indicated on the standard form. Optionally other species may be reported.

Preferably samples are processed and reported within one month after termination of the survey. The immediate reporting of herring and sprat catches (for the use of the Herring Assessment Working Group Meeting) should be made using the standard spreadsheet e-mailed to Peter Munk (pm@dfu.min.dk). Subsequently the standard forms (Figure 4.4) should be mailed to Peter Munk, Danish Institute for Fisheries DIFRES, Charlottenlund Castle, DK-2920 Charlottenlund, Denmark.

The data will be included in a database at DIFRES. A revised copy of the data will be available at the ICES Secretariat.

The standard areas for which the abundance of herring larvae is calculated is shown in Figure 6.5.

4.5 Calibration of the Flowmeter

The flowmeter used in the survey should be calibrated to revolutions per meter. One method is to tow the MIK (without the bucket) at a depth of about 10 meter for a known distance and make at least two measurements in opposite directions.

4.6 Allocation of Rectangles

At least 2 hauls per ship per rectangle are made within each standard rectangle and the distance between hauls within and between rectangles is at least 10 nm. In the Southern Bight abundance of herring larvae is very variable. Intensified sampling should therefore be carried out in this area.

If possible, more than 2 hauls per ship per rectangle should be made in the following rectangles: 30F1, 32F2, 32F3, 33F2, and 33F3.

Each year, the first quarter coordinator announces the allocation of rectangles to all participants.

During the survey the status of MIK-sampling should be reported to the coordinating vessel. If there is any risk that rectangles will be left unsampled then initiatives should be taken to reallocate sampling between participants.

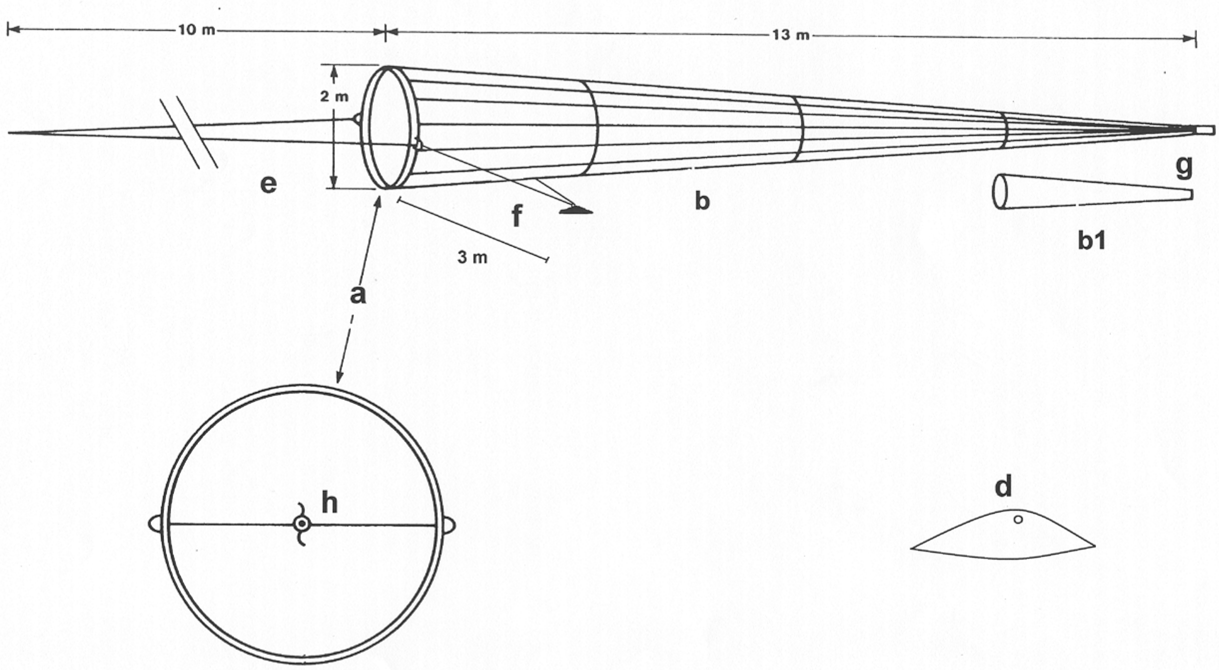


Figure 4.1 Construction and rigging of the MIK trawl. Letters refer to description in the text.

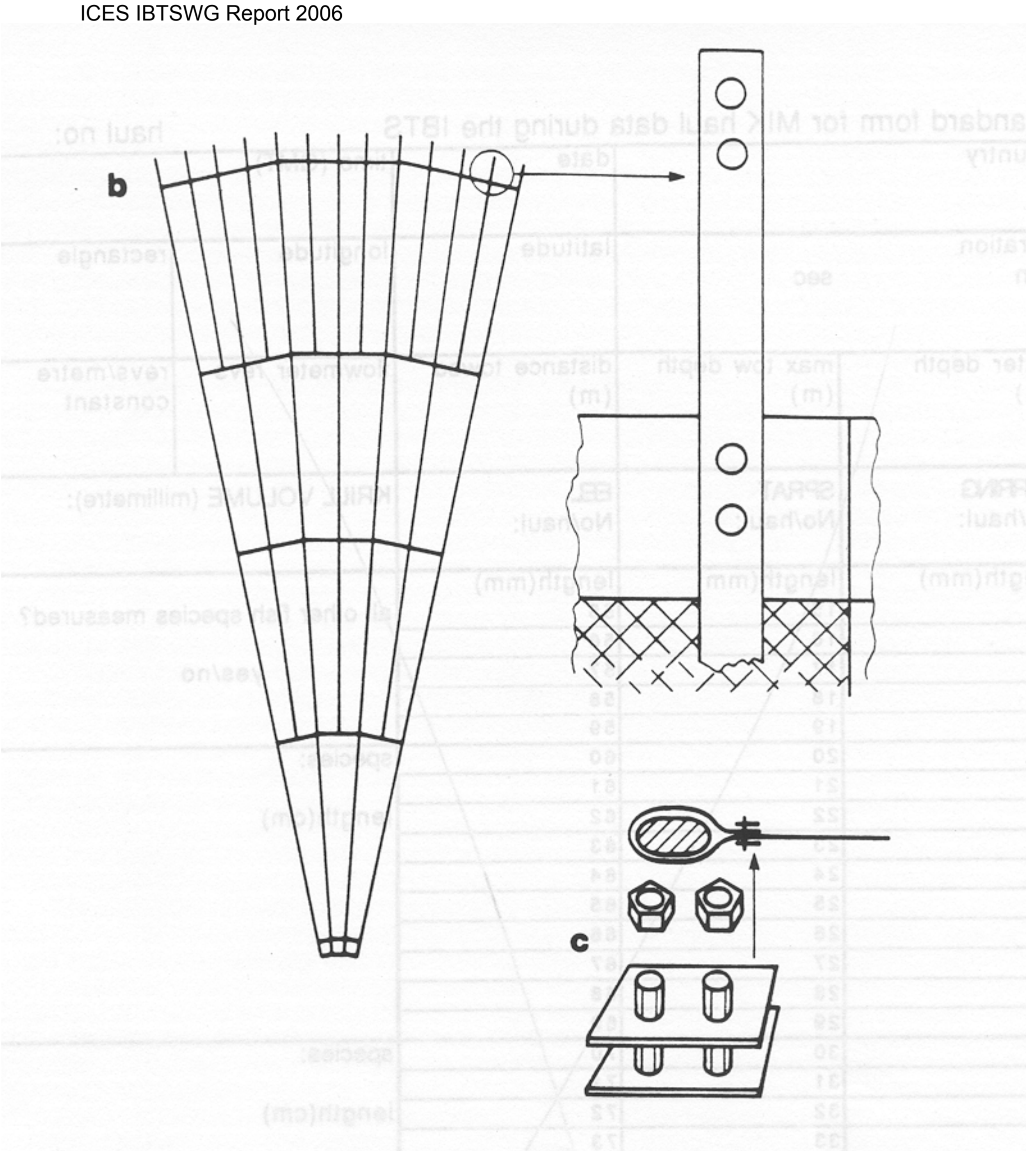


Figure 4.2 Unfolded net of the MIK midwater trawl and illustration of net attachment.

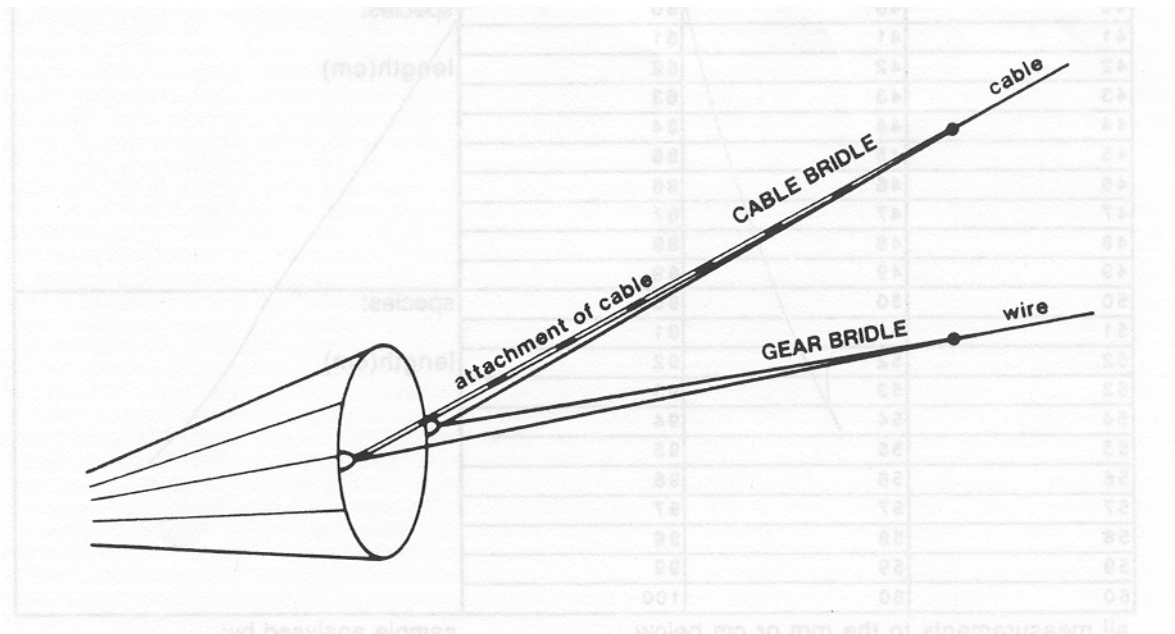


Figure 4.3 Proposed rigging of transmitting cable

Standard form for MIK haul data during the IBTS haul no:

country		date	time (GMT)	
duration min sec		latitude	longitude	rectangle
water depth (m)	max tow depth (m)	distance towed (m)	flowmeter revs	revs/metre constant
HERRING No/haul:	SPRAT No/haul:	EEL No/haul:	KRILL VOLUME (millilitre)	
length (mm)	length (mm)	length (mm)		
15	25	55	measured to millimetre below: yes / no	
16	26	56		
17	27	57	preserved in ethanol: yes / no	
18	28	58		
19	29	59		
20	30	60	species:	
21	31	61		
22	32	62	length (cm)	
23	33	63		
24	34	64		
25	35	65		
26	36	66		
27	37	67		
28	38	68		
29	39	69		
30	40	70	species:	
31	41	71		
32	42	72	length (cm)	
33	43	73		
34	44	74		
35	45	75		
36	46	76		
37	47	77		
38	48	78		
39	49	79		
40	50	80	species:	
41	51	81		
42	52	82	length (cm)	
43	53	83		
44	54	84		
45	55	85		
46	56	86		
47	57	87		
48	58	88		
49	59	89		
50	60	90	species:	
51	61	91		
52	62	92	length (cm)	
53	63	93		
54	64	94		
55	65	95		
56	66	96		
57	67	97		
58	68	98		
59	69	99		
60	70	100		

all measurements to the mm or cm below sample analysed by:
see IBTS Manual for guidelines

Figure 4.4 Standard form for MIK haul data

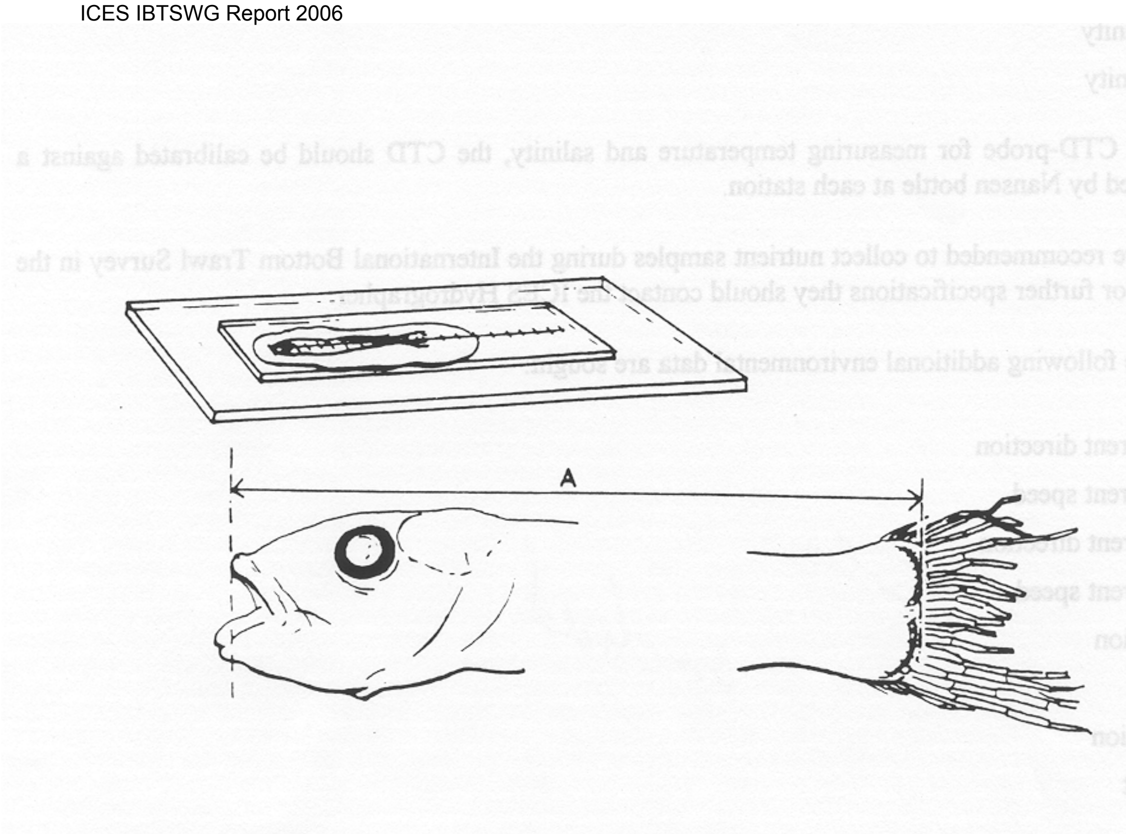


Figure 4.5 Measurement of standard length of herring and sprat larvae (to the millimetre below)

5 ENVIRONMENTAL DATA

After each haul with the GOV trawl, the following minimum hydrographical data are collected:

- surface temperature
- bottom temperature
- surface salinity
- bottom salinity

When using a CTD-probe for measuring temperature and salinity, an appropriate calibration should be undertaken.

Participants are recommended to collect nutrient samples during the International Bottom Trawl Survey in the first quarter. For further specifications they should contact the ICES Hydrographer.

Since 1992 the following additional environmental data are sought:

- surface current direction
- surface current speed
- bottom current direction
- bottom current speed
- wind direction
- wind speed
- swell direction
- swell height

The above parameters should be reported in the 'Haul Information file HH' (Appendix IX).

6 EXCHANGE SPECIFICATIONS FOR IBTS DATA

Three distinct types of computer records have been defined for standard storage of the IBTS data:

Type 1: HH - Record with detailed haul information (Appendix IX)
Type 2: HL -Length frequency data (Appendix X)
Type 3: CA - Sex-maturity-age-length keys (SMALK) (Appendix XI)

The summaries of the formats of these record types are given in the appendices given above, and detailed descriptions can also be found at the ICES web page: http://www.ices.dk/datacentre/datsu/selrep.asp.

When data are submitted to ICES it is important to give details of the data, such as the number of records of each record type, and the number of CA-records per species.

Provisional data obtained from the North Sea and Skagerrak/Kattegat should be submitted to the quarterly coordinator as soon as possible after completion of the cruise. Appendix XIII lists the length splits for the various target species. Final data should only be submitted to the ICES Secretariat after the national institute has checked the data (see section 6 for format) using official checking programs issued by ICES.

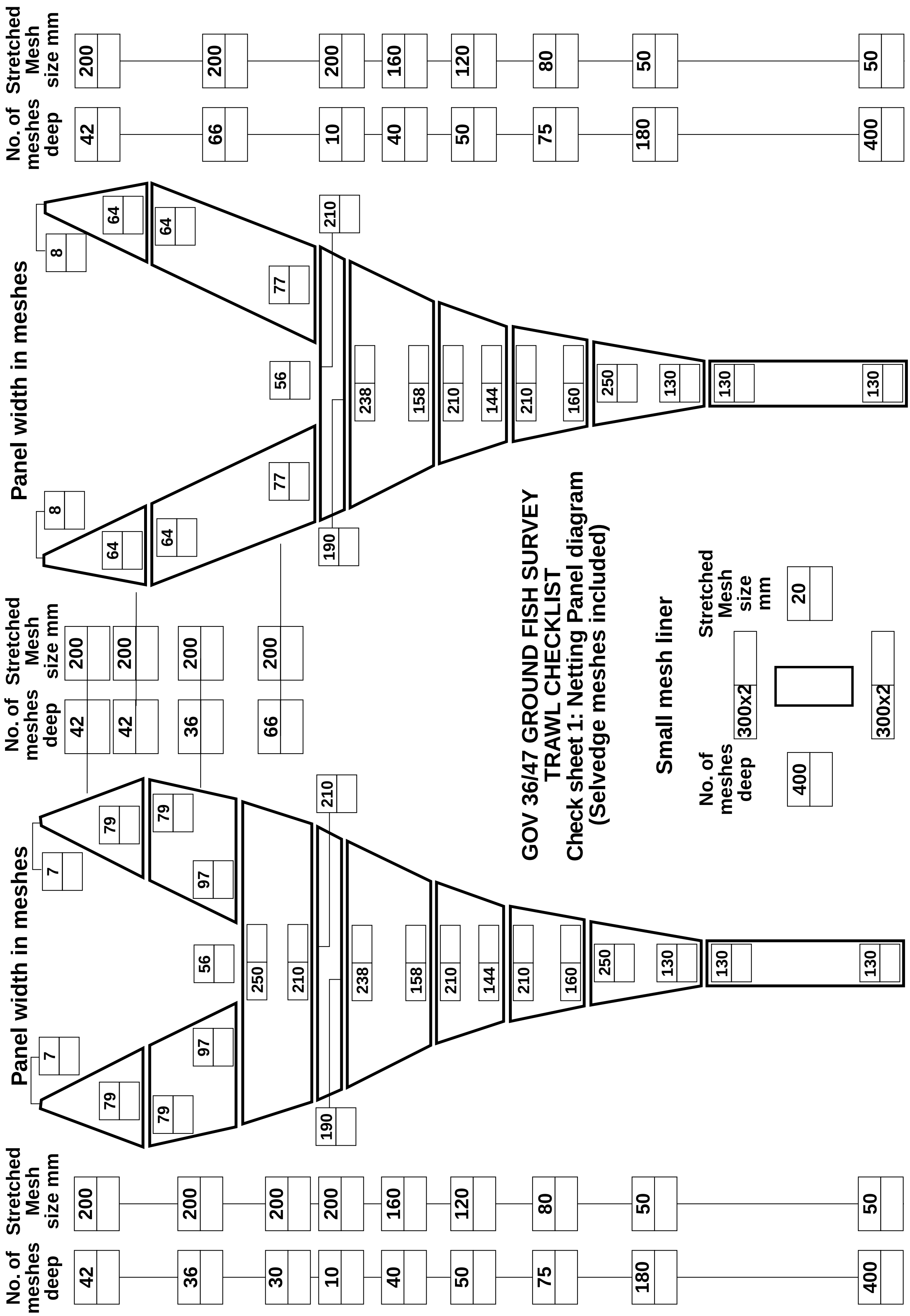
NB:

Details of environmental data should be submitted to the Hydrographic Service of ICES according to established procedures. The national hydrographic station number must be reported in Record Type 1 to enable the link to be made between haul data and environmental data.

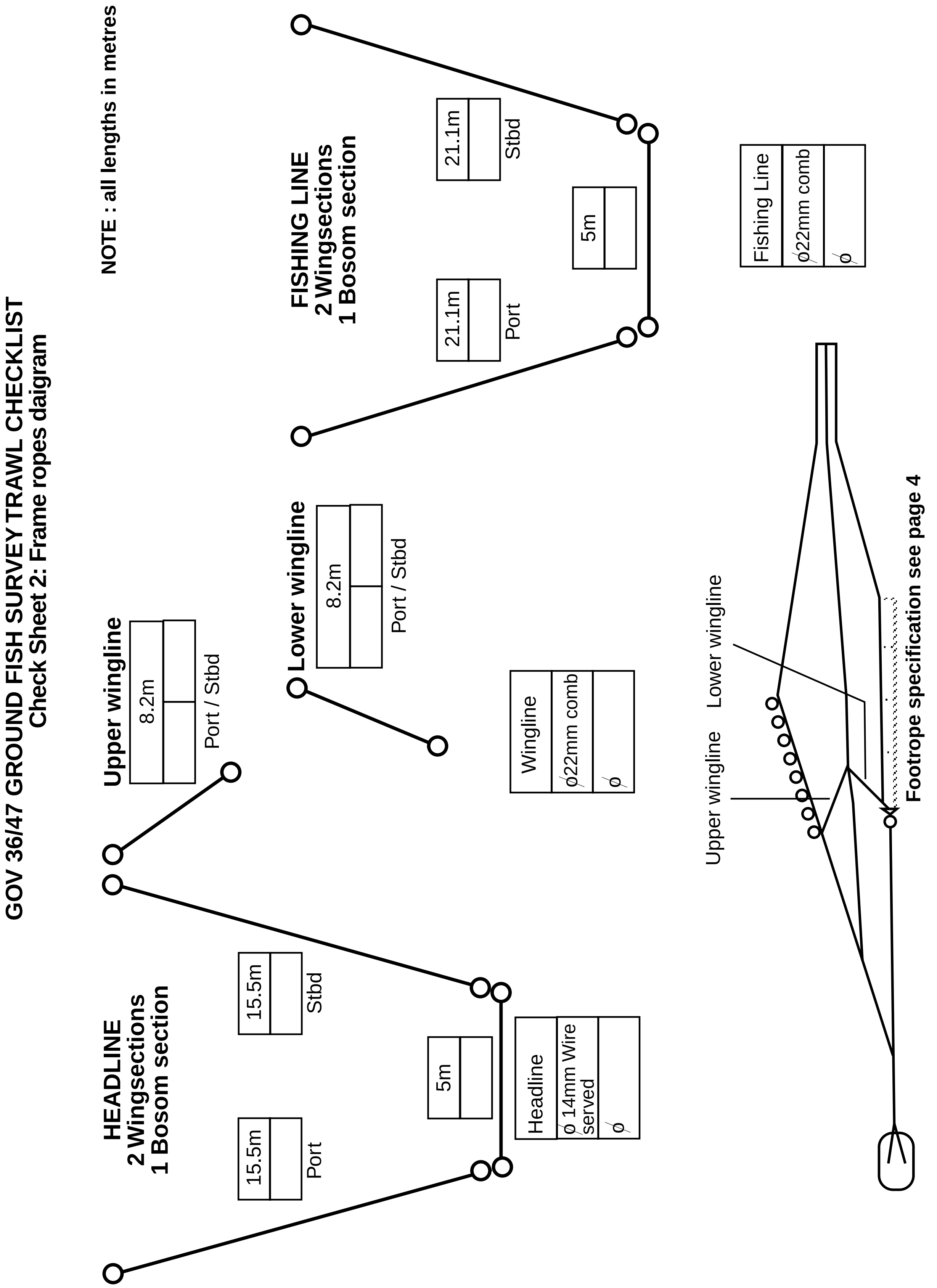
APPENDIX I - CHRONOLOGY OF THE INTERNATIONAL BOTTOM TRAWL SURVEY

1960-1961	Spring and autumn trawl surveys to map distribution of herring
1966	Annual surveys in the southern and central North Sea established to obtain recruitment indices for the combined North Sea herring stocks - the International Young Herring Survey (IYHS).
1969	Skagerrak and Kattegat included in survey area
1970's	Many different survey trawls being used by various institutes carrying out different surveys in the North Sea, Skagerrak and Kattegat, amongst them the Dutch Herring Trawl, GOV and Herring Trawl
1974	Northern North Sea included in survey area to collect data for gadoids
1975	Recommendation for participants in IYHS to use Isaacs-Kidd midwater trawl to fish for herring larvae at night
1976	Some participants start to fish ½ hour tows in order to reduce gear damage and increase numbers of hauls per day
1977	IYHS Working Group and Gadoid I-Group Working Group recommend that all participants change to ½ hour tow duration.
	Working Groups also recommend that from 1978 the GOV trawl be the standard gear for future surveys. At least 4 countries were to use this gear in 1978, with other participants changing over to the GOV at the earliest possible occasion
1981	Survey was renamed the International Young Fish Survey (IYFS)
1983	All Quarter 1 participants use standard GOV.
1984	ICES 'Working Group on Young Herring Surveys' and the 'Gadoid 1-Group Working Group' were combined to form the International Young Fish Survey (IYFS) Working Group.
1990	IYFS WG proposed to combine the IYFS and other national surveys into Quarterly Co-ordinated Surveys in the North Sea, Skagerrak and Kattegat, which were to be called the International Bottom Trawl Surveys (IBTS).
1991-1996	Quarterly surveys undertaken
1992	All participating countries now using GOV as standard survey gear for all quarters.
1997	National financial constraints reduce co-ordinated surveys to quarter 1 and quarter 3 with target coverage of 2 hauls per ICES rectangle per survey.

APPENDIX II – IBTS STANDARD GEAR CHECK SHEET 1



APPENDIX III – IBTS STANDARD GEAR CHECK SHEET 2

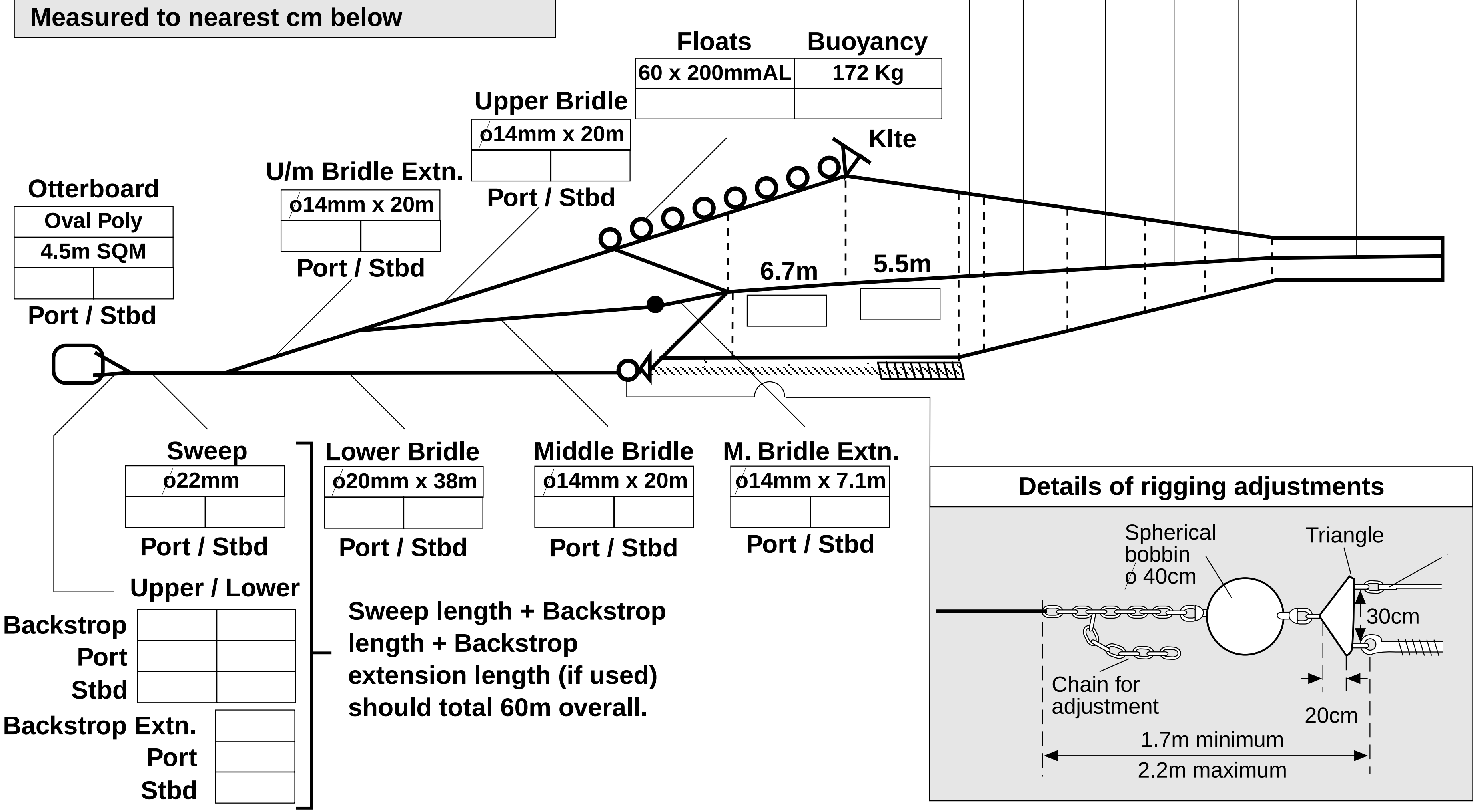


APPENDIX IV – IBTS STANDARD GEAR CHECK SHEET 3

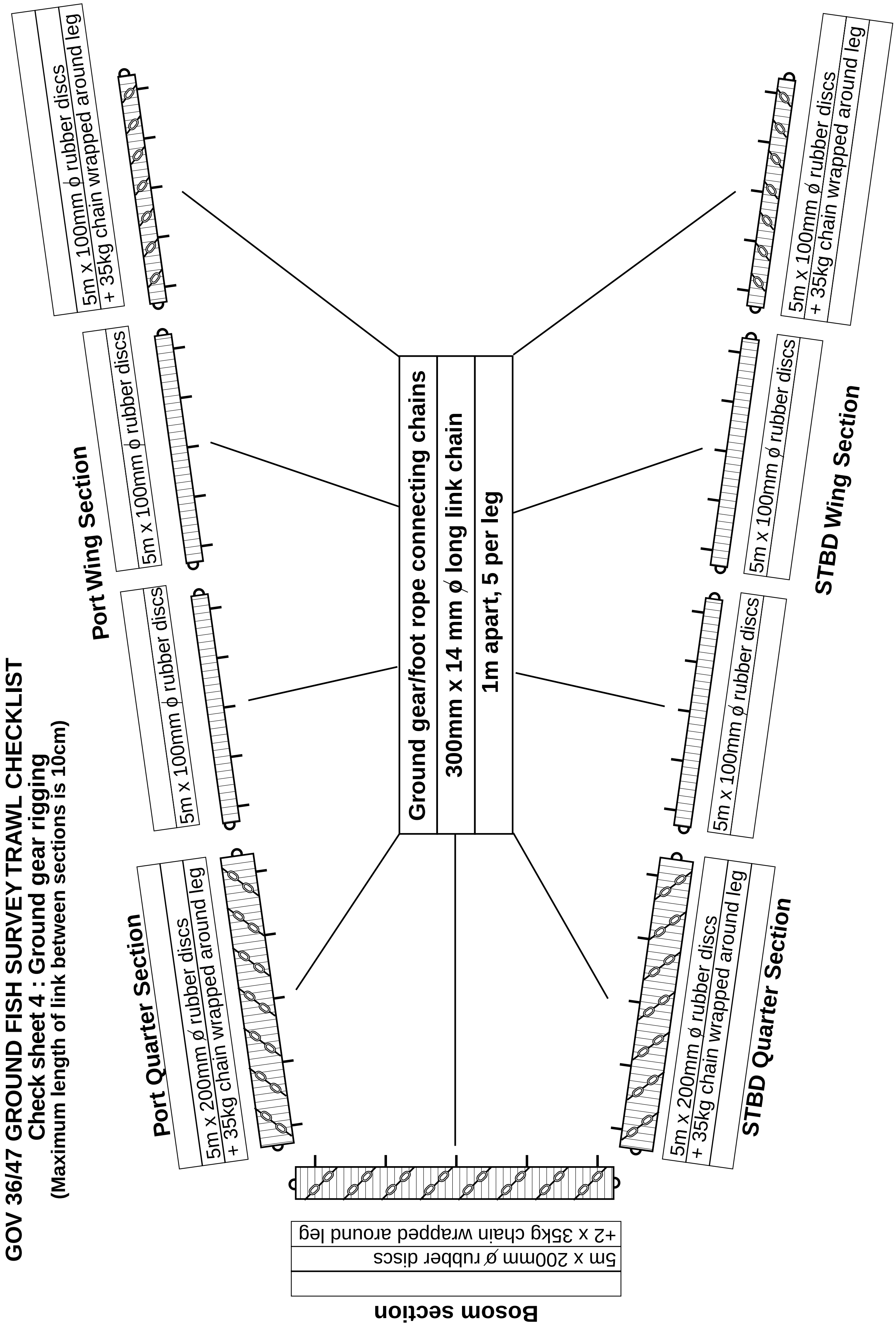
Vessel	
Cruise	
Date	
Checked by	
Checked by	
Measured to nearest cm below	

GOV 36/47 GROUND FISH SURVEY TRAWL CHECKLIST
Check sheet 3: Overall rigging diagram

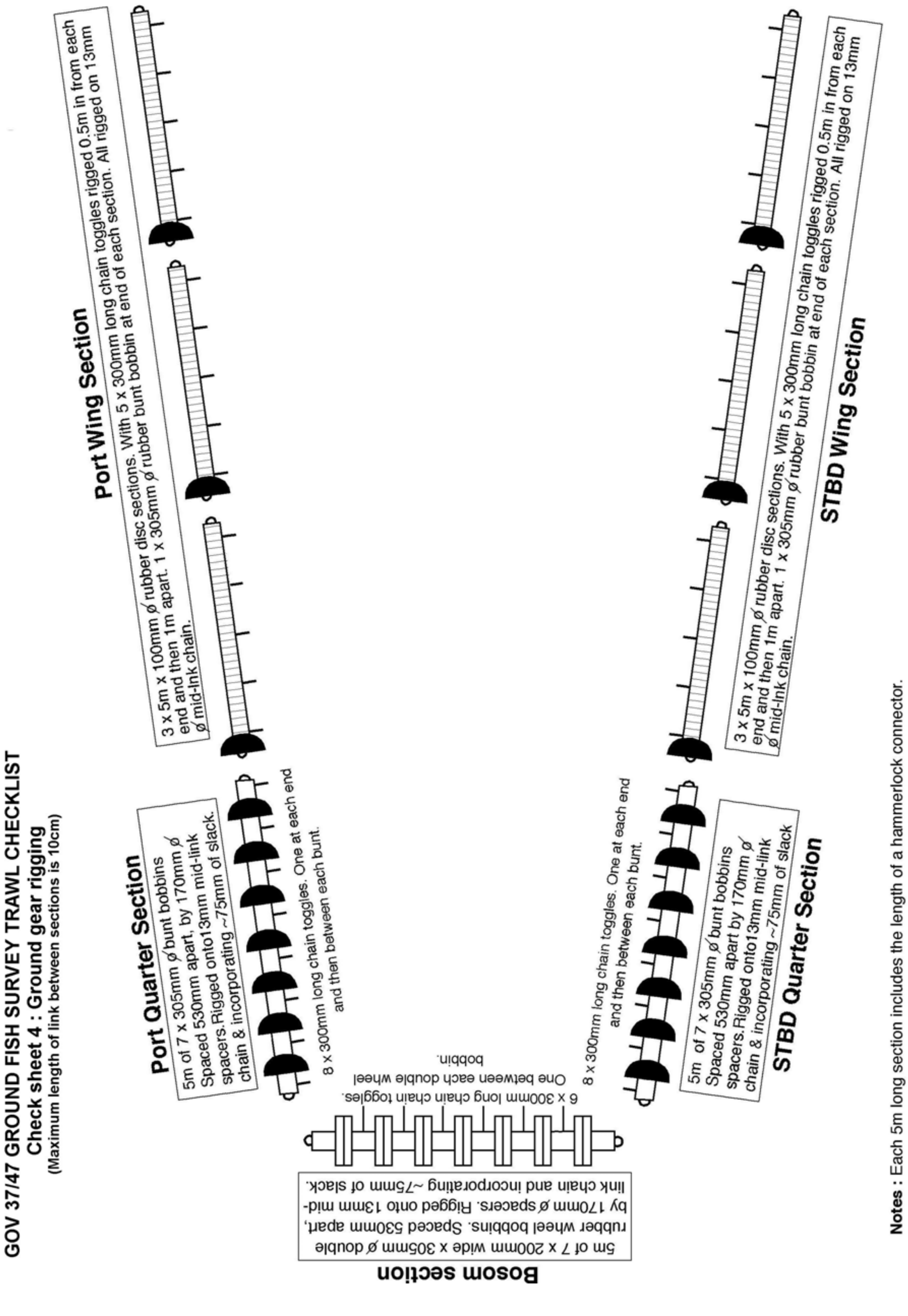
Ribline longer than netting (length for length)	YES						
	NO						



APPENDIX Va – IBTS STANDARD GEAR CHECK SHEET 4 – GROUND GEAR A



APPENDIX Vb – IBTS STANDARD GEAR CHECK SHEET 4 – GROUND GEAR B



APPENDIX VI – IBTS CLEAR TOW DATA

Required information:	Country Year Shoot position Haul position Accuracy Rectangle Gear Haul validity

Country: code as per standard 3-letter code (ICES exchange format)

Year: full format e.g. 1992

Shoot position: degrees decimal minutes if possible please

Haul position: idem

Accuracy: accuracy to which position data was recorded as decimal places, e.g.:

50 35.25	=	accuracy code 2
50 35.3	=	accuracy code 1
50 35	=	accuracy code 0 (data this coarse is not really any use)

Rectangle: ICES rectangle

Gear: as per code below

Description	Options
Gear type (3 characters)	GOV
Sweep length (metres)	60/110
Groundrope type (standard or bobbins)	S/B

Haul validity: V = valid, I = invalid

Acceptable file formats are:

Format	Extension
Excel	.XLS
Lotus 1-2-3	.WK?
Dbase3	.DBF
Comma separated	.CSV

APPENDIX VII – CATCH SAMPLING SUMMARY FOR NORTH SEA IBTS QUARTER 1 SURVEYS

North Sea quarter 1

		Denmark	France	Germany	Netherlands	Norway	Sweden	UK(Eng)	UK(Scot)
Staffing	number available for catch processing	4	8/10	6/8	4	2/3	6/7	6/7	6
Hauls	Average number per day	3/4	4	4	4/5	3/4	5	3/4	4/5
Catch	retention in hopper or bin	y	y	y	y	y	y	y	y
	codend cleaned	y	y	y	y	y		y	y
	net cleaned	y	y	n	n	y		y	y
	cleanings added to catch	y	y	p	p	y		y	y
Sorting	'deckmaster' in charge	y	y	y	y	y	y	y	y
	sorting facility - **b**ench or **c**onveyor	c	c	c	c	b	c	b	b
	complete sort upto no. bstkts	30	20	40	40	10	3	40	50
	small fish mixture sub sorting	y	y	y	y	y	y	y	y
	part of the catch discarded unprocessed	n	n	n	n	y		n	n
Categories	by sex (1)	n	y	y	y	n	y	y	y
	by size large or small	y	y	y	y	y		y	y
	by size multi modal	y	n	n	y	y	y	y	n
Sub sample	re-mix before selection	y	y	y	y	n	n	y	n
	selection random	y	y	y	y	y	y	y	y
Weighing	all catch components	y	y	y	n	y	y	y	y
	all sub samples	y	y	y	n	y	y	y	y
Measuring	all fish species (2)	y	y	y	y	n	y	y	y
	minimum sample size	75	100	100	50	50	50	75	150
	commercial benthos	n	c	n	c	n	y	y	n
	cephalopods	n	c	n	c	y	y	n	n
	other benthos - **w**eigh, **c**ount, **o**bserve	n	c	o	c	n	o	o	n
Biological sampling	prescribed species (3)	y	y	y	y	y	y	y	y
	other species (4)	n	n	n	y	n	y	y	y
	weight	y	n	y	y	y	y	y	y
	sex	y	y	y	y	y	y	y	y
	maturity	y	y	y	y	y	y	y	y
	age material	y	y	y	y	y	y	y	y
	ageing - at sea or ashore	a	s/a	a	a	a	a	a	s
Data capture	station detail - **e**lectronic or **p**aper/pencil	e/p	e	e	p	e/p	p	p	p
	catch detail - **e**lectronic or **p**aper/pencil	p	e	p	e	e	p	e	p
	length detail - **e**lectronic or **p**aper/pencil	p	p	p	e	e	p	e	p
	biological detail - **e**lectronic or **p**aper/pencil	p	p	p	p	e	p	e	p
	error checking	y	y	y	y	y	y	y	y
	back up	y	y	y	y	y	y	y	y

		Denmark	France	Germany	Netherlands	Norway	Sweden	UK(Eng)	UK(Scot)
(1) Categories by sex	plaice	n	y	n	n	n		y	n
	dab	n	n	y	n	n		y	n
	elasmobranchs	n	y	n	y	n		y	y
(2) Measuring 0.5cm	herring	y	y	y	y	y		y	y
	sprat	y	y	y	y	y		y	y
	pilchard	y	y	y	n	n		y	n
	anchovie	y	y	y	n	n		y	n
(2) Measuring mm	commercial benthos	n	y	n	n	n		y	n
(3) Prescribed species	cod	y	y	y	y	y	y	y	y
	haddock	y	y	y	y	y	y	y	y
	whiting	y	y	y	y	y		y	y
	saithe	y	y	y	y	y		y	y
	Norway pout	y	y	y	y	y	y	y	y
	herring	y	y	y	y	y	y	y	y
	sprat	y	y	y	y	n	y	y	y
	mackerel	y	y	y	y	p		y	y
	plaice	n	y	y	n	n	y	y	n
(4) Other species	dab	n	n	n	n	n		y	n
	brill	n	n	n	n	n		y	n
	turbot	n	n	n	n	n		y	n
	lemon sole	n	n	n	n	n		y	n
	anglers	n	n	n	n	n		y	y
	elasmobranchs	n	n	n	y	n		y	n

APPENDIX VIII– CATCH SAMPLING SUMMARY FOR NORTH SEA IBTS QUARTER 3 SURVEYS

North Sea quarter 3

		Denmark	Germany	Norway	Sweden	UK(Eng)	UK(Scot)
Staffing	number available for catch processing	5	6/8	2/3	4/5	6/7	6
Hauls	Average number per day	3/4	4	7/8	5	3/4	4/5
Catch	retention in hopper or bin	y	y	y	y	y	y
	codend cleaned	y	y	y		y	y
	net cleaned	y	n	y		y	y
	cleanings added to catch	y	p	y		y	y
Sorting	'deckmaster' in charge	y	y	y	y	y	y
	sorting facility - **b**ench or **c**onveyor	c	c	b	c	b	b
	complete sort upto no. bstkts	30	40	10	3	40	50
	small fish mixture sub sorting	y	y	y	y	y	y
	part of the catch discarded unprocessed	n	n	y		n	n
Categories	by sex (1)	n	y	n	y	y	y
	by size large or small	y	y	y		y	y
	by size multi modal	y	n	y	y	y	n
Sub sample	re-mix before selection	y	y	n		y	n
	selection random	y	y	y	y	y	y
Weighing	all catch components	y	y	y	y	y	y
	all sub samples	y	y	y	y	y	y
Measuring	all fish species (2)	y	y	n	y	y	y
	minimum sample size	75	100	50	50	75	150
	commercial benthos	n	n	n	y	y	n
	cephalopods	n	n	y	y	n	y
	other benthos - **w**eigh, **c**ount, **o**bserve	n	o	n	o	o	n
Biological sampling	prescribed species (3)	y	y	y	y	y	y
	other species (4)	n	n	n	y	y	y
	weight	y	y	y	y	y	y
	sex	y	y	y	y	y	y
	maturity	y	y	y	y	y	y
	age material	y	y	y	y	y	y
	ageing - at sea or ashore	a	a	a	a	a	s
Data capture	station detail - **e**lectronic or **p**aper/pencil	e/p	e	e/p	p	p	p
	catch detail - **e**lectronic or **p**aper/pencil	p	p	e	p	e	p
	length detail - **e**lectronic or **p**aper/pencil	p	p	e	p	e	p
	biological detail - **e**lectronic or **p**aper/pencil	p	p	e	p	e	p
	error checking	y	y	y	y	y	y
	back up	y	y	y	y	y	y

		Denmark	Germany	Norway	Sweden	UK(Eng)	UK(Scot)
(1) Categories by sex	plaice	n	n	n		y	n
	dab	n	y	n		y	n
	elasmobranchs	n	n	n		y	y
(2) Measuring 0.5cm	herring	y	y	y		y	y
	sprat	y	y	y		y	y
	pilchard	y	y	n		y	n
	anchovie	y	y	n		y	n
(2) Measuring mm	commercial benthos	n	n	n		y	n
(3) Prescribed species	cod	y	y	y	y	y	y
	haddock	y	y	y	y	y	y
	whiting	y	y	y		y	y
	saithe	y	y	y		y	y
	Norway pout	y	y	y	y	y	y
	herring	y	y	y	y	y	y
	sprat	y	y	n	y	y	y
	mackerel	y	y	y		y	y
	plaice	n	y	n	y	y	n
(4) Other species	dab	n	n	n		y	n
	brill	n	n	n		y	n
	turbot	n	n	n		y	n
	lemon sole	n	n	n		y	n
	anglers	n	n	n		y	y
	elasmobranchs	n	n	n		y	n

APPENDIX IX – FINFISH MATURITY KEY

1. IMMATURE

Male	Testes very thin translucent ribbon lying along an unbranched blood vessel. No sign of development.
Female	Ovaries small, elongated, whitish, translucent. No sign of development.

2. MATURING

Male	Development has obviously started, colour is progressing towards creamy white and the testes are filling more and more of the body cavity but sperm cannot be extruded with only moderate pressure.
Female	Development has obviously started, eggs are becoming larger and the ovaries are filling more and more of the body cavity but eggs cannot be extruded with only moderate pressure.

3. SPAWNING

Male	Will extrude sperm under moderate pressure to advanced stage of extruding sperm freely with some sperm still in the gonad.
Female	Will extrude eggs under moderate pressure to advanced stage of extruding eggs freely with some eggs still in the gonad.

4. SPENT

Male	Testes shrunken with little sperm in the gonads but often some in the gonoducts which can be extruded under light pressure. Resting condition firm, not translucent, showing no development.
Female	Ovaries shrunken with few residual eggs and much slime. Resting condition, firm, not translucent, showing no development.

APPENDIX X - FOUR STAGE MATURITY KEY FOR SKATES AND RAYS (RAJIDAE)

STAGE	MALE	FEMALE
A	Immature: Claspers undeveloped, shorter than extreme tips of posterior margin of pelvic fin. Testes small and thread-shaped.	Immature: Ovaries small, gelatinous or granulated, but with no differentiated oocytes visible. Oviducts small and thread-shaped, width of shell gland not much greater than the width of the oviduct.
B	Maturing: Claspers longer than posterior margin of pelvic fin, their tips more structured, but the claspers are soft and flexible and the cartilaginous elements are not hardened. Testes enlarged, sperm ducts beginning to meander.	Maturing: Ovaries enlarged and with more transparent walls. Oocytes differentiated in various small sizes (<5mm). Oviducts small and thread-shaped, width of the shell gland greater than the width of the oviduct, but not hardened.
C	Mature: Claspers longer than posterior margin of pelvic fin, cartilaginous elements hardened and claspers stiff. Testes enlarged, sperm ducts meandering and tightly filled with sperm.	Mature: Ovaries large with enlarged oocytes (>5mm), with some very large, yolk-filled oocytes (ca. 10mm) also present. Uteri enlarged and wide, shell gland fully formed and hard.
D	Active: Claspers reddish and swollen, sperm present in clasper groove, or flows if pressure exerted on cloaca.	Active: Egg capsules beginning to form in shell gland and partially visible in uteri, or egg capsules fully formed and hardened and in oviducts/uteri.

APPENDIX XI – HAUL INFORMATION

Explanations of the various field names and data types can be found on the ICES web page:
http://www.ices.dk/datacentre/datsu/selrep.asp

HH

Start/Order	Field Name	Width	Mandatory	Data Type
1	RecordType	2	✓	char
2	Quarter	1	✓	int
3	Country	3	✓	char
4	Ship	4	✓	char
5	Gear	6	✓	char
6	SweepLngt	3		int
7	GearExp	2		char
8	DoorType	2		char
9	StNo	6	✓	char
10	HaulNo	3	✓	int
11	Year	4	✓	char
12	Month	2	✓	int
13	Day	2	✓	int
14	TimeShot	4		char
15	Stratum	4		char
16	HaulDur	3	✓	int
17	DayNight	2	✓	char
18	ShootLat	8	✓	decimal4
19	ShootLong	9	✓	decimal4
20	HaulLat	8	✓	decimal4
21	HaulLong	9	✓	decimal4
22	StatRec	4		char
23	Depth	4	✓	int
24	HaulVal	1	✓	char
25	HydroStNo	8	✓	char
26	StdSpecRecCode	1	✓	char
27	BycSpecRecCode	1	✓	char
28	DataType	2	✓	char
29	Netopening	4		decimal1
30	Rigging	2		char
31	Tickler	2		int
32	Distance	4		int
33	Warplngt	4		int
34	Warpdia	2		int
35	WarpDen	2		int
36	DoorSurface	4		decimal1
37	DoorWgt	4		int
38	DoorSpread	3		int
39	WingSpread	2		int
40	Buoyancy	4		int
41	KiteDim	3		decimal1
42	WgtGroundRope	4		int

43 TowDir	3	int
44 GroundSpeed	3	decimal1
45 SpeedWater	3	decimal1
46 SurCurDir	3	int
47 SurCurSpeed	4	decimal1
48 BotCurDir	3	int
49 BotCurSpeed	4	decimal1
50 WindDir	3	int
51 WindSpeed	3	int
52 SwellDir	3	int
53 SwellHeight	4	decimal1
54 SurTemp	4	decimal1
55 BotTemp	4	decimal1
56 SurSal	5	decimal2
57 BotSal	5	decimal2
58 ThermoCline	2	char
59 ThClineDepth	4	int

APPENDIX XII – LENGTH FREQUENCY INFORMATION

HL

Start/Order	Field Name	Width	Mandatory	Data Type
1	RecordType	2	✓	char
2	Quarter	1	✓	int
3	Country	3	✓	char
4	Ship	4	✓	char
5	Gear	6	✓	char
6	SweepLngt	3		int
7	GearExp	2		char
8	DoorType	2		char
9	StNo	6	✓	char
10	HaulNo	3	✓	int
11	Year	4	✓	char
12	SpecCodeType	1	✓	char
13	SpecCode	10	✓	char
14	SpecVal	2	✓	char
15	Sex	2		char
16	TotalNo	7		decimal2
17	CatIdentifier	2	✓	int
18	NoMeas	3	✓	int
19	SubFactor	9	✓	decimal4
20	SubWgt	5		int
21	CatCatchWgt	8	✓	int
22	LngtCode	2	✓	char
23	LngtClass	3	✓	int
24	HLNoAtLngt	6	✓	int

APPENDIX XIII – SMALK

CA

Start/Order	Field Name	Width	Mandatory	Data Type
1	RecordType	2	✓	char
2	Quarter	1	✓	int
3	Country	3	✓	char
4	Ship	4	✓	char
5	Gear	6	✓	char
6	SweepLngt	3		int
7	GearExp	2		char
8	DoorType	2		char
9	StNo	6	✓	char
10	HaulNo	3	✓	int
11	Year	4	✓	char
12	SpecCodeType	1	✓	char
13	SpecCode	10	✓	char
14	AreaType	2	✓	Char (Appendix XII)
15	AreaCode	4	✓	char
16	LngtCode	2	✓	char
17	LngtClass	3	✓	int
18	Sex	2	✓	char
19	Maturity	2	✓	char
20	PlusGr	2	✓	char
21	age	2		int
22	CANoAtLngt	3	✓	int
23	IndWgt	5		int

N.B. When sending information on herring in 1st Quarter, number of rings should be substituted for age.

APPENDIX XIV – AREA TYPE CODES: SAMPLING AREAS AND STANDARD AREAS FOR THE CALCULATION OF ABUNDANCE INDICES

AREA TYPE CODES

0	=	ICES Statistical Rectangles	See CM 1977/Gen:3.
1	=	Four Statistical Rectangles	See Figure 6.1
2	=	Standard Roundfish Areas	See Figure 6.2
3	=	Herring Sampling Areas	See Figure 6.3

NB: There has been confusion in the definition of herring areas in the past and for some years no ALK's may have been collected for areas 14, 15 and 67, in which case these areas must be considered as subsets of 12, 13 and 63 respectively. The Skagerrak/ Kattegat areas have also not always been distinguished in which case the appropriate code should be 80. See Figure 6.3

APPENDIX XV – LENGTH SPLITS USED TO PROVIDE PRELIMINARY NUMBERS AT AGE

Age	0-group			1-group			
Quarter	2	3	4	1	2	3	4
Cod	11	18	23	25	33	38	44
Haddock	12	17	20	20	27	30	32
Whiting	9	17	20	20	23	24	26
Norway pout	-	13	14	15	15	16	20
Herring	-	15.5	17.5	20.0	21.0	23.0	24.5
Sprat	-	-	10.0	10.0	10.5	13.0	14.0
Mackerel	-	17	24	25	25	30	31
Saithe	-	22	25	25	25	33	38
Plaice	-	10	12	-	-	19	21

NB: The lengths indicated are 'less than' lengths: 0-group cod in quarter 2 are fish <11 cm.

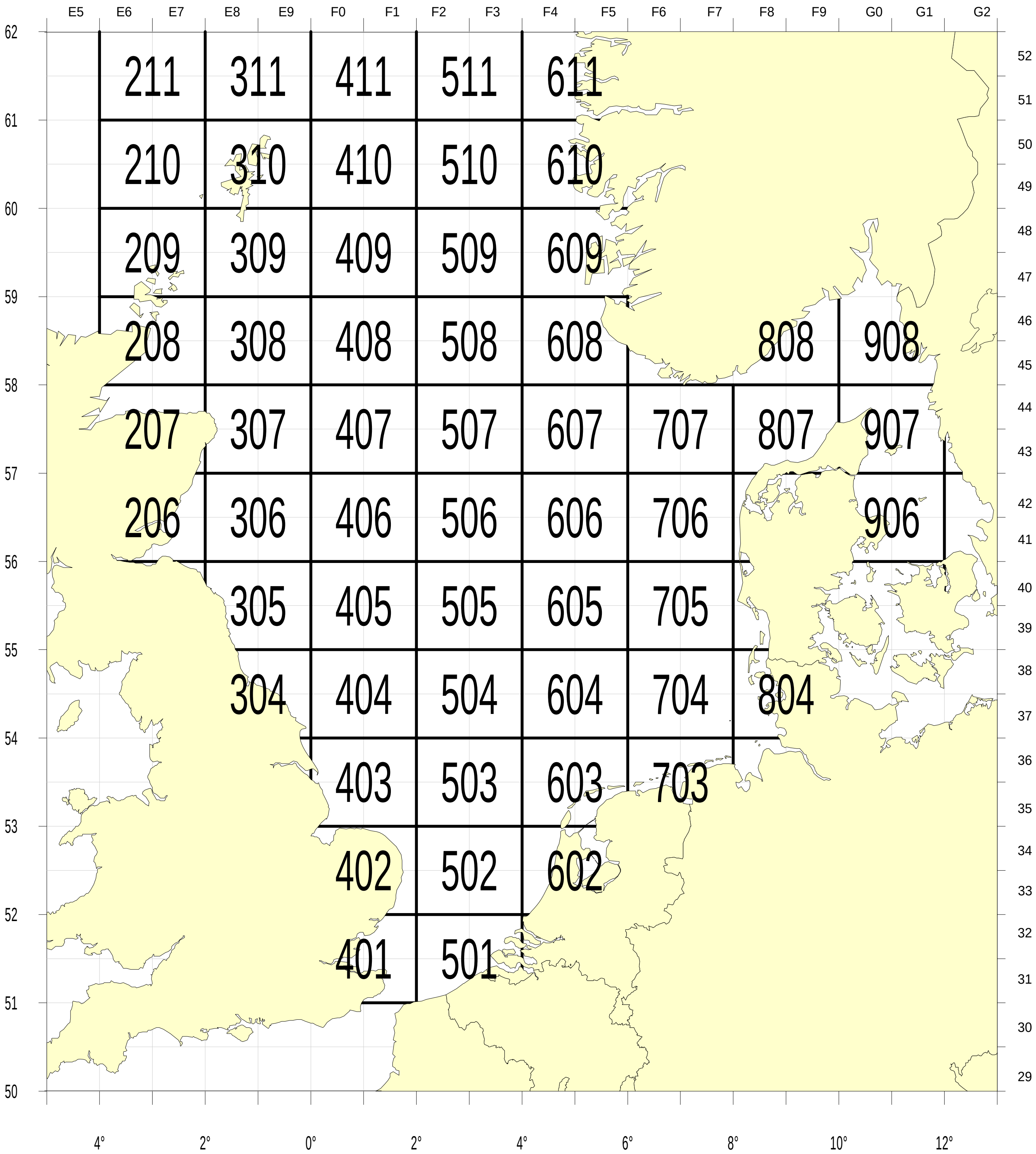


Figure 6.1 Four Statistical Rectangles: used for sampling roundfish otoliths up to and including 1979, for herring up to and including 1982.

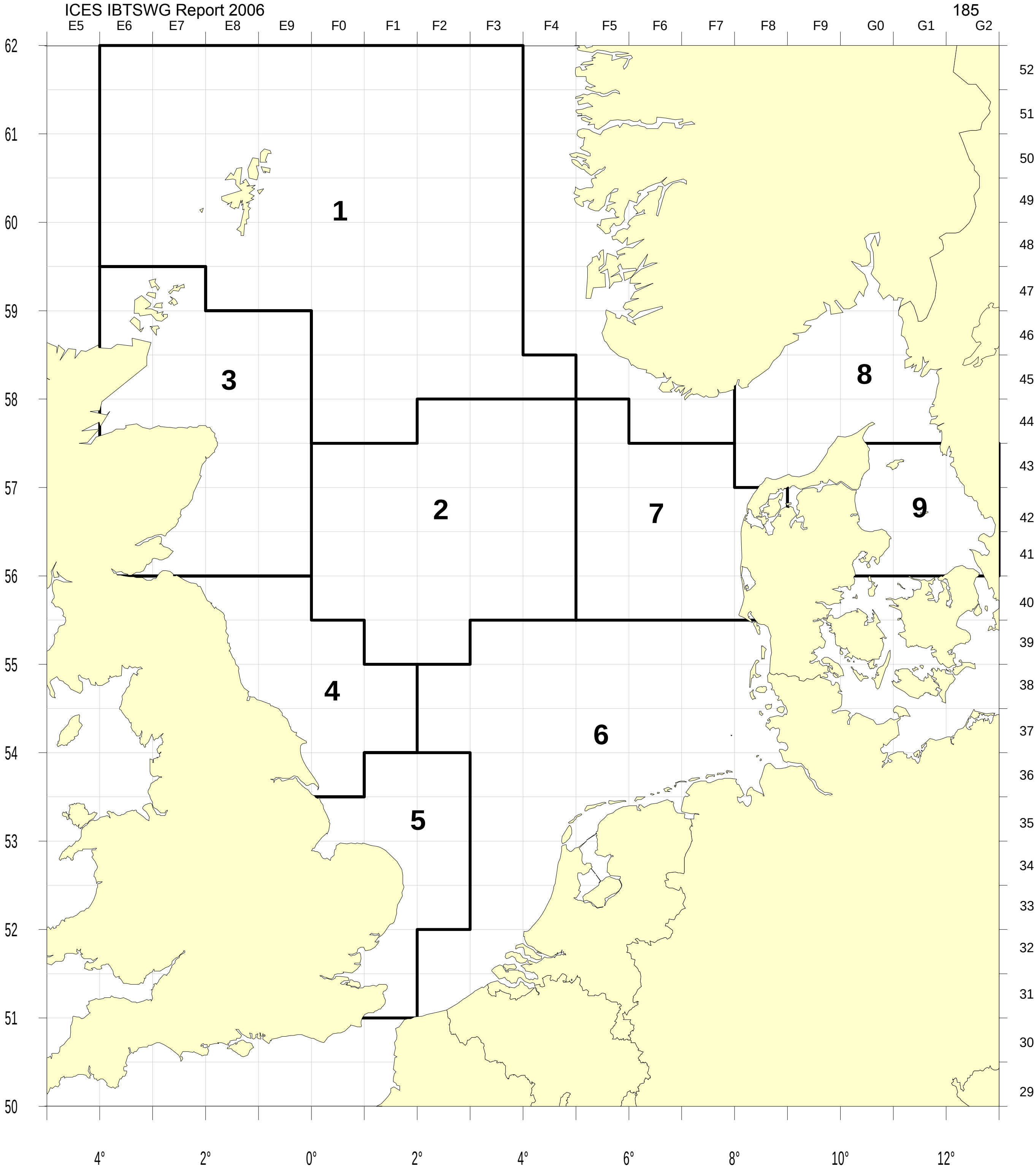


Figure 6.2 Standard Roundfish Areas: used for roundfish since 1980, for all standard species since 1991.

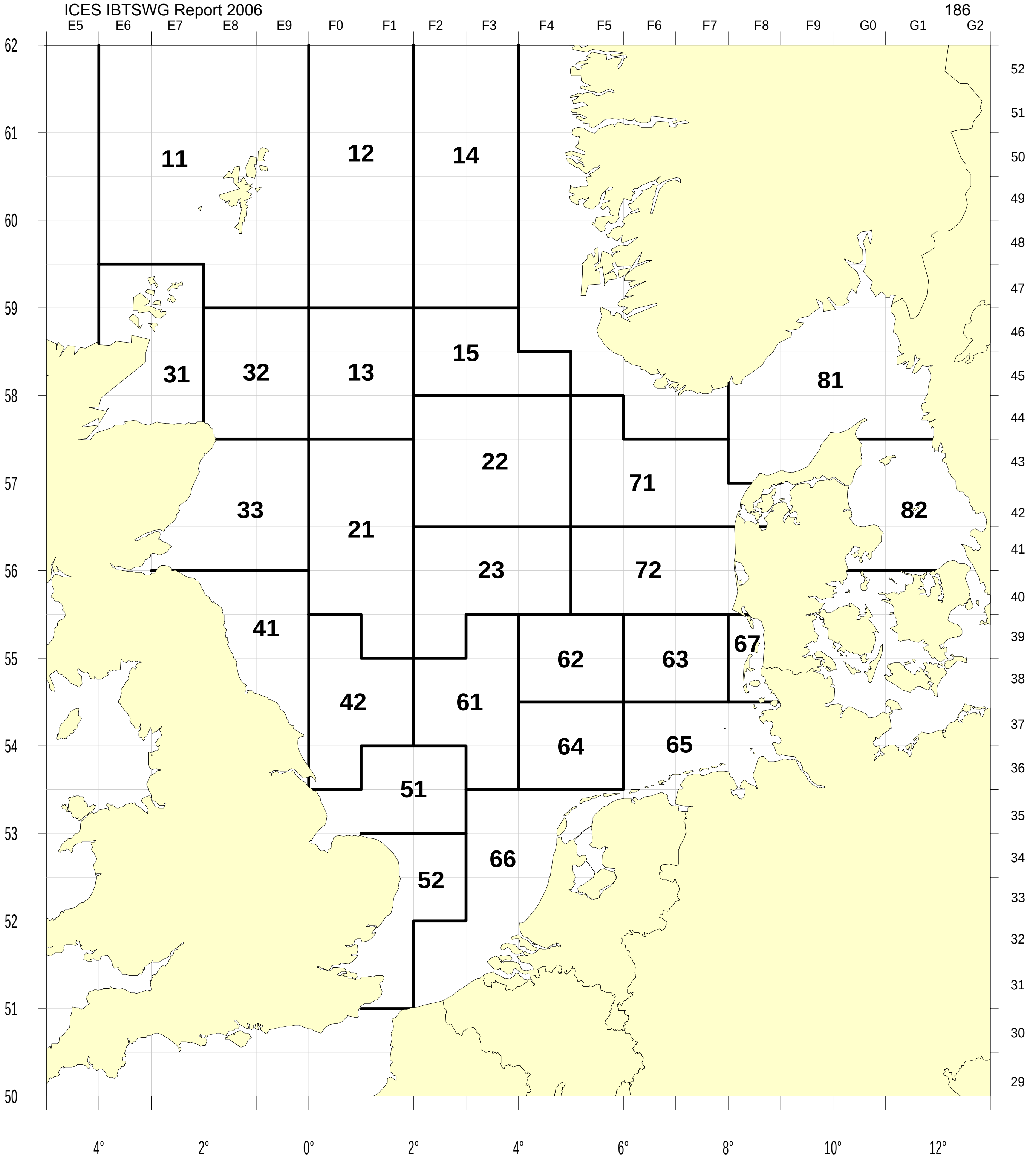


Figure 6.3 Herring Sampling Areas: used in the period 1983-1990.

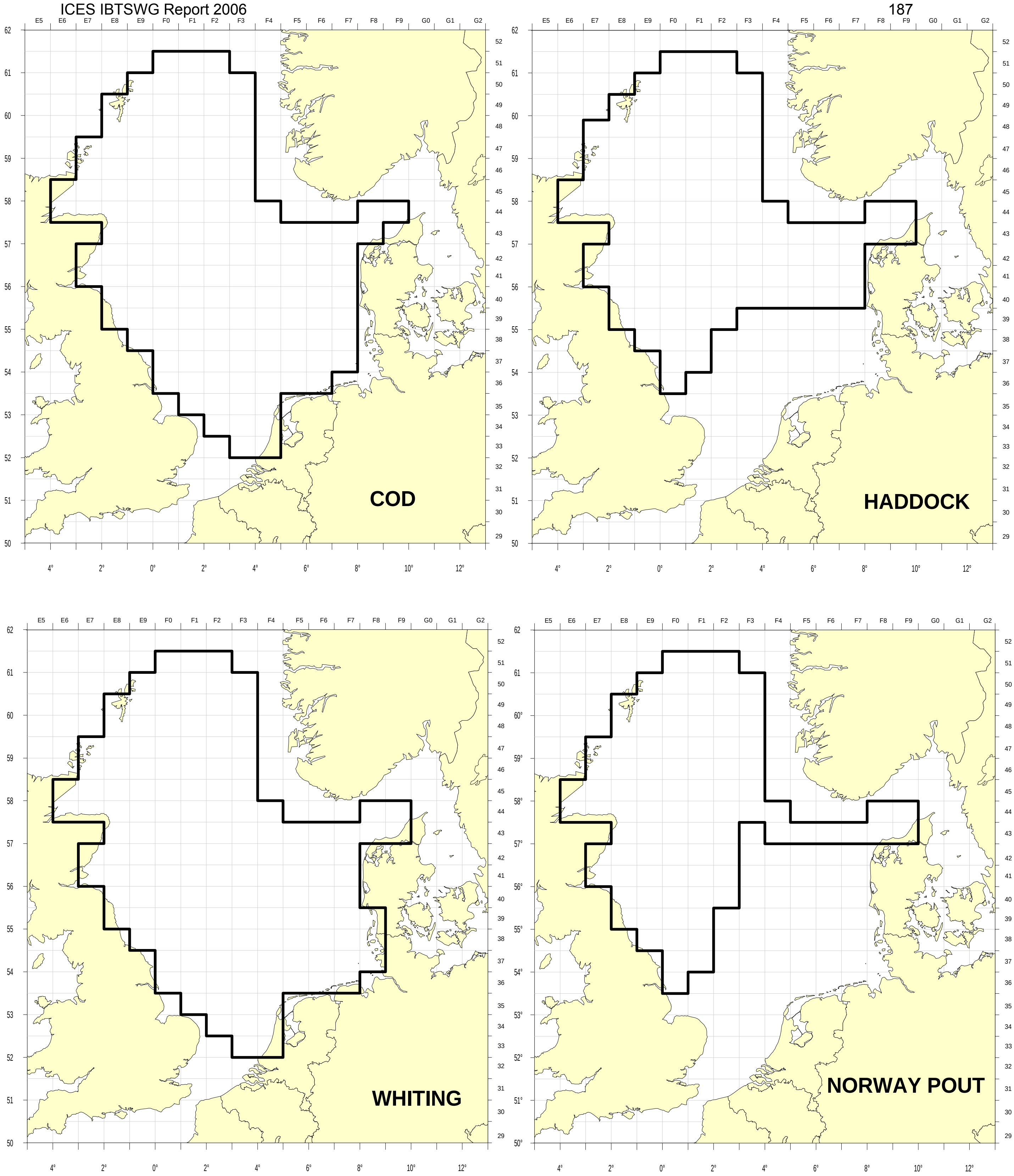


Figure 6.4 Standard areas for the calculation of the IBTS abundance indices. Information obtained from DATRAS database at ICES.

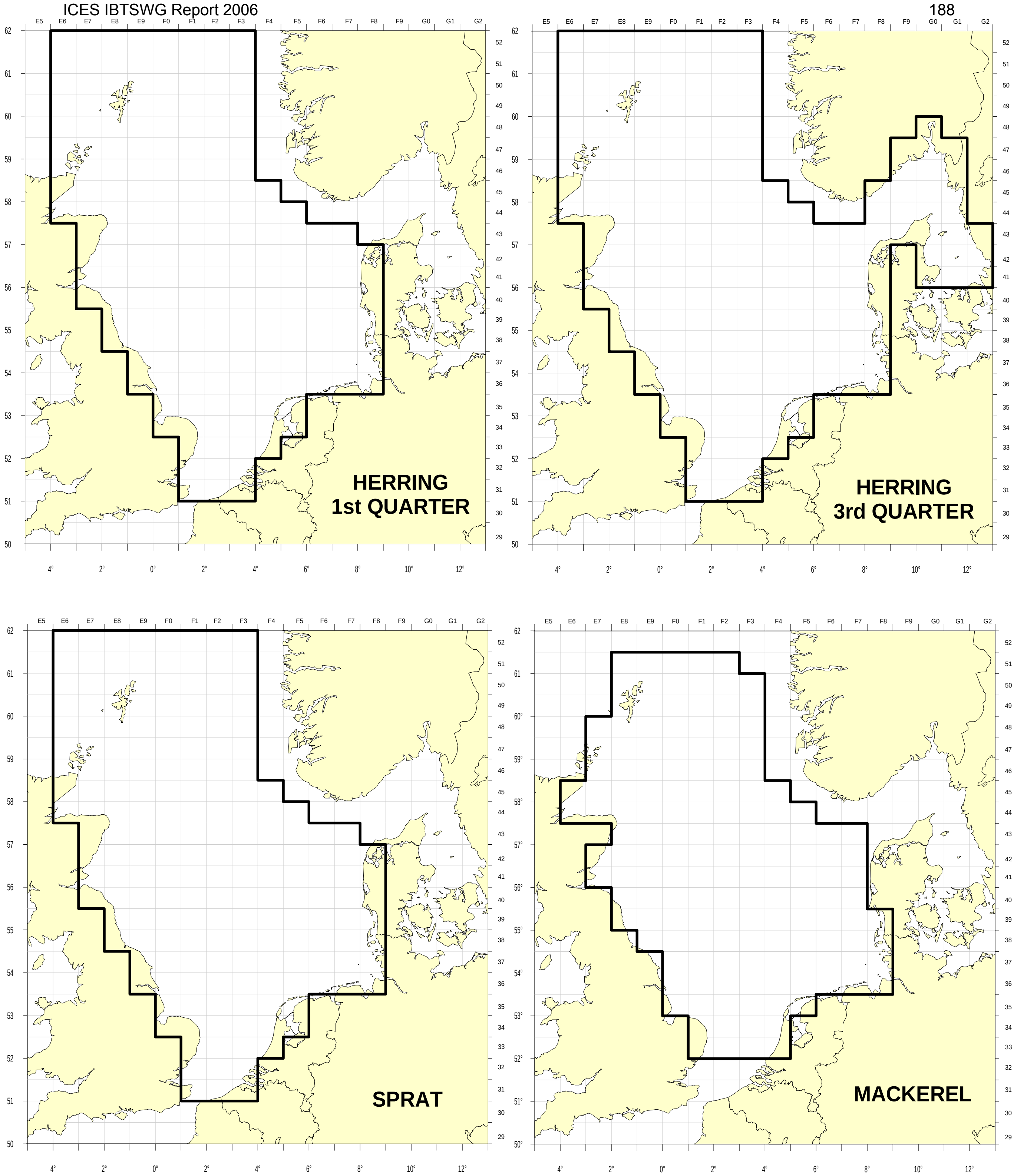


Figure 6.4 Continued

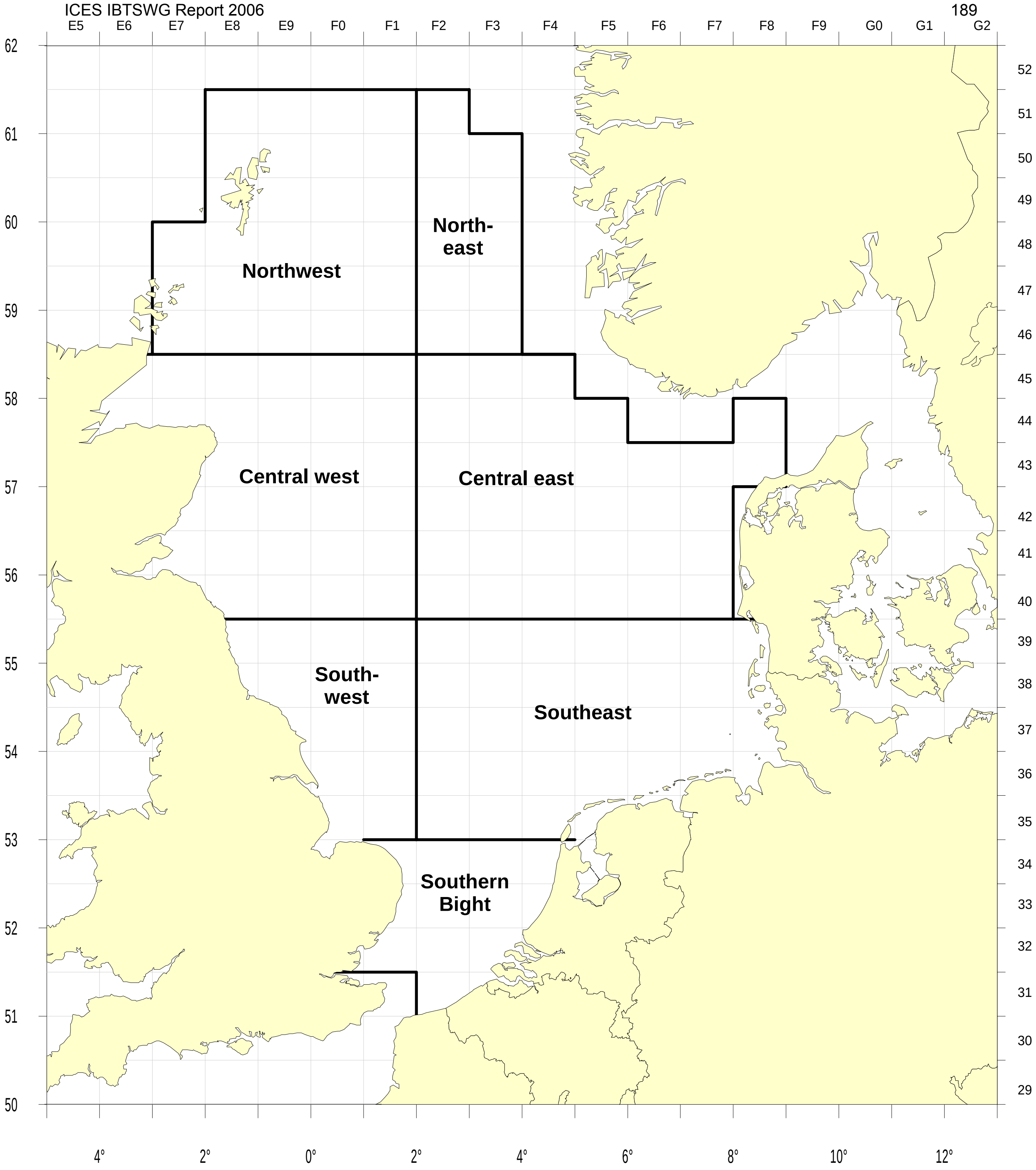


Figure 6.5 Subareas used for the calculation of abundance indices of herring larvae.

Annex 2: IBTSWG Terms of Reference 2007

The **International Bottom Trawl Survey Working Group** [IBTSWG] (Chair: R. ter Hofstede, Netherlands) will meet in Sète, France (to be confirmed), from 27 to 30 March 2007 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 most recent surveys for species of interest to assessment WG according to their response.

c) further develop standardization of all sampling strategies, computation of indices and estimation of precision;

d) review the findings from the SGSTS in respect to issues relevant to IBTS and respond;

e) review progress made in the updated DATRAS database and data access policy;

f) complete the shapefiles and supporting information for the agreed strata in the Eastern Atlantic;

g) coordinate the production and dissemination of identification keys for North Sea, and southern and western IBTS groundfish surveys.

IBTSWG will report by 15 April 2007 for the attention of the Resource Management Committee.

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 the main stay of the work of the Working Group and since the 2002 Dublin meeting participants have made more effort in the actual Working Group to coordinate and plan future surveys. Co-ordination of North Sea Surveys is fairly standard with most effort directed towards rationalising biological collection. However, the western and southern surveys still need considerable input from the appropriate participants, as many surveys are relatively new. (Action Plan 1.8,1.11) b) A first version of a reporting format has been used in the 2006 WG report. After feed back from Assessment WG, the reporting format will be updated to answer in the most proper way to expectations. (Action Plan 1.11) c) 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. The surveys coordinated by the WG have different sampling strategies and there is a need to define the best adapted methods for computing indices and estimating precision. (Action Plan 1.11) d) Aspects of quality in survey design, sampling strategies and analysis of data are of prime importance for IBTSWG. Therefore outcome from dedicated Study Groups and Workshops have to be considered within the IBTSWG. (Action Plan 1.10, 1.11, 1.13). e) A new data access policy has been proposed and IBTS WG has commented on it in 2006. There will also be a new DATRAS version in development and IBTSWG will comment on the outputs of this new version. (Action Plan 1.11, 6.1.) f) It has been agreed that supporting information for the stratification and shape files should be provided. It was also agreed that this process would be extended to the North and South and should therefore cover all Eastern Atlantic. (Action Plan 1.11) g) Maintaining a high level of expertise in fish identification is a high priority. A way to achieve this is through development of adapted tools to be used by the scientific staff onboard the vessels. (Action Plan 1.10).
RESOURCE REQUIREMENTS:	A four day IBTS meeting. Pre-prepared documents from members. Six days Chair's time to edit. It is estimated that each ToR will require 4 hours pre-preparation
PARTICIPANTS:	All members will participate in all ToRs, although leads for each ToR have still to be allocated. It would be highly beneficial to have the person responsible for the ICES DATRAS (Lena Larsen) participating for some days.
SECRETARIAT FACILITIES:	None
FINANCIAL:	None
LINKAGES TO ADVISORY COMMITTEES:	ACFM
LINKAGES TO OTHER COMMITTEES OR GROUPS:	WGFTFB d) Cooperation with PGCCDBS and SGSTS
LINKAGES TO OTHER ORGANIZATIONS:	IOC, GOOS
SECRETARIAT MARGINAL COST SHARE:	ICES: 100%

Annex 3: Recommendations

RECOMMENDATION	ACTION
1.***IBTS North Sea Q1 coordination – section 4.1***: The Working Group recommends for 2007 that participants of the North Sea IBTS Quarter 1 survey will aim to perform their cruise during the month February, in order to guarantee good overlap in the timing of the surveys.	To be implemented by North Sea IBTS Q1 participants.
2 ***Overlapping surceys - section 7:*** The WG **recommends** that each of IFREMER, IEO and IPIMAR dedicates 1 day each year in their surveys to start building a data series of intercalibration hauls.	To be implemented by national institutes
3. ***ICES Data access policy –section 9***: The discussion on open data access is not unique to ICES but is also taking place in relation to the new EU fishery data collection regulation. The IBTSWG therefore recommends that each institute discusses the issue internally and find out what legislations applies to data in their country. The group would prefer that ICES implement the access levels that the group proposed last year. This policy covered the groups concerns and at the same time opened up access to the data. The group recommends that each institute accept this access policy.	National delegates to be informed of the IBTSWG position. This position should be taken in consideration by ICES.
4. ***Coordination of biological sampling - section 13.1: The*** IBTSWG recommends that all countries at their surveys in 2006 and first half year of 2007 take as many images of gonads and testis for hake, anglerfish, cod, haddock, whiting and saithe as possible.	To be implemented by national institutes
5. ***Coordination of biological sampling - section 13.1*** The IBTSWG recommend that 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	To be implemented by national institutes

Annex 4: List of participants

NAME	ADDRESS	TELEPHONE	FAX	E-MAIL
Jean Claude Mahé (Chair)	IFREMER 8, rue François Toullec F-56100 Lorient France	+33 2 97 87 3818	+33 2 97873836	jcmahe@ifremer.fr
Craig Davis	Fisheries Research Services Marine Laboratory P.O. Box 101 Victoria Road Aberdeen AB11 9DB United Kingdom	+44 1224 295397	+44 1224 295511	daviscg@marlab.ac.uk
Jim Ellis	CEFAS Lowestoft Laboratory Lowestoft Suffolk NR33 0HT United Kingdom	+44 1502 524300	+44 1502 524225	j.r.ellis@cefas.co.uk
Brian Harley	CEFAS Lowestoft Laboratory Lowestoft Suffolk NR33 0HT United Kingdom	+44 1502 524254	+44 1502 524254	b.m.harley@cefas.co.uk
Ken Coull	Fisheries Research Services Marine Laboratory P.O. Box 101 Victoria Road Aberdeen AB11 9DB United Kingdom	+44 1224 295399	+44 1224 295511	coullka@marlab.ac.uk
Odd Smedstad	Institute of Marine Research P.O. Box 1870 Nordnes N-5817 Bergen Norway	+47 55238683	+47 55238687	odd.smedstad@imr.no
Jørgen Dalskov	DIFRES Danish Institute for Fishery Research Charlottenlund Castle DK-2920 Charlottenlund Denmark	+45 33 96 33 80	+45 33 96 33 33	jd@difres.dk
Palle Brogaard	DIFRES Danish Institute for Fishery Research Charlottenlund Castle DK-2920 Charlottenlund Denmark	+45 33 96 33 98	+45 33 96 33 33	pb@difres.dk
Helle Andersen	DIFRES Danish Institute for Fishery Research Charlottenlund Slot DK-2920 Charlottenlund Denmark	+45 33 96 32 42	+45 33 96 33 33	ha@difres.dk
Lena Larsen	ICES H.C. Andersens Blv. 44–46 1553 Copenhagen V Denmark	+45 33386700	+45 33934215	lena@ices.dk

NAME	ADDRESS	TELEPHONE	FAX	E-MAIL
Yves Vérin	IFREMER 150, Quai Gambetta F-62200 Boulogne-sur-Mer France	+33 321995608	+33 3995601	yves.verin@ifremer.fr
Siegfried Ehrich	Bundesforschungsanstalt f. Fischerei Institut für Seefischerei Palmaille 9 D-22767 Hamburg Germany	+494038905-179	+494038905-263	Siegfried.ehrich@ish.bfa-fisch.de
Francisco Velasco	Instituto Español de Oceanografía Laboratorio de Santander Apdo 240 E-39080 Santander Spain	+34 942 291060	+34 942 275072	francisco.velasco@st.ieo.es
David Stokes	Marine Institute, Rinville, Oranmore, Co. Galway Ireland	+353 091 387200	+353 91387201	David.stokes@marine.ie
Rob Bunn	Marine Institute, Rinville, Oranmore, Co. Galway Ireland	+353 091 387200	+353 91387201	
Remment ter Hofstede	IMARES Institute for Marine Resources & Ecosystem Studies (better known as RIVO) Haringkade 1 P.O. Box 68 1970 AB Ijmuiden Netherlands	+31 255 564646	+31 255 564644	remment.terhofstede@wur.nl
Fátima Cardador	IPIMAR Avenida de Brasilia P-1449-006 Lisbon Portugal	+351 213027097	+351 213 025 948	cardador@ipimar.pt
Joakim Hjelm	National Board of Fisheries Insitute of Marine Research, P O Box 4, Turistgatan 4, SE-453 21 Lysekil, Sweden	+46 (0) 523 18751	+46 (0)52313977	Joakim.hjelm@fiskeriverket.se
Nils Håkansson	National Board of Fisheries Insitute of Marine Research, P O Box 4, Turistgatan 4, SE-453 21 Lysekil, Sweden	+46 (0) 523 18716	+46 (0)52313977	nils.hakansson@fiskeriverket.se

NAME	ADDRESS	TELEPHONE	FAX	E-MAIL
Ann-Christin Rudolphi	National Board of Fisheries Insitute of Marine Research, P O Box 4, Turistgatan 4, SE-453 21 Lysekil, Sweden	+46 (0) 523 18724	+46 (0)52313977	ann-christin.rudolphi@ fiskeriverket.se
Andrew Kenny[1]	CEFAS Burnham Laboratory Remembrance Avenue Burnham-on-Crouch Essex CM0 8HA UK	01621-787200		
Peter J. Kershaw[1]	Principal Research Scientist, Ecosystem Interactions The Centre for Environment, Fisheries & Aquaculture Science (Cefas) Lowestoft, Suffolk, NR33 0HT, UK			
Jim B. Reid[1]	Head, Seabirds and Cetaceans Joint Nature Conservation Committee 7 Thistle Place Aberdeen AB10 1UZ Scotland, UK			
Rudolf Kafemann	Bundesforschungsanstalt f. Fischerei Federal research Centre for Fisheries Institut für Seefischerei Palmaille 9 D-22767 Hamburg Germany	+494038905-166	+494038905-263	Rudolf.Kafemann@ish.bfa-fisch.de

[1]Attended part of the meeting.

Annex 5: Working documents presented to the IBTSWG 2005 meeting (3)

WD 1:Cardador&Azevedo_2006.pdf

WD 2: SCOGFSQ4Stratification.pdf

WD 3:Working_document_misreporting_RH.pdf

Working Document to be presented at ICES Working Group on International Bottom Trawl Surveys (IBTS), Lysekil, 27-31 March 2006

Conversion factor to correct Hake indices of abundance estimated with R/V *Capricórnio* (bottom trawl CAR) into R/V *Noruega* (bottom trawl NCT)

Fátima Cardador and Manuela Azevedo

IPIMAR, Lisbon, Portugal

cardador@ipimar.pt, mazevedo@ipimar.pt

INTRODUCTION

Since 1979 the Portuguese Institute of Fisheries Research (IPIMAR) is conducting groundfish surveys along the Portuguese continental waters, using the R/V "Noruega" with a NCT bottom trawl net with rollers in the groundrope. However, due to repairs in the vessel Noruega, the surveys performed in autumn 1996, 1999, 2003 and 2004 and in summer 1999 were conducted with a different vessel and a different fishing gear. The vessel used was the Capricórnio and the fishing net was a bottom trawl designated by CAR, with no bobbins in the groundrope.

The main objective of these surveys is to study the geographical distribution and abundance indices of the main commercial species particularly hake, horse mackerel, blue whiting, mackerel and Spanish mackerel. Since it is important to keep the Noruega/NCT time series a comparative fishing survey was undertaken in 2005 to derive factors by which the indices of the *Capricórnio* with the CAR net could be converted to values equivalent to what would have been obtained by the *Noruega* with the NCT net. This study presents the results obtained for hake.

MATERIAL AND METHODS

Fishing operations

The survey took place in 2005, from 7 to 14 of July, when IPIMAR had the two vessels and crews available. A total of 32 valid paired hauls were performed in the southwest and south of Portugal (Figure 1).

Fishing was undertaken in paired tows, the vessels fished at the same time along parallel courses. The duration of each tow was 30 minutes, the trawl speed was 3.5 knots for both vessels and the hauls were performed during daylight. The ships remained as close as safety considerations permitted, i.e., keeping a minimum distance of 0.25 nautical miles.

The fishing gears were monitored by the Scanmar equipment, to obtain the vertical and the horizontal opening between the wings of the nets. The mean horizontal opening of NCT was 15.2 m with a vertical opening of 3.8 m; for CAR net the horizontal opening is larger, with 25.4 m, and the vertical opening is shorter, with 2.2 m. Both nets had the codend with 20 mm mesh size.

Comparisons between the initial and final depths of the paired hauls showed no differences except in one case (haul 17) where the gear NCT had operated 70 m deeper than CAR.

The catches by haul were weighted, counted and measured for all the species caught.

Data analysis

Analysis were performed for overall data and by tow to decide if ratios should be based on overall catches by length class and if all tows should be retained to compute these ratios.

The ratio by length, between the catches with the Capricórnio/CAR and the Noruega/NCT, was estimated by fitting the parametric model of Warren (1997), log transformed and with weighted least squares:

$$\ln(Ratio) = \ln(a) + b \ln(L) + c L$$

where Ratio = Catch number CAR/ Catch number NCT and L is the length class. Residual analysis was performed to assess the model´s fit.

The fitted ratio was applied to the mean number at length estimated for October 1996, 1999, 2003 and 2004 surveys. The corrected length distributions were translated into ages by using age-length-keys of those surveys.

Finally, it was considered of interest to compare the results with ratios estimated by age. To estimate the ratio CAR/NCT by age the length distributions of the experiment were converted into ages by applying an age-length-key of the 3rd quarter of 2005.

RESULTS

Hake was caught in the 32 valid hauls, in 27 hauls performed with NCT and in 30 with CAR, which represent 84% and 94%, respectively, of the total valid hauls. In 25 of the paired hauls hake has been caught by both gears.

The overall analysis showed that:

(i) The CAR net was more efficient than NCT in catching hake: in the majority of the hauls CAR has caught (in number and weight) more hake than NCT, only in 6 hauls the inverse has occurred (Figure 2);

(ii) CAR caught smaller hake in higher quantities than NCT: the overall length distribution of hake caught by each gear is shown in Figure 3. This could be an anticipated result since the CAR net, by not having bobbins in the groundrope and a larger horizontal opening, would be more efficient in catching the smaller hake if smaller sizes are more dependent on the bottom. Hake larger than 27 cm was caught by both gears in similar quantities. Since the catch of hake larger than 45 cm was very low (not achieving 1% of the total number caught) these length classes were not included in the analysis.

The analysis by haul showed that:

(iii) In the cases when only one of the gear caught hake (7 hauls) this did not occur systematically for a particular gear; in most of these hauls the number of hake caught was small (between 1 and 11 hakes) and only once CAR caught 122 hakes while NCT had no hake catches;

(iv) In the cases when both gears caught hake (25 hauls), it has occurred that NCT catch missed some smaller hakes (as is exemplified in Figure 4) but usually was able to sample the modal length of the CAR catch.

For the demersal species as hake, results (i to iv) supported the following rationale: if the species is distributed in the area then both nets should be able to catch it so, if the species is caught only by one net it reflects the different efficiency between the fishing nets; the length structure was different by gear so the conversion factor should be length based. With this rationale the catch by gear and length class (1 cm interval) was computed from the 32 hauls.

The ratio by length is shown in Figure 5. It is shown that the number of hauls used to compute the ratio by length class was quite small (1 to 6) for length classes between 7cm and 17cm (small hakes) and between 35cm and 45cm (larger hakes). It is clear a declining trend of the ratio from smaller sizes to flatten out at length classes above 21 cm. The ratio intercepts the horizontal line, corresponding to ratio=1, at the length classes 25-27cm and is close to 1 for larger sizes (observed variability likely due to the small sample sizes in these length classes).

The model was fitted to the ratios at length classes below 28 cm with weighted least squares (weights=number of hauls used to compute the ratio by length class). The results indicated that the parameter *b* was not significantly different from zero, hence suggesting that the ratio trend could be described by the simpler exponential model $ln(ratio)= ln(a)+cL$, model 2.

Table 1 summarizes the results for the fitted models and Figure 6 superimposes to the observed ratio the fitted ratios.

The ratio estimated by model 2 was applied to the length distributions of the surveys carried out with Capricórnio (1996, 1999, 2003 and 2004 October) and the resulting distributions are shown in Figure 7.

The ratio estimated by age is shown in Figure 8. This ratio at age was applied to the age compositions estimated for October 1996, 1999, 2003 and 2004 and the results obtained (Figure 9) were compared with those corresponding to length distributions presented in Figure 7 converted to ages. It is shown that this alternative procedure (age based conversion) underestimates the number of hake at ages 0 and 1 (~ corresponding to the length classes up to 15 cm and between 16-27 cm). In fact the ratio at age is very close to the mean of the ratio by length for those length classes.

MAIN CONCLUSIONS

The conversion factor to correct the hake indices of abundance estimated with R/V Capricórnio/CAR into R/V Noruega/NCT should be performed by length class. It is not advisable to use a procedure based on a ratio by age as this will result in underestimation of the frequencies.

The CAR net has greater ability to catch hake than the NCT, particularly small size hake. The results indicate a decreasing trend expressed by an exponentially decreasing ratio factor, from 20 to 5 for length classes 7 to 16 cm. For hake larger than 26 cm the ratio CAR/NCT was close to 1 and hence the length frequency for October 1996, 1999, 2003 and 2004 surveys should be kept the same.

References

Warren, W. G., 1997. Report on the comparative fishing trial between the *Gadus Atlantica* and *Teleost*. NAFO Sci. Coun. Studies, 29: 81-92

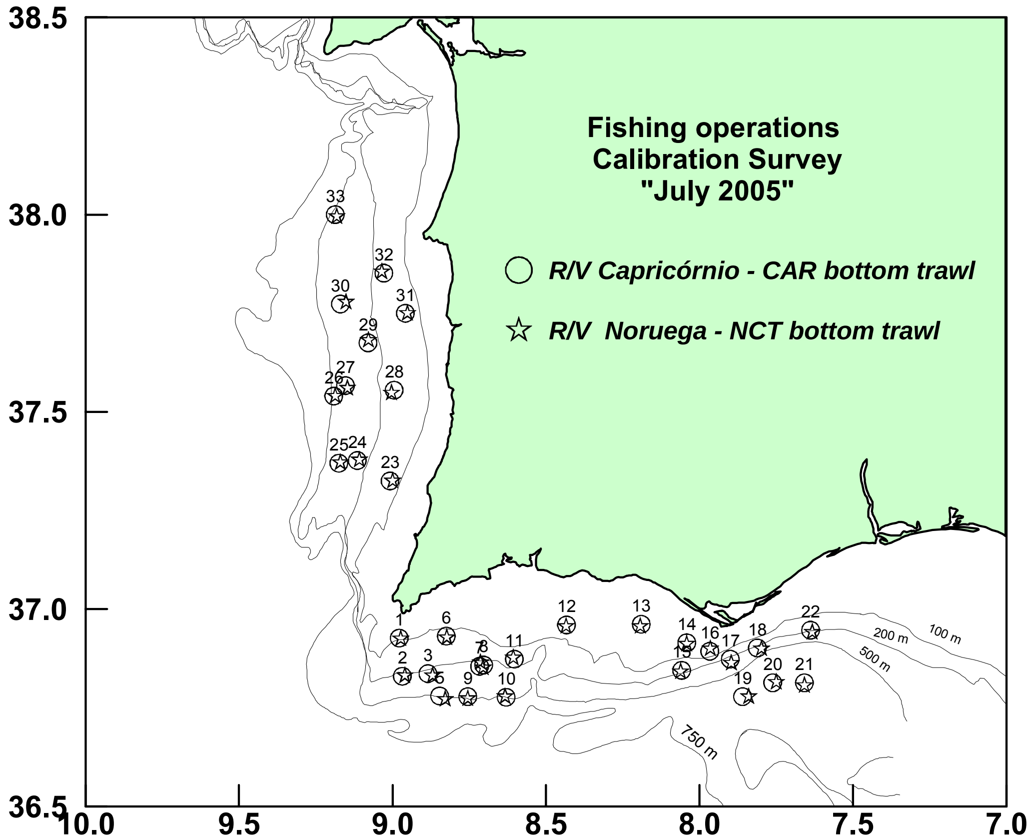


Figure 1 – Portuguese Calibration Survey – paired hauls positions

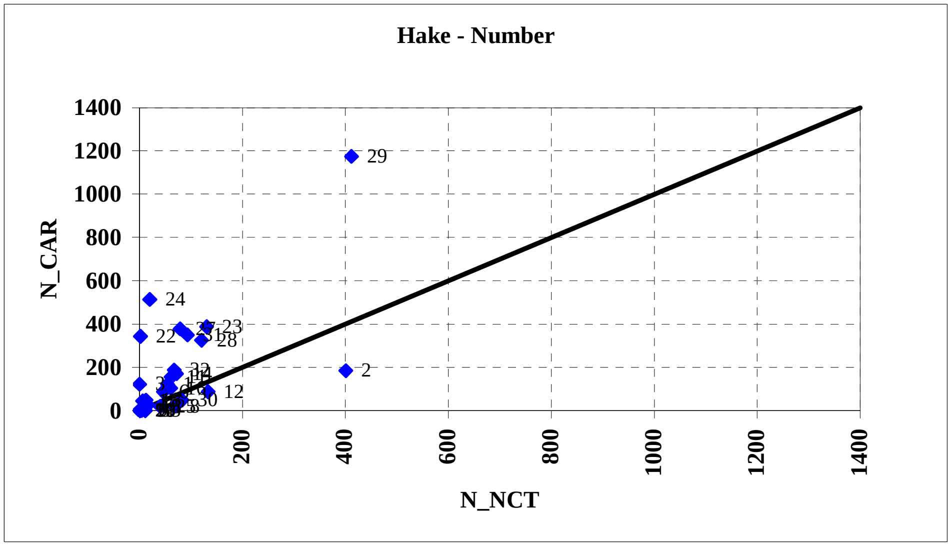


Figure 2a – Hake - relationship between the numbers caught by each gear at each paired haul

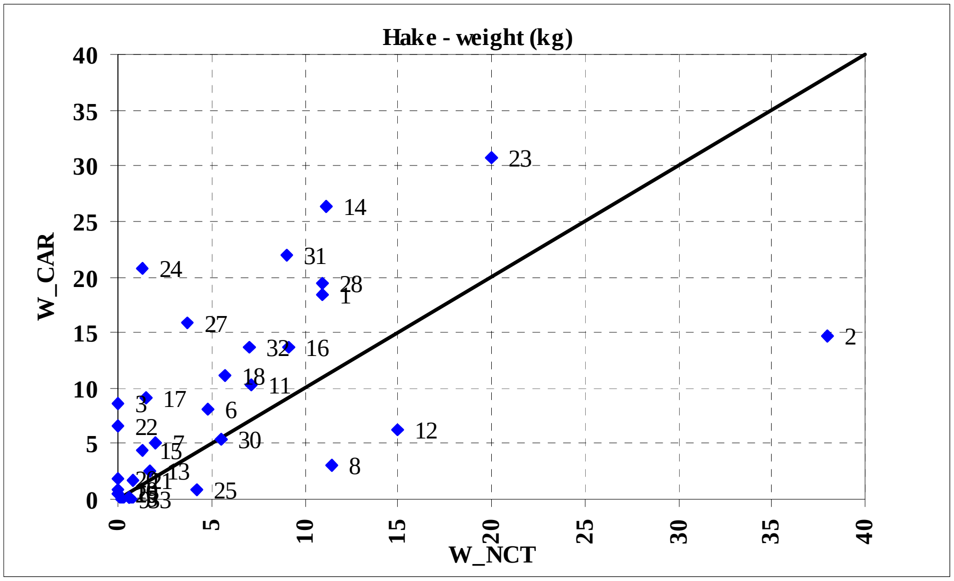


Figure 2b – Hake - relationship between the weights caught by each gear at each paired haul

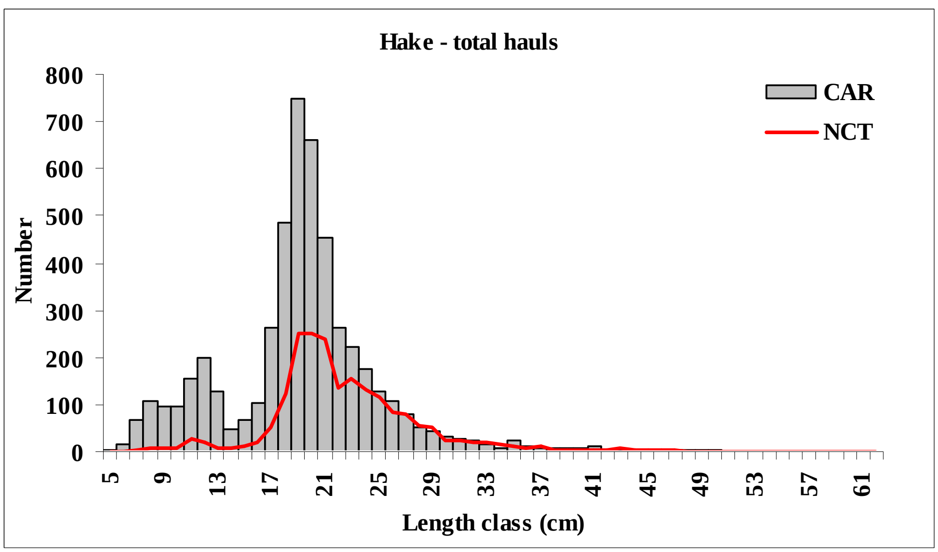


Figure 3 – Hake - Length frequency distributions by Vessel/gear

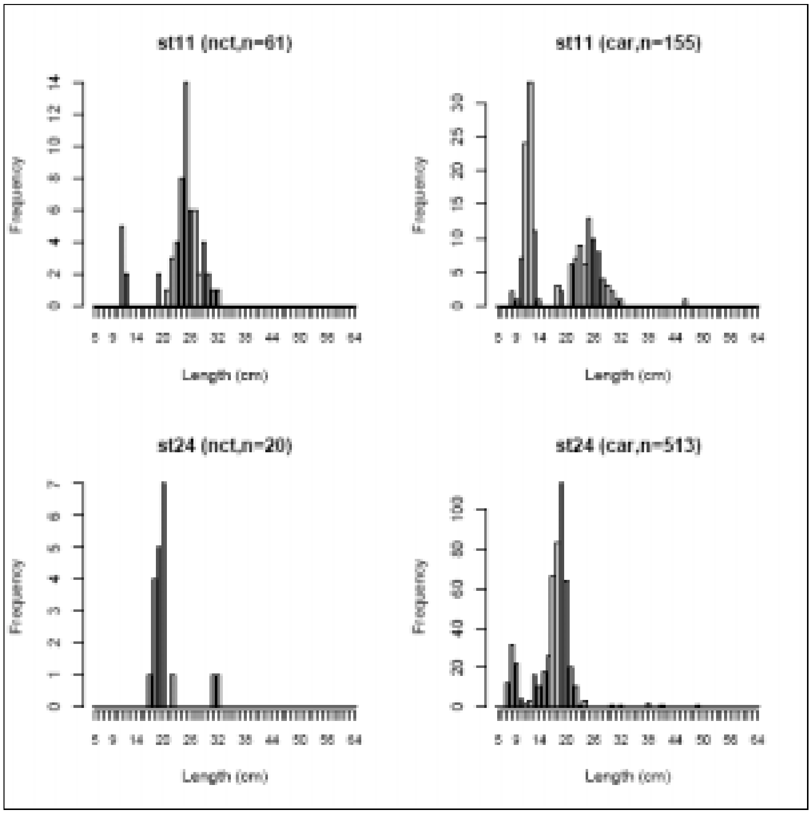


Figure 4 – Hake – length frequency distributions by paired hauls (examples)

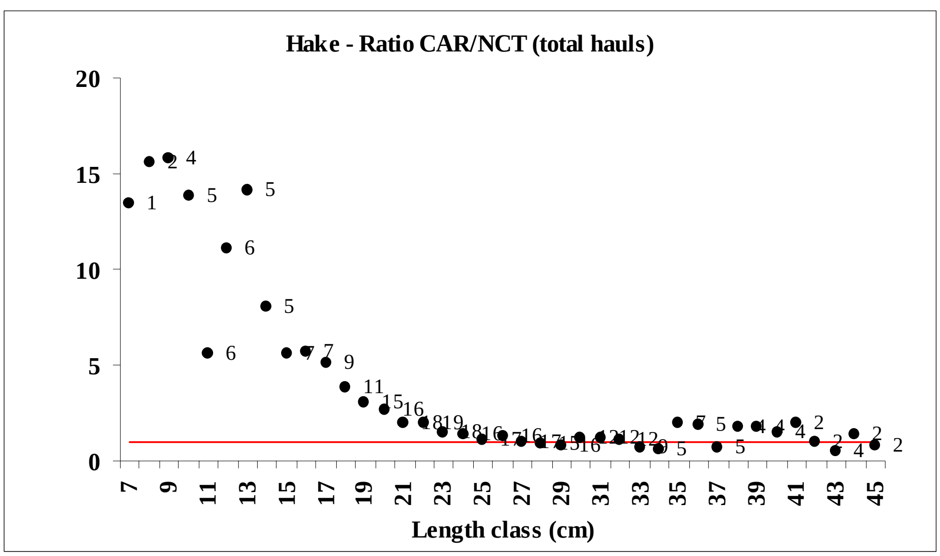


Figure 5 – Ratio by length class (labels indicate the number of hauls used to compute the ratio, horizontal line corresponds to ratio=1)

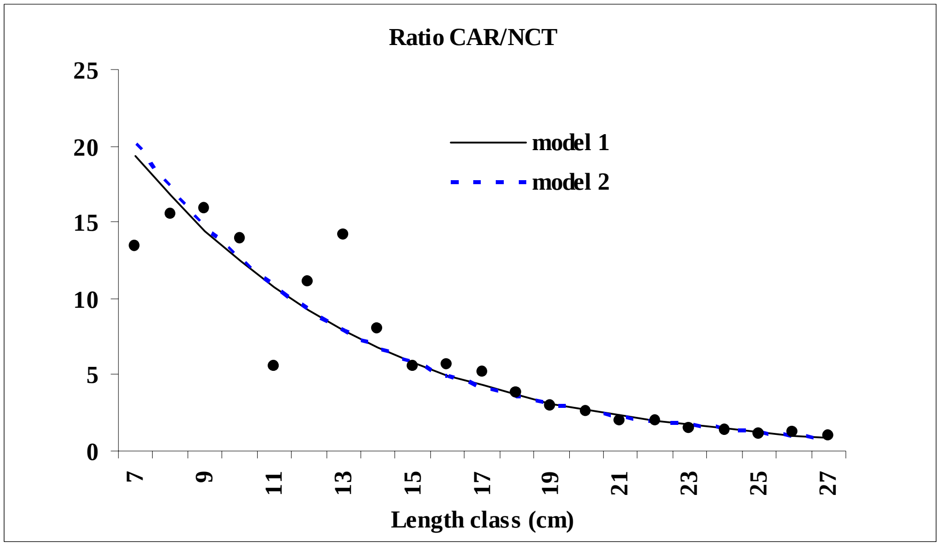


Figure 6 – Hake – models fitted to the ratio

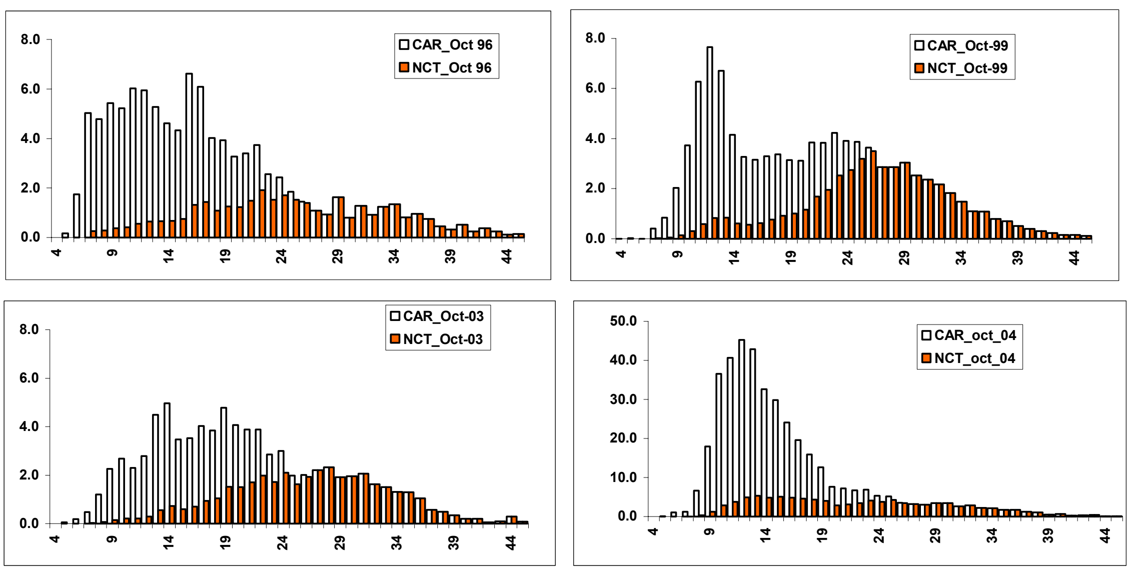


Figure 7 – Hake - Comparison between the length distributions with CAR gear and the ones estimated for NCT

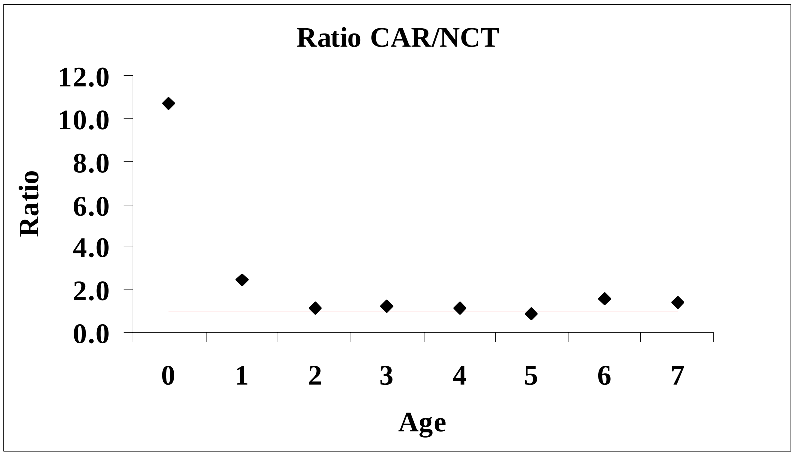


Figure 8 – Hake – Estimated ratio CAR/NCT by age – horizontal line corresponds to ratio=1

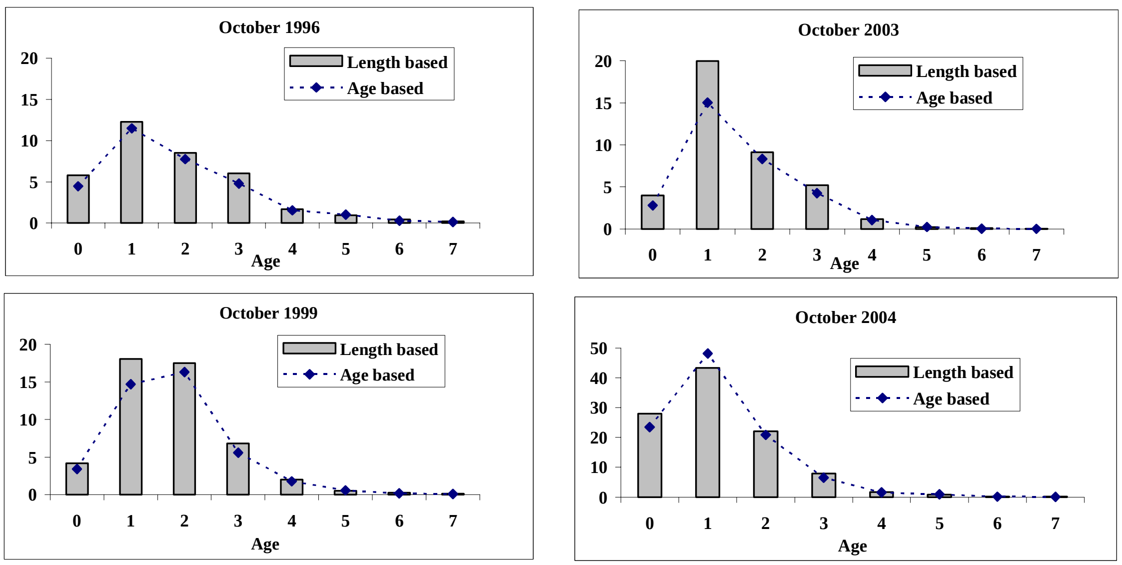


Figure 9 – Hake – Numbers at age estimated with the ratio at length and with the ratio at age

Table 1 – Summary of the results of the fitted models

Parametric model (1) : ln(ratio)=ln(a)+bln(L)+cL

Parameters	estimate	s.e.	Pr(>| t|)
ln a	3.890	1.771	0.041
b	0.149	0.958	0.878
c	-0.164	0.054	0.007

R square = 0.95

Parametric model (2): ln(ratio)=ln(a)+cL

Parameters	estimate	s.e.	Pr(>| t|)
ln a	4.164	1.800	0.000
c	-0.155	0.008	0.000

R square = 0.95

	Ratio CAR/NCT		
Length (cm)	Obs	Model 1	Model 2
7	13.40	19.34	20.05
8	15.57	16.73	17.16
9	15.83	14.44	14.69
10	13.86	12.44	12.58
11	5.57	10.71	10.77
12	11.06	9.20	9.22
13	14.11	7.90	7.89
14	8.00	6.78	6.75
15	5.58	5.81	5.78
16	5.72	4.98	4.95
17	5.12	4.27	4.24
18	3.87	3.65	3.63
19	3.00	3.12	3.10
20	2.64	2.67	2.66
21	1.92	2.29	2.28
22	1.95	1.95	1.95
23	1.43	1.67	1.67
24	1.33	1.43	1.43
25	1.11	1.22	1.22
26	1.26	1.04	1.05
27	1.01	0.89	0.90

Stratification in the Eastern Atlantic – Q4SCOGFS

Finlay Burns

Introduction

Using trawl data from the Q4 Scottish Groundfish Survey (SCOGFSQ4) this study will attempt to broadly describe some of the demersal fish assemblages in ICES areas VIA and VIIA. The results from the analysis will be incorporated into a series of GIS shapefiles that will aim to delineate boundaries between the resultant faunal assemblages.

Method

Sampling stations

The SCOGFS is the only trawl survey to comprehensively sample the continenetal shelf throughout area VIA. Given the diverse nature of the topography within the region a robust sampling tool is required. The gear used for these surveys is the GOV with groundgear 'C'. This is rockhopper gear with 21" hoppers on the bosom section together with 18" and 14" hoppers on the quarters. This is a very selective gear that was designed primarily to sample gadoids and juvenile mackerel over the broad range of terrains to the North and West of Scotland. Unfortunately this makes it highly unsuitable when trying to describe demersal fish assemblages. In an effort to overcome this problem the positions of all the trawls from 1998 to 2004 were plotted in GIS. What became instantly apparent was the presence of haul clusters. The FRS botton trawl are essentially repeat station surveys i.e. the same stations tend to be sampled every year,and during roughly the same period (within 2 or 3 weeks of one another). Although not the most precise survey design for providing stock estimates it does however provide extensive biological data that exist in the form of clustered samples. By com bining the trawl data from several hauls it was hoped that a more representative species array may become more visible.

Firstly the data needed to be standardised. Since the arrival of the new Scotia in 1998 the standard tow duration has been reduced from 1 hour to 30 minutes. However, after discussion distance travelled was seen as a better measure of standardisation than tow duration due to strong currents and tidal stresses encountered within this area. The distance(m) was calculated for all stations and the values for all standard duration tows were plotted on a histogram so that the variance could be analysed. The results from 505 thirty minute trawls showed that the mean distance travelled was 3523m with a standard deviation of 239m. Of these, 380 trawls fell within 1 standard deviation of the mean with 482 trawls falling within 2 standard deviations. On balance it was decided to accept all stations within 2 standard deviations of the mean. To have only accepted stations within 1 standard deviation would have compromised the study with almost a quarter of the data being unusable. In addition to the 482 available standard trawls, 6 non standard tows

were added which met the criteria in terms of distance travelled. The duration for these tows was between 25 and 35 minutes.
The next step was to formulate a set of standardised clusters. This was achieved by plotting all the accepted hauls on a GIS chart and scrutinising the clusters of hauls. 72 clusters each of 4 hauls were identified. These provided comprehensive survey coverage whilst also providing a sufficient amount of data with which to analyse (Figure 1). In each cluster the samples which showed the tightest spatial clustering were chosen and where this resulted in more than 4 samples being included the number was reduced further by choosing those that had the best depth correlation. This resulted in the vast majority of hauls being positioned within 2.5nm of the geometric center of each haulgroup. In labelling the clusters the depth was recorded as the mean depth of the 4 samples. Depths range from 32m to 450m.

Physical Variables

As already mentioned the mean depth for each haul cluster was recorded. In addition to this the underlying sediment type was also recorded for each cluster. This was collected largely from the BGS charts although some sediment data was available from analysis of grab samples taken as part of the HABMAP project which were collected during 2001 – 2004. These validated the BGS data and generally correlation was good. For data analysis a scale was created in order to assign a sediment type to each haulgroup. 1=mud, 2=sandy mud, 3= muddy sand, 4=sand, 5=gravelly sand; and 6=sandy gravel. Some of the stations fall outwith the area covered by the BGS charts, notably those located to the west of Ireland, in this case no sediment type was allocated although the results of the cluster analysis may allow an assumption to be made on the underlying sediment.
Bottom temperature is routinely recorded on these surveys. Since the data were aggregated from more than one year it was decided to use the temperature data from the 2004 survey only rather than try to create an index based on temperature data from multiple years which contained wide interannual variation.

Data analysis

Primer (Clarke & Warwick,1994) was used for the cluster analysis on the species abundance data from the 72 haulgroups. This was carried out using the Bray – Curtis similarity on 4^{th} root transformed species CPUE abundance data. This transformation was used in order to try and downweight the importance of several very abundant ubiquitous species (mainly gadoids). Before performing any analysis all the data for herring, mackerel, horsemackerel, blue whiting, sprat and boarfish were removed. These are largely shoaling pelagic species and due to the unpredictability associated with their capture they are ommitted from any analysis of demersal fish species. Clusters with similar species compositions were assumed to reflect sites with similar demersal assemblages. Discriminating species (indicative of a particular assemblage type) were identified using a similarityof percentages procedure (SIMPER). This determines the contribution made by each species to the average dissimilarity between each designated assemblage group as well as highlighting species which typify a particular species grouping. It also ranks the contribution that each species makes to the within group similarity.

The BIOENV routine was used to test for any correlation between the physical abiotic variables and the demersal fish assemblages. Average depth, Latitude, sediment type as well as bottom temperature(2004) were all compared to determine the level of association for each variable but also to ascertain which combination of variables best explained the demersal assemblages.

Results

Cluster analysis of the 72 haulgroups indicated that 71 of these could be attributed to 5 broad demersal assemblages at around the 60% similarity level. However in addition to this one of the species groupings can be subdivided further at a similarity level of between 64 -66% into 3 further groupings. This provides a total of seven demersal fish assemblage groups (Figure 2). A brief description of each assemblage group is found below.

Deep Edge Assemblage - 1

The deeper offshore waters towards the continental slope are covered by this assemblage(Mean similarity = 64.89%). The 3 haulgroups that describe this assemblage range in depth from 300 – 450m and are characterised by coarser grounds typical of this depth. The dominant species underpinning this assemblage are bluemouth *Helicolenus dactylopteru*s, silvery pout *Gadiculus argentaeus*, hake *Merluccius merluccius*, hollowsnout grenadier *Coelorhynchus coelorhynchus* and the greater argentine *Argentina silus*. These 5 species accounted for just over 40% of the average within group similarity. As might be expected this group was the most dissimilar of all the 7 groupings identified. This assemblage showed most similarity with the 'Sand Assemblage-deep' with the lowest dissimilarity value of 58.44%.

Minch Assemblage - 3

As the name suggests this assemblage is associated almost exclusively with those haulgroups found within the North and South Minch. (Mean similarity = 72.38) The depth range here is broad with stations ranging from between approx. 80 – 200m. The associated substrate is muddy with the dominant types being muddy sand and sandy mud. Essentially these are *Nephrops* grounds and as such are typified by species you would expect in such substrates. Gadoid species such as Norway pout *Trisopterus esmarkii* (15%), whiting *Merlangius merlangus* (11%) and poor cod *Trisopterus minutus* (9%) account for a large part of the average similarity within the group (35%). *Nephrops norvegicus* also features highly, accounting for almost 6.5% of the within group similarity. Long rough dab *Hippoglossoides plattesoides* and witch *Glytocephalus* *cynoglossus* together contributed almost 8 %. These 3 species typify the assemblage more than any other. Otherwise, with the exception of the Deep Edge assemblage this group shows good between group similarity. (40 – 50% dissimilarity). Norway pout *Trisopterus esmarkii* and haddock *Melanogrammus aeglefinus* which are a much more northerly species are the main discriminating species between the Minch and NW Irish Sea assemblage which is also characterised by muddy sediments.

NW Irish Sea/Clyde Assemblage - 5

This assemblage again as its name suggests describes the species inhabiting the North West Irish Sea and Clyde area. (Mean similarity = 64.65%) Like the Minch assemblage it is typified by species known to be present on muddy ground. The dominant sediment types here being mud and sandy mud. Compared to the Minch the depth range here is much shallower, typically between 50 – 100m. The same 4 species account for the largest percentage of the average similarity within the group as was the case for the Minch assemblage, only this time they are in a different order. Whiting *Merlangius merlangus* accounts for almost 20% whilst norway Pout *Trisopterus esmarkii* only accounts for 9%. Much lower catch rates of haddock *Melanogrammus aeglefinus* are also recorded. These differences reflect the latitudinal differences between the two assemblages. As expected with muddy substrate there are significant numbers of *Nephrops norvegicus*(8.5%). Long rough dab *Hippoglossoides plattesoides* (3%) and witch *Glytocephalus cynoglossus*(0.9%) are also present though in the latter case of the latter the contribution is much reduced. This again can be explained by the southerly location. This area is a known nursery ground for small gadoids and analysis of the length frequency data reinforces this.

NE Irish Sea Assemblage - 6

Compared to the uniformly muddy sediments associated with the previous assemblage this species grouping was rather more mixed. (Mean similarity = 62.20%) In addition the stations were generally shallower ranging from between 30 – 70m. Whiting *Merlangius merlangus* again was the dominant species accounting for 17% of the average similarity within the group. Poor cod *Trisopterus minutus* accounted for 9% whilst grey gurnard *Eutrigla gurnardus* accounted for 7%. The greatest similarity was seen with the Sand assemblage – shallow fine which has a mean dissimilarity of 42% with this group. The other species which typify this group as a shallow/inshore sandy assemblage rather than just identifying it as a southerly assemblage are the prescence of species such as the tub gurnard, bib *Trisopterus luscus* and plaice *Pleuronectes platessa*. The absence of any norway pout *Trisopterus esmarki* is also attributable to the shallow depth.

Sand Assemblage – Deep 4a

This assemblage is characterised largely by deep offshore stations within the depth range 120 – 190m. Again as the name suggests the sediment type is typically clean sand, though with gravelly sand also defining some haulgroup locations.(Mean similarity = 74.44%) Haddock *Melanogrammus aeglefinus* and norway pout *Trisopterus esmarkii* each account for 9% of the average within group similarity whereas whiting *Merlangius merlangus* is less abundant and only accounts for 4%. All three sand assemblages showed significant similarities in species composition. This is highlighted by their low mean dissimilarity(33 – 35%). Species that typified this assemblage were lesser argentine *Argentina sphyraena*(5%), megrim *Lepidorhombus whiffiagonis*(4%), silvery pout *Gadiculus argentaeus*(3%) and bluemouth *Helicolenus dactylopteru*s (2%). The abundance of these species is indicative of the depth range.

Sand Assemblage – Shallow coarse – 4b

This assemblage constitutes 4 clusters in the depth range 60 – 100m. 3 of the 4 clusters in this species hrouping are located north of 58 degrees with the 4^{th} being located just off Malin Head. (Mean similarity = 73.02%) Haddock *Melanogrammus aeglefinus* (13%), poor cod *Trisopterus minutus* (9%), whiting *Merlangius merlangus* (6%), red gurnard(6%) and lesser spotted dogfish *Scyliorhinus canicula* (6%) account for approx. 40% of the within assemblage similarity. Again this assemblage showed significant similarity with the other sand assemblages. (33 – 35% mean dissimilarity) Abundance was generally lower for this associationcomapred to shallow fine. The one notable exception to this was red gurnard *Aspitrigla cuculus*. The reduction in flatfish species and whiting *Merlangius merlangus* coupled with an increase in red gurnard abundance is significant and suggests that this assemblage is more closely associated with coarser sandy substrates and this is reinforced by the prescence of coarser(more gravelly) sediments which predominate in this assemblage.

Sand Assemblage – Shallow fine – 4c

Again this assemblage constitutes clusters broadly within the depth range 60 – 100m.(Mean similarity = 70.39%). This assemblage is dominated by whiting *Merlangius merlangus* (10%), haddock *Melanogrammus aeglefinus* (10%) grey gurnard *Eutrigla gurnardus* (7%) and Norway pout *Trisopterus esmarkii* (6%) which between them account for almost 35% of the average within assemblage similarity. Mean dissimilarity between the other sand assemblages was 35%. The discriminating species in this assemblage are common dab *Limanda limanda* and plaice *Pleuronectes platessa* which are known to favour finer sandy substrates at shallower depths.

Correlation of demersal fish abundance data with abiotic variables.

The BIOENV analysis indicated that the physical variable that correlated best with the observed patterns within the fish abundance data (using the Rank Spearman correlation) was depth(r_w= 0.470). Very close behind was sediment type($r_{w=}$ 0.462) and then latitude (r_w= 0.358). Temperature was less well correlated ($r_{w=}$ 0.176). A combination of depth, sediment type and latitude produced the best correlation ($r_{w=}$ 0.713).

Discussion

This study has aimed to construct meaningful species groupings based on the aggregated fish data from the quarter 4 Scottish Groundfish Survey. Despite the sparsity of the data over what is undoubtably a huge area this study has highlighted several species groupings which appear to correlate especially well with both sediment type and depth. A limited proportion of stations were sampled as part of the HABMAP project between 2001 and 2004 and in addition to sediment analysis beam trawls were also conducted to sample the epibenthos and are in the process of being analysed. These will be made available later this year and will hopefully be incorporated into this report in time for the 2007 WGIBTS.

GIS Shapefiles

A series of meaningful biological strata were created which incorporated the findings of the study, particularly the correlation of species assemblage with depth and sediment type. The following geographic and bathymetric strata were developed for ICES area VIa which is the target area for both the Scottish Groundfish surveys. A description of the four geographical strata as well as the bathymetric strata can be found in Table 1. The distribution of the strata is illustrated in Figure 3.

Table 1. Description of Geographical and Bathymetric strata.

Geographical Strata	Bathymetric Stratum
North East VIa	31 - 80m
Outer Hebrides VIa	81 – 120m
Minch	121 – 160m
South VIa	161 – 200m
	201 – 300m
	301 – 400m
	401 – 500m

The southern boundary of the North East strata represents the division between the muddier sediments of the minch and the cleaner ground to the north of the Hebrides. This is also an obvious faunal boundary with the northern grounds yielding good catches of Haddock whereas the minch is dominated by small gadoid species and Nephrops.
The shallow coarse assemblage highlighted in the study was located mainly north of 58 Degrees. This correlates well with the BGS charts shows a higher predominance of coarse ground type in this area. The northwestern boundary of this strata is divided by the Wyville-Thompson ridge. Due to the temperature inversion that exists north of the ridge these deepers stratum would be subdivided. The species grouping found north of the ridge at depths greater than approx. 400m differ maredly from that found to the south.

The Minch is bounded by landmass on both sides and in the south again there is sediment boundary at approximately 56 °30 latitude. This is where the muddier substrate stops and the cleaner sandier substrates start. The Minch is not totally characterised by softer sediments however at its boundary margins they are the dominant substrate.

The South region contains a larger number of species groupings. This correlates well with the diverse numbers of sediment types present. Subdivisions should probably occur to separate the bathymetrically similar Clyde area which has a typically muddy species grouping with the grounds off Malin Head which is made up of very coarse gravelly substrate. Stanton Banks lie somewhere in the middle and are characterised as having sandier clean grounds which typically yield good numbers of whiting and flatfish.

The Hebrides strata has the same northern and southern boundary as the Minch albeit much further west in deeper open water. In terms of substrate type, this is probably the most homogeneous. The deeper sandy assemblage dominates these strata and is characterised by deeper shelf species such as megrim, silvery pout and bluemouth. A large area of unfishable rocky ground exists in the shallower waters to the west of the Hebrides. This is left unfished by the industry as well as FRS.

All the strata with the exception of the Minch border the deep continental slope on their western margin. This marks the most obvious faunal boundary with this stratum showing very little similarity with any of the other species groupings. At between 300 – 400m species such as bluemouth, hake, and greater argentine dominate the catch.

The very complex topography makes creation of these strata a difficult task. The Minch is the most complex with numerous deep holes which often occur close to shore coupled with a myriad of sediment types. Straightforward topography and well as a more ordered substrate profile meant the other 3 strata were less of a challenge. Each polygon in the shapefile is tagged with the underlying sediment type, the geographic and depth strata it belongs to as well as the area of each polygon (m2).

Figure 1: Haulgroup positions. (Geometric centre of cluster).

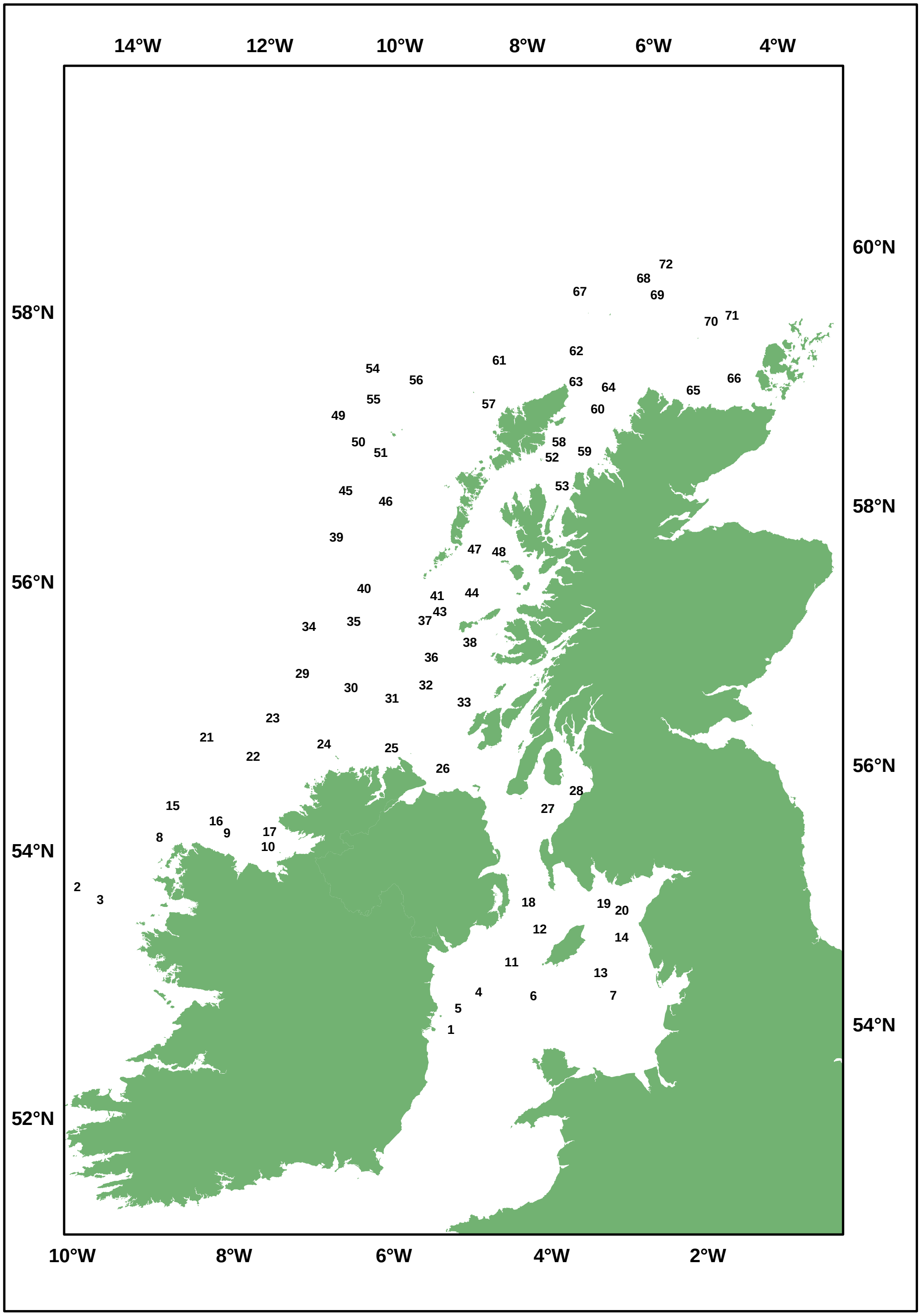


Figure 2 : Distribution of demersal fish assemblages as derived from cluster analysis.

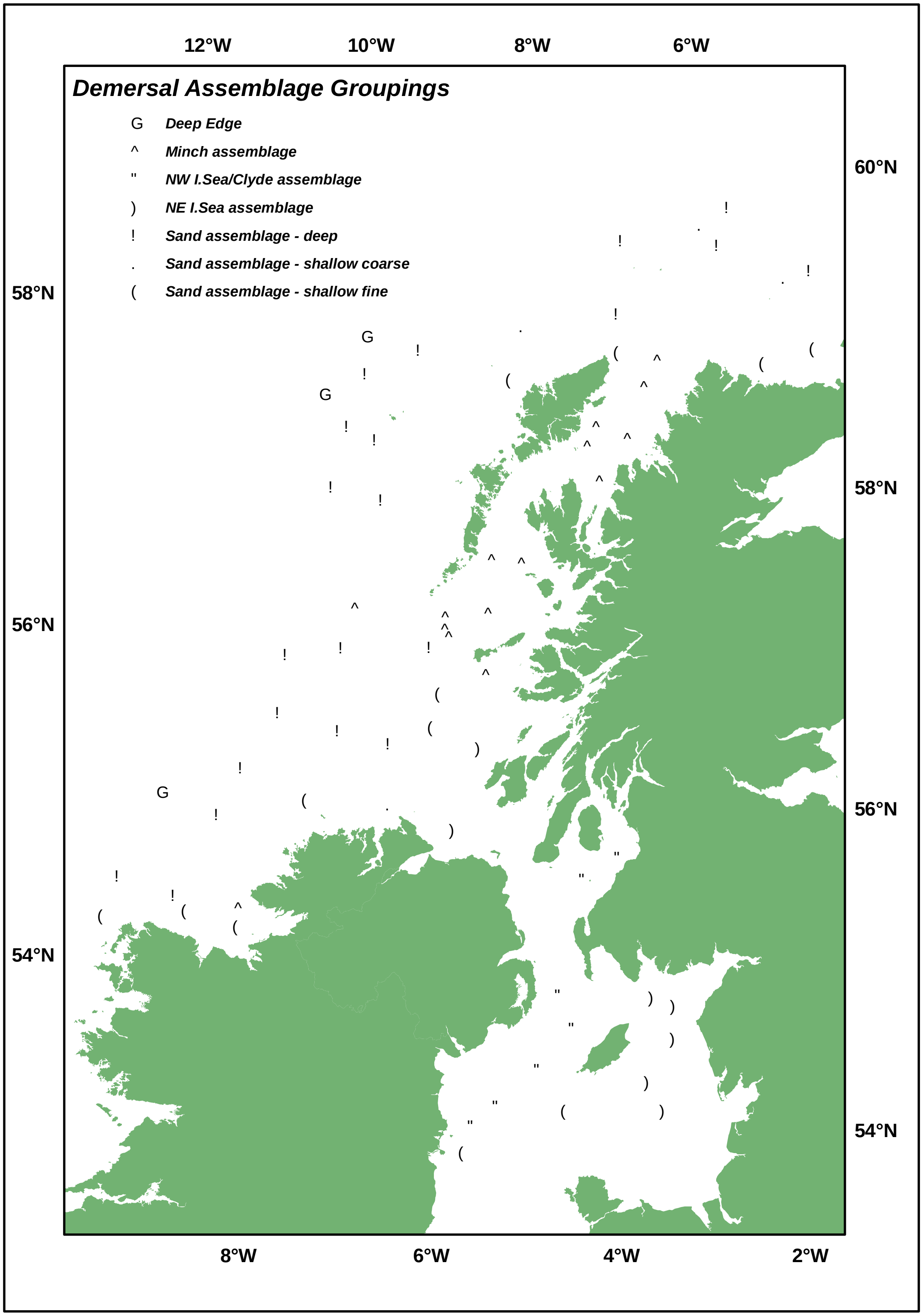
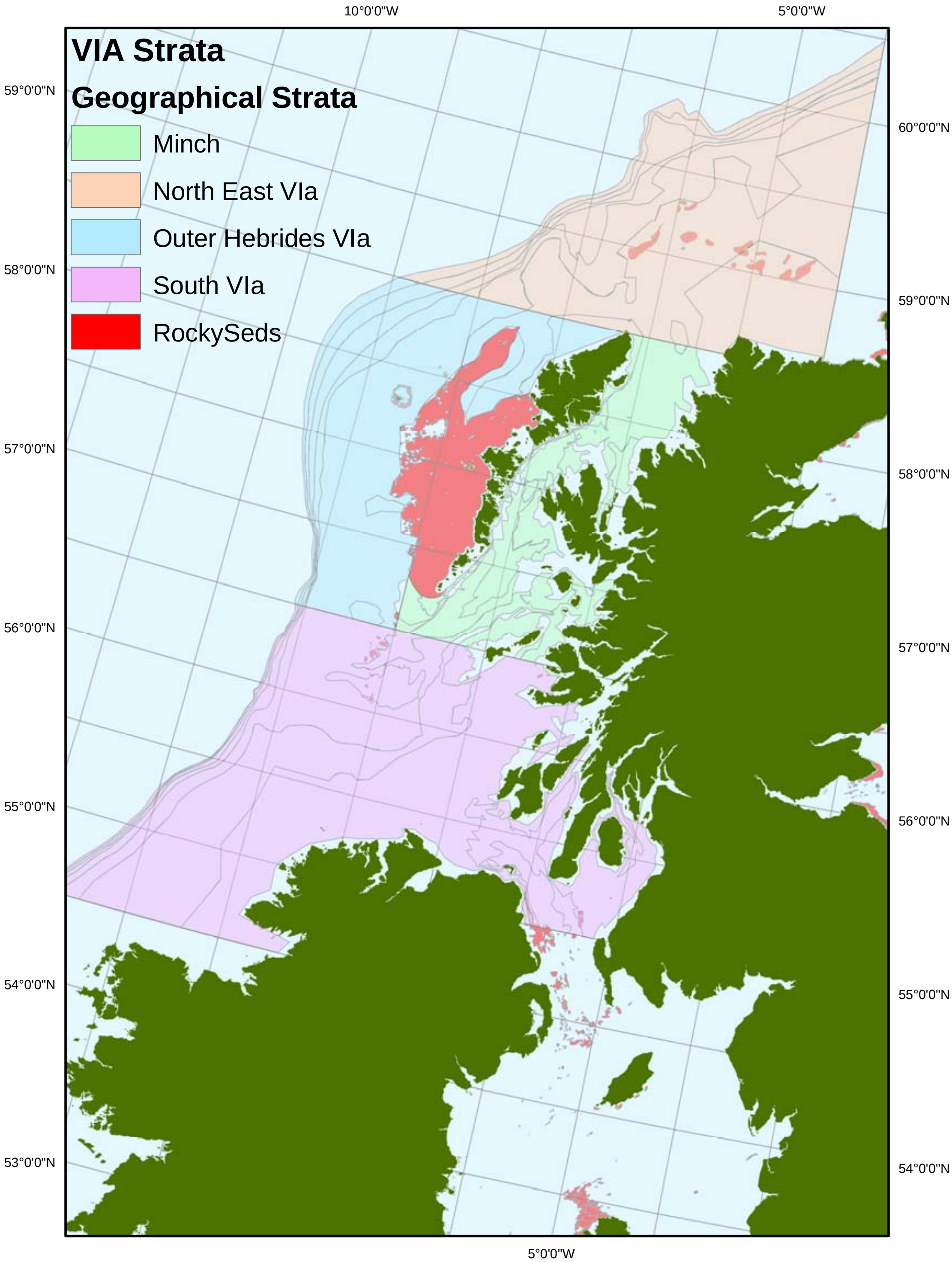


Figure 3: Map showing 4 primary geographical strata for ICES area VIa.



Working Document

Quality check surveys: DATRAS North Sea IBTS

Remment ter Hofstede & Niels Daan

IMARES - Institute for Marine Resources and Ecosystem Studies:

1 Table of Contents

2 Introduction

The North Sea International Bottom Trawl Survey (NS-IBTS) provides the most appropriate data for the examination of large-scale spatial and temporal analyses of fish assemblages for the North Sea, Skagerrak and Kattegat area, and therefore for the derivation of metrics with which to assess changes in the structure, function and diversity of fish assemblages. The survey data are becoming increasingly important for assessing the status of commercial and non-target fish species and fish communities as a whole. Hence, many aspects of the North Sea IBTS survey (e.g. catch sampling and sub-sampling protocols, and fish identification) should ensure that data collection is appropriate for studies of the wider fish community.

It has been highlighted that the IBTS has potential problems associated with (a) input errors and (b) the misidentification of selected taxa, especially with several taxa of non-target fish species (Daan, 2001; ICES, 2005). Additionally, there are several taxa that member states report at a range of taxonomic levels (species, genus or family), which may affect the utility of survey data for fish assemblage studies (e.g. biodiversity studies and metrics for fish communities).

This working document lists these problematic taxa in the North Sea, Skagerrak and Kattegat, and provides recommendations for change. Furthermore, it gives an overview by species and year of recordings of lengths that exceed the theoretical maximum lengths. Both analyses have been executed on all available data in DATRAS, section "North Sea International Bottom Trawl Survey", for the year 1965-2005, last modified on 6 February 2006.
Next to this, for a selection of species that are suspicious for being misreported, detailed analyses have been performed and described to identify possible errors.

3 Overview species

Given below is a table that gives an overview by species of the total number caught (numb), based on catches per hour, and the number of positive hauls (freq). Raw data were extracted from ICES-DATRAS, section "North Sea International Bottom Trawl Survey", for the year 1965-2005, all quarters, last modified on 6 February 2006.
Comments in red are straightforward and should be implemented by the ICES-secretary, after approval of all concerning countries. It often applies to the use of the genus-name *(Name spec.)*, when the genus is only represented by one species in the North Sea. To shorten the list of the number of different species caught and thereby preventing misinterpretations in for example biodiversity studies, we recommend to change the genus name into the species name. The same accounts for family name versus genus name.
The overview below is followed by a summary table with all recommendations.
Comments in blue are based on the interpretation of the authors and sensitive for debate. Therefore we can only recommend people to apply these comments in blue. They will be adopted for internal use at the IMARES (=RIVO).

NODC	TSN	species	numb	freq	comments
871304013400	160876	RAJA RADIATA	91	36	=Amblyraja radiata
871304012500	564140	LEUCORAJA LENTIGINOSA	3	2	Not in CLOFNAM ; id. error?
879103260100	550592	GAIDROPSARUS MACROPTHALMUS	2	1	=Antonogadus macrophthalmus
860301020000	159700	LAMPETRA	8	4	Gen with 1 sp; change into 159719
860301021700	159719	LAMPETRA FLUVIATILIS	96	44	
860301030000	159721	PETROMYZON	10	5	Gen with 1 sp; change into 159722
860301030100	159722	PETROMYZON MARINUS	95	47	
860601020100	159772	MYXINE GLUTINOSA	26934	3656	
870704030200	159911	LAMNA NASUS	4	2	
870801000000	159985	SCYLIORHINIDAE	2	1	S. canicula?; check cntr/rect
870801020300	160034	GALEUS MELASTOMUS	192	73	
870801030000	160053	SCYLIORHINUS	4	3	S. canicula?; check cntr/rect
870801030600	160065	SCYLIORHINUS CANICULA	12399	4996	
870801030700	160067	SCYLIORHINUS STELLARIS	12	5	
870802010200	160181	GALEORHINUS GALEUS	793	294	
870802040000	160226	MUSTELUS	248	48	
870802040800	160240	MUSTELUS ASTERIAS	1470	518	Uncertain; change into 160255
870802040900	160242	MUSTELUS MUSTELUS	703	263	Uncertain; change into 160255
871001000000	160604	SQUALIDAE	142	57	S. acanthias?; check cntr/rect
871001010200	160611	SOMNIOSUS MICROCEPHALUS	4	2	
871001020100	160617	SQUALUS ACANTHIAS	27087	5669	

871001051000	160670	ETMOPTERUS SPINAX	92	44	
871303010400	160838	TORPEDO MARMORATA	4	2	S. acanthias?; check cntr/rect
871304000000	160845	RAJIDAE	128	54	All rajids require careful checking!
871304010000	160846	RAJA	226	106	Error- Rajidae; change into 160845
871304013400	564149	AMBLYRAJA RADIATA	81433	30203	
871304013800	160880	RAJA BRACHYURA	109	63	
871304014100	160883	RAJA MONTAGUI	3081	1294	
871304014300	564126	DIPTURUS BATIS	170	94	
871304014500	564148	DIPTURUS OXYRHINCHUS	4	2	
871304014600	564134	LEUCORAJA FULLONICA	61	36	
871304014700	564128	LEUCORAJA CIRCULARIS	59	26	
871304014800	564143	LEUCORAJA NAEVUS	6109	3063	
871304015300	564141	DIPTURUS LINTEA	2	1	
871304015800	160900	LEUCORAJA UNDULATA	3	2	
871304015900	160901	RAJA CLAVATA	13315	2693	
871305011100	160959	DASYATIS PASTINACA	3	2	
871602020200	161022	CHIMAERA MONSTROSA	840	316	
874101000000	161125	ANGUILLIDAE	150	57	A. anguilla?; check cntr/rect
874101010200	161128	ANGUILLA ANGUILLA	791	327	
874112011100	161341	CONGER CONGER	14	9	
874701010000	161701	ALOSA	7	4	Prob A.fallax; change into 161716
874701010700	161708	ALOSA ALOSA	386	65	A. fallax? Check cntr/area
874701010900	161716	ALOSA FALLAX	19282	550	
874701020100	161722	CLUPEA HARENGUS	82508628	248587	
874701170100	161789	SPRATTUS SPRATTUS	75651841	107202	
874701220100	161813	SARDINA PILCHARDUS	138545	1469	
874702010400	161831	ENGRAULIS ENCRASICOLUS	190447	2374	
875501030000	161994	SALMO	2	1	
875501030500	161996	SALMO SALAR	10	6	
875501030600	161997	SALMO TRUTTA	41	20	
875503030100	162039	OSMERUS EPERLANUS	5023	360	
875601000000	162057	ARGENTINIDAE	37113	2784	Argentina; change into 162061
875601020000	162061	ARGENTINA	5490	367	
875601020300	162064	ARGENTINA SILUS	28699	2982	
875601020900	162071	ARGENTINA SPHYRAENA	234670	13717	
875901050100	162187	MAUROLICUS MUELLERI	146296	1899	
876200000000	162368	MYCTOPHOIDEI	2496	5	
876207020100	162471	NOTOLEPIS RISSOI	2	1	
878401060000	164475	LEPADOGASTER	2	1	Id error?
878401070100	164482	DIPLECOGASTER BIMACULATA	3	3	
878601000000	164497	LOPHIIDAE	258	237	Prob L.piscatorius; change to 164501
878601010300	164501	LOPHIUS PISCATORIUS	11481	5830	
878601010400	164502	LOPHIUS BUDEGASSA	10	7	
879103040200	164712	GADUS MORHUA	1250998	173606	
879103090100	164727	POLLACHIUS VIRENS	291685	28150	
879103090200	164728	POLLACHIUS POLLACHIUS	7247	1757	
879103110100	164740	BROSME BROSME	1501	688	
879103130100	164744	MELANOGRAMMUS AEGLEFINUS	20943752	260723	
879103150100	164748	RHINONEMUS CIMBRIUS	66450	13221	
879103160200	164751	PHYCIS BLENNOIDES	88	45	
879103170100	164754	TRISOPTERUS MINUTUS	460971	25747	
879103170200	164755	TRISOPTERUS LUSCUS	76079	5602	
879103170300	164756	TRISOPTERUS ESMARKI	68069324	73928	
879103180100	164758	MERLANGIUS MERLANGUS	33397666	316509	
879103190100	164760	MOLVA MOLVA	10233	4717	
879103190200	164761	MOLVA DYPTERYGIA	23	14	
879103200000	164764	GAIDROPSARUS	81	35	
879103200100	164765	GAIDROPSARUS VULGARIS	1361	336	
879103200200	164766	GAIDROPSARUS MEDITERRANEUS	20	9	
879103200400	164768	GAIDROPSARUS ARGENTATUS	6	1	
879103210000	164771	GADICULUS	47	1	Gen with 1 sp; Change into 164772
879103210100	164772	GADICULUS ARGENTEUS	156708	3377	
879103220100	164774	MICROMESISTIUS POUTASSOU	1418738	6447	
879103230100	164777	RANICEPS RANINUS	56	30	
879103240100	164779	CILIATA MUSTELA	1505	452	
879103240200	164780	CILIATA SEPTEMTRIONALIS	61	20	
879104000000	164789	MERLUCCIIDAE	48	19	Fam with 1 sp; Change into 164795
879104010500	164795	MERLUCCIUS MERLUCCIUS	33641	9760	
879202020200	165116	ECHIODON DRUMMONDI	248	73	
879301000000	165215	ZOARCIDAE	646	46	Check cntr/area
879301051300	165243	LYCENCHELYS SARSI	1048	263	
879301070000	165255	LYCODES	6	3	Gen with 1 sp; change into 165284
879301072400	165284	LYCODES VAHLI	7363	4387	
879301200100	165324	ZOARCES VIVIPARUS	2728	496	
879401011700	165350	CORYPHAENOIDES RUPESTRIS	42	25	
879401150200	165419	TRACHYRHYNCHUS MURRAYI	3	3	Id. error: Triglops murrayi??
880302050200	165594	BELONE BELONE	205	88	
880303020100	165612	SCOMBERESOX SAURUS	2	1	
880502100300	166025	ATHERINA PRESBYTER	20	3	
881100000000	166271	ZEIFORMES	8	4	Fam with 1 sp; change into 166287
881103020100	166283	ZENOPSIS OCELLATA	12	6	Id. error; change into 166287
881103030100	166287	ZEUS FABER	562	253	
881106000000	166309	CAPROIDAE	8	4	Fam with 1 sp; change into 166320
881106030100	166320	CAPROS APER	87	45	
881301000000	615903	LAMPRIDIDAE	44	8	Id error; Lampridae?
881801000000	166363	GASTEROSTEIDAE	36	11	Prob G.aculeatus; change into 166363

881801010100	166365	GASTEROSTEUS ACULEATUS	8745	486	
881801050100	166401	SPINACHIA SPINACHIA	1009	65	
882000000000	166438	SYNGNATHOIDEI	2	1	Change tsn --> 166443
882002000000	166443	SYNGNATHIDAE	1965	343	All syngnathidae need checking!!
882002010000	166444	SYNGNATHUS	8	4	
882002011900	166463	SYNGNATHUS ROSTELLATUS	1026	211	
882002012000	166464	SYNGNATHUS ACUS	1101	157	
882002012300	166467	SYNGNATHUS TYPHLE	30	13	
882002210100	166591	ENTELURUS AEQUORAEUS	1251	451	
882002220200	166595	NEROPHIS OPHIDION	37	17	
882002250000	166613	ACENTRONURA	2	1	Not in CLOFNAM; id. error
882601000000	166704	SCORPAENIDAE	2	1	
882601013900	166745	SEBASTES MARINUS	473	108	
882601015100	166756	SEBASTES MENTELLA	2	1	
882601017500	166779	SEBASTES VIVIPARUS	10833	2129	
882601030100	166787	HELICOLENUS DACTYLOPTERUS	7431	1136	
882601062800	166839	SCORPAENA SCROFA	6	4	
882602000000	166972	TRIGLIDAE	5472	526	
882602050100	167039	TRIGLA LUCERNA	6021	1651	
882602060100	167044	EUTRIGLA GURNARDUS	2423043	115975	
882602070100	167046	TRIGLOPORUS LASTOVIZA	12	2	
882602080100	167049	ASPITRIGLA CUCULUS	6067	1502	
883102000000	167196	COTTIDAE	183	110	
883102030800	167209	ARTEDIELLUS ATLANTICUS	2	1	
883102220000	167311	MYOXOCEPHALUS	48	1	Change tsn -->167317
883102220500	167316	TRIGLOPSIS QUADRICORNIS	70	12	Identif. errors; change into 167318
883102220600	167317	MYOXOCEPHALUS SCORPIOIDES	416	61	Identif. errors; change into 167318
883102220700	167318	MYOXOCEPHALUS SCORPIUS	22962	4826	
883102380700	167375	TRIGLOPS MURRAYI	120	64	
883102460100	167390	TAURULUS BUBALIS	3857	758	Id errors!!
883102460200	167391	TAURULUS LILLJEBORGI	20	10	
883108080300	167454	AGONUS CATAPHRACTUS	42005	5913	
883108180100	167478	LEPTAGONUS DECAGONUS	25	3	Check cntr/area
883109000000	167483	CYCLOPTERIDAE	8	4	
883109080000	167550	LIPARIS	308	46	
883109082800	167578	LIPARIS LIPARIS	3489	702	
883109083100	167581	LIPARIS MONTAGUI	169	50	
883109150100	167612	CYCLOPTERUS LUMPUS	6670	3097	
883528010300	168588	TRACHURUS TRACHURUS	5578547	27064	
883543000000	169180	SPARIDAE	6	4	
883543080400	169215	PAGELLUS ERYTHRINUS	3	2	
883543120100	169229	SPONDYLIOSOMA CANTHARUS	389	87	
883545020200	169418	MULLUS SURMULETUS	14958	2001	
883545020300	169419	MULLUS BARBATUS	4	2	Check cntr/area
883575010000	170316	DICENTRARCHUS	12	5	Gen. with 1 sp; change into 179317
883575010100	170317	DICENTRARCHUS LABRAX	185	70	
883601000000	170333	MUGILIDAE	20	9	
883601010100	170335	MUGIL CEPHALUS	4	2	
883601070400	170371	CHELON LABROSUS	140	48	
883601090100	170376	LIZA RAMADA	4	2	
883601090200	170377	LIZA AURATA	13	7	
883901330100	614239	SYMPHODUS MELOPS	14	3	
883901350100	170733	CTENOLABRUS RUPESTRIS	34	13	
883901360300	170737	LABRUS BERGYLTA	15	8	
883901360500	170739	LABRUS BIMACULATUS	1	1	
884006010100	170991	ECHIICHTHYS VIPERA	287451	6544	
884006010200	170992	TRACHINUS DRACO	30690	1256	
884201000000	171124	BLENNIIDAE	2	1	Check cntr/area
884201010000	171125	BLENNIUS	4	1	Check cntr/area
884202000000	171335	ANARHICHADIDAE	61	24	Fam with 1 gen; change into 171336
884202010000	171336	ANARHICHAS	4	2	
884202010200	171338	ANARHICHAS DENTICULATUS	6	3	
884202010300	171341	ANARHICHAS LUPUS	3912	2049	
884202010400	171342	ANARHICHAS MINOR	17	8	
884212000000	171554	STICHAEIDAE	50	9	Check cntr/area
884212090500	171588	LUMPENUS LAMPRETAEFORMIS	43069	4424	
884212180100	171603	LEPTOCLINUS MACULATUS	59	27	
884213020900	171645	PHOLIS GUNNELLUS	2361	234	
884501000000	171670	AMMODYTIDAE	870559	2909	
884501010000	171671	AMMODYTES	721951	1114	
884501010500	171676	AMMODYTES TOBIANUS	51341	573	Change into 171671
884501010600	171677	AMMODYTES MARINUS	576955	2718	Change into 171671
884501020100	171680	GYMNAMMODYTES SEMISQUAMATUS	37389	70	
884501030000	171681	HYPEROPLUS	8687	20	
884501030100	171682	HYPEROPLUS LANCEOLATUS	402364	6849	Change into 171681
884501030200	171683	HYPEROPLUS IMMACULATUS	58507	328	Change into 171681
884601000000	171691	CALLIONYMIDAE	2810	469	Fam with 1 gen; change into 171692
884601010000	171692	CALLIONYMUS	636	149	
884601010600	171698	CALLIONYMUS LYRA	82212	16901	
884601010700	171699	CALLIONYMUS MACULATUS	61394	6879	
884601012000	171712	CALLIONYMUS RETICULATUS	838	219	
884701000000	171746	GOBIIDAE	16465	1086	
884701130000	171833	GOBIUS	22622	68	Pomatoschistus!; Change into 171977
884701130700	171841	GOBIUS COBITIS	2	1	
884701131600	171850	GOBIUS NIGER	119	37	
884701490100	171971	CRYSTALLOGOBIUS LINEARIS	98	19	

884701510000	171977	POMATOSCHISTUS	34624	572	
884701510100	171978	POMATOSCHISTUS MINUTUS	32290	679	Change into 171977
884701510300	171982	POMATOSCHISTUS MICROPS	46	7	Change into 171977
884701660100	172033	APHIA MINUTA	150	27	
884701670000	172034	LESUEURIGOBIUS	34	11	
884701670200	172036	LESUEURIGOBIUS FRIESII	321	68	
885003030200	172414	SCOMBER SCOMBRUS	1844874	30075	
885003040200	172421	THUNNUS THYNNUS	2	1	
885703000000	172714	BOTHIDAE	61	17	Check cntr/area
885703040200	616195	PSETTA MAXIMA	3161	1573	
885703040300	172749	SCOPHTHALMUS RHOMBUS	2480	1147	
885703170000	172803	ARNOGLOSSUS	25	11	
885703170200	172805	ARNOGLOSSUS LATERNA	13392	2794	
885703170300	172806	ARNOGLOSSUS IMPERIALIS	36	17	
885703170600	172809	ARNOGLOSSUS THORI	1	1	
885703210000	172828	ZEUGOPTERUS	4	2	
885703210100	172829	ZEUGOPTERUS PUNCTATUS	454	119	
885703220100	616613	ZEUGOPTERUS NORVEGICUS	522	198	
885703220200	616605	ZEUGOPTERUS REGIUS	15	11	
885703230100	172834	LEPIDORHOMBUS BOSCII	6	2	
885703230200	172835	LEPIDORHOMBUS WHIFFIAGONIS	15160	5098	
885704050200	172873	GLYPTOCEPHALUS CYNOGLOSSUS	34671	10419	
885704060300	172877	HIPPOGLOSSOIDES PLATESSOIDES	3073054	131798	
885704090400	172881	LIMANDA LIMANDA	12538952	215196	
885704120200	172888	MICROSTOMUS KITT	268833	54547	
885704140200	172894	PLATICHTHYS FLESUS	100200	15219	
885704150200	172902	PLEURONECTES PLATESSA	727806	95382	
885704190200	172933	HIPPOGLOSSUS HIPPOGLOSSUS	614	323	
885801000000	172980	SOLEIDAE	615	80	Check cntr/area
885801060000	173000	SOLEA	1	1	Change into 173001
885801060100	173001	SOLEA VULGARIS	19538	5376	
885801080000	173020	BUGLOSSIDIUM	78	24	Gen with 1 sp; change into 173021
885801080100	173021	BUGLOSSIDIUM LUTEUM	74921	5927	
885801090000	173022	MICROCHIRUS	10	5	Gen with 1 spc; change into 173026
885801090300	173026	MICROCHIRUS VARIEGATUS	425	179	
885801170100	173051	PEGUSA LASCARIS	15	7	

3.1 Recommendations

Change			Into		
tsn	nodc	name	tsn	nodc	name
159700	860301020000	LAMPETRA	159719	860301021700	LAMPETRA FLUVIATILIS
159721	860301030000	PETROMYZON	159722	860301030100	PETROMYZON MARINUS
160876	871304013400	RAJA RADIATA	564149	871304013400	AMBLYRAJA RADIATA
162057	875601000000	ARGENTINIDAE	162061	875601020000	ARGENTINA
164771	879103210000	GADICULUS	164772	879103210100	GADICULUS ARGENTEUS
164789	879104000000	MERLUCCIIDAE	164795	879104010500	MERLUCCIUS MERLUCCIUS
165255	879301070000	LYCODES	165284	879301072400	LYCODES VAHLI
166271	881100000000	ZEIFORMES	166287	881103030100	ZEUS FABER
166283	881103020100	ZENOPSIS OCELLATA	166287	881103030100	ZEUS FABER
166309	881106000000	CAPROIDAE	166320	881106030100	CAPROS APER
166438	882000000000	SYNGNATHOIDEI	166443	882002000000	SYNGNATHIDAE
170316	883575010000	DICENTRARCHUS	170317	883575010100	DICENTRARCHUS LABRAX
171335	884202000000	ANARHICHADIDAE	171336	884202010000	ANARHICHAS
171691	884601000000	CALLIONYMIDAE	171692	884601010000	CALLIONYMUS
173000	885801060000	SOLEA	173001	885801060100	SOLEA VULGARIS
173020	885801080000	BUGLOSSIDIUM	173021	885801080100	BUGLOSSIDIUM LUTEUM
173022	885801090000	MICROCHIRUS	173026	885801090300	MICROCHIRUS VARIEGATUS
171691	884601000000	CALLIONYMIDAE	171692	884601010000	CALLIONYMUS

4 Exceeding maximum length

The table below gives an overview on a haul basis of all recordings of species that exceed their presumed maximum length. The value of the maximum length is determined by expert judgment. The data were extracted from ICES-DATRAS, section “North Sea International Bottom Trawl Survey”, for the year 1965-2005, all quarters, last modified on 6 February 2006. Comments in red are straightforward and should be implemented by the ICES-secretary, after approval of all concerning countries. Comments in blue are based on the interpretation of the authors and sensitive for debate. Therefore we can only recommend people to apply these comments in blue. They will be adopted for internal use at the IMARES (=RIVO).

nodc	species	cntr	yr	Q	ship	haul	nr	size class	max lngt	comments
871303010400	TORPEDO MARMORATA	NED	1975	1	TRI	12	2	85	60	Error; tsn = 160901
871303010400	TORPEDO MARMORATA	NED	1975	1	TRI	13	2	85	60	Error; tsn = 160901

871304013400	AMBLYRAJA RADIATA	DEN	2004	3	DAN2	15	2	62	60	Misidentification
871304013400	AMBLYRAJA RADIATA	FRA	1994	3	THA	1	2	80	60	
871304013400	AMBLYRAJA RADIATA	FRA	1995	1	THA	9	2	66	60	
871304013400	AMBLYRAJA RADIATA	FRA	1995	1	THA	48	2	83	60	
871304013400	AMBLYRAJA RADIATA	FRA	1995	1	THA	50	3	82	60	
871304013400	AMBLYRAJA RADIATA	FRA	1996	3	THA2	3	2	76	60	
871304013400	AMBLYRAJA RADIATA	GFR	1977	1	PO	16	2	100	60	
871304013400	AMBLYRAJA RADIATA	GFR	1979	1	PO	48	6	63	60	
871304013400	AMBLYRAJA RADIATA	GFR	1979	1	PO	50	4	61	60	
871304013400	AMBLYRAJA RADIATA	GFR	1979	1	PO	50	2	62	60	
871304013400	AMBLYRAJA RADIATA	GFR	1979	1	PO	50	2	65	60	
871304013400	AMBLYRAJA RADIATA	GFR	1988	1	WAH2	74	2	61	60	
871304013400	AMBLYRAJA RADIATA	GFR	1988	1	WAH2	74	2	65	60	
871304013400	AMBLYRAJA RADIATA	GFR	1992	2	WAH2	77	2	68	60	
871304013400	AMBLYRAJA RADIATA	GFR	1992	2	WAH2	124	2	62	60	
871304013400	AMBLYRAJA RADIATA	NED	1980	1	TRI	3	2	70	60	
871304013400	AMBLYRAJA RADIATA	NED	1989	1	TRI	45	2	65	60	
871304013400	AMBLYRAJA RADIATA	NOR	1987	1	ELD	18	2	77	60	
871304013400	AMBLYRAJA RADIATA	NOR	1987	1	ELD	18	2	79	60	
871304013400	AMBLYRAJA RADIATA	NOR	1993	4	GOS	4	8	78	60	
871304013400	AMBLYRAJA RADIATA	NOR	1994	2	MIC	84	16	70	60	
871304013400	AMBLYRAJA RADIATA	NOR	1994	4	GOS	6	2	64	60	
871304013400	AMBLYRAJA RADIATA	NOR	1995	1	MIC	47	2	82	60	
871304013400	AMBLYRAJA RADIATA	NOR	2000	3	MIC	586	5	82	60	
871304013400	AMBLYRAJA RADIATA	NOR	2001	3	MIC	486	2	69	60	
871304013400	AMBLYRAJA RADIATA	SCO	1980	1	EXP	32	1	80	60	
871304013400	AMBLYRAJA RADIATA	SCO	1988	1	SCO2	29	1	72	60	
871304013400	AMBLYRAJA RADIATA	SCO	1988	1	SCO2	30	1	74	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	2	4	61	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	2	1	68	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	2	1	71	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	6	3	62	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	6	3	64	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	6	3	67	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	6	3	68	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	6	3	70	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	6	3	71	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	7	2	61	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	7	9	62	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	7	4	65	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	7	4	67	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	7	4	68	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	9	2	62	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	12	3	61	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	13	4	62	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	13	4	67	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	14	2	61	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	14	1	62	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	14	3	64	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	14	1	65	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	14	2	67	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	14	1	68	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	14	1	70	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	15	4	65	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	15	4	67	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	15	4	68	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	15	4	71	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	15	4	72	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	16	1	64	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	16	2	65	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	16	1	68	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	16	2	70	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	16	1	71	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	17	2	62	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	17	4	67	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	17	4	68	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	17	2	71	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	17	2	72	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	17	2	80	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	18	3	64	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	18	3	71	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	18	6	72	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	18	3	77	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	19	1	61	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	19	2	65	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	20	1	68	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	20	1	75	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	21	1	68	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	21	2	71	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	21	1	72	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	21	1	74	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	22	3	75	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	22	3	77	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	23	2	70	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	23	4	71	60	

871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	23	2	72	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	23	2	74	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	23	2	78	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	24	4	74	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	24	2	75	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	24	2	77	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	25	7	61	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	25	7	62	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	25	7	64	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	25	7	67	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	25	7	68	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	25	21	70	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	25	7	71	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	25	21	72	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	26	1	65	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	26	2	68	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	26	1	70	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	26	1	71	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	26	1	74	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	26	1	80	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	2	61	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	1	64	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	1	67	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	3	68	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	2	70	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	1	71	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	3	72	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	3	74	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	2	75	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	3	78	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	1	80	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	27	1	81	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	28	6	62	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	28	6	64	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	28	6	65	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	28	4	68	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	28	6	70	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	28	6	71	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	28	8	72	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	28	4	74	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	28	2	77	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	2	61	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	1	62	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	6	64	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	1	67	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	3	70	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	6	71	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	4	72	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	6	74	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	1	75	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	1	77	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	29	1	80	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	30	3	61	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	30	6	62	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	30	3	67	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	30	3	70	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	30	6	74	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	30	12	75	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	31	2	65	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	31	2	67	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	32	3	64	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	32	6	65	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	32	3	70	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	34	13	67	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	34	13	68	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	34	13	70	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	35	4	61	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	35	4	65	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	35	4	75	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	36	3	67	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	36	4	68	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	36	4	70	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	36	5	71	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	36	2	72	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	36	4	74	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	44	1	62	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	44	1	64	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	46	1	61	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	47	1	67	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	52	2	67	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	52	2	68	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	52	2	74	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	53	1	62	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	53	1	67	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	55	1	61	60
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	55	1	62	60

871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	55	2	64	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	55	1	65	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	55	2	67	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	55	1	68	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	55	1	70	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	56	2	64	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	56	2	65	60	
871304013400	AMBLYRAJA RADIATA	SCO	1989	1	SCO2	56	2	70	60	
871304013400	AMBLYRAJA RADIATA	SWE	1977	1	ARG	16	1	65	60	
871304013400	AMBLYRAJA RADIATA	SWE	1983	1	ARG	33	2	63	60	
871304013400	AMBLYRAJA RADIATA	SWE	1985	1	ARG	37	2	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1986	1	ARG	20	1	62	60	
871304013400	AMBLYRAJA RADIATA	SWE	1987	1	ARG	20	2	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1987	1	ARG	40	1	62	60	
871304013400	AMBLYRAJA RADIATA	SWE	1987	1	ARG	40	1	65	60	
871304013400	AMBLYRAJA RADIATA	SWE	1987	1	ARG	46	1	65	60	
871304013400	AMBLYRAJA RADIATA	SWE	1989	1	ARG	46	2	72	60	
871304013400	AMBLYRAJA RADIATA	SWE	1989	1	ARG	46	2	74	60	
871304013400	AMBLYRAJA RADIATA	SWE	1989	1	ARG	52	2	64	60	
871304013400	AMBLYRAJA RADIATA	SWE	1989	1	ARG	61	2	74	60	
871304013400	AMBLYRAJA RADIATA	SWE	1989	1	ARG	62	1	62	60	
871304013400	AMBLYRAJA RADIATA	SWE	1990	1	ARG	20	2	67	60	
871304013400	AMBLYRAJA RADIATA	SWE	1990	1	ARG	27	1	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1991	1	ARG	22	2	62	60	
871304013400	AMBLYRAJA RADIATA	SWE	1991	2	ARG	110	2	64	60	
871304013400	AMBLYRAJA RADIATA	SWE	1991	3	ARG	193	2	62	60	
871304013400	AMBLYRAJA RADIATA	SWE	1991	3	ARG	193	2	65	60	
871304013400	AMBLYRAJA RADIATA	SWE	1992	3	ARG	138	2	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1992	3	ARG	138	2	62	60	
871304013400	AMBLYRAJA RADIATA	SWE	1993	1	ARG	35	2	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1993	1	ARG	39	2	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1993	1	ARG	40	1	65	60	
871304013400	AMBLYRAJA RADIATA	SWE	1993	1	ARG	40	1	67	60	
871304013400	AMBLYRAJA RADIATA	SWE	1993	1	ARG	41	2	67	60	
871304013400	AMBLYRAJA RADIATA	SWE	1993	3	ARG	180	2	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1993	3	ARG	191	2	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1994	1	ARG	8	2	67	60	
871304013400	AMBLYRAJA RADIATA	SWE	1994	2	ARG	107	2	64	60	
871304013400	AMBLYRAJA RADIATA	SWE	1994	2	ARG	108	1	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1995	2	ARG	109	2	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1997	1	ARG	110	2	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1998	3	ARG	508	2	63	60	
871304013400	AMBLYRAJA RADIATA	SWE	1999	1	ARG	152	2	61	60	
871304013400	AMBLYRAJA RADIATA	SWE	1999	3	ARG	18	2	66	60	
874701010900	ALOSA FALLAX	FRA	1999	1	THA2	61	2	110	70	mm??
874701020100	CLUPEA HARENGUS	NOR	1995	4	GOS	14	2	44	40	??
874701170100	SPRATTUS SPRATTUS	FRA	1999	1	THA2	17	10	20	19	unbelievable
874701170100	SPRATTUS SPRATTUS	FRA	1999	1	THA2	17	10	20	19	
874701170100	SPRATTUS SPRATTUS	FRA	1999	1	THA2	17	8	21	19	
874701170100	SPRATTUS SPRATTUS	FRA	1999	1	THA2	17	18	21	19	
874701170100	SPRATTUS SPRATTUS	FRA	1999	1	THA2	17	12	22	19	
874701170100	SPRATTUS SPRATTUS	FRA	1999	1	THA2	17	4	22	19	
874701170100	SPRATTUS SPRATTUS	FRA	1999	1	THA2	17	8	23	19	
874701170100	SPRATTUS SPRATTUS	FRA	1999	1	THA2	17	2	23	19	
874701170100	SPRATTUS SPRATTUS	FRA	1999	1	THA2	17	2	24	19	
874701220100	SARDINA PILCHARDUS	NED	1991	2	ISI	19	2	31	30	
874701220100	SARDINA PILCHARDUS	NED	1992	2	ISI	19	2	31	30	
874702010400	ENGRAULIS ENCRASICOLUS	DEN	2000	3	DAN2	31	44	198	20	mm?
874702010400	ENGRAULIS ENCRASICOLUS	DEN	2000	3	DAN2	31	56	199	20	
874702010400	ENGRAULIS ENCRASICOLUS	DEN	2000	3	DAN2	31	6	200	20	
874702010400	ENGRAULIS ENCRASICOLUS	DEN	2000	3	DAN2	31	2	201	20	
874702010400	ENGRAULIS ENCRASICOLUS	DEN	2005	1	DAN2	1	12	22	20	
874702010400	ENGRAULIS ENCRASICOLUS	FRA	2003	1	THA2	27	2	120	20	
874702010400	ENGRAULIS ENCRASICOLUS	FRA	2003	1	THA2	27	2	135	20	
874702010400	ENGRAULIS ENCRASICOLUS	FRA	2004	1	THA2	1	16	21	20	
874702010400	ENGRAULIS ENCRASICOLUS	FRA	2004	1	THA2	1	14	22	20	
874702010400	ENGRAULIS ENCRASICOLUS	FRA	2004	1	THA2	1	10	23	20	
874702010400	ENGRAULIS ENCRASICOLUS	FRA	2004	1	THA2	1	6	24	20	
874702010400	ENGRAULIS ENCRASICOLUS	FRA	2004	1	THA2	1	4	27	20	
874702010400	ENGRAULIS ENCRASICOLUS	FRA	2004	1	THA2	1	2	28	20	
874702010400	ENGRAULIS ENCRASICOLUS	FRA	2005	1	THA2	5	2	80	20	
874702010400	ENGRAULIS ENCRASICOLUS	GFR	2000	3	WAH3	22	4	21	20	
874702010400	ENGRAULIS ENCRASICOLUS	NED	1992	4	ISI	35	16	21	20	
874702010400	ENGRAULIS ENCRASICOLUS	SCO	2000	3	SCO3	55	2	21	20	
875601020300	ARGENTINA SILUS	NOR	2003	3	HAV	553	11	69	60	??
875901050100	MAUROLICUS MUELLERI	SCO	1985	1	SCO2	11	1	12	8	
875901050100	MAUROLICUS MUELLERI	SCO	2003	1	SCO3	33	4	9	8	
875901050100	MAUROLICUS MUELLERI	SWE	1972	1	SKA	31	1	9	8	

876207020100	NOTOLEPIS RISSOI	NOR	2004	3	HAV	312	2	33	29	??
878401060000	LEPADOGASTER	FRA	1992	1	THA	29	2	20	8	misidentification
879103150100	RHINONEMUS CIMBRIUS	DEN	1991	1	DAN2	21	8	45	41	??
879103170100	TRISOPTERUS MINUTUS	DEN	1971	1	DAN	8	2	28	27	
879103170100	TRISOPTERUS MINUTUS	DEN	1986	1	DAN2	27	2	29	27	
879103170100	TRISOPTERUS MINUTUS	DEN	1991	1	DAN2	14	2	29	27	
879103170100	TRISOPTERUS MINUTUS	DEN	1992	1	DAN2	35	2	30	27	
879103170100	TRISOPTERUS MINUTUS	DEN	1992	4	DAN2	29	4	28	27	
879103170100	TRISOPTERUS MINUTUS	DEN	1992	4	DAN2	29	4	30	27	
879103170100	TRISOPTERUS MINUTUS	DEN	1993	1	DAN2	15	10	30	27	
879103170100	TRISOPTERUS MINUTUS	DEN	1999	1	DAN2	23	2	30	27	
879103170100	TRISOPTERUS MINUTUS	FRA	1999	1	THA2	2	4	29	27	
879103170100	TRISOPTERUS MINUTUS	GFR	1982	1	AND2	19	2	33	27	
879103170100	TRISOPTERUS MINUTUS	GFR	1983	1	AND2	61	12	29	27	
879103170100	TRISOPTERUS MINUTUS	GFR	1992	1	SOL	28	2	28	27	
879103170100	TRISOPTERUS MINUTUS	GFR	1992	1	SOL	28	2	29	27	
879103170100	TRISOPTERUS MINUTUS	NED	1995	4	ISI	3	16	30	27	
879103170100	TRISOPTERUS MINUTUS	NOR	1982	1	MIC	65	2	29	27	
879103170100	TRISOPTERUS MINUTUS	SWE	1972	1	THE	4	1	28	27	
879103170100	TRISOPTERUS MINUTUS	SWE	1980	1	ARG	3	2	31	27	
879103170100	TRISOPTERUS MINUTUS	SWE	1980	1	ARG	32	2	35	27	
879103170300	TRISOPTERUS ESMARKI	DEN	2003	1	DAN2	37	34	28	25	??
879103170300	TRISOPTERUS ESMARKI	DEN	2003	1	DAN2	37	52	29	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1977	1	PO	20	44	26	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1977	1	PO	20	40	27	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1977	1	PO	20	7	28	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1977	1	PO	20	4	29	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1977	1	PO	65	50	26	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1977	1	PO	65	18	27	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1977	1	PO	65	24	28	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1977	1	PO	65	6	30	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1979	1	PO	9	10	26	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1979	1	PO	9	4	29	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1979	1	PO	9	2	32	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1992	1	WAH2	23	4	26	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1992	1	WAH2	23	8	27	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1992	1	WAH2	23	10	28	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1992	1	WAH2	23	10	29	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1992	1	WAH2	23	2	30	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1992	3	WAH2	70	8	26	25	
879103170300	TRISOPTERUS ESMARKI	GFR	1992	3	WAH2	70	8	27	25	
879103170300	TRISOPTERUS ESMARKI	GFR	2002	1	WAH3	29	81	27	25	
879103170300	TRISOPTERUS ESMARKI	NOR	1991	2	JHJ	10	25	26	25	
879103170300	TRISOPTERUS ESMARKI	NOR	1995	4	GOS	42	191	26	25	
879103170300	TRISOPTERUS ESMARKI	NOR	1995	4	GOS	42	38	27	25	
879103170300	TRISOPTERUS ESMARKI	NOR	1995	4	GOS	59	7	26	25	
879103170300	TRISOPTERUS ESMARKI	NOR	1995	4	GOS	59	14	27	25	
879103170300	TRISOPTERUS ESMARKI	NOR	1999	3	MIC	581	50	31	25	
879103170300	TRISOPTERUS ESMARKI	SCO	1980	1	EXP	26	1	26	25	
879103170300	TRISOPTERUS ESMARKI	SCO	1983	1	EXP	40	10	26	25	
879103200200	GAIDROPSARUS MEDITERRANEUS	GFR	1983	1	AND2	43	2	27	25	??
879103200200	GAIDROPSARUS MEDITERRANEUS	GFR	1983	1	AND2	75	2	28	25	
879103200200	GAIDROPSARUS MEDITERRANEUS	GFR	1988	1	WAH2	12	2	29	25	
879103210100	GADICULUS ARGENTEUS	ENG	2003	3	END	51	2	18	17	
879103210100	GADICULUS ARGENTEUS	SWE	1995	3	ARG	195	12	19	17	
879103220100	MICROMESISTIUS POUTASSOU	SWE	1991	3	ARG	193	2	51	47	??
879103240100	CILIATA MUSTELA	NED	1976	1	TRI	54	2	53	30	??
881801010100	GASTEROSTEUS ACULEATUS	SCO	1987	1	SCO2	32	3	16	11	??
881801050100	SPINACHIA SPINACHIA	DEN	1992	4	DAN2	8	4	33	22	misidentification
881801050100	SPINACHIA SPINACHIA	DEN	1992	4	DAN2	8	4	43	22	
881801050100	SPINACHIA SPINACHIA	DEN	2004	1	DAN2	26	2	25	22	
881801050100	SPINACHIA SPINACHIA	DEN	2004	3	DAN2	38	6	33	22	
881801050100	SPINACHIA SPINACHIA	DEN	2004	3	DAN2	40	4	39	22	
881801050100	SPINACHIA SPINACHIA	DEN	2004	3	DAN2	43	4	38	22	
881801050100	SPINACHIA SPINACHIA	DEN	2005	1	DAN2	31	2	28	22	
881801050100	SPINACHIA SPINACHIA	DEN	2005	1	DAN2	34	2	40	22	
881801050100	SPINACHIA SPINACHIA	DEN	2005	1	DAN2	40	2	26	22	
881801050100	SPINACHIA SPINACHIA	DEN	2005	1	DAN2	42	2	34	22	
881801050100	SPINACHIA SPINACHIA	DEN	2005	1	DAN2	43	2	26	22	
881801050100	SPINACHIA SPINACHIA	DEN	2005	1	DAN2	43	2	35	22	
881801050100	SPINACHIA SPINACHIA	DEN	2005	1	DAN2	44	6	28	22	
881801050100	SPINACHIA SPINACHIA	DEN	2005	1	DAN2	44	2	31	22	
882002011900	SYNGNATHUS ROSTELLATUS	GFR	1993	1	WAH2	59	2	26	17	misidentification
882002220200	NEROPHIS OPHIDION	FRA	2005	1	THA2	42	2	38	30	misidentification

882002220200	NEROPHIS OPHIDION	FRA	2005	1	THA2	44	2	42	30	
882002220200	NEROPHIS OPHIDION	FRA	2005	1	THA2	47	2	36	30	
882002220200	NEROPHIS OPHIDION	FRA	2005	1	THA2	47	2	39	30	
882002220200	NEROPHIS OPHIDION	FRA	2005	1	THA2	55	2	31	30	
882002220200	NEROPHIS OPHIDION	FRA	2005	1	THA2	55	2	42	30	
882002220200	NEROPHIS OPHIDION	FRA	2005	1	THA2	58	2	37	30	
882002220200	NEROPHIS OPHIDION	FRA	2005	1	THA2	59	2	37	30	
882002220200	NEROPHIS OPHIDION	FRA	2005	1	THA2	67	2	37	30	
882002220200	NEROPHIS OPHIDION	FRA	2005	1	THA2	70	2	41	30	
882002220200	NEROPHIS OPHIDION	NOR	2004	1	HAV	26	2	33	30	
882002220200	NEROPHIS OPHIDION	NOR	2004	1	HAV	26	2	40	30	
882002220200	NEROPHIS OPHIDION	NOR	2004	1	HAV	31	3	33	30	
883102460100	TAURULUS BUBALIS	DEN	1999	3	DAN2	45	2	19	17	misidentification
883102460100	TAURULUS BUBALIS	DEN	1999	3	DAN2	45	2	27	17	
883102460100	TAURULUS BUBALIS	DEN	1999	3	DAN2	45	2	30	17	
883102460100	TAURULUS BUBALIS	ENG	1982	1	CIR	4	2	29	17	
883102460100	TAURULUS BUBALIS	ENG	1984	1	CIR	33	4	20	17	
883102460100	TAURULUS BUBALIS	ENG	1984	1	CIR	33	2	22	17	
883102460100	TAURULUS BUBALIS	ENG	1984	1	CIR	33	2	23	17	
883102460100	TAURULUS BUBALIS	ENG	1984	1	CIR	34	2	22	17	
883102460100	TAURULUS BUBALIS	ENG	1984	1	CIR	34	2	26	17	
883102460100	TAURULUS BUBALIS	ENG	1984	1	CIR	41	2	20	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	42	2	18	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	42	6	20	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	42	10	21	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	42	6	22	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	42	12	23	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	42	6	24	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	42	4	25	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	42	2	26	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	53	6	22	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	55	4	20	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	55	2	21	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	55	4	22	17	
883102460100	TAURULUS BUBALIS	ENG	1985	1	CIR	55	2	23	17	
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883102460100	TAURULUS BUBALIS	GFR	1989	1	WAH2	38	2	27	17	
883102460100	TAURULUS BUBALIS	GFR	1991	1	WAH2	3	2	22	17	
883102460100	TAURULUS BUBALIS	GFR	1992	3	WAH2	77	6	20	17	
883102460100	TAURULUS BUBALIS	GFR	1992	3	WAH2	80	14	27	17	
883102460100	TAURULUS BUBALIS	GFR	1992	3	WAH2	84	2	23	17	
883102460100	TAURULUS BUBALIS	SCO	1987	1	SCO2	34	1	18	17	
883102460100	TAURULUS BUBALIS	SCO	1987	1	SCO2	34	1	24	17	
883102460100	TAURULUS BUBALIS	SCO	1987	1	SCO2	34	1	25	17	
883102460100	TAURULUS BUBALIS	SCO	1987	1	SCO2	34	1	27	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	31	3	18	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	31	1	19	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	31	2	21	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	31	1	25	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	71	1	21	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	71	1	22	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	71	1	23	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	71	2	24	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	71	1	31	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	72	1	22	17	
883102460100	TAURULUS BUBALIS	SCO	1992	2	SCO2	73	1	29	17	
883102460100	TAURULUS BUBALIS	SCO	1992	3	SCO2	78	1	22	17	
883102460100	TAURULUS BUBALIS	SCO	1992	3	SCO2	78	1	23	17	
883102460100	TAURULUS BUBALIS	SCO	2001	1	SCO3	28	2	20	17	
883102460100	TAURULUS BUBALIS	SCO	2001	1	SCO3	29	2	19	17	
883102460100	TAURULUS BUBALIS	SCO	2001	1	SCO3	29	2	21	17	
883102460100	TAURULUS BUBALIS	SCO	2001	1	SCO3	30	2	21	17	
883102460100	TAURULUS BUBALIS	SCO	2002	1	SCO3	5	2	20	17	
883102460100	TAURULUS BUBALIS	SWE	1986	1	ARG	27	2	24	17	
883102460100	TAURULUS BUBALIS	SWE	1990	1	ARG	23	2	20	17	
883102460100	TAURULUS BUBALIS	SWE	1990	1	ARG	44	2	19	17	
883102460100	TAURULUS BUBALIS	SWE	1990	1	ARG	44	2	22	17	
883102460100	TAURULUS BUBALIS	SWE	1990	1	ARG	44	4	23	17	
883102460100	TAURULUS BUBALIS	SWE	1990	1	ARG	44	2	24	17	
883102460100	TAURULUS BUBALIS	SWE	1990	1	ARG	44	4	25	17	
883102460100	TAURULUS BUBALIS	SWE	1990	1	ARG	44	2	27	17	
883102460100	TAURULUS BUBALIS	SWE	1990	1	ARG	49	1	25	17	
883102460200	TAURULUS LILLJEBORGI	DEN	1998	1	DAN2	14	2	10	7	
883108080300	AGONUS CATAPHRACTUS	FRA	2002	1	THA2	67	2	23	22	
883108080300	AGONUS CATAPHRACTUS	NED	1984	1	ISI	18	4	23	22	check
883108080300	AGONUS CATAPHRACTUS	NED	1984	1	ISI	18	4	24	22	
883108080300	AGONUS CATAPHRACTUS	NED	1984	1	ISI	18	16	25	22	
883108080300	AGONUS CATAPHRACTUS	NED	1984	1	ISI	18	12	26	22	
883109082800	LIPARIS LIPARIS	FRA	1997	1	THA2	61	2	19	18	??
883109082800	LIPARIS LIPARIS	NED	1994	2	TRI2	13	2	35	18	change size --> unknown
883109082800	LIPARIS LIPARIS	NED	1997	1	TRI2	30	2	32	18	change size --> unknown
883109083100	LIPARIS MONTAGUI	ENG	2001	1	CIR	34	2	12	10	
883109083100	LIPARIS MONTAGUI	FRA	1999	1	THA2	3	2	11	10	misidentification
883109083100	LIPARIS MONTAGUI	FRA	1999	1	THA2	3	4	12	10	
883109083100	LIPARIS MONTAGUI	FRA	1999	1	THA2	3	10	13	10	
883109083100	LIPARIS MONTAGUI	FRA	1999	1	THA2	3	8	14	10	
883109083100	LIPARIS MONTAGUI	FRA	1999	1	THA2	3	8	15	10	
883109083100	LIPARIS MONTAGUI	FRA	2000	1	THA2	43	2	14	10	
883109083100	LIPARIS MONTAGUI	FRA	2000	1	THA2	43	2	15	10	
883109083100	LIPARIS MONTAGUI	FRA	2002	1	THA2	31	2	11	10	
883109083100	LIPARIS MONTAGUI	FRA	2002	1	THA2	68	2	12	10	
883109083100	LIPARIS MONTAGUI	FRA	2002	1	THA2	68	2	14	10	
883109083100	LIPARIS MONTAGUI	FRA	2002	1	THA2	68	2	15	10	
883109083100	LIPARIS MONTAGUI	FRA	2002	1	THA2	69	2	11	10	
883109083100	LIPARIS MONTAGUI	FRA	2002	1	THA2	69	2	12	10	
883109083100	LIPARIS MONTAGUI	FRA	2002	1	THA2	69	10	13	10	
883109083100	LIPARIS MONTAGUI	FRA	2002	1	THA2	69	10	14	10	
883109083100	LIPARIS MONTAGUI	FRA	2002	1	THA2	69	16	15	10	
883601090200	LIZA AURATA	ENG	1993	3	CIR	2	2	52	45	??
883601090200	LIZA AURATA	ENG	1996	3	CIR	3	2	48	45	
883601090200	LIZA AURATA	NED	1994	3	TRI2	1	2	56	45	

884006010100	ECHIICHTHYS VIPERA	FRA	2001	1	THA2	52	146	19	18	
884006010100	ECHIICHTHYS VIPERA	FRA	2001	1	THA2	52	163	20	18	
884006010100	ECHIICHTHYS VIPERA	GFR	1995	2	WAH3	7	6	19	18	
884006010100	ECHIICHTHYS VIPERA	GFR	1995	2	WAH3	7	18	20	18	
884212180100	LEPTOCLINUS MACULATUS	DEN	1989	1	DAN2	35	2	21	20	??
884212180100	LEPTOCLINUS MACULATUS	DEN	1991	4	DAN2	7	2	21	20	
884212180100	LEPTOCLINUS MACULATUS	DEN	1991	4	DAN2	7	2	27	20	
884212180100	LEPTOCLINUS MACULATUS	ENG	1997	3	CIR	34	2	23	20	
884212180100	LEPTOCLINUS MACULATUS	ENG	1997	3	CIR	40	2	31	20	
884212180100	LEPTOCLINUS MACULATUS	NOR	1999	3	MIC	556	2	21	20	
884212180100	LEPTOCLINUS MACULATUS	NOR	1999	3	MIC	556	2	24	20	
884212180100	LEPTOCLINUS MACULATUS	NOR	1999	3	MIC	556	2	26	20	
884212180100	LEPTOCLINUS MACULATUS	NOR	1999	3	MIC	556	2	27	20	
884212180100	LEPTOCLINUS MACULATUS	NOR	1999	3	MIC	556	2	28	20	
884212180100	LEPTOCLINUS MACULATUS	NOR	1999	3	MIC	556	2	29	20	
884212180100	LEPTOCLINUS MACULATUS	SCO	1991	3	SCO2	33	1	27	20	
884212180100	LEPTOCLINUS MACULATUS	SCO	1991	3	SCO2	33	1	34	20	
884213020900	PHOLIS GUNNELLUS	FRA	2005	1	THA2	67	4	26	25	??
884213020900	PHOLIS GUNNELLUS	FRA	2005	1	THA2	67	2	27	25	
884213020900	PHOLIS GUNNELLUS	FRA	2005	1	THA2	67	2	29	25	
884213020900	PHOLIS GUNNELLUS	FRA	2005	1	THA2	67	2	31	25	
884213020900	PHOLIS GUNNELLUS	FRA	2005	1	THA2	67	2	33	25	
884501010000	AMMODYTES	ENG	1983	1	CIR	49	2	28	25	??
884501010000	AMMODYTES	ENG	1984	1	CIR	17	2	26	25	
884501010000	AMMODYTES	ENG	1984	1	CIR	35	2	26	25	
884501010000	AMMODYTES	ENG	1984	1	CIR	35	2	27	25	
884501010000	AMMODYTES	ENG	1988	1	CIR	3	2	27	25	
884501010000	AMMODYTES	ENG	1988	1	CIR	12	4	27	25	
884501010000	AMMODYTES	ENG	1988	1	CIR	13	2	30	25	
884501010000	AMMODYTES	ENG	1989	1	CIR	9	2	27	25	
884501010000	AMMODYTES	ENG	1989	1	CIR	14	36	26	25	
884501010000	AMMODYTES	ENG	1989	1	CIR	14	31	27	25	
884501010000	AMMODYTES	ENG	1989	1	CIR	14	18	28	25	
884501010000	AMMODYTES	ENG	1989	1	CIR	14	4	29	25	
884501010000	AMMODYTES	ENG	1989	1	CIR	14	4	30	25	
884501010000	AMMODYTES	ENG	1989	1	CIR	15	4	26	25	
884501010000	AMMODYTES	ENG	1989	1	CIR	63	4	30	25	
884501010000	AMMODYTES	ENG	1989	1	CIR	64	2	28	25	
884501010000	AMMODYTES	ENG	1989	1	CIR	64	2	30	25	
884501010000	AMMODYTES	ENG	1990	1	CIR	2	2	30	25	
884501010000	AMMODYTES	ENG	1990	1	CIR	34	2	27	25	
884501010000	AMMODYTES	ENG	1992	4	CIR	35	2	26	25	
884501010000	AMMODYTES	ENG	1992	4	CIR	35	2	27	25	
884501010000	AMMODYTES	ENG	1993	3	CIR	10	118	26	25	
884501010000	AMMODYTES	ENG	1993	3	CIR	10	47	27	25	
884501010000	AMMODYTES	ENG	1993	3	CIR	10	24	28	25	
884501010000	AMMODYTES	ENG	1993	4	CIR	55	2	27	25	
884501010000	AMMODYTES	ENG	1995	3	CIR	23	2	26	25	
884501010000	AMMODYTES	NOR	1991	2	JHJ	26	12	26	25	
884501010000	AMMODYTES	NOR	1991	2	JHJ	26	12	26	25	
884501010000	AMMODYTES	NOR	1991	2	JHJ	26	3	27	25	
884501010000	AMMODYTES	NOR	1991	2	JHJ	26	3	29	25	
884501010000	AMMODYTES	NOR	1993	1	MIC	46	2	26	25	
884501010000	AMMODYTES	NOR	1993	1	MIC	46	4	27	25	
884501010000	AMMODYTES	NOR	1993	1	MIC	46	10	28	25	
884501010000	AMMODYTES	NOR	1993	1	MIC	46	4	29	25	
884501010000	AMMODYTES	NOR	1993	1	MIC	46	2	31	25	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	68	38	22	21	??
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	68	15	23	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	69	2	27	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	71	2	27	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	71	2	29	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	72	5	24	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	72	5	31	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	72	5	32	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	73	2	30	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	75	2	24	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	75	6	25	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	75	6	26	21	
884501010500	AMMODYTES TOBIANUS	FRA	1998	1	THA2	76	2	22	21	
884501010500	AMMODYTES TOBIANUS	FRA	2001	1	THA2	5	2	24	21	
884501010500	AMMODYTES TOBIANUS	FRA	2001	1	THA2	5	2	25	21	
884501010500	AMMODYTES TOBIANUS	FRA	2001	1	THA2	5	2	26	21	
884501010500	AMMODYTES TOBIANUS	FRA	2001	1	THA2	37	2	22	21	
884501010500	AMMODYTES TOBIANUS	FRA	2001	1	THA2	56	2	22	21	
884501010500	AMMODYTES TOBIANUS	FRA	2003	1	THA2	7	2	24	21	
884501010500	AMMODYTES TOBIANUS	FRA	2004	1	THA2	40	2	24	21	
884501010500	AMMODYTES TOBIANUS	FRA	2004	1	THA2	40	2	27	21	
884501010500	AMMODYTES TOBIANUS	NED	1983	1	TRI	59	2	22	21	
884501010500	AMMODYTES TOBIANUS	NOR	1976	1	JOH	36	16	23	21	
884501010500	AMMODYTES TOBIANUS	SCO	1993	2	SCO2	32	2	22	21	
884501010500	AMMODYTES TOBIANUS	SWE	1995	2	ARG	131	6	22	21	

884501010500	AMMODYTES TOBIANUS	SWE	1995	2	ARG	131	4	23	21	
884501010500	AMMODYTES TOBIANUS	SWE	1995	2	ARG	141	13	22	21	

884501010600	AMMODYTES MARINUS	GFR	1991	2	WAH2	4	2	27	25	??
884501010600	AMMODYTES MARINUS	GFR	1991	2	WAH2	4	2	28	25	
884501010600	AMMODYTES MARINUS	GFR	1991	2	WAH2	44	345	26	25	
884501010600	AMMODYTES MARINUS	GFR	1991	2	WAH2	62	2	27	25	
884501010600	AMMODYTES MARINUS	GFR	1991	2	WAH2	62	2	28	25	
884501010600	AMMODYTES MARINUS	GFR	1991	2	WAH2	62	2	29	25	
884501010600	AMMODYTES MARINUS	GFR	1993	2	WAH2	2	2	26	25	
884501010600	AMMODYTES MARINUS	GFR	1993	2	WAH2	21	2	29	25	
884501010600	AMMODYTES MARINUS	GFR	1995	2	WAH3	39	2	27	25	
884501010600	AMMODYTES MARINUS	GFR	1995	2	WAH3	67	280	26	25	
884501010600	AMMODYTES MARINUS	GFR	2002	3	WAH3	2	4	27	25	
884501010600	AMMODYTES MARINUS	SCO	2001	3	SCO3	59	2	26	25	

884501030100	HYPEROPLUS LANCEOLATUS	GFR	1994	2	WAH3	73	2	55	40	??

884501030200	HYPEROPLUS IMMACULATUS	NED	2002	1	TRI2	3	2	36	35	Error: never 100%

positive identified on Dutch vessels

884601010700	CALLIONYMUS MACULATUS	DEN	1990	1	DAN2	7	3	21	20	
884601010700	CALLIONYMUS MACULATUS	DEN	2001	3	DAN2	34	22	21	20	
884601010700	CALLIONYMUS MACULATUS	DEN	2001	3	DAN2	43	10	22	20	
884601010700	CALLIONYMUS MACULATUS	FRA	2005	1	THA2	11	2	21	16	
884601010700	CALLIONYMUS MACULATUS	FRA	2005	1	THA2	11	2	22	16	
884601010700	CALLIONYMUS MACULATUS	GFR	1990	1	WAH2	40	2	22	16	
884601010700	CALLIONYMUS MACULATUS	GFR	1992	1	SOL	16	8	21	16	
884601010700	CALLIONYMUS MACULATUS	GFR	1992	1	SOL	16	4	22	16	
884601010700	CALLIONYMUS MACULATUS	GFR	1992	1	SOL	16	4	25	16	
884601010700	CALLIONYMUS MACULATUS	GFR	1995	1	WAH3	1	6	21	16	
884601010700	CALLIONYMUS MACULATUS	GFR	1995	1	WAH3	1	2	22	16	
884601010700	CALLIONYMUS MACULATUS	GFR	1995	1	WAH3	1	10	23	16	
884601010700	CALLIONYMUS MACULATUS	GFR	1995	1	WAH3	4	2	26	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1991	1	SCO2	43	2	20	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1991	1	SCO2	43	1	24	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1991	1	SCO2	43	1	30	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1991	1	SCO2	65	1	23	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1991	1	SCO2	66	1	25	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1991	1	SCO2	66	1	27	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1991	2	SCO2	39	1	24	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1991	2	SCO2	39	1	26	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	1	SCO2	5	1	21	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	1	SCO2	10	1	23	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	1	SCO2	38	1	24	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	1	SCO2	43	1	27	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	1	SCO2	53	2	25	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	2	SCO2	23	1	21	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	2	SCO2	23	1	22	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	2	SCO2	28	9	23	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	2	SCO2	28	9	24	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	3	SCO2	2	1	25	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1992	3	SCO2	78	1	22	16	
884601010700	CALLIONYMUS MACULATUS	SCO	1998	1	SCO3	55	2	29	16	
884601010700	CALLIONYMUS MACULATUS	SCO	2002	3	SCO3	66	8	21	16	
884601010700	CALLIONYMUS MACULATUS	SWE	1981	1	ARG	32	6	21	16	
884601010700	CALLIONYMUS MACULATUS	SWE	1981	1	ARG	32	2	22	16	
884601010700	CALLIONYMUS MACULATUS	SWE	1981	1	ARG	32	2	23	16	
884601010700	CALLIONYMUS MACULATUS	SWE	1981	1	ARG	32	2	24	16	
884601010700	CALLIONYMUS MACULATUS	SWE	1981	1	ARG	32	2	26	16	
884601010700	CALLIONYMUS MACULATUS	SWE	2000	1	ARG	27	5	23	16	

884601012000	CALLIONYMUS RETICULATUS	ENG	1993	4	CIR	49	2	14	12	misidentification
884601012000	CALLIONYMUS RETICULATUS	ENG	1993	4	CIR	67	2	17	12	
884601012000	CALLIONYMUS RETICULATUS	ENG	1999	3	CIR	56	2	13	12	
884601012000	CALLIONYMUS RETICULATUS	ENG	2001	3	CIR	69	2	17	12	
884601012000	CALLIONYMUS RETICULATUS	FRA	2004	1	THA2	9	2	15	12	
884601012000	CALLIONYMUS RETICULATUS	FRA	2004	1	THA2	24	2	13	12	
884601012000	CALLIONYMUS RETICULATUS	FRA	2004	1	THA2	24	2	14	12	
884601012000	CALLIONYMUS RETICULATUS	FRA	2004	1	THA2	24	4	17	12	
884601012000	CALLIONYMUS RETICULATUS	FRA	2004	1	THA2	24	2	18	12	
884601012000	CALLIONYMUS RETICULATUS	GFR	2003	1	WAH3	64	2	14	12	
884601012000	CALLIONYMUS RETICULATUS	NED	1973	1	TRI	21	2	14	12	
884601012000	CALLIONYMUS RETICULATUS	NED	1976	1	TRI	14	2	15	12	
884601012000	CALLIONYMUS RETICULATUS	NED	1983	1	TRI	9	2	14	12	
884601012000	CALLIONYMUS RETICULATUS	NED	1991	1	TRI2	2	2	13	12	
884601012000	CALLIONYMUS RETICULATUS	NED	1991	1	TRI2	7	2	18	12	
884601012000	CALLIONYMUS RETICULATUS	NED	1991	1	TRI2	20	2	16	12	
884601012000	CALLIONYMUS RETICULATUS	NED	1991	2	TRI2	23	4	14	12	
884601012000	CALLIONYMUS RETICULATUS	NED	1994	3	TRI2	36	2	18	12	
884601012000	CALLIONYMUS RETICULATUS	NED	2005	1	TRI2	22	1	14	12	
884601012000	CALLIONYMUS RETICULATUS	NED	2005	1	TRI2	26	1	13	12	
884601012000	CALLIONYMUS RETICULATUS	NOR	2001	3	MIC	497	2	14	12	
884601012000	CALLIONYMUS RETICULATUS	NOR	2001	3	MIC	499	4	14	12	
884601012000	CALLIONYMUS RETICULATUS	NOR	2004	3	HAV	305	8	14	12	
884601012000	CALLIONYMUS RETICULATUS	NOR	2004	3	HAV	314	2	16	12	

884701510100	POMATOSCHISTUS MINUTUS	GFR	1988	1	WAH2	46	2	11	9	errors
884701510100	POMATOSCHISTUS MINUTUS	GFR	1992	3	WAH2	83	6	19	9	
884701510100	POMATOSCHISTUS MINUTUS	GFR	2000	1	WAH3	59	2	55	9	
884701510300	POMATOSCHISTUS MICROPS	GFR	1991	1	WAH2	11	2	7	6	??
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	2	38	6	mm??
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	2	42	6	
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	2	45	6	
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	2	49	6	
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	2	51	6	
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	4	52	6	
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	2	53	6	
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	2	54	6	
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	2	56	6	
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	4	57	6	
884701660100	APHIA MINUTA	SWE	1972	1	SKA	41	4	58	6	
885703170200	ARNOGLOSSUS LATERNA	SCO	2003	3	SCO3	88	2	22	20	??
885703210100	ZEUGOPTERUS PUNCTATUS	SWE	1981	1	ARG	13	2	29	25	
885703230200	LEPIDORHOMBUS WHIFFIAGONIS	GFR	1987	1	WAH2	101	2	65	60	
885703230200	LEPIDORHOMBUS WHIFFIAGONIS	SCO	1980	1	EXP	51	1	62	60	
885704060300	HIPPOGLOSSOIDES PLATESSOIDES	GFR	1994	1	WAH3	76	2	71	50	unbelievable
885704060300	HIPPOGLOSSOIDES PLATESSOIDES	SCO	1997	2	SCO2	35	4	51	50	
885704060300	HIPPOGLOSSOIDES PLATESSOIDES	SCO	1997	2	SCO2	35	1	52	50	
885704060300	HIPPOGLOSSOIDES PLATESSOIDES	SCO	1997	2	SCO2	35	3	53	50	
885704060300	HIPPOGLOSSOIDES PLATESSOIDES	SCO	1997	2	SCO2	35	5	54	50	
885704060300	HIPPOGLOSSOIDES PLATESSOIDES	SCO	1997	2	SCO2	35	5	55	50	
885704060300	HIPPOGLOSSOIDES PLATESSOIDES	SCO	1997	2	SCO2	35	2	56	50	
885704060300	HIPPOGLOSSOIDES PLATESSOIDES	SCO	1997	2	SCO2	35	1	57	50	
885704060300	HIPPOGLOSSOIDES PLATESSOIDES	SCO	1997	2	SCO2	35	1	59	50	
885704090400	LIMANDA LIMANDA	NED	1970	1	WIL	11	8	47	45	
885704090400	LIMANDA LIMANDA	NED	1970	1	WIL	11	8	48	45	
885704090400	LIMANDA LIMANDA	NED	1970	1	WIL	11	16	49	45	
885704090400	LIMANDA LIMANDA	NED	1970	1	TRI	13	4	100	45	
885801080100	BUGLOSSIDIUM LUTEUM	FRA	2000	1	THA2	68	4	20	18	??
885801080100	BUGLOSSIDIUM LUTEUM	FRA	2000	1	THA2	68	4	21	18	
885801080100	BUGLOSSIDIUM LUTEUM	GFR	2001	1	WAH3	35	2	19	18	
885801080100	BUGLOSSIDIUM LUTEUM	GFR	2005	1	WAH3	42	2	19	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1980	1	EXP	53	1	19	1	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1982	1	EXP	37	1	21	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1983	1	EXP	14	2	20	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1983	1	EXP	14	1	21	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1983	1	EXP	15	1	19	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1983	1	EXP	15	1	28	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1984	1	EXP	17	1	21	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1984	1	EXP	17	1	22	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1991	1	SCO2	47	2	19	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1991	3	SCO2	53	1	19	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1991	3	SCO2	54	1	19	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1992	1	SCO2	43	3	21	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1992	2	SCO2	51	1	19	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1992	2	SCO2	52	1	19	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1992	3	SCO2	66	2	20	18	
885801080100	BUGLOSSIDIUM LUTEUM	SCO	1993	3	SCO2	72	2	19	18	

4.1 Recommendations

All institutes should check their records exceeding the maximum length and correct if necessary and possible.

5 *Mustelus* – Smoothhounds

5.1 Coding

DATRAS records 2 species (Smoothhound – *M. mustelus*; and Starry smoothhound – *M. asterias*) as well as the genus unspecified (*Mustelus*). Although morphological characteristics have been described to identify the two species, in practice identification is based purely on coloration. However, a recent catch of smoothhounds revealed that individuals exhibited white spots ranging from absent or almost invisible and few to dense coverage with bright white spots, while morphological characteristics showed no distinction. This casts some doubt on the potential to identify the two species properly (Daan *et al.* 2005). The following codes have been used:

Latin name	**tsn-code**	**NODC**	**Synonym**
Mustelus	**160226**	**870802040000**	
Mustelus asterias	**160240**	**870802040800**	
Mustelus mustelus	**160242**	**870802040900**	

Mustelus asterias

Mustelus mustelus

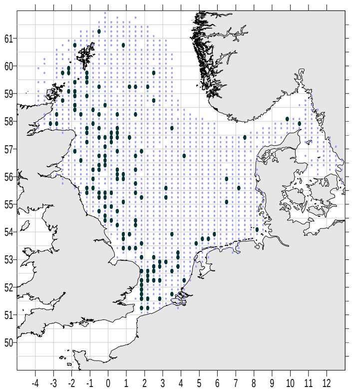
5.2 Length-frequency distribution

Size Class	870802040000 *Mustelus*	870802040800 *M. asterias*	870802040900 *M. mustelus*	comments
3	.	.	8	
4	.	.	4	
5	.	.	56	
6	.	.	12	
7	.	.	2	
8	.	.	2	
9	.	.	4	
11	.	.	4	
13	.	.	4	
24	.	5	.	
25	.	4	.	
26	.	10	.	
28	.	2	2	
29	.	3	.	
30	.	6	4	
31	.	6	2	
32	.	4	4	
33	.	4	4	
34	.	16	2	
35	.	22	6	
36	.	8	12	
37	.	10	4	
38	.	30	4	
39	2	35	4	
40	2	32	18	
41	2	38	10	
42	10	49	6	
43	8	43	12	
44	16	43	21	
45	12	48	8	
46	.	36	23	
47	4	32	22	
48	.	36	26	
49	2	32	6	
50	.	10	9	
51	2	17	9	
52	.	16	4	
53	10	23	4	
54	10	10	10	
55	16	12	16	
56	12	35	10	
57	12	33	18	

58	20	36	15
59	14	23	23
60	16	18	8
61	10	18	10
62	6	40	6
63	10	27	10
64	6	10	5
65	2	18	7
66	.	15	8
67	.	6	5
68	2	18	12
69	.	18	6
70	2	28	7
71	.	14	5
72	2	14	10
73	4	14	6
74	4	14	5
75	.	10	9
76	4	28	11
77	.	19	8
78	.	19	4
79	2	17	8
80	6	32	8
81	.	10	.
82	2	10	12
83	2	22	13
84	2	15	8
85	.	20	6
86	2	10	4
87	2	21	4
88	.	9	4
89	2	13	4
90	.	17	10
91	2	16	2
92	.	16	6
93	.	18	6
94	.	2	4
95	.	13	14
96	.	6	4
97	.	6	2
98	.	4	2
99	.	12	4
100	2	18	4
101	.	4	4
102	.	2	2
103	.	2	.
110	2	.	2
113	.	2	.
115	.	2	.
117	.	2	2
118	.	.	2
132	.	.	2
145	.	2	.
151	.	.	2

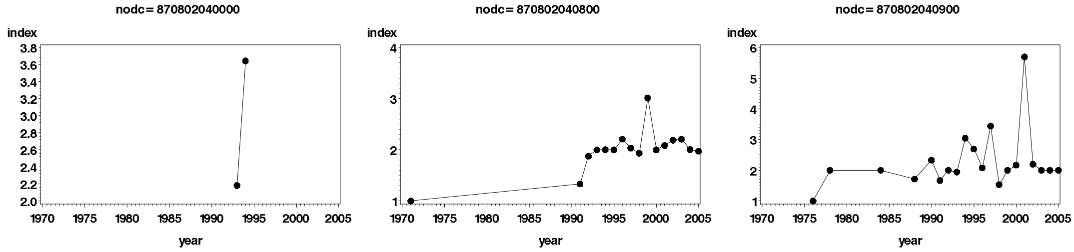
Large numbers of extremely small *M. mustelus* have been reported. Given a size at birth of 35 cm, this appears to be totally irrealistic. For the remainder the size compositions of the two species largely overlap.

5.3 Presence-absence by species



Mustelus sp.

5.4 Trends in abundance



Both species have been reported incidentally before 1980 and regularly thereafter. Reports of *M. asterias* have been more stable that those for *M. mustelus*, but apart from the change in abundance around 1980, there is no sign of a consistent trend.

5.5 Consistency in reporting among countries

(NB. The catches refer to numbers-per-hour fishing; because most hauls have a duration of 30 minutes, the numbers are often multiples of 2.)

***Mustelus* - 870802040000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	comments
39	.	.	2	.	.	.	.	.	
40	.	.	2	.	.	.	.	.	
41	.	.	2	.	.	.	.	.	
42	.	.	8	.	2	.	.	.	
43	.	.	8	.	.	.	.	.	
44	.	.	16	.	.	.	.	.	
45	.	.	12	.	.	.	.	.	
47	.	.	4	.	.	.	.	.	
49	.	.	2	.	.	.	.	.	
51	.	.	2	.	.	.	.	.	
53	.	.	10	.	.	.	.	.	
54	.	.	10	.	.	.	.	.	
55	.	.	16	.	.	.	.	.	
56	.	.	12	.	.	.	.	.	
57	.	.	12	.	.	.	.	.	
58	.	.	20	.	.	.	.	.	
59	.	.	14	.	.	.	.	.	
60	.	.	16	.	.	.	.	.	
61	.	.	10	.	.	.	.	.	
62	.	.	6	.	.	.	.	.	
63	.	.	10	.	.	.	.	.	
64	.	.	6	.	.	.	.	.	
65	.	.	2	.	.	.	.	.	
68	.	.	2	.	.	.	.	.	
70	.	.	2	.	.	.	.	.	
72	.	.	2	.	.	.	.	.	
73	.	.	4	.	.	.	.	.	
74	.	.	4	.	.	.	.	.	
76	.	.	4	.	.	.	.	.	
79	.	.	2	.	.	.	.	.	
80	.	.	4	.	2	.	.	.	
82	.	.	2	.	.	.	.	.	
83	.	.	2	.	.	.	.	.	
84	.	.	2	.	.	.	.	.	
86	.	.	2	.	.	.	.	.	
87	.	.	2	.	.	.	.	.	
89	.	.	2	.	.	.	.	.	
91	.	.	2	.	.	.	.	.	
100	.	.	2	.	.	.	.	.	
110	.	.	2	.	.	.	.	.	

***M. asterias* - 870802040800**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
24	.	1	.	.	.	.	4	.
25	.	.	.	.	.	.	4	.
26	.	2	.	.	.	.	8	.
28	.	.	2	.	.	.	.	.
29	.	3	.	.	.	.	.	.
30	.	6	.	.	.	.	.	.
31	.	4	2	.	.	.	.	.
32	.	4	.	.	.	.	.	.
33	.	2	2	.	.	.	.	.
34	2	4	10	.	.	.	.	.
35	2	12	8	.	.	.	.	.
36	.	4	4	.	.	.	.	.

37	.	.	10	.	.	.	.	.
38	4	2	24	.	.	.	.	.
39	4	5	26	.	.	.	.	.
40	.	.	30	.	.	.	2	.
41	.	3	34	.	1	.	.	.
42	.	.	46	2	1	.	.	.
43	.	.	43	.	.	.	.	.
44	.	.	40	.	2	.	1	.
45	.	3	36	4	.	.	5	.
46	.	.	32	2	.	.	2	.
47	.	.	26	2	4	.	.	.
48	.	2	26	4	3	.	1	.
49	2	.	24	2	.	.	4	.
50	.	.	8	2	.	.	.	.
51	2	.	8	.	.	7	.	.
52	.	.	4	2	2	7	1	.
53	.	2	14	.	3	.	4	.
54	.	.	6	.	2	.	2	.
55	.	.	6	4	.	.	2	.
56	.	2	27	6	.	.	.	.
57	.	.	30	.	2	.	1	.
58	.	.	25	6	2	.	3	.
59	.	.	4	8	2	2	5	2
60	.	.	8	.	4	.	6	.
61	2	2	8	4	.	2	.	.
62	2	.	24	6	1	.	7	.
63	.	.	20	4	.	.	3	.
64	.	.	6	2	.	.	.	2
65	.	.	.	4	2	.	12	.
66	.	2	4	6	.	.	3	.
67	.	2	2	2	.	.	.	.
68	.	.	8	8	.	.	2	.
69	.	4	.	12	.	.	2	.
70	.	2	14	4	6	.	2	.
71	.	2	2	10	.	.	.	.
72	.	.	2	8	.	.	4	.
73	.	2	.	4	.	.	8	.
74	2	6	.	2	.	.	4	.
75	.	4	4	2	.	.	.	.
76	3	7	6	6	.	.	6	.
77	.	8	8	2	.	.	1	.
78	.	6	4	4	.	.	5	.
79	2	2	.	2	.	7	4	.
80	.	4	12	6	2	4	4	.
81	2	2	2	2	.	.	2	.
82	2	2	2	2	.	.	2	.
83	2	8	4	4	.	.	4	.
84	2	6	2	4	.	.	1	.
85	2	4	6	4	4	.	.	.
86	.	6	2	2	.	.	.	.
87	4	4	4	4	.	3	2	.
88	2	4	2	.	.	.	1	.
89	2	9	2	.	.	.	.	.
90	.	4	4	2	3	.	4	.
91	7	6	.	2	.	.	1	.
92	2	8	4	.	.	1	1	.
93	2	8	.	8	.	.	.	.
94	.	2	.	.	.	.	.	.
95	2	7	4	.	.	.	.	.
96	.	4	.	.	.	.	2	.
97	2	4	.	.	.	.	.	.
98	.	2	.	2	.	.	.	.
99	.	8	.	4	.	.	.	.
100	2	6	4	2	2	.	2	.
101	.	4	.	.	.	.	.	.
102	.	2	.	.	.	.	.	.
103	2	.	.	.	.	.	.	.
113	2	.	.	.	.	.	.	.
115	2	.	.	.	.	.	.	.
117	2	.	.	.	.	.	.	.
145	2	.	.	.	.	.	.	.

***M. mustelus* - 870802040900**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
3	8	.	.	.	.	.	.	.
4	4	.	.	.	.	.	.	.
5	56	.	.	.	.	.	.	.
6	12	.	.	.	.	.	.	.
7	2	.	.	.	.	.	.	.
8	2	.	.	.	.	.	.	.
9	4	.	.	.	.	.	.	.
11	4	.	.	.	.	.	.	.
13	4	.	.	.	.	.	.	.
28	.	2	.	.	.	.	.	.
30	.	4	.	.	.	.	.	.
31	.	.	.	.	2	.	.	.

32	.	2	2	.	.	.	.	.
33	.	.	4	.	.	.	.	.
34	.	.	2	.	.	.	.	.
35	.	.	4	.	2	.	.	.
36	.	4	4	4	.	.	.	.
37	.	2	2	.	.	.	.	.
38	.	.	2	.	2	.	.	.
39	.	.	4	.	.	.	.	.
40	.	.	14	2	2	.	.	.
41	.	2	6	2	.	.	.	.
42	.	.	6	.	.	.	.	.
43	4	.	6	2	.	.	.	.
44	2	2	17	.	.	.	.	.
45	.	.	6	.	.	.	2	.
46	.	.	22	.	.	.	1	.
47	2	.	16	2	.	.	2	.
48	2	.	12	.	.	12	.	.
49	2	.	4	.	.	.	.	.
50	.	.	4	.	.	.	5	.
51	.	.	4	.	2	.	3	.
52	.	.	4	.	.	.	.	.
53	.	.	4	.	.	.	.	.
54	.	.	10	.	.	.	.	.
55	.	.	14	2	.	.	.	.
56	.	.	10	.	.	.	.	.
57	.	.	18	.	.	.	.	.
58	.	.	10	2	2	.	1	.
59	.	.	20	2	.	.	1	.
60	.	2	6	.	.	.	.	.
61	.	.	10	.	.	.	.	.
62	.	.	6	.	.	.	.	.
63	.	.	8	.	.	.	2	.
64	.	.	4	.	.	.	1	.
65	.	.	4	.	.	.	3	.
66	.	.	4	.	.	.	4	.
67	.	.	2	2	.	.	1	.
68	.	.	8	.	.	.	4	.
69	.	.	6	.	.	.	.	.
70	.	.	6	.	.	.	1	.
71	2	.	2	.	.	.	1	.
72	.	.	10	.	.	.	.	.
73	2	.	2	2	.	.	.	.
74	.	.	4	.	.	.	1	.
75	.	.	2	.	4	.	3	.
76	2	.	8	.	.	.	1	.
77	.	.	4	2	.	.	2	.
78	.	.	2	2	.	.	.	.
79	.	2	4	.	.	.	2	.
80	4	.	.	.	4	.	.	.
82	.	2	8	.	.	.	2	.
83	6	.	4	2	.	.	1	.
84	2	.	.	4	.	.	2	.
85	.	.	4	2	.	.	.	.
86	.	.	4	.	.	.	.	.
87	4	.	.	.	.	.	.	.
88	.	.	2	2	.	.	.	.
89	2	2	.	.	.	.	.	.
90	2	2	4	2	.	.	.	.
91	.	2	.	.	.	.	.	.
92	2	2	2	.	.	.	.	.
93	6	.	.	.	.	.	.	.
94	.	2	.	2	.	.	.	.
95	8	4	2	.	.	.	.	.
96	.	2	2	.	.	.	.	.
97	.	.	2	.	.	.	.	.
98	2	.	.	.	.	.	.	.
99	.	2	2	.	.	.	.	.
100	2	2	.	.	.	.	.	.
101	2	.	2	.	.	.	.	.
102	.	2	.	.	.	.	.	.
110	.	.	2	.	.	.	.	.
117	2	.	.	.	.	.	.	.
118	2	.	.	.	.	.	.	.
132	2	.	.	.	.	.	.	.
151	2	.	.	.	.	.	.	.

The two species have been recorded by all countries, but most prominently so by France. Denmark is identified as being responsible for the unrealistically small *M. mustelus*, recorded in 2001 and 2002 These records should be checked by Denmark.

5.6 Consistency in reporting within countries among years

The next table identifies the number of records by species, country and year:

Country	year	870802040000 *Mustelus*	870802040800 *M. asterias*	870802040900 *M. mustelus*	comments
DEN	1992	.	8	.	
DEN	1998	.	.	6	
DEN	1999	.	24	.	
DEN	2000	.	.	38	
DEN	2001	.	.	84	
DEN	2002	.	2	24	
DEN	2003	.	18	6	
DEN	2004	.	10	4	
DEN	2005	.	10	2	
ENG	1984	.	.	4	
ENG	1991	.	9	.	
ENG	1992	.	16	2	
ENG	1993	.	14	8	
ENG	1994	.	25	2	
ENG	1995	.	2	.	
ENG	1996	.	30	2	
ENG	1997	.	24	6	
ENG	1998	.	2	6	
ENG	1999	.	2	.	
ENG	2000	.	2	14	
ENG	2001	.	2	.	
ENG	2002	.	56	.	
ENG	2003	.	14	2	
ENG	2005	.	26	.	
FRA	1990	.	.	8	
FRA	1991	.	.	4	
FRA	1992	.	.	16	
FRA	1993	30	.	30	
FRA	1994	214	82	108	
FRA	1995	.	14	117	
FRA	1996	.	30	68	
FRA	1997	.	.	2	
FRA	1998	.	32	.	
FRA	1999	.	297	.	
FRA	2000	.	6	10	
FRA	2001	.	22	.	
FRA	2002	.	48	6	
FRA	2003	.	124	4	
FRA	2004	.	50	.	
FRA	2005	.	26	.	
GFR	1990	.	.	2	
GFR	1991	.	4	.	
GFR	1992	.	.	4	
GFR	1994	.	4	.	
GFR	1996	.	.	6	
GFR	1997	.	2	.	
GFR	1998	.	4	.	
GFR	1999	.	.	10	
GFR	2000	.	4	.	
GFR	2001	.	26	.	
GFR	2002	.	26	4	
GFR	2003	.	20	.	
GFR	2004	.	52	6	
GFR	2005	.	42	8	
NED	1978	.	.	2	
NED	1992	.	14	6	
NED	1993	.	6	10	
NED	1994	4	.	.	
NED	1995	.	.	2	
NED	1997	.	6	.	
NED	1998	.	6	.	
NED	1999	.	6	.	
NED	2002	.	4	.	
NED	2003	.	1	.	
NED	2004	.	1	.	
NED	2005	.	4	.	
NOR	1996	.	24	.	
NOR	1997	.	4	12	
NOR	2001	.	2	.	
NOR	2004	.	3	.	
SCO	1971	.	1	.	
SCO	1976	.	.	1	
SCO	1988	.	.	12	
SCO	1991	.	.	1	
SCO	1992	.	2	.	
SCO	1993	.	4	1	
SCO	1994	.	1	.	

SCO	1996	.	1	1
SCO	1997	.	8	7
SCO	1998	.	5	7
SCO	1999	.	6	4
SCO	2000	.	16	.
SCO	2001	.	6	8
SCO	2002	.	50	.
SCO	2003	.	34	.
SCO	2004	.	2	.
SCO	2005	.	8	4
SWE	1996	.	2	.
SWE	2000	.	2	.

The number of the two species reported by individual countries are highly variable. Overall, *M. mustelus* has dominated in the earlier years, while *M. asterias* took over in the later ones, but there is very little consistency in the reports of the two species among countries within years or in successive years within individual countries. Accordingly, we feel that over time the identifications, and therefore the trends in abundance, cannot be trusted.

5.7 Proposed corrections

In view of the inconsistency of the identification among countries and years (and the uncertainty about the status of the two species in general; Daan *et al.*, 2005), we propose to change all records to *Mustelus* sp. (tsn=160226).

5.8 Recommendation:

DATRAS should replace all tsn-codes 160240 and 160242 to 160226
Denmark should check the records of small smoothhounds made in 2001 and 2002.

6 *Gaidropsarus/Ciliata* – Rocklings

6.1 Coding

The ICES data-base describes many species that belong to the genus *Gaidropsarus*, of which four have been reported in the North Sea IBTS section of DATRAS, namely *G. vulgaris* (threebearded rockling), *G mediterraneus* (shore rockling), *G. macrophthalmus* (bigeye rockling) and *G. argentatus* (Arctic rockling). These species are easily confused for one of the two *Ciliata* species *C. mustella* (fivebearded rockling) or *C. septemtrionalis* (northern rockling).

Latin name	tsn-code	NODC	Synonym
Gaidropsarus	**164764**	**879103200000**	
Gaidropsarus vulgaris	**164765**	**879103200100**	
Gaidropsarus macrophthalmus	**550592**	**879103260100**	*Antonogadus macrophthalmus*
Gaidropsarus mediterraneus	**164766**	**879103200200**	
Gaidropsarus argentatus	**164768**	**879103200200**	*Onogadus argentatus*
Ciliata mustella	**164779**	**879103240100**	
Ciliata septemtrionalis	**164780**	**879103240200**	


Gaidropsarus vulgaris


Ciliata mustella

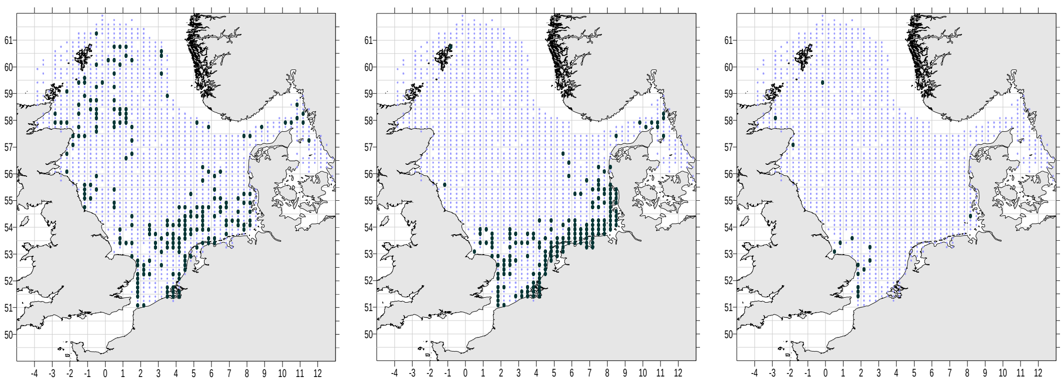

Ciliata septemtrionalis

6.2 Length-frequency distribution:

Size Class	879103200000 *Gaidropsarus*	879103200100 *G. vulgaris*	879103200200 *G. mediterraneus*	879103200400 *G. argentatus*	879103240100 *Ciliata mustella*	879103240200 *C. septemtrionalis*
2	.	2	.	.	.	.
3	.	4	.	.	.	.
4	.	2	.	.	2	.
5	.	.	.	.	5	1
6	1	4	.	.	9	5
7	.	16	.	.	34	12
8	.	39	.	.	82	20
9	.	43	.	.	108	31
10	1	28	.	.	78	10
11	.	8	.	.	59	8
12	.	18	.	.	82	2
13	1	19	.	.	118	4
14	1	47	.	.	142	1
15	6	46	.	.	92	2
16	7	103	.	.	146	.
17	6	116	2	.	127	.
18	15	139	.	.	85	.
19	4	167	.	.	78	.
20	13	140	2	.	76	.
21	12	113	.	.	121	.
22	8	75	6	.	42	.
23	.	71	2	.	27	.
24	3	40	.	6	11	.
25	1	31	2	.	10	.
26	1	33	.	.	.	.
27	1	13	2	.	2	.
28	.	16	2	.	.	.
29	.	.	2	.	.	.
30	.	4	.	.	.	.
33	.	1	.	.	.	.
34	.	2	.	.	.	.
35	.	1	.	.	.	.
36	.	6	.	.	.	.
38	.	2	.	.	.	.
39	.	4	.	.	.	.
41	.	2	.	.	.	.
44	.	2	.	.	.	.
46	.	3	.	.	.	.
47	.	1	.	.	.	.
53	.	.	.	.	2	.

The threebearded rockling *(Gaidropsarus vulgaris)* is known to grow up to 55 cm, the shore rockling *(G. mediterraneus)* to 25 cm. the bigeye rockling *(G. macrophthalmus)* to 10 cm and the Arctic rockling *(G. argentatus)* to 30 cm, while the five-bearded rockling *(Ciliata mustella)* may reach 30 cm, and the northern rockling *(Ciliata septemtrionalis)* has a maximum length of 18 cm. Judging the length-frequency distributions of these species, most recordings of the six species are within their size range. However, three specimens of the 20 *G. mediterraneus* reported were larger than the reported maximum size of the species and should be considered as misidentifications.

6.3 Presence-absence by species

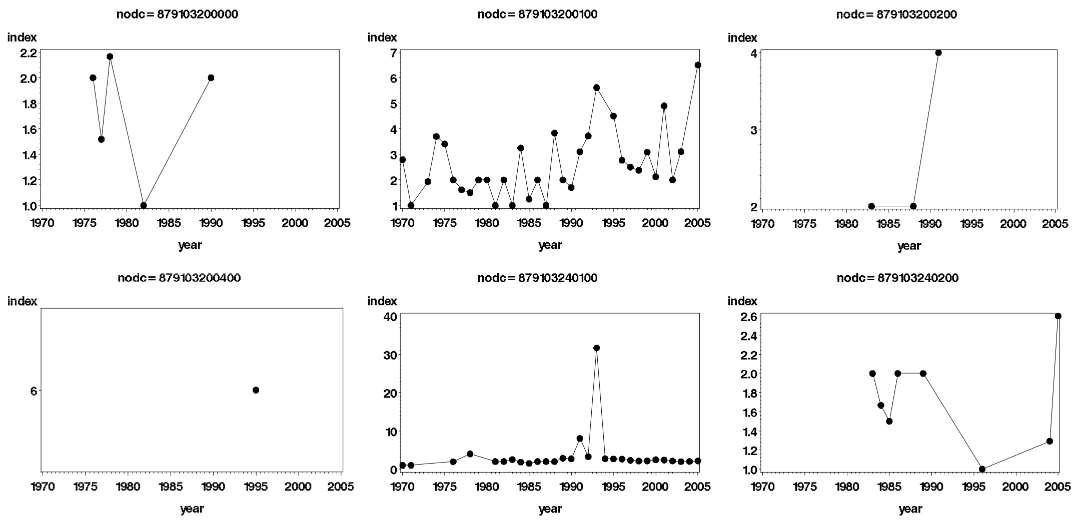


Gaidropsarus vulgaris ***Ciliata mustella*** ***Ciliata septemtrionalis***

Three-bearded rockling *(G. vulgaris)* is mainly distributed in the southern and northwestern North Sea, and hardly occurs in the central North Sea, nor in the Skagerrak/Kattegat. The five-bearded rockling *(C. mustela)* is restricted to the southern North Sea. The northern rockling

(C. septemtrionalis) is just occasionally caught in front of the British coast and near the Orkney Islands.

6.4 Trends in abundance



Annual catches of *G. vulgaris* (879103200100) are small, but gradually increasing. However and strangely enough, in 2004, no single specimen was caught. The catches of the five-bearded rockling (*C. mustela;* 879103240100) display no long term trend in the North Sea, but are consistently low, except for the two years 1991 and 1993. Catches of the northern rockling (*C. septemtrionalis*; 879103240200), *G. mediterraneus* (879103200200) and *G. argentatus* (879103200400) are very rare.

6.5 Consistency in reporting among countries

(NB. the catches refer to numbers-per-hour-fishing; because most hauls have a duration of 30 minutes, the numbers are often multiples of 2!):

***Gaidropsarus* - 879103200000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	comments
6	.	1	.	.	.	.	.	.	
10	.	1	.	.	.	.	.	.	
13	.	1	.	.	.	.	.	.	
14	.	1	.	.	.	.	.	.	
15	.	3	.	.	.	3	.	.	
16	.	4	.	.	.	2	1	.	
17	.	4	.	2	.	.	.	.	
18	.	7	.	4	.	4	.	.	
19	.	4	.	.	.	.	.	.	
20	.	5	.	.	.	8	.	.	
21	.	6	.	.	.	6	.	.	
22	.	2	.	2	.	4	.	.	
24	.	1	.	.	.	2	.	.	
25	.	1	.	.	.	.	.	.	
26	.	1	.	.	.	.	.	.	
27	.	1	.	.	.	.	.	.	

***G. vulgaris* - 879103200100**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
2	2	.	.	.	.	.	.	.
3	4	.	.	.	.	.	.	.
4	2	.	.	.	.	.	.	.
6	.	4	.	.	.	.	.	.
7	.	10	2	.	4	.	.	.
8	.	22	15	.	2	.	.	.
9	.	24	13	.	6	.	.	.
10	.	8	12	.	4	.	2	2
11	.	2	2	.	2	.	.	2
12	.	6	2	.	2	8	.	.
13	.	2	2	2	9	2	2	.
14	.	8	2	2	2	25	8	.
15	4	20	6	2	6	6	2	.
16	.	54	17	2	6	18	6	.
17	.	50	13	4	9	38	2	.
18	.	72	10	12	2	40	3	.

19	.	68	7	10	34	40	8	.
20	.	80	4	4	10	36	6	.
21	5	42	2	2	2	43	17	.
22	.	26	.	4	.	37	8	.
23	.	12	4	2	5	43	5	.
24	.	4	4	.	2	20	10	.
25	.	4	.	.	6	10	11	.
26	5	2	.	.	2	14	10	.
27	5	.	.	2	.	.	6	.
28	.	2	.	.	2	12	.	.
30	.	.	.	.	.	.	4	.
33	.	.	.	.	.	.	1	.
34	.	.	.	.	.	2	.	.
35	.	.	.	.	.	.	1	.
36	.	.	.	2	2	.	2	.
38	.	.	.	.	2	.	.	.
39	.	.	.	.	.	.	4	.
41	.	.	.	2	.	.	.	.
44	.	.	.	.	.	.	2	.
46	.	.	.	.	.	.	3	.
47	.	.	.	.	.	.	1	.

***G. mediterraneus* - 879103200200**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
17	.	.	.	2	.	.	.	.
20	.	.	.	2	.	.	.	.
22	.	.	.	6	.	.	.	.
23	.	.	.	2	.	.	.	.
25	.	.	.	2	.	.	.	.
27	.	.	.	2	.	.	.	.
28	.	.	.	2	.	.	.	.
29	.	.	.	2	.	.	.	.

***G. argentatus* - 879103200400**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
24	.	.	.	.	.	6	.	.
3	4	.	.	.	.	.	.	.

***Ciliata mustela* - 879103240100**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
4	.	.	2	.	.	.	.	.
5	.	2	2	.	.	.	1	.
6	.	4	2	.	3	.	.	.
7	4	2	24	.	4	.	.	.
8	6	4	32	.	38	.	.	2
9	.	18	46	6	33	.	1	4
10	4	10	24	2	32	.	.	6
11	2	4	8	2	39	.	.	4
12	16	12	29	6	19	.	.	.
13	.	16	27	22	33	.	.	20
14	.	23	32	14	70	.	1	2
15	2	20	30	6	32	.	.	2
16	.	28	29	8	81	.	.	.
17	8	16	37	2	62	.	.	2
18	3	5	32	8	37	.	.	.
19	4	11	34	4	25	.	.	.
20	.	8	17	2	47	.	.	2
21	.	4	14	.	103	.	.	.
22	.	10	16	2	14	.	.	.
23	.	6	14	.	7	.	.	.
24	.	2	4	2	3	.	.	.
25	.	2	2	2	4	.	.	.
27	.	.	.	.	2	.	.	.
53	.	.	.	.	2	.	.	.

***C.septemtrionalis* - 879103240200**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
5	.	.	.	.	.	.	1	.
6	.	4	.	.	1	.	.	.
7	.	2	2	.	8	.	.	.
8	.	2	10	.	7	.	1	.
9	.	4	20	.	7	.	.	.
10	.	4	4	.	2	.	.	.
11	.	.	.	.	8	.	.	.
12	.	.	.	.	1	.	1	.
13	.	.	.	.	4	.	.	.
14	.	.	.	.	1	.	.	.
15	.	2	.	.	.	.	.	.

6.6 Consistency in reporting within countries among years

The next table identifies the number of records by species, country and year:

Cntry	year	879103200000 *Gaidropsarus*	879103200100 *G. vulgaris*	879103200200 *G. mediterraneus*	879103200400 *G. argentatus*	879103240100 *Ciliata mustella*	879103240200 *C. septemtrionalis*	comments

DEN	1987	.	.	.	.	2	.
DEN	1987	.	.	.	.	2	.
DEN	1988	.	23	.	.	.	.
DEN	1991	.	.	.	.	13	.
DEN	1992	.	4	.	.	.	.
DEN	1994	.	.	.	.	5	.
DEN	1996	.	.	.	.	8	.
DEN	1999	.	.	.	.	5	.
DEN	2000	.	.	.	.	8	.
DEN	2003	.	.	.	.	6	.
DEN	2005	.	.	.	.	2	.
ENG	1977	43	.	.	.	.	.
ENG	1982	.	4	.	.	2	.
ENG	1983	.	.	.	.	18	.
ENG	1984	.	4	.	.	.	10
ENG	1985	.	.	.	.	12	2
ENG	1986	.	10	.	.	2	2
ENG	1987	.	.	.	.	8	.
ENG	1988	.	.	.	.	6	.
ENG	1989	.	.	.	.	30	4
ENG	1990	.	.	.	.	64	.
ENG	1991	.	.	.	.	3	.
ENG	1994	.	.	.	.	2	.
ENG	1996	.	.	.	.	2	.
ENG	2001	.	.	.	.	8	.
ENG	2002	.	2	.	.	10	.
ENG	2003	.	352	.	.	40	.
ENG	2005	.	150	.	.	.	.
FRA	1991	.	2	.	.	.	.
FRA	1992	.	24	.	.	.	.
FRA	1996	.	25	.	.	.	.
FRA	1997	.	20	.	.	30	.
FRA	1998	.	20	.	.	.	.
FRA	1999	.	.	.	.	36	.
FRA	2001	.	.	.	.	63	.
FRA	2002	.	2	.	.	20	.
FRA	2003	.	18	.	.	186	.
FRA	2004	.	.	.	.	48	.
FRA	2005	.	6	.	.	74	36
GFR	1983	.	.	8	.	.	.
GFR	1988	.	.	8	.	.	.
GFR	1990	8	28	.	.	.	.
GFR	1991	.	.	4	.	.	.
GFR	1992	.	.	.	.	46	.
GFR	1995	.	18	.	.	.	.
GFR	1997	.	.	.	.	10	.
GFR	1998	.	.	.	.	14	.
GFR	2000	.	4	.	.	16	.
GFR	2003	.	2	.	.	2	.
NED	1970	.	9	.	.	2	.
NED	1971	.	1	.	.	1	.
NED	1973	.	4	.	.	.	.
NED	1974	.	22	.	.	.	.
NED	1975	.	29	.	.	.	.
NED	1976	.	2	.	.	56	.
NED	1978	.	.	.	.	4	.
NED	1979	.	2	.	.	.	.
NED	1980	.	6	.	.	.	.
NED	1981	.	.	.	.	12	.
NED	1983	.	.	.	.	.	4
NED	1984	.	4	.	.	10	.
NED	1986	.	2	.	.	8	.
NED	1989	.	2	.	.	14	.
NED	1990	.	.	.	.	12	.
NED	1991	.	24	.	.	232	.
NED	1992	.	.	.	.	78	.
NED	1993	.	.	.	.	100	.
NED	1994	.	.	.	.	14	.
NED	1995	.	2	.	.	12	.
NED	1996	.	.	.	.	8	.
NED	1997	.	4	.	.	18	.
NED	1998	.	.	.	.	16	.
NED	1999	.	.	.	.	10	.
NED	2000	.	6	.	.	26	.
NED	2001	.	.	.	.	6	.
NED	2002	.	2	.	.	18	.
NED	2003	.	.	.	.	19	.
NED	2004	.	.	.	.	7	28
NED	2005	.	.	.	.	7	7
NOR	1976	8	.	.	.	.	.
NOR	1977	.	16	.	.	.	.

NOR	1978	21	2	.	.	.	.
NOR	1982	.	2	.	.	.	.
NOR	1984	.	26	.	.	.	.
NOR	1986	.	2	.	.	.	.
NOR	1991	.	8	.	.	.	.
NOR	1992	.	95	.	.	.	.
NOR	1993	.	40	.	.	.	.
NOR	1995	.	14	.	6	.	.
NOR	1996	.	38	.	.	.	.
NOR	1999	.	92	.	.	.	.
NOR	2001	.	55	.	.	.	.
NOR	2005	.	4	.	.	.	.
SCO	1970	.	49	.	.	.	.
SCO	1973	.	33	.	.	.	.
SCO	1975	.	1	.	.	.	.
SCO	1976	.	.	.	.	1	.
SCO	1977	.	2	.	.	.	.
SCO	1978	.	1	.	.	.	.
SCO	1981	.	5	.	.	.	.
SCO	1982	1	.	.	.	.	.
SCO	1983	.	3	.	.	.	.
SCO	1984	.	2	.	.	1	1
SCO	1985	.	5	.	.	1	1
SCO	1987	.	1	.	.	.	.
SCO	1990	.	2	.	.	.	.
SCO	1996	.	.	.	.	.	1
SCO	1999	.	6	.	.	.	.
SCO	2000	.	12	.	.	.	.
SCO	2002	.	2	.	.	.	.
SWE	1993	.	4	.	.	.	.
SWE	1997	.	.	.	.	2	.
SWE	1999	.	.	.	.	6	.
SWE	2000	.	.	.	.	32	.
SWE	2005	.	.	.	.	4	.

The annual reports by country indicate large discrepancies in catch rates of the various species, jumping from large numbers for one species in one year and none for the others to the reverse situation next year. We suggest that this is a crew effect. In the case of Holland, we have only quite recently learned to properly distinguish *C. septemtrionalis* from *G. vulgaris* and many of the older identifications of the latter may in fact refer to *C. septemtrionalis*. Given the apparent problems in this group, we also somewhat mistrust the single records of *G. macrophthalmus* and *G. argentatus*.

6.7 Proposed corrections

The data suggest that not only have species been misidentified within the two genus, but also among genus. Therefore, it is not easy to come up with a proper correction procedure, but because *C. mustela* appears to be far the most abundant species in these surveys, we suggest to replace all species by *Ciliata* sp. In the DATRAS data base, unless countries can ensure that recent identifications have been correct.

6.8 Recommendation:

This group clearly needs careful consideration and the IBTS working group should take steps to ensure that future records are trustworthy, for instance by freezing all rocklings caught or exchange photographs of each catch.

Meanwhile members of the group should be asked to carefully consider their recent records and indicate where they are trustworthy and change the record otherwise to 164778 (*Ciliata* sp.).

7 *Syngnathus* - Pipefish

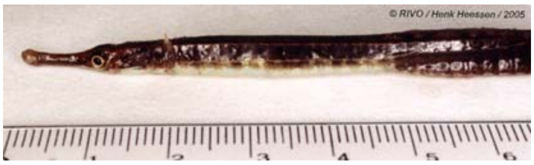
7.1 Coding

DATRAS records 3 species (Greater pipefish - *Syngnathus acus*; Nilsson's pipefish - *S. rostellatus*; Deep-snouted pipefish - *S. typhle*) as well as the genus unspecified (*Syngnathus*). The following codes have been used:

Latin name	tsn-code	NODC	Synonym

Syngnathus	**166444**	**882002010000**
Syngnathus rostellatus	**166463**	**882002011900**
Syngnathus acus	**166464**	**882002012000**
Syngnathus typhle	**166467**	**882002012300**

The deep-snouted pipefish is easy to distinguish from the other two species and misidentification will be excluded. The species will therefore not be taken into account in the exercise.



Syngnathus rostellatus

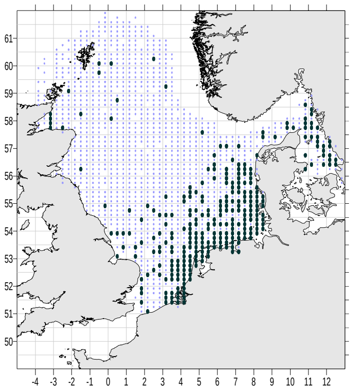
Syngnathus acus

7.2 Length-frequency distribution:

Size Class	882002010000 *Syngnathus*	882002011900 *S. rostellatus*	882002012000 *S. acus*	comments
5	.	6	.	
6	.	19	.	
7	.	46	3	
8	.	133	31	
9	.	244	147	
10	.	379	509	
11	.	246	61	
12	2	202	20	
13	4	161	17	
14	.	41	20	
15	.	32	30	
16	.	4	6	
17	.	2	36	
18	.	.	4	
19	.	.	30	
20	.	.	10	
21	.	.	8	
22	.	.	2	
23	.	.	8	
24	2	.	13	
25	.	.	11	
26	.	2	16	
27	.	.	9	
28	.	.	4	
29	.	.	4	
30	.	.	9	
31	.	.	12	
32	.	.	14	
33	.	.	6	
34	.	.	4	
35	.	.	7	
36	.	.	7	
37	.	.	12	
38	.	.	4	
39	.	.	6	
40	.	.	14	
41	.	.	4	
43	.	.	6	
44	.	.	4	
47	.	.	2	

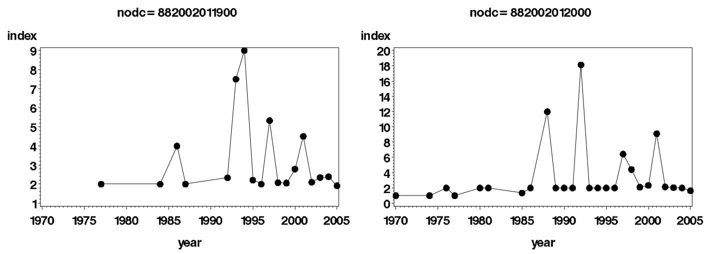
The greater pipefish *(S. acus)* is known to grow up to 46 cm, while *S. rostellatus* can reach sizes up to 17 cm. Therefore the 2 records of 24 cm for *Syngnathus* spec. and the 2 records of 26 cm for *S. rostellatus* should be changed into *S. acus*. Next to this, we severely suspect that misidentifications have been and still are being made in the range of small sized Syngnathus: *S. acus* is mistaken for by *S. rostellatus*. We cannot detect and correct these misidentifications, but we strongly recommend that in the future observers will count the rings of these species using a stereo-microscope for clear determination; *S. rostellatus* has 13-17 rings before the anal opening, *S. acus* 17-21.

7.3 Presence-absence by species



Syngnathus sp.

7.4 Trends in abundance



Annual catch rates of both species fluctuate widely from year to year, but oddly, at some points the peaks seem to switch by subsequent years. Catches of *S. rostellatus* are high in 1986, 1993 and 1994, while *S. acus* shows high peaks in 1987 and 1992. Both species have a moderate peak in 1997 and 2001. These findings may indicate inaccurate determinations and probably small *S. acus* has been mistaken for by *S. rostellatus*.

7.5 Consistency in reporting among countries

(NB. the catches refer to numbers-per-hour-fishing; because most hauls have a duration of 30 minutes, the numbers are often multiples of 2!):

***Syngnathus* - 882002010000**

LngtClass	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	comments
12	.	.	2	.	.	.	.	.	
13	.	.	4	.	.	.	.	.	
24	.	.	2	.	.	.	.	.	probably *S. acus*

***S. rostellatus* - 882002011900**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	
5	.	6	.	.	.	.	.	.	
6	.	4	.	4	11	.	.	.	
7	.	32	.	5	9	.	.	.	
8	.	80	.	23	30	.	.	.	
9	.	144	.	36	62	.	.	2	
10	.	86	.	51	194	.	.	48	
11	.	52	4	48	132	.	.	10	
12	.	56	.	65	65	.	.	16	
13	.	22	.	34	79	.	.	26	
14	.	4	.	18	9	.	.	10	
15	.	4	.	8	18	.	.	2	
16	.	2	.	.	2	.	.	.	
17	.	.	.	.	2	.	.	.	
26	.	.	.	2	.	.	.	.	probably *S. acus*

***S. acus* - 882002012000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
7	.	.	.	.	3	.	.	.
8	.	.	11	.	20	.	.	.
9	.	.	.	2	145	.	.	.
10	.	2	.	2	505	.	.	.
11	.	.	.	2	58	.	1	.
12	.	.	2	4	14	.	.	.
13	.	8	.	.	9	.	.	.
14	.	2	3	.	12	.	.	3
15	.	2	.	2	4	.	.	22
16	.	.	2	.	2	.	.	2

17	.	.	.	.	34	.	.	2
18	.	.	.	.	2	.	.	2
19	.	.	.	2	22	.	.	6
20	.	.	.	4	.	.	.	6
21	.	.	.	2	.	.	.	6
22	.	.	.	2	.	.	.	.
23	.	.	.	.	.	.	.	8
24	.	.	.	6	.	.	1	6
25	.	.	.	2	.	.	3	6
26	.	.	.	4	12	.	.	.
27	.	2	.	6	1	.	.	.
28	.	.	.	2	.	.	.	2
29	.	.	.	.	.	.	.	4
30	.	.	.	4	1	.	2	2
31	.	.	.	4	.	.	.	8
32	.	.	.	6	.	.	.	8
33	.	.	.	4	.	.	.	2
34	.	.	.	.	.	.	.	4
35	.	2	.	.	3	.	.	2
36	.	.	.	4	.	.	.	3
37	.	.	.	4	2	.	.	6
38	.	.	.	.	2	.	.	2
39	.	.	2	.	.	.	.	4
40	.	.	.	2	.	.	.	12
41	.	2	.	.	2	.	.	.
43	.	.	.	.	.	.	.	6
44	.	.	.	2	.	.	.	2
47	.	.	.	.	.	.	.	2

These tables show some major discrepancies in reporting of species between countries. Looking at the smaller sizes (up to 17 cm), England and Germany are consistently reporting much more *S. rostellatus* than *S. acus*, while France is almost only reporting S. acus. Sweden draws a border at ca 15 cm: everything smaller is considered *S. rostellatus*, everything larger *S. acus*. The Netherlands report large amounts of both species. Of course countries operate to some extent in different areas and therefore some differences might be expected for species with restricted distribution areas. However, all stations are fished by at least two countries and it would seem highly unlikely that such large differences could emerge from proper species identifications, especially since the mentioned countries have overlap in their fished areas.

7.6 Consistency in reporting within countries among years

The next table identifies the number of records by species, country and year:

Country	**year**	**882002010000** *Syngnathus*	**882002011900** *S. rostellatus*	**882002012000** *S. acus*	**comments**
ENG	1984	.	4	.	
ENG	1987	.	18	.	
ENG	1990	.	.	8	
ENG	1995	.	.	2	
ENG	1998	.	2	.	
ENG	2001	.	450	.	
ENG	2002	.	.	2	
ENG	2003	.	16	8	
ENG	2005	.	2	.	
FRA	1997	2	.	.	
FRA	2000	.	.	2	
FRA	2001	.	4	16	
FRA	2005	6	.	2	
GFR	1986	.	4	.	
GFR	1987	.	2	.	
GFR	1989	.	.	2	
GFR	1990	.	.	4	
GFR	1992	.	16	2	
GFR	1993	.	2	2	
GFR	1994	.	2	4	
GFR	1995	.	28	.	
GFR	1996	.	2	4	
GFR	1997	.	4	8	
GFR	1998	.	50	4	
GFR	1999	.	4	14	
GFR	2000	.	54	2	
GFR	2001	.	33	4	
GFR	2002	.	9	2	
GFR	2004	.	74	20	
GFR	2005	.	10	.	
NED	1970	.	.	2	
NED	1976	.	.	2	
NED	1977	.	2	.	

NED	1980	.	.	2
NED	1981	.	.	2
NED	1988	.	.	12
NED	1990	.	.	4
NED	1991	.	.	4
NED	1992	.	.	488
NED	1993	.	36	2
NED	1994	.	48	2
NED	1995	.	6	.
NED	1997	.	4	204
NED	1998	.	2	112
NED	1999	.	14	.
NED	2000	.	2	.
NED	2001	.	2	.
NED	2002	.	4	2
NED	2003	.	122	.
NED	2004	.	348	.
NED	2005	.	23	15
SCO	1974	.	.	1
SCO	1985	.	.	4
SCO	1986	.	.	2
SWE	1977	.	.	1
SWE	1991	.	.	2
SWE	1992	.	.	6
SWE	1993	.	.	6
SWE	1996	.	10	4
SWE	1997	.	58	4
SWE	1998	.	2	18
SWE	1999	.	2	6
SWE	2000	.	6	18
SWE	2001	.	.	20
SWE	2002	.	.	10
SWE	2003	.	20	17
SWE	2004	.	8	10
SWE	2005	.	8	16

Except for 2003, England has determined all *Syngnathus* species to be either *S. rostellatus* or *S. acus* in alternating years, which we consider to be at least suspicious. Even more fishy is the inconsistency in determination of pipefish by the Netherlands throughout the years: before 1993 almost all were identified as *S. acus*, and since then high amounts of either one of the species were found in the years 1997-1998 and 2003-2004.
These findings plead (again) for a more precise determination of *Syngnathus* species in the future.

7.7 Proposed corrections

Country	year	Q	ship	haulno	lngtclass	hlnoatlngt	*change* speccode	*into* speccode
FRA	2005	1	THA	23	24	2	166444	166464
GFR	1993	1	WAH	59	26	2	166463	166464

7.8 Recommendation:

In the view of the observed inconsistency in records of pipefish, in particular the smaller sizes, participants in the IBTS should in the future count the rings of both *S. rostellatus* and *S. acus* using a stereo-microscope for clear determination; *S. rostellatus* has 13-17 rings before the anal opening, *S. acus* 17-21. All records for specimens <17 cm in the DATRAS data base should be changed to TSN code 166444 (*Sygnathus* sp.)

8 *Triglidae* – Gurnards

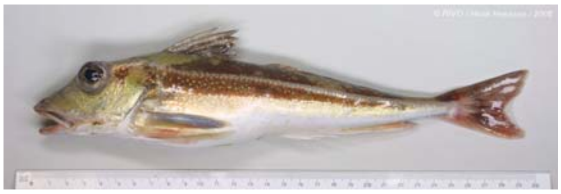
8.1 Coding

DATRAS records in the section North Sea IBTS four species that belong to four different genera within the family of gurnards *(Triglidae)*, namely *Trigla lucerna* (tub gurnard), *Eutrigla gurnardus* (grey gurnard), *Trigloporus lastoviza* (streaked gurnard) and *Aspitrigla cuculus* (red gurnard). Unspecified genera have not been recorded.

Latin name	tsn-code	NODC	Synonym
Triglidae	**166972**	**882602000000**	
Trigla lucerna	**167039**	**882602050100**	

Eutrigla gurnardus	167044	882602060100
Trigloporus lastoviza	167046	882602070100
Aspitrigla cuculus	167049	882602080100

Trigla lucerna



Eutrigla gurnardus

Trigloporus lastoviza

Aspitrigla cuculus

A tricky thing with the determination of species within the family of *Triglidae* lies in the color and subsequent name giving. *Aspitrigla cuculus* is very reddish, which is probably why the color red is used in the common name in the English, French and Swedish languages. However, in Danish, Dutch, German and Norwegian labeled *Trigla lucerna* as the 'red' species of the family. Therefore, people should be very careful when using common names while determinating the species.

Language	***T. lucerna***	***E. gurnardus***	***T. lastoviza***	***A. cuculus***
Danish	Rød knurhane	Grå knurhane	Båndet knurhane	Tværstribet knurhane
Dutch	Rode Poon	Grauwe poon	Gestreepte poon	Engelse poon
English	Tub gurnard	Grey gurnard	Streaked gurnard	Red gurnard
French	Grondin perlon	Grondin gris	Grondin camard	Grondin rouge
German	Roter Knurrhahn	Grauer Knurrhahn	Gestreifter Knurrhahn	Kuckucksknurrhahn
Norwegian	Rødknurre	Vanlig knurr	Taggknurr	Tverrstripet knurr
Swedish	Fenknot	Knot/Knorrhahne	Tvärbandad knot	Rödknot

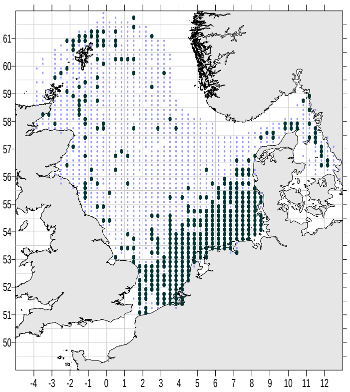
8.2 Length-frequency distribution:

Size class	882602000000 comments *Triglidae*	882602050100 *Trigla lucerna*	882602060100 *Eutrigla gurnardus*	882602070100 *Trigloporus lastoviza*	882602080100 *Aspitrigla cuculus*
2	.	.	2	.	.
3	.	.	13	.	.
4	.	2	44	.	.
5	.	2	148	.	.
6	.	11	514	.	.
7	1	15	1448	4	14
8	6	8	3058	.	20
9	3	58	5056	.	10
10	2	68	7159	.	16
11	4	250	9004	.	8
12	17	67	13240	.	38
13	31	211	17787	.	76
14	66	100	27669	.	150
15	76	404	52395	.	296
16	134	471	98273	.	381
17	326	146	145730	.	413
18	500	243	182834	8	369
19	619	228	209435	.	318
20	661	206	226241	.	338
21	645	229	216256	.	338
22	567	202	206572	.	421
23	455	363	175376	.	449
24	383	237	153313	.	487

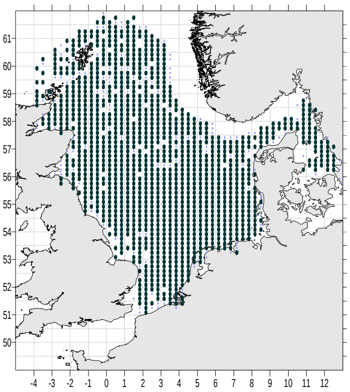
25	298	237	125495	.	399
26	173	241	103417	.	320
27	126	236	90690	.	244
28	137	269	78008	.	235
29	60	208	62712	.	188
30	33	154	50076	.	127
31	48	172	43851	.	111
32	31	121	33026	.	104
33	20	92	24904	.	79
34	13	101	18768	.	42
35	2	73	11662	.	25
36	13	109	9154	.	13
37	15	65	6334	.	8
38	1	49	4239	.	13
39	2	39	2561	.	.
40	.	39	1223	.	1
41	1	42	687	.	.
42	1	24	377	.	.
43	1	16	243	.	1
44	1	16	81	.	.
45	.	24	39	.	.
46	.	14	23	.	.
47	.	19	16	.	.
48	.	4	6	.	.
49	.	13	6	.	.
50	.	8	.	.	.
51	.	6	.	.	.
52	.	2	.	.	.
53	.	4	.	.	.
54	.	2	.	.	.

According to Whitehead *et al.* (1986) *Trigla lucerna* may grow up to 75 cm, *Eutrigla gurnardus* up to 50 cm, *Trigloporus lastoviza* up to 40 cm, and *Aspitrigla cuculus* up to 50 cm. Judging the length-frequency distribution, all records are within the size ranges of the species.

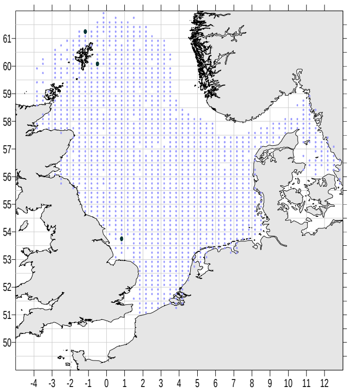
8.3 Presence-absence by species



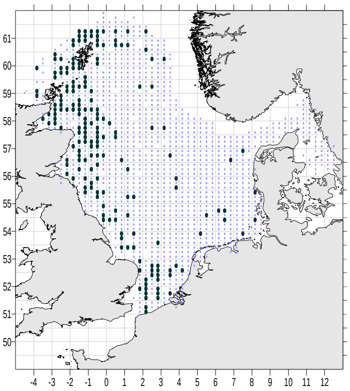
Trigla lucerna



Eutrigla gurnardus



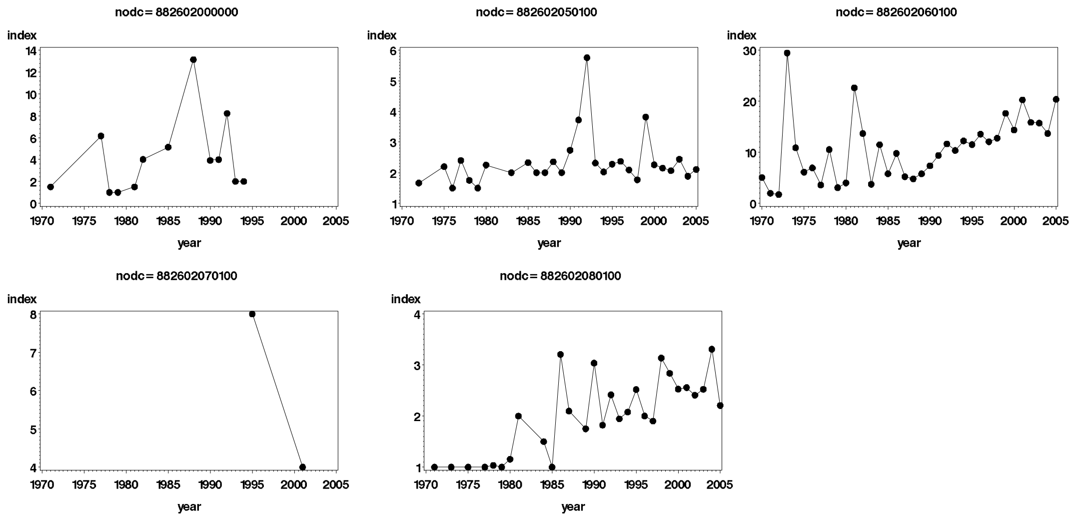
Trigloporus lastoviza



Aspitrigla cuculus

Most common gurnard in the North Sea is *E. gurnardus* and it is spread throughout the entire area. *T. lucerna* is common in the southeastern parts of the North Sea, while *A. cuculus* is mainly distributed along the British coast. *T. lastoviza* is very rare. *T. lucerna* and *A. cuculus* might have been mixed up, judging from the outliers from their respective main distribution areas.

8.4 Trends in abundance



The annual catch rates of grey gurnard (*E. gurnardus*; 882602060100) and red gurnard (*A. cuculus*; 882602080100) both show a clear increase since the 1980s. Tub gurnard (*T. lucerna*; 882602050100) has no long term trend.

8.5 Consistency in reporting among countries

(NB. the catches refer to numbers-per-hour-fishing; because most hauls have a duration of 30 minutes, the numbers are often multiples of 2):

***Triglidae* 882602000000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	comments
7	.	.	.	.	.	.	1	.	
8	.	.	2	.	.	.	4	.	
9	.	.	.	.	.	.	3	.	
10	.	.	.	.	.	.	2	.	
11	.	.	.	.	.	.	4	.	
12	.	.	8	.	.	.	9	.	
13	.	.	9	.	.	.	22	.	
14	.	.	23	.	.	.	43	.	
15	.	.	23	.	.	.	53	.	
16	.	.	48	.	.	.	86	.	
17	.	.	108	.	.	.	218	.	
18	.	.	158	.	.	.	342	.	
19	.	.	238	.	.	.	381	.	
20	.	.	265	.	.	.	396	.	
21	.	.	349	.	.	.	296	.	
22	.	.	359	.	.	.	208	.	
23	.	.	316	.	.	.	139	.	
24	.	.	266	.	.	.	117	.	
25	.	.	231	.	.	.	67	.	
26	.	.	121	.	.	.	52	.	
27	.	.	78	.	.	.	48	.	
28	.	.	98	.	.	.	39	.	
29	.	.	36	.	.	.	24	.	
30	.	.	17	.	.	.	16	.	
31	.	.	31	.	.	.	17	.	
32	.	.	19	.	.	.	12	.	
33	.	.	11	.	.	.	9	.	
34	.	.	7	.	.	.	6	.	
35	.	.	.	.	.	.	2	.	
36	.	.	9	.	.	.	4	.	
37	.	.	7	.	.	.	8	.	
38	.	.	.	.	.	.	1	.	
39	.	.	.	.	.	.	2	.	
41	.	.	.	.	.	.	1	.	
42	.	.	.	.	.	.	1	.	
43	.	.	.	.	.	.	1	.	
44	.	.	.	.	.	.	1	.	

Trigla lucerna **882602050100**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
4	.	2	.	.	.	.	.	.
5	.	2	.	.	.	.	.	.
6	2	6	.	.	2	.	1	.
7	2	6	.	.	.	5	.	2
8	4	2	.	.	.	.	.	2
9	4	6	.	.	45	.	.	3
10	10	2	.	.	48	.	.	8
11	10	14	4	.	214	2	.	6
12	12	4	.	.	36	8	.	7
13	2	12	4	2	172	4	4	11
14	2	14	2	.	52	25	2	3
15	.	10	.	12	326	51	2	3
16	2	16	6	2	396	47	.	2
17	10	14	6	.	82	32	.	2
18	8	18	2	2	62	139	2	10
19	11	12	2	10	30	154	2	7
20	.	24	4	31	36	104	2	5
21	10	26	12	36	64	78	2	1
22	20	16	18	24	52	65	2	5
23	20	44	49	26	152	58	7	7
24	14	57	33	45	62	20	4	2
25	29	60	21	28	75	11	8	5
26	22	50	46	20	81	2	4	16
27	17	50	53	14	84	3	9	6
28	34	50	29	38	94	2	5	17
29	27	47	31	22	74	.	3	4
30	10	22	12	22	62	8	7	11
31	2	42	16	24	86	.	.	2
32	11	29	13	6	54	2	4	2
33	.	31	6	8	38	.	5	4
34	8	24	8	17	36	2	2	4
35	14	12	2	20	22	.	3	.
36	44	17	12	10	20	.	4	2
37	4	19	8	4	24	.	6	.
38	6	9	4	2	20	.	4	4
39	2	14	11	2	4	.	4	2
40	4	9	6	8	10	.	.	2
41	2	16	2	4	16	.	2	.
42	4	8	.	2	10	.	.	.
43	2	2	2	2	8	.	.	.
44	4	4	.	2	6	.	.	.
45	.	10	.	10	4	.	.	.
46	2	6	.	2	2	.	2	.
47	4	7	.	4	4	.	.	.
48	.	2	.	2	.	.	.	.
49	.	5	4	.	4	.	.	.
50	.	.	.	2	6	.	.	.
51	2	2	.	2	.	.	.	.
52	.	.	2	.	.	.	.	.
53	.	.	4	.	.	.	.	.
54	.	.	.	.	2	.	.	.

Eutrigla gurnardus **882602060100**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
2	.	.	.	.	.	2	.	.
3	.	.	.	4	4	4	1	.
4	14	10	.	4	.	2	12	2
5	27	12	26	28	.	11	29	15
6	131	64	44	78	10	19	97	71
7	327	99	89	190	134	98	264	247
8	586	158	270	328	442	162	392	720
9	1025	286	480	437	958	150	430	1290
10	1655	442	761	520	1158	192	605	1825
11	2358	819	955	662	803	266	876	2263
12	3500	1491	1387	1171	1219	538	1461	2472
13	3429	2904	1440	2721	1552	779	2735	2227
14	6102	4701	2004	4521	2237	1008	4838	2257
15	13131	7782	4341	10409	3860	1602	7887	3383
16	25162	12761	8785	19435	10761	3703	12189	5477
17	35875	18588	13535	29216	18287	6685	17940	5602
18	42013	25349	15621	37164	23356	8740	25591	4999
19	47024	29890	17659	40149	30419	10992	29654	3647
20	50810	31801	20348	46939	28165	14060	31544	2573
21	45453	33512	20324	46140	27097	12416	29199	2114
22	43758	29164	18329	49705	25937	12288	25649	1741
23	36140	25601	17231	41648	22101	10244	21143	1268
24	31340	22227	14679	37245	21246	8314	17424	838
25	24839	18320	11424	36101	13398	6786	14077	550
26	18410	14201	9718	30195	14687	4777	11043	385
27	17379	11707	8799	25476	12973	4385	9663	307
28	16018	9564	6350	22121	11965	3937	7821	232
29	11955	9012	4818	17978	9404	2642	6781	121
30	10165	7186	3981	14462	6501	2370	5291	119
31	9815	6395	2955	11946	6150	1935	4580	75

32	6754	5001	2143	8488	5089	1844	3652	54
33	4448	3739	2013	6937	3556	1464	2713	34
34	4185	2532	1331	4838	2632	1219	2011	19
35	1750	1792	736	3000	1897	949	1516	22
36	1790	1319	657	2547	976	764	1082	19
37	1438	868	467	1323	863	594	766	14
38	988	564	203	1137	454	407	482	4
39	766	342	95	511	314	248	285	.
40	202	165	99	309	170	122	154	2
41	80	100	81	162	64	94	105	1
42	51	64	44	75	41	51	51	.
43	31	33	14	74	46	14	31	.
44	12	23	2	18	8	8	10	.
45	2	4	2	12	4	10	5	.
46	.	5	.	4	2	11	1	.
47	.	5	.	9	.	.	2	.
48	4	.	.	2	.	.	.	.
49	.	2	2	2	.	.	.	.

***Trigloporus lastoviza* 882602070100**

Size Class	**DEN**	**ENG**	**FRA**	**GFR**	**NED**	**NOR**	**SCO**	**SWE**
7	.	.	.	4	.	.	.	.
18	.	.	8	.	.	.	.	.

***Aspitrigla cuculus* 882602080100**

Size Class	**DEN**	**ENG**	**FRA**	**GFR**	**NED**	**NOR**	**SCO**	**SWE**
7	.	.	.	4	.	.	10	.
8	.	.	.	10	.	.	10	.
9	.	.	2	2	2	.	4	.
10	.	1	2	6	.	.	7	.
11	.	.	2	.	.	.	6	.
12	.	.	6	8	.	2	22	.
13	.	1	9	42	.	.	24	.
14	.	2	11	110	.	.	27	.
15	.	23	6	188	6	.	73	.
16	.	14	12	212	12	.	131	.
17	.	16	14	208	26	2	147	.
18	.	4	28	150	16	.	171	.
19	.	6	32	98	14	.	168	.
20	.	14	19	104	11	2	188	.
21	.	12	51	106	8	.	161	.
22	.	18	25	144	10	2	222	.
23	.	8	48	130	8	4	251	.
24	.	9	83	154	27	4	210	.
25	.	8	46	104	27	8	206	.
26	.	11	23	62	18	6	200	.
27	.	5	18	46	8	6	161	.
28	.	1	22	44	4	2	162	.
29	.	9	12	20	12	8	127	.
30	.	6	18	4	10	.	89	.
31	.	.	22	10	2	.	77	.
32	.	2	26	4	4	.	68	.
33	.	.	16	10	2	.	51	.
34	.	.	22	.	.	.	20	.
35	.	.	4	4	2	.	15	.
36	.	.	6	.	.	.	7	.
37	.	.	4	.	2	.	2	.
38	.	.	6	.	.	.	7	.
40	.	.	.	.	.	.	1	.
43	.	.	.	.	.	.	1	.

France and Scotland are the only countries who have recorded gurnards unspecified by the family name *Triglidae*, but these are matters from the past since they've stopped doing so in respectively 1995 and 1983.

Remarkable is that the 'norhtern' countries Norway, Scotland and Sweden hardly report catches of large (>30 cm) *T. lucerna*, while other countries do. This may of course be a result from the area covered (tub gurnard is not a northern species), but then it is odd that Norway does have many records of smaller tub gurnards. The Netherlands have large numbers of small tub gurnard (<15 cm) compared to many of the other countries.

The red gurnard *A. cuculus* is not at all recorded by Sweden and Denmark and is apparently absent from the Skagerak/Kattegat area. However, the complete absence in Danish catches is slightly worrying, because the species is quite common along the British coast, where this country is fishing annually.

8.6 Consistency in reporting within countries among years

The next table identifies the number of records by species, country and year.

Country year comments	**882602000000**	**882602050100**	**882602060100**	**882602070100**	**882602080100**

		Triglidae	*Trigla lucerna*	*Eutrigla gurnardus*	*Trigloporus lastoviza*	*Aspitrigla cuculus*
DEN	1973	.	.	748	.	.
DEN	1974	.	.	448	.	.
DEN	1985	.	.	806	.	.
DEN	1986	.	.	496	.	.
DEN	1987	.	.	121	.	.
DEN	1988	.	26	569	.	.
DEN	1989	.	.	1714	.	.
DEN	1990	.	.	1467	.	.
DEN	1991	.	6	15562	.	.
DEN	1992	.	.	28496	.	.
DEN	1993	.	.	28949	.	.
DEN	1994	.	.	64831	.	.
DEN	1995	.	.	54242	.	.
DEN	1996	.	.	36074	.	.
DEN	1997	.	.	35670	.	.
DEN	1998	.	93	37479	.	.
DEN	1999	.	72	28938	.	.
DEN	2000	.	44	28388	.	.
DEN	2001	.	26	36208	.	.
DEN	2002	.	26	23202	.	.
DEN	2003	.	32	37876	.	.
DEN	2004	.	20	19130	.	.
DEN	2005	.	52	39540	.	.
ENG	1977	.	.	1	.	.
ENG	1982	.	.	1261	.	.
ENG	1983	.	.	2234	.	.
ENG	1984	.	.	26505	.	.
ENG	1985	.	.	3887	.	.
ENG	1986	.	.	10028	.	.
ENG	1987	.	.	4485	.	.
ENG	1988	.	4	2649	.	.
ENG	1989	.	2	2722	.	.
ENG	1990	.	.	5410	.	2
ENG	1991	.	149	26131	.	58
ENG	1992	.	104	27105	.	26
ENG	1993	.	76	17979	.	8
ENG	1994	.	42	24639	.	4
ENG	1995	.	42	25263	.	2
ENG	1996	.	30	17859	.	22
ENG	1997	.	70	10676	.	.
ENG	1998	.	14	11545	.	2
ENG	1999	.	42	14666	.	2
ENG	2000	.	12	12399	.	2
ENG	2001	.	70	27428	.	4
ENG	2002	.	64	26208	.	8
ENG	2003	.	51	20730	.	10
ENG	2005	.	82	18809	.	20
FRA	1985	128	62	2214	.	.
FRA	1986	.	.	2004	.	234
FRA	1987	.	.	6588	.	50
FRA	1988	2508	.	411	.	.
FRA	1989	.	.	1349	.	12
FRA	1990	105	4	3663	.	120
FRA	1991	12	.	7673	.	4
FRA	1992	74	44	11579	.	44
FRA	1993	8	117	10300	.	14
FRA	1994	2	89	8078	.	35
FRA	1995	.	16	21160	8	18
FRA	1996	.	51	17740	.	30
FRA	1997	.	.	3429	.	2
FRA	1998	.	6	5541	.	.
FRA	1999	.	.	6338	.	.
FRA	2000	.	.	9571	.	4
FRA	2001	.	.	20368	.	4
FRA	2002	.	.	20514	.	2
FRA	2003	.	12	21503	.	10
FRA	2004	.	15	11811	.	8
FRA	2005	.	18	22408	.	4
GFR	1977	.	2	2245	.	.
GFR	1978	.	.	731	.	.
GFR	1979	.	.	537	.	.
GFR	1981	.	.	44337	.	.
GFR	1982	.	.	72	.	.
GFR	1983	.	2	1837	.	.
GFR	1984	.	.	12	.	.
GFR	1985	.	6	2685	.	.
GFR	1986	.	6	10752	.	.
GFR	1987	.	8	3701	.	.
GFR	1988	.	2	2116	.	.
GFR	1989	.	.	5970	.	.
GFR	1990	.	18	15689	.	.
GFR	1991	.	2	21038	.	22

GFR	1992	.	41	28818	.	2
GFR	1993	.	10	9995	.	.
GFR	1994	.	22	20500	.	62
GFR	1995	.	10	22519	.	296
GFR	1996	.	38	16397	.	180
GFR	1997	.	24	15215	.	224
GFR	1998	.	20	11077	.	312
GFR	1999	.	14	80090	.	8
GFR	2000	.	60	60084	.	232
GFR	2001	.	58	47303	4	72
GFR	2002	.	20	41901	.	208
GFR	2003	.	82	26053	.	158
GFR	2004	.	4	26802	.	116
GFR	2005	.	18	37965	.	92
NED	1970	.	.	1205	.	.
NED	1971	.	.	466	.	.
NED	1972	.	.	113	.	.
NED	1973	.	.	28704	.	.
NED	1974	.	.	6877	.	.
NED	1975	.	6	4816	.	.
NED	1976	.	2	12644	.	.
NED	1977	.	.	792	.	.
NED	1978	.	4	17396	.	.
NED	1979	.	2	24	.	.
NED	1980	.	12	1946	.	.
NED	1981	.	.	4223	.	2
NED	1982	.	.	15376	.	.
NED	1983	.	6	366	.	.
NED	1984	.	.	369	.	2
NED	1985	.	.	730	.	.
NED	1986	.	.	514	.	8
NED	1987	.	.	499	.	.
NED	1988	.	.	474	.	.
NED	1989	.	.	1374	.	2
NED	1990	.	8	453	.	.
NED	1991	.	1592	22036	.	114
NED	1992	.	254	26914	.	50
NED	1993	.	400	24261	.	22
NED	1994	.	256	28404	.	6
NED	1995	.	96	11009	.	.
NED	1996	.	4	2790	.	2
NED	1997	.	32	11120	.	.
NED	1998	.	.	10022	.	.
NED	1999	.	.	10060	.	.
NED	2000	.	.	19574	.	2
NED	2001	.	.	5660	.	10
NED	2002	.	.	10844	.	.
NED	2003	.	.	8955	.	2
NED	2004	.	3	9865	.	5
NED	2005	.	.	10066	.	4
NOR	1971	.	.	317	.	.
NOR	1972	.	.	61	.	.
NOR	1975	.	15	615	.	.
NOR	1976	.	.	142	.	.
NOR	1977	.	14	466	.	.
NOR	1978	.	.	68	.	.
NOR	1979	.	.	122	.	.
NOR	1980	.	.	39	.	.
NOR	1981	.	.	18	.	.
NOR	1982	.	.	70	.	.
NOR	1983	.	.	60	.	.
NOR	1984	.	.	82	.	.
NOR	1985	.	.	345	.	.
NOR	1986	.	.	135	.	.
NOR	1987	.	.	469	.	.
NOR	1988	.	.	312	.	.
NOR	1989	.	.	275	.	.
NOR	1990	.	.	645	.	.
NOR	1991	.	489	1968	.	.
NOR	1992	.	185	8460	.	.
NOR	1993	.	10	12420	.	.
NOR	1994	.	.	9659	.	.
NOR	1995	.	.	8429	.	.
NOR	1996	.	42	13704	.	.
NOR	1997	.	6	6642	.	.
NOR	1998	.	.	1343	.	.
NOR	1999	.	.	9069	.	.
NOR	2000	.	.	8258	.	.
NOR	2001	.	.	6121	.	.
NOR	2002	.	6	7381	.	.
NOR	2003	.	51	14451	.	.
NOR	2004	.	4	11123	.	46
NOR	2005	.	.	3637	.	.

SCO	1970	.	.	2259	.	.
SCO	1971	3	.	231	.	1
SCO	1972	.	.	223	.	.
SCO	1973	.	.	700	.	1
SCO	1974	.	.	2055	.	.
SCO	1975	.	.	651	.	4
SCO	1976	.	1	1912	.	.
SCO	1977	2213	.	1	.	1
SCO	1978	3	1	6963	.	12
SCO	1979	1	1	508	.	2
SCO	1980	.	.	413	.	35
SCO	1981	3	.	1924	.	.
SCO	1982	412	.	365	.	.
SCO	1983	.	.	2802	.	.
SCO	1984	.	.	2791	.	1
SCO	1985	.	.	701	.	2
SCO	1986	.	.	1127	.	15
SCO	1987	.	.	462	.	6
SCO	1988	.	.	651	.	.
SCO	1989	.	.	5144	.	7
SCO	1990	.	.	4568	.	13
SCO	1991	.	.	12458	.	187
SCO	1992	.	.	17757	.	45
SCO	1993	.	1	14922	.	170
SCO	1994	.	3	13594	.	20
SCO	1995	.	.	7777	.	13
SCO	1996	.	1	18236	.	26
SCO	1997	.	.	14309	.	33
SCO	1998	.	2	20909	.	234
SCO	1999	.	22	35396	.	586
SCO	2000	.	14	19689	.	238
SCO	2001	.	6	13903	.	214
SCO	2002	.	10	22146	.	88
SCO	2003	.	14	17117	.	332
SCO	2004	.	10	18493	.	536
SCO	2005	.	16	18925	.	204
SWE	1972	.	72	.	.	.
SWE	1974	.	.	59	.	.
SWE	1975	.	2	76	.	.
SWE	1976	.	.	74	.	.
SWE	1977	.	.	75	.	.
SWE	1978	.	.	229	.	.
SWE	1979	.	.	662	.	.
SWE	1980	.	.	36	.	.
SWE	1981	.	.	394	.	.
SWE	1982	.	.	279	.	.
SWE	1983	.	.	198	.	.
SWE	1984	.	.	278	.	.
SWE	1985	.	.	128	.	.
SWE	1986	.	.	159	.	.
SWE	1987	.	.	324	.	.
SWE	1988	.	.	156	.	.
SWE	1989	.	.	693	.	.
SWE	1990	.	.	1566	.	.
SWE	1991	.	6	5050	.	.
SWE	1992	.	24	3706	.	.
SWE	1993	.	.	4343	.	.
SWE	1994	.	2	3730	.	.
SWE	1995	.	.	2409	.	.
SWE	1996	.	.	1175	.	.
SWE	1997	.	.	860	.	.
SWE	1998	.	.	1307	.	.
SWE	1999	.	2	3579	.	.
SWE	2000	.	2	2154	.	.
SWE	2001	.	7	1747	.	.
SWE	2002	.	.	1681	.	.
SWE	2003	.	8	1292	.	.
SWE	2004	.	12	1889	.	.
SWE	2005	.	30	6684	.	.

It seems plausible that the high Scottish records of *Triglidae* in 1977 and 1982 (and the French in 1988) were *E. gurnardus*, taking into account the numbers of *E. gurnadus* reported in the adjoining years.

8.7 Proposed corrections

We suggest that for community analyses, the catches reported as *Triglidae* are redistributed among the various species according to the species composition of catches of other countries fishing in the same year and rectangle. Species identification appears to be satisfactory.

8.8 Recommendation:

All countries should remain careful in reporting gurnards and not confuse the different species, especially when using common names. Denmark and Norway should pay specific attention to respectively *A. cuculus* and *T. lucerna*.

9 *M. scorpius/T. bubalis* – Bullrout/Sea Scorpion

9.1 Coding

Two species of *Myoxocephalus* are reported in DATRAS: *M. scorpius* (bullrout) and *M. scorpioides* (Arctic sculpin).Also two species of *Taurulus* are reported: *T. bubalis* (Sea scorpion) and *T. lilljeborgii* (Norway bullhead).

Latin name	tsn-code	NODC	Synonym
Myoxocephalus	**167311**	**883102220000**	
Myoxocephalus scorpiodides	**167317**	**883102220600**	
Myoxocephalus scorpius	**167318**	**883102220700**	
Taurulus	**167389**	**883102460000**	
Taurulus bubalis	**167390**	**883102460100**	
Taurulus lilljeborgi	**167391**	**883102460200**	

Myoxocephalus scorpius

Taurulus bubalis

According to available text books, *M. scorpioides* is not known from the North Sea and the 97, 103 and 216 specimens reported in 2002, 2004 and 2005, respectively, probably refer to *M. scorpius*.

T. bubalis and *M. scorpius* are quite similar superficially, but can be easily distinguished by the lappets at the corners of the mouth and the fused connection of the skin between the two gill covers with the belly in *T. bubalis*

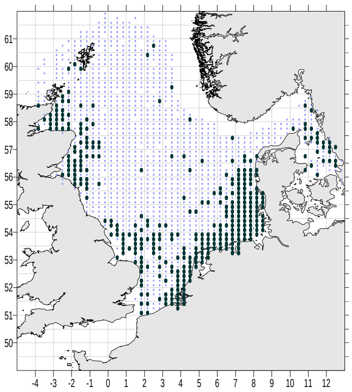
9.2 Length-frequency distribution:

Size class	883102220000 *Myoxocephalus*	883102220700 *M. scorpius*	883102460100 *Taurulus bubalis*	comments
2	.	.	2	
3	.	.	2	
4	.	24	36	
5	.	44	72	
6	.	115	98	
7	.	195	156	
8	.	404	202	
9	.	537	168	
10	.	635	210	
11	.	667	244	
12	.	626	218	
13	.	788	260	
14	.	952	301	
15	.	1261	298	
16	.	2127	252	
17	.	1699	263	
18	96	2015	233	
19	.	1905	176	
20	.	1695	154	
21	.	1376	119	
22	.	1402	138	
23	.	1600	104	
24	.	1023	59	

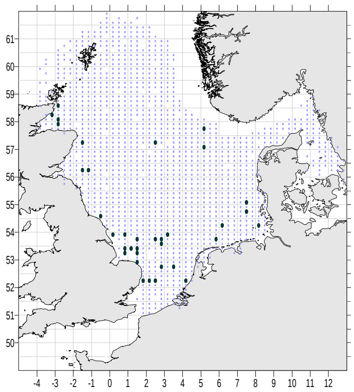
25	.	701	78
26	.	549	40
27	.	380	34
28	.	240	8
29	.	97	5
30	.	51	4
31	.	27	4
32	.	30	.
33	.	4	.
34	.	10	.
35	.	9	.
37	.	2	.

The reported maximum size of *M. scorpius* is 60 cm and for *T. bubalis* 17 cm. It follows that the reports for the latter are suffering from a serious identification problem.

9.3 Presence-absence by species



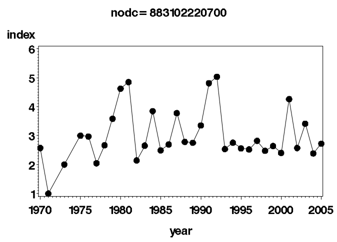
Myoxocephalus scorpius

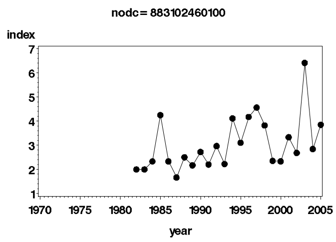


Taurulus bubalis

The bullrout is mainly distributed in waters <50m along the continental and British coast and in the Kattegat. The sea scorpion is rather rare.

9.4 Trends in abundance





Annual catch rates of both species fluctuate widely from year to year, but both *T. bubalis* (right) appears to have increased in abundance over the survey period.

9.5 Consistency in reporting among countries

(NB. the catches refer to numbers-per-hour-fishing; because most hauls have a duration of 30 minutes, the numbers are often multiples of 2):

***Myoxocephalus* - 883102220000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	comments
18	.	.	.	.	96	.	.	.	

***Myoxocephalus scorpius* - 883102220700**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
4	.	16	4	.	4	.	.	.
5	22	14	8	.	.	.	.	.
6	25	48	10	.	32	.	.	.
7	53	48	16	4	69	.	1	4
8	114	54	54	18	157	.	5	2
9	113	38	96	45	239	.	2	4
10	83	44	172	42	281	.	7	6

11	89	18	130	56	360	6	6	2
12	68	20	259	70	193	8	.	8
13	83	52	314	81	235	2	5	16
14	67	89	265	83	373	.	11	64
15	109	137	271	114	519	.	17	94
16	111	176	240	137	1291	.	36	136
17	119	197	185	151	804	9	47	187
18	169	181	161	164	1022	15	50	253
19	152	155	148	113	1055	12	55	215
20	199	138	103	111	794	2	72	276
21	146	130	141	160	504	.	62	233
22	104	151	84	107	644	6	49	257
23	132	120	62	76	947	16	52	195
24	86	128	32	95	490	18	45	129
25	58	85	26	73	293	.	45	121
26	24	59	20	82	277	2	14	71
27	32	26	21	61	142	.	26	72
28	23	18	9	30	92	6	15	47
29	13	13	2	22	27	.	10	10
30	2	6	2	12	4	2	15	8
31	.	2	2	8	6	.	5	4
32	11	6	.	.	2	.	9	2
33	.	.	.	.	.	.	4	.
34	.	4	.	4	.	.	2	.
35	.	.	.	.	6	.	3	.
37	.	.	.	.	2	.	.	.

***Taurulus bubalis* - 883102460100**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
2	.	.	2	.	.	.	.	.
3	.	.	2	.	.	.	.	.
4	.	16	16	.	4	.	.	.
5	.	44	22	.	6	.	.	.
6	.	30	58	.	10	.	.	.
7	.	40	111	.	5	.	.	.
8	.	28	160	.	14	.	.	.
9	.	28	132	.	8	.	.	.
10	.	18	178	6	8	.	.	.
11	.	12	216	.	16	.	.	.
12	.	18	174	.	24	.	.	2
13	.	8	232	.	18	.	2	.
14	.	16	282	.	3	.	.	.
15	.	4	283	.	5	.	4	2
16	.	2	248	.	.	.	2	.
17	.	8	247	.	.	.	6	2
18	.	2	227	.	.	.	4	.
19	2	6	163	.	.	.	3	2
20	.	16	126	6	.	.	4	2
21	.	14	96	2	.	.	7	.
22	.	22	109	2	.	.	3	2
23	.	16	80	2	.	.	2	4
24	.	6	46	.	.	.	3	4
25	.	9	62	.	.	.	2	5
26	.	4	36	.	.	.	.	.
27	2	5	8	16	.	.	1	2
28	.	2	6	.	.	.	.	.
29	.	2	2	.	.	.	1	.
30	2	.	2	.	.	.	.	.
31	.	3	.	.	.	.	1	.

With the exception of the Netherlands all countries report sea scorpions far beyond its reported maximum size, while some hardly report any within its normal size range. The only conclusion can be that the two species have been completely mixed up.

9.6 Consistency in reporting within countries among years

The next table identifies the number of records by species, country and year:

Country	year	883102220000 *Myoxocephalus*	883102220700 *M. scorpius*	883102460100 *Taurulus bubalis*	comments
DEN	1973	.	4	.	
DEN	1985	.	40	.	
DEN	1986	.	183	.	
DEN	1987	.	139	.	
DEN	1988	.	22	.	
DEN	1989	.	38	.	
DEN	1991	.	223	.	
DEN	1992	.	145	.	
DEN	1993	.	129	.	
DEN	1994	.	163	.	
DEN	1995	.	102	.	
DEN	1996	.	50	.	
DEN	1997	.	206	.	

DEN	1998	.	133	.
DEN	1999	.	75	6
DEN	2000	.	68	.
DEN	2001	.	152	.
DEN	2002	.	14	.
DEN	2003	.	104	.
DEN	2004	.	109	.
DEN	2005	.	108	.
ENG	1982	.	20	2
ENG	1983	.	86	4
ENG	1984	.	.	48
ENG	1985	.	126	90
ENG	1986	.	199	30
ENG	1987	.	584	18
ENG	1988	.	118	16
ENG	1989	.	130	10
ENG	1990	.	158	56
ENG	1991	.	125	.
ENG	1992	.	42	.
ENG	1993	.	8	2
ENG	1994	.	10	19
ENG	1995	.	14	.
ENG	1996	.	32	.
ENG	1997	.	70	.
ENG	1998	.	32	.
ENG	1999	.	16	.
ENG	2000	.	4	.
ENG	2001	.	82	2
ENG	2002	.	36	6
ENG	2003	.	263	76
ENG	2005	.	18	.
FRA	1992	.	.	22
FRA	1993	.	.	14
FRA	1994	.	.	167
FRA	1995	.	.	384
FRA	1996	.	.	452
FRA	1997	.	.	555
FRA	1998	.	.	737
FRA	1999	.	.	124
FRA	2000	.	.	112
FRA	2001	.	741	54
FRA	2002	.	170	132
FRA	2003	.	824	471
FRA	2004	.	610	12
FRA	2005	.	492	90
GFR	1977	.	6	.
GFR	1979	.	6	.
GFR	1985	.	6	.
GFR	1986	.	147	.
GFR	1987	.	20	.
GFR	1989	.	2	4
GFR	1990	.	18	.
GFR	1991	.	22	2
GFR	1992	.	558	28
GFR	1993	.	8	.
GFR	1994	.	218	.
GFR	1995	.	76	.
GFR	1996	.	35	.
GFR	1997	.	120	.
GFR	1998	.	357	.
GFR	1999	.	55	.
GFR	2000	.	40	.
GFR	2001	.	47	.
GFR	2002	.	90	.
GFR	2003	.	20	.
GFR	2004	.	26	.
GFR	2005	.	42	.
NED	1970	.	34	.
NED	1973	.	12	.
NED	1975	.	17	.
NED	1976	.	182	.
NED	1977	.	40	.
NED	1978	.	20	.
NED	1979	.	50	.
NED	1980	.	118	.
NED	1981	.	314	.
NED	1982	.	16	.
NED	1983	.	182	.
NED	1984	.	860	.
NED	1985	.	382	.
NED	1986	.	824	.
NED	1987	.	1156	.

NED	1988	.	184	.
NED	1989	.	252	.
NED	1990	.	306	.
NED	1991	96	1648	24
NED	1992	.	1352	.
NED	1993	.	982	2
NED	1994	.	320	.
NED	1995	.	222	.
NED	1996	.	30	.
NED	1997	.	580	6
NED	1998	.	338	2
NED	1999	.	72	.
NED	2000	.	14	4
NED	2001	.	16	.
NED	2002	.	52	2
NED	2003	.	25	3
NED	2004	.	154	78
NED	2005	.	110	.
NOR	1977	.	4	.
NOR	1991	.	6	.
NOR	1995	.	14	.
NOR	1996	.	6	.
NOR	1997	.	18	.
NOR	1999	.	56	.
SCO	1971	.	4	.
SCO	1984	.	18	.
SCO	1985	.	15	.
SCO	1986	.	63	.
SCO	1987	.	11	4
SCO	1988	.	7	.
SCO	1989	.	5	.
SCO	1990	.	9	.
SCO	1991	.	31	.
SCO	1992	.	26	19
SCO	1993	.	34	.
SCO	1994	.	31	.
SCO	1995	.	12	.
SCO	1996	.	55	.
SCO	1997	.	19	.
SCO	1998	.	47	.
SCO	1999	.	12	.
SCO	2000	.	32	.
SCO	2001	.	20	20
SCO	2002	.	75	2
SCO	2003	.	62	.
SCO	2004	.	46	.
SCO	2005	.	36	.
SWE	1985	.	14	.
SWE	1986	.	.	2
SWE	1987	.	28	.
SWE	1988	.	14	.
SWE	1989	.	2	.
SWE	1990	.	16	23
SWE	1991	.	36	.
SWE	1992	.	87	.
SWE	1993	.	86	2
SWE	1994	.	94	.
SWE	1995	.	293	.
SWE	1996	.	126	.
SWE	1997	.	124	.
SWE	1998	.	96	.
SWE	1999	.	184	.
SWE	2000	.	50	.
SWE	2001	.	122	.
SWE	2002	.	186	.
SWE	2003	.	188	.
SWE	2004	.	166	.
SWE	2005	.	504	.

Based on the reported catches of *T. bubalis* by Denmark, Scotland and Sweden undoubtedly refer to *M. scorpius*. However, their catches of small *M. scorpius* have probably been mixed up with *T. bubalis*, France is a special case because this country did only report *T. bubalis* before 2001, which were clearly misidentified. England reported *T. bubalis* consistently before 1991, while more incidental catches were reported thereafter. It may be noted that England has not reported excessively large *T. bubalis* after 2001 and France not after 2003.

9.7 Proposed corrections

Altogether, only the Dutch species identifications after 1977 appear to be trustworthy, and possibly those by England and France after 2001 and 2003. For all other country-year combinations, all fish >17 cm should be labeled as *M. scorpius* (TSN 167311) and all fish ≤17 cm as *Myoxocephalus* sp. (TSN 167311). In addition, *M. scorpioides* should be changed to *M. scorpius* and *T. lilljeborgi* to *T. bubalis*.

9.8 Recommendation:

Countries should certify correct identification of this group.

10 *Liparis* – Seasnails

10.1 Coding

The ICES data-base describes many species that belong to the genus *Liparis*, but only two species have been reported in the North Sea IBTS section of DATRAS, namely *Liparis liparis* (striped seasnail) and *Liparis montagui* (Montagu's seasnail). The unspecified genus name *(Liparis spec.)* has also been reported.

Latin name	tsn-code	NODC	Synonym
Liparis	**167550**	**883109080000**	
Liparis liparis	**167578**	**883109082800**	
Liparis montagui	**167581**	**883109083100**	

Liparis liparis ***Liparis montagui***

The easiest way to identify the two species is by looking at the anal fin: the anal fin of *L. liparis* overlaps one-quarter to one-half of the caudal fin, while the anal fin of *L. montagui* reaches only the base of the caudal fin.

10.2 Length-frequency distribution:

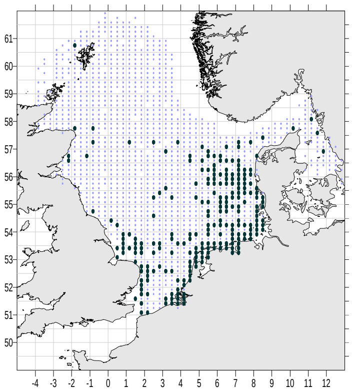
Size Class	883109080000 *Liparis*	883109082800 *L. liparis*	883109083100 *L. montagui*	comments
3	.	4	.	
4	.	8	6	
5	6	56	8	
6	28	168	10	
7	79	439	30	
8	46	706	17	
9	36	538	6	
10	24	367	6	
11	24	274	6	
12	43	269	10	
13	12	284	20	
14	10	281	22	
15	.	107	28	
16	.	11	.	
17	.	2	.	
18	.	2	.	
19	.	2	.	
32	.	2	.	
35	.	2	.	

The striped seasnail *(L. liparis)* is known to grow up to 18 cm, while *L. montagui* can reach sizes up to 10 cm. Therefore, we may assume that the recordings of size 11 cm or more for

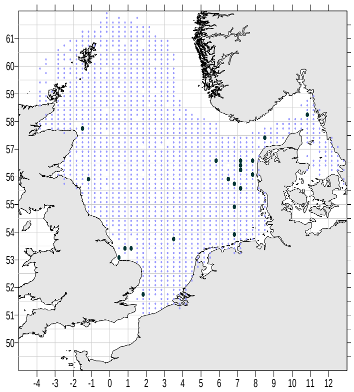
Liparis spec. and *L. montagui* were actually the species *L. liparis*. The data should be changed likewise. The catch of *L. liparis* of lengths 32 and 35 cm is also highly unlikely.

Judging the reasonable number of very probable misidentifications in the larger size classes, it may be expected that within the smaller size classes similar mistakes have been made. We cannot detect and correct these possible misidentifications, but we recommend strongly that the observers will be focused on correct determination of the species in the future.

10.3 Presence-absence by species



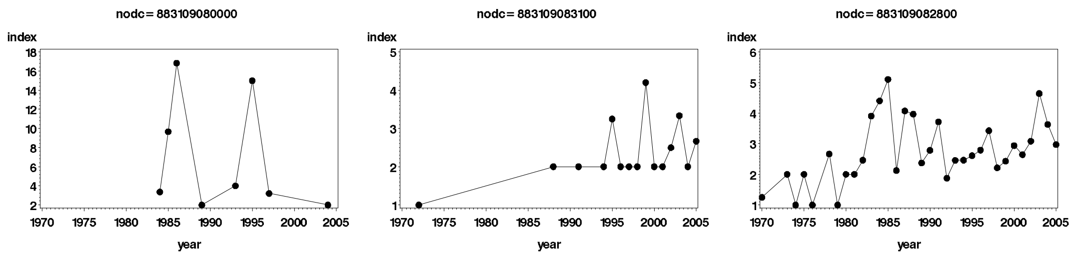
Liparis liparis



Liparis montagui

Both species can be found throughout the southern and central North Sea, but *L. montagui* is more confined to the shallow waters (<30m),..

10.4 Trends in abundance



Annual catches of *Liparis* spec. (883109080000), *L. liparis* (883109082800) and *Liparis montagui* (883109083100) seem to fluctuate throughout the years and no long term trends are visible. The low catches of *L. liparis* before 1980 and the absence of *L. montagui* before the 1990s are probably due to indifference in the sampling procedure.

10.5 Consistency in reporting among countries

(NB. the catches refer to numbers-per-hour-fishing; because most hauls have a duration of 30 minutes, the numbers are often multiples of 2!):

***Liparis* - 883109080000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	comments
5	.	6	.	.	.	.	.	.	
6	.	10	.	18	.	.	.	.	
7	15	36	.	28	.	.	.	.	
8	.	20	2	24	.	.	.	.	
9	.	22	.	14	.	.	.	.	
10	.	10	2	12	.	.	.	.	
11	.	4	.	20	.	.	.	.	
12	.	2	.	41	.	.	.	.	
13	.	2	.	10	.	.	.	.	
14	.	.	.	10	.	.	.	.	

***L. liparis* - 883109082800**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
3	4	.	.	.	.	.	.	.

4	.	6	.	.	2	.	.	.
5	5	18	.	8	22	.	3	.
6	12	58	20	32	28	.	14	4
7	65	168	76	48	64	4	8	6
8	58	290	197	28	127	.	6	.
9	22	214	116	22	162	.	2	.
10	4	118	126	6	111	.	2	.
11	7	82	108	.	74	.	3	.
12	2	56	147	2	62	.	.	.
13	.	36	184	6	58	.	.	.
14	6	18	174	8	75	.	.	.
15	.	6	78	4	19	.	.	.
16	.	.	8	.	3	.	.	.
17	.	.	2	.	.	.	.	.
18	.	.	.	2	.	.	.	.
19	.	.	2	.	.	.	.	.
32	.	.	.	.	2	.	.	.
35	.	.	.	.	2	.	.	.

***L. montagui* - 883109083100**

Size Class	**DEN**	**ENG**	**FRA**	**GFR**	**NED**	**NOR**	**SCO**	**SWE**
4	.	2	.	.	.	.	2	2
5	.	2	4	.	2	.	.	.
6	2	2	2	.	4	.	.	.
7	8	2	6	.	12	.	2	.
8	6	.	2	2	4	.	.	3
9	4	.	.	.	.	.	.	2
10	4	.	2	.	.	.	.	.
11	.	.	6	.	.	.	.	.
12	.	2	8	.	.	.	.	.
13	.	.	20	.	.	.	.	.
14	.	.	22	.	.	.	.	.
15	.	.	28	.	.	.	.	.

Germany and England are just about the only countries that have reported seasnail by the unspecified genus name. From the following table is visible that these data are all from years in which the seasnail was not recorded by species, just by genus. We may therefore safely assume that these all refer to *L. liparis*.

France is the main country reporting ‘oversized’ *Liparis montagui* and it is strongly recommended that in the future care will be taken into determining the seasnail.

The Netherlands have reported catches of *L. liparis* of lengths 32 and 35 cm, which is impossible. These records should be changed into ‘unknown size’, although possibly the species is an input error and they were actually *Cyclopterus lumpus*.

10.6 Consistency in reporting within countries among years

The next table identifies the number of records by species, country and year:

Country	**year**	**883109080000** ***Liparis***	**883109082800** ***L. liparis***	**883109083100** ***L. montagui***	**comments**
DEN	1987	.	12	.	
DEN	1991	.	10	.	
DEN	1993	.	27	.	
DEN	1994	.	16	.	
DEN	1995	15	6	.	
DEN	1996	.	7	.	
DEN	1997	.	10	.	
DEN	1998	.	1	6	
DEN	1999	.	8	.	
DEN	2000	.	48	.	
DEN	2001	.	2	.	
DEN	2003	.	18	.	
DEN	2004	.	.	4	
DEN	2005	.	20	14	
ENG	1982	.	34	.	
ENG	1983	.	120	.	
ENG	1984	108	.	.	
ENG	1985	.	134	.	
ENG	1986	.	126	.	
ENG	1987	.	206	.	
ENG	1988	.	152	6	
ENG	1989	.	158	.	
ENG	1990	.	98	.	
ENG	1992	.	8	.	
ENG	1993	4	.	.	
ENG	1994	.	2	.	
ENG	1996	.	2	.	
ENG	1997	.	.	2	
ENG	2001	.	10	2	
ENG	2002	.	18	.	

ENG	2003	.	2	.
FRA	1995	.	58	.
FRA	1996	.	44	.
FRA	1997	.	258	.
FRA	1998	.	46	.
FRA	1999	.	18	32
FRA	2000	.	28	4
FRA	2001	.	108	.
FRA	2002	.	6	54
FRA	2003	.	222	10
FRA	2004	4	240	.
FRA	2005	.	210	.
GFR	1978	.	6	.
GFR	1985	58	.	.
GFR	1986	101	.	.
GFR	1989	2	.	.
GFR	1991	.	2	.
GFR	1993	.	6	.
GFR	1994	.	6	.
GFR	1995	.	26	.
GFR	1997	16	.	.
GFR	1998	.	14	.
GFR	1999	.	36	.
GFR	2000	.	46	.
GFR	2001	.	2	.
GFR	2002	.	4	2
GFR	2004	.	6	.
GFR	2005	.	12	.
NED	1970	.	4	.
NED	1973	.	2	.
NED	1975	.	2	.
NED	1978	.	10	.
NED	1980	.	8	.
NED	1981	.	10	.
NED	1984	.	96	.
NED	1985	.	28	.
NED	1986	.	4	.
NED	1987	.	12	.
NED	1989	.	2	.
NED	1991	.	218	.
NED	1992	.	34	.
NED	1993	.	2	.
NED	1994	.	52	4
NED	1995	.	84	18
NED	1996	.	6	.
NED	1997	.	64	.
NED	1998	.	32	.
NED	1999	.	12	.
NED	2000	.	40	.
NED	2001	.	10	.
NED	2002	.	46	.
NED	2004	.	23	.
NED	2005	.	10	.
NOR	1999	.	2	.
NOR	2000	.	2	.
SCO	1974	.	1	.
SCO	1976	.	5	.
SCO	1979	.	1	.
SCO	1983	.	2	.
SCO	1984	.	4	.
SCO	1985	.	1	.
SCO	1986	.	3	.
SCO	1987	.	13	.
SCO	1989	.	1	.
SCO	1992	.	1	.
SCO	1996	.	.	2
SCO	1997	.	1	.
SCO	1998	.	3	.
SCO	2002	.	.	2
SCO	2005	.	2	.
SWE	1972	.	.	1
SWE	1991	.	.	2
SWE	1993	.	2	.
SWE	1995	.	.	2
SWE	1998	.	2	.
SWE	1999	.	6	2

As mentioned in the previous section, Germany and England have had years in which the *Liparis* was only recorded on genus level, but in general and especially in the recent years these countries record by species. The relative abundance in years when France reported both species appears to be inconsistent with all other countries and all *L. montagui* over the Lmax should be changed to *L. liparis*.

10.7 Proposed corrections

Country	year	Q	ship	haulno	lngtclass	hlnoatlngt	*change* lngtclass	*into* lngtclass
NED	1994	2	TRI2	13	35	2	35	-9
NED	1997	1	TRI2	30	32	2	32	-9

Country	year	Q	ship	haulno	lngtclass	hlnoatlngt	*change* tsn	*into* tsn
ENG	2001	1	CIR	34	12	2	167581	167578
FRA	1999	1	THA2	3	12	4	167581	167578
FRA	1999	1	THA2	3	13	10	167581	167578
FRA	1999	1	THA2	3	14	8	167581	167578
FRA	1999	1	THA2	3	15	8	167581	167578
FRA	2000	1	THA2	43	14	2	167581	167578
FRA	2000	1	THA2	43	15	2	167581	167578
FRA	2002	1	THA2	68	12	2	167581	167578
FRA	2002	1	THA2	68	14	2	167581	167578
FRA	2002	1	THA2	68	15	2	167581	167578
FRA	2002	1	THA2	69	12	2	167581	167578
FRA	2002	1	THA2	69	13	10	167581	167578
FRA	2002	1	THA2	69	14	10	167581	167578
FRA	2002	1	THA2	69	15	16	167581	167578

The records for *Liparis* sp. should be changed to *L. liparis*.

10.8 Recommendation:

In order to avoid misidentifications in the future, we recommend strongly that the observers will be focused on correct determination of the species.

11 *Trachinus* – Weevers

11.1 Coding

The ICES data-base knows fours species that belong to the genus *Trachinus*, namely *Trachinus araneus* (spotted weever), *Trachinus radiatus* (streaked weeverfish), *Trachinus draco* (greater weever), and *Trachinus vipera* (lesser weever). The first two species are restricted to the Mediterranean Sea and adjacent areas, and only the latter two are present in the North Sea.

Latin name	tsn-code	NODC	Synonym
Trachinus	**170990**	**884006010000**	
Trachinus vipera	**170991**	**884006010100**	***Echiichthys vipera***
Trachinus draco	**170992**	**884006010200**	

Trachinus vipera

Trachinus draco

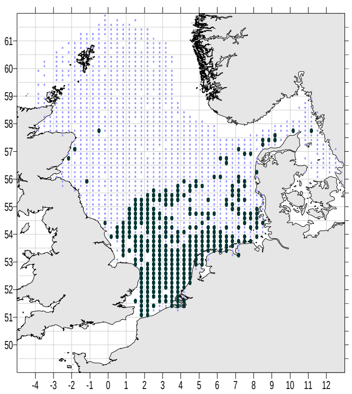
Identification should not present a problem, The greater weever *(T. draco)* can be distinguished from the lesser weever *(T. vipera)* by having 2-3 small spines in front of each eye, the oblique lines crossing the sides and the much longer body.

11.2 Length-frequency distribution:

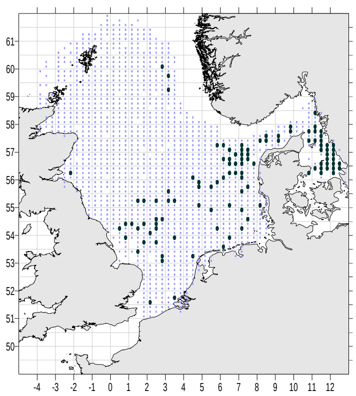
Size Class	884006010100 *Trachinus vipera*	884006010200 *Trachinus draco*	comments
1	8	.	
4	1	.	
5	316	.	
6	1455	25	
7	5983	10	
8	17471	82	
9	37808	145	
10	72116	271	
11	74784	503	
12	45040	564	
13	19742	261	
14	9282	238	
15	3097	245	
16	787	688	
17	214	1676	
18	30	1668	
19	152	3003	
20	181	3084	
21	.	2747	
22	.	2559	
23	.	2479	
24	.	2523	
25	.	1679	
26	.	1032	
27	.	1210	
28	.	662	
29	.	768	
30	.	392	
31	.	388	
32	.	186	
33	.	70	
34	.	36	
35	.	27	
36	.	12	
37	.	2	
38	.	2	
39	.	4	
40	.	2	

The greater weever *(Trachinus draco)* is known to grow up to 40 cm, while the lesser weever *(Trachinus vipera)* can reach sizes up to about 18 cm. Judging the length frequency distribution, the large number of lesser weevers of 19 and 20 cm suggest some mistake. Furthermore, the lesser weever of 1 cm is most likely an error as well and should be checked or changed into 'unknown size'.

11.3 Presence-absence by species



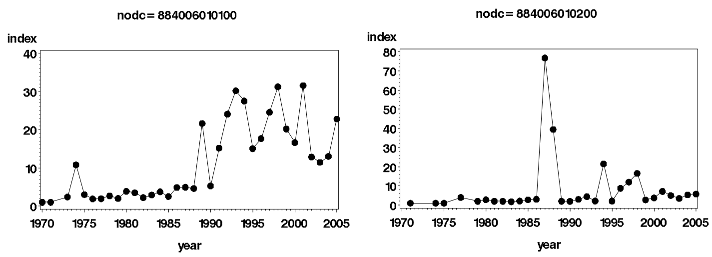
Trachinus vipera



Trachinus draco

Catches of *T. vipera* are fairly common in the southern North Sea, especially along the coasts. The distribution of *T. draco* is restricted to the deeper waters of the Skagerrak and Kattegat.

11.4 Trends in abundance



After a serious decline in the southern North Sea in the 1960s, the catches of *T. draco* (884006010200) have been fairly stable throughout the years, with an exception of an extreme peak in Swedish catches in 1987-1988. The lesser weever (884006010100) is showing an increase in its catches since the late 1980s.

11.5 Consistency in reporting among countries

(NB. the catches refer to numbers-per-hour-fishing; because most hauls have a duration of 30 minutes, the numbers are often multiples of 2!):

***Trachinus vipera* - 884006010100**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	comments
1	.	.	.	.	8	.	.	.	
4	.	.	.	.	1	.	.	.	
5	128	14	34	.	140	.	.	.	
6	361	382	174	28	510	.	.	.	
7	1825	1818	874	41	1417	.	8	.	
8	4928	4372	2080	66	5996	.	29	.	
9	10990	7898	4912	407	13366	.	235	.	
10	25023	14407	9575	1039	21367	.	705	.	
11	28222	13776	10048	1252	20297	.	1187	2	
12	15868	7299	6346	822	13589	.	1116	.	
13	7641	2862	2352	530	5747	.	608	2	
14	4035	1166	1143	174	2523	.	241	.	
15	1498	270	258	94	924	.	53	.	
16	536	53	137	12	41	.	8	.	
17	176	2	16	16	3	.	1	.	
18	.	2	16	8	4	.	.	.	
19	.	.	146	6	.	.	.	.	
20	.	.	163	18	.	.	.	.	

***Trachinus draco* - 884006010200**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
6	25	.	.	.	.	.	.	.
7	10	.	.	.	.	.	.	.
8	82	.	.	.	.	.	.	.
9	131	.	.	2	.	12	.	.
10	201	.	.	4	.	66	.	.
11	281	.	2	2	.	216	.	2
12	387	.	2	4	.	141	.	30
13	136	.	.	2	8	77	.	38
14	72	.	.	4	.	24	.	138
15	2	.	.	.	8	.	.	235
16	29	.	.	.	16	4	.	639
17	.	.	.	.	32	4	.	1640
18	.	.	.	.	40	2	.	1626
19	10	.	.	.	81	2	.	2910
20	10	.	.	2	152	3	1	2916
21	5	.	.	.	136	.	.	2606
22	27	.	.	.	64	6	.	2461
23	4	.	.	2	88	2	.	2383
24	14	.	.	.	88	8	.	2413
25	10	.	.	2	100	14	.	1553
26	20	.	.	4	46	4	.	958
27	24	2	.	6	24	4	.	1150
28	8	.	.	.	20	4	.	630
29	16	.	2	2	32	5	1	710
30	10	2	.	.	8	4	1	367
31	12	2	.	2	36	2	1	333
32	7	4	.	6	50	.	2	117
33	21	.	.	2	16	.	.	31
34	1	4	.	6	8	.	.	17
35	.	.	.	.	11	8	.	8
36	2	.	.	.	8	.	.	2
37	.	.	.	.	.	.	.	2
38	.	.	.	.	2	.	.	.
39	.	.	2	.	.	.	.	2
40	.	.	.	2	.	.	.	.

T. vipera is remarkably absent in the catches of Norway and Sweden, which is likely since the distribution of the species is limited to the southern North Sea, an area not covered by the surveys of these two Scandinavian countries. Less likely is the reporting by the Netherlands of lesser weever of size 1 cm, and this should be checked or changed into 'unknown size'. Furthermore, the records by France and Germany of 'oversized' lesser weever of 19 and 20 cm should be checked.

The reported length frequency indicates some major discrepancies. Although *T. draco* is apparently surviving in large numbers in the Skagerak/Kattegat area, this species is now rare in the North Sea. Nevertheless, Netherlands has reported relatively large numbers, whereas Denmark and Norway have reported large numbers of small fish that are virtually absent in the catches of other countries.

11.6 Consistency in reporting within countries among years

The next table identifies the number of records by species, country and year:

Country	year	884006010100 *Trachinus vipera*	884006010200 *Trachinus draco*	comments
DEN	1987	.	10	
DEN	1988	.	6	
DEN	1989	8	.	
DEN	1990	.	12	
DEN	1991	8	68	
DEN	1992	.	94	
DEN	1993	2341	14	
DEN	1994	75	1254	
DEN	1995	585	6	
DEN	1996	345	7	
DEN	1997	66	.	
DEN	1998	19119	1	
DEN	1999	9661	6	
DEN	2000	11419	.	
DEN	2001	21593	14	
DEN	2002	8037	.	
DEN	2003	6762	18	
DEN	2004	7598	14	
DEN	2005	13614	37	
ENG	1982	20	.	
ENG	1983	26	2	
ENG	1984	98	.	
ENG	1985	40	.	
ENG	1986	38	.	
ENG	1987	180	.	
ENG	1988	129	2	
ENG	1989	2714	2	
ENG	1990	142	2	
ENG	1991	10657	.	
ENG	1992	2086	.	
ENG	1993	3991	6	
ENG	1994	2304	.	
ENG	1995	5467	.	
ENG	1996	3586	.	
ENG	1997	4131	.	
ENG	1998	1573	.	
ENG	1999	1511	.	
ENG	2000	1425	.	
ENG	2001	6220	.	
ENG	2002	4242	.	
ENG	2003	2575	.	
ENG	2005	1170	.	
FRA	1993	8	.	
FRA	1994	4576	4	
FRA	1995	3981	.	
FRA	1996	4876	.	
FRA	1997	778	.	
FRA	1998	3246	.	
FRA	1999	156	.	
FRA	2000	884	4	
FRA	2001	7828	.	
FRA	2002	1342	.	
FRA	2003	2029	.	
FRA	2004	3175	.	
FRA	2005	5395	.	
GFR	1977	2	.	
GFR	1978	6	.	
GFR	1981	.	2	

GFR	1985	.	14
GFR	1986	18	.
GFR	1988	50	.
GFR	1990	122	.
GFR	1991	90	8
GFR	1992	1673	.
GFR	1993	126	10
GFR	1994	428	2
GFR	1995	218	8
GFR	1996	10	4
GFR	1997	146	.
GFR	1998	4	.
GFR	1999	210	.
GFR	2000	228	2
GFR	2001	214	.
GFR	2002	48	4
GFR	2003	370	.
GFR	2004	2	.
GFR	2005	548	.
NED	1970	4	.
NED	1971	4	.
NED	1973	19	.
NED	1975	12	.
NED	1976	18	.
NED	1977	24	.
NED	1978	28	.
NED	1979	2	.
NED	1980	60	4
NED	1981	12	.
NED	1982	2	.
NED	1983	18	.
NED	1984	96	8
NED	1985	6	.
NED	1986	42	.
NED	1987	156	.
NED	1988	60	2
NED	1989	118	.
NED	1990	273	.
NED	1991	9296	4
NED	1992	19751	3
NED	1993	13814	2
NED	1994	14594	2
NED	1995	6033	.
NED	1996	3594	.
NED	1997	9918	.
NED	1998	1972	1048
NED	1999	824	.
NED	2000	740	.
NED	2001	208	.
NED	2002	2180	.
NED	2003	321	1
NED	2004	1036	.
NED	2005	698	.
NOR	1971	.	1
NOR	1975	.	2
NOR	1977	.	12
NOR	1982	.	2
NOR	1984	.	18
NOR	1985	.	4
NOR	1986	.	2
NOR	1988	.	6
NOR	1990	.	4
NOR	1993	.	2
NOR	1994	.	8
NOR	1995	.	14
NOR	1996	.	118
NOR	1997	.	408
NOR	1998	.	2
NOR	2000	.	2
NOR	2002	.	4
NOR	2004	.	3
SCO	1974	54	.
SCO	1976	1	.
SCO	1977	1	.
SCO	1978	4	.
SCO	1980	10	.
SCO	1981	1	.
SCO	1983	.	1
SCO	1991	289	.
SCO	1992	1805	1
SCO	1993	125	2
SCO	1994	55	1
SCO	1995	510	1

SCO	1996	43	.
SCO	1997	78	.
SCO	1998	18	.
SCO	1999	50	.
SCO	2000	196	.
SCO	2001	48	.
SCO	2002	142	.
SCO	2003	16	.
SCO	2004	331	.
SCO	2005	414	.
SWE	1974	.	2
SWE	1979	.	2
SWE	1980	.	12
SWE	1982	.	2
SWE	1983	.	10
SWE	1984	.	14
SWE	1985	.	12
SWE	1986	.	74
SWE	1987	.	4824
SWE	1988	.	8476
SWE	1989	.	12
SWE	1990	.	5
SWE	1991	.	537
SWE	1992	.	465
SWE	1993	.	96
SWE	1994	.	142
SWE	1995	.	108
SWE	1996	.	30
SWE	1997	.	12
SWE	1998	2	140
SWE	1999	.	338
SWE	2000	.	166
SWE	2001	.	3428
SWE	2002	2	864
SWE	2003	.	678
SWE	2004	.	2019
SWE	2005	.	3457

Both Denmark (1994) and the Netherlands (1998) have recorded a extremely high number of *T. draco* as compared to other years. Denmark appears to have confounded the two species before 1995, because extremely few lesser weever were reported in those years. This might explain the large number of small *T. draco* in the size composition. The Dutch catch of 1048 *T. draco* has been checked and can be traced to an input error: the original logbook lists a catch of 1048 grey gurnards in hl 36 and no greater weever! Finally, large catches of 118 and 408 greater weevers in 1997/1998 by Norway seem exceptional. These should be checked against their location and size distribution.

11.7 Proposed corrections

Replace all *T. draco* ≤19 cm reported by Denmark before 1995 by *T. vipera*.
Change all Dutch records for *T. draco* in hl 36 (40F0) by TRI by *Eutrigla gurnardus (TSN 167044).*

11.8 Recommendation:

France and Germany should check there recordings of ‘oversized’ *T. vipera* of 19 and 20 cm.
Norway should check the large numbers of *T. draco* reported in 1997/1998.

12 Ammodytidae – Sandeels

12.1 Coding

The ICES data-base describes several species that belong to the family *Ammodytidae* (sandeels) of which all have been reported in the North Sea IBTS section of DATRAS. For the genus *Ammodytes* these are *A. tobianus* (lesser sandeel) and *A. marinus* (raitt’s sandeel), for the genus *Gymnammodytes* this is *G. semisquamatus* (smooth sandeel), and for the genus *Hyperoplus* these are *H. lanceolatus* (greater sandeel) and *H. immaculatus* (corbin’s sandeel).

Latin name	tsn-code	NODC	Synonym
Ammodytidae	**171670**	**884501000000**	

Ammodytes	171671	884501010000
A. tobianus	171676	884501010500
A. marinus	171677	884501010600
Gymnammodytes	171679	884501020000
G. semisquamatus	171680	884501020100
Hyperoplus	171681	884501030000
H. lanceolatus	171682	884501030100
H. immaculatus	171683	884501030200

Hyperoplus lanceolatus

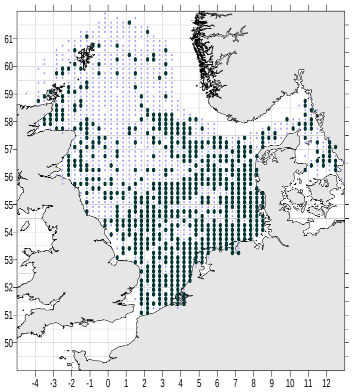
Although *Hyperoplus* sp. should be easily distinguishable from the *Ammodytes/Gymnamnodytes* complex by the fixed upper lip of the former and the extrudable mouth of the latter, identification at the species level is extremely difficult without counting meristic characters of individuals.

12.2 Length-frequency distribution:

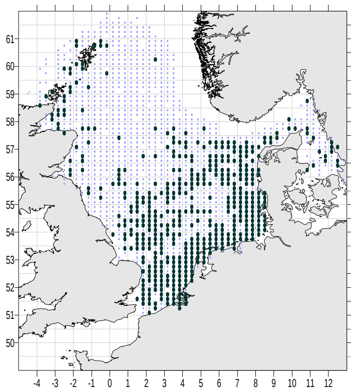
SizeClass	884501000000 *Ammodytidae*	884501010000 *Ammodytes*	884501010500 *A. tobianus*	884501010600 *A. marinus*	884501020100 *G. Semisquamatus*	884501030000 *Hyperoplus*	884501030100 *H. lanceolatus*	884501030200 *H. immaculatus*
2	.	.	4	1	.	.	.	.
3	1	.	10	.	.	.	3	.
4	2	19	20	2	.	.	11	.
5	8	430	10	7	.	.	25	.
6	2306	1402	16	94	.	.	164	8
7	5788	8731	1143	524	.	.	379	20
8	19989	26240	7081	1840	8	.	673	28
9	31574	22754	11877	2821	6	.	590	6
10	35134	14453	6698	2912	5	.	469	14
11	33182	11282	1595	2721	249	.	367	12
12	66331	9548	1546	14041	2976	.	437	10
13	95372	40433	3483	38894	7002	.	3560	35
14	83405	99978	2841	90953	7245	160	10016	556
15	80185	144103	2707	98048	12320	812	14978	5797
16	92078	133877	2839	91899	5413	1569	22377	12823
17	141371	110551	3174	65899	949	1881	51461	16171
18	136414	53283	3467	55615	767	2257	79124	12914
19	19856	14844	1665	40135	325	804	50728	5854
20	10387	4347	435	33450	80	80	35376	3466
21	8982	5629	292	22300	38	.	28913	144
22	3836	795	67	7156	5	82	26646	255
23	2639	676	35	1885	.	160	24805	58
24	906	687	13	1011	.	.	17265	56
25	446	533	8	568	.	80	12409	20
26	149	180	8	629	.	400	7012	10
27	52	101	6	10	.	162	4685	16
28	19	56	.	4	1	240	2901	15
29	26	11	2	4	.	.	2152	8
30	23	14	2	.	.	.	1230	6
31	6	2	5	.	.	.	539	4
32	11	.	5	.	.	.	318	.
33	12	.	.	.	.	.	291	2
34	17	.	.	.	.	.	104	2
35	3	.	.	.	.	.	70	.
36	4	.	.	.	.	.	33	2
37	2	.	.	.	.	.	206	.
38	5	.	.	.	.	.	12	.
39	2	.	.	.	.	.	5	.
40	1	.	.	.	.	.	4	.
41	1	.	.	.	.	.	.	.
55	.	.	.	.	.	.	2	.

The maximum length of each species is indicated in the table: *A. tobianus*: 20 cm; *A. marinus*: 25 cm; *G. semisquamatus*: 28 cm; *H. lanceolatus*: 40 cm; *H. immaculatus*: 35 cm.
Even though relatively few of the specimens have been identified beyond the genus level, most length distributions both at the genus and species exceed the maximum length reported in the literature: up to 12 cm for *A. tobianus* and even to 14 cm for *H. lanceolatus*. This suggest major misidentifications even at the genus level!

12.3 Presence-absence by species



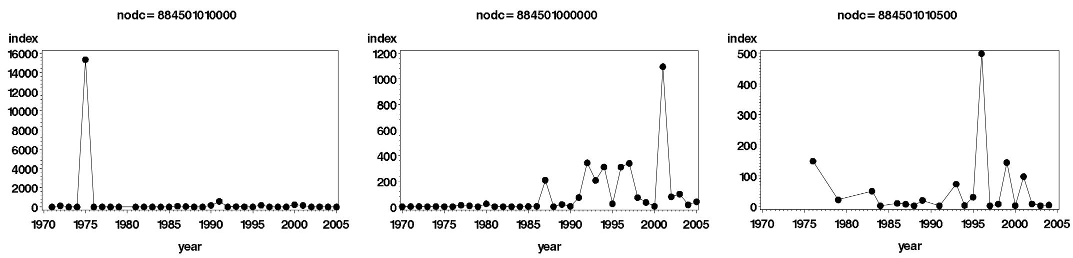
Ammodytes sp.



Hyperoplus lanceolatus

The distribution patterns appear to be very similar, but this may be caused by misidentifications.

12.4 Trends in abundance



The abundances of all sand eel species very widely throughout the years, which is presumably due to the fact that the catchability of the GOV for sand eels is very low.

12.5 Consistency in reporting among countries

(NB. the catches refer to numbers-per-hour-fishing; because most hauls have a duration of 30 minutes, the numbers are often multiples of 2!):

***Ammodytidae* - 884501000000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	comments
3	.	.	.	.	.	.	1	.	
4	.	.	.	.	.	2	.	.	
5	8	.	.	.	.	.	.	.	
6	2250	.	2	.	20	32	.	2	
7	4709	.	12	.	152	899	3	13	
8	17919	.	12	.	898	1015	5	140	
9	28764	.	18	2	1304	1322	13	151	
10	31287	.	20	.	2214	1425	19	169	
11	28932	.	22	.	3205	967	27	29	
12	60584	.	22	.	4571	1048	42	64	
13	80738	.	.	.	13481	1087	25	41	
14	62390	.	18	.	20213	764	10	10	
15	36631	.	175	.	42753	605	15	6	
16	19788	.	291	.	70997	966	22	14	
17	11501	.	817	.	126283	2720	29	21	
18	5164	.	761	.	127601	2815	35	38	
19	1509	.	358	.	15120	2791	29	49	
20	840	2	362	.	6591	2555	15	22	

21	47	.	266	.	6768	1890	5	6
22	6	.	123	.	2524	1175	8	.
23	36	.	85	.	1960	555	3	.
24	617	.	48	.	15	222	2	2
25	4	.	32	.	12	394	4	.
26	20	.	14	.	4	105	6	.
27	23	.	2	.	.	26	1	.
28	13	.	.	.	.	5	1	.
29	2	.	2	.	2	19	1	.
30	.	.	4	.	.	19	.	.
31	2	.	.	.	.	.	4	.
32	2	.	4	.	.	.	5	.
33	2	.	.	.	2	.	8	.
34	2	.	2	.	4	.	9	.
35	.	.	.	.	.	.	3	.
36	.	.	.	.	2	.	2	.
37	2	.	.	.	.	.	.	.
38	.	.	.	.	.	4	1	.
39	2	.	.	.	.	.	.	.
40	.	.	.	.	.	.	1	.
41	.	.	.	.	.	.	1	.

***Ammodytus* - 884501010000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
4	.	6	.	5	.	8	.	.
5	.	379	.	5	.	46	.	.
6	16	1287	15	35	14	35	.	.
7	112	7899	44	572	39	51	.	14
8	1031	23823	58	1182	60	36	.	50
9	1433	19996	189	887	52	91	.	106
10	1700	11749	116	607	38	169	.	74
11	1505	3649	249	694	52	5083	.	50
12	1256	2030	60	675	111	5392	.	24
13	320	6301	21	924	110	32739	.	18
14	118	29445	60	537	146	69599	.	73
15	188	46481	10	214	129	97006	.	75
16	111	31812	10	94	274	101393	.	183
17	417	12392	8	128	307	96730	.	569
18	852	10667	10	68	94	41453	.	139
19	594	4816	10	53	47	9232	.	92
20	151	3997	18	63	40	15	.	63
21	90	856	20	52	.	4609	.	2
22	10	663	22	55	2	31	.	12
23	10	564	2	37	.	63	.	.
24	.	574	.	.	.	113	.	.
25	.	461	.	2	.	70	.	.
26	.	166	.	.	.	14	.	.
27	.	94	.	.	.	7	.	.
28	.	46	.	.	.	10	.	.
29	.	4	.	.	.	7	.	.
30	.	14	.	.	.	.	.	.
31	.	.	.	.	.	2	.	.

***A. tobianus* - 884501010500**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
2	.	.	.	.	.	4	.	.
3	.	.	.	.	.	10	.	.
4	.	.	.	.	.	20	.	.
5	.	.	2	.	.	8	.	.
6	.	2	10	.	.	4	.	.
7	.	10	1099	.	4	8	.	22
8	.	14	6846	.	4	22	89	106
9	.	16	11279	.	2	214	238	128
10	.	26	6147	.	.	215	258	52
11	124	16	1201	.	.	152	102	.
12	640	2	639	.	2	170	23	70
13	496	.	2240	.	12	283	12	440
14	124	.	1679	.	18	746	13	261
15	.	.	341	.	14	2117	96	139
16	.	4	109	.	20	2125	484	97
17	2	.	273	.	10	1420	1154	315
18	20	.	285	.	2	1309	1008	843
19	.	.	180	.	2	859	188	436
20	.	.	99	.	2	128	22	184
21	.	.	71	.	.	122	9	90
22	.	.	44	.	2	.	2	19
23	.	.	15	.	.	16	.	4
24	.	.	13	.	.	.	.	.
25	.	.	8	.	.	.	.	.
26	.	.	8	.	.	.	.	.
27	.	.	6	.	.	.	.	.
29	.	.	2	.	.	.	.	.
30	.	.	2	.	.	.	.	.
31	.	.	5	.	.	.	.	.
32	.	.	5	.	.	.	.	.

A. marinus **- 884501010600**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
2	.	.	.	.	.	.	1	.
4	.	.	.	.	.	.	2	.
5	.	.	.	6	.	.	1	.
6	2	.	.	49	.	12	29	2
7	219	.	.	119	.	24	154	8
8	1142	.	.	262	.	9	423	4
9	1498	.	.	628	.	8	687	.
10	758	.	.	1143	.	47	964	.
11	191	.	.	1247	38	64	1177	4
12	106	.	.	12425	.	169	1341	.
13	254	.	.	36934	44	126	1536	.
14	119	.	.	86036	16	48	4734	.
15	42	.	.	89071	6	40	8889	.
16	28	2	.	80979	14	34	10842	.
17	44	.	4	55369	8	22	10446	6
18	28	.	2	45335	12	22	10216	.
19	4	.	.	35046	4	36	5045	.
20	.	.	.	31192	4	16	2238	.
21	.	.	.	21427	.	4	869	.
22	.	.	.	7037	.	.	119	.
23	.	.	.	1877	.	.	8	.
24	.	.	.	1009	.	.	2	.
25	.	.	.	567	.	.	1	.
26	.	.	.	627	.	.	2	.
27	.	.	.	10	.	.	.	.
28	.	.	.	4	.	.	.	.
29	.	.	.	4	.	.	.	.

Gymnammodytes semisquamatus **- 884501020100**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
8	.	.	.	.	.	.	.	8
9	.	.	.	.	.	.	.	6
10	.	.	.	.	.	.	1	4
11	248	.	.	.	.	.	1	.
12	2976	.	.	.	.	.	.	.
13	7002	.	.	.	.	.	.	.
14	7244	.	.	.	.	.	1	.
15	12319	.	.	.	.	.	1	.
16	5381	.	.	.	.	.	32	.
17	859	2	.	.	.	.	88	.
18	432	2	.	.	.	.	333	.
19	.	.	.	.	.	.	325	.
20	.	.	.	.	.	.	80	.
21	.	.	.	.	.	.	38	.
22	.	.	.	.	.	.	5	.
28	.	.	.	.	.	.	1	.

Hyperoplus **- 884501030000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
14	.	.	160	.	.	.	.	.
15	.	.	812	.	.	.	.	.
16	.	.	1569	.	.	.	.	.
17	.	.	1881	.	.	.	.	.
18	.	.	2257	.	.	.	.	.
19	.	.	804	.	.	.	.	.
20	.	.	80	.	.	.	.	.
22	.	.	82	.	.	.	.	.
23	.	.	160	.	.	.	.	.
25	.	.	80	.	.	.	.	.
26	.	.	400	.	.	.	.	.
27	.	.	162	.	.	.	.	.
28	.	.	240	.	.	.	.	.

H. lanceolatus **- 884501030100**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
0	.	.	.	.	.	.	1	.
3	.	.	.	.	.	.	3	.
4	.	.	2	.	.	.	9	.
5	.	.	4	8	.	.	13	.
6	46	10	8	80	12	4	2	2
7	69	28	37	210	2	4	25	4
8	135	40	64	304	.	4	114	12
9	195	38	46	190	22	8	79	12
10	99	20	22	228	60	2	30	8
11	67	4	26	132	92	.	40	6
12	120	4	14	58	109	.	86	46
13	3118	4	13	46	175	.	204	.
14	8595	16	31	237	1019	.	114	4
15	7733	932	141	228	5233	.	658	53
16	3532	10785	462	973	3216	2	3116	291
17	5905	32119	722	2331	4129	4	5598	653
18	13411	46104	1071	4470	8408	20	3491	2149
19	19499	11784	1283	5883	6675	26	2405	3173

20	12591	3817	1265	6604	4014	184	2424	4477
21	6528	3939	975	5485	4137	673	2978	4198
22	5805	2987	870	4528	3446	920	5368	2722
23	7514	1827	884	4465	4730	887	2715	1783
24	6941	1053	815	3079	2667	622	1173	915
25	4953	585	430	1810	2433	471	888	839
26	2436	399	248	1179	1292	297	534	627
27	940	265	218	949	1245	184	534	350
28	533	403	89	576	763	65	275	197
29	395	255	73	488	336	98	241	266
30	252	209	32	261	248	32	155	41
31	32	84	26	94	143	19	141	.
32	19	39	2	80	44	9	125	.
33	10	27	2	125	22	2	103	.
34	28	5	.	.	25	2	44	.
35	4	5	.	.	23	.	38	.
36	.	4	2	4	6	.	17	.
37	.	4	.	.	198	.	4	.
38	.	2	.	.	6	.	4	.
39	.	.	.	.	4	.	1	.
40	.	.	.	.	2	.	2	.
55	.	.	.	2	.	.	.	.

***H. immaculatus* - 884501030200**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
6	.	2	6	.	.	.	.	.
7	.	.	20	.	.	.	.	.
8	.	.	28	.	.	.	.	.
9	.	.	6	.	.	.	.	.
10	.	.	14	.	.	.	.	.
11	.	.	10	.	2	.	.	.
12	.	2	8	.	.	.	.	.
13	.	.	33	.	2	.	.	.
14	.	.	471	.	.	.	85	.
15	.	.	5606	.	10	.	181	.
16	.	.	12048	.	42	.	733	.
17	.	.	15139	.	46	.	986	.
18	.	.	12459	.	42	.	413	.
19	.	.	5581	.	24	.	249	.
20	.	.	3333	.	28	.	105	.
21	.	.	89	.	20	.	35	.
22	.	.	218	.	14	.	23	.
23	.	.	30	.	16	.	12	.
24	.	.	36	.	16	.	4	.
25	.	.	16	.	2	.	2	.
26	.	.	8	.	2	.	.	.
27	.	.	12	.	2	.	2	.
28	.	.	8	.	.	.	7	.
29	.	.	8	.	.	.	.	.
30	.	.	2	.	2	.	2	.
31	.	.	4	.	.	.	.	.
33	.	.	.	2	.	.	.	.
34	.	.	.	.	.	.	2	.
36	.	.	.	.	2	.	.	.

Discrepancies in the genus identification in terms of maximum size appear to be largely restricted to England, France, Germany and Scotland. Within species, only Denmark stays within the reported range.

12.6 Consistency in reporting within countries among years

The next table identifies the number of records by species, country and year:

Country	year	884501000000 *Ammodytidae*	884501010000 *Ammodytes*	884501010500 *A. tobianus*	884501010600 *A. marinus*	884501020100 *G.semisquamatus*	884501030000 *Hyperoplus*	884501030100 *H. lanceolatus*	884501030200 *H. immaculatus*	comments
DEN	1971	.	34	.	.	.	.	.	.	
DEN	1972	.	3252	.	.	.	.	.	.	
DEN	1973	.	46	.	.	.	.	.	.	
DEN	1974	.	2	.	.	.	.	.	.	
DEN	1985	.	16	.	.	.	.	.	.	
DEN	1986	.	6564	.	.	.	.	.	.	
DEN	1987	15572	.	.	.	.	.	26	.	
DEN	1988	6	.	.	.	.	.	6	.	
DEN	1989	2401	.	.	.	.	.	50	.	
DEN	1990	22	.	.	.	.	.	90	.	
DEN	1991	1380	.	.	.	.	.	27	.	
DEN	1992	2556	.	.	.	.	.	232	.	
DEN	1993	49553	.	.	.	.	.	226	.	
DEN	1994	778	.	.	.	.	.	30	.	
DEN	1995	155	.	.	.	.	.	425	.	
DEN	1996	1231	.	.	.	.	.	2257	.	
DEN	1997	76	.	.	.	.	.	2	.	
DEN	1998	19405	.	.	.	135	.	5532	.	
DEN	1999	1172	.	1404	.	.	.	13406	.	

DEN	2000	214	.	.	3437	.	.	6126	.
DEN	2001	277324	.	.	.	8038	.	42935	.
DEN	2002	7372	.	.	.	.	.	3289	.
DEN	2003	7544	.	.	.	.	.	5217	.
DEN	2004	1624	.	2	.	21292	.	9637	.
DEN	2005	5413	.	.	998	6996	.	21993	.
ENG	1978	.	2	.	.	.	.	.	.
ENG	1982	.	4	.	.	.	.	.	.
ENG	1983	.	8	.	.	.	.	.	.
ENG	1984	.	22	.	.	.	.	.	.
ENG	1986	.	4	.	.	.	.	.	.
ENG	1987	.	14	.	.	.	.	.	.
ENG	1988	.	28	.	.	.	.	.	.
ENG	1989	.	443	.	.	.	.	.	.
ENG	1990	.	14312	.	.	.	.	.	.
ENG	1991	.	141968	.	.	.	.	605	.
ENG	1992	.	64	.	.	.	.	150	.
ENG	1993	.	2440	.	.	.	.	3038	.
ENG	1994	2	1136	.	.	.	.	2165	.
ENG	1995	.	237	.	.	.	.	99435	.
ENG	1996	.	28463	.	2	.	.	448	.
ENG	1997	.	719	.	.	.	.	448	.
ENG	1998	.	705	.	.	.	.	835	.
ENG	1999	.	58	.	.	.	.	2236	.
ENG	2000	.	1574	.	.	.	.	2131	.
ENG	2001	.	27160	86	.	4	.	3675	.
ENG	2002	.	614	.	.	.	.	2103	.
ENG	2003	.	196	4	.	.	.	528	.
ENG	2005	.	.	.	.	.	.	.	4
FRA	1985	6	.	.	.	.	.	.	.
FRA	1988	14	.	.	.	.	.	.	.
FRA	1989	38	.	.	.	.	.	.	.
FRA	1990	87	.	.	.	.	.	.	.
FRA	1991	72	.	.	.	.	.	.	.
FRA	1992	1911	.	.	.	.	.	.	.
FRA	1993	1328	.	.	.	.	.	1560	.
FRA	1994	16	.	4	.	.	.	2414	40586
FRA	1995	.	.	.	.	.	.	225	136
FRA	1996	.	.	.	.	.	8563	3869	13739
FRA	1997	.	.	.	.	.	.	365	569
FRA	1998	.	.	840	.	.	.	140	68
FRA	1999	.	.	24	.	.	.	68	4
FRA	2000	.	.	8	.	.	124	300	56
FRA	2001	.	922	30714	.	.	.	154	17
FRA	2002	.	.	613	.	.	.	332	.
FRA	2003	.	.	103	.	.	.	118	2
FRA	2004	.	.	302	.	.	.	166	.
FRA	2005	.	.	.	6	.	.	166	16
GFR	1977	.	973	.	.	.	.	.	.
GFR	1978	.	6	.	.	.	.	.	.
GFR	1979	.	6	.	.	.	.	.	.
GFR	1985	.	206	.	.	.	.	.	.
GFR	1986	.	1593	.	.	.	.	.	.
GFR	1987	.	4103	.	.	.	.	.	.
GFR	1988	.	.	.	.	.	.	2	.
GFR	1989	2	.	.	.	.	.	106	.
GFR	1990	.	2	.	4	.	.	70	.
GFR	1991	.	.	.	93450	.	.	2483	.
GFR	1992	.	.	.	90254	.	.	7825	.
GFR	1993	.	.	.	243	.	.	74	.
GFR	1994	.	.	.	288808	.	.	24118	.
GFR	1995	.	.	.	31748	.	.	1916	.
GFR	1996	.	.	.	787	.	.	971	.
GFR	1997	.	.	.	280	.	.	714	.
GFR	1998	.	.	.	44	.	.	1456	.
GFR	1999	.	.	.	51	.	.	724	.
GFR	2000	.	.	.	50	.	.	290	.
GFR	2001	.	.	.	2176	.	.	1060	.
GFR	2002	.	.	.	68	.	.	1032	.
GFR	2003	.	.	.	20	.	.	1452	2
GFR	2004	.	.	.	6	.	.	2	.
GFR	2005	.	.	.	414	.	.	812	.
NED	1970	5	.	.	.	.	.	.	.
NED	1971	154	.	.	.	.	.	1	.
NED	1972	34	.	.	.	.	.	144	.
NED	1973	6	.	.	.	.	.	.	.
NED	1974	40	.	.	.	.	.	18	.
NED	1975	49	.	.	.	.	.	471	.
NED	1976	12	.	.	.	.	.	28	.
NED	1977	1734	.	.	.	.	.	208	.
NED	1978	1594	.	.	.	.	.	32	.
NED	1979	14	.	.	.	.	.	.	.

NED	1980	3938	.	.	.	.	.	294	.
NED	1981	114	.	.	.	.	.	40	.
NED	1982	.	14	.	.	.	.	.	.
NED	1983	.	10	70	.	.	.	14	.
NED	1984	.	660	4	146	.	.	16	.
NED	1985	266	.	.	.	.	.	4	.
NED	1986	142	.	.	.	.	.	6	.
NED	1987	340	.	.	.	.	.	.	.
NED	1988	82	.	.	.	.	.	12	.
NED	1989	210	.	.	.	.	.	56	.
NED	1990	14	.	.	.	.	.	11	.
NED	1991	33390	.	.	.	.	.	6433	.
NED	1992	215183	.	.	.	.	.	24938	.
NED	1993	60194	.	.	.	.	.	4387	.
NED	1994	81003	.	.	.	.	.	12296	.
NED	1995	2750	.	.	.	.	.	1343	.
NED	1996	24418	.	.	.	.	.	1896	.
NED	1997	20430	.	.	.	.	.	1704	.
NED	1998	370	.	.	.	.	.	74	.
NED	1999	68	.	.	.	.	.	42	.
NED	2000	26	.	.	.	.	.	140	.
NED	2001	116	.	.	.	.	.	190	.
NED	2002	.	52	20	.	.	.	.	272
NED	2003	.	428	.	.	.	.	47	.
NED	2004	.	324	.	.	.	.	78	.
NED	2005	.	27	.	.	.	.	13	.
NOR	1971	.	1	.	.	.	.	.	.
NOR	1975	.	460357	.	.	.	.	6	.
NOR	1976	.	42	1625	.	.	.	.	.
NOR	1977	86	.	.	.	.	.	.	.
NOR	1978	2	.	.	.	.	.	.	.
NOR	1979	2	.	342	.	.	.	.	.
NOR	1981	.	26	.	.	.	.	.	.
NOR	1982	.	206	.	.	.	.	.	.
NOR	1984	18	2	.	.	.	.	.	.
NOR	1985	22	.	.	.	.	.	.	.
NOR	1986	.	.	224	.	.	.	.	.
NOR	1987	.	.	74	.	.	.	.	.
NOR	1988	.	.	26	.	.	.	.	.
NOR	1989	.	.	626	.	.	.	.	.
NOR	1990	.	10	.	.	.	.	2	.
NOR	1991	.	693	2	.	.	.	2	.
NOR	1992	36	116	.	14	.	.	94	.
NOR	1993	.	2032	.	.	.	.	2	.
NOR	1994	496	16	.	.	.	.	108	.
NOR	1995	2586	.	.	220	.	.	506	.
NOR	1996	2525	499	7018	329	.	.	274	.
NOR	1997	13748	.	.	.	.	.	2	.
NOR	1998	4	.	.	.	.	.	2	.
NOR	1999	5840	4	.	42	.	.	857	.
NOR	2000	.	.	.	10	.	.	2111	.
NOR	2001	.	.	2	60	.	.	32	.
NOR	2002	32	.	.	6	.	.	506	.
NOR	2004	30	.	13	.	.	.	35	.
SCO	1971	8	.	.	.	.	.	.	.
SCO	1972	2	.	.	.	.	.	.	.
SCO	1973	29	.	.	.	.	.	.	.
SCO	1974	1	.	.	.	.	.	.	.
SCO	1975	22	.	.	.	.	.	.	.
SCO	1976	2	.	.	.	.	.	.	.
SCO	1977	104	.	.	.	.	.	.	.
SCO	1979	22	.	.	.	.	.	.	.
SCO	1980	107	.	.	.	.	.	.	.
SCO	1981	6	.	.	.	.	.	.	.
SCO	1982	11	.	.	.	.	.	.	.
SCO	1983	41	.	3182	8118	.	.	1	.
SCO	1984	.	.	.	31	.	.	6	.
SCO	1985	.	.	.	541	.	.	5	.
SCO	1986	.	.	.	25	.	.	1	.
SCO	1987	.	.	.	423	.	.	12	.
SCO	1988	.	.	.	127	.	.	3	.
SCO	1989	.	.	.	678	.	.	1	.
SCO	1990	.	.	.	391	.	.	65	.
SCO	1991	.	.	.	1465	.	.	10841	.
SCO	1992	.	.	.	5351	.	.	4404	2822
SCO	1993	.	.	385	5306	.	.	3158	.
SCO	1994	.	.	2	5495	.	.	742	.
SCO	1995	.	.	.	24103	.	.	10305	2
SCO	1996	.	.	.	384	.	.	28	.
SCO	1997	.	.	129	1574	8	.	512	1
SCO	1998	.	.	.	898	.	.	16	2
SCO	1999	.	.	.	2482	.	.	243	2
SCO	2000	.	.	.	10	.	.	338	.
SCO	2001	.	.	.	1904	.	.	1976	.

SCO	2002	.	.	.	16	.	.	81	2
SCO	2003	.	.	.	16	.	.	198	8
SCO	2004	.	.	.	194	.	.	120	.
SCO	2005	.	.	.	194	898	.	696	2
SWE	1972	1	.	.	.	.	.	.	.
SWE	1975	10	.	.	.	.	.	4	.
SWE	1977	2	.	.	.	.	.	.	.
SWE	1979	2	.	.	.	.	.	.	.
SWE	1981	4	.	.	.	.	.	.	.
SWE	1983	.	.	2	.	.	.	.	.
SWE	1986	.	.	302	.	.	.	4	.
SWE	1991	.	.	.	.	18	.	540	.
SWE	1992	.	.	.	.	.	.	49	.
SWE	1993	466	.	1724	.	.	.	11002	.
SWE	1994	82	.	105	.	.	.	483	.
SWE	1995	.	.	1071	.	.	.	2596	.
SWE	1996	100	.	.	.	.	.	28	.
SWE	1997	58	.	.	.	.	.	14	.
SWE	1998	18	.	.	.	.	.	282	.
SWE	1999	.	.	.	.	.	.	1566	.
SWE	2000	.	.	.	8	.	.	4	.
SWE	2001	10	.	2	2	.	.	72	.
SWE	2002	22	60	.	.	.	.	10	.
SWE	2003	.	342	.	.	.	.	20	.
SWE	2004	2	14	.	.	.	.	8	.
SWE	2005	.	1128	.	14	.	.	6146	.

All countries appear to be highly inconsistent in how they report sandeels from year to year. Few countries appear to be able to identify *Gymnammodytes*, while France consistently reports *H. immaculatus* instead of *H. lanceolatus*. Given this mess, the only satisfactory option would seem to take all species together as *Ammodytidae*.

12.7 Proposed corrections

Change all records with sandeels to *Ammodytidae* (TSN 171670).

12.8 Recommendation:

Given the different positions in the foodweb and the importance of these species in terms of fish biomass, we recommend that countries pay more attention to the distinction of *Hyperoplus* vs *Ammodytes/Gymnammodytes*, so that we will be able to distinguish these two groups in the future. While it may not be feasible to count meristic characters at a large scale, some sub-sampling routine an checking a limited number of individuals at the species level would enhance the value of the DATRAS data base considerably. A common key used on board of all vessels would facilitate intercomparisons.

13 *Callionymus* – Dragonets

13.1 Coding

DATRAS records several dragonet species, of which 3 can be found in the North Sea, namely dragonet *(C. lyra)*, spotted dragonet *(C. maculatus)*, and reticulated dragonet *(C. reticulatus)*. The following codes have been used:

Latin name	tsn-code	NODC	Synonym
Callionymidae	**171691**	**884601000000**	
Callionymus	**171692**	**884601010000**	
Callionymus lyra	**171698**	**884601010600**	
Callionymus maculatus	**171699**	**884601010700**	
Callionymus reticulatus	**171712**	**884601012000**	

Callionymus maculatus

Callionymus lyra

Callionymus reticulatus

Although adult males of the three species can be easily distinguished based on the colour patterns in the dorsal fin, this becomes more difficult for females and especially the juveniles. However, *C. lyra* always has an horizontal line in the dorsal fin and has a broader head, while the pattern on the side is a good aid for distinguishing the other two: *C. maculatus* always has many small spots, whereas *C. reticulatus* has a few outstanding spots on the side line. The forward pointing spine at the end of the gill cover in *C. lyra* and *C. maculatus* is often another distinction, but less reliable, because it is sometimes missing.

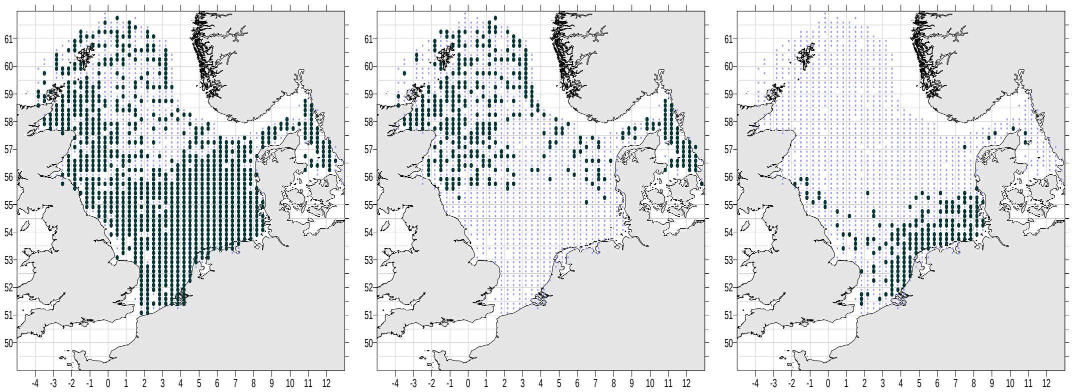
13.2 Length-frequency distribution:

Size Class	884601010600 *C. lyra*	884601010700 *C. maculatus*	884601012000 *C. reticulatus*	884601000000 *Callionymidae*	884601010000 *Callionymus*	comments
2	2	.	.	.	.	
3	13	49	.	.	14	
4	206	321	15	.	80	
5	659	764	123	3	76	
6	1064	1686	178	20	40	
7	1785	4034	235	146	32	
8	2273	8194	152	113	18	
9	2427	10138	156	307	6	
10	2579	10943	121	342	2	
11	2489	8510	73	255	2	
12	3564	6766	27	296	18	
13	4556	4569	7	255	40	
14	6074	2480	29	218	54	
15	7680	1136	4	90	56	
16	8695	494	4	105	46	
17	8349	240	8	150	36	
18	7801	282	6	130	34	
19	7088	42	.	120	29	
20	5452	41	.	111	6	
21	3307	57	.	67	29	
22	2340	24	.	48	6	
23	1167	28	.	13	12	
24	622	14	.	5	.	
25	310	8	.	10	.	
26	141	5	.	5	.	
27	75	2	.	1	.	
28	23	.	.		.	
29	5	2	.		.	
30	2	1	.		.	
31	6	.	.		.	
32	2	.	.		.	
35	2	.	.		.	
36	4	.	.		.	
38	3	.	.		.	

According to Whitehead *et al.* (1986), *C. lyra* may grow up to 30 cm, *C. maculatus* up to 16 cm and *C. reticulatus* up to 11 cm. Looking at the length frequency distribution, all species exceed their supposed maximum length. *C. lyra* undoubtedly growth larger and 38 cm is probably more appropriate. We have also positively identified a 20 cm *C. maculatus* and a 12 cm *C. reticulatus*. However, this still suggests that many *C. lyra* have been misidentified as *C. maculatus* and many *C. maculatus* as *C. reticulatus*.

Furthermore, since there is only 1 genus (*Callionymus*, 171692) within the family *Callionymidae*, the taxon Callionymidae is redundant and all *Callionymidae* (171691) should be renamed *Callionymus* (171692).

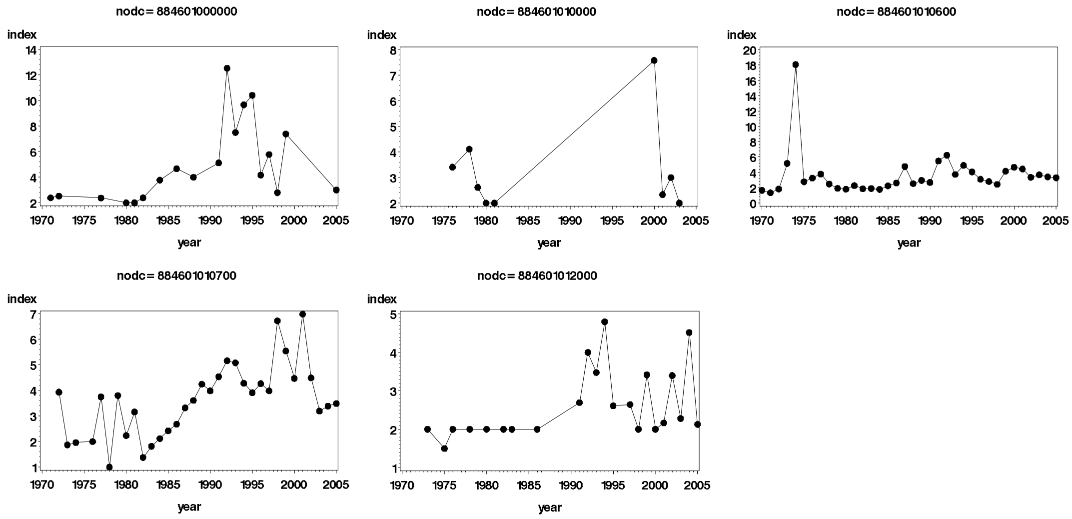
13.3 Presence-absence by species



Callionymus lyra *Callionymus maculatus* *Callionymus reticulatus*

These maps are based upon verified identifications only. Most common dragonet in the North Sea is *C. lyra* and it is spread throughout the entire area including the Skagerrak/Kattegat, but only little in the northeastern and central North Sea. *C. maculatus* is restricted to the Northern half of the North Sea (including highest abundance in the Skagerrak/Kattegat), while *C. reticulatus* seems only distributed in the southern half, mainly along the Dutch Coast and in the German Bight.

13.4 Trends in abundance



The annual catch rates of *C. lyra* (884601010600) show periods of low abundance (late 1970s, early 1980s) and of high abundance (early 1990s), but there is no long term trend. The spotted dragonet (*C. maculatus* - 884601010700) have shown a possible increasing trend, but the last three years catches have reduced again. The catches of reticulated dragonet (*C. reticulatus* - 884601012000) fluctuates and long clear trend is visible.

13.5 Consistency in reporting among countries

(NB. the catches refer to numbers-per-hour-fishing; because most hauls have a duration of 30 minutes, the numbers are often multiples of 2!):

***Callionymidae* 884601000000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	comments
5	.	2	.	.	.	.	1	.	
6	.	6	.	.	.	11	1	2	
7	.	6	.	.	.	138	2	.	
8	.	.	.	.	.	106	7	.	
9	.	4	.	.	.	265	34	4	
10	.	.	.	.	.	259	71	12	
11	.	.	.	.	.	193	58	4	

12	.	.	.	.	.	232	58	6
13	.	.	.	.	.	173	72	10
14	.	.	.	.	.	164	52	2
15	.	.	.	.	.	71	15	4
16	.	.	.	.	.	82	23	.
17	.	.	.	.	.	111	39	.
18	.	.	.	.	.	104	24	2
19	.	.	.	.	.	97	17	6
20	.	.	.	.	.	87	22	2
21	.	.	.	.	.	57	10	.
22	.	.	.	.	.	41	7	.
23	.	.	.	.	.	8	5	.
24	.	.	.	.	.	2	3	.
25	.	.	.	.	.	7	3	.
26	.	.	.	.	.	.	5	.
27	.	.	.	.	.	.	1	.

***Callionymus* 884601010000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
3	14	.	.	.	.	.	.	.
4	77	.	.	3	.	.	.	.
5	73	.	.	3	.	.	.	.
6	40	.	.	.	.	.	.	.
7	32	.	.	.	.	.	.	.
8	14	.	4	.	.	.	.	.
9	4	.	.	.	.	2	.	.
10	2	.	.	.	.	.	.	.
11	.	.	.	.	.	2	.	.
12	.	.	.	.	.	18	.	.
13	.	.	.	.	.	40	.	.
14	.	.	.	.	.	54	.	.
15	.	.	2	.	.	54	.	.
16	.	.	4	.	.	42	.	.
17	.	.	2	.	.	34	.	.
18	.	.	.	.	.	34	.	.
19	.	.	2	3	.	24	.	.
20	.	.	.	.	.	6	.	.
21	.	.	2	.	.	27	.	.
22	.	.	2	.	.	4	.	.
23	.	.	.	.	.	12	.	.

***Callionymus lyra* 884601010600**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
2	.	.	2	.	.	.	.	.
3	5	6	.	2	.	.	.	.
4	78	8	16	42	52	6	.	4
5	397	70	46	74	57	.	3	12
6	490	124	145	104	122	10	18	51
7	997	206	222	88	125	60	25	62
8	1010	191	363	89	232	190	58	140
9	1100	147	298	95	130	399	124	134
10	1231	169	243	105	158	375	169	129
11	960	205	315	127	185	317	216	164
12	1078	462	605	196	348	262	247	366
13	1198	628	645	231	603	206	327	718
14	1343	885	923	334	831	78	459	1221
15	1731	1250	924	478	1455	63	569	1209
16	1945	1324	964	551	1676	40	766	1428
17	1645	1354	967	676	1752	36	657	1262
18	1486	1180	929	584	1834	41	644	1103
19	1519	1076	812	561	1410	49	510	1151
20	924	886	668	446	1203	47	460	817
21	470	601	431	376	524	18	306	580
22	330	432	288	261	390	16	288	335
23	97	213	158	173	197	5	196	128
24	57	115	79	85	93	.	167	26
25	27	55	23	29	68	.	104	4
26	6	14	14	12	31	18	44	2
27	.	14	4	17	16	.	24	.
28	.	5	.	.	4	.	14	.
29	.	1	.	2	.	.	2	.
30	.	.	.	.	2	.	.	.
31	.	.	.	6	.	.	.	.
32	.	.	.	2	.	.	.	.
35	.	.	.	2	.	.	.	.
36	.	.	.	4	.	.	.	.
38	.	.	.	2	.	.	1	.

***Callionyus maculatus* 884601010700**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
3	6	.	.	4	.	.	.	39
4	16	8	2	16	.	.	1	278
5	42	22	18	20	.	18	3	641
6	39	82	67	40	2	58	6	1392
7	240	152	124	92	4	79	35	3308
8	417	219	103	206	3	133	63	7050

9	692	276	78	315	3	138	132	8503
10	858	218	71	397	10	118	211	9059
11	598	154	32	342	14	126	232	7012
12	495	159	18	296	14	105	237	5442
13	197	80	12	245	11	74	315	3635
14	129	59	9	173	9	18	193	1890
15	127	44	6	49	1	11	124	774
16	45	18	4	52	.	.	75	300
17	32	4	.	22	.	.	20	162
18	28	.	8	14	.	.	15	217
19	3	.	.	26	.	.	5	8
20	12	.	2	12	2	.	9	4
21	25	.	2	14	.	.	10	6
22	10	.	2	8	.	.	2	2
23	.	.	.	10	.	.	11	7
24	.	.	.	.	.	.	12	2
25	.	.	.	4	.	.	4	.
26	.	.	.	2	.	.	1	2
27	.	.	.	.	.	.	2	.
29	.	.	.	.	.	.	2	.
30	.	.	.	.	.	.	1	.

***Callionymus reticulatus* 884601012000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
4	.	.	.	.	15	.	.	.
5	.	2	.	4	117	.	.	.
6	.	4	2	4	160	8	.	.
7	.	8	4	18	197	4	2	2
8	.	10	8	12	118	4	.	.
9	.	10	8	12	94	32	.	.
10	.	16	.	14	66	23	.	2
11	.	16	4	6	22	25	.	.
12	.	8	.	6	12	.	1	.
13	.	2	2	.	3	.	.	.
14	.	2	2	2	9	14	.	.
15	.	.	2	.	2	.	.	.
16	.	.	.	.	2	2	.	.
17	.	4	4	.	.	.	.	.
18	.	.	2	.	4	.	.	.

Looking at the consistency in reporting among countries, Norway, Scotland and Sweden have restricted some of their determination of dragonets to the genus *(Callionymus)* or family *(Callionymidae)* , while England and Denmark name use these taxa only for the smaller sizes. Recordings of ‘oversized’ *C. maculatus* can mainly be ascribed to Denmark, Germany, Scotland and Sweden, while the other countries have recorded *C. reticulatus* of a size that is probably too large for the species. Denmark has never reported *C. reticulatus*.

13.6 Consistency in reporting within countries among years

The next table identifies the number of records by species, country and year:

Country	year	884601010600 *C. lyra*	884601010700 *C. maculatus*	884601012000 *C. reticulatus*	884601000000 *Callionymidae*	884601010000 *Callionymus*	comments
DEN	1973	286	.	.	.	.	
DEN	1974	1503	.	.	.	.	
DEN	1985	32	.	.	.	.	
DEN	1986	199	.	.	.	.	
DEN	1987	311	4	.	.	.	
DEN	1988	252	.	.	.	.	
DEN	1989	269	40	.	.	.	
DEN	1990	105	12	.	.	.	3 > Lmax
DEN	1991	3800	152	.	.	.	
DEN	1992	1416	386	.	.	.	
DEN	1993	1170	1669	.	.	.	
DEN	1994	1814	663	.	.	.	
DEN	1995	1200	500	.	.	.	
DEN	1996	280	225	.	.	.	
DEN	1997	72	.	.	.	.	
DEN	1998	495	3	.	.	.	
DEN	1999	1139	32	.	.	.	
DEN	2000	1284	170	.	.	256	
DEN	2001	1502	147	.	.	.	32 > Lmax
DEN	2002	760	8	.	.	.	
DEN	2003	806	.	.	.	.	
DEN	2004	401	.	.	.	.	
DEN	2005	1036	.	.	.	.	
ENG	1982	10	.	.	.	.	
ENG	1983	150	.	.	.	.	
ENG	1984	112	.	.	.	.	
ENG	1985	86	.	.	.	.	
ENG	1986	84	.	.	.	.	

ENG	1987	346	.	.	.	.	
ENG	1988	154	.	.	.	.	
ENG	1989	634	20	.	.	.	
ENG	1990	684	110	.	.	.	
ENG	1991	1785	86	.	.	.	
ENG	1992	846	156	.	.	.	
ENG	1993	628	22	24	.	.	4 > Lmax
ENG	1994	410	87	8	.	.	
ENG	1995	685	24	.	.	.	
ENG	1996	260	36	.	.	.	
ENG	1997	196	8	6	.	.	
ENG	1998	100	34	.	.	.	
ENG	1999	716	34	10	.	.	2 > Lmax
ENG	2000	244	26	.	.	.	
ENG	2001	900	280	18	.	.	2 > Lmax
ENG	2002	534	54	.	.	.	
ENG	2003	1474	208	16	.	.	
ENG	2005	586	311	.	18	.	
FRA	1988	36	.	.	.	.	
FRA	1989	34	.	.	.	.	
FRA	1990	112	.	.	.	.	
FRA	1991	758	.	.	.	.	
FRA	1992	1646	.	.	.	.	
FRA	1993	890	.	.	.	.	
FRA	1994	625	.	.	.	.	
FRA	1995	883	.	.	.	.	
FRA	1996	370	.	.	.	.	
FRA	1997	241	9	.	.	.	
FRA	1998	140	.	.	.	.	
FRA	1999	235	.	.	.	.	
FRA	2000	380	300	.	.	.	
FRA	2001	495	2	4	.	14	
FRA	2002	902	.	.	.	.	
FRA	2003	861	12	.	.	4	
FRA	2004	659	86	34	.	.	12 > Lmax
FRA	2005	817	149	.	.	.	4 > Lmax
GFR	1977	36	.	.	.	.	
GFR	1978	20	.	.	.	.	
GFR	1979	34	.	.	.	.	
GFR	1982	30	.	.	.	.	
GFR	1984	2	.	.	.	.	
GFR	1985	52	.	.	.	.	
GFR	1986	262	.	.	.	.	
GFR	1987	94	2	.	.	.	
GFR	1988	180	.	.	.	.	
GFR	1989	232	44	.	.	.	
GFR	1990	212	42	.	.	.	2 > Lmax
GFR	1991	308	16	.	.	.	
GFR	1992	542	178	.	.	.	16 > Lmax
GFR	1993	202	20	.	.	.	
GFR	1994	268	144	.	.	.	
GFR	1995	150	234	.	.	.	20 > Lmax
GFR	1996	90	74	.	.	.	
GFR	1997	206	38	.	.	.	
GFR	1998	142	168	.	.	.	
GFR	1999	574	234	.	.	.	
GFR	2000	480	412	.	.	.	
GFR	2001	532	303	.	.	.	
GFR	2002	276	278	22	.	9	
GFR	2003	550	68	4	.	.	2 > Lmax
GFR	2004	34	48	12	.	.	
GFR	2005	246	56	40	.	.	
NED	1970	67	.	.	.	.	
NED	1971	72	.	.	.	.	
NED	1972	2	.	.	.	.	
NED	1973	250	.	2	.	.	2 > Lmax
NED	1974	890	.	.	.	.	
NED	1975	1958	.	9	.	.	
NED	1976	234	.	6	.	.	2 > Lmax
NED	1977	112	.	.	.	.	
NED	1978	74	.	2	.	.	
NED	1979	2	.	.	.	.	
NED	1980	134	.	2	.	.	
NED	1981	250	4	.	.	.	
NED	1982	12	.	2	.	.	2 > Lmax
NED	1983	116	.	12	.	.	
NED	1984	48	4	.	.	.	
NED	1985	6	2	.	.	.	
NED	1986	8	6	.	.	.	
NED	1987	35	.	.	.	.	
NED	1988	24	.	.	.	.	
NED	1989	102	.	.	.	.	
NED	1990	106	.	.	.	.	

NED	1991	3318	.	50	.	.	2 > Lmax
NED	1992	1278	14	4	.	.	
NED	1993	2204	28	178	.	.	
NED	1994	832	2	74	.	.	2 > Lmax
NED	1995	558	.	18	.	.	
NED	1996	132	.	.	.	.	
NED	1997	160	.	48	.	.	
NED	1998	48	.	2	.	.	
NED	1999	32	2	32	.	.	
NED	2000	46	.	8	.	.	
NED	2001	8	2	2	.	.	
NED	2002	90	.	54	.	.	
NED	2003	40	3	122	.	.	
NED	2004	137	6	120	.	.	
NED	2005	113	.	74	.	.	2 > Lmax
NOR	1971	.	.	.	9	.	
NOR	1976	.	.	.	.	131	
NOR	1977	80	.	.	16	.	
NOR	1978	.	.	.	.	44	
NOR	1979	4	8	.	.	164	
NOR	1980	21	.	.	.	8	
NOR	1981	.	.	.	.	6	
NOR	1982	2	.	.	28	.	
NOR	1984	.	.	.	322	.	
NOR	1985	70	.	.	.	.	
NOR	1986	.	.	.	19	.	
NOR	1987	10	.	.	.	.	
NOR	1988	.	.	.	4	.	
NOR	1989	4	.	.	.	.	
NOR	1991	.	.	.	84	.	
NOR	1992	.	.	.	473	.	
NOR	1993	.	.	.	189	.	
NOR	1994	.	.	.	305	.	
NOR	1995	12	.	.	216	.	
NOR	1996	46	.	.	112	.	
NOR	1997	4	.	.	34	.	
NOR	1998	.	.	.	64	.	
NOR	1999	28	.	.	333	.	
NOR	2000	648	.	.	.	.	
NOR	2001	257	.	6	.	.	6 > Lmax
NOR	2002	61	139	.	.	.	
NOR	2003	450	100	.	.	.	
NOR	2004	461	383	106	.	.	10 > Lmax
NOR	2005	78	248	.	.	.	
SCO	1970	18	.	.	.	.	
SCO	1971	9	.	.	303	.	
SCO	1972	5	.	.	183	.	
SCO	1973	104	18	.	.	.	
SCO	1974	379	60	.	.	.	
SCO	1975	24	.	.	.	.	
SCO	1976	1354	.	.	.	.	
SCO	1977	48	.	.	43	.	
SCO	1978	363	3	.	.	.	
SCO	1979	123	26	.	.	.	
SCO	1980	88	63	.	.	.	
SCO	1981	12	.	.	.	.	
SCO	1982	18	7	.	.	.	
SCO	1983	115	2	.	.	.	
SCO	1984	135	45	.	.	.	
SCO	1985	46	31	.	.	.	
SCO	1986	81	82	2	1	.	
SCO	1987	56	11	.	.	.	
SCO	1988	46	3	.	.	.	
SCO	1989	87	79	.	.	.	
SCO	1990	94	44	.	.	.	
SCO	1991	401	95	1	.	.	9 > Lmax
SCO	1992	350	150	.	.	.	28 > Lmax
SCO	1993	169	100	.	.	.	
SCO	1994	132	40	.	.	.	
SCO	1995	48	20	.	.	.	
SCO	1996	73	61	.	.	.	
SCO	1997	53	38	.	.	.	
SCO	1998	105	99	.	.	.	2 > Lmax
SCO	1999	175	158	.	.	.	
SCO	2000	203	80	.	.	.	
SCO	2001	220	80	.	.	.	
SCO	2002	308	112	.	.	.	8 > Lmax
SCO	2003	372	64	.	.	.	
SCO	2004	304	52	.	.	.	
SCO	2005	280	98	.	.	.	
SWE	1972	.	254	.	.	.	
SWE	1974	.	1	.	.	.	
SWE	1976	1	2	.	.	.	

SWE	1977	2	40	.	.	.	
SWE	1978	.	1	.	.	.	
SWE	1979	.	248	.	.	.	
SWE	1980	2	54	.	2	.	
SWE	1981	2	82	.	2	.	8 > Lmax
SWE	1982	11	13	.	50	.	
SWE	1983	6	126	.	.	.	
SWE	1984	40	93	.	.	.	
SWE	1985	10	100	.	.	.	
SWE	1986	50	228	.	.	.	
SWE	1987	468	201	.	.	.	
SWE	1988	4	82	.	.	.	
SWE	1989	148	90	.	.	.	
SWE	1990	90	887	.	.	.	
SWE	1991	1338	4234	.	.	.	
SWE	1992	2390	2784	.	.	.	
SWE	1993	1020	3855	.	.	.	
SWE	1994	335	4610	.	.	.	
SWE	1995	574	3922	.	.	.	
SWE	1996	128	1396	.	.	.	
SWE	1997	106	2835	.	.	.	
SWE	1998	137	8767	.	.	.	
SWE	1999	600	4619	.	.	.	
SWE	2000	438	1373	.	.	.	5 > Lmax
SWE	2001	472	1239	.	.	.	
SWE	2002	880	1257	.	.	.	
SWE	2003	476	1948	.	.	.	
SWE	2004	607	2580	.	.	.	
SWE	2005	711	1816	4	.	.	

The determination of dragonets up to only the genus *(Callionymus)* or family *(Callionymidae)* level by Denmark, Sweden and Scotland as mentioned in the previous section, is restricted to only a few years. Norway has consequently reported large numbers of dragonets by only genus or family name, but seriously improvements have been made during the last 5 years and all dragonets were determined up to species level.
All countries seem to have had problems with the identification of these three species according to the numbers that exceed the reported maximum length of one or the other. Denmark has never positively identified the reticulated dragonet and the numbers of the spotted dragonet reported in the early 1990s were relatively large compared with other countries. England started to report spotted dragonets in 1989 and the reticulated dragonet in 1993, suggesting that before the latter date species identifications were uncertain. This also applies to French data before 2001 and GFR data before 2002. Netherlands has consistently reported relatively large numbers of the reticulated dragonet, although a few appear to have been misidentified and presumably have been spotted dragonets. Norway has reported the two smaller species only since 2001, but the reticulated ones appear to be incorrect. Scotland has consistently reported spotted dragonets, some of which appear to have been common dragonets, whereas reticulated dragonets were rarely reported. Sweden finally covers an area, where the abundance of spotted dragonets exceeds the one of common ones. However, in the early years common dragonets appear to have been somewhat underestimated.

The Dutch catches clearly indicate that the distributions of the spotted and reticulated dragonet hardly overlap, the former being distributed in waters deeper than 50 m and particularly around Scotland, while the latter is restricted to the shallower depth range in the south. It appears that at present we are not able to estimate the exact distributions nor the temporal trends in any of these species and the future identification needs careful attention. It might be possible to correct the identifications based on the differences in spatial distributions. However, as a first step all records with specimens of reticulated dragonets above 12 cm should be recorded as spotted dragonets and all spotted dragonets >20 cm as common dragonets.

13.7 Proposed corrections

Change			**Into**		
tsn	**nodc**	**name**	**tsn**	**nodc**	**name**
171691	884601000000	CALLIONYMIDAE	171692	884601010000	CALLIONYMUS

Change			**Into**	
tsn	**name**	**lngtclass**	**tsn**	**name**
171712	C. RETICULATUS	[>=13 <21 cm]	171699	C. MACULATUS
171712	C. RETICULATUS	[>=21 cm]	171698	C. LYRA

171699	C. MACULATUS	[>=21 cm]	171698	C. LYRA

13.8 Recommendation:

All countries should be very careful with reporting dragonets and aim for a determination at species level. Specimens should be kept frozen for exchange.

14 *Zeugopterus* – Topknots

14.1 Coding

DATRAS records 3 species (Topknot - *Z. punctatus*; Norwegian topknot - *Z. norvegicus*; and Eckström's topknot -*Z. regius*) as well as the genus unspecified (*Zeugopterus*). *Z. norvegicus* and *Z. regius* were formerly distinguished as a separate genus: *Phrynorhombus*. The following codes have been used:

Latin name	tsn-code	NODC	Synonym
Zeugopterus	**172828**	**885703210000**	
Zeugopterus punctatus	**172829**	**885703210100**	
		885703220000	*Phrynorhombus* **(172830)**
Zeugopterus norvegicus	**616613**	**885703220100**	*Phrynorhombus norvegicus* **(172831)**
Zeugopterus regius	**616605**	**885703220200**	*Phrynorhombus regius* **(172832)**

Zeugopterus norvegicus

Zeugopterus punctatus

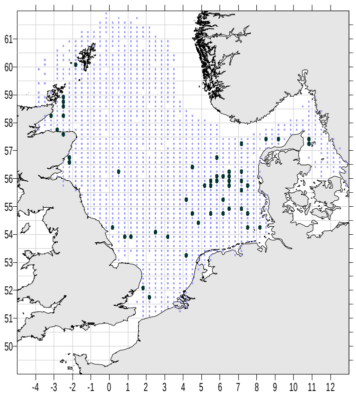
Zeugopterus regius

14.2 Length-frequency distribution

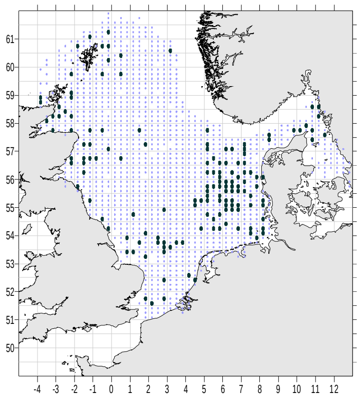
Size class	885703210000 *Zeugopterus*	885703210100 *Z. punctatus*	885703220100 *Z. norvegicus*	885703220200 *Z. regius*	comments
3	.	.	4	.	
4	.	6	4	.	
5	.	14	21	1	
6	2	33	57	1	
7	2	32	88	1	
8	.	29	158	4	
9	.	81	139	2	
10	.	73	38	1	
11	.	42	20	4	
12	.	99	17	1	
13	.	24	4	.	
14	.	10	2	.	
16	.	5	.	.	
18	.	4	.	.	
22	.	.	1	.	
29	.	2	.	.	

According to Wheeler (1978), *Z. norvegicus* is the smaller species (Lmax=12 cm) and *Z. punctatus* the larger one (Lmax=25cm) , while *Z. regius* is intermediate (Lmax=20 cm). However, later records have shown that *Z. norvegicus* may grow up to an Lmax of 14 cm rather than 12 cm. Although the one 22cm record for *Z. norvegicus* seems highly unlikely and suggests confounding with *Z. punctatus*, the other records would seem to fit well within their reported size ranges.

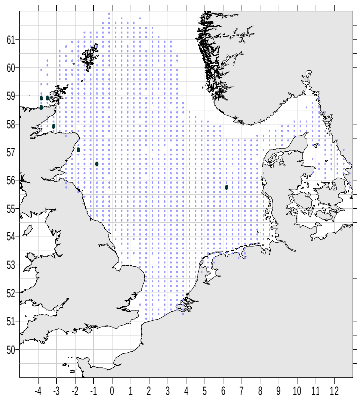
14.3 Presence-absence by species



Z. punctatus



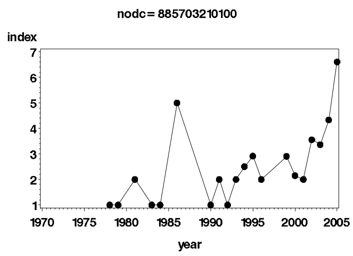
Z. norvegicus

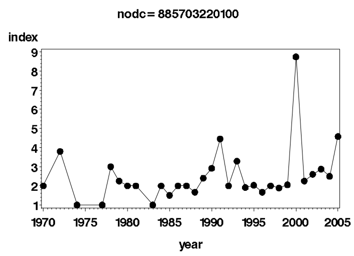


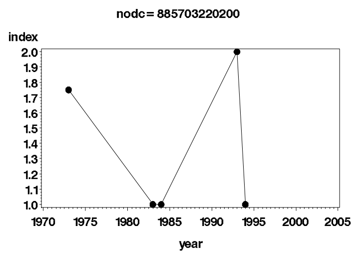
Z. regius

These maps would indicate quite a bit of overlap in distribution between *Z. punctatus* and *Z. norvegicus*, with *Z. regius* largely restricted to Scottish waters (with one outlier). The apparent distribution of the former two species does not correspond with existing knowledge (Wheeler, 1978): *Z. punctatus* is an uncommon flatfish of rather restricted distribution, living among rocks in shallow waters (1-25 m), while *Z. norvegicus* is a moderately common flatfish on rough grounds living at depths of 20-50m. *Z. regius* is relatively uncommon and confined to offshore rocky grounds to the West of the British isles and therefore, rare catches in Scottish North Sea waters might be expected.

14.4 Trends in abundance







Annual catch rates of all three species fluctuate widely from year to year, but both *Z. punctatus* and *Z. norvegicus* appear to have increased in abundance over the survey period.

14.5 Consistency in reporting among countries

(NB. the catches refer to numbers-per-hour-fishing; because most hauls have a duration of 30 minutes, the numbers are often multiples of 2):

***Zeugopterus* - 885703210000**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE	comments
6	.	.	.	.	2	.	.	.	
7	.	.	.	.	2	.	.	.	

***Z. punctatus* - 885703210100**

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
4	.	.	2	4	.	.	.	.
5	8	.	.	6	.	.	.	.
6	20	.	6	4	.	.	3	.
7	16	.	6	2	.	.	8	.
8	10	.	12	4	.	.	3	.
9	42	.	14	20	.	.	5	.
10	48	.	8	14	.	.	1	2
11	30	.	12	.	.	.	.	.
12	97	.	.	2	.	.	.	.
13	24	.	.	.	.	.	.	.
14	10	.	.	.	.	.	.	.
16	4	.	.	.	.	.	1	.
18	2	.	2	.	.	.	.	.
29	.	.	.	.	.	.	.	2

Z. norvegicus - 885703220100

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
3	.	.	.	2	.	.	.	2
4	.	.	.	.	.	.	.	4
5	.	6	2	4	.	.	1	8
6	.	11	2	20	4	.	12	8
7	.	16	12	16	6	.	9	29
8	2	26	29	18	32	2	8	41
9	.	30	51	18	4	5	11	20
10	.	10	6	2	1	4	3	12
11	.	3	4	2	2	8	1	.
12	.	.	2	.	.	14	1	.
13	.	.	.	.	4	.	.	.
14	.	.	.	.	2	.	.	.
22	.	.	.	.	.	.	1	.

Z. regius - 885703220200

Size Class	DEN	ENG	FRA	GFR	NED	NOR	SCO	SWE
5	.	.	.	.	.	.	1	.
6	.	.	.	.	.	.	1	.
7	.	.	.	.	.	.	1	.
8	.	.	.	.	.	.	4	.
9	.	.	.	.	.	.	2	.
10	.	.	.	.	.	.	1	.
11	.	.	.	.	.	.	4	.
12	.	.	.	.	.	.	1	.

These tables show some major discrepancies in reporting of species between countries: England, the Netherlands have never reported *Z. punctatus*, while Denmark has only reported 2 *Z. norvegicus*. France, Germany and Scotland report these two species in similar quantities. Sweden is responsible for 2 *Z. punctatus*,but predominantly reports *Z. norvegicus*. Norway has reported only very few *Z. norvegicus*. Of course countries operate to some extent in different areas and therefore some differences might be expected for species with restricted distribution areas. However, all stations are fished by at least two countries and it would seem highly unlikely that such large differences could emerge from proper species identifications. Scotland is the only country that has reported *Z. regius*.

14.6 Consistency in reporting within countries among years

The next table identifies the number of records by species, country and year (excluding that have not or hardly reported *Z. punctatus*):

Country	year	885703210000 *Zeugopterus*	885703210100 *Z. punctatus*	885703220100 *Z. norvegicus*	885703220200 *Z. regius*	comments
DEN	1991	.	2	.	.	38F4; both >14 cm; presumably Z. punctatus
DEN	1995	.	4	.	.	
DEN	1999	.	2	2	.	
DEN	2000	.	16	.	.	
DEN	2001	.	2	.	.	
DEN	2002	.	18	.	.	
DEN	2003	.	50	.	.	
DEN	2004	.	22	.	.	41F0; 4>14 cm; prob. Z. punctatus
DEN	2005	.	195	.	.	
ENG	1984	.	.	2	.	
ENG	1986	.	.	4	.	
ENG	1987	.	.	4	.	
ENG	1988	.	.	16	.	
ENG	1989	.	.	10	.	
ENG	1990	.	.	30	.	
ENG	1991	.	.	21	.	
ENG	1992	.	.	2	.	
ENG	1993	.	.	2	.	
ENG	1994	.	.	2	.	
ENG	1995	.	.	2	.	
ENG	1996	.	.	2	.	
ENG	1997	.	.	2	.	
ENG	2001	.	.	3	.	
FRA	1990	.	.	2	.	
FRA	1991	.	2	.	.	
FRA	1993	.	2	.	.	
FRA	1994	.	2	.	.	
FRA	1995	.	24	.	.	
FRA	1996	.	2	.	.	
FRA	1997	.	.	4	.	
FRA	1999	.	.	2	.	
FRA	2000	.	4	37	.	
FRA	2001	.	2	.	.	

FRA	2002	.	8	38	.	
FRA	2003	.	.	17	.	
FRA	2004	.	6	.	.	41F0: 2>14 cm; prob. Z .punctatus
FRA	2005	.	10	8	.	
GFR	1981	.	.	2	.	
GFR	1985	.	.	2	.	
GFR	1986	.	10	.	.	
GFR	1987	.	.	2	.	
GFR	1989	.	.	6	.	
GFR	1990	.	.	4	.	
GFR	1992	.	.	6	.	
GFR	1993	.	.	10	.	
GFR	1994	.	.	8	.	
GFR	1995	.	.	18	.	
GFR	1996	.	.	2	.	
GFR	1998	.	.	16	.	
GFR	1999	.	46	.	.	
GFR	2000	.	.	2	.	
GFR	2002	.	.	4	.	
NED	1970	.	.	2	.	
NED	1978	.	.	4	.	
NED	1991	4	.	2	.	
NED	1992	.	.	4	.	
NED	1993	.	.	2	.	
NED	1995	.	.	4	.	
NED	1997	.	.	2	.	
NED	2005	.	.	35	.	
NOR	1978	.	.	2	.	
NOR	1979	.	.	28	.	
NOR	2004	.	.	3	.	
SCO	1972	.	.	19	.	
SCO	1973	.	.	.	7	
SCO	1974	.	.	1	.	
SCO	1977	.	.	1	.	
SCO	1978	.	1	.	.	
SCO	1979	.	2	1	.	
SCO	1980	.	.	2	.	
SCO	1983	.	2	1	1	
SCO	1984	.	1	.	4	
SCO	1985	.	.	4	.	
SCO	1986	.	7	.	.	
SCO	1988	.	.	1	.	
SCO	1990	.	1	.	.	1>14 cm; probably Z. punctatus
SCO	1991	.	.	8	.	1>14 cm; probably Z. punctatus
SCO	1992	.	2	.	.	
SCO	1993	.	.	.	2	
SCO	1994	.	3	1	1*	*40F6; unlikely identification
SCO	1996	.	.	1	.	
SCO	1998	.	.	3	.	
SCO	1999	.	.	2	.	
SCO	2000	.	2	.	.	
SCO	2001	.	.	2	.	
SWE	1981	.	2	.	.	
SWE	1984	.	.	2	.	
SWE	1991	.	2	18	.	
SWE	1993	.	.	22	.	
SWE	1994	.	.	2	.	
SWE	1995	.	.	4	.	
SWE	1999	.	.	12	.	
SWE	2000	.	.	24	.	
SWE	2001	.	.	2	.	
SWE	2002	.	.	4	.	
SWE	2003	.	.	4	.	
SWE	2004	.	.	2	.	
SWE	2005	.	.	28	.	

Among a set of 52 country/year combinations, only in 7 cases have both species been recorded. In all other cases, countries reported either one species or the other. In the case of Germany and to a lesser extent France and Scotland, this happened consistently in alternating years. The emerging pattern leaves no other conclusion than that the species identifications for topknots in the IBTS have been highly unsatisfactory and something has to be done about this, either within DATRAS or before using DATRAS.

14.7 Proposed corrections

The 2 records in DATRAS for *Zeugopterus spp*. refer to a Dutch catch of two individuals in rectangle 50E8 in 1991:

Country	Year	Quarter	Haul no	Rectangle	Length class	N/hr
NED	1991	1	?	50E8	6	2
NED	1991	1	?	50E8	7	2

A check with the original data revealed that these two fish have been recorded as ***Z. norvegicus***. Somehow a coding error appears to have occurred and the records in DATRAS should be corrected accordingly.

Although it seems almost certain that the greater majority of the *Z. punctatus* records refer to *Z. norvegicus*, undoubtedly the odd *Z. punctatus* has been caught, as indicated by specimens that are larger than the reported Lmax of 14 cm for *Z. norvegicus*. Assuming that most identifcations of Z.norvegicus are correct, we suggest to make the following corrections before using DATRAS:

DENMARK: The more common species has been rarely reported. Because of uncertain identification, all catches of *Z. punctatus* with the exception of those that are larger than 14 cm should be identified as *Zeugopterus spp*.

ENGLAND: English records of topknots correspond closely to those from the Netherlands and never exceed the Lmax. They can be safely assumed to be correct.

FRANCE: French records of the two species jump up an down from one year to another and appear to be highly inconsistent, although in recent years more than one species has been recorded annually. Because of uncertain identification, all catches of *Z. punctatus* with the exception of those that are larger than 14 cm should be identified as *Zeugopterus spp*.

FEDERAL REPUBLIC OF GERMANY: Interannual records are inconsistent, with Z. punctatus being recorded only in two years, when *Z. norvegicus* was not recorded. All *Z. punctatus* records should be assigned to *Z. norvegicus*,

NETHERLANDS: The two records in 50E8 in 1991 referring to *Zeugopterus spp.* have been checked and because of a coding error, should be assigned to *Z. norvegicus*. *Z. punctatus* has never been positively identified during a Dutch IBTS, although a few records from other surveys have been confirmed. All records of *Z. norvegicus* can be trusted.

NORWAY: Reports the lowest numbers, which may well have been influenced by their allocation of deeper waters of the northeasten North Sea. The records are supposedly correct.

SCOTLAND: reports of the three species have been somewhat erratic over time as well as spatially and there has been an identification problem, as indicated by an excessively large *Z. norvegicus*. However, there is no obvious reason to mistrust the reports of *Z. regius* in Scottish waters. Because of uncertain identification, all catches of *Z. punctatus* and *Z. norvegicus* should be identified as *Zeugopterus spp*., with the exception of the 22 cm specimen, which should be assigned to *Z. punctatus*. Also, the record of *Z. regius* in rectangle 40F6 in 1994, a long way from the usual distribution area, should be assigned to *Zeugopterus spp*.

SWEDEN: There is no obvious reason to doubt the single record of *Z. punctatus*. All data are supposedly correct.

14.8 Recommendation

In view of the continuing inconsistency in records of topknots, participants in the IBTS should ensure that all specimens of *Z. punctatus* and *Z. regius* recorded are at least photographed and pictures exchanged.

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