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

30 March–3 April 2009

Bergen, Norway

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CIEM Conseil International pour l'Exploration de la Mer

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IBTS

INTERNATIONAL-BOTTOM-TRAWL-SURVEYS

Executive summary

Highlights

- The national contributions to all surveys coordinated by the WG are reported in a standard reporting format (Section 4). The working groups using this information are urged to provide feedback.
- Over the past years, considerable progress has been made in the functionalities of DATRAS, the ICES DAtabase for TRAwl Surveys that stores information on vessel, gear, hydrographic and catch parameters (Sections 6, 8, 9). The WG is still of the opinion that DATRAS should be supported by the establishment of a dedicated User Group to evaluate the functionality of the database, to provide feedback by data submitters and data users, to suggest updates of the system where needed, and to prioritize future developments (Section 7).
- To aid studies on time-series trends in population structures, the signal strength of IBTS survey data were evaluated using the software package SURBA on age structured haddock data in Q3–4 IBTS surveys as a case study (Section 5). The outcome of the analysis is promising, because natural structure within the cpue data can often be seen, even with low or variable catch rates.

The International Bottom Trawl Survey Working Group (IBTSWG) met in Bergen, Norway, from 30 March to 3 April 2009. There were 21 participants from 12 countries all involved in designing and conducting bottom-trawl surveys and one participant represented the ICES Secretariat.

All terms of reference have been met; details are given in relevant Sections (see Table of contents). Major developments, achievements and recommendations from the 2009 meeting are given below:

Presentation of survey results

Individual surveys coordinated by IBTSWG are presented using a standard reporting format providing information on survey design, coverage, and aggregated results for the most important species. This format provides a centralized and easily accessible overview of specific survey datasets, to those using the data. In a number of maps the distribution of some major species throughout the entire area covered by IBTS surveys is shown (see Section 4).

Gear parameters

Quality control of survey gear is a key issue of the IBTSWG. Some explorations of the NS IBTS catch data in combination with available gear parameters have shown that there is no apparent overall trend but that individual countries may have a drift with their gear performance (see Section 6). There appears to be many gaps in the database and all countries need to check whether they have submitted all available information. The IBTSWG suggests that the reporting of gear performance should be routinely checked.

Data quality

The increased use of IBTS data for studies on fish assemblages and diversity has resulted in the requirements for improved data checking, especially of the non-commercial species, to ensure high quality of the data, and the IBTSWG has increas-

ingly considered these issues in recent years. Section 9 reports on the progress made in individual countries to improve the quality of historical IBTS data.

Section 8 of the report provides details for a check of the North Sea data for years 1997–2008. The data were checked for inconsistencies in species recorded, length-distributions and geographical distributions. Institutes that participate in the surveys are requested to use the outcome of these checks to correct their data and resubmit these to DATRAS.

DATRAS database

Over the last years considerable progress has been made in the functionalities of DATRAS, the trawl survey database at ICES. The WG is still of the opinion that DATRAS should be supported by the establishment of a dedicated User Group to evaluate the functionality of the database, in order to provide feedback by data submitters and data users, to suggest updates of the system where needed, and to prioritize future developments (Section 7).

Review of abundance indices

Survey catch data (cpue) can represent a population or stock and therefore be used to study time-series trends in population structure. The IBTSWG evaluated the signal strength in IBTS surveys using the software package SURBA on age structured haddock data in Q3–4 IBTS surveys as a case study (Section 5). The outcome of the analysis is promising, because natural structure within the cpue data can often be seen, even with low or variable catch rates. Furthermore, where age structured data are not relevant or of sufficient precision, similar use can be made of length frequencies or other structures. Future work includes the production of a generalized working document, using the case study on haddock as an example, so that IBTS data for various stocks can be reviewed in a standard format.

Outcome of SGSTS

The final report of SGSTS was not yet available and therefore has not been discussed.

Depth strata for Western and Southern Areas

Unfortunately no agreement was reached on the shape files to be used for the depth strata for the surveys in the Western and Southern areas.

Update of survey manuals

It has been a number of years because the IBTS manuals have been revised for the last time. Several items were proposed to be updated or added to the next revision. It was agreed that both the manual for the North Sea IBTS and the manual for the IBTS in the Western and Southern waters will be revised intersessionally and presented at the next IBTSWG meeting.

1 Terms of Reference and participation

The **International Bottom Trawl Survey Working Group** [IBTSWG] (Chair: R. ter Hofstede, The Netherlands) will meet in Bergen, Norway, from 30 March–3 April 2008 to:

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

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

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

d) review recent updates within DATRAS and prioritize further developments ;

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

f) review national progress in improving quality of historical IBTS data;

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

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

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

j) review the IBTS manuals and update as necessary;

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

2 Introduction

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

The IBTSWG assumed responsibility for coordinating western and southern division surveys in 1994. Initially progress in coordination was slow but in the last few years there has been a marked improvement and whilst data exchange etc. is not at the level of that enjoyed in the North Sea, there is excellent cooperation between the participating institutes.

In recent years, the IBTSWG is developing the accessibility and quality of their data (including trawl, vessel, environmental, and catch parameters) by storing these in a common database at ICES headquarters, i.e. DATRAS (Database for TRAwl Surveys). The IBTSWG aims to store all data collected during IBTSurveys in this database, to allow an easy supply to different users. Currently, the IBTSWG is focussing on the detection and correction of errors in the historical data, and the development of protocols for prevention of storage of future errors, eventually resulting in one large, high quality database.

Also recently, there has been discussion about the lack of communication between survey coordinators and assessment working groups about the survey data used in assessments. Already the IBTSWG has modified the structure of the report to be more informative about the latest survey results. This year, the IBTSWG evaluated the signal strength in IBTS surveys using the software package SURBA on age structured haddock data in Q3–4 IBTS surveys as a case study. The outcome of the analysis is promising and future work includes the review of IBTS data for various stocks.

3 Review of IBTSWG 2008 recommendations

3.1 IBTS North Sea Q1 and Q3 coordination

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

This recommendation is implemented and the timing of the surveys has improved.

3.2 Extension of NS-IBTS Q1 into the Eastern Channel

The IBTSWG recommends that the extension of the North Sea IBTS programme with 5 rectangles into the Eastern Channel will also take place in 2009, however emphasizes that the first priority must be given to GOV hauls and MIK samples as required in the IBTS protocol, and that additional surveying (e.g. acoustics, CUFES samples) are carried out only if it does not delay the regular IBTS programme.

This recommendation is implemented and without further notice will be executed similarly in future.

3.3 Roundfish area 10

The IBTSWG recommends to name the area in the Eastern Channel "roundfish area 10", in addition to the other 9 roundfish areas that are covered by the North Sea IBTS.

This recommendation is implemented.

3.4 International workshop on the identification of clupeid larvae

The IBTSWG recommends a workshop on the identification of fish larvae and eggs to ensure data quality and especially deal with possible misidentifications of sprat, herring and other clupeid larvae.

This recommendation is implemented and the ICES Workshop on the Identification of Ichthyoplankton, especially Clupeid Larvae (WKIDCL) is scheduled for 1–3 September 2009 in Hamburg. It is emphasized that the success of the workshop is highly dependent on a good coverage of required expertise of the participants.

3.5 Measuring mesh size

The IBTSWG recommends that for quality control of survey gear with respect to the control of mesh size, stretched mesh measurement protocol should be used.

This recommendation is implemented and the manuals will be updated accordingly (Section 13).

3.6 DATRAS User Group

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

A DATRAS user group has not been initiated yet. It has been suggested that the functionality of DATRAS falls within the responsibilities of the ICES Working Group on Data and Information Management (WGDIM), because the main objective of this group is to ensure that needs of users are met and it has a key role to act as a mediator between Users/WGs and the Data Centre to prioritize activities, to ensure appropriate experts are available, and to give reasons for priorities.

However, the idea behind the DATRAS user group is that it supports the ICES Datacenter in issues that are too specific to be dealt with within WGDIM that only meets annually. Therefore, the recommendation for the establishment of a DATRAS User Group remains standing.

3.7 Maturity staging of 4 gadoid species

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

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

- *The ICES secretariat will be asked to update the ICES DATRAS database to be able to handle the reporting of 6 maturity stages.*

The working group makes the remark that the available draft manuals for the reporting of the 6 maturity stages created by WKMSCWHS are not fully functional yet and lack some essential information, e.g. pictures of specific stages. Some countries have collected additional material to be used for finalizing the manuals which will be supplied by the coordinator Rikke Hagstrom Buholtz, DTU-aqua.

All countries were supposed to implement the use of the 6 maturities scales from 2009 onwards, but the Netherlands and France failed to do this, leading to inconsistencies in the DATRAS database (i.e. mixed storage of 2 different types of scaling within a combined international survey). To avoid the use of flagging and to make it clear for now and in future which scale is used, the Working Group proposes the following: Continue reporting 4 stage maturity scale data as it is now (-9,1,2,3,4), and store all 6 stage maturity scale data using new values, namely -9,61,62,63,64,65,66.

Furthermore it is strongly recommended that *all* IBTS Q1 participants start using the 6 scale maturity stages from 2010 onwards, to assure consistency in the combined dataset. Furthermore it should be noted that the 6-stage scale, cannot be "translated" back into the 4 stage scale. Surveys within the other seasons remain using the 4 scale maturity stages as in the past.

The manual of the IBTS surveys will be updated accordingly (Section 13).

3.8 Stratification CGFS

The IBTSWG recommends that stratification based on the results from studies about habitat and fish assemblage in the area covered by the CGFS should be further investigated and used to compute abundance indices as this could increase precision and year to year consistency. Results of these investigations should be presented at the 2009 meeting of the IBTSWG prior to agreement of this stratification.

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

Results of a first investigation were presented at the 2009 meeting and discussed. This study compares the"CGFS whiting indices" used by the WGNSSK working group and a"new CGFS index" based on communities' stratification (Working document 1, Annex 5). The first index defined by ICES is based on the average indices by ICES rectangle and the second one is supported by a study which splits the Eastern English Channel in four fish communities in relation to their environmental parameters (Vaz *et al.*, 2007). As a result, it seems that whatever the method used, the same trend is observed and the indices remain inconsistent. This may likely be explained by the fishing effects and the fact that the Eastern English Channel is a continuum in the whiting distribution.

In this study, only the whiting was investigated and no improvement was observed to increase precision and year to year consistency for this species. So, the working group recommends that more investigations must be done including also some other

species in order to know whether the results obtained on whiting are as a result of a "species effect" or as a result of the survey design.

3.9 Objectives IBTSWG

The IBTSWG proposes a definition of their remits, including a set of criteria as drafted last year, and asks RCM for its approval

During the ICES Annual Science Conference the RCM fully agreed upon the proposed objectives of the IBTSWG as drafted in the IBTSWG report of 2008, Section 11.1.

In addition, during ConC in Halifax 2008, ICES started the process of collating the information about expertise in the Expert Groups of science committees. On request of ICES, the IBTSWG summarized by correspondence its current remit and its potential within the ideas of the ICES Science Plan as follows:

The International Bottom Trawl Survey Working Group [IBTSWG]

- To coordinate and plan the IBTSurveys (>17 surveys)
- To provide expert advice to ensure the survey quality, data quality and consistency of the IBTSurveys for use in fisheries stock assessments
- To supervise the development and integration of the IBTSurveys
- This group is now core to the coordination of bottom-trawl surveys in the ICES area and contributes to many assessment and advisory groups. A current definition of the remit of the IBTSWG can be found in its report of 2008, Section 11.1.

4 North Sea and Eastern Atlantic Surveys (ToR a)

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

4.1 Q1 North Sea

4.1.1 General overview

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

Seven vessels participated in the quarter 1 survey in 2009: "Argos" (Sweden), "Dana" (Denmark), "G.O. Sars" (Norway), "Scotia" (Scotland), "Thalassa" (France), "Tridens II" (Netherlands) and "Walther Herwig III" (Germany). The survey covered the period 16 January to 1 March (see Table 4.1.1). In total, 387 GOV and 640 MIK hauls were carried out (see Figure 4.1.1). All rectangles were covered, most of them by two or more GOV hauls. Although not every rectangle was sampled with 4 MIK stations as planned, the overall coverage of the MIK sampling was quite good.

Last year Denmark used groundgear B during 2 out of 46 hauls (although wrongly referred to as "rock-hopper gear" in last year's report), this year groundgear B was used during 16 out of 44 stations. The IBTSWG recommends that these stations are flagged in Datras as "non standard".

Denmark also reports to have collected biological material for *Mullus barbatus*. This is a wrongly identified species and should be replaced by *M. surmulletus* and highlights the sort of problems with species identification discussed in Chapter 8.

Table 4.1.1. Overview of the surveys performed during the North Sea IBTS Q1 survey in 2009.

SURVEY:	NORTH SEA IBTS Q1	DATES:	JANUARY – FEBRUARY 2009
NATION:	VESSEL:	PERIOD:	
Denmark	Dana	30 January – 9 February	
France	Thalassa	16 January – 14 February	
Germany	Walther Herwig III	23 January – 18 February	
Netherlands	Tridens 2	26 January – 26 February	
Norway	G.O. Sars	5 February – 1 March	
Scotland	Scotia 3	26 January – 17 February	
Sweden	Argos	19 January – 5 February	

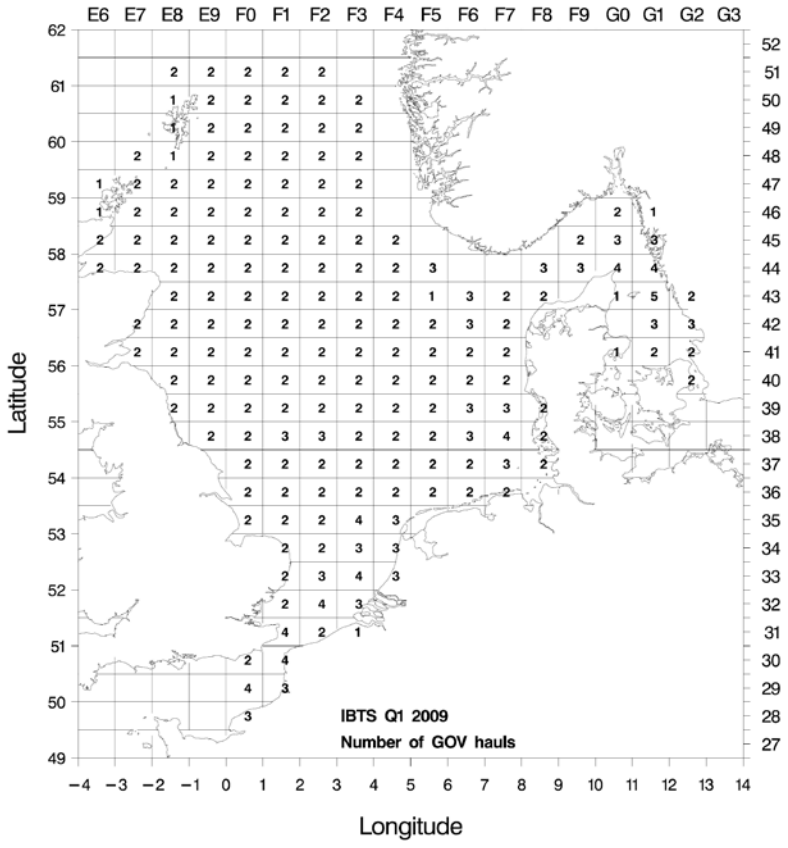


Figure 4.1.1. Number of hauls per ICES-rectangle with GOV during the North Sea IBTS Q1 2009.

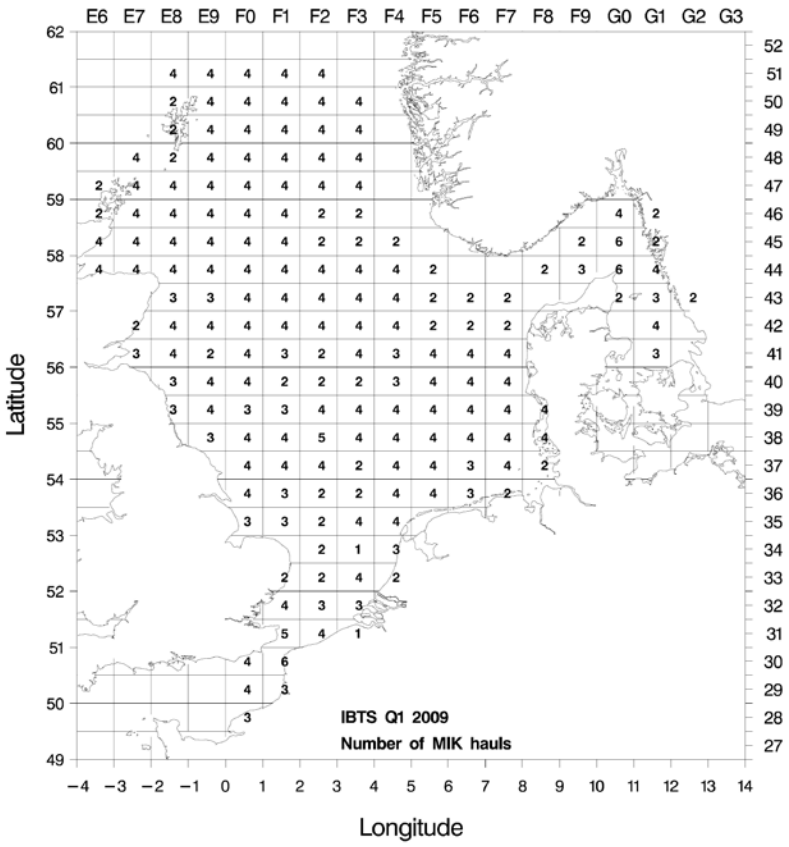


Figure 4.1.2. Number of hauls per ICES-rectangle with MIK during the North Sea IBTS Q1 2009.

4.1.2 Survey summaries by country

4.1.2.1 Denmark – North Sea Quarter 1 IBTS

Nation:	**Denmark**	Vessel:	RV Dana
Survey:	01/09	Dates:	30 January-9 February 2009

Cruise	The IBTS North Sea Q1survey aims to collect data on the distribution, relative abundance and biological information on a range of fish species in ICES area IIIa and IV. CTD was deployed at each trawl station to collect temperature and salinity profiles. Age data were collected for cod, haddock, whiting, saithe, Norway pout, herring, mackerel and sprat. Sampling for herring larvae is carried out during night-time
Gear details:	The bottom trawl used is the GOV (Grande Ouverture Verticale), during 16 hauls groundgear B was used. Herring larvae are sampled with a MIK-net (Methot Isaac Kidd).
Notes from survey (e.g. problems, additional work etc.):	The cruise plan was fulfilled as planned. SCANMAR data were collected during all hauls.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 70 species of fish were recorded during the survey.

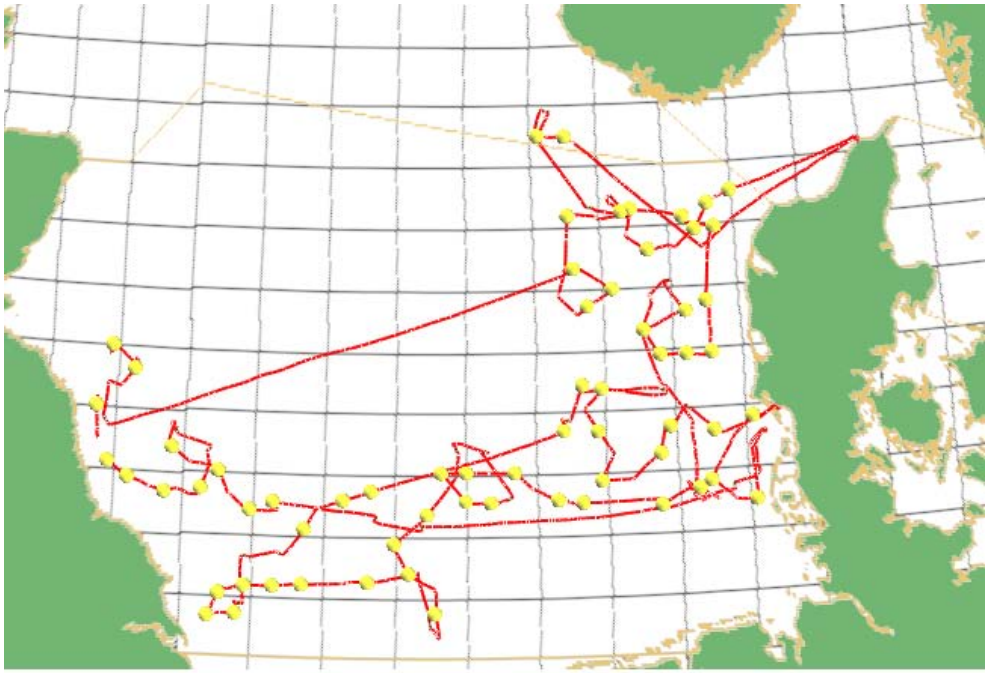
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	GOV	28	28		0	100	
		GOV-B	16	16				
		MIK	80	80				

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

SPECIES	AGE	SPECIES	AGE
Clupea harengus	629	*Limanda limanda*	-
Gadus morhua	174	*Scomber scombrus*	0
Melanogrammus aeglefinus	319	*Lophius piscatorius*	4
Merlangius merlangus	521	*Merluccius merluccius*	2
Pollachius virens	1	*Mullus barbatus*	4
Sprattus sprattus	413	*Psetta maxima*	6
Psetta maxima	7	*Trachurus trachurus*	82
Trisopterus esmarki	102	*Pleuronectes platessa*	430
Microstomus kitt	65	*Solea solea*	1

Cruise track of Dana during the Q1 IBTS 2009



4.1.2.2 France – North Sea Quarter 1 IBTS

Nation:	**France**	Vessel:	Thalassa
Survey:	IBTS09	Dates:	16 January–14 February 2009

Cruise	Participation to the North Sea IBTS Q1 survey. France sampled the southern part of the North Sea and the Eastern English Channel. A CTD was deployed at each trawl station to collect temperature and salinity profiles. Age data were collected for the main species. Sampling for herring larvae (MIK) was carried out during night-time.
Gear details:	The gear used is the IBTS standard GOV 36/47 with groundgear A, Exocet kite and with SCANMAR door, wing (unavailable for some hauls) and vertical openning sensors. For larvae the standard MIK net is used.
Notes from survey (e.g. problems, additional work etc.):	The Thalassa left Cherbourg (France) the 16 January. The English Channel was covered first; two GOV hauls and 3 MIK stations were done in the Western part (outside the limits of area 10). In the eastern part, 10 GOV hauls (at least 2 in each rectangles of area 10) and 11 MIK stations were done. In the North Sea, 67 GOV hauls and 102 MIK hauls were carried out in the area south of 56°30 N. At each trawl and MIK station, a CTD was deployed (160 for the whole survey). As additional work : - the CUFES device (Continuous Underwater Fish Egg Sampler) was used during the whole survey (day and night) in the Channel and the North Sea and 1,103 samples were collected. - Samples for zoo- and phytoplankton were collected (”bongo” net and ”Niskin bottle”). - Acoustic data were recorded in the Channel (mono- and multi beam echo-sounders) and one pelagic haul was deployed on herring schools. - In addition, observers for marine mammals and birds collected information during the 5 days in the English Channel. No major problems were encountered.
Number of fish species recorded and notes on any rare species or unusual catches:	74 fish species were recorded. Shellfish were also measured and benthic fauna identified at all stations.

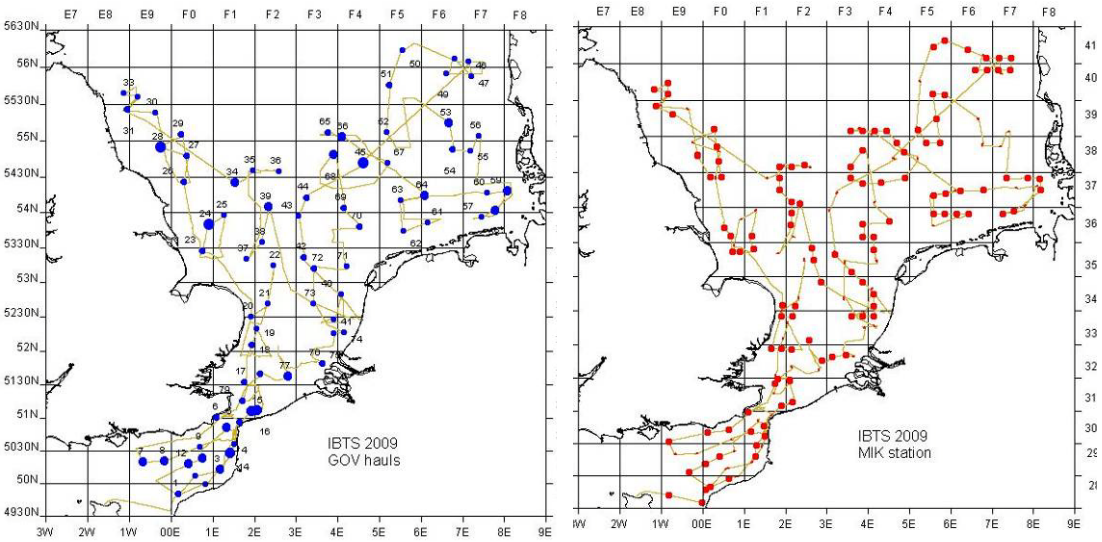
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIId	ICES squares	GOV	5	5		0	200%	
IVb,c		MIK	11	11	5			
VIId		GOV	63	63		0	100%	
IVb,c		MIK	102	102	4			
	TOTAL		68/113	68/113	9	0		

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

SPECIES	AGE	SPECIES	AGE
Merlangus merlangius	883	*Pleuronnectes platessa*	1,052
Gadus morhua	238	*Psetta maxima*	2
Melanogrammus aeglefinus	104	*Scophtalmus rhombus*	2
Trisopterus esmarki	65	*Dicentrarchus labrax*	14
Clupea harengus	347	*Mullus surmuletus*	37
Sprattus sprattus	148	*Trisopterus luscus*	99
Solea solea	56		

Thalassa GOV hauls (left) and MIK hauls (right) IBTS 2009-q1



4.1.2.3 Germany – North Sea Quarter 1 IBTS

Nation:	**Germany**	Vessel:	Walther Herwig III
Survey:	319	Dates:	23 January–18 February 2009

Cruise	The North Sea IBTS Q1 survey aims to collect data on the distribution, relative abundance and biological information of fish in ICES subareas IVa, b and c. The primary focus is on the demersal species cod, haddock, whiting, saithe, and Norway pout and the pelagic species herring, sprat and mackerel.
Gear details:	IBTS standard GOV 36/47 with groundgear A (standard); SCANMAR sensors for door and wing spread and vertical net opening.
Notes from survey (e.g. problems, additional work etc.):	Of the planned 77 stations for the IBTS Q1 survey, 72 were fished (4 rectangles were not fished as a result of rough ground, 1 loss to gear damage). The standard GOV was used and depth profiles of temperature and salinity were obtained with a CTD combined with a water sampler for nutrient samples.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 66 species of fish were recorded during the survey.

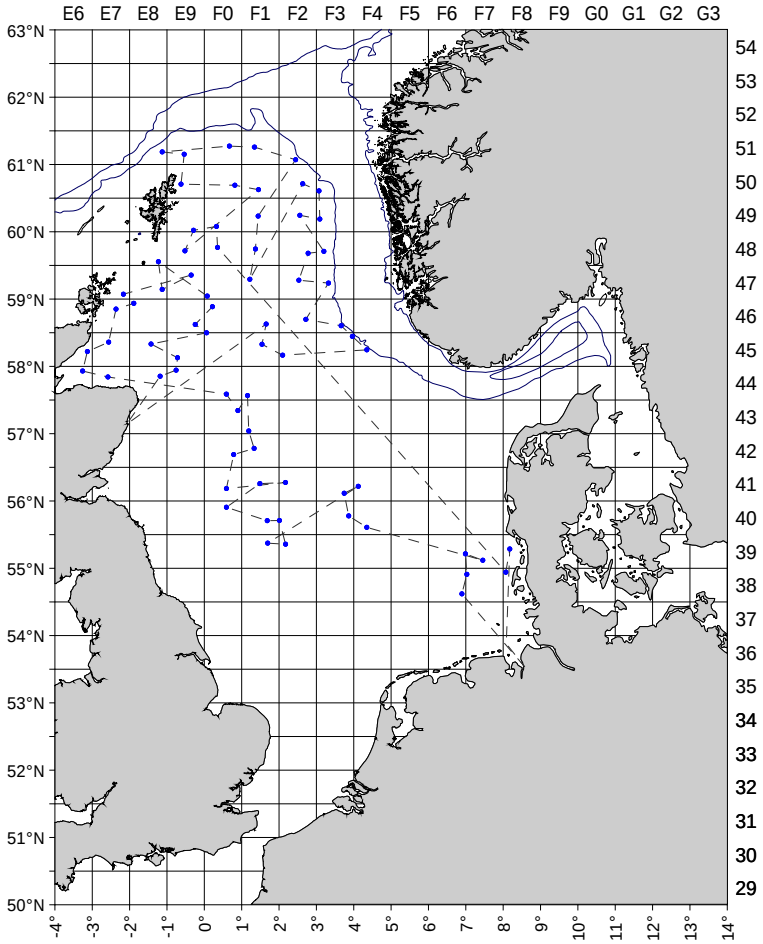
Stations fished (aims: to complete 77 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	GOV	77	72	0	0	94	
IV	N/A	MIK	154	146	0	0	95	

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

Species	Age	Species	Age
Clupea harengus	627	* *Lophius budegassa*	1
Gadus morhua	243	* *Lophius piscatorius*	22
Melanogrammus aeglefinus	828	* *Merluccius merluccius*	184
Merlangius merlangus	822	* *Micromesistius poutassou*	1
Pollachius virens	259	* *Microstomus kitt*	288
Sprattus sprattus	298	* *Pleuronectes platessa*	279
Trisopterus ermarki	331	* *Psetta maxima*	1

Cruise track of Walther Herwig III during the Q1 IBTS 2009.



4.1.2.4 Netherlands – North Sea Quarter 1 IBTS

Nation:	**The Netherlands**	Vessel:	Tridens 2
Survey:	IBTS Q1	Dates:	26 January–26 February 2009

Cruise	The Q1 North Sea survey aims to collect data on the distribution, relative abundance, and biological information of a number of (mainly) commercial fish species in southern and central part of area IV and in the eastern part of VIId. The primary species are cod, haddock, saithe, whiting, Norway pout, sprat, herring, mackerel, and plaice.
Gear details:	IBTS standard GOV 36/47 with groundgear A. No Exocet kite is used but wooden kite with similar lifting power, SCANMAR door and and headline height sensors. Headline height sensor positioned above central part of groundrope.
Notes from survey (e.g. problems, additional work etc.):	As in 2007 and 2008 five additional rectangles in VIId were sampled (both with GOV and MIK). A number of rectangles on the Dutch EEZ have been fished twice. In the Southern Bight, one GOV trawl was severely damaged: during a haul off the Dutch coast, because of fishing in an area with "sand dunes". A number of elasmobranchs have been tagged and released: *Raja clavata* 44, *Scyliorhinus canicula* 11. For the first year weights for samples and subsamples of fish that were measered have been recorded.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 66 species or species-groups of fish were recorded during the survey. A special catch in the central North Sea was a bream, *Brama brama*. Benthos was sampled and recorded according to Beam Trawl Survey procedures. For all species the number, total weight, Lmin and Lmax have been recorded.

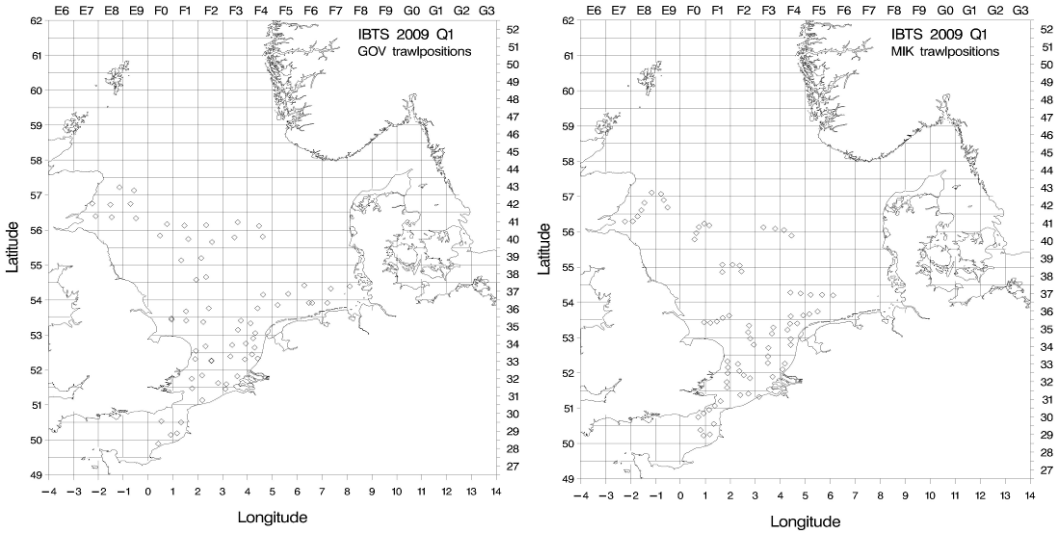
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	GOV	49	60	11	3	122	
VIId		GOV	5	5	0	0	100	
IV		MIK	98	76	0	0	78	
VIId		MIK	10	7	0	0	100	
	TOTAL		54/108	65/83	11/0	3/0	-	

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

SPECIES	AGE	SPECIES	AGE
Clupea harengus	294	*Trisopterus esmarki*	102
Sprattus sprattus	250	*Merluccius merluccius*	5
Scomber scombrus	1	*Psetta maxima*	4
Gadus morhua	369	*Microstomus kitt*	53
Melanogrammus aeglefinus	329	*Pleuronectes platessa*	475
Merlangius merlangus	583		

Cruise track of Tridens during the Q1 IBTS 2009



4.1.2.5 Norway – North Sea Quarter 1 IBTS

Nation:	**Norway**	Vessel:	G.O. Sars
Survey:	2009103	Dates:	5 February–1 March.2009

Cruise	The survey was a combination of the IBTS quarter 1 and a survey using the GULF VII for sampling gadoid eggs and larvae. It aims to collect data on the distribution and relative abundance and biological information of commercial fish in area IV. The primary species are herring, saithe, cod, haddock, whiting, sprat, mackerel, Norway pout and plaice.
Gear details:	IBTS standard GOV 36/47 with groundgear A, the Exocet kite, with SCANMAR sensors. The bottom panel of the trawl was made with PE. The sensors logged door distance, depth and angle, wing distance, headline height, trawl eye data.
Notes from survey (e.g. problems, additional work etc.):	Three hydrographical transects were taken. On two of them also phytoplankton and zooplankton were sampled.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 36 species of fish were recorded during the survey.

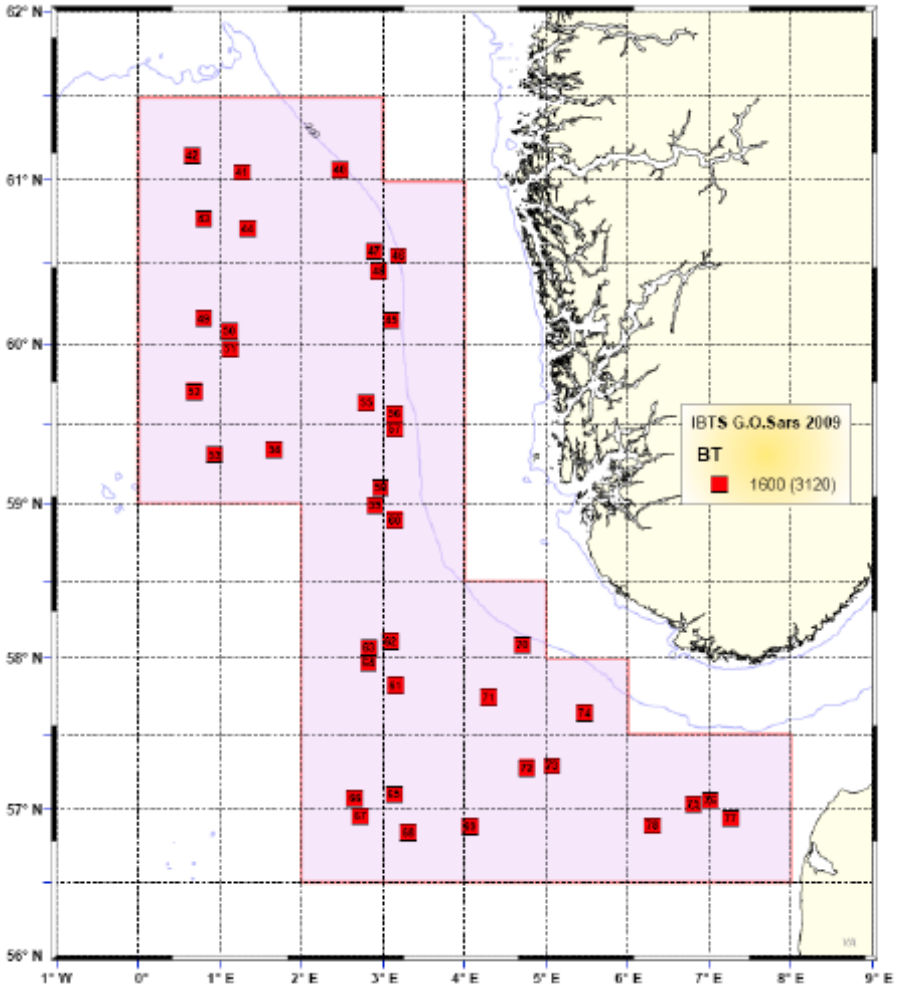
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	GOV	40	40	0	0	100	
		MIK	56	56	0	0	100	
	TOTAL		40/56	40/56	0	0	100	

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

SPECIES	AGE	SPECIES	AGE
Clupea harengus	318	*Pollachius virens*	179
Gadus morhua	50	*Trisopterus esmarki*	50
Melanogrammus aeglefinus	159	*Lophius piscatorius*	1
Scomber scombrus	22		

G.O. Sars GOVstations IBTS 2009 quarter 1



4.1.2.6 Sweden – North Sea Quarter 1 IBTS

Nation:	**Sweden**	Vessel:	Argos
Survey:	2/09	Dates:	19 January-5 February 2009

Cruise	Q1 North Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in IIIa. The primary species for GOV trawling are cod, haddock and whiting, sprat, herring, mackerel, Norway pout, plaice and saithe. The aim of the MIK trawl survey is mainly to catch North Sea autumn spawning herring larvae.
Gear details:	IBTS standard GOV 36/47 with groundgear A, Exocet kite with SCANMAR door, bottom contact, trawl eye and headline height sensors. Daylight hauls at bottom. Methot Isaac Kidd (MIK) midwater ring trawl. Dark light oblique hauls.
Notes from survey (e.g. problems, additional work etc.):	The cruise was fulfilled as planned.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 67 species of fish were recorded during the survey.

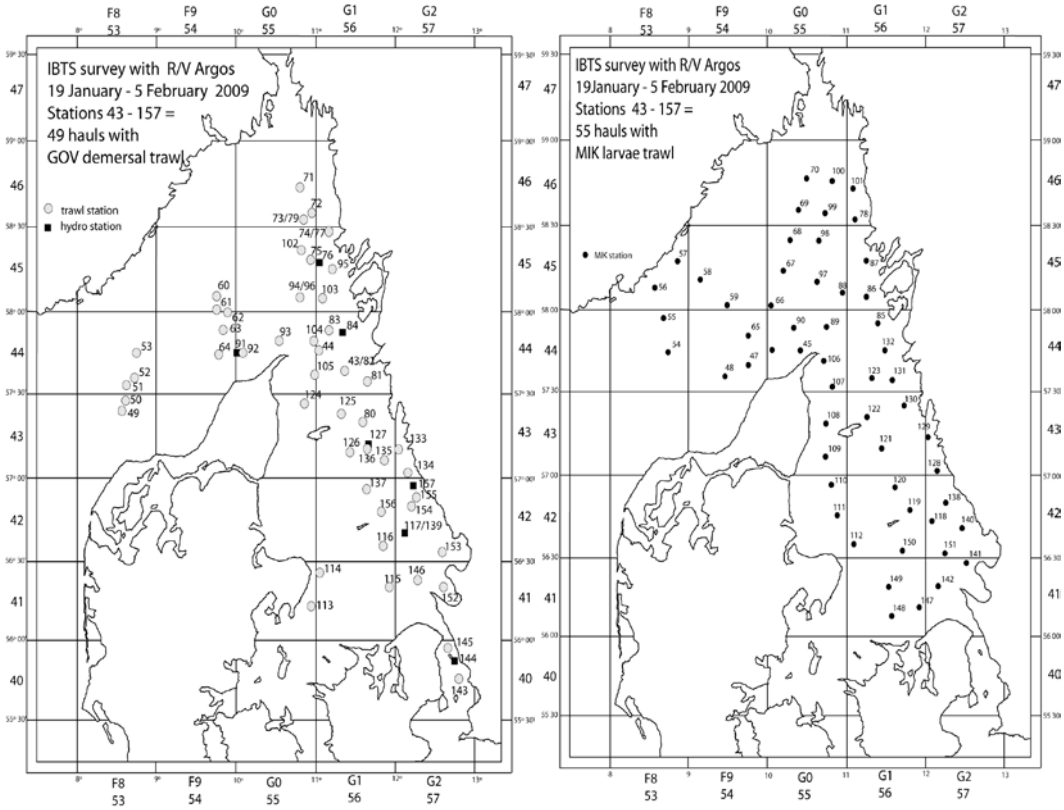
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IIIa	N/A	GOV	48	48	0	0	100	
IIIa	N/A	MIK	-	55	-	-	100	

Number of biological samples (maturity and age material)

SPECIES	AGE	SPECIES	AGE
Clupea harengus	1533	*Trisopterus esmarki*	130
Gadus morhua	826	*Sprattus sprattus*	737
Melanogrammus aeglefinus	224	*Pleuronectes platessa*	694
Pollachius virens	49	*Glyptocephalus cynoglossus*	66

Cruise track of Argos during the Q1 IBTS 2009



4.1.2.7 UK (Scotland) – North Sea Quarter 1 IBTS

Nation:	**UK (Scotland)**	Vessel:	Scotia
Survey:	0209s (IBTS Quarter 1)	Dates:	26 January–17 February 2009

Cruise	Q1 IBTS survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on a range of fish species in ICES area IVa and IVb. Age data were collected for cod, haddock, whiting, saithe, Norway pout, herring, mackerel and sprat.
Gear details:	GOV using groundgear B on 3 stations off the northeast coast of Scotland and all stations north of 57.30 N and groundgear A used on all other stations south of 57.30 N.
Notes from survey (e.g. problems, additional work etc.):	With favourable weather conditions for most of the cruise, no problems were encountered. Ship's thermosalinigraph was run continuously throughout the cruise. Temperature, salinity and water samples for nutrient analyses were collected at each station. Altogether 52 valid hauls was achieved with all allocated stations being sampled as well as two further stations west of the Orkney Islands (44E6 & 44E7). In all 109 MIK stations were fished, of which 5 were taken to support the international coverage. SCANMAR and bottom contact sensors were used throughout the cruise to monitor net parameters and performance.
Number of fish species recorded and notes on any rare species or unusual catches:	Altogether 75 species were recorded during the survey with a total weight of 8583 kgs. Within the regular sampling protocols FRS continue to develop the recording of benthic species caught in the GOV trawl.

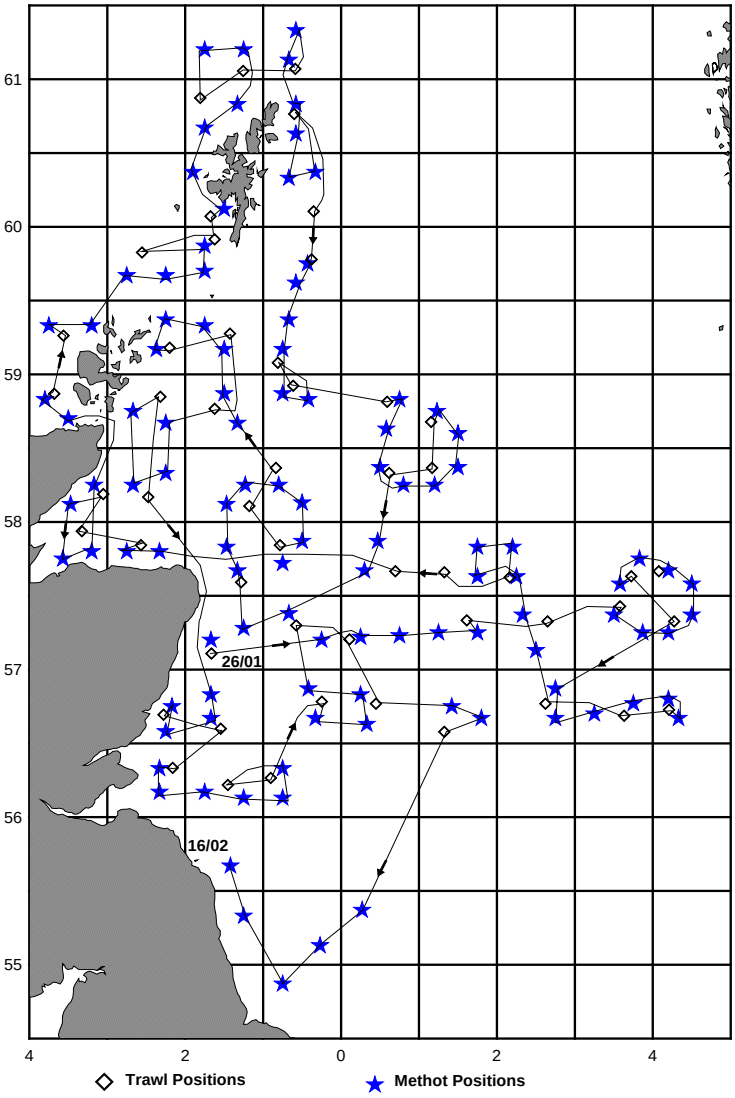
Stations fished

ICES IVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	VALID WITH ROCK-HOPPER	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
IVa		GOV-B	30	32	-	2	0	107	
IVa		GOV-A	2	2				100	
IVb		GOV-A	15	15				100	
IVb		GOV-B	3	3	-	0	0	100	
IV		MIK	104	109		5		105	
	TOTAL		50/104	52/109	-	2	0	104	

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

SPECIES	AGE	SPECIES	AGE
Clupea harengus	427	*Scomber scombrus*	8
Gadus morhua	124	* *Lophius piscatorius*	10
Melanogrammus aeglefinus	906	* *Amblyraja radiata*	12
Merlangius merlangus	667	* *Raja montagui*	50
**Psetta maxima*	1	* *Dipturus batis*	2
Pollachius virens	11	* *Raja fullonica*	1
**Lepidorhombus whiffiagonis*	78	* *Raja brachyura*	7
**Hippoglossus hippoglossus*	1	* *Leucoraja naevus*	9

Cruise track of Scotia during the Q1 IBTS 2009



Variance in catch rates and estimates of sampling precision

Species	Stock Area	Valid tows	Mean cpue (nos/hr)	Total weight (kg)	Mean weight (kg/hour)
Gadus morhua	IV	52	4.89	208.24	8.08
Melanogrammus aeglefinus	IV	52	483	2827	109.66
Merlangius merlangus	IV	52	237	545.12	21.15
Pollachius virens	IV	52	0.51	8.42	0.33
Scomber scombrus	IV	52	0.32	0.72	0.03
Clupea harengus	IV	52	70.60	205.34	7.97
Pleuronectes platessa	IV	52	21.68	120.52	4.67
Trisopterus esmarki	IV	52	7430	2504	97.13
Sprattus sprattus	IV	52	52.11	8.46	0.33

4.1.3 Results

4.1.3.1 GOV

The preliminary indices for the recruits of seven commercial species based on the 2009 quarter 1 survey are shown in Figure 4.1.3.1. According to these preliminary results, sprat and Norway pout showed a year class in 2009 well above the long-term average for the years 1980–2008. The index for 1-group herring was also above average, though less extreme. The indices for cod, haddock, whiting and mackerel were far below the long-term average value.

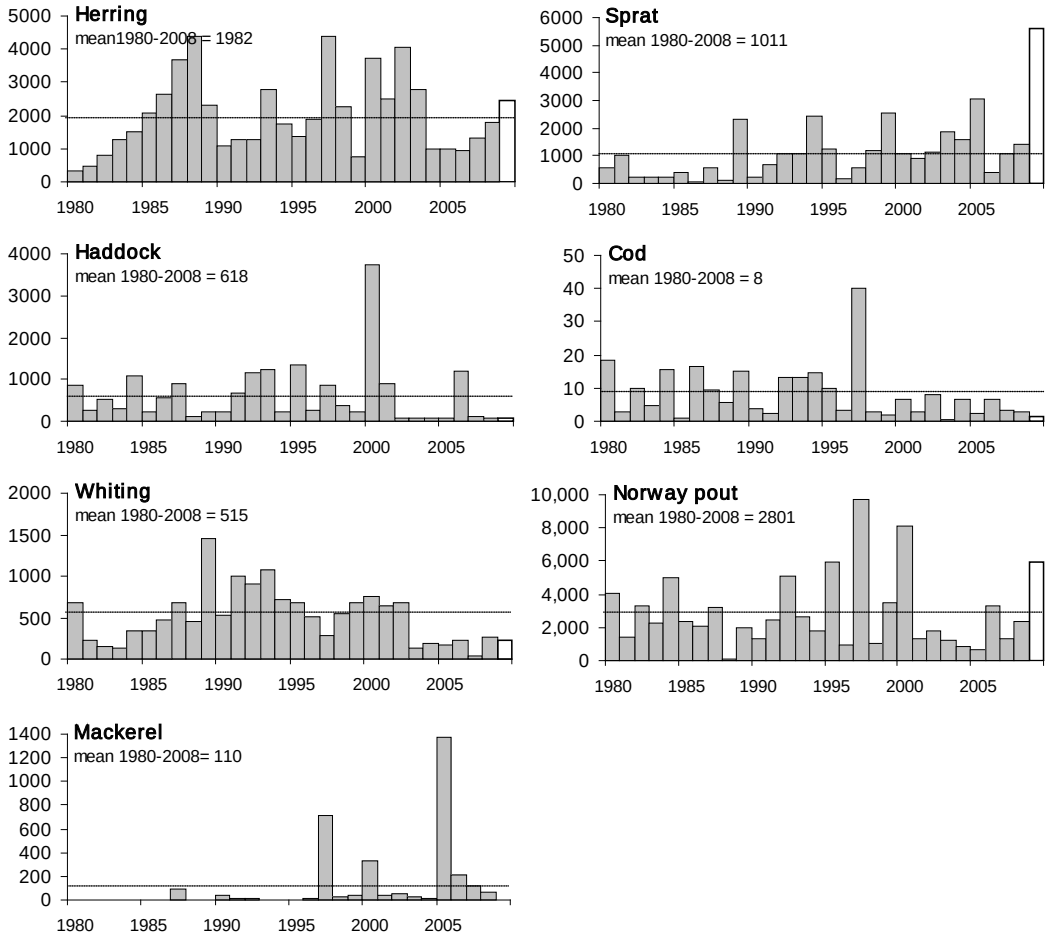


Figure 4.1.3.1. Time series of indices for 1-group (1-ring) mackerel caught during the quarter 1 IBTS survey in the North Sea, Skagerrak and Kattegat. Indices for the last year are preliminary, and based on a length split of the catches.

4.1.3.2 MIK

For the ICES Herring Assessment Working Group for the area South of 62°N (HAWG), the IBTS survey provides recruitment indices and abundance estimates of adults of herring and sprat. Sampling at night with fine-meshed nets (MIK; Methot Isaacs–Kidd Midwater Trawl) was implemented from 1977 onwards, and the catch of herring larvae has been used for the estimation of 0-ringer abundance in the survey area.

This year's 0-ringer index is based on 641 hauls. Index values are calculated as described in the 1996 report of the Herring Assessment Working Group (ICES 1996/ACFM:10). The index for the 2009 survey is the highest of the last seven years

(Figure 4.1.3.2). The 0-ringers were predominantly distributed in two concentrations, one off the Scottish coast (in the central-western area) and one in the Southern Bight.

It is notified by the Herring Assessment Working Group (HAWG) that the countries sample very close to the borders of rectangles, and the sampling is quite patchy at some places. All by all, the distribution of samples gives a fair coverage of larvae, and at the high level of sampling, the pattern of sampling does not create significant problems. However, at lower sampling intensities this sampling "tradition" – to sample very close to rectangle borders – might create problems, and it was suggested by members of the HAWG to discuss the possibility of sampling across the entire rectangle area, and that at least one of the two samples in a rectangle should be at least 7 nautical miles from a rectangle border. The issue was discussed during the IBTSWG meeting, and the Working Group decided not to include the regulation of sampling the second station within a rectangle at least 7 nm from the border in the manual. The main reason for this decision is time constraints of the surveys and accordingly to avoid limitation of sampling as a result of this regulation.

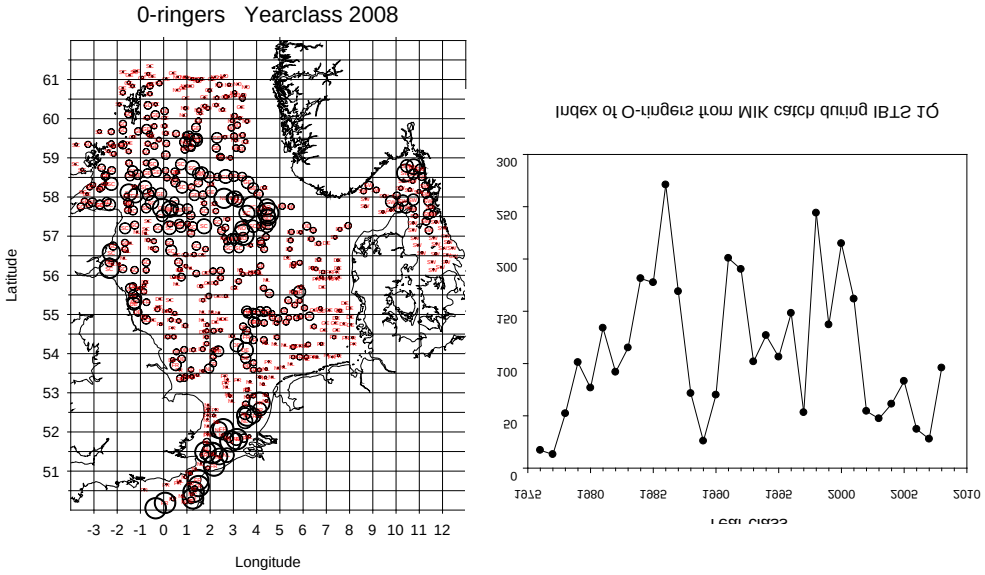


Figure 4.1.3.2. Distribution of MIK caught herring larvae of all size classes during the IBTS Q1 2009 (left) and the time-series of herring larvae since 1976 (right).

4.1.4 Participation in 2010

The ships time available for the quarter 1 survey in 2010 is expected to be as usual over the last years. The WG strongly recommends that each country carries out the survey in the month of February.

4.1.5 Other issues

4.1.5.1 Resdistribution of rectangles between Germany and Scotland

Scotland and Germany proposed to exchange the allocation of 5 rectangles to their surveys in quarter 1. The 5 rectangles in the Northwest of the survey area, to the West of the Orkney and Shetland Islands (46E6, 47E6, 48E7, 49E8, 50E8), cannot be fished without substantial gear damage and related loss in ship time when using the IBTS standard groundgear (Type A = "S" in Datras). Therefore, Germany requested that Scotland would fish these five rectangles, with the advantage that in this area the

Scottish vessel applies groundgear B anyhow, which is not available on the German vessel. In exchange, 5 rectangles in the central North Sea, would from now on be allocated to the German instead if the Scottish part of the Q1 survey (42F4, 43F3, 43F4, 44F3, 44F4 – up to now not fished by Germany). While this means that the 5 rectangles in the Northwest will from now on in Q1 be sampled twice by the same nation, the group felt that this was preferable over missing one of the two stations per rectangle in most years.

4.2 Q3 North Sea

4.2.1 General overview

Six vessels participated in the quarter three survey in 2008: Dana (Denmark), Walter Herwig III (Germany), Johan Hjort (Norway), Argos (Sweden), CEFAS Endeavour (England) and Scotia (Scotland). In all, 329 valid GOV hauls were made, allowing full coverage of the survey area. The North Sea, Skagerrak and Kattegat quarter 3 surveys have now completed 18 years in its coordinated form. Table 4.2.1.1 shows the effort ascribed in the current year. From 2007 a combined index was calculated for cod and Norway pout and used by the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), whilst the remaining indices were calculated by country. Figure 4.2.1.1 shows the distribution of the stations fished in 2008.

It was noted that Denmark have started to use a groundgear 'B' on some of their stations and a request to the Danish institute for more information on the reasons for this was put in. The reasons given were that, as a result of damage on the stations whilst using the traditional groundgear 'A', the decision to use groundgear 'B' on three stations was taken. The 3rd quarter co-ordinator will supply all participants with an updated clear tow list so that additional clear tow information is always available to survey leaders whilst at sea, in order to help with problems like this in future. The tows will be flagged in DATRAS as valid, but non-standard for the area.

Table 4.2.1.1. Number of valid hauls and days at sea per country for quarter 3 surveys in 2008.

YEAR		DENMARK	GERMANY	NORWAY	SWEDEN	UK ENGLAND	UK SCOTLAND	TOTAL
2008	Days	21	15	23	16	32	24	131
	Hauls	57	23	38	47	75	89	329

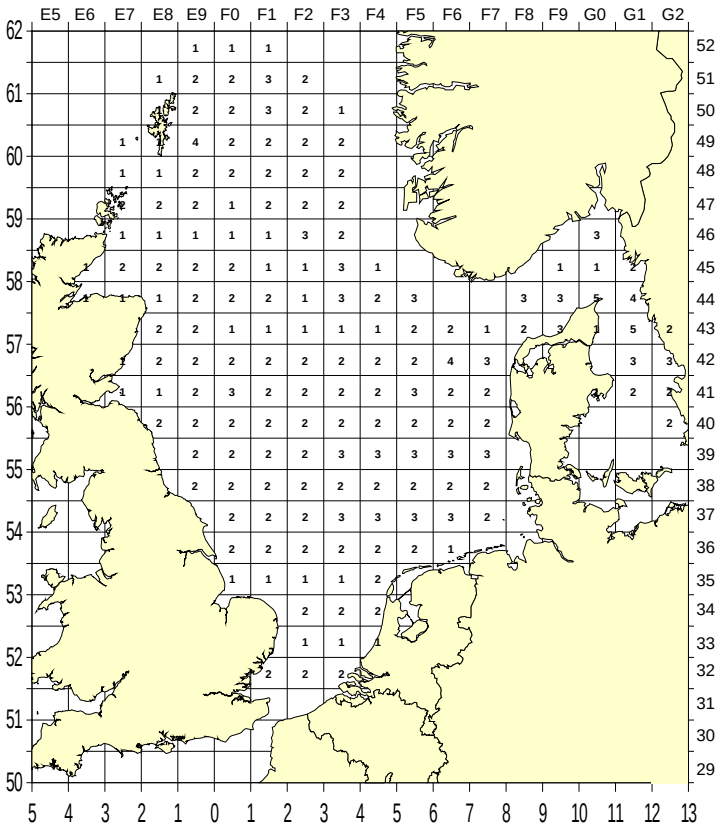


Figure 4.2.1.1. Plot of number of stations fished by rectangle by all participants of the 3rd Quarter IBTS survey 2008.

4.2.2 Survey summaries by country

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

Nation:	**UK (England and Wales)**	Vessel:	Cefas Endeavour
Survey:	15/08	Dates:	5 August–7 September 2008

Cruise	Q3 North Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in IV. The primary species are cod, haddock and whiting, sprat, herring, mackerel, Norway pout, plaice and saithe.
Gear details	IBTS standard GOV 36/47 with groundgear A, Exocet kite with SCANMAR door, wing and headline height sensors. Also attached is the SAIV mini CTD.
Notes from survey (e.g. problems, additional work, etc.):	An additional tow was carried out on the day of sailing to ensure gear could be deployed correctly and to test all the shipboard systems. The first week of the survey was used to do a multidisciplinary survey with the environmental group within Cefas. GOV tows were carried out during the day then sedimental process control work was carried out in the dark. After six days this work was completed and the survey continued as normal. Remment ter Hofstede joined for this first week as an observer and was put ashore in Lowestoft when the environmental staff disembarked. At the end of the survey, a Fisheries Science Partnership (FSP) survey was carried out.
Number of fish species re-corded and notes on any rare species or unusual catches:	Overall, 74 species of fish were recorded during the survey. Species of note caught this year during the survey are *Dipturus batis, Hippoglossus hippoglossus, Brosme brosme* and a *Petromyzon marinus.*

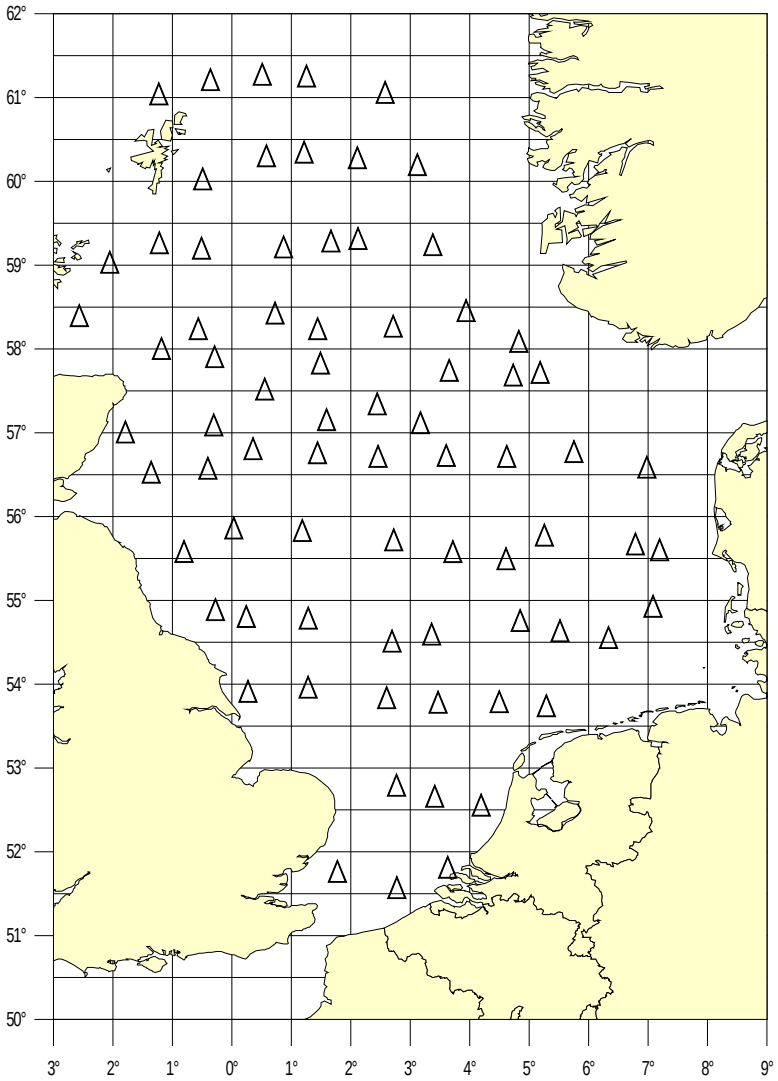
Stations fished (aims: to complete 75 valid tows per year)

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

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

SPECIES	NUMBER	SPECIES	NUMBER
Clupea harengus	1142	*Limanda limanda*	412
Gadus morhua	378	*Scomber scombrus*	402
Melanogrammus aeglefinus	1179		
Merlangius merlangus	1237		
Pollachius virens	271	**Leucoraja naevus*	44
Sprattus sprattus	478	**Raja clavata*	627
Psetta maxima	13	**Raja montagui*	4
Trisopterus esmarki	398	**Dipturus batis*	1
Microstomus kitt	221	**Amblyraja radiata*	117
Pleuronectes platessa	1232		

Cruise track of Endeavour during the Q3 IBTS 2008



4.2.2.2 Norway – North Sea Quarter 3 IBTS

Nation:	**Norway**	Vessel:	Johan Hjort
Survey:	2008207	Dates:	8–31 July 2008

Cruise	The survey IBTS quarter 3 aims to collect data on the distribution, relative abundance and biological information of commercial fish in area IV. The primary species are herring, saithe, cod, haddock, whiting, sprat, mackerel, Norway pout and plaice.
Gear details:	IBTS standard GOV 36/47 with groundgear A, four "Balmoral Kite Floats", and SCANMAR sensors. The bottom panel of the trawl was made with PE. The sensors logged were door distance, depth and angle, wing distance, headline height, trawl-eye data.
Notes from survey (e.g. problems, additional work etc.):	Two hydrographical transects were taken. On one transect also phytoplankton and zooplankton were sampled.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 43 species of fish were recorded during the survey.

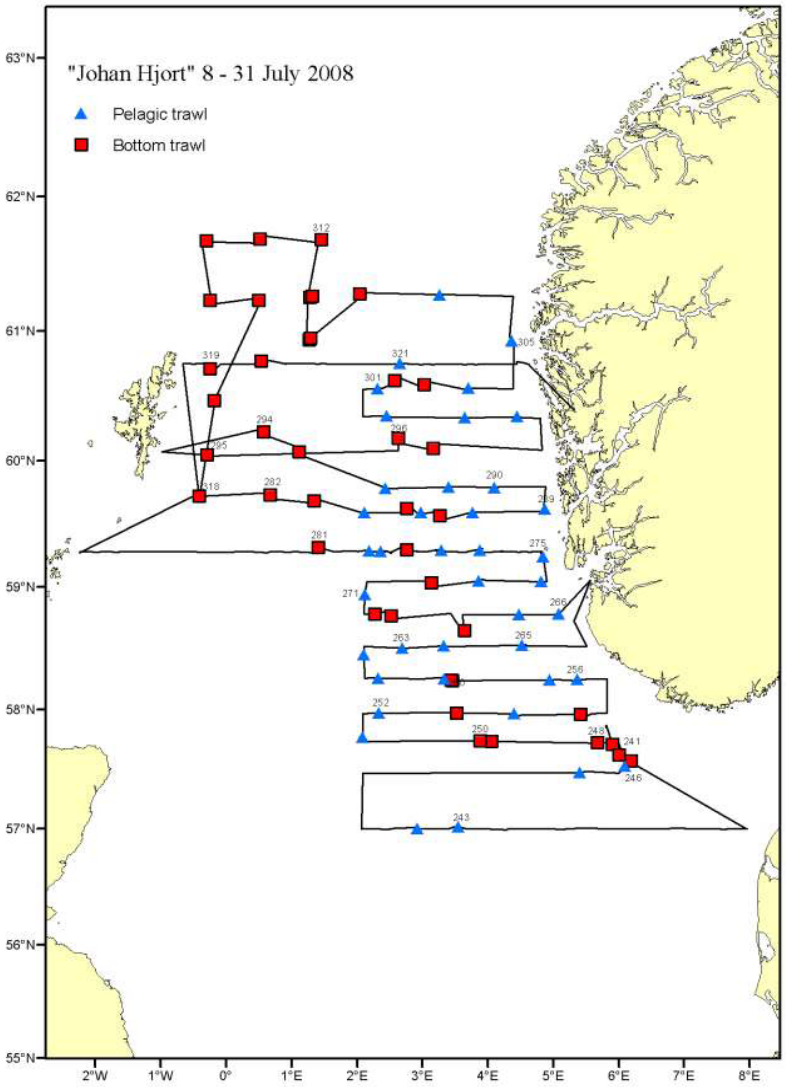
Stations fished

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	GOV	40	38	0	0	100	
	TOTAL		40	38	0	0	100	

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

SPECIES	AGE	SPECIES	AGE
Clupea harengus	1019	*Pollachius virens*	219
Gadus morhua	182	*Trisopterus esmarki*	23
Melanogrammus aeglefinus	330		

Cruise track of Johan Hjort during the Q3 IBTS 2008



4.2.2.3 Sweden – North Sea Quarter 3 IBTS

Nation:	**Sweden**	Vessel:	Argos
Survey:	12/08	Dates:	25 August-11 September 2008

Cruise	Q3 North Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in IV. The primary species are cod, haddock, sprat, herring, Norway pout, plaice, lemon sole and saithe.
Gear details:	IBTS standard GOV 36/47 with groundgear A, Exocet kite with SCANMAR door, bottom contact, trawl eye and headline height sensors.
Notes from survey (e.g. problems, additional work etc.):	The cruise was fulfilled as planned.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 58 species of fish were recorded during the survey.

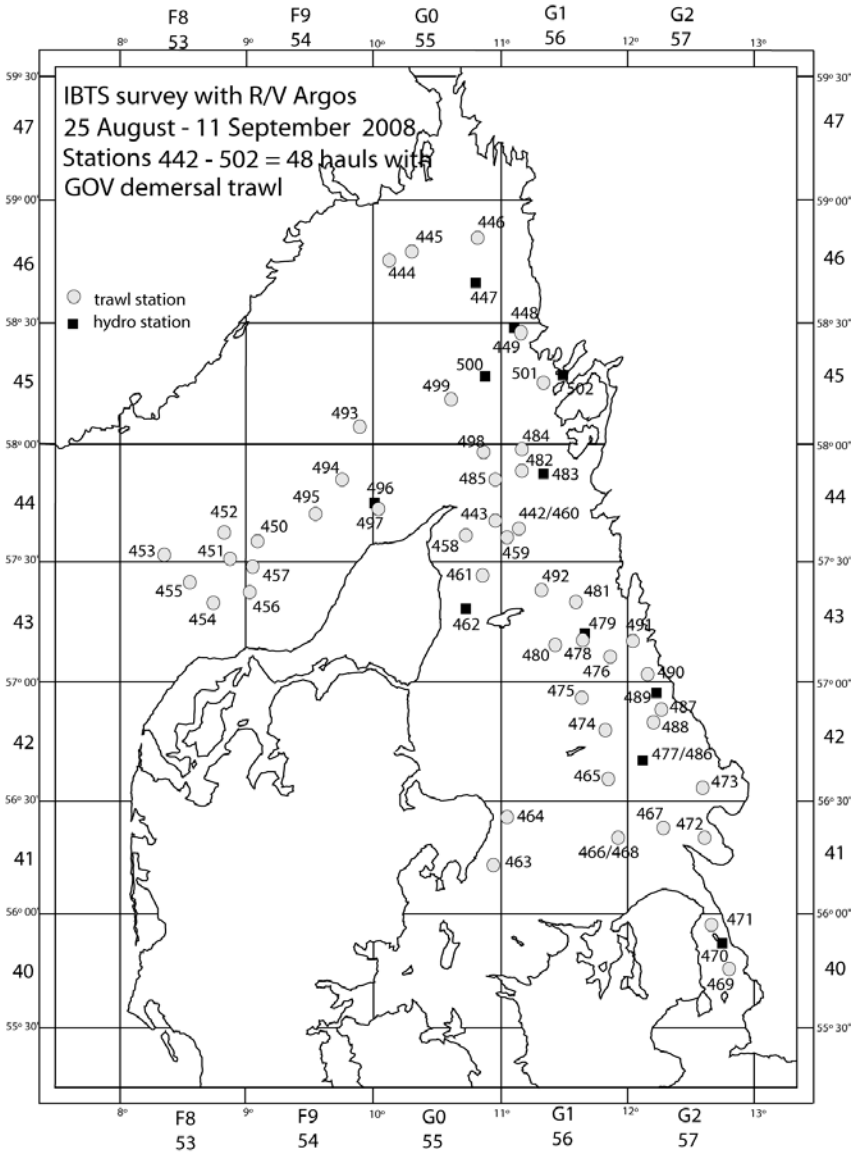
Stations fished (aims: to complete 47 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IIIa	N/A	GOV	47	47	0	0	100	
	TOTAL		47	47	0	0	100	

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

SPECIES	AGE	SPECIES	AGE
Clupea harengus	1263	*Sprattus sprattus*	613
Gadus morhua	738	*Trisopterus esmarki*	140
Melanogrammus aeglefinus	252	*Microstomus kitt*	111
Pollachius virens	90	*Pleuronectes platessa*	809

Cruise track of Argos during the Q3 IBTS 2008



4.2.2.4 Germany – North Sea Quarter 3 IBTS

Nation:	**Germany**	Vessel:	Walther Herwig III
Survey:	314	Dates:	7–22 August

Cruise	This cruise contributed to the Q3 IBTS in the North Sea, while it also had the objective and to monitor the bottom fish fauna and the benthic epifauna in 6 10-by-10 nm areas (part of the German Small-Scale Bottom Trawl Survey; GSBTS). The latter could in 2008 only be achieved for one of the 6 areas ("Box A"). North Sea IBTS Q3 survey aims to collect data on the distribution, relative abundance and biological information of fish in ICES subareas IVa, b and c. The primary focus is on the demersal species cod, haddock, whiting, saithe, and Norway pout and the pelagic species herring, sprat and mackerel.
Gear details:	IBTS standard GOV 36/47 with groundgear A (standard); SCANMAR sensors for door and wing spread and vertical net opening.
Notes from survey (e.g. problems, additional work etc.):	Depth profiles of temperature and salinity were obtained with a CTD combined with a water sampler for nutrient samples. A 2m-beam trawl and a "van Veen" grab were applied to sample the benthic epifauna and sediment, respectively. Two ornithologists recorded abundances of seabirds. The planned additional 8 days at sea for a comparative fishing experiment (gear comparison) with the "Scotia" GOV had to be cancelled as a result of technical problems with "Walther Herwig III" and substantial loss of ship time. Also no sampling in the GSBTS areas ("Boxes") B, C, D, L, M for the same reasons.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 39 species of fish were recorded during the survey.

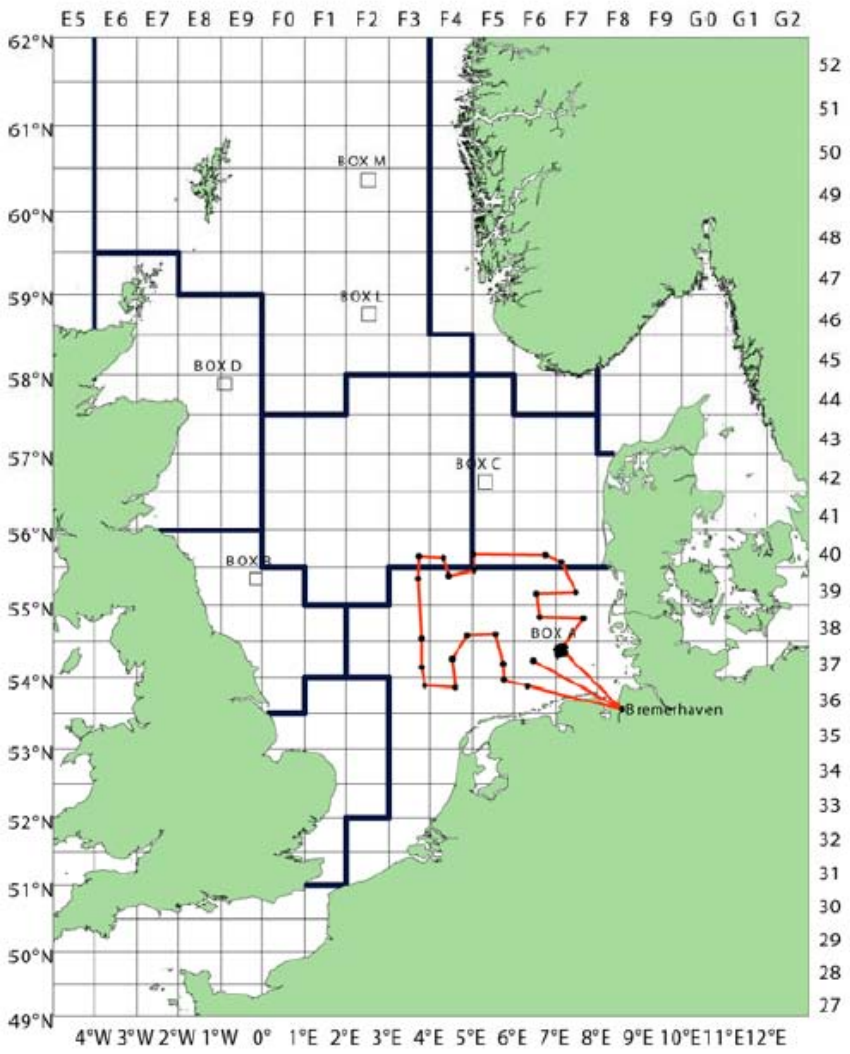
Stations fished (aims: to complete 29 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
IV	N/A	GOV	29	24	0	0	79	
	TOTAL		29	24	0	0	79	

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

SPECIES	AGE	SPECIES	AGE
Clupea harengus	155	* *Merluccius merluccius*	12
Gadus morhua	27	* *Microstomus kitt*	144
Melanogrammus aeglefinus	21	* *Pleuronectes platessa*	216
Merlangius merlangus	232	* *Psetta maxima*	14
Pollachius virens	2	* *Scophthalmus rhombus*	6
Scomber scombrus	164		
Sprattus sprattus	130		

Cruise track of Walter Herwig during the Q3 IBTS 2008



4.2.2.5 Denmark – North Sea Quarter 3 IBTS

Nation:	**DIFRES Denmark**	Vessel:	RV Dana
Survey:	07/08 IBTS 3Q 2008	Dates:	19 August-9 September 2008

Cruise	Q3 North Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in IV. The primary species are cod, haddock and whiting, sprat, herring, mackerel, Norway pout, plaice and saithe.
Gear details	Two gear survey, using a modified GOV with rgroundgear 'B' on hard ground stations, and GOV with groundgear 'A' on fine ground stations..
Notes from survey (e.g. problems, additional work, etc.):	The cruise plan was fulfilled as planned.
Number of fish species re-corded and notes on any rare species or unusual catches:	Overall, 69 species of fish were recorded during the survey.

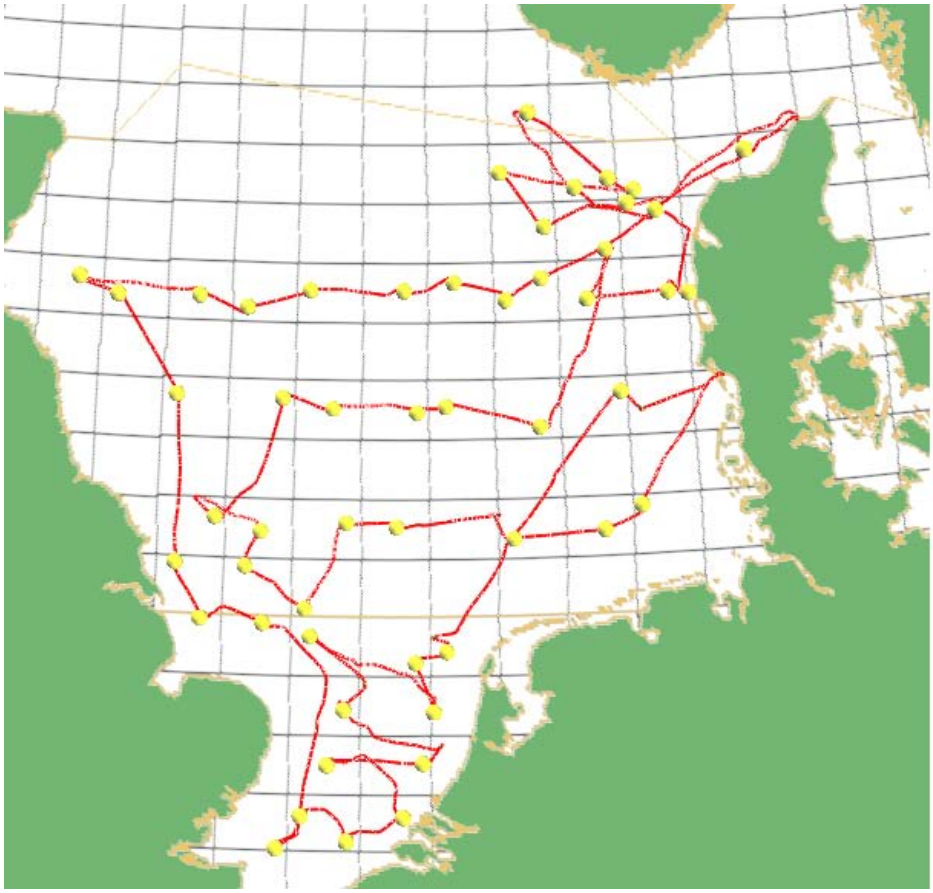
Stations fished (aims: to complete 46 valid tows per year)

ICES Divisions	Strata	Gear	Tows Planned	Valid	Additional	Invalid	% Stations fished	Comments
IV	N/A	IBTS standard GOV	55	54	0	1	100	
IV	N/A	GOV 'B'	3	3	0		100	
	TOTAL		58	57		1		

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

SPECIES	NUMBER	SPECIES	NUMBER
Clupea harengus	735	*Limanda limanda*	-
Gadus morhua	297	*Scomber scombrus*	418
Melanogrammus aeglefinus	267	*Merluccius merluccius*	77
Merlangius merlangus	662	*Psetta maxima*	13
Pollachius virens	3	**Leucoraja naevus*	0
Sprattus sprattus	295	**Raja clavata*	0
Scophthalmus maximus	0	**Raja montagui*	0
Trisopterus esmarki	0	*Lophius piscatorius*	1
Microstomus kitt	108	*Trachurus trachurus*	158
Pleuronectes platessa	948	*Solea solea*	39
Mullus surmulletus	58		

Cruise track of Dana during the Q3 IBTS 2008



4.2.2.6 UK (Scotland) – North Sea Quarter 3 IBTS

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	1008s (IBTS Quarter 3)	Dates:	5–29 August 2008

Cruise	Q3 IBTS North Sea Groundfish survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on a range of fish species in ICES area IVa and IVb. Age data were collected for cod, haddock, whiting, saithe, Norway pout, herring, mackerel and sprat.
Gear details:	GOV using groundgear B on stations north of 57deg 30min North and groundgear A on stations south of 57deg 30min North.
Notes from survey (e.g. problems, additional work etc.):	No problems encountered. Ship's thermosalinigraph was run continuously throughout the cruise and a CTD deployed at each station. The survey was successfully completed in favourable weather conditions with the 87 standard stations being completed and international coverage supplemented by two additional tows (41E7 & 40E8). SCANMAR system was used throughout the cruise to monitor net parameters. Bottom contact sensor was used throughout the cruise and data retained for future analyses. Sampling of benthic species were sampled and recorded according to developing FRS protocols.
Number of fish species recorded and notes on any rare species or unusual catches:	Altogether 77 different species were observed during the trip with a total catch weight of 31178kgs. Numbers of juvenile cod (0+) were down on last year's numbers and more in line with the long-term trend. Distribution of juvenile cod was restricted to inshore stations off the Scottish coast. Numbers of juvenile haddock increased on the last year but with the exception of the 2005 year class, the survey indices for this species in recent years appears to be relatively low. The numbers of juvenile haddock were higher in the stations off the east and northeast coasts of Scotland, with the overall distribution being similar to last year. The number of juvenile whiting showed a continuing increase on last year's figures, with the distribution being wide across the survey area. Numbers of Norway pout were slightly down on last year's results but still high in relation to the recent average. Distribution of this species showed slight variation from last year with the larger numbers being encountered in the northern and western part of the survey area. Length, weight, sex and maturity data were collected from several species, as defined by WGIBTS. Following recommendations from IBTS and WKMSCHWS, no maturity information was taken for cod, haddock, whiting and saithe.

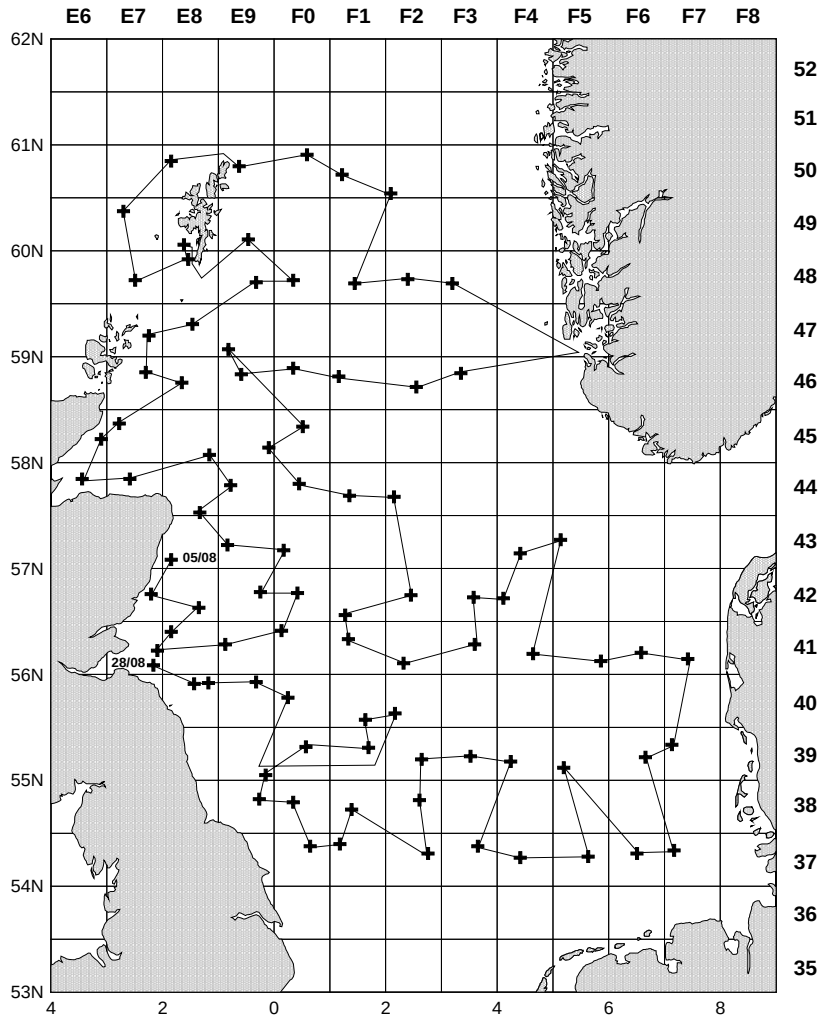
Stations fished (aims: to complete 87 valid tows per year)

ICES Divisions	Strata	Gear	Tows Planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	comments
IVa		GOV-A	37	39	-	2	0	105	
IVb		GOV-B	50	50	-	0	0	100	
	TOTAL		87	89	-	2	2	102	

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

Species	No.	Species	No.
* *Gadus morhua*	285	* *Pollachius virens*	183
* *Melanogrammus aeglefinus*	1225	*Trisoperus esmarki*	218
* *Merlangius merlangus*	1123	*Microstomus kitt*	125

Cruise track of Scotia during the Q3 IBTS 2008



4.2.3 Results

GOV

The combined indices for the 0-group recruits of seven commercial species based on the 2008 quarter 3 surveys are shown in Figure 4.2.3.1. All the indices are below the long-term mean, although Norway pout and mackerel are close to the mean.

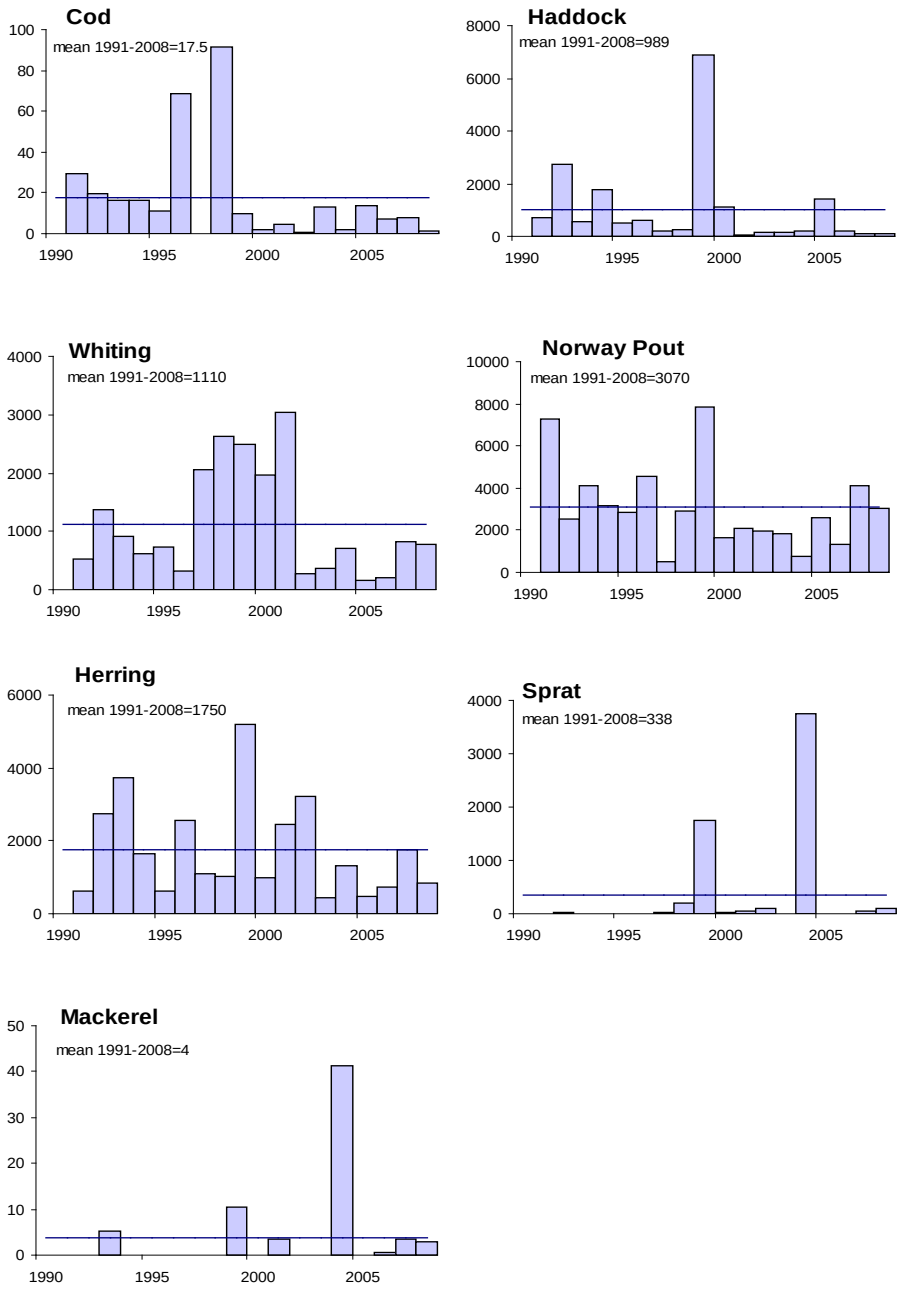


Figure 4.2.3.1. Time series of indices for 0-group species during the quarter 3 IBTS survey in the North Sea, extracted from DATRAS.

4.2.4 Precision estimates

The ICES DATRAS system now provides precision estimates for the survey area. They are provided in Figure 4.2.4.1 as plots over the time-series. The individual country precision tables have been removed from the survey summary sheets.

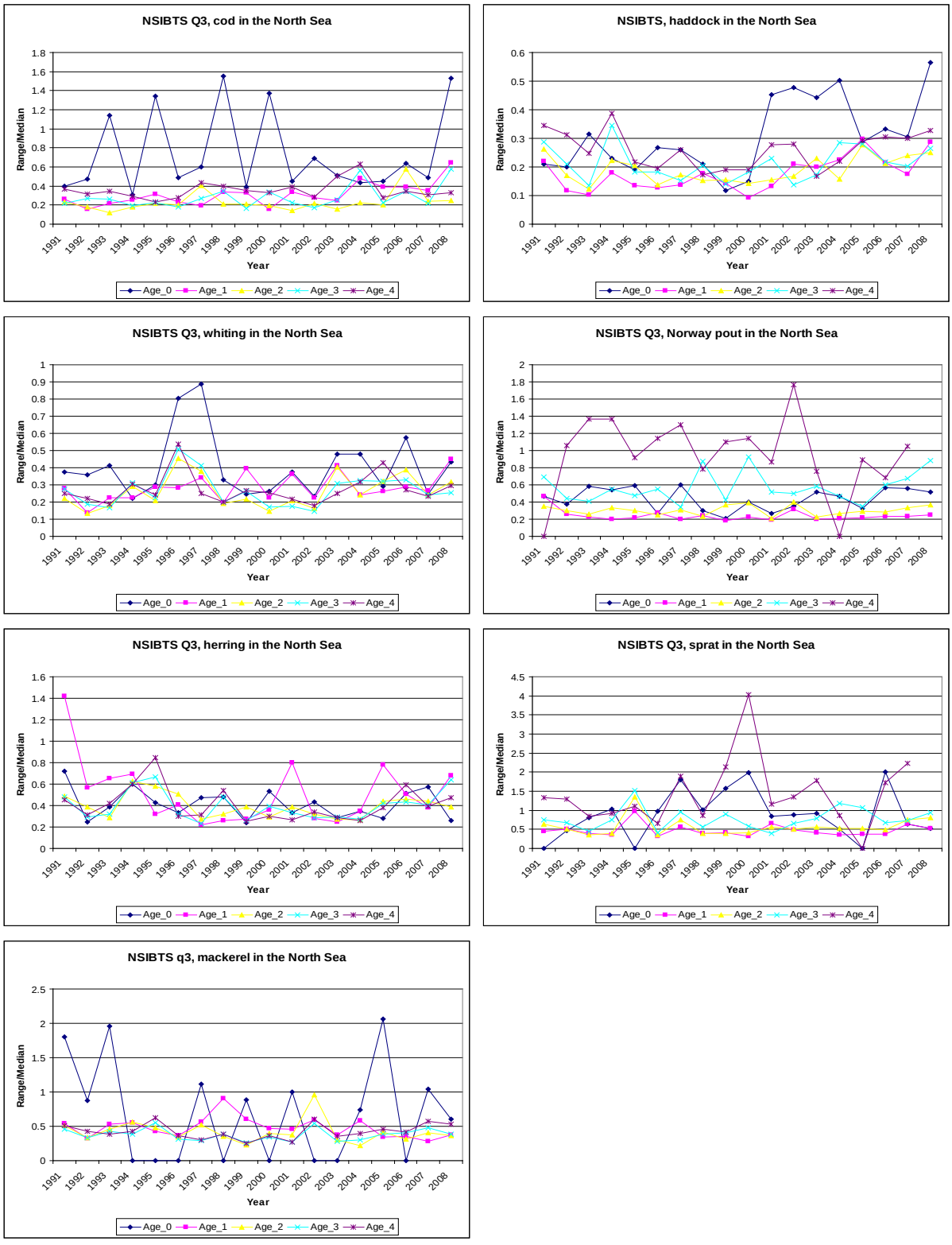


Figure 4.2.4.1. Precision estimates indices for 0-group species during the quarter 3 IBTS survey in the North Sea, extracted from DATRAS.

4.2.5 Participation in 2009

Sweden, Germany and England have advised that they will be participating fully in the programme in 2009. The timing of the surveys will be broadly in line with recent years. Norway (dealt with in Section 4.2.6.1) will not participate this year and Scot-

land is to extend their survey coverage to the rectangles to the west of the Shetland Isles (see Section 4.2.6.2 for further details). In doing so, Scotland will drop ten stations in rectangles around the German Bight. As these stations are already fished by two other countries (England and Germany) it is felt that this is a practical solution to their need to extend the index area to the west. The IBTS WG strongly recommends that all countries try to have the majority of the 3rd quarter survey in August in order to minimize the variance associated with survey timing.

4.2.6 Other issues

4.2.6.1 Cancellation in 2009 of Norwegian Quarter 3 IBTS

In January 2009, IBTSWG were informed that Norway will not carry out its commitment to the 3rd Quarter IBTS, for internal reasons. Since 2007, there has been a combined cod index from the 3rd quarter data. In order to estimate the consequence of this Cefas commissioned a working document (WD2, Annex 5). The conclusion of which was that the Norwegian survey contributed to the older ages and that the loss of these data, could affect the assessment at the older ages but not adversely affect the overall trend. As the data collected by the Norwegians is concentrated in the North, an attempt was made to see if the other contributors could cover the loss of stations in their existing surveys. Although both Scotland and England could pick up a few of the stations, there was no way to complete all of the stations that Norway would normally fish. Given that the individual surveys are used independently for a number of species by WGNSSK any change to existing coverage could severely affect these assessments, therefore no radical change to the coverage can be considered for Scotland and England at this time. It is the recommendation of the IBTS WG that Norway is encouraged not to drop the survey this year and if they do, that they do their best to reinitiate the survey in 2010.

4.2.6.2 Extension of NS-IBTS into the northwesterly area of North Sea

For several reasons, Scotland has been considering extending the survey area coverage during the quarter 1 and quarter 3 IBTS to include statistical rectangles north and west of Scotland. Commercial activity in this area (Figure 4.3.6.2.1.) show that significant quantities of cod (and other demersal species) are caught commercially in the north and west of area IV, but to date, this area has not been sampled on a regular basis within IBTS, or indeed, Scotland. Industry leaders have often criticized the fact that the Scottish quarter 1 and quarter 3 survey indices are used in the assessment process but that these indices do not account for a significant number of rectangles (10) that fall within the assessment area for demersal stocks.

In comments of the quality of the assessment, WGNSSK (ICES 2008) indicate that "any such review of the area coverage of IBTS should also include a consideration of the northwesterly extent of the survey west of Shetland where good catches of cod have been reported".

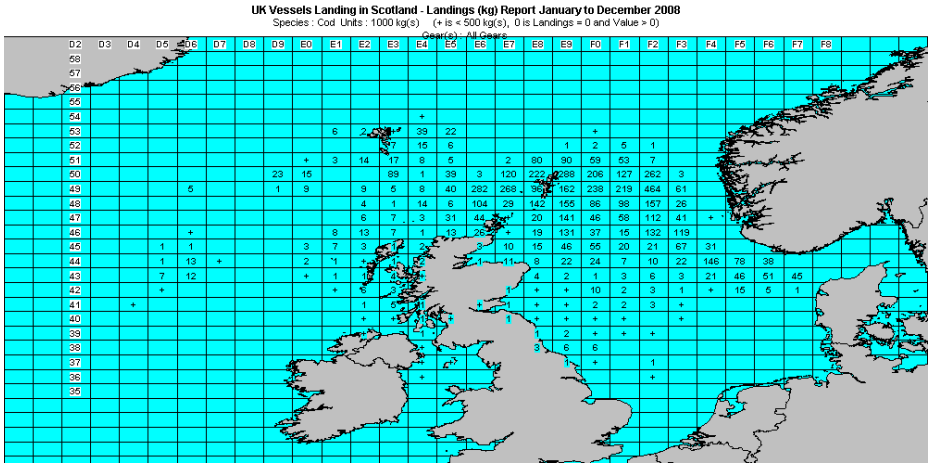


Figure 4.3.6.2.1. Landings of cod into Scotland by UK vessels.

Scotland has identified 10 statistical rectangles which currently lie to the north and west of the existing standard areas for the calculation of the IBTS abundance indices for demersal species (Figure 4.3.6.2.2). Six of these are currently sampled within the international coverage of the quarter 1 IBTS and 5 are covered during the quarter 3 IBTS.

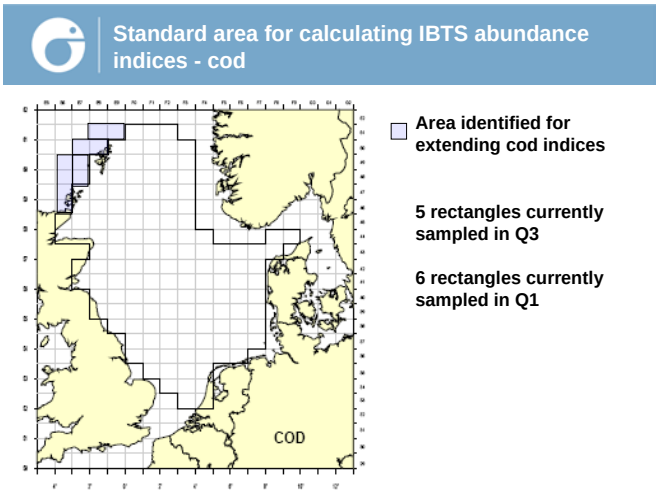


Figure 4.3.6.2.2. Additional stations abundance indices.

Scotland has added 4 stations, covering statistical rectangles 48E6, 49E6, 49E7 and 50E7 to the existing survey coverage for quarter 1 (Figure 4.3.6.2.3) and will continue to meet their commitment of 52 stations for the international coverage. It is expected that this additional work can be met under the existing time normally allocated for this survey. In order to accommodate the 7 additional stations for the quarter 3 survey (Figure 4.3.6.2.3), Scotland has removed 10 stations in the southeastern part of the area which they have covered in recent years. Given that these statistical rectangles are also covered by two other countries, no affect on the coordinated international coverage is expected. There will also be scope for Scotland to allocate some time (3 hauls) to support the coordinated international coverage on the northern part of the survey area.

In deciding any future alterations to the standard areas for calculating IBTS abundance indices, the addition of the extra stations planned, as well as those currently sampled outside the area should be considered.

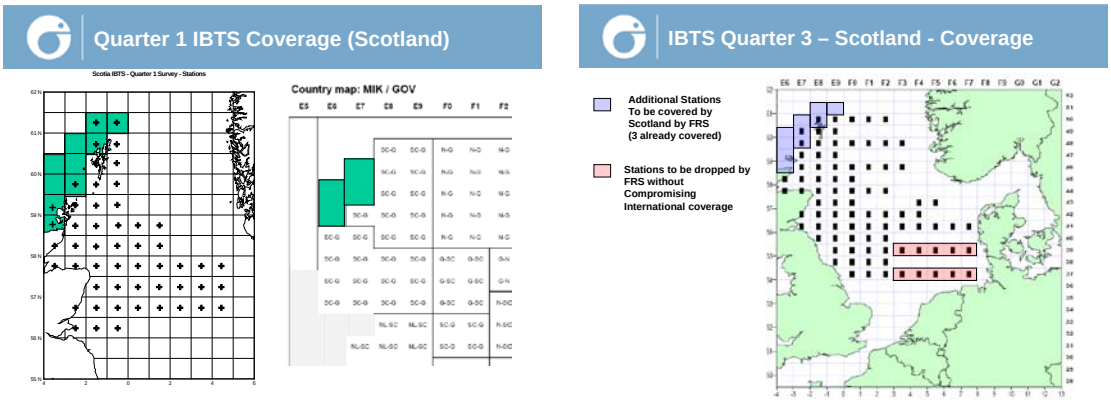


Figure 4.3.6.2.3. Extension of Scottish coverage during quarter 1 and 3 IBTS.

Reference

ICES. 2008. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak – Combined SPRING and autumn (WGNSSK), 7 -13 May 2008, Copenhagen. ICES CM 2008/ACOM:09.

4.2.6.3 Staff exchange in 2008

There is a recommendation from the IBTS working group as well as the LRC (Living Resource Committee) that sea-going technical or scientific personnel take part in other countries surveys in order to study trawling and biological sampling procedures on board ships partaking in internationally coordinated programmes.

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

The coordinator of the Dutch contribution to the ICES International Bottom Trawl Survey (IBTS), Remment ter Hofstede, had the opportunity to join the UK vessel RV "Cefas Endeavour" (Figure 4.2.6.3.1) for a week at sea in august 2008 during their 3rd quarter IBTS survey.

These following minutes focus on the differences in the sampling procedures between Cefas and IMARES, and points out possible improvements for the IBTS procedures by IMARES on-board the Dutch vessel RV Tridens (Figure 4.2.6.3.1).

Figure 4.2.6.3.1. RV Cefas Endeavour (left) and RV Tridens (right).

General

The Endeavour is the coordinating vessel of the 3rd quarter IBTS. Contact with the other participating vessels is limited to issues concerning the completion of the full sampling program, e.g. the sampling of all the allocated rectangles. On the contrary to the 1st quarter IBTS coordinated by IMARES, no preliminary data are exchanged during the Q3 cruises, only final data are distributed after all vessels have finished their survey.

A briefing of the full Endeavour cruise program is held with all scientific and most of the vessels' staff together at the beginning of the cruise, the first mate is in charge of this. Regulations of the ship and requirements for the scientific work are discussed. A complete cruise plan was not available, but all tasks are described on separate papers and the cruise leader keeps well track of the complete fulfilment and scheduling of the tasks. Compared to IMARES, a complete and detailed cruise plan is available; all scientists are briefed 1–2 weeks prior to the survey. At the start of the Tridens cruise, the IBTS briefing used to be held between the cruise leader, captain, first mate and chief engineer exclusively, but has since 2009 performed in the presence of all crew members and scientists, same as on-board Endeavour.

On-board the Endeavour, the division of the tasks among the scientific crew was as follows: The cruise leader has the overall overview and is dealing mainly with the fishing aspects at the wheelhouse. A deck master keeps control of the sampling of the catches. The rest of the scientific crew are involved in handling all other aspects of a fisheries survey, e.g. CTD measurements, species determination, maturity staging, etc. Note that none of these tasks are person specific and everybody is involved in all types of work. On-board the Tridens, the cruise leader is dealing with both the fishing aspects on the bridge and the tasks of the deck master. All other tasks are appointed to a single person (one for the CTD, one for measuring fish lengths, one for taking otoliths, etc.), which is in practice very efficient, but for the sake of a versatile employability of the scientists, it is recommended to incorporate more variation in the tasks of each scientist during a cruise.

CTD

On-board the Endeavour, one small CTD is attached to the GOV-net (see Figure 4.2.6.3.2), that measures every 5 seconds the Temperature, Salinity (2 digits), Density and Pressure. Information on temperature and salinity at both surface and bottom from only 1 random measurement is stored (not an average from the haul). A vertical CTD cast is being taken before each GOV haul, measuring the temperature, salinity, etc, and a water sample is taken from the bottom by using a lead weight to close the tube. A water sample from the surface is taken straight from the tap of the continuous water flow. The Tridens is taking a vertical cast after each GOV trawl for collecting a bottom and (nearly) surface water sample and to gather information on temperature

and salinity, no mini-CTD is attached to the net. The collected data are solid and no improvements are necessary.

Figure 4.2.6.3.2. CTD deployment on-board the RV Cefas Endeavour during the 3rd quarter IBTS; left and middle CTD for vertical cast, including the device for taking a water sample, right the mini-CTD that is attached to the GOV net.

Monitoring the gear deployment

Like Tridens, the Endeavour uses SCANMAR equipment to monitor headline height and doorspread, and in addition wingspread. Main differences with the measurements on board the Tridens are the connection of the sensors on the doors (very robust for the Endeavour, but not adjustable (see Figure 4.2.6.3.3)), the recording of wingspread (currently not by Tridens) and the storage of the data (Tridens uses in-house developed software to store the recordings and calculate the mean).

During the cruise of the Endeavour in August, somehow the doorspread measurements were not recorded by the SCANMAR computer, therefore the recording of the wingspread turned out to be very helpful to judge the gear performance. Still, the recording of the door spread on board the Tridens is currently very practical and reliable, and does not need improvements.

Figure 4.2.6.3.3. SCANMAR instruments on board the Endeavour; connection on the boards (left: open, and middle: closed), and visualization of the recordings in the wheelhouse (right).

Sorting of the catch

The sorting of the catch on board the Endeavour is performed outside on the aft deck, underneath a higher deck and partly shielded from wind and rain by a canvas blind. The ship crew drops the catch into a hopper from where the catch is manually led on to two chutes of approximately 2.5 meter, where persons easily can sort the catch on both side of the chutes (see Figure 4.2.6.3.4). Between the chutes there is a sufficient amount of boxes for putting the different species in. This sorting arrangement is by far slower than using a mechanical conveyor belt (as on board Tridens), but on the other hand allows the scientists to fully sort the catch directly at a species level. At the Tridens, as a result of the speed of the conveyor belt, the catch is first sorted into combined groups (e.g. samples like 'herring+sprat', 'flatfish', 'gadoids', 'other species', etc), which are divided into species groups at a later stage. However, because this further sorting of the fish can take place next to the measuring of already sorted species, in the end the use of the conveyor belt seems less time consuming and preferable.

Figure 4.2.6.3.4. Sorting of the catch on board the Endeavour (left) and the Tridens (right).

Processing the catch

After having sorted the catch, it is weighed by species (and sex for elasmobranchs, crustacea, and some flatfish species) and in case of a large catch a subsample is being taken and weighed as well. The deck master records the weights, and is responsible later on for handing out the otolith boxes. Next, each species sample is being processed using the EDC (Electronic Data Collection) system. It consist of several workstations (see Figure 4.2.6.3.5), each comprising of a measuring board, balance, computer (+screen) and other necessary instruments for taking individual data.

The measuring board has bar codes for length classes (1 cm and .5 cm), alphabetical (a-z) and numerical (0–9) barcodes, and some barcodes for shortcuts. A swiping pen reads the barcodes and the swipe is confirmed on the computer screen by a beep (through a headphone). The EDC keeps track of the past measurements and informs you whether maturity, otoliths or other data need to be recorded for the measured individual fish. When all species have been measured and sampled, the data from the different work units are transferred to the central computer operated by the Deckmaster and stored in an Access database.

Figure 4.2.6.3.5. Left and middle: Workstations at the Endeavour equipped with the Electronic Data Collection system; right box for storing otoliths.

The EDC (Electronic Data Collection) system has the advantage that each individual fish is measured only once, it keeps track of the past sampling and knows exactly for which species and size classes additional sampling (otholiths, maturity etc) is required and informs the user on this during the measuring procedures. Furthermore the data go straight into the computer which saves time and possible errors compared to manual typing. However, the measuring procedure itself is slower than when performed manually and moreover the EDC system requires that all personnel measuring are trained in taking otoliths and judging maturity stages. Also, when errors are being made (and noticed!), correcting these errors on the main computer is rather difficult and not user friendly.

On board Tridens, only one person takes length measurements of all the species, and communicates through a headset with another person who's operating the main computer for storing the measurements, using the in-house developed software 'Billie'. In the meantime the other scientists are involved in further sorting (e.g. benthos), weighing the catches, and collecting otolith and maturity data.

There are a few differences in sampling for otoliths between Endeavour and Tridens. Tridens uses the roundfish areas as sampling areas for all roundfish species (as prescribed by the IBTS manual), Endeavour uses these areas only for gadoids and has different sampling areas for herring (IVa-west, IVa-east, IVb, Buchan, NE-coast, and IVc), sprat (IVa-west, IVa-east, IVb-west, IVb-east, and IVc), and mackerel (IVa, IVb, and IVc; see Figure 4.2.6.3.6). Furthermore, otholith samples are recorded on board the Endeavour by cm (Tridens: mm), though recording in mm would be possible. Otholiths are stored in boxes (Tridens: individual envelopes), which in combination with the EDC system allows a single person to easily perform the sampling (compared to Tridens one person measuring and cutting, and another writing and storing).

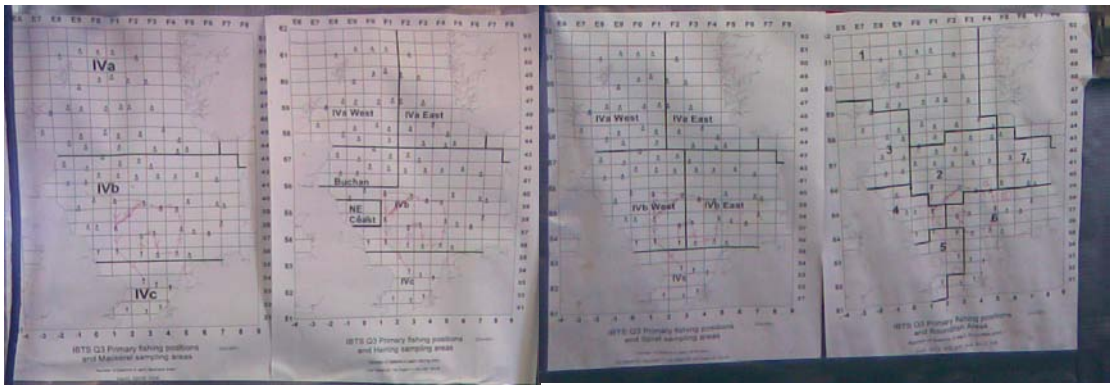


Figure 4.2.6.3.6. Sampling areas used by Cefas during the 3rd quarter IBTS (from left to right: Mackerel, herring, sprat and general roundfish areas).

Conclusions

In general, the procedures on board the Tridens are rather solid and things like CTD measurements, registration of gear performance, and sorting of the catch do not need improvements. The processing of the catch (length measurements, otolith sampling) may not be the most efficient, e.g. fish often gets sorted and measured twice, in case of otolith sampling the measurements are recorded manually with pen and paper and have to be stored in the main computer thereafter. However, the current procedure is very practical and orderly, and implementing a system such as the EDC does not necessarily add as much value to compensate for all thinkable costs of the implementation.

More likely would be to merely improve the current procedures. One example is that measuring the total catch and the sub sample by species would allow the calculation of a precise subsampling factor (catches are currently not weighed at all). A way to save time and errors when taking otolith samples (and other biological information), is to store the data straight into a local computer (laptop at the workstation) and combine these files thereafter with the main file at the main computer. The first improvement has already been implemented on board Tridens by now; the second is in the process of being implemented.

Also, having a crew knowing about all procedures going on during a fisheries survey seems highly valuable. On board the Endeavour such skills are simply a necessity as a result of the use of the EDC system while sampling. The way things are arranged currently on board the Tridens; tasks are specified per individual scientist, mainly for reasons of efficiency. However, for the sake of passing on and ensuring skills and knowledge, it is recommended to invest more time in multi-tasking during the surveys.

4.3 Eastern Atlantic

4.3.1 General overview

From Q3 2008 to Q1 2009 altogether 15 coordinated groundfish surveys were and carried out in the Western and Southern IBTS Atlantic Area, culminating in 1193 valid tows. The slight decrease from 1199 valid stations appears due mainly to adverse weather reported by a number of surveys with a handful of stations lost overall, but no exceptional gear damage has been reported for this period.

A technical difficulty in an existing valid survey trawl was reported by the Spanish Porcupine survey. Manifest as delay in sinking and settling times with a slight shift in geometry, there has been no identification of the source of the problem despite thorough examination at sea during the survey.

The Scottish Rockall survey reported a historical 16 year low in 0-group haddock recruitment based on length, with their Western Q1 Survey length based 1-group indices also showing a continuing downward trend for cod, haddock and whiting.

Good catches of hake in terms of biomass are reported for the EVHOE and Irish Groundfish Surveys with moderate catches in terms of numbers indicating most likely the maturing of the juvenile 2005 catches. However, catches from the Spanish Porcupine Survey and those south of the Celtic Sea, which also recorded strong juvenile signal in 2005 are reporting more moderate catches currently.

The French *RV Thalassa* was involved in 2 separate calibration exercise in 2008. One in the Celtic Sea with the Irish *RV Celtic Explorer* (14 paired hauls) and the other in Southern Biscay with the Spanish *RV Cornide de Saavedra* (4 paired hauls). A further intercalibration exercise was carried out between the UK *RV Endeavour* and the UKNI *RV Corystes*. A staff visit by the chief scientist of the Spanish Porcupine Survey on a leg of the neighbouring groundfish survey was also facilitated. A number of intercalibration datasets have and are being built between neighbouring IBTS coordinated surveys which should prove valuable in translating trends across the area.

Unusual catches included Spanish ling, *Molva macropthalma*, and skipper *Scombersox saurus* (UK Q4); sailfin dory, *Zenopsis conchifer*, (UK Sco Q4); 4.2t spurdog for 20min tow (UK NI Q4); and a large female six gill shark *Hexanchus griseus*, at 7.7m TL (Irl Q4).

4.3.2 Survey summaries by country

4.3.2.1 UK-Scotland: Western Division Bottom Trawl Survey - Quarter 4 2008 (1408S)

Nation:	UK (Scotland)	Vessel:	Scotia
Survey:	1408S	Dates:	2008

Cruise	Q4 Western Groundfish survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on a range of fish species in ICES areas VIa, VIIb and IVa. Age data were collected for Cod, Haddock, Whiting, Saithe, Herring, Mackerel and Sprat.
Gear details:	GOV with groundgear C for all stations.
Notes from survey (e.g. problems, additional work etc.):	68 valid hauls For the majority of the survey, Scotia was fortunate to have reasonable weather conditions for the time of year. As a result, only one and a half days were lost as a result of weather. A further 2 days were lost as a result of injury situation and winch repairs. This resulted in the trip achieving altogether 73 trawl hauls with the GOV. Of this total, 5 were assigned as foul hauls as a consequence of the level of gear damage sustained. Of the remaining 68 hauls, 60 were undertaken in ICES area VI. The SCANMAR gear monitoring system and the NOAA bottom contact sensor were used throughout the survey to observe the gear performance.
Number of fish species recorded and notes on any rare species or unusual catches:	81 species were encountered during the survey for a total catch weight of 23531kg. Biological data were recorded for a number of species in accordance with the requirements of the EU Data Regulations. All invertebrate species caught were identified (where possible) to species level. DNA samples from Smooth Hound were collected for analysis by University College Dublin.

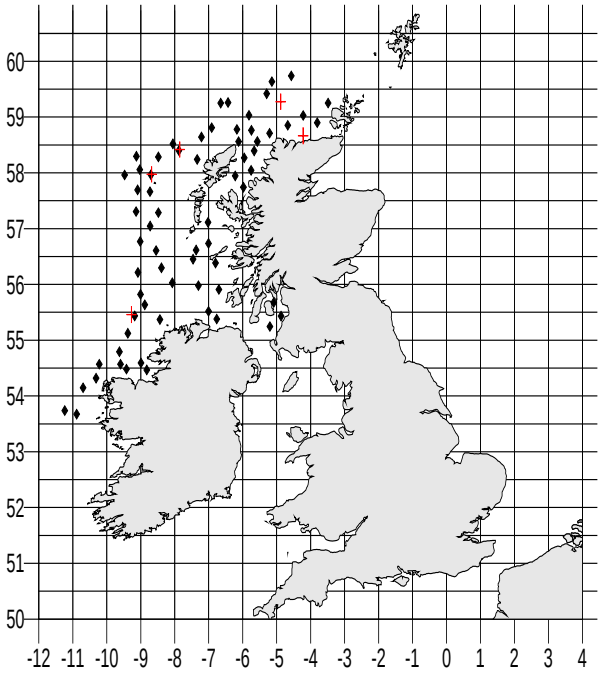
Stations fished (aims: to complete 78 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	comments
VIa		GOV - C	75		-			100	
VIIb		GOV - C	6		-		0	100	
					-	0			
IVa		GOV - C	3		-	0	0	100	
	TOTAL		84	68	-			100	

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

Species	Age	Species	Age
Clupea harengus	483	*Lophius budegassa	15
Gadus morhua	71	*Lophius piscatorius	31
Melanogrammus aeglefinus	862	Pollachius virens	40
Merlangius merlangus	484	Scomber scombrus	599
*Psetta maxima	3		
*Lepidorhombus whiffiagonis	175		

Trawl Positions for Scotland Q4 IBTS survey 2008 (Foul / Invalid tows displayed in red)

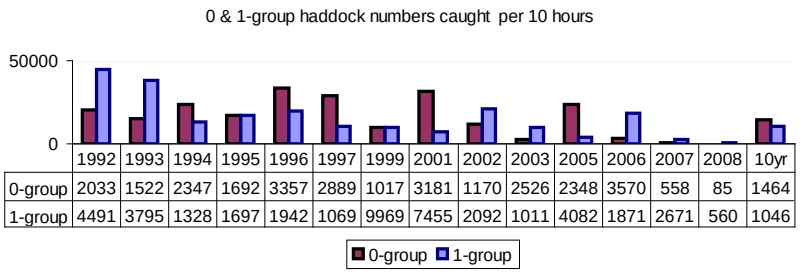


Q4 SCOGFS cpue data for major species.

Species	Strata	Mean nos/hr	Mean kgs/hr
Gadus morhua	All	2.18	4.16
Melanogrammus aeglefinus	All	196.13	72.88
Merlangius merlangus	All	262.89	21.25
Merluccius merluccius	All	59.85	9.70
Pollachius virens	All	1.20	1.58
Lepidorhombus whiffiagonus	All	5.95	1.94
Lophius piscatorius	All	1.31	3.22
Pleuronectes platessa	All	16.85	2.41
Microstomus kitt	All	14.10	1.72

4.3.2.2 UK-Scotland: West of Scotland Deepwater Survey - 2008 (1108s)

NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	1108s	Dates:	September 2008

Cruise	Q3 Rockall Haddock survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on a range of fish species in ICES area VIb. The primary objective of the survey is to assess the state of the haddock stock on the Rockall Plateau. Age data were collected for cod, haddock, whiting, saithe.
Gear details:	GOV using groundgear C.
Notes from survey (e.g. problems, additional work etc.):	No problems encountered. Ship's thermosalinigraph was run continuously throughout the cruise. SCANMAR system and bottom contact sensor was used throughout the cruise to monitor net parameters and gear performance. Sampling of benthic species were sampled and recorded according to developing FRS protocols.
Number of fish species recorded and notes on any rare species or unusual catches:	The primary objective of the survey is to assess the state of the haddock stock on the Rockall Plateau: this is done by comparing the strength of the respective year classes in the current year with those of previous years. The provisional indices using a length rather than age based-delimiter indicate yet another poor 0 –group recruitment for Haddock on Rockall with 2008 being the worst on record. The paucity of one year old fish was also expected and reflects the poor recruitment seen in 2007.  Altogether 39 species were recorded during the survey with a total weight of 12485 kgs.

	1992	1993	1994	1995	1996	1997	1999	2001	2002	2003	2005	2006	2007	2008	10yr
0-group	2033	1522	2347	1692	3357	2889	1017	3181	1170	2526	2348	3570	558	85	1464
1-group	4491	3795	1328	1697	1942	1069	9969	7455	2092	1011	4082	1871	2671	560	1046

Stations fished (aims: to complete 37 valid tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	VALID WITH ROCK-HOPPER	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VIb		GOV - C	37	37	-	0	0	100	
	TOTAL		37	37	-	0	0	100	

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

Species	No.	Species	No.
Gadus morhua	8	*Lophius piscatorius	74
Melanogrammus aeglefinus	1086	*Raja batis	8
Merlangius merlangus	1	*Raja clavata	4
Pollachius virens	21	*Leucoraja fullonica	2
*Lepidorhombus whiffiagonis	200		

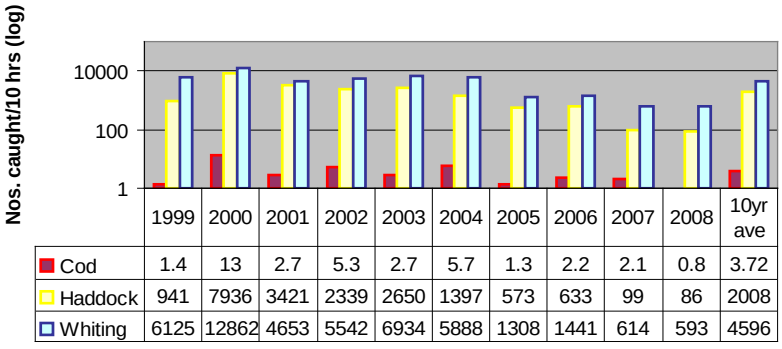
Nb: following recommendation from WKMSCWHS no maturity data were collected from cod, haddock and whiting.

Q3 SCO Rockall cpue data for major species: 2008.

Species	Strata	Mean nos/hr	Mean kgs/hr
Gadus morhua	All	0.44	3.38
Melanogrammus aeglefinus	All	630.4	213.9
Merlangius merlangus	All	0.05	0.05
Pollachius virens	All	1.21	12.65
Microstomus kitt	All	64.29	6.04
Lepidorhombus whiffiagonus	All	11.63	2.03
Lophius piscatorius	All	4.06	10.70
Argentina sphyraena	All	762.3	5.68
Trisopterus minutus	All	2607.5	17.10
Micromesistius poutassou	All	130.7	85.54

4.3.2.3 UK-Scotland: Western Division Bottom Trawl Survey - Quarter 1 2008 (0308s)

NATION:	UK (SCOTLAND)	VESSEL:	SCOTIA
Survey:	0308S	Dates:	March 2008

Cruise	Q1 Western Groundfish survey aims to collect data on the distribution, relative abundance and biological information (in connection with EU Data Directive 1639/2001) on a range of fish species in ICES areas VIa. Age data were collected for Cod, Haddock, Whiting, Saithe, Herring, Mackerel and Sprat.
Gear details:	The GOV was used throughout the cruise with groundgear "C" (525mm bobbins in the bosom section). The SCANMAR system was used throughout the cruise to monitor headline height, wing spread, door spread and distance covered during each tow. A bottom contact sensor was attached to the groundgear for each tow and the data downloaded for further analysis in the laboratory.
Notes from survey (e.g. problems, additional work etc.):	Despite atrocious weather and a couple of setbacks in the first half of the cruise Scotia still managed to complete the survey. Altogether 56 valid hauls were achieved with all the core time-series hauls being completed. In addition 5 extra stations were completed and one station was repeated. (See Figure 2 for haul positions) There was one foul haul. Fishing commenced each day at first light with all hauls being completed during the daylight period.
Number of fish species recorded and notes on any rare species or unusual catches:	82 species were encountered during the survey for a total catch weight of 37582 kg. The provisional 1-group indices using a length rather than age based delimiter for cod, haddock and whiting are shown in Figures 1. Fig.1 ICES Area 6A Numbers caught per 10 hours fishing Age 1  The index continues to display the downward trend of recent surveys for the three main commercial species, producing very low values that in all cases are well below the 10 year average. As in previous years pelagic species dominated the catches with 25 tonnes of mackerel and 4 tonnes of herring being caught. Haul 118 yielded a Sailfin Dory (Zenopsis conchifer). This is a southern relative of the John Dory which is only ever rarely seen this far north. It was caught in statistical rectangle 42E0 at a depth of 160 meters. It is the first ever recorded specimen by FRS on a bottom-trawl survey.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	10yr ave
Cod	1.4	13	2.7	5.3	2.7	5.7	1.3	2.2	2.1	0.8	3.72
Haddock	941	7936	3421	2339	2650	1397	573	633	99	86	2008
Whiting	6125	12862	4653	5542	6934	5888	1308	1441	614	593	4596

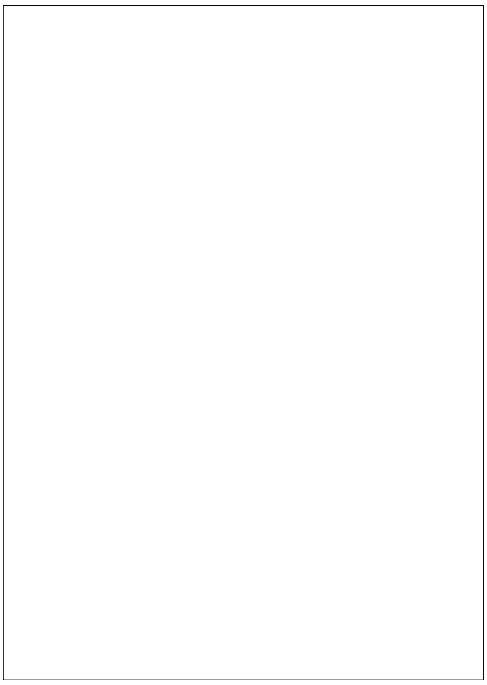
Stations fished (aims: to complete 50 valid tows per year)

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIa		GOV - C	50	56	6	1	112	
	TOTAL		50	56	6	1	112	

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

Species	Age	Species	Age
Clupea harengus	1038	**Lophius budegassa*	3
Gadus morhua	103	**Lophius piscatorius*	41
Melanogrammus aeglefinus	898	**Raja brachyura*	2
Merlangius merlangus	646	*Scomber scombrus*	843
**Merluccius merluccius*	713	**Leucoraja naevus*	46
**Psetta maxima*	4	**Raja batis*	28
**Molva molva*	12	**Raja clavata*	28
**Lepidorhombus whiffiagonis*	115	**Raja montagui*	101
Pollachius virens	175	*Trisopterus esmarki*	204
**Scopthalmus rhombus*	1		

Q1WCSCGFS 2008 Trawl Stations



Q1 SCOGFS cpue data for major species: 2008

Species	Strata	Mean nos/hr	Mean kgs/hr
Gadus morhua	All	5.36	12.85
Melanogrammus aeglefinus	All	151.05	43.11
Merlangius merlangus	All	84.66	7.82
Merluccius merluccius	All	96.26	13.68
Pollachius virens	All	7.16	28.14
Lepidorhombus whiffiagonus	All	5.87	1.30
Lophius piscatorius	All	1.65	2.41
Pleuronectes platessa	All	23.63	2.95
Microstomus kitt	All	27.93	3.22
Clupea harengus	All	1057.17	111.37
Scomber scombrus	All	8159.63	854.65

4.3.2.4 UK – Northern Ireland: Northern Irish Groundfish Survey Q4 2008 – Q4NIGFS

NATION:	UK (NORTHERN IRELAND)	VESSEL:	CORYSTES
Survey:	41/08	Dates:	11–28 October 2008

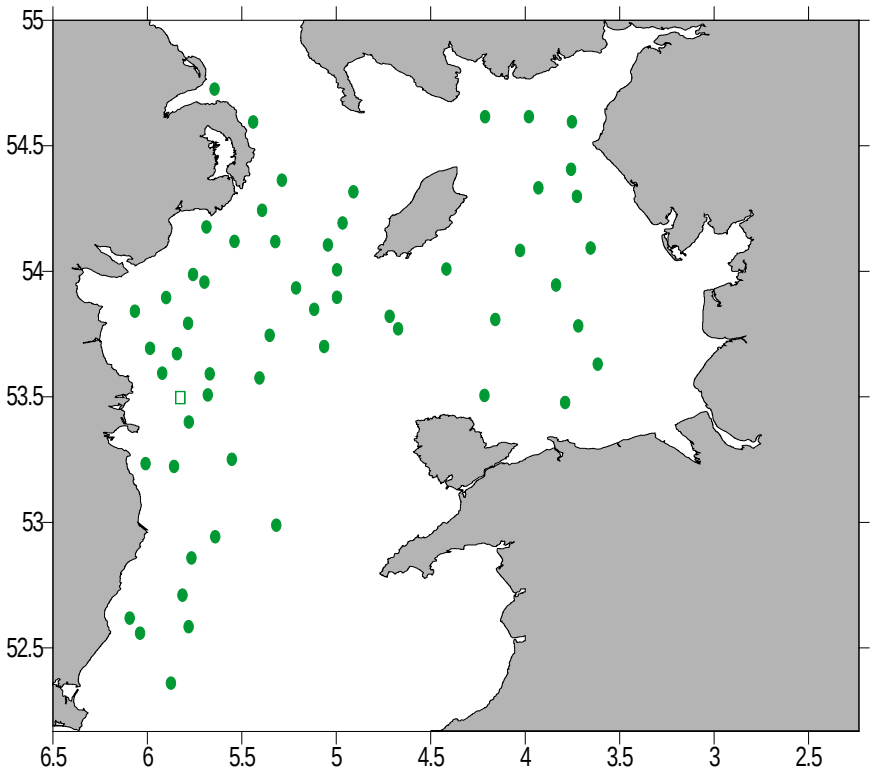
Cruise	Q4 Irish Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in VIIa. The primary species are cod, haddock and whiting, herring and plaice.
Gear details:	Rock-hopper otter trawl with a 17m footrope fitted with 250 mm non-rotating rubber discs.
Notes from survey (e.g. problems, additional work etc.):	First three days of the survey was used to complete an acoustic survey grid of approximately 590 nm around the Isle of Man and Scottish coastal waters as part of an extended acoustic survey programme in the Irish Sea. More than two days were lost because of poor weather conditions. Tides were very strong during sampling at the St Georges channel stations and half a survey day was lost because of extensive gear damage fishing in this area. Additional work included quantifying external parasite loads in whiting and cod by area and collecting tissue samples from gadoids for a genetics study. Edward Farrell, University College Dublin, joined the survey to collect biological information on Mustelus spp.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 62 species of fish were recorded during the survey. Less common fish species caught included two European eels *Anguilla anguilla* off Skerries in the western Irish Sea. An unusually large catch of mostly pregnant female spurdogs *Squalus acanthias* (~4200 kg in 20 min tow) off Dublin.

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

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VIIa	All	Rock-hopper	60	57	0	0	95	
	TOTAL		60	57	0	0	95	

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

SPECIES	AGE	SPECIES	AGE
Gadus morhua	10	*Clupea harengus*	150
Melanogrammus aeglefinus	459		
Merlangius merlangus	1138		
Merluccius merluccius	45		



Map of survey stations completed during the Northern Irish quarter 4 groundfish survey (open circle: unusual large spurdog catch).

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

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

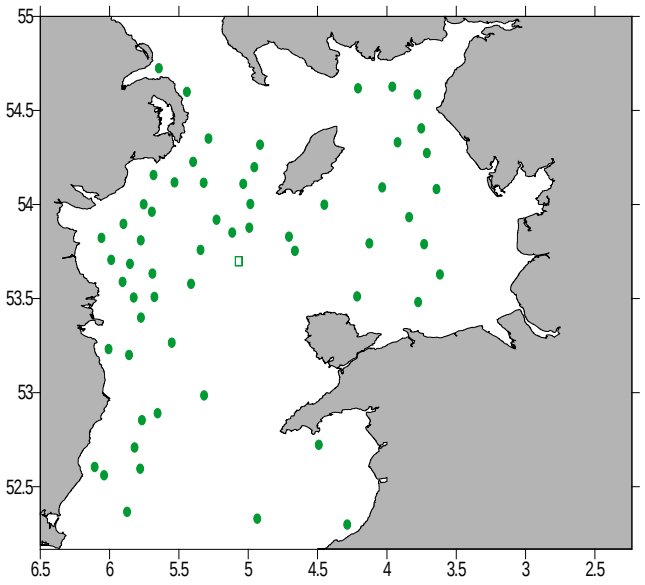
Cruise	Q1Irish Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in VIIa. The primary species are cod, haddock and whiting, herring and plaice.
Gear details:	Rock-hopper otter trawl with a 17m footrope fitted with 250 mm non-rotating rubber discs. SCANMAR sensors were fitted to gear and trawl parameters recorded.
Notes from survey (e.g. problems, additional work etc.):	Very little gear damage and relatively good weather meant very little fishing time was lost overall. Strong tides in the eastern Irish Sea were a particular problem in the second week of the survey. Additional work included quantifying external parasite loads in whiting and cod by area and collecting tissue samples from cod and hake for a genetics study. Fecundity samples were taken from over 170 haddock females and all female cod that had IBTS stages 2 and 3.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 71 species of fish were recorded during the survey. Less common fish species caught included one specimen of corkwing *Crenilabrus melops* off the west coast of the Isle of Man.

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

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

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

SPECIES	AGE	SPECIES	AGE
Gadus morhua	122	*Merlangius merlangus*	1205
Melanogrammus aeglefinus	570	*Merluccius merluccius*	78
Pleuronectes platessa	530		



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

4.3.2.6 Ireland: Irish Groundfish Survey Q4 – IGFS08

NATION:	IRELAND	VESSEL:	CELTIC EXPLORER
Survey:	IGFS	Dates:	24 September–3 October (VIa) 27 October–28 November (VIIb,g,j)

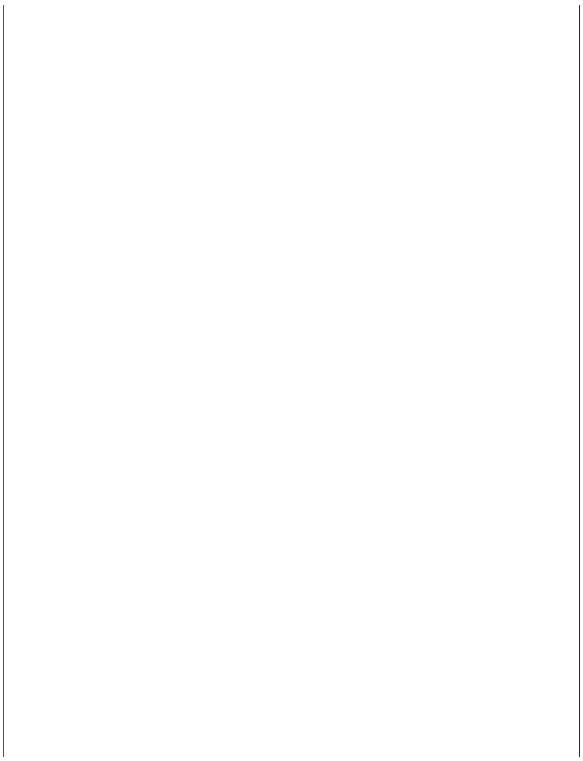
Cruise	Q4 Irish Groundfish survey aims to collect data on the distribution, relative abundance and biological parameters of commercial fish in VIaS, VIIb, VIIgN and VIIjN. The indicess currently utilized by assessment WG's are for haddock, whiting, plaice and sole with survey data provided also for cod, white and black anglerfish, megrim, lemon sole, hake, saithe, ling, blue whiting and a number of elasmobranchs as well as several pelagics (herring, horse mackerel and mackerel).
Gear details:	Two gear survey since 2004, using GOV groundgear "A" for areas VIIb,g and j; and "D"for area VIa.
Notes from survey (e.g. problems, additional work etc.):	Very little gear damage or poor weather so no significant downtime was encountered. A second year of intercalibration was carried out with the Thalassa in the Celtic sea with 14 parallel tows completed, bringing the total to 24. Tows in shallow areas continue to be problematic, particularly in VIa, because of static gear activity on traditional grounds.
Number of fish species recorded and notes on any rare species or unusual catches:	In 2008 96 species of fish and 17 elasmobranch species were caught. Overall, whiting numbers were low for area VII, while plaice numbers for the same area were up very slightly. Hake biomass appears to be up in recent years with numbers remaining constant or even reducing slightly in area VIa, indicating a maturing of the reasonably strong juvenile catches from 2005. Unusual catches included a large female six gill shark *Hexanchus griseus*, at 7.7m TL.

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

ICES Divisions	Strata	Gear	Tows planned	Valid	Additional	Invalid	% stations fished	comments
VIa	All	D	50	47	0	2	98	
VIIb,c	All	A	39	39	0	1	102	
VIIg	All	A	38	38	4	0	110	
VIIj	All	A	44	44	2	0	104	
	TOTAL		170	167	6	3	108	

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

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



Map of Survey Stations completed by the Irish Groundfish Survey in 2008. Valid = red circles; Invalid = crosses; Intercalibration = blue squares; intercal and additional stations not valid for IBTS survey indices = green rectangles. Two CTD transect lines in ICES VIIb also shown.

Biomass and number estimates. Year estimate 2008 (y_i); previous year estimate 2007 (y_{i-1}); average of last two years estimate ($y_{(i,i-1)}$); average of the previous three year estimates 2004–06 ($y_{(i-2,i-3,i-4)}$).

			BIOMASS INDEX			NUMBER INDEX		
Species	Strata	Valid	y_i	y_i/y_{i-1}	$y_{(i,i-1)}/$	y_i	y_i/y_{i-1}	$y_{(i,i-1)}/$
		tows			$y_{(i-2,i-3,i-4)}$			$y_{(i-2,i-3,i-4)}$
			kg/Km2	%	%	No/Km2	%	%
Gadus morhua	VIa	46	5.0	-35.3	59.5	3.7	-70.8	35.9
Lepidorhombus whiffiagonis	VIa	46	1.6	-14.3	-16.4	6.3	-46.3	-39.2
Lophius piscatorius	VIa	46	0.9	-54.3	-57.9	0.5	-66.8	-59.2
Melanogrammus aeglefinnus	VIa	46	77.5	-9.8	-35.3	273.4	4.9	-34.3
Merlangius merlangus	VIa	46	79.9	13.0	66.1	476.2	14.6	-8.3
Merluccius merluccius	VIa	46	44.3	14.1	222.7	221.5	4.6	-5.9
Pleuronectes platessa	VIa	46	9.7	-41.1	63.9	64.0	-35.5	68.3
Pollachius virens	VIa	46	15.7	39.7	252.0	21.1	14.3	307.0
Solea solea	VIa	46	0.4	-41.2	18.8	1.5	-40.3	20.8
Gadus morhua	VII	121	10.6	1.8	77.2	0.8	-65.3	-10.7
Lepidorhombus whiffiagonis	VII	121	13.7	86.2	-11.2	22.9	-2.8	-50.9
Lophius piscatorius	VII	121	9.2	-0.5	-33.8	1.0	-51.9	-75.5
Melanogrammus aeglefinnus	VII	121	462.0	7.6	44.4	1344.6	-51.7	50.8
Merlangius merlangus	VII	121	304.4	-18.6	31.2	607.7	-75.6	11.3
Merluccius merluccius	VII	121	74.4	98.2	82.5	233.1	-7.9	9.2
Pleuronectes platessa	VII	121	24.0	78.3	64.5	51.5	75.5	33.3
Pollachius virens	VII	121	0.2	-83.9	-9.3	0.0	-96.3	34.1
Solea solea	VII	121	1.5	125.4	-40.8	1.8	113.0	-55.8

4.3.2.7 UK – England: Western Groundfish Survey Q4–19/08

NATION:	UK (ENGLAND AND WALES)	VESSEL:	CEFAS ENDEAVOUR
Survey:	19/08	Dates:	5 November–7 December 2008

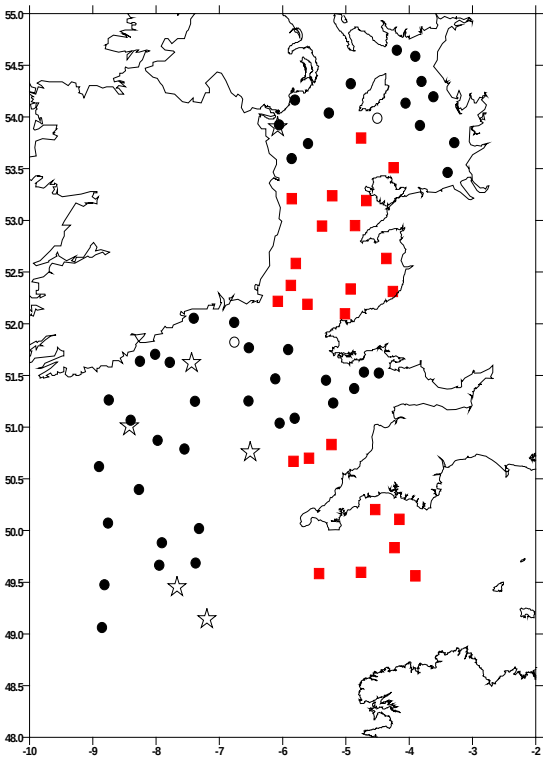
Cruise	Q4 Western Groundfish survey aims to collect data on the distribution, relative abundance, and biological information of commercial fish in VIIa and VIIe-h. The primary species are cod, haddock, hake and whiting, with data also collected for other demersal fish (e.g. skates and rays, anglerfish, plaice, megrim,) and pelagic fish (herring and mackerel). Data on the distribution and relative abundance of all non-target fish and the benthic bycatch are also recorded.
Gear details:	Two gear survey, using the modified rock-hopper GOV with groundgear D on hard ground stations, and GOV with groundgear A on fine ground stations (though with extra floats instead of kite and the toggle chains set to 10 cm). Since 2006, the trawls have been made from polyethylene (nylon nets were used in earlier years), a lifting bag of 200 mm mesh size (double 4 mm twine) covered the codend to minimize damage to the codend when bringing the net on board and emptying the codend. In 2008 a symmetry/flow sensor was used in the centre of the headline.
Notes from survey (e.g. problems, additional work etc.):	A shakedown tow was undertaken in the eastern English Channel whilst en route to the main fishing area. The polyethylene net was used on the rock-hopper GOV, and this gear had only limited gear damage, with stations around the Cornish peninsula and in St George's Channel fished successfully. Once hard ground stations were completed, the polyethylene GOV on groundgear A was rigged and stations in the Celtic Sea sampled. After a change of staff, stations in the Irish Sea were completed, with comparative sampling with RV Corystes undertaken. Further fine ground stations in the Celtic Sea were then undertaken, before poor weather prevented further fishing. Additional work included CTD casts, 2m beam trawl sampling for epibenthos, a tag/release programme for various dogfish, tissue sampling of smoothhounds and skates, and a marine mammal observer was on board to collect data on cetacean sightings.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 89 species of fish were recorded during the survey, and most of the species caught were relatively common. Unusual fish species caught included a single specimen of porbeagle *Lamna nasus* in the Bristol Channel, two specimens of Spanish ling *Molva macrophthalma* taken in the Celtic Sea, two specimens of skipper *Scomberesox saurus* captured off southern Ireland and a single specimen of river lamprey *Lampetra fluviatilis* caught in the eastern Irish Sea.

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

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITI-ONAL	INVALID	% STATIONS FISHED	COMMENTS
VII a	A-C	Standard	12	14	1	1	117%	
	H	Rockhopper	14	15	0	0	107%	
VII e-h	D-E	Standard	19	16	1	2	84%	Major gear damage and poor weather prevented completion of grid
	F	Standard	16	14	0	3	88%	
	G	Rockhopper	9	9	0	0	100%	
TOTAL			70	68	2	6	97%	

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

Species	Stock	No.	Species	Stock	No.
Gadus morhua	VIIa	8	*Psetta maxima*	-	11
Gadus morhua	VIIe-k	38	*Scophthalmus rhombus*	-	16
Melanogrammus aeglefinus	VIIa	146	*Microstomus kitt*	-	100
Melanogrammus aeglefinus	VIIe-k	340	*Lophius budegassa*	-	28
Merlangius merlangus	VIIa	223	*Lophius piscatorius*	-	18
Merlangius merlangus	VIIe-k	248	*Mullus surmuletus*	-	4
Pleuronectes platessa	VII a	456	*Dicentrarchus labrax*	-	15
Pleuronectes platessa	VII e and VII f-g	230	**Dipturus batis*	-	3
Solea solea	VII a	21	**Leucoraja fullonica*	-	1
Solea solea	VII e and VII f-g	52	**Leucoraja naevus*	-	42
Clupea harengus	VII a	195	**Raja brachyura*	-	15
Clupea harengus	Celtic Sea	154	**Raja clavata*	-	228
Merluccius merluccius	Northern	268	**Raja microocellata*	-	105
Lepidorhombus whiffiagonis	VIIb,c,e-k, VIIIa,b,d	190	**Raja montagui*	-	99
Scomber scombrus	Northern	205			



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

Species/stock	Stock area	Area surveyed	Gear	2007 Valid tows	2007 Mean catch (no.h-1)	2008 Valid tows	2008 Mean catch (no.h-1)
G. morhua	VII a	VII a	A	14	4.43	14	0.7
			D	16	0.25	15	0.2
	VII e-k	VII e-g	A	29	3.86	30	2.5
			D	11	0.73	9	0.2
M. aeglefinus	VII a	VII a	A	14	323.83	14	27.3
			D	16	229.71	15	75.3
	VII e-k	VII e-g	A	29	127.77	30	241.5
			D	11	352.54	9	328.5
M. merlangus	VII a	VII a	A	14	2851.17	14	4622.3
			D	16	368.19	15	466.1
	VII e-k	VII e-g	A	29	794.12	30	1227.7
			D	11	23.45	9	72.7
M. merluccius	North	VIIa, e-g	A	43	55.42	44	138.8
			D	27	2.59	24	2.8
L. piscatorius	VIIb-k, VIIIa,b	VII a,e-g	A	43	2.42	44	0.8
			D	27	0.22	24	0.1
S. acanthias	NE Atlantic	VIIa, e-g	A	43	5.19	44	14.3
			D	27	0.44	24	0.9

Catch rates of commercial stocks

4.3.2.8 France: EVHOE Groundfish Survey Q4 – EVHOE2008

NATION:	FRANCE	VESSEL:	THALASSA
Survey:	EVHOE 2008	Dates:	18 October–1 December 2008

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, monkfish, anglerfish, megrim, cod, haddock and whiting, with data also collected for all other demersal and pelagic fish. CTD temperature and salinity profiles recorded at each trawling position. Sampling design is stratified random.
Gear details:	A GOV with standard Ground gear (A) but no kite replaced by 6 extra floats.
Notes from survey (e.g. problems, additional work etc.):	95% of the initial program was achieved. 12 valid tows for intercalibration were conducted in parallel with the RV Celtic Explorer.
Number of fish species recorded and notes on any rare species or unusual catches:	165 species encountered. Unusual catch of 60 Sea Bass totaling 125 Kg in the Bay of Biscay by 45°51'N and 2°24'W at a depth of 100 m.

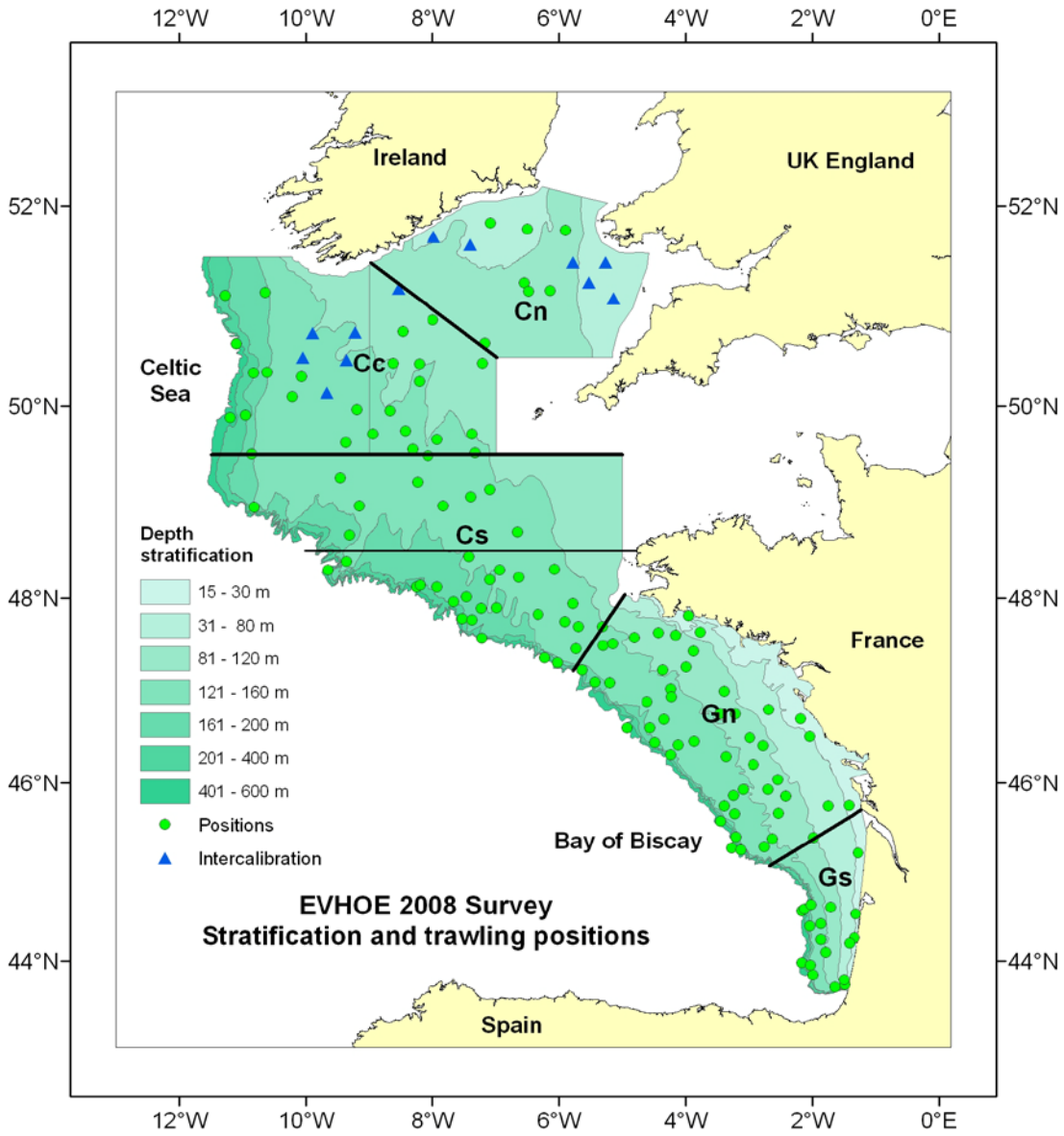
Stations fished

ICES DIVISIONS	STRATA	TOWS PLANNED	VALID	ADDITIONAL	% STATIONS FISHED	COMMENTS
VII	Cc3	9	6		67%	
	Cc4	20	19		95%	
	Cc5	3	3		100%	
	Cc6	3	3		100%	
	Cc7	2	2		100%	
	Cn2	7	7		100%	
	Cn3	7	5		71%	
	Cs4	21	17		81%	
	Cs5	9	9	1	111%	
	Cs6	3	3		100%	
	Cs7	2	2		100%	
VIII	Gn1	3	3		100%	
	Gn2	4	5	1	125%	
	Gn3	16	16	1	106%	
	Gn4	21	21	1	105%	
	Gn5	3	2		67%	
	Gn6	2	2		100%	
	Gn7	2	2		100%	
	Gs1	3	3		100%	
	Gs2	3	3		100%	
	Gs3	3	2		67%	
	Gs4	3	3	1	133%	

ICES Divisions	Strata	Tows planned	Valid	Additional	% stations fished	comments
	Gs5	2	2		100%	
	Gs6	2	1		50%	
	Gs7	2	2		100%	
TOTAL		155	144		95%	

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

Species	Age	Species	Age
Merluccius merluccius	881*	*Lophius piscatorius*	286
Gadus morhua	33	*Solea solea*	167
Melanogrammus aeglefinus	318	*Pleuronectes platessa*	131
Merlangius merlangus	404	*Chelidonichyis cuculus*	222
Lepidorhombus whiffiagonis	430	*Micostomus kitt*	121
Lophius budegassa	295	*Glyptocephalus cynoglossus*	71


12°W
10°W
8°W
6°W
4°W
2°W
0°E
52°N
50°N
48°N
46°N
44°N
Ireland
UK England
Celtic Sea
Cn
Cc
Cs
Gn
Gs
France
Bay of Biscay
Spain
Depth stratification
15 - 30 m
31 - 80 m
81 - 120 m
121 - 160 m
161 - 200 m
201 - 400 m
401 - 600 m
Positions
Intercalibration
EVHOE 2008 Survey
Stratification and trawling positions

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

			Biomass index			Number index		
Species	**Strata**	**Valid tows**	**Yi kg/.5hour**	**yi/yi-1 %**	**y(i,i-1)/ y(i-2,i-3,i-4) %**	**Yi nº/.5hour**	**yi/yi-1 %**	**y(i,i-1)/ y(i-2,i-3,i-4) %**
Merluccius merluccius	Cn, Cc, Cs, Gn, Gs	138	10.4	16	71	190.6	32	56
Merlangius merlangius	Cn, Cc, Cs	69	23.6	68	20	424.5	84	220
Melanogrammus aeglefinus	Cn, Cc, Cs	69	14.2	22	28	114.3	1	23
Gadus morhua	Cn, Cc, Cs	69	2.3	2	10	0.6	-17	40
Lepidorhombus whiffiagonnis	Cn, Cc, Cs, Gn, Gs	138	2.0	4	28	13.3	-8	15
Lophius budegassa	Cn, Cc, Cs, Gn, Gs	138	1.5	42	100	2.9	23	109
Lophius piscatorius	Cn, Cc, Cs, Gn, Gs	138	3.2	-5	-3	2.8	93	-13
Scomber scombrus	Cn, Cc, Cs, Gn, Gs	138	32.6	-65	107	271.2	-70	63
Tcrachurus trachurus	Cn, Cc, Cs, Gn, Gs	138	116.8	66	-33	3389.2	126	-24
Scylorhinus canicula	Cn, Cc, Cs, Gn, Gs	138	18.4	56	73	61.5	41	67
Leucoraja naevus	Cn, Cc, Cs, Gn, Gs	138	2.2	9	49	3.2	6	66
Raja clavata	Cn, Cc, Cs, Gn, Gs	138	1.4	267	87	0.6	120	77
Nephrops norvegicus	Cn, Cc, Cs	69	3.7	20	97	138.2	6	54
Nephrops norvegicus	Gn, Gs	69	0.3	317	-53	14.4	648	-56

4.3.2.9 France: The Channel Groundfish Survey - CGFS

NATION:	FRANCE	VESSEL:	GWEN DREZ
Survey:	CGFS08	Dates:	1–31 October 2008

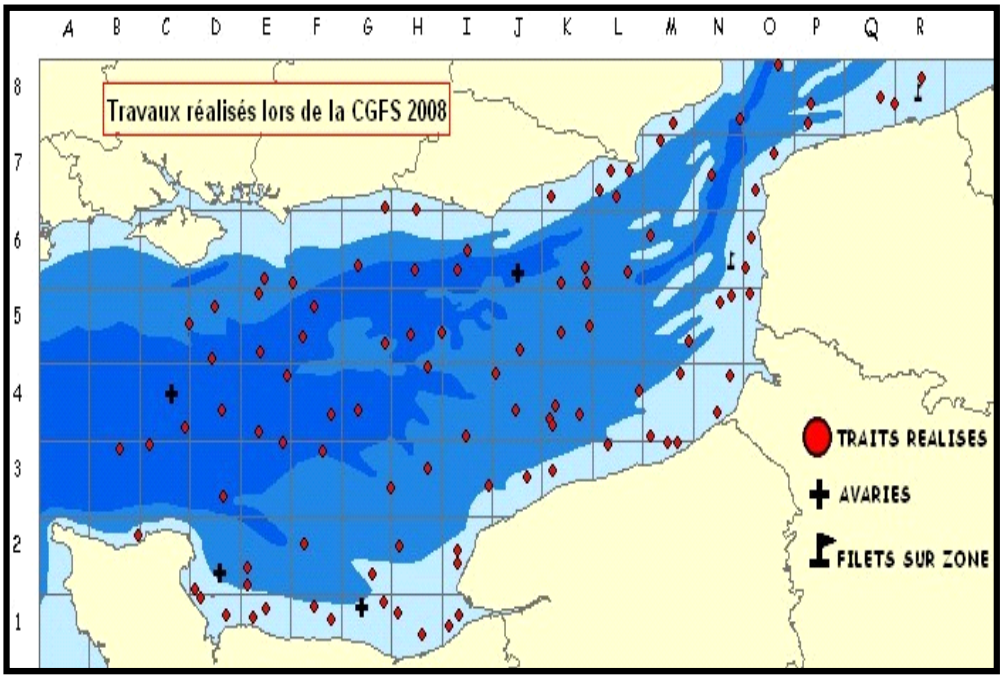
Cruise	The first objective of the Channel Ground Fish Survey carried out every years in October since 1986 sea is to collect data on the distribution, the relative abundance, and biological informations on commercial fish in in the Eastern English Channel and the South of the North. The most important species are cod, whiting, plaice and striped red mullet
Gear details:	The gear used is a GOV trawl adapted to the ship power. The headline and the groundrop are respectively 19.70 m and 25.90 m long. The mesh size in the codend is 10mm (20 mm stretched). To record the main trawl parameters, SCANMAR sensors are used.
Notes from survey (e.g. problems, additional work etc.):	100 valid hauls were done in the whole area at the same position as every years. At the end of the survey ,in the western part of the channel, an area nonregularly covered was sampled with 5 additionnal hauls. Trawl parameters were recorded at each haul, except for the 5 additional hauls were dammages could be occured on the net. 4 hauls were concidered invali
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 70 species of fish were recorded during the survey The abundance of *Zeus faber* seems higher than previous years.

Stations fished (aims: to complete 109 valid tows per year)

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VIId, IVc,		GOV	109	105	5	4	105 %	
	TOTAL		109	105	5	4		

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

SPECIES	AGE	SPECIES	AGE
	361	Pleuronectes platassa	301
Merlangius merlangus	316	Mullus surmuletus	81


A B C D E F G H I J K L M N O P Q R
8 7 6 5 4 3 2 1
Travaux réalisés lors de la CGFS 2008
TRAITS REALISES
AVARIES
FILETS SUR ZONE

4.3.2.10 Spain: The Porcupine Groundfish Survey Q3 – P08

Nation:	SP (Spain)	Vessel:	Vizconde de Eza
Survey:	P08	Dates:	8 September–8 October 2008

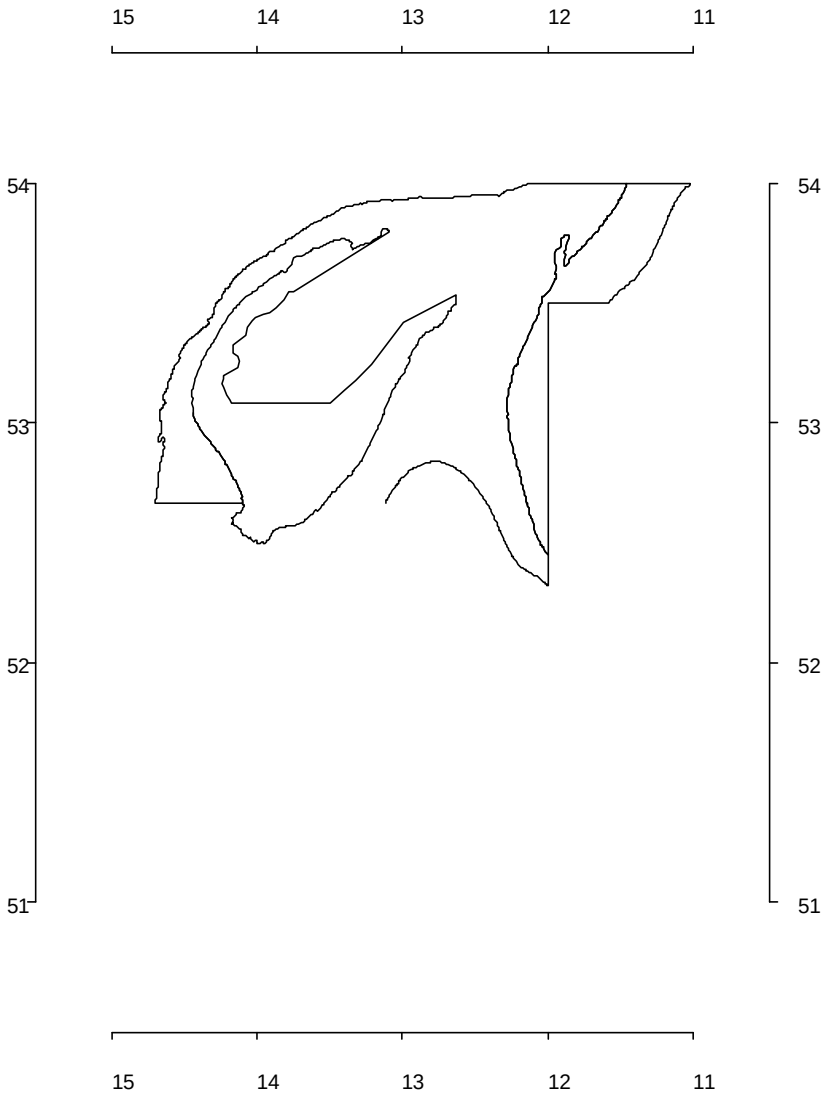
Cruise	Spanish Porcupine bottom-trawl survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in Porcupine bank area (ICES Division VIIb-k). The primary species are hake, monkfish, white anglerfish and megrim, which abundance indices are estimated by age, with abundance indices also estimated for Nephrops, four-spot megrim and blue whiting. Data collection is also collected for other demersal fish species and invertebrates.
Survey Design	This survey is random stratified with two geographical strata (northern and southern) and 3 depth strata (170–300 m, 301–450 m, 451–800 m). Stations are allocated at random according to the strata surface.
Gear details:	Porcupine baca 39/52
Notes from survey (e.g. problems, additional work etc.):	In spite of using the same gear design as in previous years, in 2008 survey there were differences in the mean vertical and door spread of the gear during the survey. These changes occurred together with a longer mean time to make ground contact. Additional work undertaken included CTD casts at most trawl stations. 12 boxcores were carried out.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 99 species of fish, 54 crustaceans and 31 molluscs were recorded during the survey.

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

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	comments
VIIb-k	All	Porcupine baca 39/52	80	79	-	4	4	100%	Also available by depth and geographical strata
	TOTAL		80	79	-	4	4	100%	

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

Species	Age	Species	Age
Merluccius merluccius	902		
Lepidorhombus whiffiagonis	568		
Lepidorhombus boscii	286		
Lophius budegassa	40		
Lophius piscatorius	132		
*Nephrops norvegicus**	113		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4.3.2.11 Spain: Spanish North Coast Survey – N08

NATION:	SP (SPAIN)	VESSEL:	CORNIDE DE SAAVEDRA
Survey:	N08	Dates:	17 September–26 October 2008

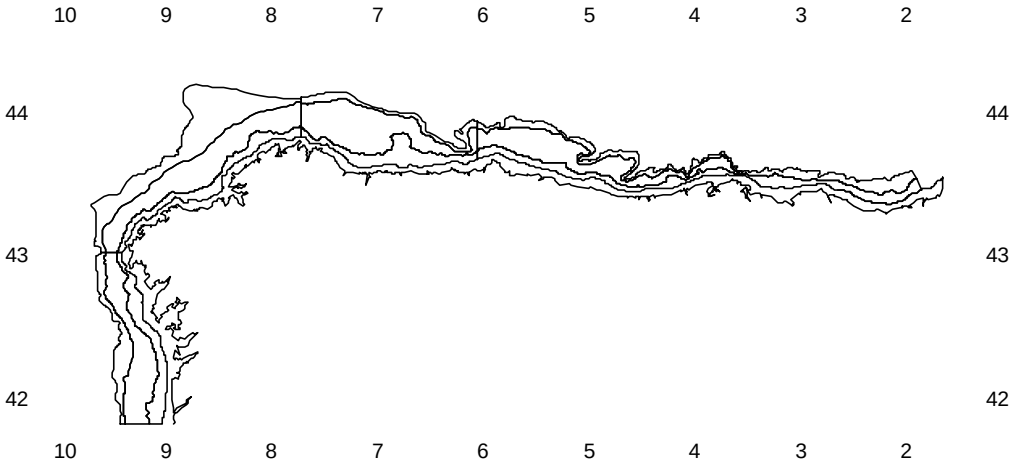
Cruise	Spanish North Coast bottom-trawl survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in ICES Divisions VIIIc and Northern IXa. The primary species are hake, monkfish and white anglerfish, megrim, four-spot megrim, blue whiting and horse mackerel abundance indices are estimated by age, with abundance indices also estimated for Nephrops, and data collection for other demersal fish and invertebrates.
Survey Design	This survey is random stratified with five geographical strata along the coast and 3 depth strata (70–120 m, 121–200 m, 201–500 m). Stations are allocated at random within the trawlable stations available according to the strata surface.
Gear details:	Standard baca 36/40
Notes from survey (e.g. problems, additional work etc.):	Additional work undertaken included CTD casts at all trawl stations. As in previous years 4 additional hauls were done to cover shallow stations between 30 and 70 m, and 8 deeper stations between 500 and 700 m. Besides 13 new stations were explored this year in the usual strata to increase the possible tracks available. In 2008 4 calibration hauls with the EVOHE were carried out during the survey in the French shelf of the Bay of Biscay in the stations fished by the RV Thalassa.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 119 species of fish, 54 crustaceans and 42 molluscs were recorded during the survey.

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

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	ADDITIONAL	INVALID	% STATIONS FISHED	COMMENTS
VIIIc-IXa	All	Standard baca	115	115	29	3	100	Also available by depth and geographical strata
	TOTAL		115	115	29	3	100	

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

SPECIES	AGE	SPECIES	AGE
Merluccius merluccius	605	*Merluccius merluccius daily growth*	357
Lepidorhombus whiffiagonis	333	*Trisopterus luscus*	261
Lepidorhombus boscii	513		
Lophius budegassa	33		
Lophius piscatorius	129		
Trachurus trachurus	679		
Micromesistius poutassou	274		
Scomber scombrus	85		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4.3.2.12 Spain: Spanish Gulf of Cadiz Bottom Trawl Survey Q1

Nation:	SP (Spain)	Vessel:	Cornide de Saavedra
Survey:	GC_spring 08 (ARSA)	Dates:	10–21 March 2008

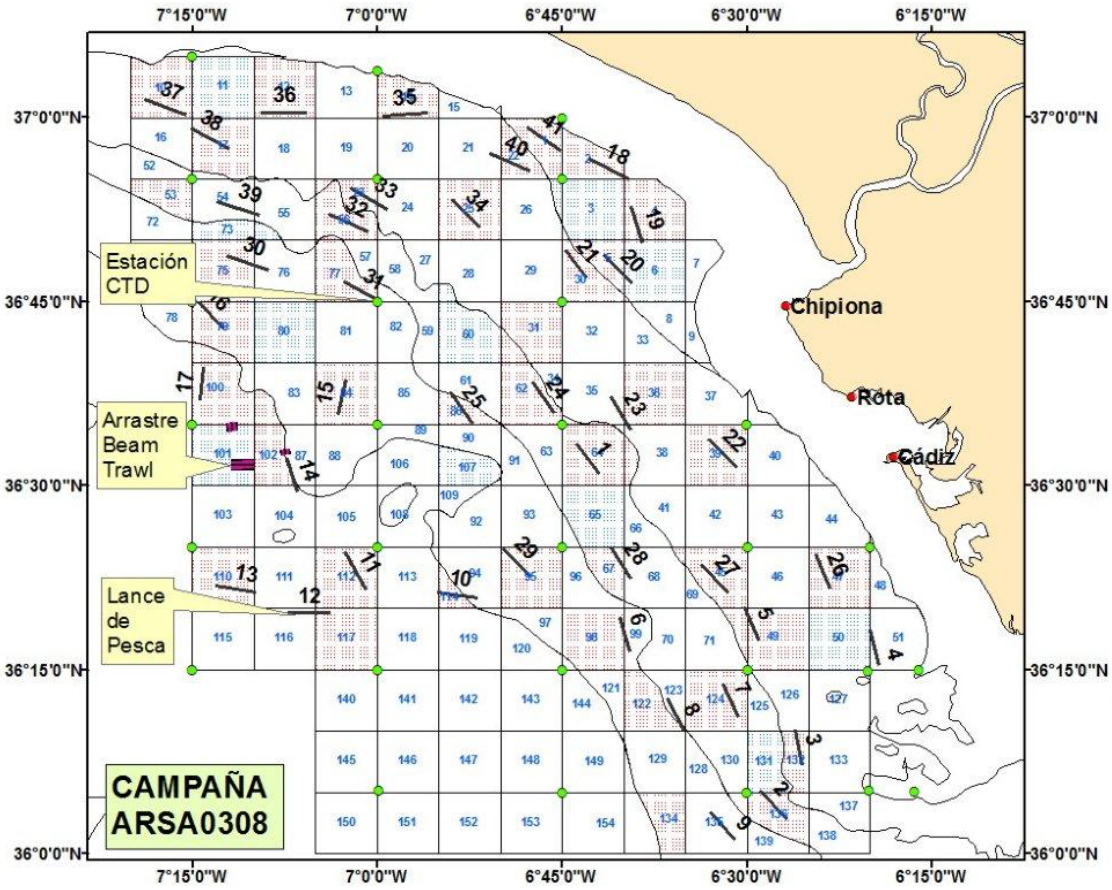
Cruise	Spanish Gulf of Cadiz bottom-trawl survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in the Gulf of Cadiz area (ICES Division IXa). The primary species are hake, horse mackerel, wedge sole, sea breams, mackerel and Spanish mackerel. Data and abundance indices are also collected and estimated for other demersal fish species and invertebrates as rose and red shrimps, Nephrops, and cephalopod molluscs.
Gear details:	Standard baca 36/40
Notes from survey (e.g. problems, additional work etc.):	Additional work undertaken included CTD stations from one at every trawl stations.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 124 species of fish, 67 of crustacean and 50 of mollusca were recorded during the survey.

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

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

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

Species	Age	Species	Age
Merluccius merluccius	356		
*Merluccius merluccius**	1073		
*Parapenaeus longirostris**	873		
*Nephrop novergicus**	87		
*Octopus vulgaris**	261		
*Loligi vulgaris**	60		
*Sepia officinalis**	124		
*Eledone cirrhosa**	56		
*Eledone moschata**	426		



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

			Biomass index			Number index		
Species	Strata	Valid tows	YI kg/hour	YI/YI-1 %	Y(I,I-1)/ Y(I-2,I-3,I-4) %	YI no./hour	YI/YI-1 %	Y(I,I-1)/ Y(I-2,I-3,I-4) %
Merluccius merluccius	ALL	41	3.48	8.1	-39.31	62.72	-2.5	-45.18
Micromesistius poutassou	ALL	41	0.10	-88.6	-87.15	0.74	-92.6	-95.06
Nephrops norvegicus	ALL	41	0.35	150.0	50.00	8.59	69.1	32.38
Parapenaeus longirostris	ALL	41	1.60	357.1	178.57	370.89	315.9	234.39
Octopus vulgaris	ALL	41	6.10	335.7	10.73	5.69	238.7	-34.78
Loligo vulgaris	ALL	41	0.41	13.9	83.33	1.27	-26.6	-13.29
Sepia officinalis	ALL	41	1.26	44.8	24.32	2.94	43.4	43.94

4.3.2.13 Spain: Spanish Gulf of Cadiz Bottom Trawl Survey Q4

Nation:	SP (Spain)	Vessel:	Cornide de Saavedra
Survey:	GC08	Dates:	1–14 November 2008

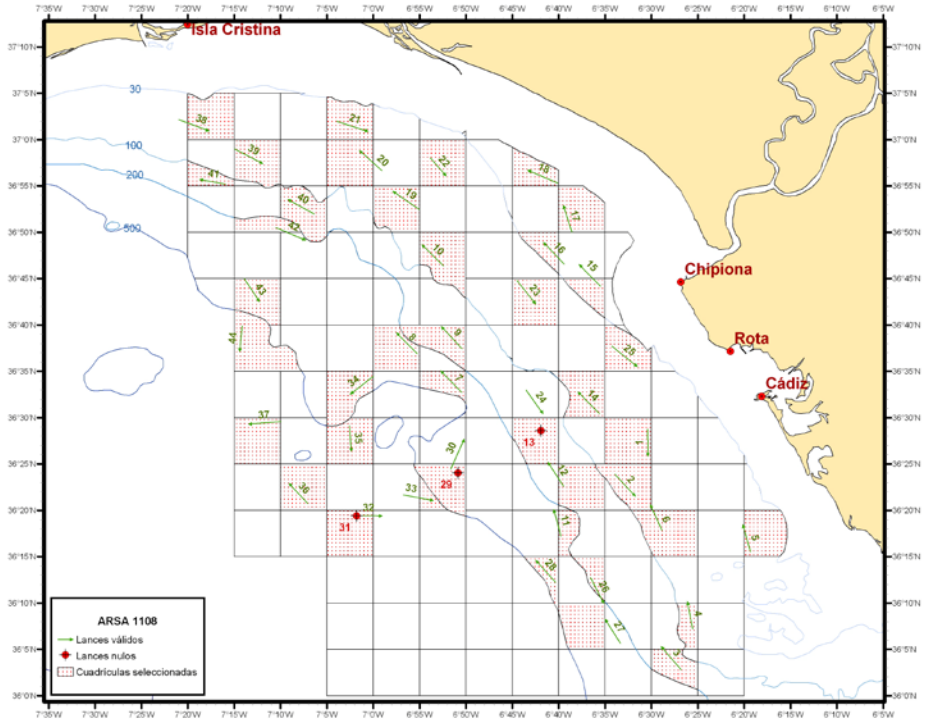
Cruise	Spanish Gulf of Cadiz bottom-trawl survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in the Gulf of Cadiz area (ICES Division IXa). The primary species are hake, horse mackerel, wedge sole, sea breams, mackerel and Spanish mackerel. Data and abundance indices are also collected and estimated for other demersal fish species and invertebrates as rose and red shrimps, Nephrops, and cephalopod molluscs.
Gear details:	Standard baca 36/40
Notes from survey (e.g. problems, additional work etc.):	Additional work undertaken included CTD stations from one at every trawl stations.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 134 species of fish, 48 of crustacean and 58 of mollusca were recorded during the survey.

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

ICES Divisions	Strata	Gear	Tows planned	Valid	Valid with rock-hopper	Additional	Invalid	% stations fished	comments
IXa	All	Standard baca 36/40	44	41	-	-	-3	100%	Also available by depth
	TOTAL		44	41	-	-	-3	100%	

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

Species	Age	Species	Age
Merluccius merluccius	406		
*Merluccius merluccius**	802		
*Parapenaeus longirostris**	1437		
*Nephrop novergicus**	132		
*Octopus vulgaris**	152		
*Loligi vulgaris**	551		
*Loligo forbesi**	70		
*Sepia officinalis**	74		
*Eledone cirrhosa**	1		
*Eledone moschata**	396		



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

			Biomass index			Number index		
Species	Strata	Valid tows	YI kg/hour	YI/YI-1 %	Y(I,I-1)/ Y(I-2,I-3,I-4) %	YI no./hour	YI/YI-1 %	Y(I,I-1)/ Y(I-2,I-3,I-4) %
Merluccius merluccius	ALL	41	4.33	-37.4	17.43	78.49	-64.5	2.88
Micromesistius poutassou	ALL	41	0.59	40.5	-81.39	3.81	98.4	-93.72
Nephrops norvegicus	ALL	41	0.28	133.3	-64.91	8.95	81.2	-71.07
Parapenaeus longirostris	ALL	41	5.53	376.7	660.23	1544.57	515.0	811.05
Octopus vulgaris	ALL	41	1.64	-59.3	-24.93	2.78	-67.0	-39.00
Loligo vulgaris	ALL	41	2.13	63.8	20.77	11.91	51.3	7.93
Sepia officinalis	ALL	41	1.08	4.9	-42.03	1.68	3.7	-60.90

4.3.2.14 Portugal: Autumn Groundfish Survey – autumn 2008

NATION:	PORTUGAL	VESSEL:	NORUEGA
Survey:	Autumn 2008	Dates:	2-29 September 2008

Cruise	Autumn Groundfish survey aims to estimate the abundance and distribution of hake and horse mackerel recruits, indices of abundance and biomass of the most important commercial species, biological parameters, e.g. maturity, ages, sex-ratio, weight, food habits and biodiversity indicators. The primary species are hake, horse mackerel, blue whiting, mackerel and Spanish mackerel.
Area	Portuguese continental waters (Division IXa), from 20 to 500 m depth.
Survey design	96 fishing stations, 66 at fixed (grid) positions and 30 at random. Tow duration is 30 min, with a trawl speed of 3.5 knots, during day light.
Gear details	NCT (Norwegian Campbell Trawl) gear with rollers in the groundrope. The mean horizontal opening between the wings is 14.7 m and the mean vertical opening is 4.4 m. Codend mesh size is 20 mm.
Notes from survey (e.g. problems, additional work etc.)	Temperature was recorded with a CTD (Conductivity, Temperature, and Depth) equipment: – 88 CTDs Stations took place in the final position of each fishing station. SCANMAR equipment was damaged. The bad weather conditions caused reduction in the number of hauls performed.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 99 species of fish, 13 of cephalopods and 24 of crustaceans were recorded during the survey. 43 species of other groups were recorded, e.g. Echinodermata, Cnidarians, Bivalves, Gastropods, Polychaeta, Ascidians and Nudibranchia.

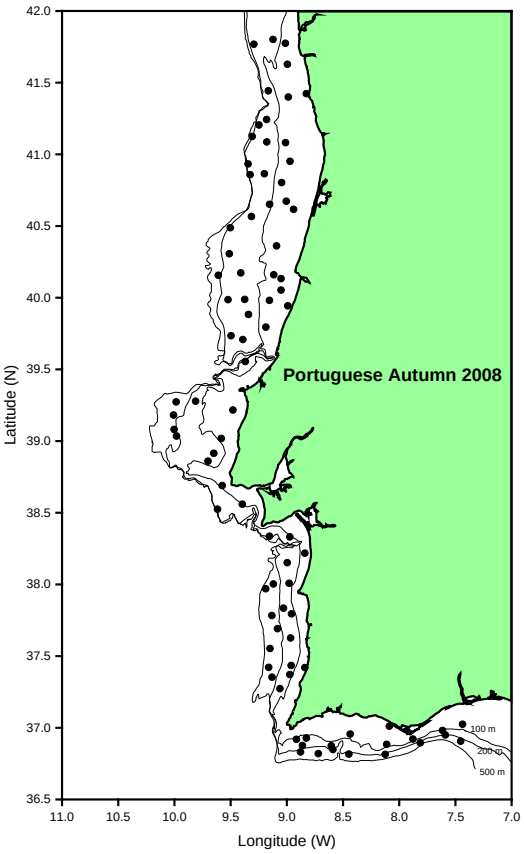
Stations fished

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	INVALID	% STATIONS FISHED	COMMENTS
IXa	ALL	NCT	96	87	1	91	The invalid refers to fishing time smaller than 15 minutes because of the presence of commercial fishing gear in the area.

Number of biological samples (maturity and age material)

SPECIES	SAMPLES	OTOLITHS
Merluccius merluccius	85	1203
Trachurus trachurus	68	606
Micromesistius poutassou	37	227
Scomber colias	51	329
Scomber scombrus	44	226
Lophius budegassa	3	3
Lepidorhombus boscii	14	13

Portuguese Groundfish survey – autumn 2008 (4th quarter)



Biomass and Number estimates. y=2008, 2y=average 2007–2008, y(3–5)= average 2004–2006

			Biomass index			Number index		
Species	Strata	Valid tows	y kg/h	% y/(y-1)	% 2y/y(3–5)	y n/h	% y/(y-1)	% 2y/y(3–5)
Merluccius merluccius	All	87	34.6	+34	+67.9	293.6	-21	+34.1
Trachurus trachurus	All	87	15.9	+47	-55.6	218.1	+35	-81.9
Trachurus picturatus	All	87	27.3	-48	-34.1	389.2	-59	-71.8
Micromesistius poutassou	All	87	22.1	-73	-39.5	264	-88	-40.1
Scomber colias	All	87	4.3	-73	+50.8	63.5	-62	+35.8
Scomber scombrus	All	87	11.8	-74	+41.5	119.9	-77	-9.5
Lophius budegassa	All	87	0.26			0.05		
Lophius piscatorius	All	87	-			-		
Lepidorhombus whiffiagonis	All	87	-			-		
Lepidorhombus boscii	All	87	0.1			0.6		
Nephrops norvegicus	All	87	0.036		-60.6	0.6		-68.0

4.3.2.15 Portugal: Portuguese Winter Groundfish Survey – Winter 2008

NATION:	PORTUGAL	VESSEL:	NORUEGA
Survey:	Winter 2008 – Groundfish survey for Hake	Dates:	25 February–19 March 2008

Cruise	Winter Groundfish survey aims to estimate distribution and abundance of hake in spawning season, indices of abundance and biomass of the most important commercial species, biological parameters, maturity, sex-ratio, weight, food habits, length and/or age compositions for the main commercial species. The primary species are hake, horse mackerel, blue whiting, mackerel, Spanish mackerel, anglerfish, megrim and Norway lobster.
Area	Portuguese continental waters (Division IXa, from 20 to 500 m depth.
Survey design	75 fishing stations, 66 at fixed (grid) positions and 9 at random. Tow duration is 60 min, with a trawl speed of 3.5 knots, during day light.
Gear details	CAR bottom gear type FGAV019 without rollers in the groundrope. The mean horizontal opening between the wings is 25 m and the mean vertical opening is 2.5 m. Codend mesh size is 20 mm.
Notes from survey (e.g. problems, additional work etc.)	Temperature was recorded with a CTD (Conductivity, Temperature and Depth) equipment. : – 78 CTDs Stations took place in the final position of each fishing station. SCANMAR equipment not used because the batteries were not able to recharge. The bad weather conditions caused reduction in the number of hauls performed.
Number of fish species recorded and notes on any rare species or unusual catches:	Overall, 120 species of fish, 18 of cephalopods and 36 of crustaceans were recorded during the survey.37 species of other groups were recorded, e.g. Echinodermata Cnidarians, Bivalves, Gastropods, Polychaeta.

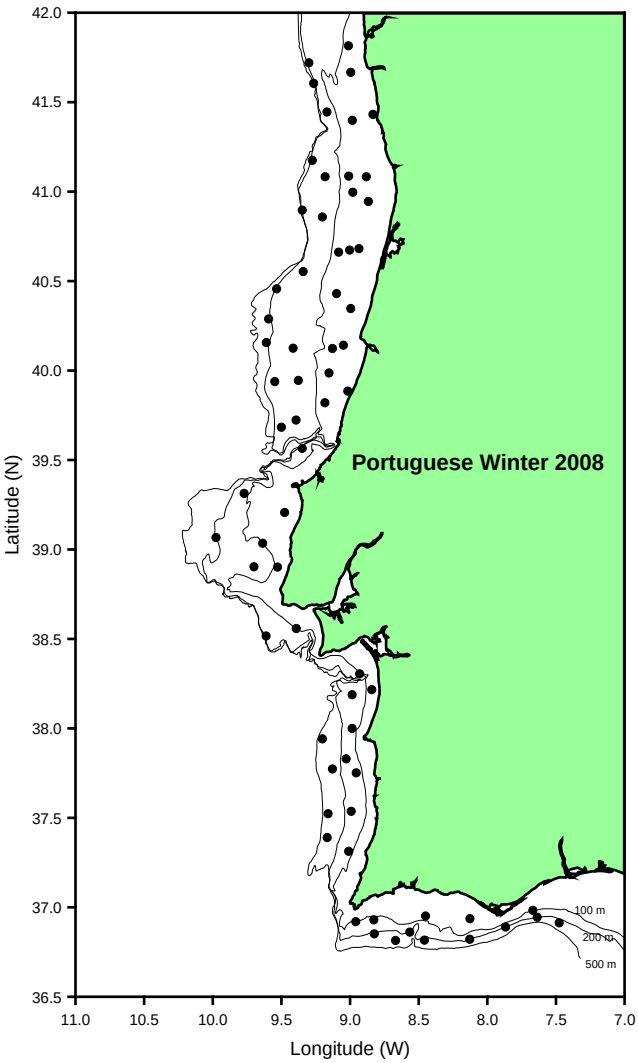
Stations fished

ICES DIVISIONS	STRATA	GEAR	TOWS PLANNED	VALID	INVALID	% STATIONS FISHED	COMMENTS
IXa	ALL	CAR	75	68	1	91	The invalid refers to fishing time smaller than 15 minutes because of the presence of commercial fishing gear in the area.

Number of biological samples (maturity and age material)

SPECIES	SAMPLES	OTOLITHS
Merluccius merluccius	68	1818
Trachurus trachurus	62	648
Micromesistius poutassou	25	341
Scomber colias	36	222
Scomber scombrus	38	130
Lophius budegassa	6	6
Lophius piscatorius	6	8
Lepidorhombus whiffiagonis	2	1
Lepidorhombus boscii	29	218
Nephrops norvegicus	10	

Portuguese Groundfish survey – winter 2008 (1st quarter)



Species	Strata	Mean catch n/hour	Mean catch kg/hour	Comments	% Diff from 2007 n/hour	% Diff from 2007 kg/hour
Merluccius merluccius	ALL	700.6	31.1		+15	+38
Trachurus trachurus	ALL	593.4	26.6		-50	-69
Trachurus picturatus	ALL	303.2	25.7		-88	-73
Micromesistius poutassou	ALL	583.3	28.8		-68	-54
Scomber colias	ALL	77.5	7.2		-86	-79
Scomber scombrus	ALL	131.0	11.0		-86	-81
Lophius budegassa	ALL	0.04	0.1	6 ind. caught	-72	-52
Lophius piscatorius	ALL	0.1	0.1	9 ind. caught	-81	-54
Lepidorhombus whiffiagonis	ALL	0.03	0.004	2 ind. caught	-81	-87
Lepidorhombus boscii	ALL	6.9	0.6		-71	-66
Nephrops norvegicus	ALL	0.8	0.1		-80	-71

4.3.3 Results

Latest survey catches of a number of relevant species in the Western and Southern Division (see Table 4.3.3.1) are mapped and given in Annex 6. As part of ongoing efforts to standardize the format and usefulness of reporting for IBTS coordinated surveys, several overview maps was produced combining the North Sea and Western Atlantic areas (St. Georges Channel, Irish Sea and Western Atlantic). The specific surveys in question are the North Sea Quarter 3 (NS) and Western Area Quarter 4 (WA) surveys. When interpreting these maps, two aspects need to be borne in mind. Moving from the North Sea (NS) to Western Area (WA) means also moving from Q3 to Q4 surveys, and secondly, the trawls used in the WA are more diverse than the single gear GOV surveys in the NS and therefore literal inter-survey comparisons are more problematic in the WA than intra-survey comparisons over the time-series.

Table 4.3.3.1. Species for which distribution maps have been produced, with length split for pre-recruit (0-group) and post-recruit (1+ group) where appropriate. Asterisk (*) denotes extended species map covering North Sea Q3 surveys along with Western Area Q4 data.

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

4.3.4 Participation 2009/2010

Survey	Code	Starting	Ending	No. expected hauls	Intercal.
UK-Scotland Rockall	1209S	3/15/09	15/09/09	42	None
UK-Scotland Western (autumn)	1509S	6/11/09	27/11/09	78	None
UK-Scotland Western (spring)	0310S	19/02/09	11/03/09	65	None
UK-North Ireland (autumn)	CO4109	5/10/09	28/10/09	60	None
UK-North Ireland (spring)	CO1010	02/03/10	26/03/09	60	None
UK-North Ireland (intercalibration)	CO4809	23/11/09	27/11/09	12	Cefas
Ireland – Groundfish Survey VIa	IGFS09	25/9/09	7/10/09	50	None
Ireland – Groundfish Survey VIIb,g,j	IGFS09	29/10/09	1/12/09	120	IFREMER
UK-England and Wales	Q4SWIBTS	6/11/09	6/12/09	80	None
France - EVHOE	EVHOE2009	13/10/09	1/12/09	155	
France - Western Channel				Unknown	
Spain - Porcupine	SP- P09	8/09/09	8/10/09	80	IGFS?
Spain - North Coast	SPGFS09	19/09/09	27/10/09	116	EVHOE
Spain - Gulf of Cádiz (Autumn)	SPGC09	1/11/08	14/11/08	42	
Spain - Gulf of Cádiz (Spring)	ARSA09	4/03/09	16/03/09	42(41)	
Portugal - Winter	PESCADA-BD	Canceled because new DCR remove funding			
Portugal - Autumn	AUTUMN	01/10/09	30/10/09	96	None

4.3.5 Other issues

Clarification was sought from participants of both the Western and Southern area, as well as the more traditional North Sea IBTS area, as to the material utilized for sweeps for the GOV. Without exception across the IBTS area the practice as well as the understanding was that wire was to be used. No difficulties with this procedure were noted by the group.

5 Review of abundance indices (ToR b)

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

5.1 Sources of error in survey indices

A cornerstone in the use and collection of trawl catch per unit of effort data (cpue) is the idea that the catch can be related to the population or stock being sampled by the simple equation:

$$n = qfN$$

where catch (n) is related to population (N) after correction for fishing effort (f) and the catchability of the trawl (q).

An advantage of research surveys is the ability to further simplify the above equation by standardizing both q and f. The possibility to standardize effort and catchability affords surveys the ability to avoid a lot of the bias associated with commercial catch data. In turn this strengthens the relationship between trends in the survey cpue and the trends in the stock being sampled.

Standardising f in terms of haul duration or swept-area is a relatively simple exercise and most survey programs work to fixed tow duration with often a further correction for swept-area for example.

Standardising trawl efficiency is a far greater undertaking given that even a change in weather may well affect trawl and/or fish behaviour. Rarely is an exact measure of q available per species and size class to allow a correction for what has escaped from the trawl path. In reality then q cannot be fixed, but through survey design trawl efficiency can be kept within an agreed and achievable range under "normal" conditions.

Despite standardizing observable trawl and fishing parameters, the affect on catching efficiency of density-dependent or spawning behaviour (Godø, 1994; Godø *et al.*, 1999; Morgan *et al.*, 1997), oceanographic conditions (Smith and Page, 1996), technical errors in rigging, skipper behaviour etc. may well go undetected without either direct observation at the trawl or post analysis of survey trends. At best this type of bias may prove random and simply add unwanted noise to the data.

The eventual replacement of vessels, trawl materials, improved technology, gained experience as scientists and crew will undoubtedly lead to incremental bias, positive or negative, and a potential change in catching efficiency. Variation may reduce, but our assumption of relatively constant q' will be violated and the relationship between cpue and population break down undetected. Incremental bias is probably the hardest to detect and the most unavoidable. Over a long series failure to evaluate possible improvements to the survey at some point, and the probable resulting changes in catchability, may prove controversial (for discussion see (ICES, 2005); Section 5.4.1).

Catchability then is a complex and dynamic parameter and difficult to measure directly. To monitor catchability indirectly then to address data quality, we can exploit the same simple catch equation above. With effort standardized to 1 it disappears effectively and we are left with:

$$CPUE = q' N$$

where q′ is the survey catchability and assumed to be constrained.

Cpue data are inherently variable and the small number of catches possible within survey means variability in is frequently high compared to commercial data. However, natural populations tend to exhibit stable distributions in terms of age, sex ratio, height etc., and in the absence of major migration or catastrophic events the structure should remain constant across repeat samples. In other words age and other population parameter ratios in the cpue should remain quite stable even where total catch numbers are variable.

Age structured relative abundance indices are the most common survey data used is fisheries management in the ICES area. The reduction in numbers-at-age of a particular year class (as a result of natural and fishing mortality) should be reflected as a similar trend in the survey catch-at-age data. Without an accurate and independent measure of the stock numbers-at-age in a given year ($N_{(a,y)}$) we must assume then that stability within the $CPUE_{(a,y)}$ is indicating that our assumptions for q′ and N hold true.

$$CPUE_{(a,y)} = q' N_{(a,y)}$$

5.2 Evaluating signal strength in IBTS surveys

The majority of stocks assessed by ICES use age structured data to track the rate of decline of each year class over time to estimate fishing mortality relative to stock abundance. As such, a number of methods are readily available to visualize and quality check age and structured dataseries. One readily available and software package widely used within ICES is SURBA, which was identified as suitable for a data quality exercise using haddock in Q3–4 IBTS surveys as a case study.

Ideally we want internal consistency within a survey (i.e. tracking year-class strength within the survey) and also consistency between surveys (all surveys showing similar relative year-class strength) for the stock(s) being surveyed. SURBA produces a number of exploratory plots to facilitate this data screening process. The first here is log mean-standardized index by age class, illustrating the UK Northern Ireland survey in VIIa (Fig 5.1). The survey illustrates good internal consistency with year classes being consistently high or low over the duration of the survey. The 1996 year class for example has been a large proportion of the annual catch since it first appeared as 0-group fish in 1996, 1-group fish in 1997 etc. Likewise the data points for each survey year of the 1992 year class are consistently low and close together indicating it appears in successive years as a persistently weak proportion of the catch.

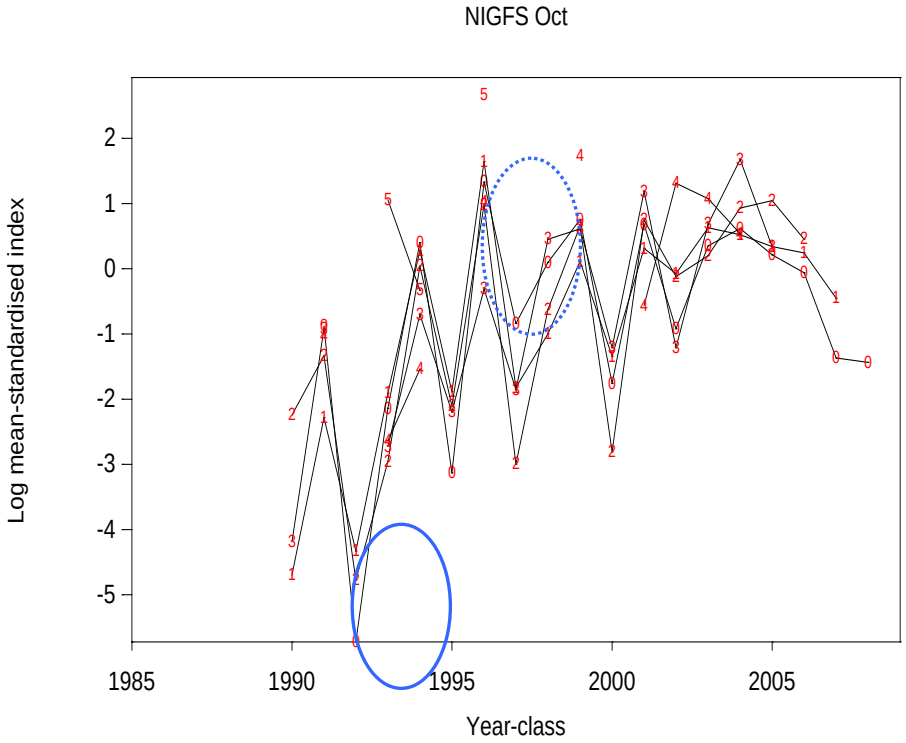


Figure 5.1. Log mean-standardized index by age-class for haddock in VIIa. Drawing a line vertically at 1996 we see consistently large proportions of the 1996 year class in the annual cpue as 0-group in 1996, 1-group in 1997 etc is enclosed by a dotted ellipse. Conversely the solid ellipse highlights the consistently weak 1992 year class.

Overall the trend is a gentle positive slope indicating a general moderate increase in abundance, assuming q' has remained constant.

The example given in Fig 5.2 shows weaker internal consistency, where the survey follows the strong year classes (e.g. 1999 and 2000) well, but the ability to track year classes in the rest of the series is weaker. The 2000 year class is reasonably stable over time except for 5 year-old fish which are virtually absent from the catches although 6+ are present. This might be because of an ageing problem in 5+ fish, with some evidence of this for other year classes, alternatively, this could relate to the ability to catch 5 year old fish in the particular year because of a change in distribution patterns, but is very unlikely considering it is only one particular age.

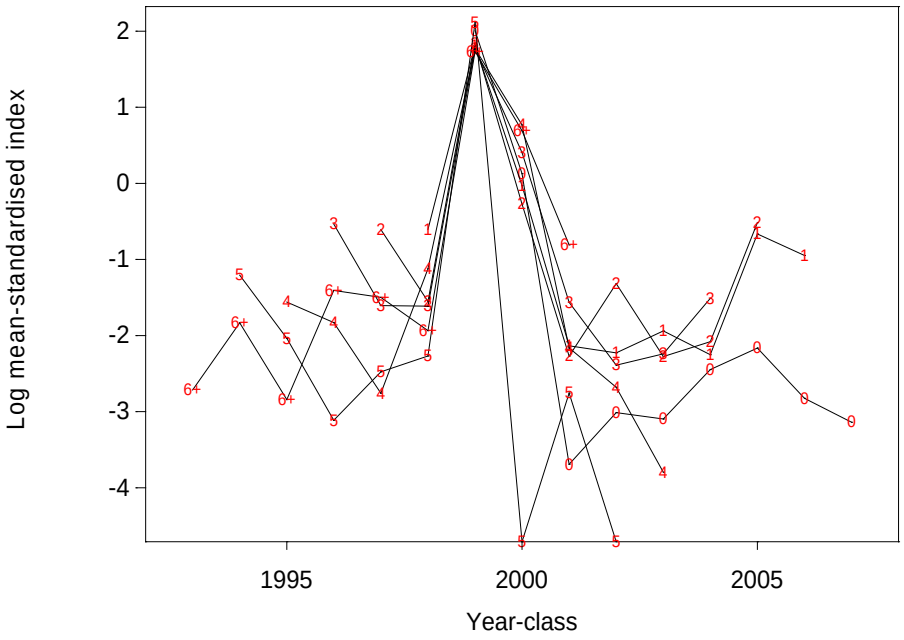


Figure 5.2. Log mean-standardized index by age-class for haddock in the North Sea. Consistently large proportions of the 1999 year class in the annual cpue; difficulty catching or ageing 5 year old fish in 2005 particularly when 6+ still; lack of 0-group fish caught or available to be caught pre-1999.

Pre- and post 1999 there is some noise in the year classes as few, if any, are consistently up or down. This may in part be as a result of the extreme 1999 cohort where neighbouring year classes are inadvertently misallocated a as a result of the abundance of this cohort in the age length key. In affect the cohort before and after 1999 could get drawn into this age class, especially for species difficult to age.

Although a potential year affect, difficulties ageing older fish for many species are common, but are unlikely to cause significant analysis problems once that cohort is a fully recruited one. Older ages can effectively be treated as a single plus group where age allocation becomes problematic, however the more age structure that can be reliably resolved the better.

Plotting the same standardized index across years' shows similar trends, but from an alternate perspective (Figure 5.3). Moving across years on the y-axis we clearly see again the 1999 year class as a peak of 0-group fish in 1999, then 1-group fish in 2000 and so forth. In contrast if we follow the 0-group line from left to right across years there was clearly a rapid fall off in recruitment post 1999 to a historically low in 2001.

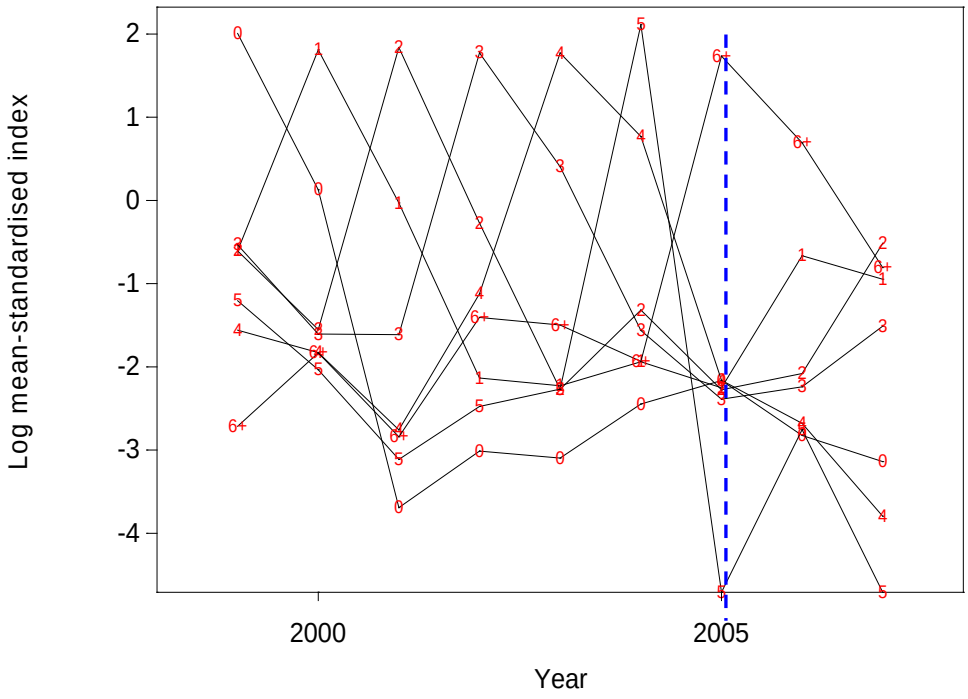


Figure 5.3. Log mean-standardized index by year for haddock in the North Sea. Consistently large proportions of the 1999 year class in the annual cpue across years shown as sequential peaks; rapid drop in recruitment to a survey minimum in 2001 shown by the 0-group line. Year affect in 2005 where 4 year old fish in 2004 come through as particularly small numbers of 5 year olds in 2005, but reappear as good numbers of 6 year old fish in 2006 (blue dotted line).

More pronounced in Figure 5.3 is the inverted abundance of 5 year-olds vs.6+ fish in 2005. Possibly the expectation of a relatively large proportion of 6 year old fish coming through in that year from the 1999 year class, combined with ageing difficulties, led to a bias towards allocating fish into this predominant age class. Of course the large proportion at length of this 1999 group means they may well have dominated the age sampling simply by chance, either might be considered a cohort affect.

While spatial or catchability changes can't be completely excluded, Figures 5.2–5.3 illustrate a simple year affect which may be due to ageing problems or possibly in part to a cohort affect. In either event there are no obvious positive or negative slopes over time and the index is tracking strong year classes and recruitment since 1999 quite consistently. Also evident from the figures is the consistent underestimate of year-class strength based on 0-group fish. Since 2001 there has been a reduced capability in the survey to capture 0-group, which might be related to a change in distribution pattern or nursery area falling outside the survey area. The likelihood of a change in distribution pattern is further indicated by the phenomenon also evident in other surveys in the same area. It is evident that the 0-group index from this survey should not be used as a recruitment index for this stock.

To evaluate the precision with which the survey tracks a year class from year to year we can look at catch by age between paired years. Plotting a scatter-matrix of catch-at-age X in year Y against catch-at-age X_{+1} in year Y_{+1} results in Figure 4. The ability, for example, of the catch of 1 year old fish to predict the proportion of 2 year old fish in the catch the following year should ideally be positive and have narrow confidence bands.

Correlation between 0-groupvs.1-group fish; 1-group vs. 2-group is consistent and precise for the early ages in particular. At older ages where age reading is inherently more difficult we can see the correlation tending towards zero and the confidence bands widening significantly. Where correlation and confidence breaks down we have weak internal consistency within the survey for those ages. Consequently we may consider either removing those particular age groups from the abundance indices. The age structure of the remaining traceable cohorts is still of significant value to the analysis however.

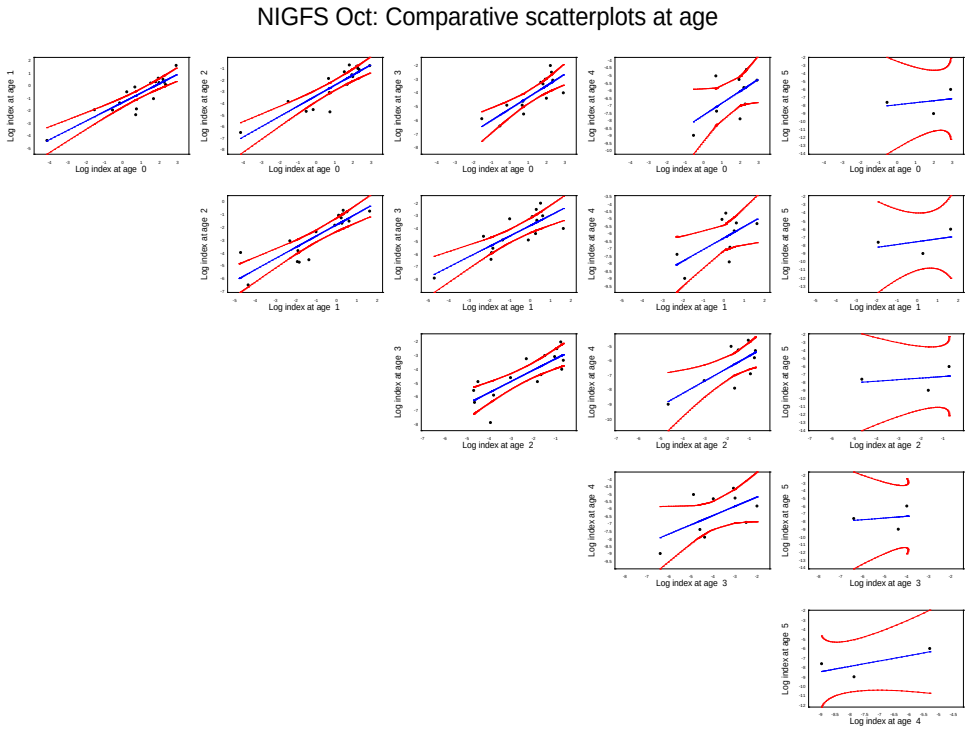


Figure 5.4. Log mean-standardized index by age for haddock in VIIa. Paired sequential years at younger ages show positive correlation (blue line) and high precision (narrow paired outer lines in red).

The slope of the log index curves (Figure 5.5) is a proxy for total mortality Z (natural 'M' and fishing 'F' mortality) over time with catchability being constant. Ideally, if catchability is constant, these curves should have parallel negative slopes.

The log index by year class (Figure 5.5) can also be used to identify strong year classes. Using the same data, the strong 1999 year class in Figure 5.2–5.3 is also evident in Figure 5.5, slowly declining predictably over time until disappearing from the catches after 2005. The reduced catchability of age 5 fish from the 2000 year class is again noticeable from the marked increase in the slope of the log index curve, with subsequent recovery the following year at age 6. In the literal context of this plot there were less fish caught from the 2000 cohort in 2005 than were predicted to be remaining in the population in 2005 following similar mortality.

Catch curves are often dome shaped at younger ages, which implies lower catchability at those ages. This could be indicative of these ages not being recruited into the fishery yet or have reduced availability of juveniles in the survey area initially. For

ages fully recruited into the fishery, one assumes constant catchability in survey and the fishery for subsequent ages and any marked changes in the slope of the curves indicate reduced internal consistency of the survey index. A change in survey catchability might be evident if a pattern emerge from these curves, but this is in most cases extremely difficult to detect.

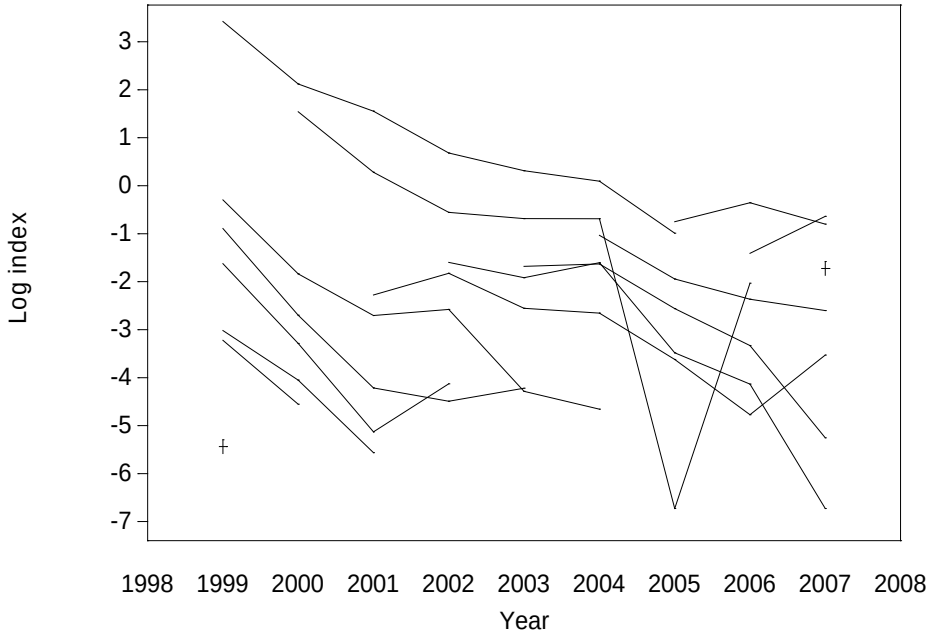


Figure 5.5. Log index by age for haddock in the North Sea. The strong 1999 year class declines predictably over time disappearing from the catch after 2005. The shift in "catchability" of the 2000 year class in 2005 when aged 5 is also evidenced by the sharp drop in that year followed by recovery the following year.

Multiple survey abundance indices are available for some stocks. Comparing indices at age across surveys shows whether surveys are giving similar signals of year-class strength or abundance-at-age. This is of particular important if surveys are combined within an assessment or to be able to make an informative decision on the survey weighting. As we can see in Figure 5.6, the indices for haddock in the North Sea show some clear trends. The strong 1999 year class is picked up by each of the national surveys and shows up then as a peak of age 1 fish in 2000, age 2 in 2001 and similarly in 2002 at-age 3.

In contrast, the sharp decline in Age 0 fish was not prevalent in the Swedish or Norwegian catches in 2001, and there is a distinct 1 year lag in the occurrence of large numbers of 1-group fish for Sweden compared to the other surveys from 2000–2001. Whether a spatial, ageing or other issue, the variability between the surveys will add noise to a combined index and the source of this important variation become obscured from view. Variability may often be a real population shift or alternatively accidental sampling issue, either way it must be emphasized in either producing or interpreting analytical results and making management decisions based on a potentially biased combined index.

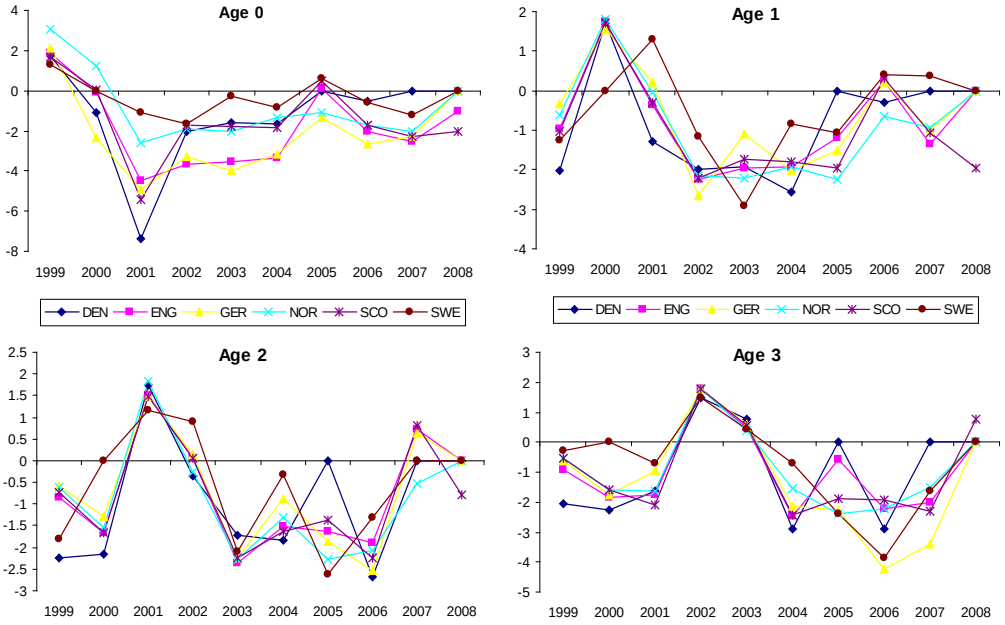


Figure 5.6. Log mean-standardized index by age for haddock in the North Sea. The strong 1999 year class is followed by a sharp decline in 0-group fish in 2001. Each survey tracks the strong 99 cohort well, but other cohorts are more variable with abundance of age 2 fish increasing in 2005 for Denmark and dropping sharply for the Swedish survey.

At first glance the English and Scottish indices for haddock (Figure 5.7) show reduced catchability of 0-group fish from 2001–2004. However, the ability to compare neighbouring coordinated surveys means that the likelihood of this being caused by issues around q' or ageing for two surveys simultaneously is low. This is most likely due to a shift in the distribution pattern of 0-group fish outside the survey area, possibly density depend related to the overall stock size.

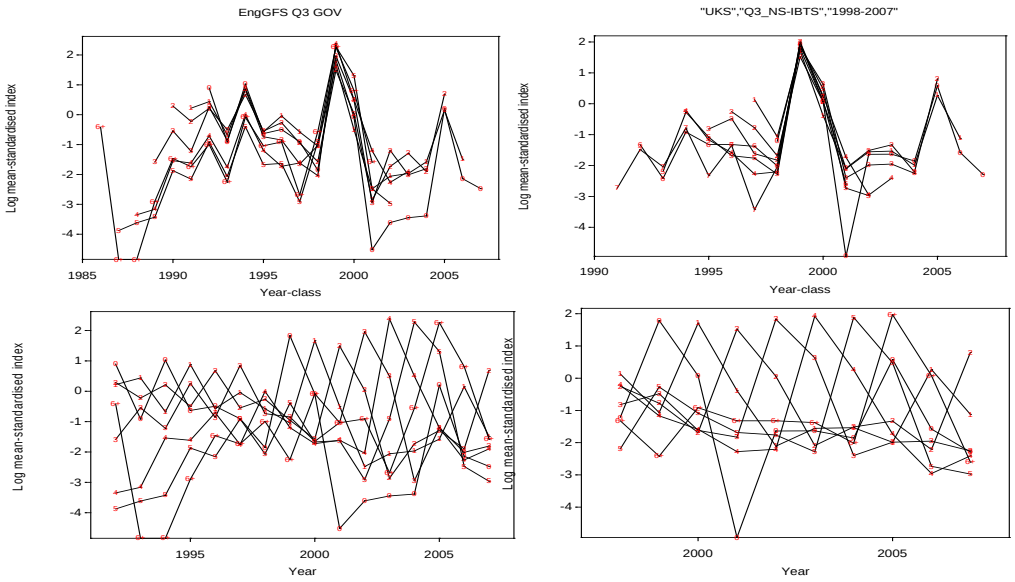


Figure 5.7. Log mean-standardized index by age (above) and year (below) plots for haddock in the North Sea. The strong 1999 year class is followed by a sharp decline in 0-group fish in 2001 for both UK and Scottish indices. 0-group fish recover more slowly in the UK index, possibly due to a lag in recovery spatially availability of juveniles in the area.

Looking at an overview of another survey we can see a lot of noise in this index. The series commenced in 2001 hence the absence of younger ages in the index by year-class plot prior to that (Figure 5.8). Clearly there has been a low recruitment signal in the early years of the survey with a strong pulse consistent from 2004 onwards. However, we have weak internal consistency and unpredictable catchability at age. Assuming the affects here are not just noise due to low sample size, it seems reasonable that either there are problems in the ageing of this species or a shift in the age structure of population has taken place through migration for example.

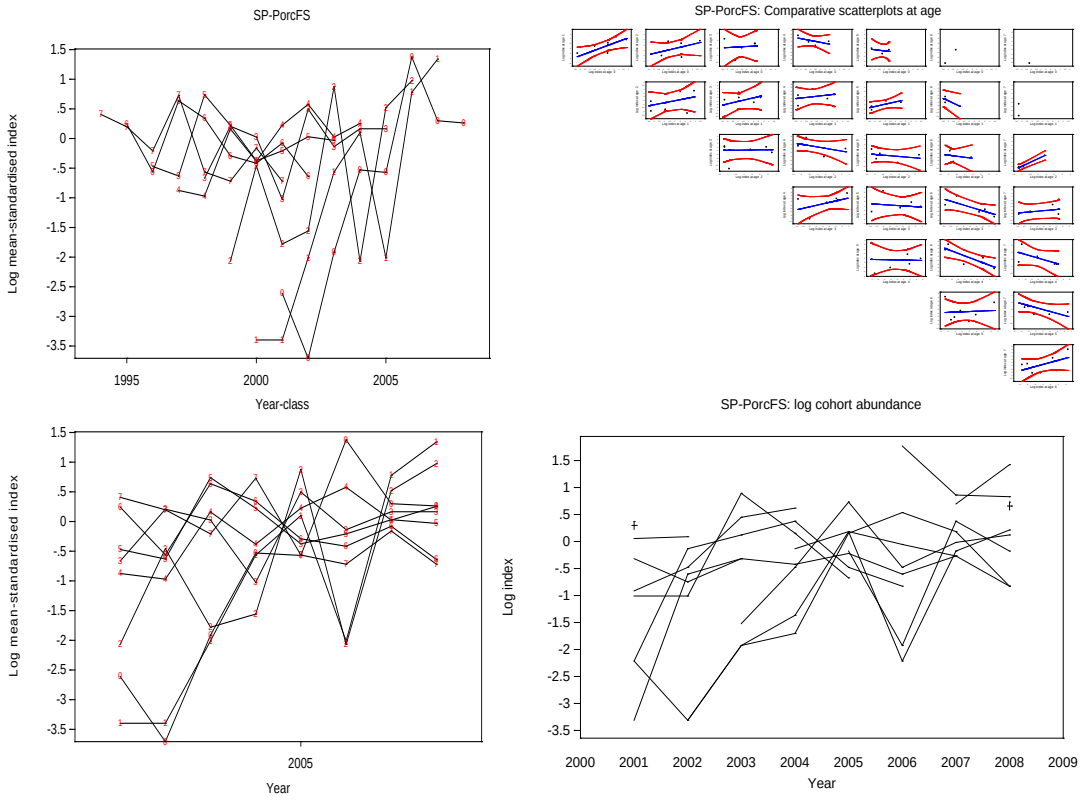


Figure 5.8. Surba summary plots for monkfish survey in VIIc. Plots show increased recruitment pattern after 2004, but weak and negative internal consistency for many older ages and unpredictable catch at-age trends.

5.3 Conclusions

Available data were presented and the approach outlined above led to constructive discussion. Where survey assumptions hold, even with low or variable catch rates, natural structure within the cpue data can often still be seen.

Where we have significant noise in the index we can use the simple catch at-age equation to group three main assumptions that may have been invalidated, either individually or in combination:

1) **Structure in cpue data** – ageing problems, sample size/noise, sample selection/raising errors are some of the catch and data processing factors that may produce a noisy survey signal.

2) **Stability in q'** – a temporary or incremental shift in environmental conditions or trawl rigging will cause a bias in catchability, as will certain types of fish behaviour and we need to check survey protocols and sampling parameters.

3) **Stability in N** – information on spatial or temporal shifts in the natural population as well as commercial exploitation patterns will be important in ensuring this assumption is valid.

For the purposes of the current exercise age structured data were used, but where that is not relevant or of sufficient precision, similar use can be made of length frequencies or other structure. This alternate approach was discussed as relevant to a couple of survey examples where problems with internal consistency might be evaluated initially by comparing length frequency structure against age structure.

If there are clear consistent modes in the length frequency then growth should be modal and problems converting these modes into clear age cohorts are likely to stem from difficulties in producing the age length keys. Absence of clear modes in the length frequency in a specific year might suggest either a sample raising problem or a significant migration in or out of the survey area. Consistent difficulty in resolving any structure in the population leads to more fundamental questions about survey design where survey coverage and sampling techniques might need to be reviewed unless a different index can be found to make use of the existing data.

5.4 Future work

Several countries managed to provide data for the 2009 meeting, but the difficulty in separating out catch numbers at-age matrices by country for the North Sea, where traditionally data are contributed to a combined index, was underestimated, likewise the ability to extract the relevant disaggregated indices from DATRAS. Paucity of general documentation as well as ICES assessment working experience within Institutes hampered construction of the basic support files for the analysis intersessionally. To address the fundamental data access issues it was agreed that detailed data and file format documentation would be drawn up and circulated intersessionally. Facilitating access to the relevant data in DATRAS would be discussed through a new DATRAS-IBTS liaison group.

There was general agreement that this type of approach was a useful framework for articulating the real world experience of IBTS survey managers which is valuable in explaining at least some of the trends in survey data, real or introduced. Likewise, simple methods to compare annual cpue data to time-series trends in population structure is a useful method of quality checking q' as long as certain assumptions about population stability, survey coverage and design hold true.

In view of discussions above it was agreed that a generalized working document will be drawn up, using haddock data available at this year's meeting as an example, so that IBTS survey data for various stocks can be reviewed in a standard format. This review document should include techniques to facilitate an index to be evaluated more in terms of general trends than as point estimates, more relevant to an annual update report. Once species for the benchmark meetings in 2010 are agreed later in the year an appropriate number of species will be selected and a review document for the appropriate IBTS data compiled for discussion at next year's meeting prior to submission to the benchmark group.

5.5 References

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6 Gear perfomance (ToR c)

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

In order to compare the gear performance among different countries a series of analyses were performed. The data were downloaded directly from DATRAS, therefore the analysis was conducted only on data currently uploaded by the different countries. This exercise revealed that many countries had failed to upload their data into DATRAS. The gear parameters uploaded explored were Door distance and Headline height as those two variables were the most complete for all the countries.

Considering all the countries, door distance values ranged between 37–172 m while headline opening values ranged between 1.8–9.9 m. A possible explanation of such wide ranges could be related to the submitted values of the two parameters chosen among several values obtained during the trawling. Preferably a median or an averaged value should be noted and submitted.

By the means of a Principal Component Analysis (PCA) those two parameters were combined in only one factor (PCA gear) which was in turn used as dependent variable in a general linear model (GLM) with country and year as independent variables and depth as covariate.

The estimate marginal means combined for all the countries in both Q1 and Q3 did not show any particular temporal trend (Figure 6.1; Q1 only shown) . However some (increasing and decreasing) trends were detected when plotting the means calculated for each country (Figure 6.1). This result indicates the presence of inconsistencies within surveys and evidences the need of a more accurate screening of the input data before any conclusion about interannual drift in gear performance.

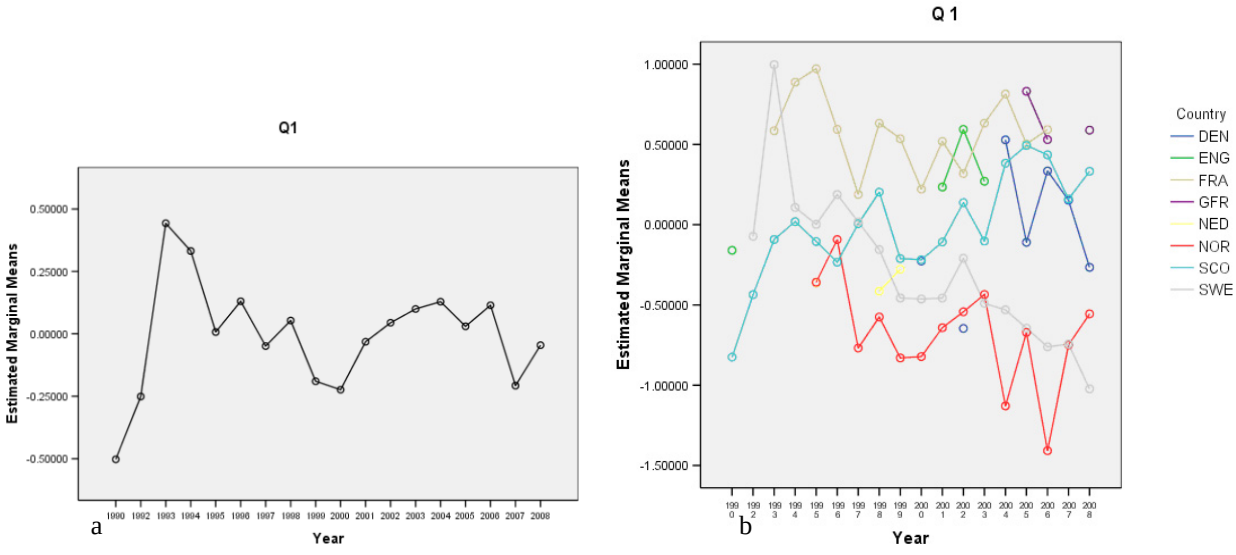

Figure 6.1. Results of the general linear model (GLM) of the PCA gear averaged among a) all the countries and for b) individual countries for the Q1survey. Comparable results were obtained for Q3.

To explore to what extent gear performance could affect catchability, the IBTS haddock total catch-at-age were combined for all ages (age 1–5) using a PCA. The resulting factor (combined age 1–5) was correlated against gear parameters (PC1 gear).

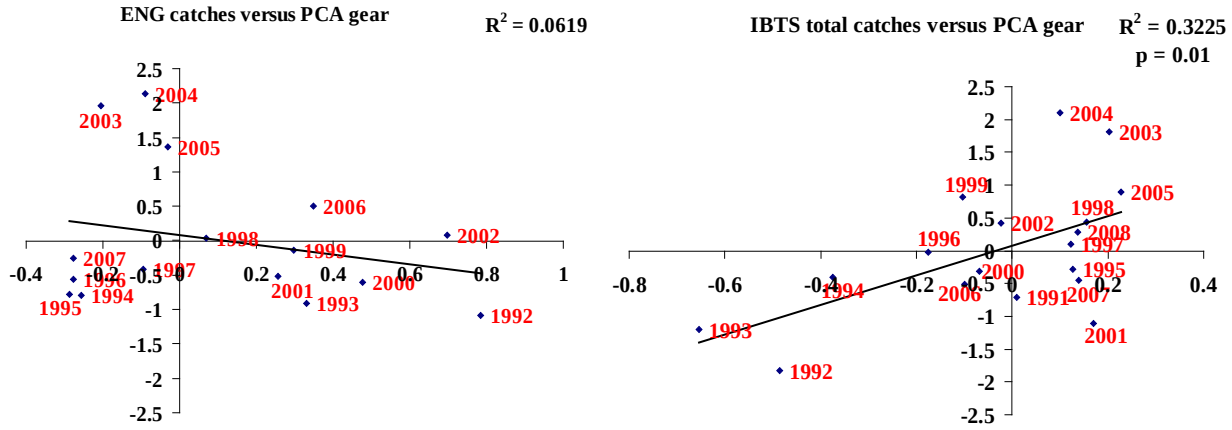

Figure 6.2. Correlation between the PCA gear and the PCA factor obtained from English (left) and IBTS (right) total haddock catch-at-age.

The results reveal that there is a positive relationship between catch of different sizes of haddock and gear performance, when considering the IBTS total catches (Figure 6.2-right). This may imply that at larger values of headline height, corresponding to a narrower door distance, there is a larger proportion of big haddock caught. The fact that years are randomly distributed in this result suggests that there is not a drift in either catchability or gear performance. When exploring single countries gear parameters vs. their respective catches for England, Scotland and Sweden, no significant trends were displayed (Figure 6.2-left. England only shown), suggesting that the overall trend may not be valid or shown for the individually investigated countries.

An alternative and finer tuned method that could be used if there were more gear parameters available, consists in the use of different forms of multivariate cluster or grouping methods. As an example of how to routinely check the gear behaviour, the gear parameters sampled on the Swedish vessel including Door distance, TEY Height, TEY Opening, TEY Clearance, TLT Roll, DST Distance, TSP Resultant, TSP Angle, Warp length and Warp Stretch since 2002 (Q1 and Q3) were analysed with a cluster method. This analysis suggests that there is fair consistency with the gear parameters between years except for one quarter (Figure 6.3); therefore something seems to have occurred with the gear in Q3 2002.

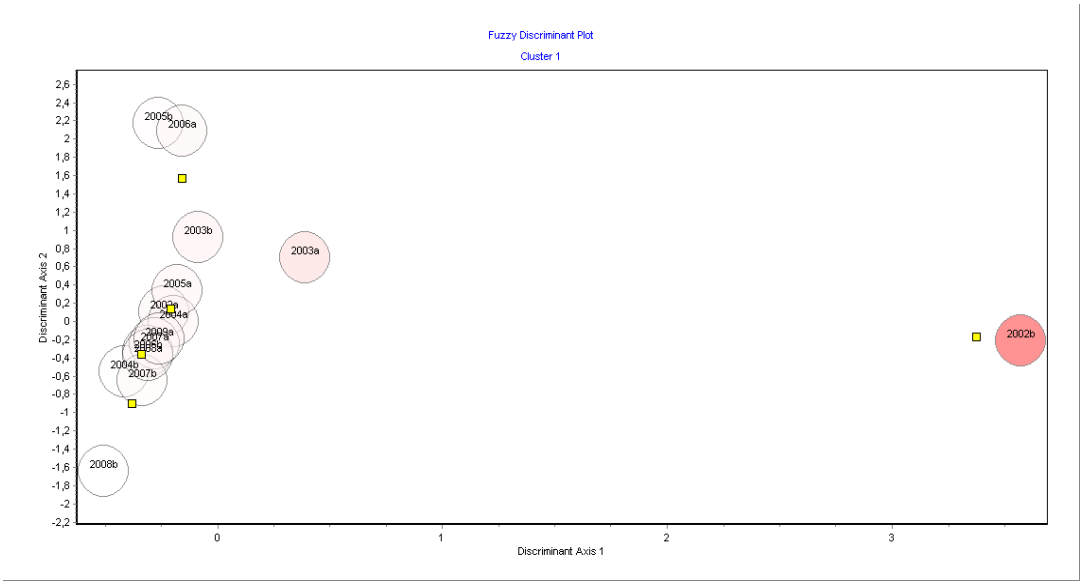

Figure 6.3 Clustering (Fuzzy clustering) of Swedish gear parameters in different years.

An analysis of the different parameters suggests that the difference is mainly found in Door distance and TEY Height. This analysis also suggests that there is no trend between years as different years are randomly distributed in this output.

For exploratory reasons, a set of gear parameters for three different vessels and for three different depth strata (0–50; 50–100; 100-) were compared. The gear parameters used were Door distance, Headline height and a measure of bottom contact and trawled Distance. The idea was to compare if the three different vessels would group accordingly to the towed depth strata. In this case the result highlighted that the gear per vessel did not behave in the same way for each depth stratum, suggesting that there can be a bias as a function of depth and area.

A key concern when discussing gear performance is if and how weather conditions could affect gear performance and, in order to give an example on how to explore the effect of weather on gear performance, a correlation was made between the Scottish gear parameters (PC1) and their combined weather parameter (PC1; swell height and wind strength). The results suggest that there is no effect of weather on the chosen gear parameters (Figure 6.4). This does of course not mean that weather will not affect other gear parameters like bottom contact or speed through water.

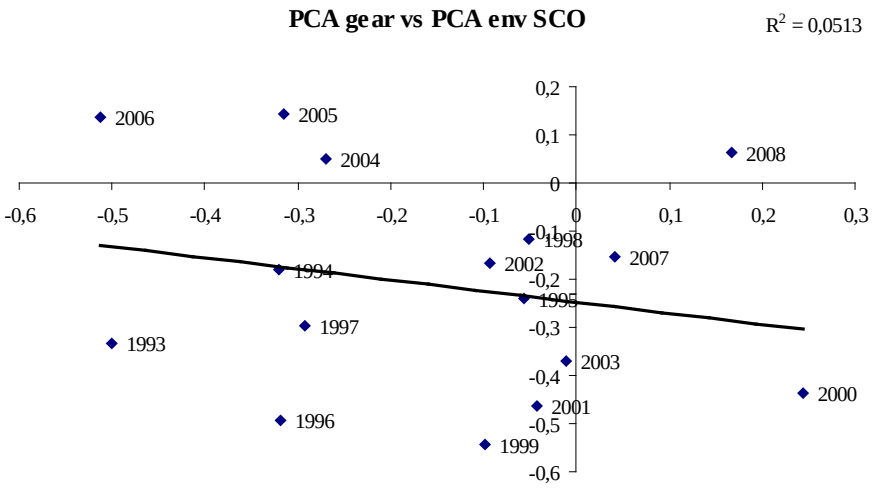

Figure 6.4. Correlation between the Scottish PC1 for gear vs. PC1 for weather conditions.

Conclusions

The exploration of the available gear data has shown that there are many gaps in the DATRAS database and that all countries need to check if they have submitted all their gear parameter data. The overall trend in the combined gear parameters, door distance and headline height, suggests that both quarters show no apparent trend but that individual countries may have drift i.e. a problem with their gear performance. The IBTSWG suggests that gear parameters and consequently gear performance should be routinely checked.

7 Review of DATRAS (ToR d)

ToR d) Review recent updates within DATRAS and prioritize further developments.

Remaining priority deliverables which were not completed in 2007 (see Section 7 of ICES, 2008) as part of the development of DATRAS version 2.0 (Project Number QLRT- 2001 -0025; Development of a central database for European trawl survey data) was completed in 2008. The status of the remaining functionalities is described below.

7.1 Developments

7.1.1 Completed tasks:

- Improvement of data checking and the uploading routine. The data screening utility is upgraded to .Net framework as a result the screening process is improved. New developments include more checks in the screening program and the reprogrammed upload routine that results in data submission working more efficiently in a multiuser environment.
- Description of data fields and units on the web.
- New survey description available on the web.
- Maturity data includes 6-stage-scale.
- Development of a functionality that calculates data products as a schedule task job which is calculated on new uploaded data.
- Graphical outlier identification utility. Process covers the general evaluation of the quality of the SMALK data. Plots show the length-weight relationship with default 95% confidence limits, revealing outliers (Figure 7.1 left). Users can easily indentify the line number which is an outlier with the help of tooltip text. Data are uploaded automatically when users view the length-weight (Figure 7.1 left) and residuals (Figure 7.1 right) outlier charts. If data already exist in the database, then existing data are overwritten.
- Graphical overview of uncertainty in abundance trends. Using bootstrap data as source data, the difference between upper and lower quartiles divided by median (a proxy for coefficient of variation) is plotted (Figure 7.2).

$$CPUEage\left[\frac{75\% - 25\%}{50\%}\right]$$

- Automated the manual checking of exchange data. In DATRAS version 1.0, the exchange file was submitted to the data manager and those mistakes which were not possible to handle in the screening utility were corrected by the DATRAS data manager. In DATRAS version 2.0, the uploading is fully automated because of the new functionality added to the data screening utility which handles this issue.

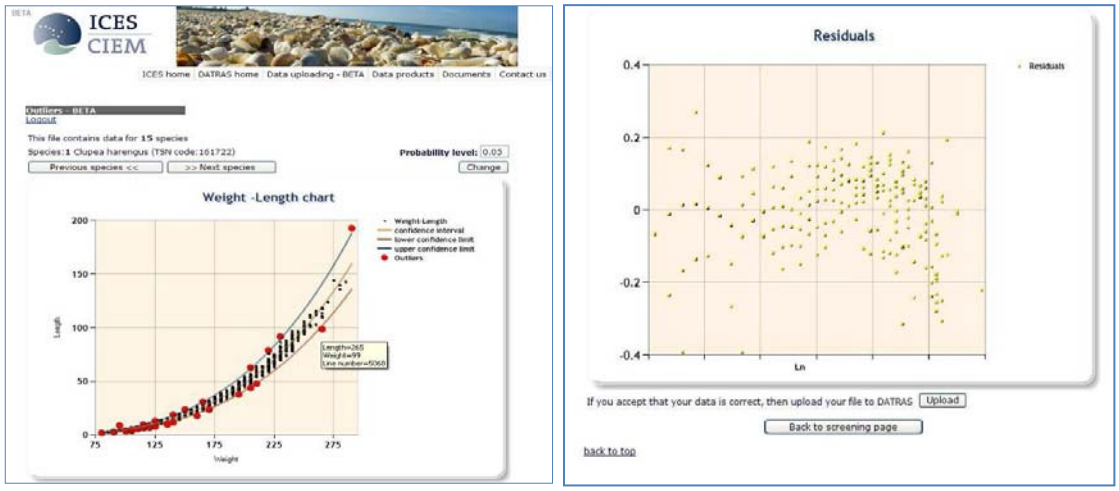

Figure 7.1. DATRAS checks for the length-weight relationship (left) and residuals (right).

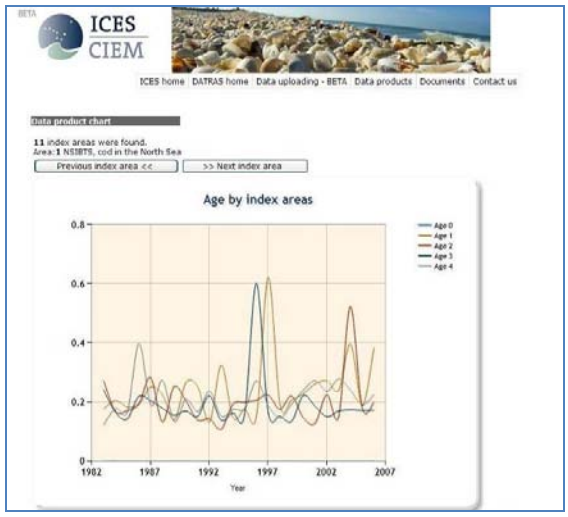

Figure 7.2. Temporal trends in cod by age class.

7.1.2 In progress

- New calculation: maturity ogive weighted by cpue
- GIS mapping of data for visual inspection and identification of spatial distributions. In future this will become part of the ecosystem data pages on the ICES website.

7.1.3 Not completed /Second priority tasks

- Since 1988, IFREMER has conducted the Channel groundfish survey (CGFS) each October in order to evaluate abundance indices for the main commercial species caught in the Eastern English Channel (see Section 3.8, Working Document 1, Annex 5). Documentation describing this survey was provided to IBTSWG in 2008 and will be made available through the DATRAS webpage.
- Quality assurance by survey (inter-survey comparisons to compare results for different regions and identify potential inconsistencies)
- Updates to the exchange format as specified by IBTSWG (ICES 2007b, Section 8.2.2.3) and WGBITS (ICES 2007a, Section 9).

7.1.4 Other issues

- Documentation on the web about the calculation of indices, detailed fields information of exchange file.
- Ability to upload data for individual stations
- More details in metadata information in DATRAS if someone changes the flat file, so that there is better documentation of data checks
- Use of validity codes for all records (e.g. unchecked but assumed ok; Questionable; Verified)
- Add new field in HH record (e.g. haul quality; Standard, Non Standard).

7.2 Flagging of IBTS data in DATRAS

During the IBTSWG meeting in 2007, the issue was raised that Cefas used a gear that was not rigged as described in the IBTS manual (revision VII) during the 2006 Q3 IBTS in the North Sea. As a result, the IBTSWG recommended the data to be flagged as non-standard in the DATRAS database (ICES 2007b, Section 4.2.5), and the recommendation was implemented. However, during this year's meeting, the IBTSWG was informed that the flagging of the data were undone by ICES, on demand of a certain assessment working group, apparently to simplify working with the dataset. The IBTSWG is of the opinion that the group itself is responsible for and most capable of judging IBTS data, and that no other parties should be authorized to adjust IBTS data that are stored in DATRAS. If certain analyses of the data are complicated due to the setup of the database, the techniques performing the analyses should be considered to be the limiting factors that need adjustments, not the data itself. Therefore, the IBTSWG strongly recommends reflagging the data in question as non-standard.

In some cases unusual catches are reported. These can be extremely large catches, very big fish, unusual species etc. It would help users of DATRAS if such records could be flagged in the database, possibly in a comment field where it could be indicated that the data have been checked (when, by whom) and found to be correct. Otherwise new data would again and again need to be checked for different users.

7.3 FishMap version 2

After the IBTSWG meeting, the head of the ICES Datacentre Neil Holsworth supplied the following information on the development of ICES-FishMap:

The FishMap species distribution maps are a useful tool and ICES would like to continue to make this a useful product available to the ICES community. Currently, the FishMap GIS maps are hosted at Lowestoft and the maintenance of the data feeds and GIS have now used their available funding. Therefore an update is needed and ICES will take this opportunity to rethink the technical aspects and the content of ICES-FishMap.

Technical: The FishMap maps and data will be hosted within the framework of ecosystemdata.ices.dk, which has mapping, charting and downloading functionalities. The DATRAS data warehouse will provide data into this web application. Web services may also be offered. The technical development and hosting will be handled within the ICES Data Centre and within the Data Centre budget and is scheduled to start in the autumn of 2009.

Content: Up to 100 species factsheets will be developed, to cover the whole ICES area and surveys, under an open offer tender process to all ICES member institutes. The tender will be advertised before summer.

8 Data quality (ToR e)

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

8.1 Introduction

The increased use of IBTS data for studies on fish assemblages and diversity has resulted in the requirements for improved data checking to ensure high quality of the data, and the IBTSWG has increasingly considered these issues in recent years. This section of the report discusses TOR e)

The EC's Marine Strategy Framework Directive (MSFD), which was adopted in June 2008, emphasizes that "*The marine environment is a precious heritage that must be protected, preserved and, where practicable, restored with the ultimate aim of maintaining biodiversity and providing diverse and dynamic oceans and seas which are clean, healthy and productive*." (CEC, 2008). The MSFD aims to achieve 'Good Environmental Status' by 2020 and biodiversity is one of the eleven defined qualitative descriptors for determining this Good Environmental Status. The MSFD may require new monitoring programmes or modification of existing monitoring programmes and the EC has asked that "*monitoring methods are consistent across the marine region or subregion so as to facilitate comparability of monitoring results*", and so ICES will likely be involved in ensuring standardized sampling and analyses for such programmes (ICES, 2009).

8.2 Production of identification keys for IBTS surveys

Most surveys use established identification guides (e.g. Wheeler, 1969, 1978; Whitehead *et al*., 1984-1986) for identifying fish, as well as regional/national guides. Many of these books are currently out of print. Recent books with useful taxonomic information that are still in print include Quero *et al.* (2003) and Louisy (2002).

Preliminary keys were developed for three groups of fish for use in IBTSWG (North Sea and the northern parts of the western area): dragonets (*Callionymus* spp., Figure 8.1, Annex 4), lings (*Molva* spp., Figure 8.2) and rocklings (Gadidae, Lotinae, Figure 8.3). Identification material for smoothhounds (*Mustelus* spp.) was provided in ICES (2008a).

Depending on the feedback from these keys and their utility, further keys will be developed for other problem-taxa (see below). To facilitate the production of these, high quality photographs and/or specimens should be collected in upcoming surveys. IBTSWG still has to improve on the identification for the following taxa:

Lampreys (Petromyzontiformes)	Scorpion fish (Scorpaena spp.)	Blennies (Blennidae)
Skates and rays (*Rajidae*)	Sea scorpions (Cottidae)	Sand eels (Ammodytidae)
Shads (*Alosa* spp.)	Horse mackerel (*Trachurus* spp.)	Gobies (Gobidae)
Argentines (*Argentina* spp.)	Sea breams (Sparidae)	Topknots (*Phrynorhombus, Zeugopterus)*
Clingfishes (Gobiesocidae)	Mullets (Mugilidae)	Scaldfish (*Arnoglossus* spp.)
Sticklebacks (*Gasterosteidae*)	Wrasse (Labridae)	Soles and tonguefishes (e.g.

Lampreys (Petromyzontiformes)	Scorpion fish (Scorpaena spp.)	Blennies (Blennidae)
Seahorses and pipefish (Syngnathidae)	Eelpouts (Zoarcidae)	*Bathysolea, Diclogoglossa*)
Redfish (*Sebastes* spp.)	Snake blennies (Stichaeidae)	

8.3 Examination of DATRAS data (North Sea data)

Following a data extraction (9 February 2009), data from the North Sea IBTS (1997–2008 inclusive) were examined and the following data checks carried out:

1) Examination of the species being recorded and taxonomic use

2) Examination of length distributions

3) Examination of geographical distributions

8.3.1 Species recorded and taxonomic use

There were some obvious and potential errors in species identifications (see Annex 4 Table 8.5 for a full list of taxa and potential errors), with some nations also using inconsistent or inappropriate taxonomic identifications. For example, as there is only one member of the genus *Buglossidium* in the North Sea (*B. luteum*), there is no basis for reporting to genus-level instead of species-level. Further studies on selected families (e.g. zoarcids, gobies, cottids, pipefish etc.) are required to better examine the spatial and temporal patterns in the records, as well differences between the national laboratories (see Section 8.4).

8.3.2 Length distributions

There were few records of fish < L_{birth} or > L_{max} (Annex 4, Table 8.2). These erroneous records include database errors (e.g. confusion between mm and cm) as well as specimens which were probably misidentified.

Given that some elasmobranch records are < L_{birth}, it is possible that embryonic elasmobranchs may have been recorded. These data need to be better examined to ensure that they are not simply disc width. Nevertheless, the IBTS manual should also be updated to include:

"

."

There are also a few species of fish taken in the IBTS surveys (especially in deeper areas) for which total length may not be the best length measurement (e.g. chimaeras, grenadiers). These deep-water taxa have fragile tails and so total length may not always be measurable. Such taxa are also highlighted in the PGNEACS report (ICES, 2008b).

8.3.2.1 Length distributions of chimaeras

One species of chimaera, *Chimaera monstrosa,* is taken in the North Sea IBTS, and other species may be taken in surveys operating in deeper waters in western IBTS surveys. The standard measurement for *Chimaera* and *Hydrolagus* is 'Pre-supra caudal fin length', which is measured from the tip of the snout to the point just before the start of the supra caudal fin. The standard measurement for *Rhinochimaera* is from the tip of the snout to the end of the second dorsal fin (ICES, 2008b).

Most records of *Chimaera* in the DATRAS database are from Swedish and Norwegian surveys, although UK and German surveys encounter this species occasionally.

8.3.2.2 Length distributions of grenadiers

North Sea IBTS surveys (1997–2008) have reported one species of grenadier, round-nose grenadier *Coryphaenoides rupestris.* PGNEACS proposed that grenadiers be measured as pre-anal fin length, which is the distance from the tip of the snout to the first anal fin ray.

8.3.3 Geographical distributions

Distribution plots of all species were examined, and some obvious outliers identified (Annex 4, Table 8.3). These questionable records should be checked. More detailed analyses of problematic species-groups still need to be undertaken, and IBTSWG propose to examine these groups during future meetings. Examples of the kinds of analyses that need to be undertaken are highlighted in Section 8.4.

8.4 Examination of species complexes

Although some obvious length-based or geographical 'outliers' can be checked and corrected, many of the problem taxa need to be examined to see the temporal and spatial patterns in their recording during national surveys. Examples of this are given for several species-groups below.

8.4.1 Common and Norwegian topknot

Two topknot species have been recorded in the North Sea in recent years. Norwegian topknot (*Phrynorhombus norvegius,* L_{max} of ca. 12 cm) is a smaller-bodied species than common topknot (*Zeugopterus punctatus*, L_{max} of ca. 25 cm), and both species favour coarse grounds. Most nations report Norwegian topknot more regularly than common topknot (Table 8.1), although both Danish and German surveys have reported common topknot more frequently. There are no recent records of Norwegian topknot greater than L_{max}. The largest common topknots recorded are > L_{max} of Norwegian topknots, although there is concern over the accuracy of the identification of the smaller common topknots.

In terms of the temporal occurrence of records (Table 8.2), it should be noted that:

- Denmark reported both topknot species in 1999, but since 2000 has reported only one species (common topknot).
- Scottish and German records of common topknot have occurred in years with no records of Norwegian topknot.

Table 8.1. Total numbers and proportions of Norwegian and common topknot taken by surveys in the North Sea (DATRAS database).

Species	Phrynorhombus norvegius			Zeugopterus punctatus		
	No of records	Proportion of records	Length range	No of records	Proportion of records	Length range
Denmark	4	0.8%	8 cm	473	99.2%	5–16 cm
England	9	100.0%	6–10 cm		0.0%	
France	106	72.6%	5–12 cm	40	27.4%	4–11 cm
Germany	25	23.8%	5–10 cm	80	76.2%	4–12 cm
Netherlands	12	100.0%	6–10 cm		0.0%	

Species	Phrynorhombus norvegius			Zeugopterus punctatus		
	No of records	Proportion of records	Length range	No of records	Proportion of records	Length range
Norway	3	100.0%	9 cm		0.0%	
Scotland	14	63.6%	9 cm	8	36.4%	6–9 cm
Sweden	128	98.5%	3–10 cm	2	1.5%	6 cm

Table 8.2.Temporal occurrence of records of Norwegian and common topknot taken by surveys in the North Sea (DATRAS database).

Country	Species	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Denmark	Norwegian topknot	-	-		-	-	-	-	-	-	-	-	-
	Common topknot	-	-										-
England	Norwegian topknot		-	-	-		-	-	-	-	-		-
France	Norwegian topknot		-			-					-	-	-
	Common topknot	-	-	-				-				-	
Germany	Norwegian topknot	-		-		-		-		-	-	-	-
	Common topknot	-	-		-	-	-	-	-	-	-	-	-
Netherlands	Norwegian topknot		-	-	-	-	-	-	-		-		
Norway	Norwegian topknot	-	-	-	-	-	-	-		-	-	-	-
Scotland	Norwegian topknot	-			-		-	-	-	-	-	-	-
	Common topknot	-	-	-		-	-	-	-	-	-		-
Sweden	Norwegian topknot	-	-								-		
	Common topknot		-	-		-	-		-	-	-	-	-

8.4.2 Five-bearded and northern rockling

Two rocklings of the genus *Ciliata* occur in the North Sea, both with five barbels: Northern rockling (L_{max} of ca. 20 cm) and five-bearded rockling (L_{max} of ca. 25 cm). Most nations report only five-bearded rockling (Table 8.3), with only France, UK and the Netherlands reporting northern rockling in more recent years (Table 8.4).

Table 8.3. Total numbers and proportions of northern and five-bearded rocklings taken by surveys in the North Sea (DATRAS database).

	Ciliata mustela			Ciliata septentrionalis		
Country	Total numbers	%	Length range	Total numbers	%	Length range
Denmark	18	100.0%	7–19 cm		0.0%	
England	44	97.8%	5–24 cm	1	2.2%	14 cm
France	272	97.5%	4–27 cm	7	2.5%	7–10 cm
Germany	17	100.0%	9–18 cm		0.0%	
Netherlands	105	77.8%	6–24 cm	30	22.2%	6–14 cm
Sweden	21	100.0%	8–20 cm		0.0%	

Table 8.4. Temporal occurrence of records of northern and five-bearded rocklings taken by surveys in the North Sea (DATRAS database).

COUNTRY	SPECIES	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Denmark	5-Bearded	-	-			-	-		-		-	-	-
England	5-Bearded	-	-	-	-				-	-	-	-	-
	Northern	-	-	-	-	-	-	-	-	-	-		-
France	5-Bearded												
	Northern	-	-	-	-	-	-	-	-		-	-	-
Germany	5-Bearded			-		-	-		-	-	-	-	-
Netherlands	5-Bearded												
	Northern	-	-	-	-	-	-	-			-		
Sweden	5-Bearded		-			-	-	-	-		-		-

8.5 Standardisation of data collection for shellfish and cephalopods

Although standardized data collection for fish is well established in IBTS protocols, it is still evident that there is less consistency in the collection and submission of data on the catches and size distribution of cephalopods and shellfish (see also Section 6.4 of ICES, 2007).

In 2007, IBTSWG agreed that "*the species listed … should be recorded in all IBTS surveys and data should be submitted to the DATRAS database. This data collection should have been implemented from 2008 onwards*". This table has been updated (Table 8.9, Annex 4) in order to better inform on the correct taxonomic hierarchy of cephalopods.

As highlighted above, there has been some taxonomic confusion regarding cephalopods (e.g. the use of 'Cephalopoda', the joint use of '*Loligo* spp.' and 'Loliginidae', the incorrect use of Sepiidae (i.e. *Sepia* spp.) to refer to bobtail squids (Sepiolidae).

Cuttlefish with cuttlebones (*Sepia* spp.): should be identified to species where possible. If they cannot be identified to species level, then they should be recorded as *Sepia* spp.

Bobtail squids (i.e. cuttlefish without cuttlebones; *Sepiola, Sepietta, Rossia*): should be identified to species if possible. If they cannot be identified to species level, then they should be recorded as Sepiolidae.

Octopus: There are two species in continental shelf seas and they are easily distinguished and should be recorded to species level.

Loliginid squids: Specimens of *Loligo vulgaris, L. forbesi* and *Alloteuthis subulata* should be identified to species if possible. If they cannot be distinguished (e.g. when there are large numbers of small individuals) they may be reported as Loliginidae.

Ommastrephid squids: *Todaropsis eblanae* and *Illex* spp. are clearly distinguished. There is taxonomic confusion between *Illex coindetii* and *Illex illecebrosus* (Martinez *et al.*, 2002, 2005), and MarBEF only recognizes one species in European waters (*I. coindetti*), and so analyses should combine *Illex* spp. *Illex* spp. could also be reported as Ommastrephidae.

8.6 Notes on the suitability of DATRAS data for biodiversity studies

Time series of survey data are increasingly used to study changes in biodiversity. This chapter is meant to give some "health warnings" as far as the use of IBTS data for such purposes is concerned. This text is limited to the data for the North Sea. Data from the western and southern areas probably have their own specific problems but these are not being dealt with here.

The oldest IBTS data that are available in the DATRAS database at ICES are for the year 1965. Since that time many aspects of the survey have changed and users of these data should be aware of the influence these changes may have on the outcome of their analyses.

Survey coverage in space and time

In the first years of the survey the area was limited to the central and southern North Sea. Later, when more countries started to participate in the survey, the coverage extended to include the northern North Sea, and some years later into the Skagerrak and Kattegat. Only from 1974 onwards has the total North Sea, Skagerrak and Kattegat been covered during every year during the quarter 1 survey. Between 1991 and 1996 the IBTS was held in every quarter. Also these data are available in DATRAS. Since 1997 the frequency is limited to quarter 1 and quarter 3.

Standardisation of gear

During the first years of the survey a Dutch Herring Trawl was used as the survey gear. In 1977 it was decided to use the GOV as the standard trawl. In 1978 four vessels started using this trawl but it took some years before the GOV was fully implemented as a standard gear. From 1985 all participants only used the GOV in the quarter 1 survey, but in the quarter 3 survey, England used a Granton trawl up to and including 1992 and Scotland used an Aberdeen trawl in their quarter 3 survey up to and including 1997.

Improvements in species ID

Over the last decade or so, countries have started to pay more attention to species identification. Collections of photographs are being made to help improve the identification. Nevertheless, there are continuing problems in species ID (see Daan, YEAR; Ter Hofstede and Daan, YEAR). Even up to date it is known that identification problems still occur in "difficult" groups like Ammodytidae, Gobiidae, Callionymidae, and Rajidae, but misidentifications also occur in supposedly well-known groups such as North Sea flatfish (e.g. topknots *Phrynorhombus norvegicus* and *Zeugopterus punctatus*, scaldfish etc.).

Hence, in terms of the suitability of DATRAS data for studies on the diversity of fish (and shellfish) communities in the ICES area, there are several issues that data users must consider:

- There is currently a 'health warning' on the existing data, due to errors in (a) misidentification of species at sea, (b) data input errors, (c) inconsistent (and sometimes inappropriate) use of higher taxonomic levels.
- Certain taxa should be combined prior to any diversity or community study (e.g. Argentinidae, Gobiidae, Callionymidae, Zoarcidae, topknots)
- Not all fish can be identified to species level, and records of taxa such as Clupeidae or Lophidae (where juveniles have occasionally not been identified) should not be included in the estimation of diversity metrics, as the

main species present will have been recorded during that year, and the inclusion of data at a higher taxonomic level would artificially 'increase' a diversity metric.

- Any diversity metric is gear-specific, and only subsets of the overall fish community are sampled (e.g. estuarine fish communities, reef-associated fish communities and large pelagic fish are not sampled), and gear selectivity will be low for various fish species, such as small-bodied demersal species, and faster moving species.
- The 'appearance' of species in survey data (e.g. northern rockling) can be related to improvements in species identification during the evolution of the surveys.
- There have been important changes in gear type, area of coverage, tow duration, taxonomic interest of non-commercial fish over time for the various participating nations.

8.7 Recommendations

In terms of quality control and data checking, IBTSWG recommend that:

- All nations examine the potential errors reported above, correct their national data where appropriate, submit the corrected data to DATRAS, and report progress to IBTSWG in 2010.
- All IBTS pay particular attention to the identification of dragonets and flatfish so that contemporary data can act as a suitable baseline with which to compare historic data.

8.8 References

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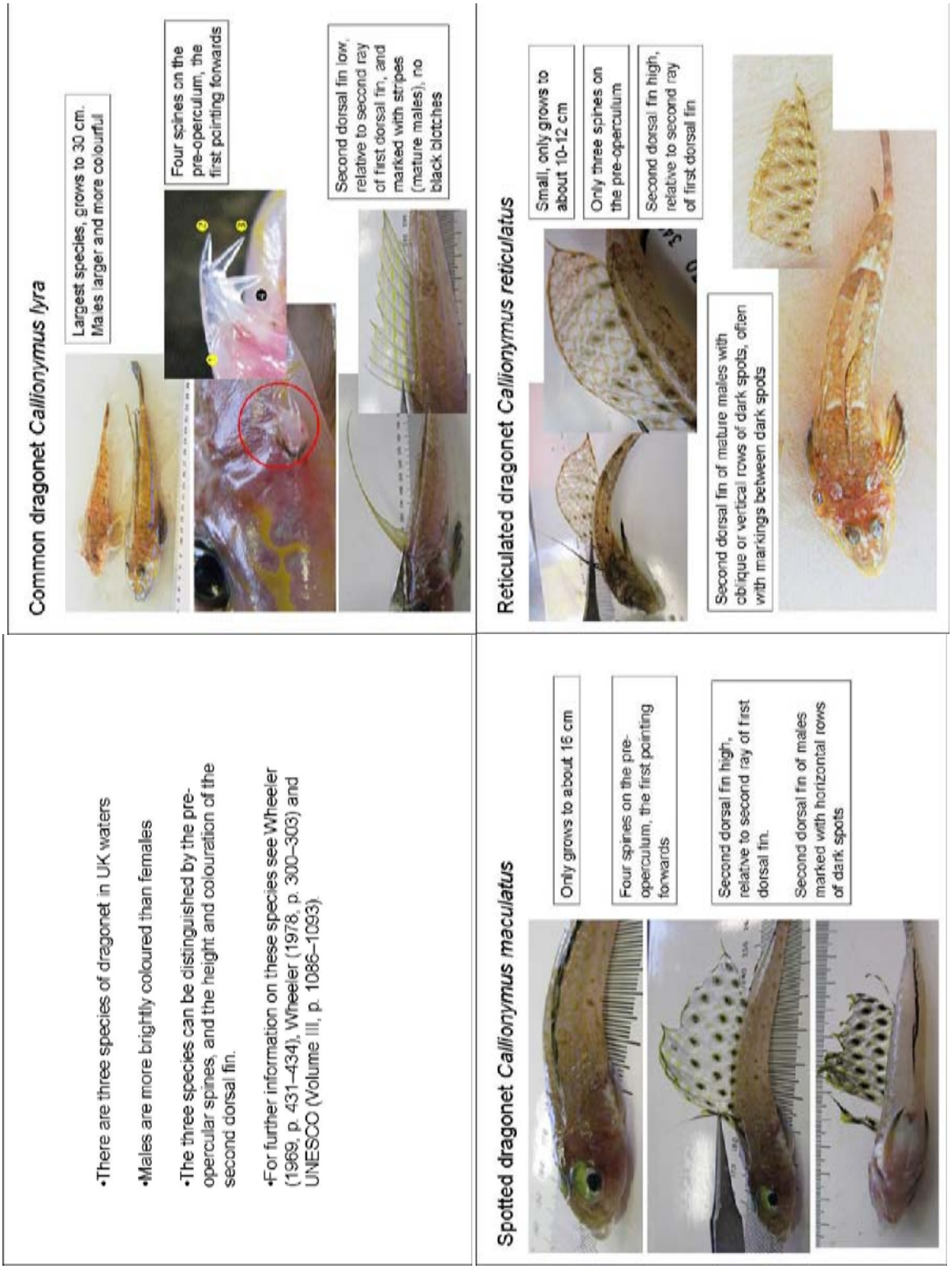


Figure 8.1. Identification key for dragonets (spp.) in the North Sea. From: Neudecker and Damm (2004). J. Appl. Ichthyol. 20: 204–210.

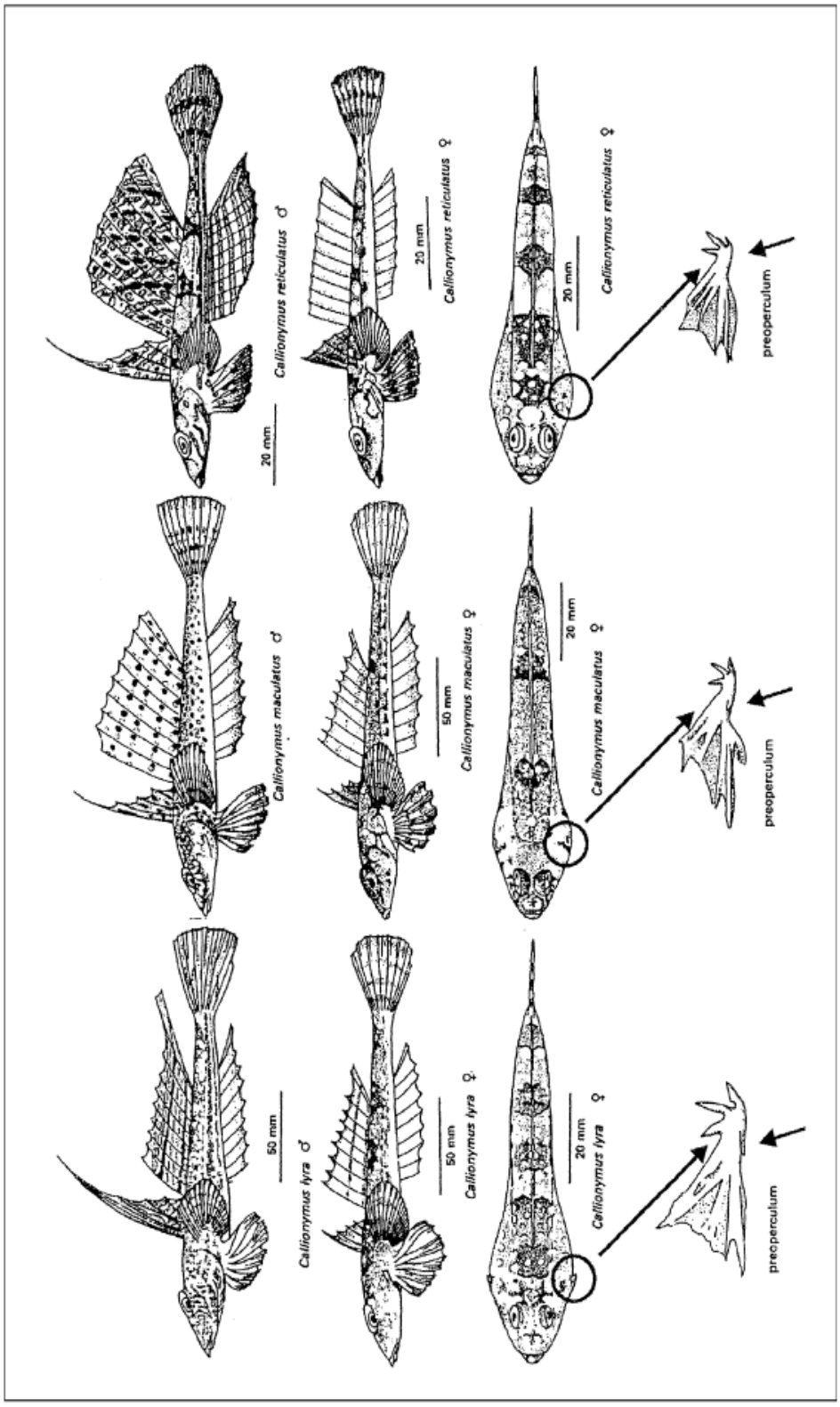


Fig. 1. Sketches of callionymid fishes (redone after Ryland, 1990. In: Hayward and Ryland, The Marine Fauna of the British Isles and North-West Europe, Vol. 2, p. 943, Clarendon Press, Oxford) with special emphasis on the pre-opercular spines as distinguishing features: *Callionymus lyra* has one of four spines pointing to the anterior, which can easily be felt by moving a fingernail along the operculum in an anteposterior direction. This fourth spine is only barely distinguishable in *C. maculatus* and is entirely absent in *C. reticulatus*

Figure 8.1 (continued): Identification key for dragonets (spp.) in the North Sea. From: Neudecker and Damm (2004). J. Appl. Ichthyol. 20: 204–210.Figure 8.2: Identification key for lings (Molva spp.) around the British Isles.

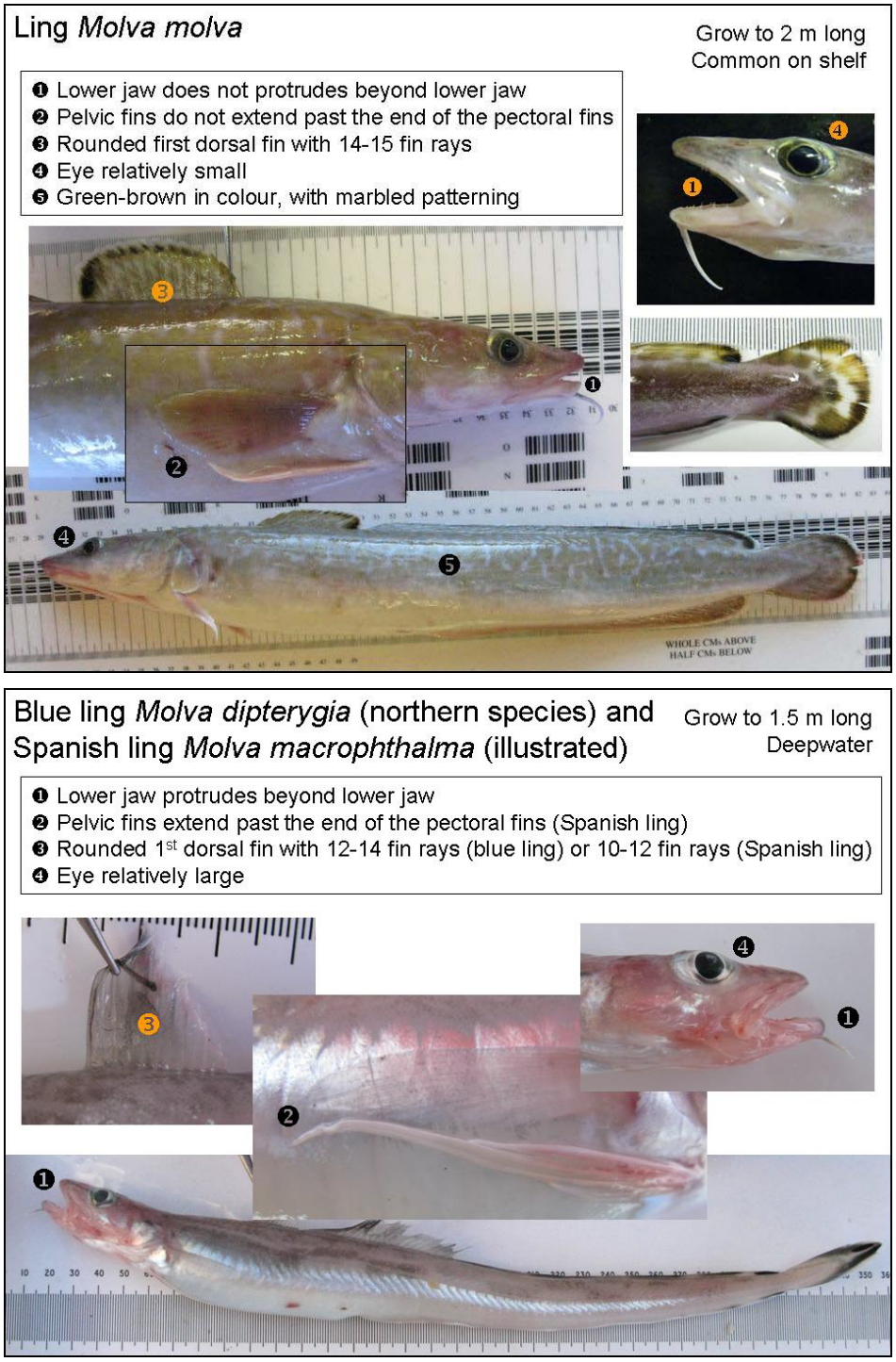


Figure 8.2. Identification key for lings (spp.) around the British Isles.

Figure 8.3. Identification key for rocklings (Gadidae, Lotinae) in the North Sea.

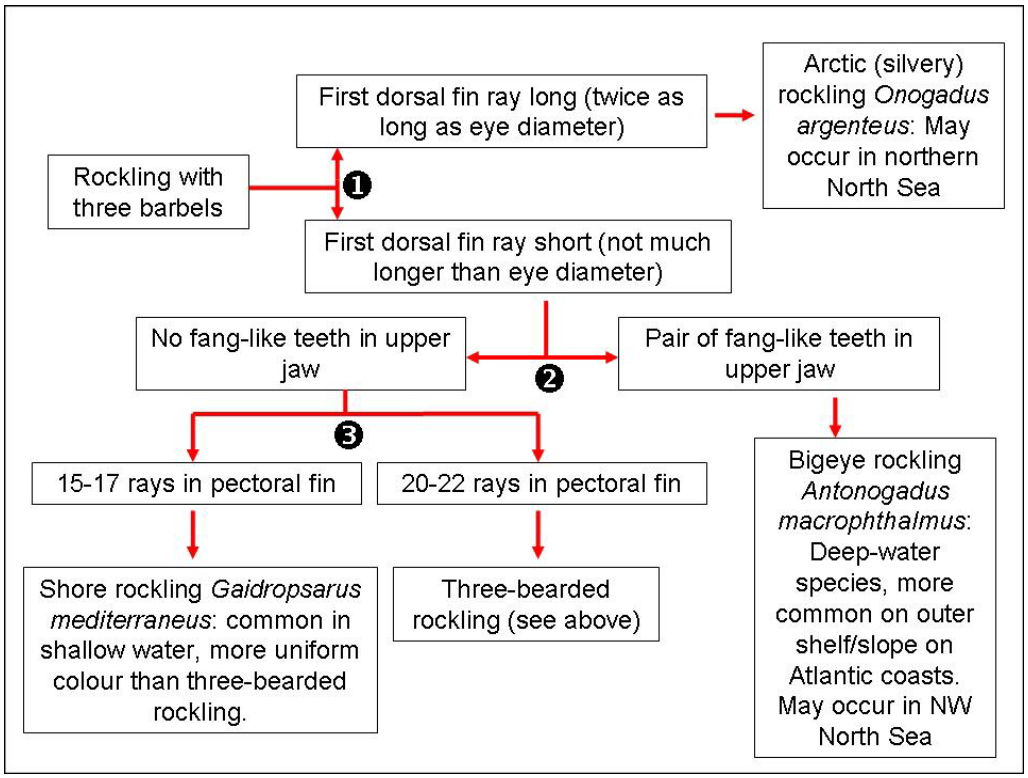
- Gadiform fish with 1–2 dorsal fins and 1 anal fin (as opposed to most cod-like gadoids).
- Brosme (not shown) has only one dorsal fin and a single barbel.
- Lings and tadpole fish (not shown) have only 1 barbel (on the chin).
- The remaining species (rocklings) have 3–5 barbels and are discussed below.

For further information see Wheeler (1969, p. 265, 289–293), Wheeler (1978, p. 162–168) and UNESCO (Volume II, p. 680–682, 695–710).

Four barbels: see Four bearded rockling (overleaf)

Five barbels: see Five-bearded rockling and northern rockling (both overleaf)

Three barbels: see Three bearded rockling (overleaf) and key below



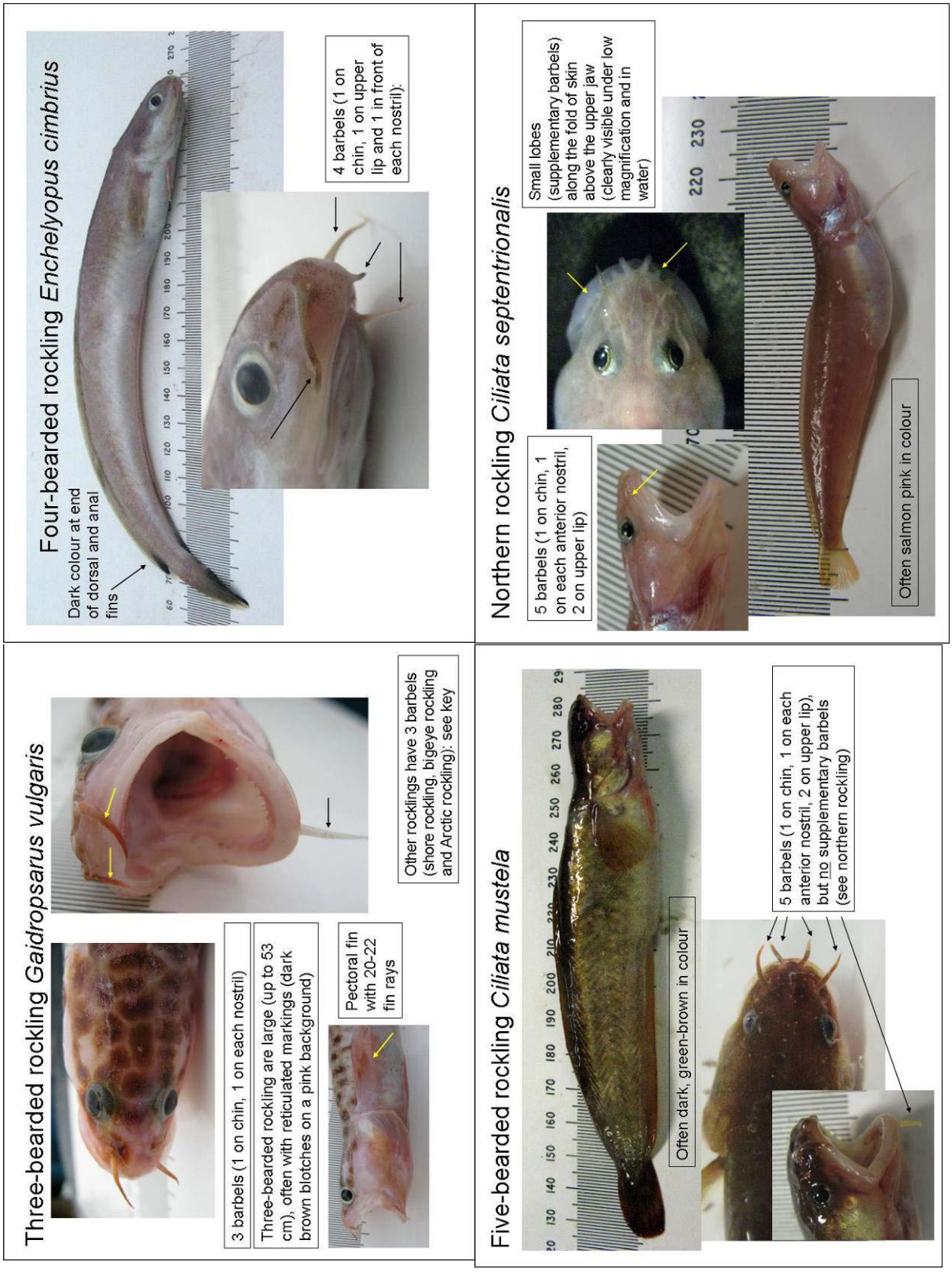


Figure 8.3 (continued): Identification key for rocklings (Gadidae, Lotinae) in the North Sea.

9 Improve quality of historical IBTS data (ToR f)

ToR f) Review national progress in improving quality of historical IBTS data.

The increased use of IBTS data for studies on fish assemblages and diversity has resulted in the requirements for improved data checking to ensure high quality of the data. During the annual IBTSWG meetings, possible errors within the international database DATRAS are discussed (e.g. see Section 8), and the follow up is that each nation checks and if necessary corrects the errors concerning their country before the next Working Group meeting. This section describes the work done per country during the past year to improve the quality of its national data.

9.1 UK (England and Wales)

The errors identified during last year have been correct on the institutes' database but have yet to be uploaded to DATRAS. This year's additional data checks on problematic taxa will be identified and corrected before any further historical data are uploaded to DATRAS.

No age length key data checks have been carried out however; this will be a further priority in the forthcoming year.

9.2 Netherlands

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

The age-data (CA-files) are still in the process of being corrected, which is expected to be finalized in 2009. All corrected data will be uploaded in DATRAS.

9.3 Portugal

Data from the Portuguese groundfish surveys are routinely corrected in the national database held at the IPIMAR and designated by CRUZDEM. The characteristics of the fishing stations are verified, as well as the catch and length frequencies for the target species (hake, horse mackerel, blue whiting, mackerel, Spanish mackerel, megrim, monkfish and *Nephrops*). Additionally, some other species (e.g. elasmobranchs, Norway pout (*Trisopterus luscus*), blue jack mackerel (*Trachurus picturatus*) are also checked for other specific studies or projects. Some species of uncertain identification are returned to the laboratory to ensure correct identification.

At present data for 1997–2008 Autumn surveys are being organized and in process of being integrated in DATRAS database (Haul and Length files). The species that are assessed will be uploaded, e.g. hake, horse mackerel, blue whiting, mackerel, megrims, monkfish and *Nephrops*.

9.4 Denmark

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

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

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

Finally, a training course on maturity staging has been conducted for the participants in the survey.

At DTU-Aqua work on revising/quality ensure the IBTS has been started. Data have been revised in the national database and the data will be re-uploaded to DATRAS in first half of 2009.

9.5 UK (Scotland)

FRS is continuing to develop their Fisheries Management Database. Although recent research vessel survey data are processed within the database, the historical data had been processed under a previous database. A programme of work has been scheduled to upload the historic data (pre 2000) to the new database and in doing so it is envisaged that previously undiscovered data errors will come to light. Any errors discovered will be conveyed to the research vessel coordinator who will formulate a time-scale for re-submitting the corrected data to DATRAS. At this stage, one years (historical) data has been uploaded to the Fisheries Management Database but due to pressure in preparing for Assessment Working Groups, FRS have had to suspend input to this work. It is envisaged that work will resume later this year and will be ongoing over an extended period.

The upload of the Scottish Rockall Survey dataseries to DATRAS has continued and cruise back to 2001 have been screened and entered.

Inconsistencies relating to method of length measurements have been addressed and the quarter 4 (West of Scotland) data back to 2003 have been updated in DATRAS.

FRS will continue to liaise with ICES with regards to the development of a (web based) look up table to indicate the method of measurement for deep-water species.

9.6 France

Problems in the identification of North Sea skates (especially *Amblyraja radiata* and *Raja clavata* in 1998), has not resolved yet and no change was made to the DATRAS files. In the last year there is a national project which aims to store all data from French surveys in a national base. It is planned in 2009, to store gradually, after verification, all the time series data. At the same time, these corrected data will be uploaded to DATRAS.

9.7 Spain

Spanish data from the IBTS Surveys are stored on CAMP database on board, and later transferred to the general IEO Data Base Application SIRENO. Both procedures include data checking and data quality controls through filters implemented in the software tools used, these include:

1) Haul position vs. geographical sector allocation and depths ranges vs. strata allocation,

2) Differences between speeds vs. expected tow distance and positions.

3) Catch weight vs. estimated weight of the sampled length distribution using L-W regressions.

4) Revision of fauna lists per depth strata.

Spanish data uploaded in DATRAS are limited to length distributions by sex and information related with species routinely provided to the assessment Working Groups. Errors detected in the last two years have not been corrected into the data already uploaded in DATRAS. But given that a revised upload of all the data will be required to overcome some problems in the format originally proposed, and detected after the first uploads, the revised upload will include all the corrections detected during the controls performed in the last years.

9.8 Germany

Corrections in the German IBTS data have, as reported in 2008 and up to now, only been implemented into the national database held at the Institute for Sea Fisheries. These changes include both, corrections that have been made using the institute's own quality assurance routines and others that cover several of the issues listed under Section 10 of the 2007 report of IBTSWG (ICES, 2007b). However, these changes have not yet been uploaded to the DATRAS database to change the original data that were submitted to ICES.

9.9 Norway

Corrections based on quality control in the national database at IMR have not been updated to DATRAS. The new species list will be implemented and uploaded when it is ready.

9.10 Sweden

The Swedish IBTS data are still undergoing a series of quality reviews before the resubmission to DATRAS. So far the following data quality checks have been performed

1) Length/weight relationships plotted and outliers identified.

2) Spatial distributions of all species screened and erroneous distributions/species records identified.

Further quality checks will consist in plotting the length distributions for all fish species and identify outliers (e.g. fish < Lmin or > Lmax). These errors may be due to incorrect lengths or species codes.

Sweden is still screening its biological data for Skagerrak and Kattegat relative to the period 1976–1999 therefore this information has not been uploaded to DATRAS at present.

Noteworthy is that all staff members have been trained in species and maturity identification.

9.11 UK (Northern Ireland)

Data for the two Northern Irish groundfish surveys are currently logged and stored on an Oracle database. Certain checks to identify outliers are programmed to be flagged at the data entry stage, which is done on a daily basis at sea. Input ranges for most parameters are set, including tow duration, tow distance, measured species in

relation to length-weight relationships, length frequencies in relation to sample weight. Species identification issues are dealt with by identifying experience staff prior to each survey to ensure standardized species ID. All survey staff also participates in the fish identification tests under the National Marine Biological Analytical Quality Control Scheme (NMBAQC), which provides a source of external quality assurance for laboratories engaged in the production of marine biological data.

The process of data screening and error checking of historical data in the two Northern Irish groundfish survey series is carried out as part of a migration to a new SQL server database. To facilitate the commitment to upload data to DATRAS, this data migration needs to be completed first, but has been slow due to institutional resource problems. Additional resources have been allocated to speed up the data migration and significant progress is expected in 2009.

9.12 Ireland

In 2008 all IBTS Q4 survey data were collected and uploaded directly into a new SQLserver database with the functionality to transfer the relevant data to DATRAS. This will be undertaken as soon as the age data entry within the Marine Institute has been completed and standard checks made. To convert historical IBTS Q4 data to this format a project was undertaken between the Marine Institute and the external database developer on an informal basis. Unfortunately it transpired that the work involved went beyond the scope of what could be achieved within the time and resources available at the time, which had not been envisaged. An alternative solution has now been developed using MI programming resources and is undergoing implementation.

As such, some of the finer checks relating to spatial distribution of species will be reviewed once data migration is complete. As regards other checks, a series of R-code and access queries are implemented during the cruise on a daily basis to flag outliers for all measured species in relation to length-weight, maturity, ratio of sample wt/catch wt for measured sample and recently otolith size in relation to length.

As regards species ID issues, a shortlist of 4–5 staff have been allocated to each of three faunal groups: i) shelf teleosts; ii) elasmobranchs and deep-water teleosts; and, iii) invertebrates. A suitable senior staff member has also been allocated to each of these groups to coordinate and standardize species ID within the team, identify resource and training needs and act as a point of contact. The intended focus being to ensure consistency of ID between staff participating in different survey legs.

10 Implement the outcome of SGSTS (ToR g)

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

This Study Group was set up to develop recommendations and protocols to improve standardization and hence quality assurance in the use and design of survey trawls within and beyond the ICES area.

At the time of the IBTSWG meeting, SGSTS was working on the publication of an additional ICES Cooperative Research Report on GOV standardization, based on the work carried out by SGSTS (ICES, 2007). This CRR is expected to be finalized in 2009. Therefore, the IBTSWG considers it to be more appropriated to wait for the CRR to study the protocols and tools provided, to consider their adoption within the IBTS standard protocols.

10.1 Reference

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

11 Agreed strata in the Eastern Atlantic (ToR h)

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

Historically there have been some difficulties in producing consistent depth stratified survey boundary files due to the lack of a global, reasonably precise, dataset and standard gridding procedure. A recent update to the GEBCO dataset, GEBCO2008, includes a number of national multibeam datasets for the Eastern Atlantic area as well as increasing precision of the grid from 1min to 30 seconds.

This is a freely available and documented dataset, with global coverage. The dataset has been used to make the agreed edits to the depth boundaries for the Irish Groundfish Survey (IGFS) and also made available in a user friendly format to the group.

After review of the overlap area between the IGFS and the Porcupine Survey it was concluded that there is no easy method of merging these two distinct stratification schemes in this area. To achieve complete overlap in strata will require significant changes in area and therefore survey effort for either or both surveys. To ensure indices are not compromised therefore it was felt a more detailed analysis of the affect of adjusting survey coverage or effort would have to be made, as well as the case for doing so at the individual Institute level.

Work will continue intersessionally on extending the current depth stratification scheme north to the UK Scotland survey in VIa.

12 Implementation of the new EU DCR (ToR i)

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

As reported at the IBTSWG in 2008 a Commission Staff Working Paper "Report of the Ad Hoc Meeting of independent experts on Indicators and associated data requirements to measure the affects of fisheries on the marine ecosystem" has been made. This report presented the results that build on the earlier reports of two SGRN meetings (SGRN 05–03, SGRN 06–01) and outputs of EC funded projects Indicators of Environmental Integration (INDENT) and Development of Indicators of the Environmental Performance of the Common Fisheries Policy (INDECO).

These indicators have from 2008 been adopted in the DCR as the module for evaluation of the effects of the fisheries sector on the marine ecosystem (Commission Decision 2008/949/EC). The DCR provides precise specifications for indicators that are considered to be operational to existing data collection procedures as described in the former DCR´s. The DCR with appendices provide a name for the indicator, define the indicator, list the data required for calculation of indicator values. The list of indicators is given in text Table 12.3. No references to specific surveys have been made.

In general the IBTSWG supports the sampling of ecosystem approach indicators as long as the sampling can be done within the limited resources available for the international survey and do not harm the precision by which data has been collected until now. IBTSWG has commented on the indicators in their report of 2008, Section 11.2.

12.1 Collection of biological data

The IBTSWG considered which species they could effectively sample for the collection of additional biological data. Discussion was based on the "List of biological variables with species sampling specification" indicated in the new DCF (Commission decision 2008/949/EC), and information from ICES PGCCDBS in 2009 on species which are not adequately covered in the commercial sampling of Member States. The IBTSWG was able to consider the findings of the relevant Regional Coordination Meetings held in 2008 in determining which species required to be sampled within the coordinated surveys. In determining the species that could be sampled in the IBTS North Sea (ICES Sub-Area IV, ICES Divisions IIIa and VIId), the IBTSWG evaluated the comments of the RCM-NS&EA (Section 3.5.3) and tables relating to intensities for stock sampling on a regional level (Annex 4, Table 1; RCM, 2008). RCM-NS&EA noted that no analyses were performed regarding sampling levels (number of individuals) due to lack of a proper analytical tool for evaluating sampling levels. Such analysis will be performed after the analytical tool prepared by the COST project is released, and will be a matter for future RCMs. With this in mind, the IBTSWG has not set sampling levels but would suggest that in determining national or coordinated targets at species level, the numbers indicated by the RCM can be used as a guide.

It should be noted that in determining the species to be sampled, by area, the IBTSWG tried to identify the species which were not already being covered within other areas of data collection by Member States. It was also clear that many of the species were not encountered within the sampling areas or depth strata covered by IBTSurveys and expect that these will be addressed by Member States through other sampling platforms such as Deep-Water surveys and sampling of commercial catches.

In order to facilitate coordination and reporting of biological data by the IBTSWG it is essential that.

- Biological data are submitted to DATRAS.
- Survey summaries include a table including number of biological samples collected.
- IBTSWG reviews each year the progress being made in collection, particularly where species are reported on tri-annually.
- Regional Coordination Meetings provide appropriate feedback on specific targets.

The list of species to be sampled by countries participating in the IBTS quarter 1 and quarter 3 surveys in the North Sea and Skagerrak areas are indicated in Table 12.1 and Table 12.2 respectively. Where coordination of sampling activities for a particular species in these regions has been highlighted, it is expected that the survey coordinators will develop an appropriate sampling plan and convey this to participating countries in advance of their surveys. The list of species to be sampled in the North East Atlantic and Western Channel is provided in Table 12.3. With IBTS survey area extending over several ICES subdivisions, the relevant areas and stocks for collection has been highlighted. As the coordination of sampling across the entire North East Atlantic and Western Channel could prove problematic it is imperative that each country consider the species and stocks that fall within their survey area and liaise directly with other countries sampling in the same area. Survey coordinators should ensure that these issues are addressed during the planning for coordinated surveys.

Although an indication of the maturity stages to be used and the timing for data collection is indicated on the tables, the IBTSWG is aware that several initiatives are underway to address issues relating to maturity staging of several species (e.g. flatfish, skate and rays, other species). As the relevant groups report on these issues, the IBTSWG will incorporate their findings as soon as is practically possible.

Table 12.1. List of species to be sampled in ICES Division IIIa.

Species (Engl.)	Species (Latin)	S/W/Mat	Mat key	Quarter	action
Witch flounder	*Glyptocephalus cynoglossus*	T	4	1 & 3	Sweden to consider DCF requirements
Plaice	*Pleuronectes platessa*	Y	4	1 & 3	Sweden to consider DCF requirements
Sole	*Solea solea*	Y	4	1 & 3	Sweden to consider DCF requirements
Hake	*Merluccius merluccius*	Y	4	1	Sweden to consider DCF requirements

Table12.2 List of species to be sampled in ICES Subarea IV and Division VIId.

Species (Engl.)	Species (Latin)	S/W/Mat	Mat key	Quarter	Action	RCM numbers
Red gurnard	*Aspitrigla cuculus*	T	4	1 & 3	All IBTS particpants each year	100
Witch flounder	*Glyptocephalus cynoglossus*	T	4	1 & 3	All IBTS particpants each year	100
Ling	*Molva molva*	T	4	1 & 3	All IBTS particpants each year	100
Turbot	*Psetta maxima*	T	4	1 & 3	All IBTS particpants each year	920
Brill	*Scopthalmus rhombus*	T	4	1 & 3	All IBTS particpants each year	920
Sole	*Solea solea*	Y	4	1 & 3	All IBTS particpants each year	5570
Tub gurnard	*Trigla lucerna*	T	4	1 & 3	All IBTS particpants each year	480
John Dory	*Zeus faber*	T	4	1 & 3	All IBTS particpants each year	10
Lemon sole	*Microstomus kitt*	T	4	1 & 3	Survey coordinator to advise	350
Hake	*Merluccius merluccius*	Y	4	1	Survey coordinator to advise	800/550
Flounder	*Platichythys flesus*	T		1 & 3	The Netherlands to coordinate with Denmark and Germany.	450
Striped red mullet	*Mullus surmuletus*	T	4	1	France to cover and coordinate if required.	600/200
Plaice	*Pleuronectes platessa*	Y	4	1 & 3	Scotland to coordinate with the Netherlands.	9550
Spotted ray	*Raja montagui*	T			Continue with national collection. Review after WK outcome	
Cuckoo ray	*Raja naevus*	T			Continue with national collection. Review after WK outcome	
Starry ray	*Raja radiata*	T			Continue with national collection. Review after WK outcome	

Table 12.3 List of species to be sampled in North East Atlantic and Western Channel.

Species (Engl.)	Species (Latin)	Area/Stock	S/W/M	Mat key	Action
Brill	*Scophthalmus rhombus*	V,VI,VII (excl. VIId), VIII, IX,X, XII,XIV	T	4	All IBTS particpants each year
Turbot	*Psetta maxima*	all areas	T	4	All IBTS particpants each year
Conger	*Conger conger*	V,VI,VII (excl. VIId), VIII, IX, XII,XIV	T	4	All IBTS particpants each year
Sea bass	*Dicentrarchus labrax*	V,VI,VII (excl. VIId), VIII, X, XII,XIV	T		All IBTS particpants each year
Sea bass	*Dicentrarchus labrax*	IX	T		All IBTS particpants each year
Pollack	*Pollachius pollachius*	V,VI,VII (excl. VIId), VIII, XII,XIV	T	4	All IBTS particpants each year
Ling	*Molva molva*	V,VI,VII (excl. VIId), VIII, IX,X, XII,XIV	T	4	All IBTS particpants each year
Sea bream	*Pagellus bogaraveo*	IXa, X	T		All IBTS particpants each year
Anglerfish	*Lophius piscatorius*	VIIIc, IXa	Y	4	All IBTS particpants each year
Black-bellied angler	*Lophius budegassa*	VIIIc, IXa	Y	4	All IBTS particpants each year
Hake	*Merluccius merluccius*	IIIa, IV, VI, VII, VIIIab / VIIIc, IXa	Y	4	Collect annually - Coordination required
Megrim	*Lepidorhombus whiffiagonis*	VI/VII, VIIIabd/VIIIc, IXa	Y	4	Collect annually - Coordination required
John Dory	*Zeus faber*	V,VI,VII (excl. VIId), VIII, IX,X, XII,XIV	T	4	Collect 2010 - Coordination required
Spurdog	*Squalus acanthias*	V,VI,VII (excl. VIId), VIII, IX,X, XII,XIV	T		Collect 2010 - Coordination required
Red gurnard	*Aspitrigla cuculus*	V,VI,VII (excl. VIId), VIII, IX,X, XII,XIV	T	4	Collect 2011- Coordination required
Lemon sole	*Limanda limanda*	All areas	T	4	Collect 2011- Coordination required
Blonde ray	*Raja brachyura*	all areas	T		Continue in national collection. Review after WK outcome
Cuckoo ray	*Raja naevus*	all areas	T		Continue in national collection. Review after WK outcome
Other rays and skates	*Rajidae*	V,VI,VII (excl. VIId), VIII, IX,X, XII,XIV	T		Continue in national collection. Review after WK outcome
Spotted ray	*Raja montagui*	all areas	T		Continue in national collection. Review after WK outcome
Thornback ray	*Raja clavata*	all areas	T		Continue in national collection. Review after WK outcome

12.2 References

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

RCM. 2008 Report of the Regional Coordination Meeting for the North Sea and Eastern Arctic (RCM NS&EA) 2008. FRS Marine Laboratory, Aberdeen, Scotland/UK, 17–21 Nov 2008

13 Update of the IBTS manuals (ToR j)

ToR j) Review the IBTS manuals and update as necessary.

13.1 Revision manual IBTS in the North Sea

It was in 2005 that the last update of the North Sea IBTS manual (revision VII) was carried out. There have been a number of issues since then that have been brought to light which have initiated the need to make a new revision. It was decided that England and France would take the lead of the next year to make all the required changes and submit a new draft (Revision VII) to the IBTSWG in 2010. The list below are the main points that are needed to be revised but are by no means exhaustive and any further items that come to light during the revision process will be dealt with accordingly.

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

All work will be done intersessionally and reported to the IBTSWG in advance of next year's meeting.

13.2 Revision manual IBTS in the Western and Southern Areas

The last update of the Western and Southern areas IBTS manual (revision II) was agreed in 2002. Since then there have been numerous changes in several surveys regarding vessels, gears or stratification and there is a need to carry out a deep revision of the manual including all the new information. It was agreed that the revision will cover, not only the changes in the surveys, but also a change in the structure of the manual, that will begin with a general outline of the surveys coordinated within the western and southern divisions by the IBTSWG, then a review of the individual surveys dealing with their particularities. Below there is a draft of the sections that will be covered in the new manual:

- General introduction

    - Short history of the area and revisions of the manual
- Objectives
- Total area and seasons covered
- General trawling procedures including parameters and information collected
- Measuring and biological Sampling
- Environmental parameters
- Draft Survey Description (to be covered individually for each survey)
    - Sampling design nowadays
        Geographical and bathymetric stratification
    - Vessel and gear
    - Technical description of the hauls (variations including gear parameters values and limits)
    - Biological data and sampling protocols with target species
    - Data base storage
    - Survey history (sampling design and data collection improvements)
- References
- Tables
    - Sampling design and strata (shape files)
    - Vessels and gears
    - Description of processing protocols
    - Target species (including ALKs expertise)
    - Specification of minimum levels of sampling of otoliths, illicia and spines by country/survey
- Figures
    - Total area with surveys distribution
    - Depth stratification
    - Individual geographic stratification
    - Gears

The possibility of using the IBTSWG Sharepoint to coordinate the new manuals intersessionally will be explored. Spain (IEO) has agreed to coordinate the revision of the manual and will produce a complete draft of a survey that will be discussed and used as template for the rest of the surveys.

14 Other business

14.1 Extended index area of North Sea cod - request WKROUND

The Benchmark and Data Compilation Workshop for Roundfish (WKROUND) met in January 2009 in Copenhagen, Denmark. WKROUND compared the standard IBTS indices for North Sea cod IBTSQ1 and IBTSQ3 with extended area indices (see Figure 14.1.1; ICES, 2009). The largest changes in abundance were observed at the younger ages, particularly for age 0 in IBTSQ3 (not used in the assessment). Residual plots indicated a slight improvement in fit for the extended indices run compared to the standard indices run. Given the improved fit for the extended indices and other benefits of using these indices (such as better coverage of the stock distribution area) the group recommended that it would be beneficial for North Sea cod to use the extended indices in future assessments. This means that the WGNSSK would like to work on the basis of the extended indices from their next meeting onwards.

The IBTSWG was asked by ICES to assure the appropriateness of the newly included rectangles on the basis of the survey coverage and the length of time-series available. The issue was raised and the Working Group responded by correspondence to ICEs and the Stock coordinator of North Sea cod as follows:

- For the Q1 index the IBTSWG does not foresee problems, except with rectangle 46F9, since it hasn't been sampled in the past and it cannot be sampled in future due to the large bottom depth in the rectangle.
- The IBTSWG has more difficulties with the area covered related to the Q3-index, since several rectangles have not been not sampled in the past according to the sampling program, i.e. 46F9 (Skagerrak), 37F8, 38F8, 39F8 (German Bight), and 35F0, 33F2, 31F1, 31F2 (Southern North Sea). Chances to start covering these rectangles are very (!) slim due to budget constraints, especially since one country (Norway) is likely cutting back from the Q3 IBTS (at least in 2009), therefore the current area has to be covered with 1 country less.

14.1.1 References

ICES. 2009. Report of the Benchmark and Data Compilation Workshop for Roundfish (WKROUND), 16–23 January 2009, Copenhagen, Denmark. ICES CM 2009/ACOM:32. 259 pp.

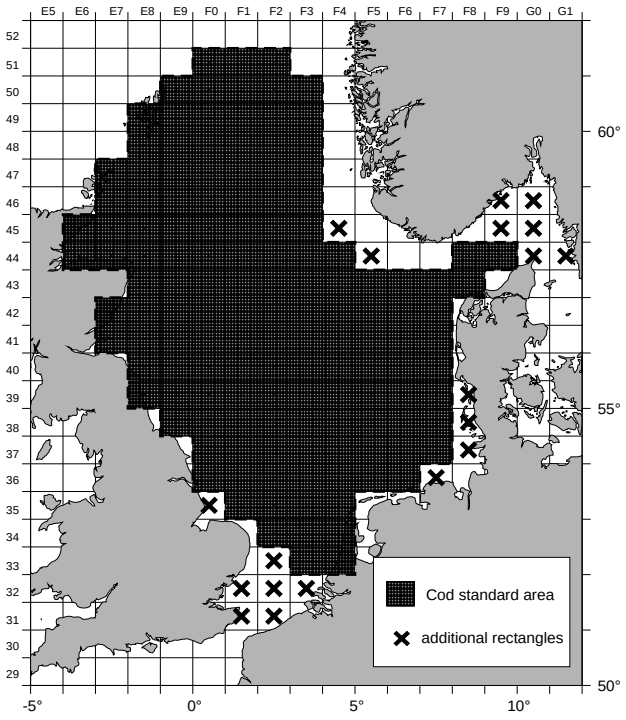


Figure 14.1.1. Extension of cod standard area used for the revision of IBTS indices.

14.2 Suppressed surveys from DCR – effects on biological data and stock analysis

The new DCR implemented in 2009 (Commission Decision - multiannual Community programme pursuant to Council Regulation (EC) No 199/2008 - EC REG 949/2008, 23.12.2008) in the Appendix IX - List of research surveys at sea, have excluded several surveys from funding.

14.2.1 Portuguese Winter Groundfish Survey (IPIMAR, Portugal)

The Portuguese Winter Groundfish (Groundfish Survey for Hake) started in 2005 and was carried out until 2008, during the hake spawning season and the main objectives are to estimate the distribution and abundance indices of hake, as well as to collect some biological parameters such as maturity, sex-ratio, weight, food habits, and length and/or age compositions and provide maturity data required for DCR for other important species such as horse mackerel, megrim, mackerel, blue whiting and anglers .

Data have been used to map the geographical distribution of mature hake, estimate the maturity ogive for Southern Stock of hake and monitor the abundance of spawning-stock biomass. This survey should also provide an important input to the assessment of the Southern hake as a tuning fleet and also for the assessment of southern anglerfish and megrims, horse mackerel, mackerel and blue whiting. It is also the most suitable survey to provide data for ecosystem indicators in Portuguese continental waters.

The suppression of this survey for funding in the spawning season will not allow collection of the maturity data required by DCR and will not provide estimates of abundance indices of spawning-stock biomass for the southern hake which is under a recovery plan.

14.2.2 Irish Sea Q1 and Q3 groundfish surveys (AFBI, UK (Northern Ireland))

The Northern Ireland surveys (NIGFS) have been carried out in March and October since 1992. Details of the survey area, season, sampling design and gear used, have been included in the "Manual for the International Bottom Trawl Surveys in the Western and Southern areas", since 2002. The main objectives of the surveys are to obtain information on spatial patterns of abundance of different size- and age-classes of demersal fish in the Irish Sea and to obtain abundance indices of cod, whiting, haddock, plaice and herring for use at ICES assessment Working Groups. Biological information is also collected on the target species. The surveys also serves as a sampling platform to collect additional information as required under the data collection regulation. The ICES Working Group on the Assessment of Northern Shelf Demersal Stocks (WGNSDS) has become increasingly dependent on the use of the NIGFS surveys in recent years for the assessment of a number of species. It should be highlighted that currently the surveys forms the main basis of management advice for gadoid stocks in Division VIIa and target a species that is under an EC Recovery Plan.

The NIGFS spring (quarter 1) and autumn (quarter 4) surveys, conducted by AFBI, have been officially coordinated under the remit of the IBTSWG since 2007 (IBTSWG 2007). Since then AFBI has conducted an intercalibration survey with Cefas in 2008 and an additional intercalibration exercise is scheduled for 2009. Similar to other IBTSWG participants, AFBI is committed to uploading the survey datasets to DATRAS and adhere to the set quality control protocols.

14.2.3 North Sea IBTS Q3 survey (IMR, Norway)

Institute of Marine Research in Norway have cut funding from the IBTS Q3 survey in the North Sea where Norway has been participating in this survey since 1999. The effect of excluding the Norway data on the IBTS Q3 indices has been investigated by Parker-Humphreys (working document, this report) and the conclusion from the analysis is that the effect will be a reduced abundance levels for most species, but the trends should largely be the same.

The Norwegian survey is very important for the saithe catches in the survey, and can take 100 % of the catch in one area. Taking out the Norwegian data will also considerably change the results for cod.

It is difficult for the other institutes to expand their surveys to cover up for the Norwegian survey.

14.2.4 Recommendation

The IBTSWG agrees that all surveys mentioned above have been included under the remit of the working group in the past and is willing to coordinate these surveys. The IBTSWG recommends that all surveys should be reinstated, since they provide vital information to the assessment process and meet all the original eligibility criteria for DCF funding that was set out by the SGRN 07–01 review.

14.3 Collection, recording and reporting of Benthic data on IBTS surveys

For some years now many countries participating in IBTS coordinated surveys have been sampling and collecting data on a multitude of benthic organisms encountered during these surveys.

Sampling of benthos has largely been undertaken by using the GOV trawl as the sampling tool, although some countries have also used beam trawls and grabs suit-

able for the collection of benthic material. It has been recognized that the GOV may not be a suitable sampling tool to appropriately sample benthic material.

The table below appeared in WGIBTS report in 2005 and details the countries and surveys that collect benthic data, the level of identification applied and also the degree to which it is reported.

Table 14.3.1. Indication of the current sampling levels for fish, shellfish and non-commercial invertebrates by country (1 = Identification to species level and reported to ICES database; 2 = identification to species level and recorded on local/national database; 3 = Identification to family/genus level and reported to ICES database; 4 = identification to family/genus level and recorded on local/national database).

Country	Survey	Fish	Commercial Shellfish	Cephalopods	Benthos
UK(Scotland)	IBTS – Q1	1	1	2	4
UK(Scotland)	IBTS – Q3	1	1	2	4
UK(Scotland)	Western Q1	1	1	2	4
UK(Scotland)	Western Q4	1	1	2	4
France	Western Q4	1	1	2	-
Portugal	Western Q4	2	2	2	-
Netherlands	IBTS - Q1	1	1	2	2
Germany	IBTS – Q1	1	1	2	-
Germany	IBTS – Q3	1	1	2	-
UK(England)	IBTS – Q3	1	1	2	2/4
UK(England)	Western Q4	2	2	2	2/4
Ireland	IGFS-Q4	1	1	1	4
Spain	Sp-Porc	2	2	2	2/4
Spain	Sp-North	2	2	2	2
Spain	Sp-G.Cadiz	2	2	2	2/4
Denmark	IBTS - Q1	1	1	3	-
Denmark	IBTS – Q3	1	1	3	-
Sweden	IBTS - Q1	1	1	2	2/4
Sweden	IBTS – Q3	1	1	2	2/4
Norway	IBTS – Q1	1	1	1/3	-
Norway	IBTS – Q3	1	1	1/3	-

From the above table it can be noted that at this stage (2005) no participating country was reporting benthic data to ICES databases. This data were being stored internally at a local or national level.

Although standardized data collection for fish is well established in IBTS protocol, it is only since 2007 that there has been a recognized standardized approach to the submission of data on the catch and size distribution of cephalopods and shellfish.

The IBTSWG agreed that species listed in Table 6.4.1 in the IBTSWG-report of 2007 should be recorded in all IBTS surveys and the data should be submitted to the DATRAS database. This data collection was implemented from 2008 onwards. However, some countries have not submitted to DATRAS data collected on the species in question and they are reminded that they should now do so.

Although at present there is not a requirement from the IBTSWG, some national laboratories record other invertebrate species (benthos), though no agreed protocols for

the collection and submission of data exists. The IBTSWG is of the opinion that this is not a coordinated activity but recognizes that some national laboratories collecting additional information on benthos may wish to continue to do so if internal demands and local users deem this necessary. However, such data should not be reported to DATRAS until rigorous quality assurance and reporting procedures are in place and have been approved by IBTSWG, so as to ensure that data are of high quality.

14.4 Nominations for a new Chair

Remment ter Hofstede has served as Chair for the period of three years and a new Chair will be designated in October 2009. Five members were nominated for the vacant post, and four accepted their nomination. A vote was held and Dave Stokes from Ireland was selected as the Group's preferred choice for new Chair. This selection will be presented to SCICOM for ratification during the ICES Annual Science Conference in September 2009.

Annex 1: List of participants

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Annex 2: IBTSWG terms of reference for the next meeting

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

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

ToR	Lead	tor	lead
A	Spain, England, Netherlands	E	England, Netherlands, Germany, Portugal
B	Ireland, Northern Ireland	F	DATRAS, England, Ireland
C	Sweden, England, Norway	G	Scotland
D	England, Germany, Portugal	H	Spain, England, France, Portugal

The **International Bottom Trawl Survey Working Group** [IBTSWG] (proposed Chair: Dave Stokes*, Ireland) will meet in Lisbon, Portugal, from 22 March – 26 March 2010 to:

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

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

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

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

e) improve the quality of newly collected biological data by (i) the production and dissemination of identification keys, (ii) the examination of DATRAS data collected during Q3–4 2009/Q1 2010 surveys to identify and correct erroneous HL- and CA-records;

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

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

h) revise the IBTS manuals intersessionally and agree.

Supporting Information

Priority:	Essential.

Scientific justification and relation to action plan:	The general need for monitoring fish abundance using surveys is evident in relation to fish stock assessments and in biodiversity studies. The meeting is based on the following needs: a) This is a core function of the IBTSWG. It is an important forum for coordination and evaluation of standardized bottom-trawl surveys in the Eastern Atlantic Area, to ensure good survey coverage in relation to stocks and areas, intercalibration work, and high quality of data. The IBTSWG provides a brief, structured overview of the main results and difficulties from individual vessel surveys annually, and thereby a centralized and easily accessible overview of specific survey datasets, to those using the data. IBTSWG will continue to review feedback and implement modifications, inlcuding new requirements of the EU DCR. b) In order to achieve the required level of quality in survey data, there is a demand for the evaluation and control of indices. c) The standardized gear settings seem to differ among countries, therefore reporting protocols for trawl, vessel and environmental parameters have to be improved and detected changes in the settings have to be evaluated. d) and e) Errors in the DATRAS database should be detected and corrected and protocols for the prevention of future errors should be developed and implemented. f) The development of DATRAS needs to be evaluated annually. IBTSWG will recommend on desired further developments. g) Aspects of quality in survey design, sampling strategies and analysis of data are of prime importance for IBTSWG. Many aspects of trawl standardization and intercalibration being examined by SGSTS are pertinent to IBTS and review of recommendations is essential. h) All changes in the protocols of the surveys coordinated by the IBTSWG have to be implemented in the IBTS manuals.
Resource requirements:	A five day IBTS meeting. Pre-prepared documents from members. Eight days Chair's time to edit. It is estimated that each ToR will require at least 8 hours pre-preparation
Participants:	All members will participate in all ToRs, although leads for each ToR are allocated. It would be highly beneficial to have the person responsible for the ICES DATRAS participating for some days.
Secretariat facilities:	None
Financial:	None
Linkages to advisory committees:	ACOM
Linkages to other committees or groups:	Assessment WG's, WGBEAM, WGBIFS h) Cooperation with SGSTS
Linkages to other organizations:	IOC, GOOS
Secretariat marginal cost share:	ICES: 100%

Annex 3: Recommendations

RECOMMENDATION	ACTION
1. DATRAS User Group – Section 3.6 The IBTSWG recommends the establishment of a DATRAS User Group to evaluate the functionality of the DATRAS database, to provide feedback by data submitters and data users, to suggest updates of the system where needed, and to prioritize future developments.	ICES Datacenter
2. Maturity staging of 4 gadoid species – Section 3.7 Following the implementation of the collection of maturity data on cod, haddock, whiting and saithe using the new 6 stage scale since 2009 onwards: i) The IBTSWG identified shortcomings of DATRAS for users to recognize whether a 4- or 6-stage maturity scale has been used. Therefore, the IBTSWG recommends to continue reporting the collection by a 4 stage maturity scale as it is now (-9, 1, 2, 3, 4) and to report the collection by a 6 stage maturity scale using new values, namely -9, 61, 62, 63, 64, 65, 66; ii) All IBTS Q1 participants are strongly recommended to implement the use of the 6 stage maturity scale from 2010 onwards .	i) ICES Datacenter, ii) All national institutes
3. CGFS indices – Section 3.8 The IBTSWG recommends that use of the CGFSurvey for accommodating assesment working groups with abundance indices of several species should be further investigated to determine whether the design of CGFS is suitable for supplying robust stock indices.	IFREMER
4. Flagging of data - Sections 4.1.1, 4.2.1, and 7.2 Non-standard gear deployment was performed by Denmark in NS-Q1 2009 (Section 4.1.1) and NS-Q1 2008 (Section 4.2.1), and by England in NS-Q3 2007 (Section 7.2), therefore, the IBTSWG recommends that the stations in question are flagged in Datras as “non standard”.	ICES Datacenter
5. IBTS North Sea Q1 and Q3 coordination – Sections 4.1.5, 4.2.5. In order to guarantee good overlap in the timing of the surveys, the IBTSWG recommends that all countries make every effort to perform most of their survey time during the specified target month, i.e. February for the Q1 survey and August for the Q3 survey.	North Sea IBTS Q1 and Q3 participants.
6. IBTS North Sea Q3, participantion of Norway – Section 4.2.6 and 14.2 The IBTSWG encourages Norway to continue their participation in the North Sea IBTS Q3.	IMR Norway
7. Submission of gear parameter data in DATRAS – Section 6. Explorations of the available gear data in DATRAS revealed that there are too many empty fields in the database. All countries need to check whether they have submitted their gear parameter data.	All national institutes
8. Data quality – Section 8. i) All national institutes should examine the potential errors reported in Section 8, correct their national data where appropriate, submit the corrected data to DATRAS, and report progress to IBTSWG in 2010. ii) All IBTS pay particular attention to the identification of dragonets and flatfish so that contemporary data can act as a suitable baseline with which to compare historical data.	All national institutes
9. Biological sampling of additional species – Section 12 The IBTSWG recommends that all national institutes implement the biological sampling of additional species according to the sampling design given in Section 12.	Survey coordinators and all national institutes

10. Suppression of surveys The Portugese Winter Groundfish Survey and the Irish Q1 and Q3 Groundfish Surveys have excluded from funding by the EU. The IBTSWG recommends that these surveys should be reinstated and asks RCM-NEA for its approval.	RCM-NEA
11. Reporting of non-fish species The IBTSWG recommends that all national institutes will report the catches of the non-fish species given in Table 6.4.1 in the IBTSWG report 2007 from 2008 onwards.	All national institutes

Annex 4: Data Quality

Table A4.8.5. Species recorded in the DATRAS database (North Sea, 1997–2008 inclusive, data extracted on 9 February 2009).

Species	Number of records submitted	Raised numbers	Measured numbers	Comments	Actions
Lampetra fluviatilis	21	62	39		
Petromyzon marinus	40	132	72		
Petromyzon spp	3	5	5	There is only one species of Petromyzon in area (P. marinus), or are they unidentified lampreys (Petromyzonidae)	England
Myxine glutinosa	3421	433463	27630		
Galeus melastomus	30	257	59		
Scyliorhinus canicula	4790	160424	12681		
Scyliorhinus stellaris	3	10	6		
Galeorhinus galeus	101	1611	219		
Mustelus asterias	633	16062	1563	Uncertainty regarding the taxonomy. Recommend that analyses combine the two species.	All IBTS nations
Mustelus mustelus	171	1728	391		
Squalus acanthias	1134	57637	4099		
Somniosus microcephalus	2	4	4		
Etmopterus spinax	19	152	42		
Amblyraja radiata	11909	263989	29476		
Dipterus (Raja) linteus	1	2	2		
Dipturus (Raja) batis	24	60	50		
Dipturus (Raja) oxyrinchus	2	4	4		
Leucoraja circularis	9	30	18		
Leucoraja fullonica	16	37	29		
Leucoraja naevus	1298	8672	2623		
Raja brachyura	85	759	136		
Raja clavata	1114	33270	2483		
Raja montagui	810	10257	1750		
Rajidae	3	6	6		
Chimaera monstrosa	130	1157	287		
Acipenser sturio	1	20	0	Not measured, probably input error	England
Anguilla anguilla	216	5402	500		

Species	Number of records submitted	Raised numbers	Measured numbers	Comments	Actions
Anguillidae	55	2578	146	Should not use this code. Only one Anguilla in area, or is it Anguilliformes?	England
Conger conger	4	6	6		
Alosa agone	162	1266	326	Freshwater species, unlikely to be in area!	Denmark, France, Netherlands, Sweden
Alosa alosa	59	1575	355		
Alosa fallax	559	43788	7021		
Clupea harengus	97627	610022957	34858044		
Sardina pilchardus	1105	845358	100212		
Sprattus sprattus	37410	344330443	31848629		
Clupeidae	16	6456	807		
Engraulis encrasicolus	3254	1267099	202408		
Argentina silus	1684	337916	31823	Uncertainty regarding the taxonomy. Recommend that analyses use combined data	All IBTS nations
Argentina sphyraena	8235	1340337	131125		
Argentinidae	2549	262972	20228		
Osmerus eperlanus	45	22006	2058	Need to ensure correct identification for 'smelt' Osmerus sperlanus and 'sand smelt' Atherina presbyter	UK
Salmo trutta	6	10	10		
Salmo spp	4	7	7		
Maurolicus muelleri	881	68989	23526		
Lophius budegassa	11	20	16		
Lophius piscatorius	2692	15204	5410		
Lophiidae	2	8	4		
Arctozenus risso (Notolepis rissoi)	1	2	2	Single, strange record (2004), should be checked	Norway
Gadiculus argenteus	2075	498881	83914		
Gadus morhua	49017	9847031	400452		
Melanogrammus aeglefinus	98380	195223586	8539703		
Merlangius merlangus	118515	219612341	12619689		
Micromesistius poutassou	4497	13417844	908267		
Pollachius pollachius	456	18925	1318		
Pollachius virens	16280	3662231	176269		

Species	Number of records submitted	Raised numbers	Measured numbers	Comments	Actions
Phycis blennoides	15	41	31		
Raniceps raninus	14	25	23		
Trisopterus esmarki	29825	184585230	22469818		
Trisopterus luscus	1493	211757	25887		
Trisopterus minutus	10489	2046758	233507		
Ciliata mustela	431	7007	1222		
Ciliata septentrionalis	38	274	78		
Enchelyopus cimbrius	7444	325272	36043		
Gaidropsarus argentatus	2	8	4	Strange record, should be checked	Norway
Gaidropsarus spp	1	2	2		
Gaidropsarus vulgaris	142	8170	784		
Brosme brosme	277	1886	605		
Molva dypterygia	1	2	2		
Molva molva	1668	30742	3533		
Merluccius merluccius	8966	360306	30777		
Coryphaenoides rupestris	3	6	6		
Ophidion barbatum	1	1	1		
Echiodon drummondi	63	929	231		
Belone belone	44	594	92		
Atherina presbyter	4	21	21	Need to ensure correct identification for 'smelt' Osmerus sperlanus and 'sand smelt' Atherina presbyter	UK
Zeus faber	307	1572	559		
Zenopsis ocellata	6	12	12	(1) Zenopsis conchifer is valid name; (2) Seems to occur too far north.	Denmark
Zeiformes	4	12	8	Zeiformes should be identified to species!	Norway
Capros aper	31	90	62		
Caproidae	3	6	6	Boarfish should be identified to species	Norway
Gasterosteus aculeatus	196	3517	1494		
Spinachia spinachia	56	5748	1906		
Entelurus aequoreus	3822	84454	9708		
Nerophis ophidion	28	127	63		
Syngnathus acus	151	1917	617		
Syngnathus rostellatus	375	8737	1226		
Syngnathus typhle	22	72	47		

Species	Number of records submitted	Raised numbers	Measured numbers	Comments	Actions
Syngnthidae	278	7403	1679	Consider separating codes for pipefish and seahorses?	All IBTS nations
Helicolenus dactylopterus	245	6023	1087		
Sebastes marinus	1	1	1		
Sebastes spp	37	831	123		
Sebastes viviparus	572	29182	3309		
Aspitrigla cuculus	1363	68376	6117		
Eutrigla gurnardus	70542	26733582	1505934		
Trigla lucerna	1049	11709	2361		
Trigloporus lastoviza	3	7	7		
Artediellus atlanticus	1	2	2		
Micrenophrys lilljeborgi	10	28	20		
Myoxocephalus scorpius	3040	97373	11497		
Myoxocephalus spp	63	5458	420	Consider changing to Cottidae	France
Taurulus bubalis	470	25833	2597		
Triglops murrayi	27	117	55		
Triglops pingeli	2	4	4		
Triglopsis quadricornis	12	750	70		
Cottidae	3	18	6		
Cottunculus microps	5	50	10		
Agonus cataphractus	3365	145830	21382		
Leptagonus decagonus	2	11	11	Northern species, record should be checked	Norway
Cyclopterus lumpus	875	4473	1776		
Liparis liparis	444	9495	2044	Uncertainty regarding the taxonomy. Recommend that analyses use combined data	All IBTS nations
Liparis montagui	53	591	158		
Liparis spp	11	126	34		
Dicentrarchus labrax	38	102	69		
Dicentrarchus spp	1	2	2	Only one species in North Sea. Change to Dicentrarchus labrax	England
Percichthyidae	3	10	6	Too vague to be useful. Is it a bass or a wreckfish?	France
Trachurus trachurus	16877	354182134	3004741		
Brama brama	1	2	2		
Spondyliosoma cantharus	16	102	38		
Mullus barbatus	169	4708	745	Mullus surmuletus?	Denmark, Scotland

Species	Number of records submitted	Raised numbers	Measured numbers	Comments	Actions
Mullus surmuletus	2070	57113	9997		
Chelon labrosus	2	12	6	Uncertainty regarding the identifications. Recommend that analyses treat grey mullets at the Family level. Records of M. cephalus should be checked.	Denmark, England
Liza aurata	6	14	6		
Liza ramada	2	4	2		
Mugil cephalus	3	5	5		
Mugilidae	3	10	6		
Centrolabrus exoletus	1	2	2		
Ctenolabrus rupestris	20	102	46		
Labrus bergylta	4	8	8		
Labrus mixtus	1	1	1		
Symphodus melops	7	20	20		
Lycenchelys sarsi	305	7751	1044		
Lycodes gracilis	10	294	55		
Lycodes vahlii	2337	393006	35068		
Zoarces viviparus	86	2539	405		
Zoarcidae	3	10	6		
Lumpenus lampretaeformis	3567	546973	44195		
Leptoclinus maculatus	20	158	46		
Stichaeidae	2	30	30		
Pholis gunnellus	268	4690	878		
Anarhichas lupus	366	1412	732		
Anarhichas minor	7	30	14		
Blenniidae	1	2	2	These should be identified to species-level	France
Ammodytes marinus	1112	1090609	105168	Uncertainty regarding the identifications. Recommend that analyses treat sandeels at the Genus or Family level.	
Ammodytes tobianus	441	308763	35923		
Ammodytes spp	605	441971	64541		
Gymnammodytes semisquamatus	109	291895	37426		
Hyperoplus immaculatus	187	13863	1118		
Hyperoplus lanceolatus	4318	1611381	175862		
Hyperoplus spp	18	906	137		
Ammodytidae	972	2562199	358631		
Callionymus lyra	10178	239123	38991		
Callionymus maculatus	4880	277194	40615		
Callionymus reticulatus	359	3284	809		
Callionymidae	125	2736	723		
Echiichthys vipera	4963	1577169	206044		
Trachinus draco	1637	514538	32333		
Aphia minuta	50	1324	139		
Crystallogobius linearis	32	305	150		

Species	Number of records submitted	Raised numbers	Measured numbers	Comments	Actions
Gobius cobitis	1	2	2		
Gobius niger	67	997	216		
Gobius spp	21	182	56		
Lesuerigobius	6	30	22	Only one species of this genus in area	Sweden (corrected and to be resubmitted)
Lesuerigobius friesii	159	2000	725		
Pomatoschistus microps	12	180	84		
Pomatoschistus minutus	636	142193	28467		
Pomatoschistus pictus	10	242	15		
Pomatoschistus spp	678	78356	17613		
Gobiidae	596	33862	8039		
Scomber scombrus	18906	13233218	1222916		
Thunnus thynnus	1	2	2	Strange record, should be checked	Sweden (corrected and to be resubmitted)
Lepidorhombus boscii	15	188	17		
Lepidorhombus whiffiagonis	3476	76734	9413		
Psetta maxima	711	1962	1264		
Scophthalmus rhombus	829	6853	1815		
Phrynorhombus norvegius	88	486	246		
Zeugopterus punctatus	111	876	332		
Arnoglossus imperialis	24	81	49		
Arnoglossus laterna	3434	72279	15073		
Arnoglossus	4	20	8	Labs should be encouraged to report to species level	France
Bothidae	6	28	16	Should be to species level	Denmark
Glyptocephalus cynoglossus	4535	171661	15257		
Hippoglossoides platessoides	64645	24360160	1831256		
Hippoglossus hippoglossus	209	486	378		
Limanda limanda	105882	91425832	5983246		
Microstomus kitt	32478	1820446	167575		
Platichthys flesus	6141	663232	40191		
Pleuronectes platessa	52174	5592814	366900		
Buglossidium	1	4	4	Should be to species level	France
Buglossidium luteum	5860	435747	73947	Species hardly reported before 1990 Misidentification as *Solea solea*?	All countries

Species	Number of records submitted	Raised numbers	Measured numbers	Comments	Actions
Microchirus variegatus	216	2810	590	Species hardly reported by some countries. Check for possible misidentification as Buglossidium luteum	
Pegusa (solea) lascaris	6	23	11		
Solea solea	2611	54917	7367		
Homarus gammarus	76	285	77		
Nephrops norvegicus	2753	217226	9097		
Lithodes maja	127	357	153		
Cancer pagurus	541	2520	606		
Pycnogonum littorale	1	0	0	Why do we have one isolated record?	UK
Arctica islandica	1	1	1	Only few records. IBTSWG should ensure consistency in reporting.	Denmark
Aequipecten opercularis	23	752	57	Are they recorded consistently?	Only Denmark and Scotland report data
Pecten maximus	25	430	72	Are they recorded consistently?	Only Denmark and Scotland report data
Sepia officinalis	4	8	2		
Sepiidae	21	83	0	Need to be clear between Sepiidae and Sepiolidae	England
Sepietta oweniana	64	295	116		
Sepiola atlantica	39	217	89		
Rossia macrosoma	18	26	19		
Alloteuthis subulata	411	84656	8541		
Loligo forbesi	1800	125506	13224		
Loligo vulgaris	41	130	45		
Loligo spp	2	4	2	Should be reported as Loliginidae	Germany
Loliginidae	4	292	73		
Todaropsis eblanae	131	320	139		
Illex coindetii	12	12	12	Confusion between these two species likely	All IBTS nations
Illex illecebrosus	10	23	13		
Teuthida	11	32	14		
Eledone cirrhosa	5	5	5		
Octopus vulgaris	2	1	1	Due to variable body shape, length measurements for this species can only to be considered as a rough proxy.	

Species	Number of records submitted	Raised numbers	Measured numbers	Comments	Actions
Octopodidae	1	1	0	Probably Eledone	England
Cephalopoda	55	197	72	Should not be used. Report to family level as a minimum	Denmark, Germany

Table A4.8.6. Comments on the length–frequency distributions from DATRAS data (species with two rows of data have two taxonomic codes used in the DATRAS database. Data for North Sea, 1997–2008 inclusive, and were extracted on 9 February 2009).

Latin name	Minimum length (cm)	Maximum length (cm)	Comment	
Homarus gammarus	3.5	17.1	Capture of such small sizes individuals should be checked	Denmark (2007)
Nephrops norvegicus	1.1	62	Error in length type (cm v mm)	England (2008), Germany
Lithodes maja	1.4	153	Error in length type (cm v mm)	Germany
Cancer pagurus	1.6	23		
Pecten maximus	4.5	15.3		
Aequipecten opercularis	5.4	10		
Arctica islandica	7.5	7.5		
Rossia macrosoma	4	4	Due to variable body shape, length measurements for this species can only to be considered as a rough proxy.	
Rossia macrosoma	1	6		
Sepiola atlantica	1.2	7		
Sepietta oweniana	1	4.4		
Sepia officinalis	8.5	9.5		
Alloteuthis subulata	1	31		
Loligo forbesi	1	53	Smaller individuals may not have been identified accurately	
Loligo vulgaris	1.8	32	Smaller individuals may not have been identified accurately	
Loligo spp	1.5	1.8		
Loliginidae	2	5		
Illex illecebrosus	8	16		
Illex coindetii	5	31.2		
Todaropsis eblanae	3.8	41		
Teuthida	5	18.5		
Octopus vulgaris	1.5	1.5	Due to variable body	

Latin name	Minimum length (cm)	Maximum length (cm)	Comment	
Eledone cirrhosa	4	15	shape, length measurements for this species can only to be considered as a rough proxy.	
Cephalopoda	3	32		
Lampetra fluviatilis	26	39		
Petromyzon spp	27	36		
Petromyzon marinus	14	80		
Myxine glutinosa	8	50		
Galeus melastomus	15	68		
Scyliorhinus canicula	8	84		
Scyliorhinus stellaris	44	69		
Galeorhinus galeus	32	160		
Mustelus mustelus	38	75		
Mustelus asterias	24	151		
Mustelus mustelus	3	151	<Lmin	Denmark (2001)
Somniosus microcephalus	137	155		
Squalus acanthias	21	128	One specimen > L max	France (1997)
Etmopterus spinax	25	41		
Rajidae	48	64		
Amblyraja radiata	10	67		
Dipturus (raja) batis	36	206		
Leucoraja circularis	12	96	Check 12-cm entry (also for species id)	Denmark (2008)
Leucoraja fullonica	36	96		
Dipterus (raja) linteus	46	46		
Leucoraja naevus	9	90	One specimen > L max	Denmark (2000)
Dipturus (raja) oxyrinchus	25	50		
Amblyraja radiata	5	82		
Raja brachyura	12	90		
Raja montagui	12	81		
Leucoraja fullonica	96	96		
Leucoraja naevus	57	64		
Raja clavata	3	97	Some specimens at 3 and 4cm (< Lbirth)	France (2003)

Latin name	Minimum length (cm)	Maximum length (cm)	Comment	
Chimaera monstrosa	11	92	Is there a standard length measurement?	
Anguillidae	29	73		
Anguilla anguilla	25	81		
Conger conger	57	102		
Clupeidae	2.5	7.5		
Alosa agone	6	46		
Alosa alosa	9	69	One large specimen, probably correct but ought to checked	Denmark (2000)
Alosa fallax	4	110	Larger individuals to be checked	France (1999)
Clupea harengus	0.5	38	Smaller fish to be checked	
Sprattus sprattus	0.5	24.5	Smaller fish to be checked	
Sardina pilchardus	1	29		
Engraulis encrasicolus	3	135	Error in length type (cm v mm) for largest entries 135, 120, 80 cm	France (2003, 2005)
Salmo spp	56	56		
Salmo spp	60	72		
Salmo trutta	31	65		
Osmerus eperlanus	4	19		
Argentinidae	3	28		
Argentinidae	5	25		
Argentina silus	4	69	Check 69-cm entry	Norway (2003)
Argentina sphyraena	3	28		
Maurolicus muelleri	3	9		
Arctozenus risso (Notolepis rissoi)	33	33		
Lophiidae	7	8		
Lophius piscatorius	4	140		
Lophius budegassa	9	61		
Gadus morhua	3	140		
Pollachius virens	8	118		
Pollachius pollachius	16	88		
Brosme brosme	15	76		
Melanogrammus aeglefinus	3	74		
Enchelyopus cimbrius	4	41		

Latin name	Minimum length (cm)	Maximum length (cm)	Comment	
Phycis blennoides	15	47		
Trisopterus minutus	3	30		
Trisopterus luscus	2	38		
Trisopterus esmarki	3	31		
Merlangius merlangus	3	69		
Molva molva	9	150		
Molva dypterygia	37	37		
Gaidropsarus vulgaris	6	46		
Gaidropsarus argentatus	23	25		
Gaidropsarus spp	17	17		
Gadiculus argenteus	3	20		
Micromesistius poutassou	8	41		
Raniceps raninus	5	15		
Ciliata mustela	4	27		
Ciliata mustela	6	24		
Ciliata septentrionalis	6	14		
Merluccius merluccius	4	113		
Ophidion barbatum	33	33		
Echiodon drummondi	16	42		
Zoarcidae	17	73		
Lycenchelys sarsi	7	19	Lot of large specimens in 2008	Sweden (2008) comment: In 2008 6 individuals were caught and they were between 14 and 17 cm which do not seem to be outside the normal interval nor bigger than the past
Lycodes vahlii	6	56	Check 56-cm entry	Norway (2006)
Zoarces viviparous	9	27		
Coryphaenoides rupestris	38	43	Is there a standard length measurement?	
Belone belone	15	75		
Atherina presbyter	7	14		
Zeiformes	16	22		
Zenopsis ocellata	8	18		
Zeus faber	5	43		

Latin name	Minimum length (cm)	Maximum length (cm)	Comment	
Caproidae	1	15		
Capros aper	5	14		
Gasterosteus aculeatus	3	10	One specimen > L max	France (2004)
Spinachia spinachia	4	40	Specimens 25–40 cm > L max	Denmark (1992–43 cm, 2004, 2005- up to 40 cm)
Syngnthidae	5	53		
Syngnthidae	9	24		
Syngnathus rostellatus	5	17		
Syngnathus acus	7	47		
Syngnathus typhle	9	27		
Entelurus aequoreus	4	56		
Entelurus aequoreus	19	48		
Nerophis ophidion	20	44		
Syngnthidae	6	6		
Sebastes spp	12	73		
Sebastes marinus	21	21		
Sebastes viviparus	5	37		
Helicolenus dactylopterus	5	29		
Trigla lucerna	6	54		
Trigla lucerna	9	39		
Eutrigla gurnardus	3	49		
Trigloporus lastoviza	7	28		
Aspitrigla cuculus	7	38		
Aspitrigla cuculus	13	33		
Cottidae	8	12		
Artediellus atlanticus	6	6		
Triglopsis quadricornis	10	23		
Myoxocephalus spp	4	28		
Myoxocephalus scorpius	4	35		
Triglops pingeli	5	11		
Triglops murrayi	5	14		
Taurulus bubalis	4	30	Specimens > L max (IBTSWG should review all records of the family Cottidae)	

Latin name	Minimum length (cm)	Maximum length (cm)	Comment	
Micrenophrys lilljeborgi	4	10		
Cottunculus microps	19	29		
Agonus cataphractus	3	23		
Leptagonus decagonus	9	12		
Liparis spp	6	10		
Liparis liparis	3	32	Specimen of 32 cm > Lmax	Netherlands (1997)
Liparis montagui	4	15		
Cyclopterus lumpus	2	50		
Trachurus trachurus	1	43		
Spondyliosoma cantharus	9	32		
Mullus surmuletus	4	37		
Mullus barbatus	9	30	Species id unlikely, as it does not typically occur in the North Sea. Should be changed to M. surmuletus unless identified with certainty	All nations !
Brama brama	51	51		
Percichthydae	25	44		
Dicentrarchus spp	34	34		
Dicentrarchus labrax	9	70		
Mugilidae	45	60		
Mugil cephalus	43	47		
Chelon labrosus	16	17		
Liza ramada	48	58		
Liza aurata	44	53		
Centrolabrus exoletus	13	13		
Ctenolabrus rupestris	3	16		
Labrus bergylta	7	29		
Labrus mixtus	35	35		
Symphodus melops	6	14		
Echiichthys vipera	1	33	>Lmax	Denmark (2008)
Echiichthys vipera	4	23		
Trachinus draco	9	39		

Latin name	Minimum length (cm)	Maximum length (cm)	Comment	
Blenniidae	9	9		
Anarhichas lupus	7	90		
Anarhichas minor	7	69		
Stichaeidae	18	22		
Lumpenus lampretaeformis	7	38		
Lycenchelys sarsi	7	31		
Lycodes gracilis	13	18		
Lumpenus lampretaeformis	7	45		
Leptoclinus maculatus	12	31		
Pholis gunnellus	5	37		
Ammodytidae	5	30		
Ammodytes spp	4	25		
Ammodytes tobianus	5	32		
Ammodytes marinus	4	28		
Gymnammodytes semisquamatus	10	180	Specimens >L max (mm reported as cm)	Scotland (2007, 2008)
Hyperoplus	8	27		
Hyperoplus lanceolatus	3	39		
Hyperoplus immaculatus	6	38		
Callionymidae	5	25		
Callionymidae	3	22	Larger specimens (>20 cm) will be C. lyra	France, Norway
Callionymus lyra	2	29		
Callionymus maculatus	3	56	>Lmax	Norway (2006) obviously wrong. Others need to be checked too.
Callionymus reticulatus	2	18	>Lmax	
Gobiidae	2	12		
Gobius spp	4	9		
Gobius cobitis	9	9		
Gobius niger	4	16		
Crystallogobius linearis	3	5		
Pomatoschistus spp	2	9		
Pomatoschistus minutus	1	55	>Lmax	Germany (2000)
Pomatoschistus pictus	4	6		

Latin name	Minimum length (cm)	Maximum length (cm)	Comment	
Pomatoschistus microps	3	6		
Aphia minuta	1	5		
Lesueurigobius	6	9		
Lesueurigobius friesii	5	14	Largest fish (14 cm) seems a bit large	Sweden (2008; corrected and to be resubmitted)
Scomber scombrus	2	56		
Thunnus thynnus	17	17	Record to be checked	Sweden (corrected and to be resubmitted)
Bothidae	5	9		
Psetta maxima	43	59		
Psetta maxima	2	88		
Scophthalmus rhombus	8	60		
Arnoglossus	9	14		
Arnoglossus laterna	3	22		
Arnoglossus imperialis	9	21		
Zeugopterus punctatus	4	16		
Phrynorhombus norvegius	3	12		
Zeugopterus norvegius	9	9		
Lepidorhombus boscii	15	49	Some specimens seem quite large (45, 49 cm). Megrim? Also, why is England the only nation reporting this species?	UK-ENG to check large speciemens. All nations fishing in northern North Sea to better check for presence of this species in catches .
Lepidorhombus whiffiagonis	3	60		
Glyptocephalus cynoglossus	3	54		
Hippoglossoides platessoides	2	59		
Limanda limanda	2	39		
Microstomus kitt	1	47		
Platichthys flesus	7	50		
Pleuronectes platessa	3	63		
Hippoglossus hippoglossus	23	121		
Solea solea	5	47		
Buglossidium	10	10		

Latin name	Minimum length (cm)	Maximum length (cm)	Comment
Buglossidium luteum	2	21	Larger individuals to be checked (also for possible misreported species id – Solea solea?)
Microchirus variegatus	5	19	
Pegusa lascaris	15	21	

Table A4.8.7. Comments on the geographical distributions of fish recorded on the DATRAS database (data extracted on the 9 February 2009).

Species	Comments	Actions
Scyliorhinus stellaris	Records to be checked. Records are not clearly differentiated from S. canicula on the basis of their lengths	France (2003), Norway (2007)
Amblyraja radiata	Most southerly records to be checked, as well as potential confusion with thornback ray	More detailed analysis of this species to be undertaken
Dipterus (Raja) linteus	Record to be checked	France (2000)
Dipturus (Raja) batis	Most southerly records to be checked	Danish records (1999, 2002) in rectangles 33F2, 34F2, 35F1, 35F0) to be checked
Leucoraja circularis	Most southerly record to be checked	Danish (2008) record in 40F5 to be checked
Raja clavata	Potential confusion with starry ray to be examined	More detailed analysis of this species to be undertaken
Alosa alosa	Check northern most record	England (1998)
Argentina silus	Records of these species need to be interpreted together to better understand the temporal and spatial patterns in national surveys	Most southerly records to be checked
Argentina sphyraena		
Argentinidae		
Osmerus eperlanus	Large numbers taken in 1997	Netherlands and Germany to check
Arctozenus risso (Notolepis rissoi)	Record to be checked	
Ciliata mustela	Records of this sub-family (rocklings) need to be interpreted together to better understand the temporal and spatial patterns in national surveys. E.g., the species Gaidropsarus mediterraneus has not been reported at all after 1995.	
Ciliata septentrionalis		
Enchelyopus cimbrius		
Gaidropsarus argentatus		
Gaidropsarus macropthalmus		
Gaidropsarus spp		
Gaidropsarus vulgaris		
Molva molva	Most southerly record to be checked	Denmark (2003, 2005) has reported ling in 32F2 (27, 62cm)
Ophidion barbatum	Record to be checked	England (2006)
Atherina presbyter	Easterly record to be checked	France (2004)

Species	Comments	Actions
Spinachia spinachia	Records from Central North Sea to be checked	Denmark and France are the only labs to have reported this species in the Central North Sea
Entelurus aequoreus	Records of this Family need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Nerophis ophidion		
Syngnathus acus		
Syngnathus rostellatus		
Syngnathus typhle		
Syngnthidae		
Sebastes marinus	Records of these species need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Sebastes spp		
Sebastes viviparus		
Artediellus atlanticus (Artediellus europaeus)	Records of these taxa need to be interpreted together to better understand the temporal and spatial patterns in national surveys	Norway to check record (1997)
Micrenophrys lilljeborgi		
Myoxocephalus scorpius		
Myoxocephalus spp		
Taurulus bubalis		
Triglops murrayi		
Triglops pingeli		
Triglopsis quadricornis		French (2003) records to be checked
Cottidae		
Cottunculus microps		Norway (2006) records to be checked
Leptagonus decagonus	Record to be checked	Norway (1998)
Liparis liparis	Records of these species need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Liparis montagui		
Liparis spp		
Chelon labrosus	Records of this Family need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Liza aurata		
Liza ramada		
Mugil cephalus		
Mugilidae		
Centrolabrus exoletus	Records of these species/sub-family need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Ctenolabrus rupestris		
Labrus bergylta		
Labrus mixtus		
Symphodus melops		
Lycenchelys sarsi	Records of this Family need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Lycodes gracilis		
Lycodes vahlii		
Zoarces viviparus		
Zoarcidae		

Species	Comments	Actions
Lumpenus lampretaeformis	Records of these species/sub-family need to be interpreted together to better understand the temporal and spatial patterns in national surveys	Most southerly record to be checked
Leptoclinus maculatus		
Stichaeidae		
Pholis gunnellus		
Anarhichas minor	Check most southerly record	Scottish (2001) record in 37F6 to be checked
Ammodytes marinus	Records of this Family need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Ammodytes tobianus		
Ammodytes spp		
Gymnammodytes semisquamatus		
Hyperoplus immaculatus		
Hyperoplus lanceolatus		
Hyperoplus spp		
Ammodytidae		
Callionymus lyra	Records of this Family need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Callionymus maculatus		
Callionymus reticulatus		
Callionymidae		
Trachinus draco	Records from southern and central North Sea to be checked	France (2000), Denmark (2005, specimens 10–14 cm), Norway (1997)
Aphia minuta	Records of this Family need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Crystallogobius linearis		
Gobius cobitis		
Gobius niger		
Gobius spp		
Lesuerigobius		
Lesuerigobius friesii		
Pomatoschistus microps		
Pomatoschistus minutus		
Pomatoschistus pictus		
Pomatoschistus spp		
Gobiidae		
Thunnus thynnus	Record to be checked	Sweden
Lepidorhombus whiffiagonis	Most southerly records to be checked	Denmark, France and Germany often report megrim in the southern and central North Sea, although they are infrequently taken in UK surveys in this area – further analyses of flatfish data in this area is required
Phrynorhombus norvegius	Records of these species need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Zeugopterus punctatus		

Species	Comments	Actions
Arnoglossus imperialis	Records of these species need to be interpreted together to better understand the temporal and spatial patterns in national surveys	Southerly records to be checked: England (2000, 36F2), Scotland (2000, 37F4)
Arnoglossus laterna		
Loligo forbesi	Records of these species need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Loligo vulgaris		
Illex coindetii	Records of these species need to be interpreted together to better understand the temporal and spatial patterns in national surveys	
Illex illecebrosus		

Table A4.8.8. Comments on reported abundance in the DATRAS database (data extracted on data extracted on 9 February 2009).

Species	Comment	Actions
Myxine glutinosa	Outlier: exceptionally large numbers 2004	Norway (2004)
Sardina pilchardus	Outlier: exceptionally large numbers 1997	Netherlands (1997)
Osmerus eperlanus	Outlier: exceptionally large numbers 1997	Netherlands and Germany (1997) to be checked
Argentina silus	Outlier: exceptionally large numbers 2008	Norway (2008)

Table A4.8.9. Cephalopods and shellfish that should be recorded in IBTS surveys.

TSN Code	Common name	Scientific name	Catch numbers/weight	Dimension	Measurement
CRUSTACEANS					
98682	Golden crab	*Cancer bellanius*	By sex	Carapace width	mm below
98681	Edible crab	*Cancer pagurus*	By sex	Carapace width	mm below
98908	Deep-water red crab	*Geryon affinis*	By sex	Carapace width	mm below
97315	European lobster	*Homarus gammarus*	By sex	Carapace length	mm below
97657	Crawfish/spiny lobster	*Palinurus elephas*	By sex	Carapace length	mm below
552966	Pink spiny lobster	*Palinurus mauritanicus*	By sex	Carapace length	mm below
199961 (98573)	Spider crab	*Maja squinado*	By sex	Carapace length	mm below
97317	Norway lobster	*Nephrops norvegicus*	By sex	Carapace length	mm below
97943	Stone crab	*Lithodes maja*	By sex	Carapace length	mm below
BIVALVES					
79683	Edible scallop	*Pecten maximus*	Sexes combined	-	-
79716	Queen scallops	*Aequipecten opercularis*	Sexes combined	-	-
79885	Common oyster	*Ostrea edulis*	Sexes combined	-	-
CEPHALOPODS					
82362	Cuttlefish	*Sepia elegans*	Sexes combined	Mantle length	cm below
82363		*Sepia officinalis*	Sexes combined	Mantle length	cm below
82364		*Sepia orbignyana*	Sexes combined	Mantle length	cm below
82361		*Sepia* spp.	Sexes combined	Mantle length	cm below
82356	Bobtail squids	[1] *Sepiola* spp.*	Sexes combined	-	-
82357		*Sepiola atlantica*	Sexes combined	-	-
82358		[1] *Sepietta* spp.*	Sexes combined	-	-
82359		*Sepietta oweniana*	Sexes combined	-	-
82343		*Rossia macrosoma*	Sexes combined	-	-
82335		*Sepiolidae*	Sexes combined	-	-

TSN Code	Common name	Scientific name	Catch numbers/weight	Dimension	Measurement
556692 (82384)	Loliginid squids	[2]*Alloteuthis subulata*	Sexes combined	Mantle length	cm below
82374		*Loligo forbesi*	Sexes combined	Mantle length	cm below
82375		*Loligo vulgaris*	Sexes combined	Mantle length	cm below
82369		*Loliginidae*	Sexes combined	Mantle length	cm below
205728	Ommastrephid squids	*Todaropsis eblanae*	Sexes combined	Mantle length	cm below
82521		[3] *Illex illecebrosus*	Sexes combined	Mantle length	cm below
82523		[3] *Illex coindetii*	Sexes combined	Mantle length	cm below
		Illex spp.	Sexes combined	Mantle length	cm below
82514		*Ommastrephidae*	Sexes combined	Mantle length	cm below
82646	Lesser octopus	*Eledone cirrhosa*	Sexes combined	-	-
82603	Octopus	*Octopus vulgaris*	Sexes combined	-	-

[1] Several other species occur in this genus, and specimens should be checked.

[2] DATRAS currently accepts , although is the official synonym. DATRAS should be updated.

[3] There is much confusion between these species, and they should be treated as spp. in any analysis

Annex 5: Working documents presented to the IBTSWG 2009

WD1: Coppin, F., D. Camara, Y. Vérin. 2009. Comparison of two methods for the whiting abundance indices calculation in the Eastern English Channel.

WD2: Parker-Humphreys, M. 2009. Report investigating the effects of including or excluding Norway data on the IBTS Q3 indices.

WD1: Comparison of two methods for the whiting abundance indices calculation in the Eastern English Channel.

By: F. Coppin, D. Camara, Y. Vérin

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1 Introduction

Since 1988, in October, the Channel Ground Fish Survey (CGFS) is carried out in the Eastern Channel and the Southern of the North Sea. The main objective of this survey is to collect data on the distribution, the relative abundance, and biological information on the main commercial fish.

Data are used in several working group such as the "Assessment of Demersal Stock in the North Sea and Skagerrak" of the International Council for the Exploration of the Sea (ICES) which use data for plaice, whiting and cod.

But for whiting, indices were considered as inconstant and as a consequence, data were not taken in account for this assessment of this species in recent years.

This survey, coordinated by the IBTS working group was presented at the last meeting in 2008 and in the recommendation of the report, it was notified that a stratification based on the results from studies about habitat and fish assemblage in the area covered by the CGFS should be further investigated and used to compute abundance indices as this could increase precision and year to year consistency.

In this document results of these investigations are presented.

2 Material and methods

Channel Ground Fish Survey (CGFS) data from 1990 to 2008 are used in this analysis. The objectives of this work is to compare CGFS whiting indices used by the WGNSSK working group and the CGFS indices using community stratifications. The first method defined by ICES is base on the average indices by ICES rectangle. The second one supports on a study which splits the Eastern English Channel in four fish community in relation with their environmental parameters (Vaz *et al.*, 2007). These four fish communities are shown Figure 1.

Class 1 was characterized by benthic community associated with pebbles, hard sediment types, oceanic hydrological conditions (high salinity and temperature in October), strong tidal currents and relatively deep water for the area.

Class 2 was characterized by benthic community associated with pebbly and coarse sand sediment types with hydrologic and bathymetric conditions intermediary between offshore and coast.

Class 3 was characterized by benthic community associated with fine sand sediment type, coastal hydrological and bathymetric conditions (low salinity and temperature in October, shallow waters and less current).

Class 4 was characterized by heterogeneous sediment type (from muds to coarse sands) and the various associated benthic community types as well as coastal hydrological and bathymetric conditions.

The first data processing stage consists in connecting each haul with the community layer in which it was carried out. Arcmap (GIS software) was used at this stage and a space joint was done between the haul shape and the community stratum shape (Figure 1). Results are given in Table 1 which is added to the database where all CGFS data are stored.

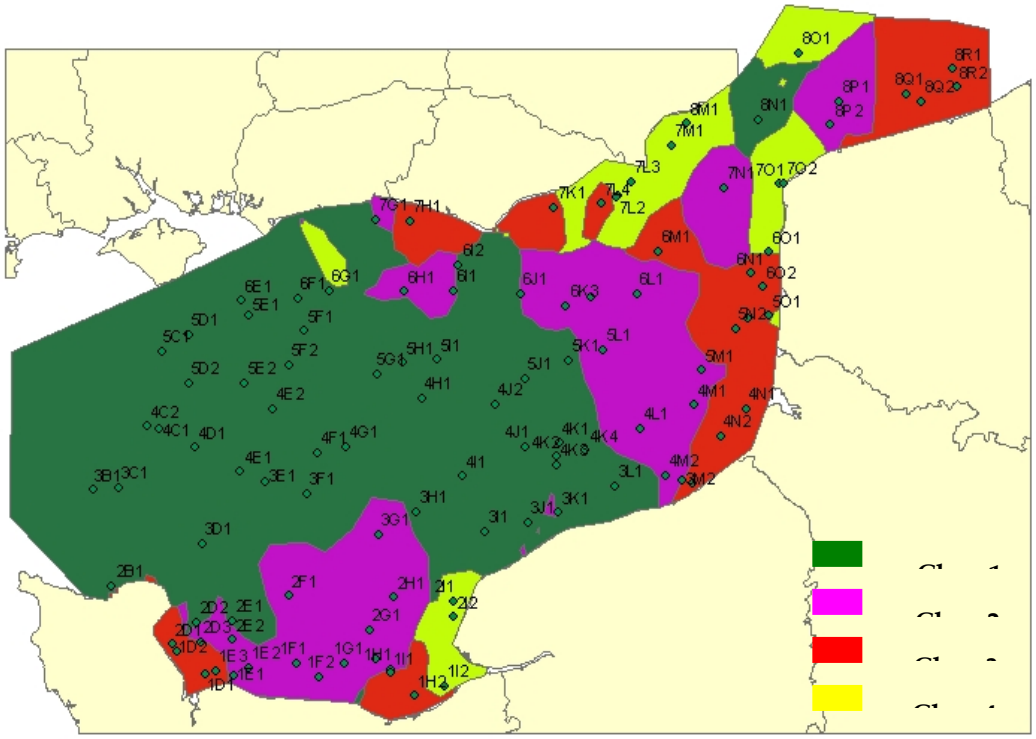


Figure 1. Haul projection on the community stratum.

Then, the calculation of the whiting indices is implemented in the following way:

1 Number by length and stratum calculation

$$NSl = \sum_{t=1}^{n} (nbtl \times Wt \div Wts \times 60 \div TDt)$$

N_{Sl} : Number of whiting by hours, length and stratum

Nbtl number of fish measured by length and trawl

Wt: Total weight of whiting in the trawl

Wts: Sampling weight

TDt: trawl duration

2 Trawl number by stratum

$$\mathbf{Nti} = \sum_{\mathbf{i=1}}^{\mathbf{4}} \mathbf{Nt}$$

3 Total surface

$$\mathbf{Stot} = \sum_{\mathbf{i=1}}^{\mathbf{4}} \mathbf{Si}$$

Si : Strate i surface

4 Abundance index by length and surface

$$\mathbf{ALindex} = \left(\sum_{\mathbf{S=1}}^{\mathbf{4}} \mathbf{NSL} \div \mathbf{Nts} \times \mathbf{Ss} \right) \div \mathbf{Stot}$$

5 Abundance index by age

$$\mathbf{AAindex} = \sum_{\mathbf{A=0}}^{\mathbf{N}} \mathbf{(ALindex \times \%A)}$$

Data were recorded and calculations were made through the database software Microsoft access. Microsoft Excel and R were used to provide analysis.

3 Results

In this analysis three calculation methods are compared. Abundance indices provided to the WGNSSK group was used and an index was calculated using all community stratums (Figure. 1). In a second time, the indices using stratum 3 and 4 was calculated in relation with whiting habitat in October (Figure2). Habitat modelling was realized during the CHARM project whose objective was to make a marine atlas and to develop a tool for decision address to the human affects on the ecosystem (Carpentier *et al.*, 2005). Generalized linear model was used to determine whiting habitat using the abundance answer to the environmental parameters (Vaz *et al.*, 2006).

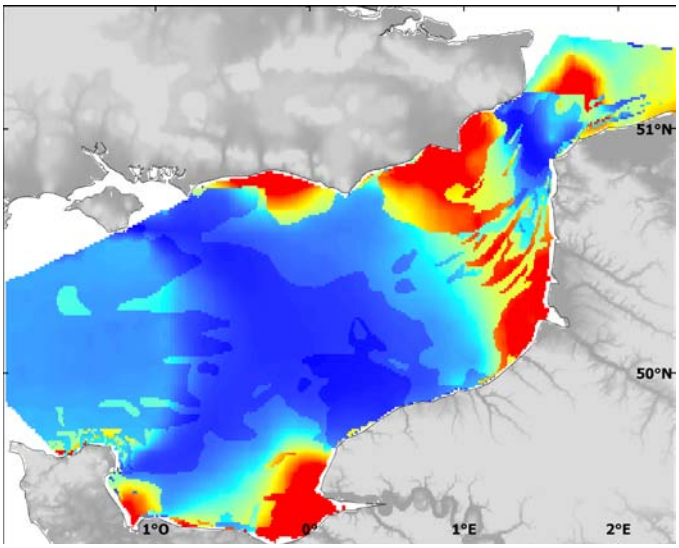


Figure 2. Eastern English Channel whiting habitat in October (GLM).

The results are given in Tables 2 to 4. Figure 3 represents the trends for each age group for the three calculation methods. Those graphs show differences of indices value between the different methods but a strong correlation of trends for all age-group

Figure 3. Abundance indices by age and calculation method.

In Figure 4, the 0 group was removed from series because it is not representative in the survey data due to a lot of inconsistency in the cohort structured abundance indices. All the other age structured indices remain consistent. Age 1 is hereby considered as the recruiting and ages 2 and 3 were shifted to age to compare the consistency of the indices for each fish cohort.

The calculation methods seem to fluctuate together, except abundance indices 1995–1998 for the age1, 2000- 2001 for the age 2 and from 2002–2003 for age 3.

Globally, estimation trends seem to be identical for all calculation methods even if values are different. The method using communities 3 and 4 tends to overrate indices. It is probably because in these areas whiting is more abundant.

But the similarity among curves is not perfect because they can be influenced by fishing rate which is not the same from an age to another or migration effects.

If we compare trends in Figure 4 we can notified that community S34 stratum method and ICES method give similar results especially in the recent years. Profiles show a very strong relationship between ICES and Community S34 calculations which fluctuate together. *By those profiles we can assume that the two methods estimate better than community all stratum method where uncertainty of abundance estimation seemed to be bigger.*

We should have same profile between age class abundance index curves but we can hereby suppose that fishing mortality rate is changing from age to age, and changes are occurred during fishery development.

Examination of commercial fishing landings can provide further more information about the accuracy of estimation results.

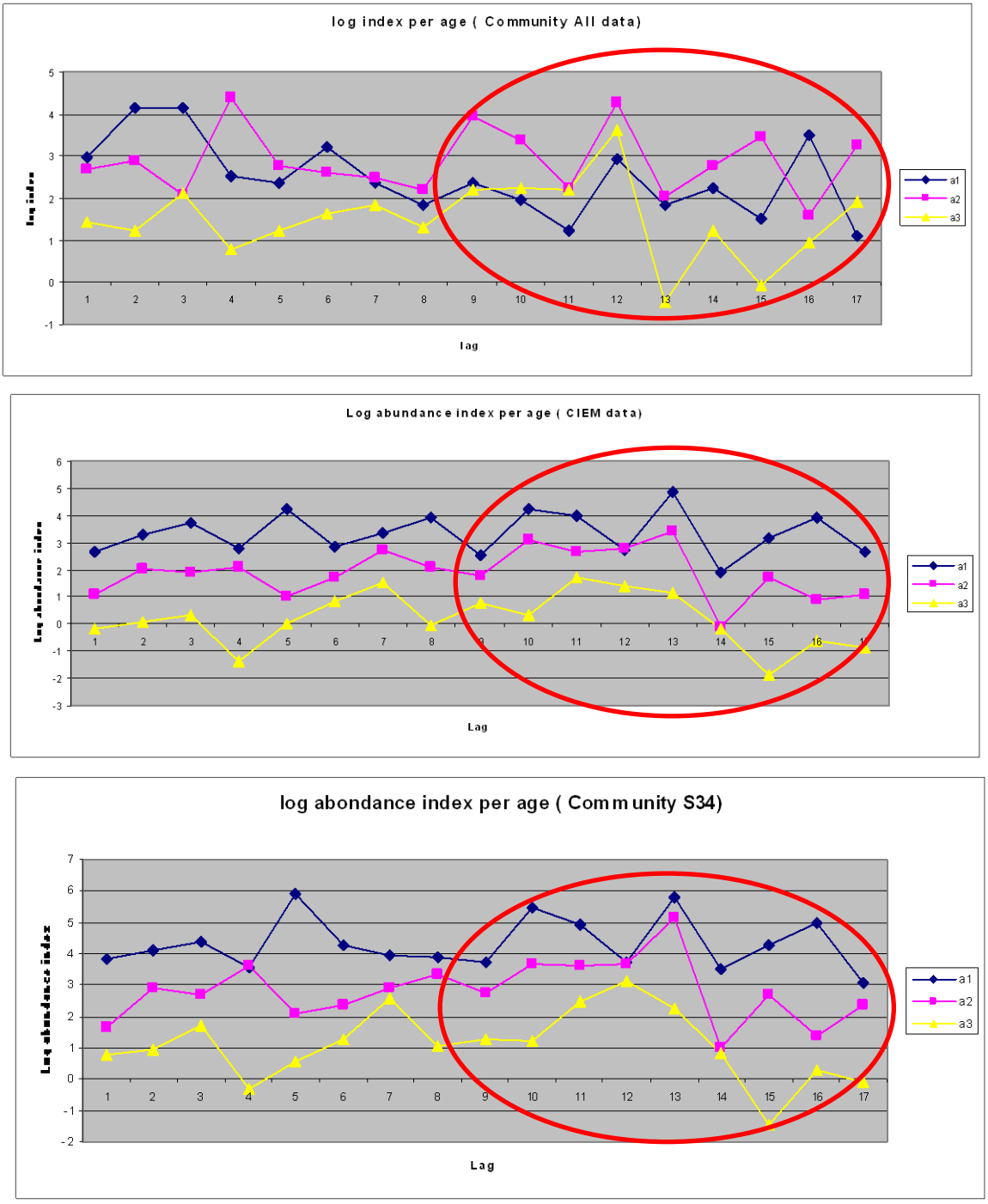


Figure 4. Shifted abundance index by age and time-lag.

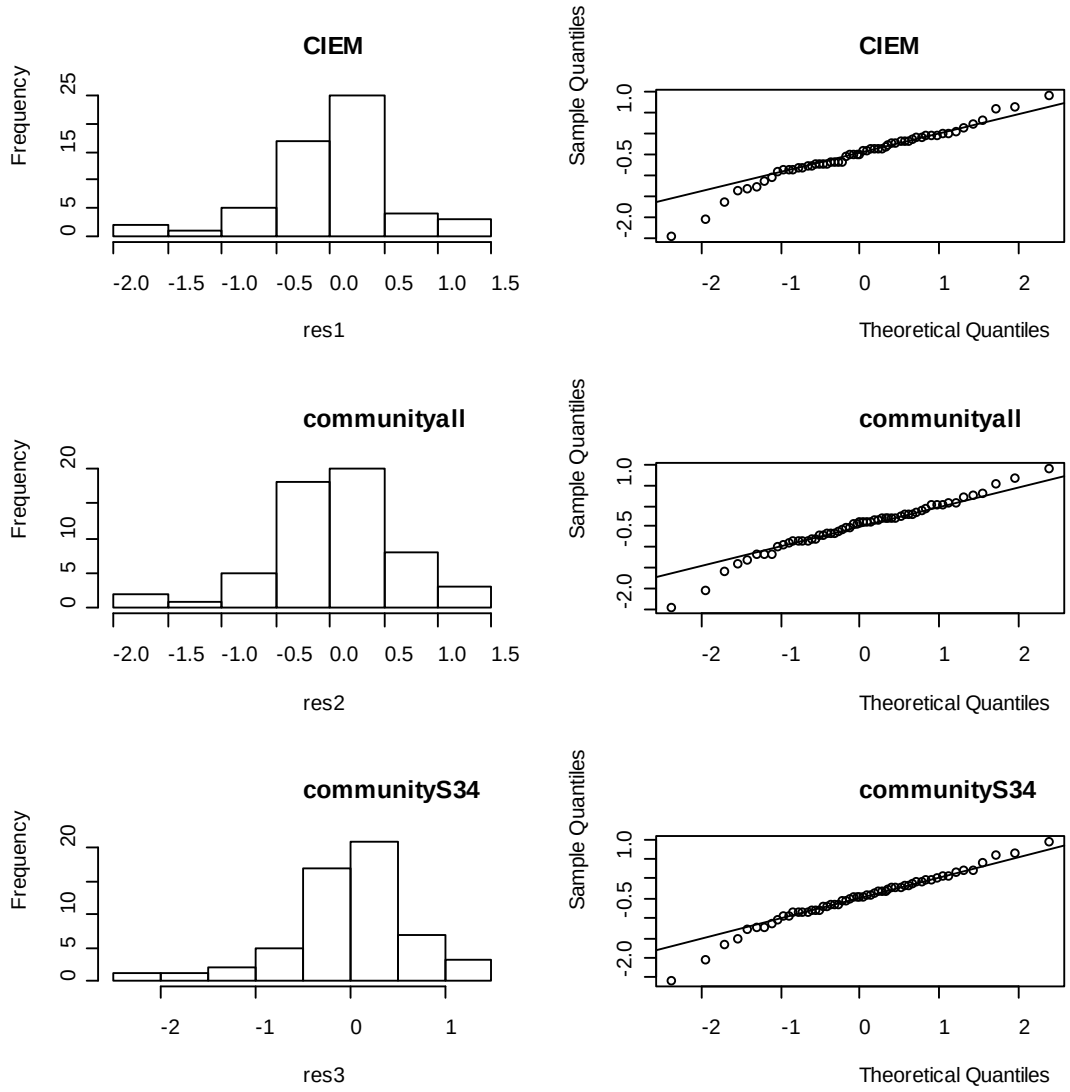


Figure 6. Series lognormal distribution.

Data are lognormally distributed because the logarithm of the random variable (X = Abundance Index) are normally distributed(Figure 6) . That is a confirmation of similarity of series.

A statistical ANOVA test has been done to see whether effects of calculation methods on abundance index are significant.

	Age effect	**Method effect**
P(>|Chi|)	1.744e-13	**1.654e-06**

This ANOVA test means that abundance index calculation is significant

In order to see how correlated the abundance index series are we use the Pyper and Peterman correlation. To measure their similarity we used **cor.pyper** correlation coefficient

Correlation between ICES and Community all method:

- Test de Pyper et Peterman: N=57 N*=46 R2=0.85 p= 8.992806e-15 <0.05

Correlation between ICES and CommunityS34 method:

- Test de Pyper et Peterman: N=57 N*=47 R2=0.85 p= 6.550316e-15 <0.05

There was an autocorrelation within each time-series so that it was necessary to remove them before to calculate the correlation between series.

Autocorrelation degree we have seen here means that abundance index IA of year y+1 can be estimated while of year y is known but uncertainty of that estimation will be strong.

Cor.pyper. Correlation test has shown that time-series (Survey abundance index) are correlated very strongly but the more significant correlation is the ICES and communityS34 one.

The main problem is that they provide different abundance indices in value even if trends are the same.

In accordance with what we said before, ICES and CommunityS34 give probably the best estimations.

4 Conclusion

The objective of this analysis was to compare abundance index calculation methods. The abundance index provided to the North Sea, Skagerrak and Kattegat working group were considered as inconsistent by experts. In this analysis we compared those indices with indices calculate from community. In the first the process took all communities into account. In a second time we compare working group index with those calculate tacking 3 and 4 stratum into account

Although index levels differ, whatever the age group all methods show the same trends, what tends to says that if working group indices are inconsistent then they are it with methods using community stratum. The inconsistency of index could be due to the fishing effect and to the Eastern English Channel and south of North Sea continuum in the whiting distribution.

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

Vaz, S., Pavoine, S., Koubbi, P., Loots, C., and Coppin, F. 2006. Comparative study of habitat modelling strategies to investigate marine fish life cycle: A case study on whiting in the Eastern English Channel. ICES Annual Science Conference. Maastricht. Netherlands. ICES CM 2006/O:06.

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

Table 1. Spatial relationship between haul and community.

NomTrait	Latitude	longitude	IndexStrate	SousStr	NomStrate	Surface
8O1	51.24016571	1.674499989	0	1	4	0.058531303
8Q1	51.12199974	2.176166654	2	3	3	0.160511238
8Q2	51.10083199	2.242166638	2	3	3	0.160511238
8R1	51.19433403	2.385833383	2	3	3	0.160511238
8R2	51.14233398	2.405999899	2	3	3	0.160511238
8P1	51.10183334	1.860166669	3	4	2	0.08972578
8P2	51.03333282	1.823333383	3	4	2	0.08972578
8N1	51.04916573	1.485666692	4	5	1	0.064101883
7G1	50.75833511	-0.281666666	6	7	2	0.008800166
7L4	50.80533218	0.763666689	10	11	3	0.015611928
7K1	50.79499817	0.543333352	11	12	3	0.038766109
7L1	50.83083344	0.840999991	12	13	4	0.14854358
7L2	50.82566833	0.832333326	12	13	4	0.14854358
7L3	50.8686676	0.902166665	12	13	4	0.14854358
7M1	50.9746666	1.085000038	12	13	4	0.14854358
8M1	51.03700066	1.154666662	12	13	4	0.14854358
6O1	50.66483307	1.538999975	13	14	4	0.073996578
7O1	50.8623333	1.584499955	13	14	4	0.073996578
7H1	50.75399971	-0.1215	14	15	3	0.04868837
7N1	50.85216713	1.331666708	15	16	2	0.089036995
6H1	50.55033302	-0.149666667	17	18	2	0.048730949
6I1	50.55216599	0.076	17	18	2	0.048730949
3M1	49.98933411	1.182666659	19	20	3	0.245601597
3M2	49.99933434	1.137833297	19	20	3	0.245601597
4N1	50.20750046	1.430166662	19	20	3	0.245601597
4N2	50.12911097	1.314111114	19	20	3	0.245601597
5N1	50.47166824	1.440000057	19	20	3	0.245601597
5N2	50.44300079	1.381500006	19	20	3	0.245601597
5O1	50.48083305	1.536499977	19	20	3	0.245601597
6M1	50.66750145	1.026666641	19	20	3	0.245601597
6N1	50.60300064	1.452999949	19	20	3	0.245601597
6O2	50.5633316	1.50999999	19	20	3	0.245601597
4L1	50.14933395	0.943833351	20	21	2	0.386467574
4M1	50.2183342	1.190000057	20	21	2	0.386467574
4M2	50.01333237	1.062166631	20	21	2	0.386467574
5L1	50.37966728	0.770999998	20	21	2	0.386467574
5M1	50.32150078	1.226833344	20	21	2	0.386467574
6J1	50.54533195	0.385499999	20	21	2	0.386467574
6K1	50.53516579	0.717000008	20	21	2	0.386467574
6K2	50.53483391	0.711499989	20	21	2	0.386467574
6K3	50.50983238	0.599333346	20	21	2	0.386467574
6L1	50.54449844	0.92566666	20	21	2	0.386467574

NomTrait	Latitude	longitude	IndexStrate	SousStr	NomStrate	Surface
2B1	49.6866684	-1.50333333	28	29	1	2.299477399
2D2	49.5795002	-1.108833373	28	29	1	2.299477399
2E1	49.58144506	-0.946333329	28	29	1	2.299477399
3B1	49.9703331	-1.592666686	28	29	1	2.299477399
3C1	49.97699928	-1.471500039	28	29	1	2.299477399
3D1	49.80983353	-1.084666669	28	29	1	2.299477399
3E1	49.99266624	-0.793166667	28	29	1	2.299477399
3F1	49.95966721	-0.603499979	28	29	1	2.299477399
3H1	49.90600014	-0.094	28	29	1	2.299477399
3I1	49.84616661	0.225500003	28	29	1	2.299477399
3J1	49.87466621	0.423500001	28	29	1	2.299477399
3K1	49.90283394	0.562666655	28	29	1	2.299477399
3L1	49.98250008	0.824666649	28	29	1	2.299477399
4C1	50.14844513	-1.282777786	28	29	1	2.299477399
4C2	50.1566658	-1.338333368	28	29	1	2.299477399
4D1	50.09483147	-1.117833376	28	29	1	2.299477399
4E1	50.02316666	-0.909000009	28	29	1	2.299477399
4E2	50.20849991	-0.762666672	28	29	1	2.299477399
4F1	50.07866669	-0.551166683	28	29	1	2.299477399
4G1	50.09616661	-0.417333335	28	29	1	2.299477399
4H1	50.23999977	-0.068	28	29	1	2.299477399
4I1	50.01066589	0.120166667	28	29	1	2.299477399
4J1	50.09777705	0.410555551	28	29	1	2.299477399
4J2	50.22000122	0.270000011	28	29	1	2.299477399
4K1	50.10833359	0.564999998	28	29	1	2.299477399
4K2	50.06850052	0.554500014	28	29	1	2.299477399
4K3	50.04266548	0.553000003	28	29	1	2.299477399
4K4	50.08600044	0.688666672	28	29	1	2.299477399
5C1	50.37566757	-1.268666625	28	29	1	2.299477399
5D1	50.42633438	-1.147499979	28	29	1	2.299477399
5D2	50.28216553	-1.149833322	28	29	1	2.299477399
5E1	50.47999954	-0.870166659	28	29	1	2.299477399
5E2	50.28416634	-0.892999977	28	29	1	2.299477399
5F1	50.43583298	-0.616666675	28	29	1	2.299477399
5F2	50.33600044	-0.686333328	28	29	1	2.299477399
5G1	50.31066513	-0.274166673	28	29	1	2.299477399
5H1	50.34350014	-0.154833339	28	29	1	2.299477399
5I1	50.35266685	0.00183	28	29	1	2.299477399
5J1	50.29799843	0.407000005	28	29	1	2.299477399
5K1	50.35099983	0.609500021	28	29	1	2.299477399
6E1	50.52383423	-0.902666658	28	29	1	2.299477399
6F1	50.53044383	-0.644333343	28	29	1	2.299477399
6G1	50.5530014	-0.5	28	29	1	2.299477399
6I2	50.62766647	0.101166662	28	29	1	2.299477399
1D1	49.42566681	-1.072000027	29	30	3	0.043895736

NomTrait	Latitude	longitude	IndexStrate	SousStr	NomStrate	Surface
1D2	49.49083328	-1.205500007	29	30	3	0.043895736
1E3	49.43533325	-1.025666714	29	30	3	0.043895736
2D1	49.51333237	-1.224833369	29	30	3	0.043895736
2D3	49.51966476	-1.092333317	29	30	3	0.043895736
1I2	49.38866615	0.0368	30	31	4	0.065118557
2I1	49.63949966	0.079500001	30	31	4	0.065118557
2I2	49.5945015	0.0778	30	31	4	0.065118557
1E1	49.42066574	-0.937166661	31	32	2	0.3822531
1E2	49.44400024	-0.871333331	31	32	2	0.3822531
1F1	49.45633316	-0.651333332	31	32	2	0.3822531
1F2	49.41500092	-0.548333347	31	32	2	0.3822531
1G1	49.45633316	-0.424666673	31	32	2	0.3822531
1G2	49.46933365	-0.280333325	31	32	2	0.3822531
2E2	49.52649879	-0.947999984	31	32	2	0.3822531
2F1	49.65716553	-0.68599999	31	32	2	0.3822531
2G1	49.55666733	-0.312666669	31	32	2	0.3822531
2H1	49.65183449	-0.198666662	31	32	2	0.3822531
3G1	49.83766747	-0.270333335	31	32	2	0.3822531
1H1	49.43700027	-0.211833335	33	34	3	0.049060768
1H2	49.35933304	-0.100166667	33	34	3	0.049060768
1I1	49.42766698	-0.211222224	33	34	3	0.049060768

Table 2 :Abundance index by age calculated from community stratification all stratum included																				
AGE	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	SDYear
0	19.20624223	62.4831512	64.5008133	12.4352924	10.5975002	24.4692905	10.7563619	6.16146887	10.5599776	7.03305948	3.36981343	18.674518	6.28753153	9.27613111	4.61396685	32.6142014	2.99272526	72.194553	2.83306069	22.0743026
1	11.36133872	14.488678	18.0852911	7.93813549	79.1825598	15.9509322	13.3448789	12.0594616	9.0042341	52.7127306	29.7745058	9.49796391	71.7765333	7.57308509	15.6841302	32.1695822	4.8348632	25.4593959	39.0903411	21.7016572
2	0.820476893	2.28874109	4.1356995	3.4847716	8.43560511	2.19226062	3.45937996	5.11910278	6.2911328	3.75336897	8.94854153	9.55096215	9.01150725	37.6970183	0.63141054	3.44506568	0.94773928	2.53777053	6.71611515	8.13111966
3	0.375250114	0.46010034	0.56402861	0.60288426	1.3743595	0.19203227	0.81017667	1.07992555	3.15736692	0.69125906	0.9274662	0.99306217	2.70614527	5.15219134	2.30034528	0.54915507	0.0702469	0.44801197	0.36386956	1.27958817
SDAge	886.4385764	881.848016	881.459435	888.573198	881.173563	887.46177	889.481167	890.363976	890.293495	887.058724	889.68989	890.567722	885.744571	889.192759	893.638181	889.104141	896.123415	886.776018	892.663533	3.94921003
Table 3 : Abundance index by age calculated from ICES Method																				
0	17.9188102	171.88865	162.734403	67.5270532	24.2508704	61.6837144	30.962543	17.622402	27.5216654	8.73050379	8.90802826	19.3728822	16.2240258	19.5556362	9.14685917	93.9590561	11.7520125	203.032005	6.64930537	61.6134853
1	14.05963114	26.2470727	42.7011062	15.9524941	68.9304949	17.8013676	27.9437124	49.0246908	12.3363549	70.6969292	52.9156844	15.101774	131.93373	6.83884889	23.3192761	50.0787144	14.3903589	27.6738372	45.2553018	29.9536016
2	1.177159957	2.93672639	7.65617515	6.74056351	8.09180352	2.82418324	5.6388045	15.7615341	8.19364733	5.80392466	22.6059397	14.5698375	16.5376484	30.6534193	0.91528007	5.50206875	2.50464658	3.00159935	8.10335441	7.85265201
3	0.543889427	0.48256982	0.84677736	1.06699285	1.42422706	0.25520455	1.04639271	2.34584237	4.53127876	0.989494	2.14309654	1.41242241	5.44589569	4.12278813	3.07538235	0.82494165	0.14991131	0.54046453	0.4167087	1.55790335
SDAge	8.879275296	81.8278022	75.1061206	30.4281932	30.3882366	28.4346475	15.2409702	19.7658652	10.1004043	32.9162236	22.519131	7.77114641	59.82158	12.2523311	10.0908351	43.6453255	6.93234379	97.0895081	20.3740737	27.1409684
Table 4 : Abundance index by age calculated from community stratification aim whiting stratum																				
0	86.84551199	284.261011	271.887196	56.1051146	48.218116	111.387482	48.7563258	27.8927712	48.0704302	31.8442589	15.3398413	85.0047715	28.5843028	41.8188643	21.0033941	148.271865	13.6232856	328.260933	12.8964711	98.1144332
1	47.08400509	61.7406462	79.8445233	35.5188124	359.373749	70.887773	50.8759313	49.2400746	40.6025362	237.682439	134.347088	41.6209153	326.10388	33.7441028	70.9283211	144.742996	21.5968244	113.43744	145.805557	98.4214309
2	2.857401402	5.32989058	18.4691902	15.1476386	37.4806398	8.30387176	10.7625543	18.3480194	27.7623536	15.94984	38.6133398	37.8124447	40.0714496	168.885974	2.77230484	14.9484907	3.9130589	10.7001195	21.132916	36.739301
3	1.409870717	1.05880386	2.170119	2.62858953	5.46274816	0.7314076	1.79594185	3.54624871	13.2790649	2.79773843	3.49874955	3.36940019	11.6657607	22.8541908	9.52976963	2.24729168	0.23236408	1.36635667	0.92145473	5.74460081
SDAge	40.80282192	133.667521	123.79899	23.4778752	165.492814	52.7630132	25.4159162	19.1505005	15.274801	111.0461	59.4165133	33.4634312	150.119079	68.4824236	30.845317	79.8037754	9.66042547	151.947379	67.5889779	46.2362939

WD 2: Report investigating the affects of including or excluding Norway data on the IBTS Q3 indices.

By: Matt Parker-Humphreys. Cefas, Lowestoft

North Sea quarter 3 combined indices of abundance have been produced by the International Council for the Exploration of the Sea (ICES) since 2007, using data supplied by the International Bottom Trawl Survey Working Group (IBTSWG). The indices run from 1991, but the Norwegian dataseries only covers the years from 1999 to present. It is proposed that this survey will no longer be conducted, and this report aims to investigate the affect this will have on the indices derived from the data. For more information regarding IBTS indices please refer to the IBTS manual available on the Datras website (http://datras.ices.dk).

The species for which data are collated by ICES include:

- Herring (*Clupea harengus*)
- Cod (*Gadus morhua*) *
- Haddock (*Melanogrammus aeglefinus*) *
- Whiting (*Merlangius merl*angus) *
- Saithe (*Pollachius virens*) *
- Plaice (*Pleuronectes platessa*)
- Mackerel (*Scomber scombrus)*
- Sprat (*Sprattus sprattus*)
- Norway pout (*Trisopterus esmarkii*) *

In order to keep this report to a manageable size only the species that have a * next to them in the list above are investigated, the survey is conducted with a bottom trawl and catches of the other species are generally noisy or very low.

The IBTS indices are available to the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), but at present only the combined cod (*Gadus morhua)* index is actually used in an assessment in this working group, data from the other surveys contributing to the index are used separately in the assessment of the other species.

Investigation

The Norwegian fisheries survey collects data from positions in the northern North Sea. Figure 1 shows the station positions from 1999:2008, and shows that the number and position of stations differs somewhat each year. It is assumed that all the stations fished each year are incorporated in the IBTS indices.

To investigate the affect of excluding the Norwegian data it was necessary to mimic the IBTS Q3 North Sea indices, downloaded from Datras, in a way that allowed it to be run with, and without Norwegian data and to be bootstrapped to achieve confidence intervals. The data used for this investigation was downloaded from the Datras website (http://datras.ices.dk) and although the exact method of creating the ICES IBTS indices was unknown, an approximation was created in R by:

- Summing all survey catch per Round Fish Area (RFA)
- Raising all catch in RFA to 100 hours fished.
- Multiplying all raised catch to the number of ICES rectangles in each RFA.

- Sum all RFAs.
- Divide total catch by the total number of ICES rectangles in all RFAs.

The results of the 'mimic' indices gave higher values of abundance than the ICES produced values, but Figures 2 to 6 show that the mimic indices including Norway data matches the trends of the original closely for all species.

Excluding Norwegian data

The mimic indices code was bootstrapped to achieve 95% confidence intervals for data including and excluding the Norwegian surveys. This was achieved using the "sample" function in R to randomly sample (with replacement) the stations within each RFA per year, for 500 iterations. The results are shown in Figures 7 to 11.

As an aid to visualize the affect of any potential changes on the indices, Figures 12:21 were created to a) show the correlation between the current IBTS Q1 index and Q3 mimic indices with the Norwegian data and then b) between the Q1 IBTS and the mimic indices without Norwegian data. If a significant linear relationship was present the model was plotted in red.

Results

Cod

Figure 7 shows that removing the Norwegian data from the mimic cod index considerably changes the result. Ages 0 to 2 show little alteration, but much bigger changes can be seen for ages greater than 2, with levels of abundance being appreciably reduced when removing the Norwegian data, although the general trends appear similar, but smoother.

Figures 12 and 13 show that removing the Norwegian data has a marginal effect on the correlation plots. Although all ages show a slight decrease in significance level, all the ages that had a significant linear relationship remain so.

Table 1 confirms that Norway provide a substantial quantity of the cod catches in RFAs 1,2&7, and in many years catches are above the average for those areas. In conclusion it seems that the Norwegian survey is catching an above average number of older fish, and that removing these catches from the dataset will change the indices, especially at the older ages, from 1999 onwards.

Haddock

Figure 8 shows that the haddock results seem relatively unaffected by the removal of the Norwegian data. It can be seen that 1999 year class would be decreased by up to approx 50% at some ages, but the trends appear very similar.

The correlation plots in Figures 14 and 15 show little change, although the linear relationship appears marginally reduced when omitting Norwegian data.

Table 2 shows that the Norwegian survey took higher than average catches of haddock in RFA7, but has fished only one station in the area since 2006 (Figure 1, Table 2). (Please note again that the stations north of RFA7 are considered RFA7 in the dataset, and consequently as this area in all calculations). Overall the removal of the Norwegian data does not seem to affect the results except to reduce the 1999 year class abundance.

Whiting

Although differences between the two indices can be seen in Figure 8, the reduced levels without Norwegian data still appear to fall within the 95% confidence intervals of the "With Norway" indices. Figures 16 and 17 confirm the similarity by showing that although the linear relationships are generally more significant in the original indices, there is still strong correlation when removing the data, with age 5 significance improving.

Again Table 3 implies that the Norwegian survey catches are often above average especially in RFA7.

Saithe

The saithe index is affected by the removal of Norwegian data (Figure 5), and exhibits similar results to cod, in that the numbers are reduced but generally show the same trends. One obvious exception is at-age 6 where saithe can be seen to be increasing steadily since 1999 with Norwegian data, but remaining at relatively constant levels without it.

Table 4 shows that the Norwegian survey is very important for saithe catches, especially in RFA7 (again). Norway can be seen to take up to 100% of the catch in an area per year. The correlation plots in Figures 18 and 19 however show some improvement when removing the Norwegian data, but they were very poor to start with, and remain so at all ages except age 5.

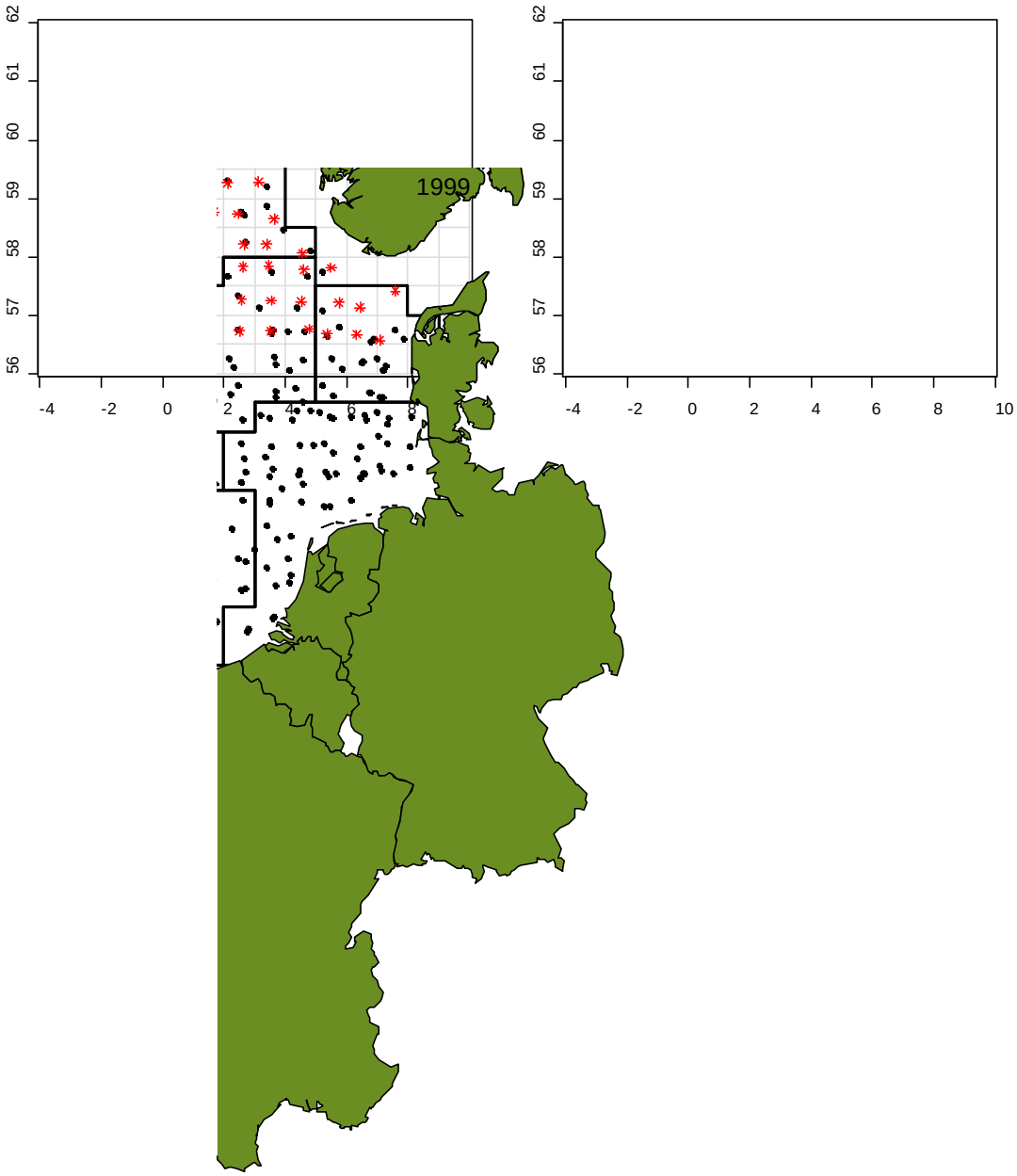
Norway pout

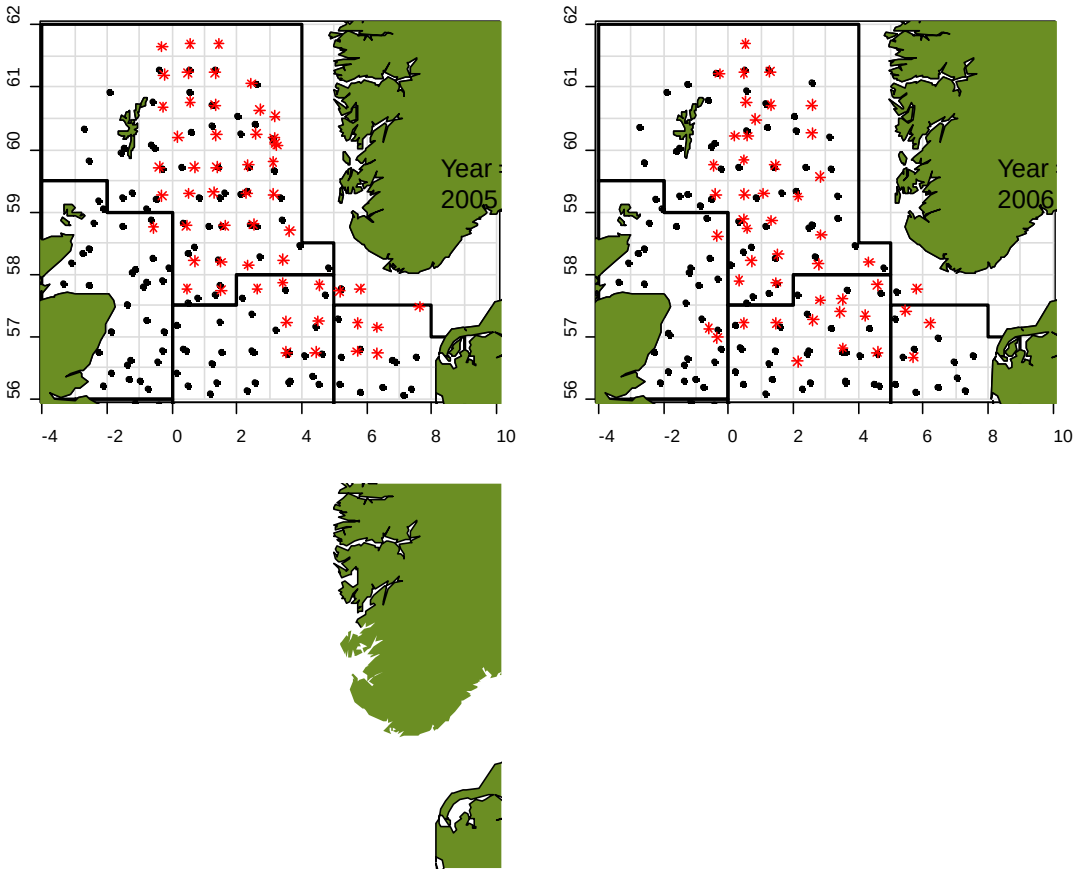
Figure 6 shows that although the abundance level shows some variation when Norway is removed the trends appear very similar. Again, the Norwegian survey appears to catch above average rates for RFA7, and the correlation seems marginally worse when this data are removed.

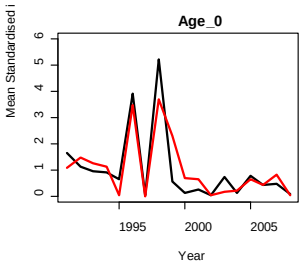
Conclusion

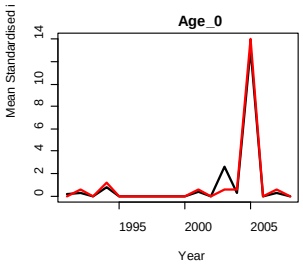
In conclusion it appears that removing the Norwegian data from the IBTS Q3 combined indices would reduce the abundance level from 1999 onwards for most species, but the trends should remain largely the same.

The most noticeable problem is that any changes to the indices would only be made from 1999 onwards, and that years prior to this would remain unchanged. The result of this would need to be investigated further. This also leads to questions regarding the suitability of the current indices, given the changes in catchability seen with the introduction of the Norway dataset in 1999. (This could be said for any survey that does not span the entire time-series.)


1999
62
61
60
59
58
57
56
-4
-2
0
2
4
6
8
10


Year
2005
Year
2006
62
61
60
59
58
57
56
-4
-2
0
2
4
6
8
10


Age_0
Mean Standardised i
0
1
2
3
4
5
6
1995
2000
2005
Year


Age_0
Mean Standardised i
0
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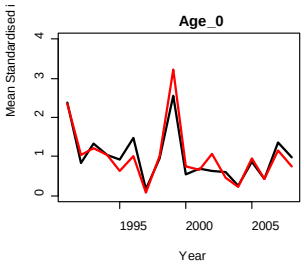
14
1995
2000
2005
Year


Age_0
Mean Standardised i
0
1
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4
1995
2000
2005
Year

Indices comparison plots for Gadus morhua.
(Dotted lines are 2.5 and 97.5 percentiles)

Indices comparison plots for Pollachius virens.
(Dotted lines are 2.5 and 97.5 percentiles)

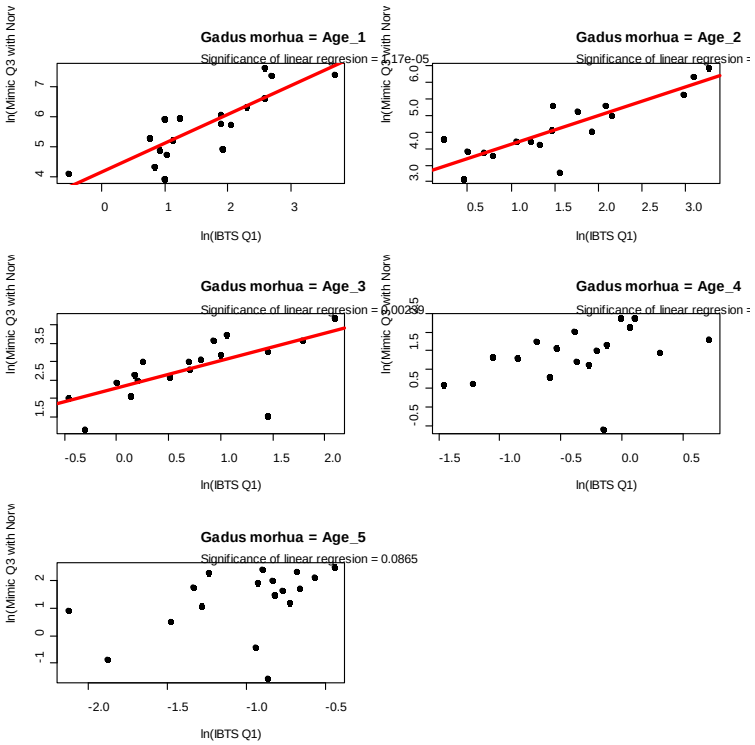

Figure 12. Cod: Correlations between ICES produced Q1, and mimic Q3 indices with Norwegian data.

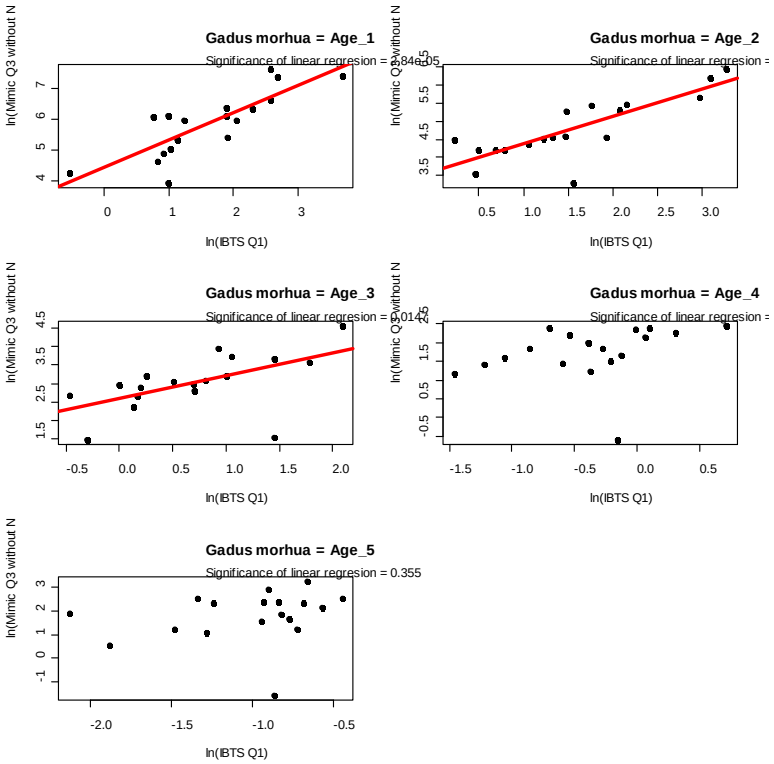

Figure 13. Cod: Correlations between ICES produced Q1, and mimic Q3 indices without Norwegian data.

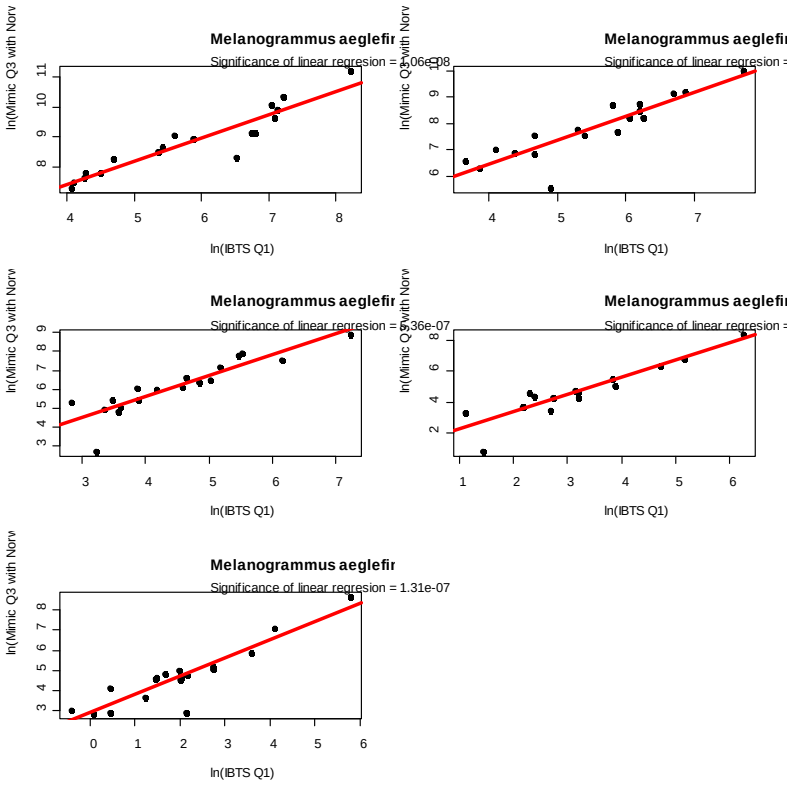

Figure 14. Haddock: Correlations between ICES produced Q1, and mimic Q3 indices with Norwegian data.

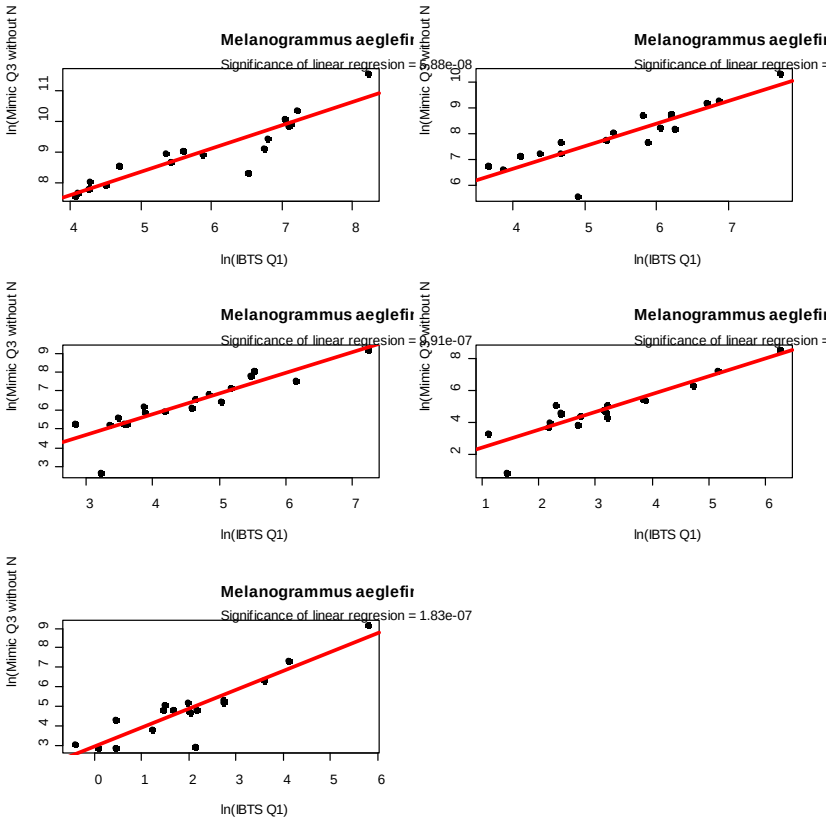

Figure 15. Haddock: Correlations between ICES produced Q1, and mimic Q3 indices without Norwegian data.

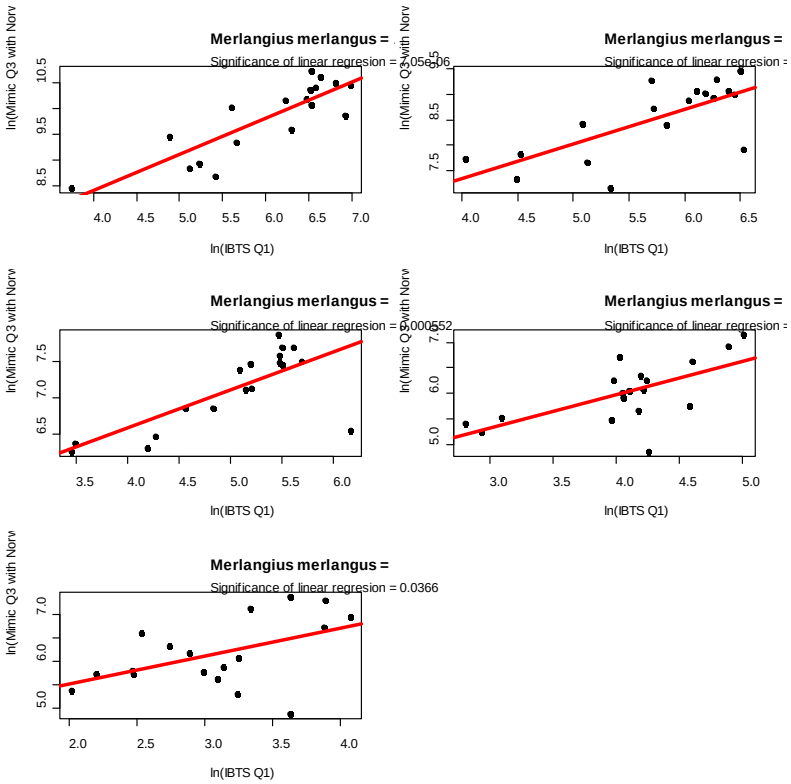

Figure 16. Whiting: Correlations between ICES produced Q1, and mimic Q3 indices with Norwegian data.

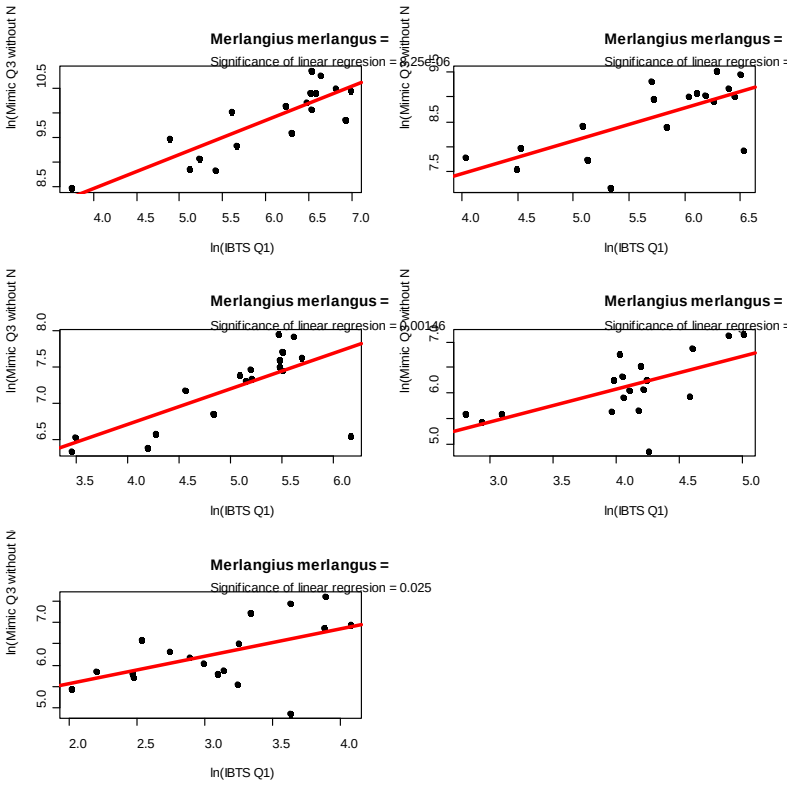

Figure 17. Whiting: Correlations between ICES produced Q1, and mimic Q3 indices without Norwegian data.

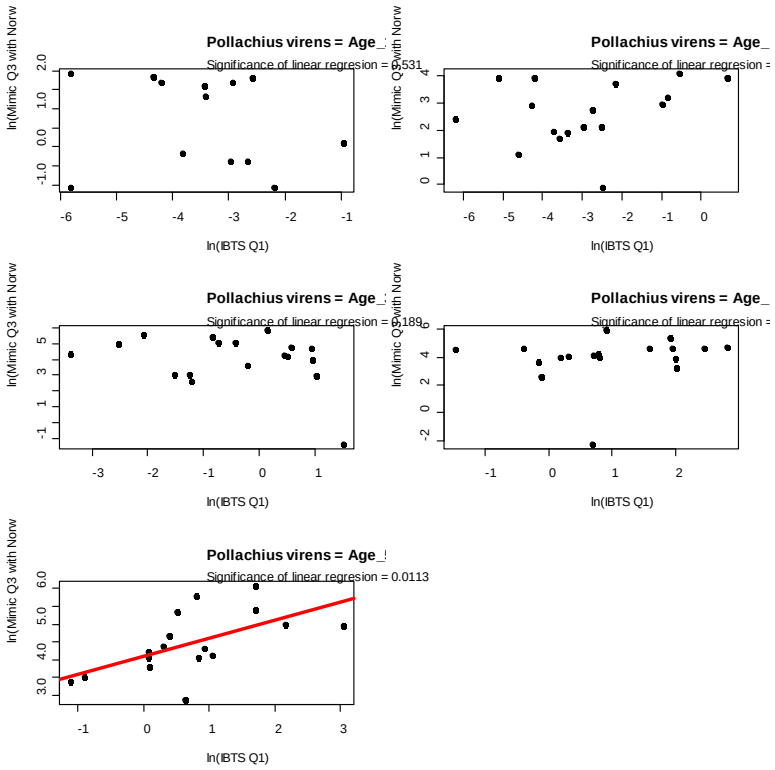

Figure 18. Saithe: Correlations between ICES produced Q1, and mimic Q3 indices with Norwegian data.

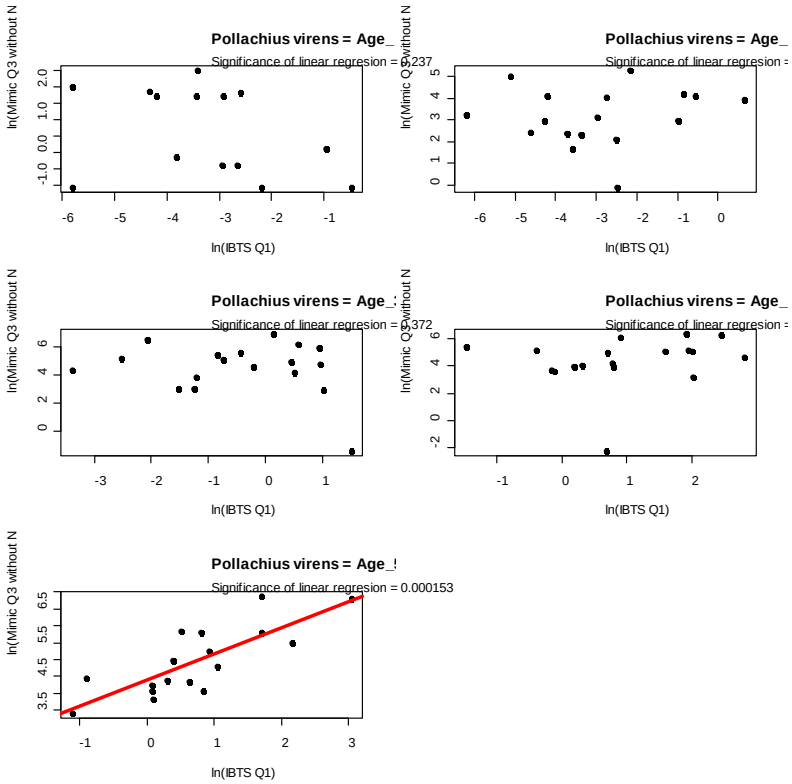

Figure 19. Saithe: Correlations between ICES produced Q1, and mimic Q3 indices without Norwegian data.

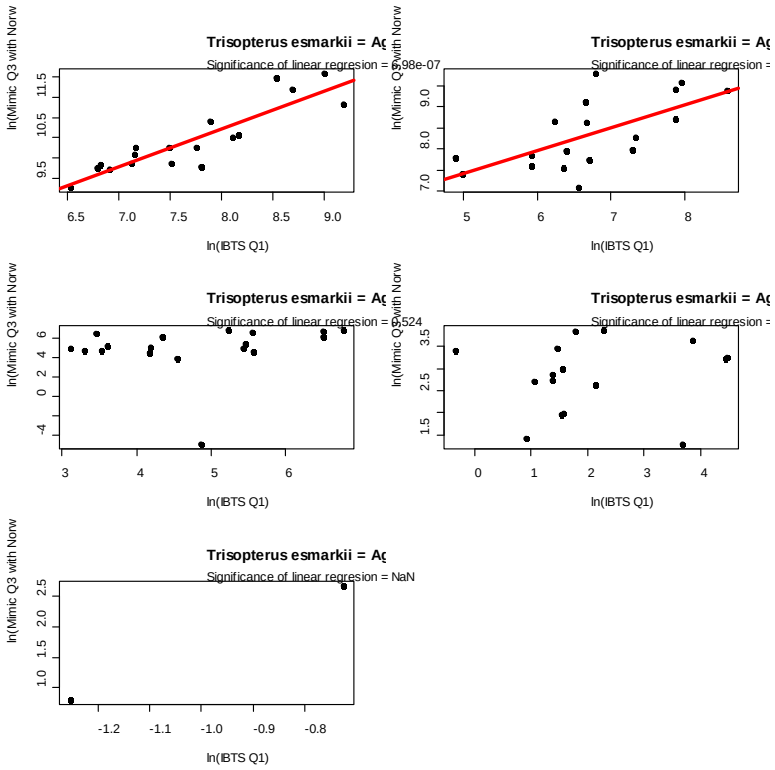

Figure 20. Norway pout: Correlations between ICES produced Q1, and mimic Q3 indices with Norwegian data.

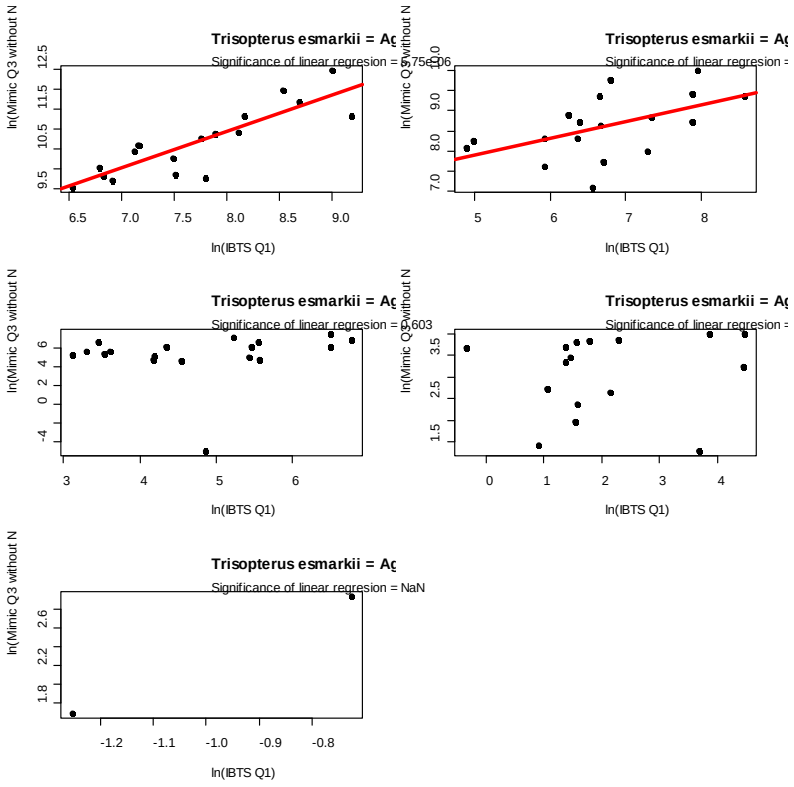

Figure 21. Norway pout: Correlations between ICES produced Q1, and mimic Q3 indices without Norwegian data.

Table 1. Cod: Table showing Norwegian contribution to IBTS data, per RFA and year.

		Norway		Others				
Year	RFA	Number of stations	Number of fish	Number of stations	Number of fish	Number of vessels in RFA (in addition to Norway)	Percentage of stations fished by Norway	Perc of fish caught by Norway
1999	1	39	1533	51	565	3	43	73
1999	2	15	389	42	1074	4	26	27
1999	3	13	34	32	54	4	29	39
1999	4	0	0	19	445	4	0	0
1999	5	0	0	13	74	2	0	0
1999	6	0	0	67	5724	4	0	0
1999	7	7	957	21	504	4	25	66
2000	1	36	682	47	596	2	43	53
2000	2	14	593	43	828	4	25	42
2000	3	12	21	29	128	2	29	14
2000	4	0	0	21	454	4	0	0
2000	5	0	0	14	148	2	0	0
2000	6	0	0	70	1848	4	0	0
2000	7	6	658	23	657	4	21	50
2001	1	37	688	51	890	3	42	44
2001	2	8	90	42	381	4	16	19
2001	3	1	2	32	68	4	3	3
2001	4	0	0	20	229	4	0	0
2001	5	0	0	12	122	2	0	0
2001	6	0	0	64	1396	4	0	0
2001	7	4	292	23	968	4	15	23
2002	1	40	385	51	492	3	44	44
2002	2	8	93	42	438	4	16	18
2002	3	4	0	33	84	4	11	0
2002	4	0	0	18	356	4	0	0
2002	5	0	0	12	452	2	0	0
2002	6	0	0	62	361	4	0	0
2002	7	4	422	20	761	4	17	36
2003	1	34	413	49	333	3	41	55
2003	2	1	36	44	328	4	2	10
2003	3	2	0	36	73	4	5	0
2003	4	0	0	19	278	4	0	0
2003	5	0	0	12	24	2	0	0
2003	6	0	0	63	64	4	0	0
2003	7	2	96	19	430	4	10	18
2004	1	36	274	51	678	3	41	29
2004	2	8	134	45	470	4	15	22
2004	3	7	34	36	76	4	16	31
2004	4	0	0	19	127	4	0	0
2004	5	0	0	12	4	2	0	0
2004	6	0	0	63	367	4	0	0
2004	7	2	317	20	394	4	9	45
2005	1	38	318	51	340	3	43	48
2005	2	7	223	42	454	4	14	33
2005	3	1	6	31	1298	4	3	0
2005	4	0	0	19	291	4	0	0
2005	5	0	0	12	8	2	0	0
2005	6	0	0	63	42	4	0	0
2005	7	7	304	19	156	4	27	66
2006	1	29	541	49	576	3	37	48
2006	2	11	184	42	955	4	21	16
2006	3	3	67	30	216	3	9	24
2006	4	0	0	19	331	4	0	0
2006	5	0	0	12	100	2	0	0
2006	6	0	0	63	784	4	0	0
2006	7	4	241	19	748	4	17	24
2007	1	40	599	52	908	3	43	40
2007	2	3	90	42	775	4	7	10
2007	3	0	0	32	142	4	0	0
2007	4	0	0	19	252	4	0	0
2007	5	0	0	12	106	2	0	0
2007	6	0	0	58	1756	4	0	0
2007	7	1	54	19	1321	4	5	4
2008	1	32	507	48	753	2	40	40
2008	2	3	374	41	1153	4	7	24
2008	3	0	0	31	134	3	0	0
2008	4	0	0	19	231	3	0	0
2008	5	0	0	12	227	2	0	0
2008	6	0	0	64	91	4	0	0
2008	7	1	26	28	850	4	3	3

Table 2. Haddock: Table showing Norwegian contribution to IBTS data, per RFA and year.

		Norway		Others				
Year	RFA	Number of stations	Number of fish	Number of stations	Number of fish	Number of vessels in RFA (in addition to Norway)	Percentage of stations fished by Norway	Perc of fish caught by Norway
1999	1	39	470242	51	563696	3	43	45
1999	2	15	97755	42	114455	4	26	46
1999	3	13	120300	32	257252	4	29	32
1999	4	0	0	19	16958	4	0	0
1999	5	0	0	13	6	2	0	0
1999	6	0	0	67	108	4	0	0
1999	7	7	80968	21	11440	4	25	88
2000	1	36	127637	47	188947	2	43	40
2000	2	14	40233	43	125291	4	25	24
2000	3	12	83113	29	172772	2	29	32
2000	4	0	0	20	74161	4	0	0
2000	5	0	0	14	350	2	0	0
2000	6	0	0	70	8742	4	0	0
2000	7	6	22817	23	17829	4	21	56
2001	1	37	44896	51	56173	3	42	44
2001	2	8	40606	42	38678	4	16	51
2001	3	1	815	32	96080	4	3	1
2001	4	0	0	20	35748	4	0	0
2001	5	0	0	12	18	2	0	0
2001	6	0	0	64	102	4	0	0
2001	7	4	5111	23	2681	4	15	66
2002	1	40	27119	51	44496	3	44	38
2002	2	8	12322	42	21924	4	16	36
2002	3	4	5284	33	77190	4	11	6
2002	4	0	0	18	18087	4	0	0
2002	5	0	0	12	4	2	0	0
2002	6	0	0	62	18	4	0	0
2002	7	4	3302	20	1016	4	17	76
2003	1	34	18040	49	28584	3	41	39
2003	2	1	732	44	27318	4	2	3
2003	3	2	6918	36	70640	4	5	9
2003	4	0	0	19	11009	4	0	0
2003	5	0	0	12	0	2	0	
2003	6	0	0	63	38	4	0	0
2003	7	2	495	19	564	4	10	47
2004	1	36	17395	51	20449	3	41	46
2004	2	8	10680	45	14751	4	15	42
2004	3	7	8870	36	39156	4	16	18
2004	4	0	0	19	4955	4	0	0
2004	5	0	0	12	0	2	0	
2004	6	0	0	63	32	4	0	0
2004	7	2	2348	20	566	4	9	81
2005	1	38	13939	51	37510	3	43	27
2005	2	7	2481	42	9715	4	14	20
2005	3	1	274	31	215727	4	3	0
2005	4	0	0	19	12413	4	0	0
2005	5	0	0	12	0	2	0	
2005	6	0	0	63	14	4	0	0
2005	7	7	2173	19	1955	4	27	53
2006	1	29	10669	49	27499	3	37	28
2006	2	11	5439	42	17045	4	21	24
2006	3	3	7459	30	70148	3	9	10
2006	4	0	0	19	12135	4	0	0
2006	5	0	0	12	6	2	0	0
2006	6	0	0	63	48	4	0	0
2006	7	4	732	19	1922	4	17	28
2007	1	40	15942	52	29595	3	43	35
2007	2	3	2581	42	21247	4	7	11
2007	3	0	0	32	60089	4	0	0
2007	4	0	0	19	5301	4	0	0
2007	5	0	0	12	4	2	0	0
2007	6	0	0	58	88	4	0	0
2007	7	1	40	19	1697	4	5	2
2008	1	32	6790	48	12610	2	40	35
2008	2	3	572	41	9669	4	7	6
2008	3	0	0	31	44458	3	0	0
2008	4	0	0	19	2595	3	0	0
2008	5	0	0	12	0	2	0	
2008	6	0	0	64	76	4	0	0
2008	7	1	16	28	7214	4	3	0

Table 3. Whiting: Table showing Norwegian contribution to IBTS data, per RFA and year.

		Norway		Others				
Year	RFA	Number of stations	Number of fish	Number of stations	Number of fish	Number of vessels in RFA (in addition to Norway)	Percentage of stations fished by Norway	Perc of fish caught by Norway
1999	1	39	1533	51	565	3	43	73
1999	2	15	389	42	1074	4	26	27
1999	3	13	34	32	54	4	29	39
1999	4	0	0	19	445	4	0	0
1999	5	0	0	13	74	2	0	0
1999	6	0	0	67	5724	4	0	0
1999	7	7	957	21	504	4	25	66
2000	1	36	682	47	596	2	43	53
2000	2	14	593	43	828	4	25	42
2000	3	12	21	29	128	2	29	14
2000	4	0	0	21	454	4	0	0
2000	5	0	0	14	148	2	0	0
2000	6	0	0	70	1848	4	0	0
2000	7	6	658	23	657	4	21	50
2001	1	37	688	51	890	3	42	44
2001	2	8	90	42	381	4	16	19
2001	3	1	2	32	68	4	3	3
2001	4	0	0	20	229	4	0	0
2001	5	0	0	12	122	2	0	0
2001	6	0	0	64	1396	4	0	0
2001	7	4	292	23	968	4	15	23
2002	1	40	385	51	492	3	44	44
2002	2	8	93	42	438	4	16	18
2002	3	4	0	33	84	4	11	0
2002	4	0	0	18	356	4	0	0
2002	5	0	0	12	452	2	0	0
2002	6	0	0	62	361	4	0	0
2002	7	4	422	20	761	4	17	36
2003	1	34	413	49	333	3	41	55
2003	2	1	36	44	328	4	2	10
2003	3	2	0	36	73	4	5	0
2003	4	0	0	19	278	4	0	0
2003	5	0	0	12	24	2	0	0
2003	6	0	0	63	64	4	0	0
2003	7	2	96	19	430	4	10	18
2004	1	36	274	51	678	3	41	29
2004	2	8	134	45	470	4	15	22
2004	3	7	34	36	76	4	16	31
2004	4	0	0	19	127	4	0	0
2004	5	0	0	12	4	2	0	0
2004	6	0	0	63	367	4	0	0
2004	7	2	317	20	394	4	9	45
2005	1	38	318	51	340	3	43	48
2005	2	7	223	42	454	4	14	33
2005	3	1	6	31	1298	4	3	0
2005	4	0	0	19	291	4	0	0
2005	5	0	0	12	8	2	0	0
2005	6	0	0	63	42	4	0	0
2005	7	7	304	19	156	4	27	66
2006	1	29	541	49	576	3	37	48
2006	2	11	184	42	955	4	21	16
2006	3	3	67	30	216	3	9	24
2006	4	0	0	19	331	4	0	0
2006	5	0	0	12	100	2	0	0
2006	6	0	0	63	784	4	0	0
2006	7	4	241	19	748	4	17	24
2007	1	40	599	52	908	3	43	40
2007	2	3	90	42	775	4	7	10
2007	3	0	0	32	142	4	0	0
2007	4	0	0	19	252	4	0	0
2007	5	0	0	12	106	2	0	0
2007	6	0	0	58	1756	4	0	0
2007	7	1	54	19	1321	4	5	4
2008	1	32	507	48	753	2	40	40
2008	2	3	374	41	1153	4	7	24
2008	3	0	0	31	134	3	0	0
2008	4	0	0	19	231	3	0	0
2008	5	0	0	12	227	2	0	0
2008	6	0	0	64	91	4	0	0
2008	7	1	26	28	850	4	3	3

Table 4. Saithe: Table showing Norwegian contribution to IBTS data, per RFA and year.

		Norway		Others				
Year	RFA	Number of stations	Number of fish	Number of stations	Number of fish	Number of vessels in RFA (in addition to Norway)	Percentage of stations fished by Norway	Perc of fish caught by Norway
1999	1	39	976	51	966	3	43	50
1999	2	15	6	42	2	4	26	75
1999	3	13	0	32	0	4	29	
1999	4	0	0	19	0	4	0	
1999	5	0	0	13	0	2	0	
1999	6	0	0	67	2	4	0	0
1999	7	7	626	21	6	4	25	99
2000	1	36	2993	47	2212	2	43	58
2000	2	14	84	43	4	4	25	95
2000	3	12	22	29	2	2	29	92
2000	4	0	0	21	0	4	0	
2000	5	0	0	14	0	2	0	
2000	6	0	0	70	0	4	0	
2000	7	6	136	23	36	4	21	79
2001	1	37	7829	51	6365	3	42	55
2001	2	8	360	42	23	4	16	94
2001	3	1	4	32	56	4	3	7
2001	4	0	0	20	0	4	0	
2001	5	0	0	12	0	2	0	
2001	6	0	0	64	0	4	0	
2001	7	4	160	23	38	4	15	81
2002	1	40	9570	51	5258	3	44	65
2002	2	8	24	42	58	4	16	29
2002	3	4	0	33	8	4	11	0
2002	4	0	0	18	0	4	0	
2002	5	0	0	12	0	2	0	
2002	6	0	0	62	0	4	0	
2002	7	4	18	20	70	4	17	20
2003	1	34	13432	49	3881	3	41	78
2003	2	1	168	44	150	4	2	53
2003	3	2	12	36	28	4	5	30
2003	4	0	0	19	4	4	0	0
2003	5	0	0	12	0	2	0	
2003	6	0	0	63	0	4	0	
2003	7	2	1375	19	12	4	10	99
2004	1	36	2413	51	3421	3	41	41
2004	2	8	0	45	14	4	15	0
2004	3	7	14	36	10	4	16	58
2004	4	0	0	19	4	4	0	0
2004	5	0	0	12	0	2	0	
2004	6	0	0	63	0	4	0	
2004	7	2	0	20	42	4	9	0
2005	1	38	2706	51	5261	3	43	34
2005	2	7	0	42	8	4	14	0
2005	3	1	0	31	32	4	3	0
2005	4	0	0	19	2	4	0	0
2005	5	0	0	12	0	2	0	
2005	6	0	0	63	8	4	0	0
2005	7	7	426	19	2	4	27	100
2006	1	29	1631	49	8536	3	37	16
2006	2	11	4	42	56	4	21	7
2006	3	3	12	30	30	3	9	29
2006	4	0	0	19	4	4	0	0
2006	5	0	0	12	0	2	0	
2006	6	0	0	63	0	4	0	
2006	7	4	208	19	34	4	17	86
2007	1	40	13921	52	8184	3	43	63
2007	2	3	0	42	172	4	7	0
2007	3	0	0	32	21	4	0	0
2007	4	0	0	19	2	4	0	0
2007	5	0	0	12	0	2	0	
2007	6	0	0	58	0	4	0	
2007	7	1	230	19	114	4	5	67
2008	1	32	3547	48	1797	2	40	66
2008	2	3	0	41	20	4	7	0
2008	3	0	0	31	10	3	0	0
2008	4	0	0	19	0	3	0	
2008	5	0	0	12	2	2	0	0
2008	6	0	0	64	2	4	0	0
2008	7	1	81	28	24	4	3	77

Table 5. Norway pout: Table showing Norwegian contribution to IBTS data, per RFA and year.

		Norway		Others				
Year	RFA	Number of stations	Number of fish	Number of stations	Number of fish	Number of vessels in RFA (in addition to Norway)	Percentage of stations fished by Norway	Perc of fish caught by Norway
1999	1	39	522666	51	550309	3	43	49
1999	2	15	158471	42	398507	4	26	28
1999	3	13	69672	32	113033	4	29	38
1999	4	0	0	19	619	4	0	0
1999	5	0	0	13	0	2	0	
1999	6	0	0	67	0	4	0	
1999	7	7	259743	21	10935	4	25	96
2000	1	36	309154	47	719215	2	43	30
2000	2	14	94473	43	288905	4	25	25
2000	3	12	122496	29	307614	2	29	28
2000	4	0	0	21	17376	4	0	0
2000	5	0	0	14	10	2	0	0
2000	6	0	0	70	2	4	0	0
2000	7	6	32165	23	26664	4	21	55
2001	1	37	165045	51	310613	3	42	35
2001	2	8	10757	42	76776	4	16	12
2001	3	1	8835	32	60957	4	3	13
2001	4	0	0	20	508	4	0	0
2001	5	0	0	12	72	2	0	0
2001	6	0	0	64	2	4	0	0
2001	7	4	69476	23	15056	4	15	82
2002	1	40	0	51	572029	3	44	0
2002	2	8	0	42	21646	4	16	0
2002	3	4	0	33	101360	4	11	0
2002	4	0	0	18	282	4	0	0
2002	5	0	0	12	0	2	0	
2002	6	0	0	62	0	4	0	
2002	7	4	0	20	7885	4	17	0
2003	1	34	104284	49	118355	3	41	47
2003	2	1	14283	44	1997	4	2	88
2003	3	2	18348	36	183204	4	5	9
2003	4	0	0	19	1189	4	0	0
2003	5	0	0	12	0	2	0	
2003	6	0	0	63	0	4	0	
2003	7	2	3709	19	2488	4	10	60
2004	1	36	36033	51	93977	3	41	28
2004	2	8	404	45	842	4	15	32
2004	3	7	32562	36	98782	4	16	25
2004	4	0	0	19	11329	4	0	0
2004	5	0	0	12	0	2	0	
2004	6	0	0	63	4	4	0	0
2004	7	2	0	20	3798	4	9	0
2005	1	38	41714	51	223160	3	43	16
2005	2	7	13040	42	8278	4	14	61
2005	3	1	1544	31	263465	4	3	1
2005	4	0	0	19	132	4	0	0
2005	5	0	0	12	2	2	0	0
2005	6	0	0	63	0	4	0	
2005	7	7	4478	19	1873	4	27	71
2006	1	29	86104	49	243855	3	37	26
2006	2	11	5755	42	24215	4	21	19
2006	3	3	29371	30	145458	3	9	17
2006	4	0	0	19	3785	4	0	0
2006	5	0	0	12	186	2	0	0
2006	6	0	0	63	0	4	0	
2006	7	4	11485	19	4026	4	17	74
2007	1	40	118105	52	489007	3	43	19
2007	2	3	62	42	21609	4	7	0
2007	3	0	0	32	226262	4	0	0
2007	4	0	0	19	7560	4	0	0
2007	5	0	0	12	0	2	0	
2007	6	0	0	58	0	4	0	
2007	7	1	2282	19	13233	4	5	15
2008	1	32	124490	48	277781	2	40	31
2008	2	3	0	41	8628	4	7	0
2008	3	0	0	31	262275	3	0	0
2008	4	0	0	19	23604	3	0	0
2008	5	0	0	12	0	2	0	
2008	6	0	0	64	0	4	0	
2008	7	1	1236	28	15493	4	3	7

Annex 6: Maps of species distribution

Table A6.1. Species for which distribution maps have been produced, with length split for pre-recruit (0-group) and post-recruit (1+ group) where appropriate. Asterisk (*) denotes extended species map covering North Sea Q3 surveys along with Western Area Q4 data.

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

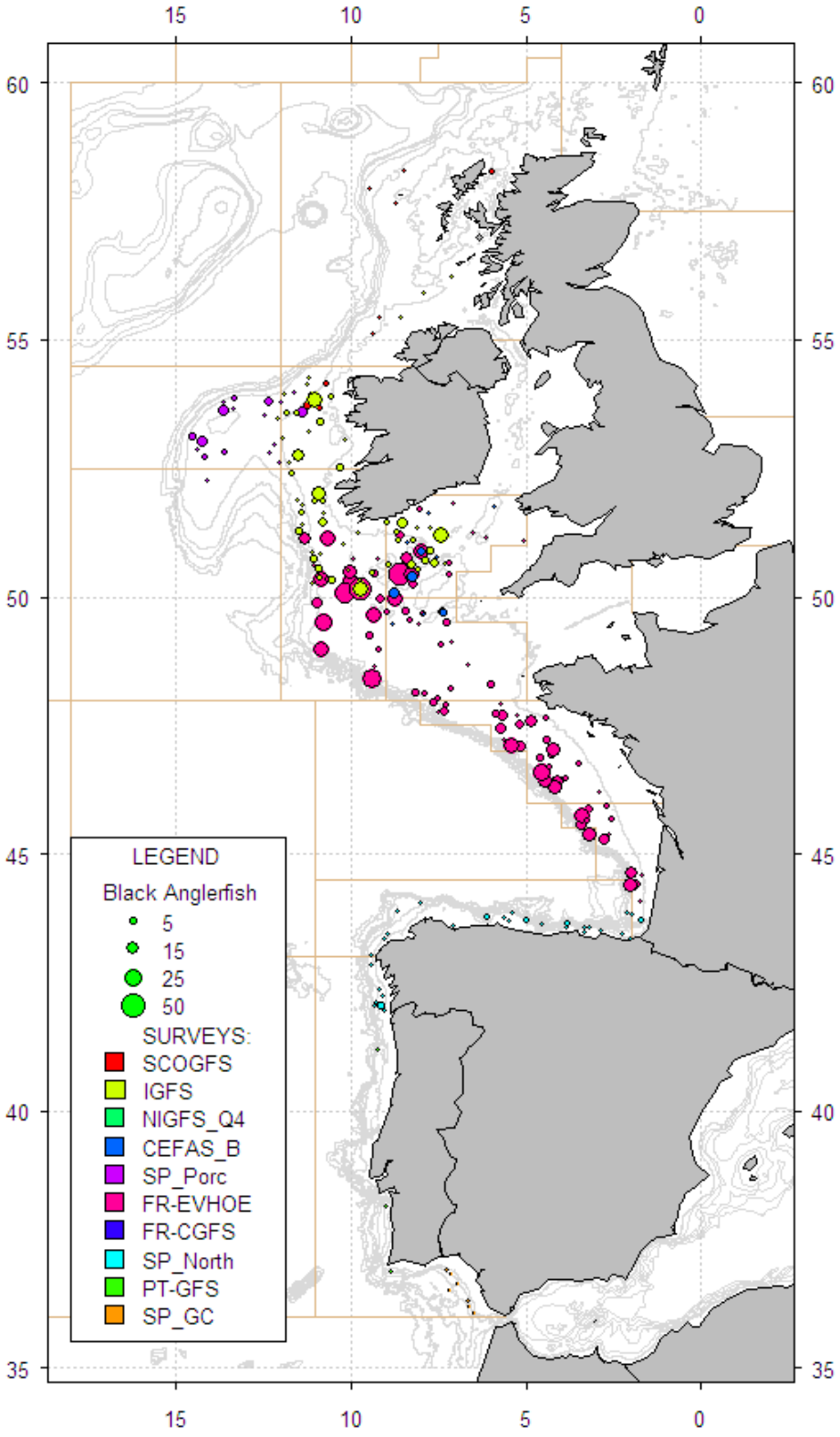

Figure A.6.17. Catches in numbers per hour of black anglerfish, , in autumn/winter 2008 IBTS surveys. The catchability of the different gears used in the WA surveys is not constant; therefore these maps do not reflect proportional abundance in all the areas but within each survey.