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13–16 May 2008

IJmuiden, Netherlands



ICES

International Council for
the Exploration of the Sea

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Contents

Contents	i
Executive Summary	1
1 Introduction.....	3
1.1 Terms of Reference	3
1.2 Participants	3
2 Review of WGBEAM 2007 recommendations and other recommendations relevant to WGBEAM.....	4
3 Results of surveys in 2007 (ToR a).....	6
3.1 Offshore Surveys	6
3.1.1 Participation and Coverage of the area.....	6
3.1.2 Survey results	6
3.1.3 Survey summary sheets per country.....	9
3.2 Inshore surveys	25
3.2.1 Participation and coverage of the area.....	25
3.2.2 Survey results	25
3.2.3 Survey summary sheets inshore surveys	28
4 Population abundance indices (ToR b)	42
4.1 Abundance indices by age-group for plaice and sole provided to the assessment WG's	42
4.1.1 Offshore indices	42
4.1.2 Inshore indices	43
5 Coordination and standardisation of beam trawl surveys (ToR c).....	62
5.1 Offshore beam trawl surveys.....	62
5.1.1 Timing and area coverage	62
5.2 Inshore surveys	62
5.2.1 Timing and area coverage	63
6 Evaluation of survey performance.....	64
6.1 Performance of offshore survey indices – internal consistency	64
6.1.1 Sole.....	64
6.1.2 Plaice.....	66
6.1.3 Belgian offshore survey.....	67
6.1.4 Combining Survey Indices	67
6.2 Comparison of Age-Length-Keys of plaice in the BTS 2007	68
7 Other ToR's.....	70
7.1 Development of manual (ToR e).....	70
7.2 Database developments (ToR f).....	70
7.3 Criteria for surveys coordinated (ToR g).....	70

8	References	71
	Annex 1: List of participants.....	72
	Annex 2: Recommendations for 2009.....	73
	Annex 3: Suggested ToRs for 2009	74
	Annex 4: Sampling coverage of offshore surveys	76
	Annex 5: Spatial distribution of fish species in offshore surveys	80
	Annex 6: Charts of Roundfish areas	111
	Annex 7: Abundance of fish species by Subdivision	112
	Annex 8: Abundance of fish species by roundfish area.....	115
	Annex 9: Abundance of 13 epifauna species by roundfish area.....	119
	Annex 10: Number of hauls by area and year	121
	Annex 11: Number of Hauls by depth class, year and country.....	125
	Annex 12: Planimetric data continental inshore surveys	128
	Annex 13: Biological data on inshore surveys.....	130
	Annex 14: Overlapping areas in offshore survey	139
	Annex 15: Details on offshore and inshore surveys	142
	Annex 16: Manual for the Beam Trawl Surveys – Revision 1.1	145
	Annex 17: Report workshop on the beam trawl data delivery to DATRAS (BTDATRAS), 18-20 February 2008, Copenhagen	170

Executive Summary

The Working Group on Beam Trawl Surveys (WGBEAM) is responsible for coordinating the international beam trawl surveys and for collating and summarizing the results of these surveys carried out in the North Sea, English Channel, Celtic Sea and in the Irish Sea. Progress on the surveys carried out in 2007 was reported and a new standard report format similar to that used by the IBTSWG was used for the first time. It is hoped that the new format will allow users such as assessment working groups to access information on the surveys more easily.

Tabulation of abundance

All the standard abundance indices used for tuning and recruitment estimation by working groups were updated with data for 2007 (Section 4) and trends in abundance of plaice and sole were reviewed. For plaice, the 2006 yearclass at age 1 in the North Sea is well above the long-term mean as is the 2006 yearclass at age 1 in VIId. For sole, the 2005 year class at age 2 in the North Sea is close to the average and confirms the trend for generally low recruitment since 1996 and the 2005 year class for sole in VIId is one of the poorest for the past 10 years.

All the standard abundance tables for finfish and epifauna species were updated with 2007 data (Annex 7, 8, 9) for the offshore surveys. WGBEAM changed the appearance of the species distribution plots (Annex 5) and split up ray species to the species level.

For the inshore surveys for the first time abundances per species were calculated for a selection of species (Annex 13).

Comparative fishing

During the 2007 offshore surveys, UK, Netherlands and Belgium carried out comparative tows on the same positions. Due to the small number of tows, no general conclusions can be drawn yet. A summary of the catches is in section 3.1.2.2.

For the inshore surveys, Germany compared catches from two slightly different gears (the Dutch and the German). A simulation was done on comparative tows. Further investigations need to be based on approaches for the estimation as well as for the simulations, which properly take into account the variability structure of the given data.

Survey coordination

In order to improve coordination of the surveys, the WG started creating a manual for beam trawl surveys in which the different surveys are described.

The timing and coverage of the surveys was summarized for 2009 and it was agreed that where there was overlap between surveys, countries should attempt to undertake comparative tows to allow further progress on evaluating gear efficiencies.

English-Dutch staff exchange will take place during the Dutch beam trawl survey.

WGBEAM was asked to consider the inclusion of a new survey in the Bay of Biscay. Following discussion on the aims and methodology of the survey it was agreed that it was suitable for coordination within WGBEAM.

Survey indices

In 2005, AMAWAC had requested survey WGs to review the performance of survey indices. In Section 6, WGBEAM again evaluated the internal consistency of the

surveys. This year WGBEAM took a more qualitative approach to examine the utility of the surveys and the information contained within each time-series covered by WGBEAM for sole and plaice. Statistical evaluation is possible only in relation to mortality as represented by the assessment, and therefore should be evaluated by assessment working groups.

WGBEAM had a first look at the Belgian survey indices for the offshore survey. The information was worked up separately by the currently implemented strata, with the combined result weighted only by the level of effort in each area. The survey appears to be less internally consistent for both plaice and sole than the other surveys, but there appears to be little contrast in yearclass strength over the time-series observed.

WGBEAM discussed the possibilities of combining indices (Section 6.1.4). Deciding on how to combine index information collected independently is very difficult. Weighting of the different components should be according to the contribution that each component has to the stock as a whole. However, this is not possible without external information and should ideally be done at the stock assessment level, not a priori.

Combining the indices into a single index overcomes the problem if it is representative of the stock as a whole. Usually this is not the case; otherwise there would be little need to conduct more than one survey in the first place.

Without prior knowledge of the proportion of the population that is sampled by any index it is not possible to combine these. Area weighting is one answer when the surveys are conducted at the same time with similar catchability, but when there is movement between areas over non-synoptic surveys or surveys overlap and used different gears this becomes subjective.

In the short term there is no objective a priori way of combining indices in isolation from the assessment. The recommendation from WGBEAM is to continue using separate surveys, but ensuring that the 'minimum s.e. to shrink to' is large. Shortening conflicting series to the length of the shorter series to minimize the effects of inverse variance weighting should also be considered.

Comparison of age-length keys

WGBEAM compared the age-length keys of the surveys from all countries. Age groups 1-5 show a usable agreement in the mean length. The discrepancy increases with the older ages, mainly as a consequence of less available otoliths.

Database developments

In February 2008, WGBEAM members and ICES secretariat met in Copenhagen and discussed the offshore beam trawl database format and the quality checks to be applied to the data sent to ICES. The report of the workshop is in Annex 17 WGBEAM agreed on the report and adopted the recommendations from the workshop.

WGBEAM worked on the inshore survey database and decided on composing this database from one exchange format which is comparable with the DATRAS exchange format.

WGBEAM agrees with IBTSWG on creating a DATRAS User group.

1 Introduction

Fisheries independent beam trawl surveys using research vessels were established in the 1980s by countries bordering the North Sea to monitor stocks of plaice and sole. Collation and analysis of some of the data derived from these surveys was undertaken by the Study Group on Beam Trawl Surveys, which in 1998 was re-established as the Working Group on Beam Trawl Surveys. Although the initial focus of its efforts was in the North Sea and Eastern Channel, the Working Group now evaluates all major surveys in Subarea IV and VII. Since 2008, the Working group evaluates the French sole survey in Subarea VIII a and b.

The Working Group comprises regular participants from all countries involved in the surveys Belgium, Germany, Netherlands and the UK. An annual report describing the surveys and summarizing the distribution and catch rate of fish species has been produced every year since 1990.

1.1 Terms of Reference

The **Working Group on Beam Trawl Surveys** [WGBEAM] (Chair: Ingeborg de Boois, The Netherlands) will meet in IJmuiden, The Netherlands from 13–16 May 2008 to:

- a) prepare a progress report summarising the results of the 2007 offshore and inshore beam trawl surveys;
- b) tabulate population abundance indices by age-group for sole and plaice in the North Sea, Division VIIa and Divisions VIId-g;
- c) further co-ordinate offshore and coastal beam trawl surveys in the North Sea and Divisions VIIa and VIId-g;
- d) evaluate and report on methodology and performance of calculating population abundance indices, taking into account the key issues involved in the index calculation;
- e) continue development of a manual to improve standardisation of sampling protocols, surveys gears and quality control aspects;
- f) continue work of developing and standardising an international (fish and epifauna) database of offshore beam trawl survey data and co-ordinate such activities with those of the IBTSWG;
- g) present a list of criteria for surveys that will be coordinated by WGBEAM and consider if the Bay of Biscay Sole survey matches the criteria.

WGBEAM will report by 31 August 2008 for the attention of the Living Resources and the Resource Management Committees, and ACOM.

1.2 Participants

A complete list of participants at the WGBEAM meeting is given in Annex 1 of the report.

2 Review of WGBEAM 2007 recommendations and other recommendations relevant to WGBEAM

1. *It is recommended that once the WGBEAM offshore surveys are uploaded to the DATRAS database that precision estimates are created, ready for inclusion in the next appropriate WGBEAM report (Section 3.1.1 Survey Reports).*

Because not all offshore data are uploaded in DATRAS, this recommendation is not yet relevant.

2. *It is recommended that relevant Working Groups review the standard reporting summaries for inshore and offshore surveys and report back to WGBEAM with any comments (Section 3.1.1 Survey Reports).*

WGBEAM did not get any feedback on the standard survey summary reports in the WGBEAM 2007 report. The chair of WGBEAM will send an e-mail to chairs of relevant working groups to point out the availability of the survey summary sheets in the WGBEAM 2008 report.

3. *WGBEAM recommended that inshore catch data should be analysed from 2008 onwards on a regular basis (Section 4.2.2).*

In this report, results for the inshore catch data are shown.

4. *WGBEAM recommends that if time and weather allows, Netherlands will attempt to carry out comparative tows with Germany and Belgium during periods when their surveys overlap in space and time. WGBEAM agreed to circulate a list of station positions to assist with this (Section 5.1.1 Survey coordination).*

Comparative tows were done by UK, Netherlands and Belgium in 2007 on two locations. Results are presented in 3.1.2.2.

5. *WGBEAM recommends organising a (2-day) workshop for beam trawl survey data managers in Copenhagen in 2008 to develop a consistent beam trawl survey data check procedure (Section 5.1.5 Survey coordination).*

A workshop was organized on which the DATRAS format was discussed by members of WGBEAM. The report of the workshop is in Annex 17.

6. *To facilitate better co-ordination of sampling and quality assurance, WGBEAM recommends that there should be staff exchanges between surveys and requests national institutes to provide funding (mainly travel costs) through the Data Collection Regulation to support this from 2008 onwards (Section 5.1.5 Survey coordination).*

Staff exchange between UK and Netherlands is organized for the 2008 offshore beam trawl survey.

7. *In view of the preliminary analysis on additional surveys, the WG recommends that further analyses should be undertaken separating data by age classes and spatial coverage. All countries should provide age based indices from the offshore surveys to Belgium by 1 Sep 2007 in order to allow further exploration of the single survey indices (Section 7.1.2 Additional survey indices).*

No analysis was done before WGBEAM, but during WGBEAM an analysis was done on the offshore survey indices (Section 6.1).

8. *WGBEAM recommends that for the continental inshore surveys, completion of the inshore databases (including quality controls) should be achieved by May 2008. For the*

UK surveys achieve completion of the database back until 1997 by May 2008 (Section 7.2.2 Evaluation of the International inshore index).

The inshore database was completed by May 2008. UK data were available from 2000 onwards because it was not possible to update the UK database faster.

9. In order to assess the affect of the revised data procedures on the abundance indices, WGBEAM that the international inshore indices should be recalculated. The performance of the new time series should be evaluated by March 2008 (Section 7.2.2 Evaluation of the International inshore index). (Note: this recommendation is dependant on the availability of a complete database for the continental inshore surveys)

Because the database for the inshore surveys was not completed before WGBEAM 2008 this recommendation will be shifted to 2009.

10. WGBEAM recommended that a statistical power analyses should be undertaken to provide advice on the number of hauls which would be needed in future experiments in order to obtain a statistically robust estimate of relative gear efficiency (Section 8.2 Inshore surveys gear comparisons).

Germany presented an analysis on the number of tows needed to obtain a statistically robust estimate. However, only hypothetical data were used for this analysis and the use of realistic data is preferred (Section 3.2.2).

11. WGBEAM recommended that further comparative tows should be carried out to extend the number of samples available for analysis in future (Section 8.2 Inshore surveys gear comparisons).

Comparative tows for the inshore surveys were carried out by Germany (Section 3.2.2). Comparative tows between countries were done by UK, Belgium and Netherlands during the offshore survey (Section 3.1.2).

12. (=11)

13. WGBEAM recognizes that epifauna is an important part of the catch, providing useful ecosystems information. Therefore, it recommends that ICES consider how a set of epifauna species can be added to the DATRAS database (Section 9 Database developments).

BTDATRAS covered this recommendation (Annex 17).

14. WGBEAM recommends sending 2007 data and any crucial updates of historical data of offshore and inshore data to the Chair of WGBEAM by 31 March 2008 (Section 9 Database developments).

It is still difficult to send the data by the deadline. WGBEAM tries to improve by the appointment to send offshore and inshore data in DATRAS format to the chair from 2009 onwards.

15. It is recommended that first drafts of Sections 2 and 3 of the new WGBEAM offshore manual sections are completed for each survey by the institutes involved, before the start of next year's meeting (Section 10 Protocols and criteria for standardisation).

This recommendation is in the process of being implemented, see Annex 16.

3 Results of surveys in 2007 (ToR a)

ToR a) prepare a progress report summarising the results of the 2007 offshore and inshore beam trawl surveys

3.1 Offshore Surveys

3.1.1 Participation and Coverage of the area

Eight surveys were carried out, covering the North Sea, VIId, VIIe, VIIfg, VIIa, VIIa and VIIb. The participating vessels and time of the cruises is listed in Table 3.1.1.1. The coverage of the area by each of the participating countries' surveys and the number of stations sampled in 2007 is shown in Annex 4, Figures 3.1.1–3.1.4. The area covered is extended with VIIa and VII b since WGBEAM has incorporated the French sole survey in then Bay of Biscay. This survey is a beam trawl survey and is carried out since 2007.

Comparative tows have been carried out by UK, Belgium and the Netherlands during the 2007 survey in two ICES rectangles. Results of the comparison are shown in Table 3.1.2.2.1.

WGBEAM recommends that once the offshore surveys are uploaded to the DATRAS database ICES secretariat should be asked to provide precision estimates for inclusion in the next appropriate WGBEAM report.

WGBEAM recommends that relevant Working Groups review the standard reporting summaries for inshore and offshore surveys and give feedback to WGBEAM.

Table 3.1.1.1. Overview of the offshore surveys during 2007.

Country	Vessel	Area	Dates	Gear
Belgium	Belgica	southern North Sea (IVb,c)	28 Aug –7 Sept	4m beam
England	Corystes	VIId	20 Jul–3 Aug	4m beam
England	Corystes	VIIfg, VIIa	16 Sep–6 Oct	4m beam
England	Carhelmar	VIIe	9 Oct–16 Oct	4m beam
France	Gwen Drez	VIIa, VIIb	2 Nov -10 Dec	4m beam
Germany	Solea	German Bight (IVb)	16 – 30 Aug	7 m beam
Netherlands	Tridens	central North Sea (IVa,b)	20 Aug – 13 Sep	8m beam + flip-up rope
Netherlands	Isis	southern North Sea (IVb,c)	6 Aug – 6 Sep	8m beam

3.1.2 Survey results

3.1.2.1 Catch results

Distribution plots for the offshore survey fish species are presented in Annex 5. Numbers per hour for fish species per ICES division and roundfish area (rfa) are in Annex 7 and 8. The time-series of the catch of epifauna species per rfa is in Annex 9.

3.1.2.2 Comparative tows

Comparative tows have been carried out by UK, Belgium and the Netherlands during the 2007 survey in three ICES rectangles. The tows were done in ICES rectangles 31F2, 32F2 and 32F1. Exchange of positions was done after the survey since the offshore beam trawl surveys of UK, Netherlands and Belgium do not overlap in that

area. Results of the comparison are shown in Table 3.1.2.2.1, in percentage of the total numbers of fish caught in a rectangle per country.

Although catches vary between countries, it is clear that in 32F1 the catch composition of Netherlands and UK has many similarities. The numbers caught in a haul in an area are higher for UK than for Netherlands and Belgium. It is unclear if this is caused by a different sampling period or by the gear efficiency. Remarkable is, that Netherlands had complete net damage in 32F2 and Belgium had net damage twice in trying to do comparative tows. Some difference between the gears might be expected since UK did not face problems during the tows. The Dutch survey might have faced the problems because the gear is not equipped with a chain mat.

As for the length distribution in the catch (Table 3.1.2.2.2), it seems that UK caught smaller specimen of all species, but this is due to the timing of the survey and the mesh of the liner. The effect seems to be large for small roundfish (whiting and bib) but is present in plaice, sole and dab, too. The length distribution for bib, dab, plaice, sole and whiting is in table 3.1.2.2.2.

Table 3.1.2.2.1. Results of comparative tows in 2007 (in % of total numbers caught per country per rectangle) for a selection of species.

	32F1			32F2			31F2	
	NED	UK		BEL	UK		BEL	UK
WHITING POUT (BIB)	26.3	27	EUROPEAN PLAICE	5.3	17.8	EUROPEAN PLAICE	7.3	19
SOLE (DOVER SOLE)	19	17.4	POOR COD	30.5	16.1	DAB	0	17.9
EUROPEAN PLAICE	0.2	10.6	SCALD FISH	28.5	14.1	WHITING POUT (BIB)	0	15.5
WHITING	8.2	9.8	LESSER WEEVER FISH	0.7	12	LESSER WEEVER FISH	1.9	14.9
POOR COD	9	8	DAB	0	11.2	SCALD FISH	5.3	11.5
POGGE (ARMED BULLHEAD)	6.5	7.2	COMMON DRAGONET	11.9	7.2	COMMON DRAGONET	19.9	5.2
DAB	1.5	5.4	SOLENETTE	6.6	5.7	SOLE (DOVER SOLE)	0	4.5
LESSER SPOTTED DOGFISH	16.1	4.5	POGGE (ARMED BULLHEAD)	0	4	SOLENETTE	5.8	4.1
COMMON DRAGONET	11.4	3.8	WHITING	0.7	2.6	POGGE (ARMED BULLHEAD)	0	2.5
LESSER WEEVER FISH	0	1.6	WHITING POUT (BIB)	1.3	2.4	POOR COD	0	1.2
SOLENETTE	0	1	SOLE	11.3	1.5	TUB GURNARD	0.5	1.2
BRILL	0	0.9	SOLE (DOVER SOLE)	0	1.5	COD	0	0.8
LEMON SOLE	1.1	0.9	LEMON SOLE	0	1.1	LEMON SOLE	0	0.8
TUB GURNARD	0.2	0.9	COD	2.6	1	EDIBLE CRAB	0	0.1
SCALD FISH	0	0.5	TUB GURNARD	0.7	0.6	GREY GURNARD	0	0.1
EDIBLE CRAB	0	0.2	RED GURNARD	0	0.5	RED MULLET	0	0.1
GREY GURNARD	0.1	0.1	LESSER SPOTTED DOGFISH	0	0.3	TURBOT	0	0.1
THICKBACK SOLE	0.3	0.1	GREY GURNARD	0	0.2	WHITING	0	0.1
COD	0	0	BRILL	0	0.1	BRILL	0	0
GREATER WEEVER FISH	0	0	EDIBLE CRAB	0	0.1	GREATER WEEVER FISH	0	0
JOHN DORY	0	0	JOHN DORY	0	0.1	JOHN DORY	0	0
RED GURNARD	0	0	TURBOT	0	0.1	LESSER SPOTTED DOGFISH	0	0
RED MULLET	0.1	0	GREATER WEEVER FISH	0	0	RED GURNARD	0	0
SOLE	0	0	RED MULLET	0	0	SOLE	59.2	0
TURBOT	0	0	THICKBACK SOLE	0	0	THICKBACK SOLE	0	0

Table 3.1.2.2.2. Results of comparative tows in 2007 (in numbers per hour) for a selection of species.

	length (cm)	31F2 BEL UK	32F1 NED UK	32F2 BEL UK
DAB	4	44	36	28
	5	100	30	64
	6	56		4 76
	7	16		10 8
	8	4		14
	9			16
	10		6	6
	11		4	
	12		2 10	
	14	4	12	
	15		4 12	4
	16		2 8	28
	17	4	2 36	56
	18	40	2 32	32
	19	4 40	12	6 40
	20	6 72	6 14	16 20
	21	52	4 34	2 32
	22	2 32	10	2 36
	23	28	2	8 20
	24	2 12	10	6 12
	25	4	2 4	20
	26		10	2 12
	27	2 8	4	12
	28			4
	30	4		
	31	4		4
EUROPEAN PLAICE	13		6	
	14		6	
	15		6	
	16		10	
	17		10	
	18	12	40	8
	19	2 52	26	4 24
	20	4 64	32	2 56
	21	24 52	48	8 40
	22	8 56	76	12 64
	23	18 40	40	42 100
	24	2 60	32	40 96
	25	4 68	60	28 80
	26	6 28	2 44	32 68
	27	4 40	44	20 60
	28	2 8	2 12	18 40
	29	8	16	16 56
	30	4	12	6 4
	31	16	8	6 24
	32	6 16	14	4 12
	33	8	12	2 8
	34	4 4	4	4
	35	2 4		2 12
	36	8		8
	38			2 4
	39		4	
	41			4
	42			4
	43	4		
	45	4		
SOLE	17	2		
	21	2		
	22	8		
	23	6		2
	24	2		
	25	6		
	26	4		
	27	2		
	30	2		
	31			2

	length (cm)	31F2 BEL UK	32F1 NED UK	32F2 BEL UK
WHITING	7		24	
	8		10	
	9		22	4
	10		34	
	11		60	
	12		52	
	13		52	
	14		44	
	15		60	
	16		2 22	
	17		6 10	
	18		12 12	
	19		12 8	
	20		6 16	
	21		2 4	
	22		18 24	4
	23		28 16	8
	24		22 20	6 24
	25		16 16	44
	26		12	24
	27	4	6 10	2 8
	28		2	
WHITING POUT (BIB)	3		6	
	5		42	
	6		96	
	7		224	
	8		258	16
	9	48	182	16
	10	68	226	8
	11	76	32 160	4
	12	92	72 100	4
	13	52	120 90	4 8
	14	56	72 30	8
	15	28	72 4	6 20
	16	24	56	10 16
	17	8	32	6 8
	18		8	2
	23		4	

3.1.3 Survey summary sheets per country

3.1.3.1 Survey summary Belgium

Nation:	Belgium	Vessel:	RV "Belgica"
Survey:	Offshore North Sea Beam Trawl Survey	Dates:	28 August 2007–7 September 2007

Survey description:	An annual NSBTS survey is carried out in the southwestern part of the North Sea, IVb, c west, to sample the adult flatfish stocks, primarily targeting plaice and sole. Starting in 1992, the RV "Belgica" samples 62 fixed sampling stations in BTS Areas 2, 3 and 4.			
Gear details:	All NSBTS sampling stations are fished for approx. 30 min, with a 4 m beam trawl, codend 40 mm and chain mat.			
Notes from survey (e.g. problems, additional work etc.):	<p>59 valid stations done, 2 extra tows overlapping with the UK BTS.</p> <p>Number of otoliths: 20 ind per cm size class per BTS Area for sole and plaice.</p> <p>Indices for plaice and sole are the numbers per hour, averaged by ICES rectangle and averaged over all sampled ICES rectangles. The indices will be further investigated in co-operation with WGBEAM (See section 6.1.3).</p>			
Target species catch rates:		sole abundance (no per h)		plaice abundance (no per h)
	1993	139.7	1993	33.9
	1994	158.6	1994	42.8
	1995	113.9	1995	70.9
	1996	73.3	1996	55.3
	1997	114.4	1997	74.2
	1998	113.2	1998	74.3
	1999	75.8	1999	63.7
	2000	67.2	2000	42.4
	2001	35.3	2001	27.4
	2002	104.9	2002	78.5
	2003	94.9	2003	51.2
	2004	43.5	2004	41.5
	2005	103.5	2005	53.2
	2006	121.4	2006	44.7
	2007	67.6	2007	46.6
Number of fish species recorded and notes on any rare species or unusual catches:	The BTS measures all commercial fish species to the cm below and records all other fish species, most of them by length, if not by the number of individuals.			
Number of epifauna species recorded	A large list (number of individuals) of epibenthic/benthic species is recorded based on a subsample. A selected list, decided by WGBEAM, is presented to the WGBEAM			

Stations fished:

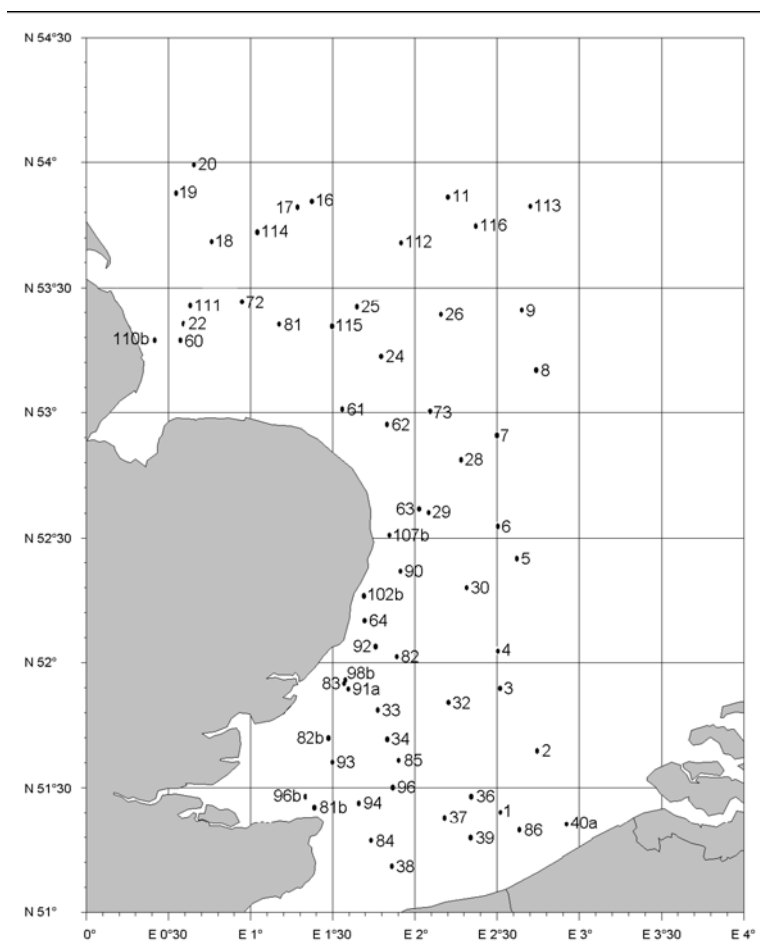
ICES Divisions	Strata	Gear	Indices stations	comments
----------------	--------	------	------------------	----------

VIb, c	62 fixed stations	4 m beam trawl	59	
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Number of biological samples (maturity and age material, *maturity only):				
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20 otoliths per cm size classes are collected per BTS Area for sole and plaice.

No maturity information is recorded (inappropriate period of the year).



3.1.3.2 Survey summary England: VIId & IVc

Nation:	UK (England and Wales)	Vessel:	RV "Corystes"
Survey:	1/07	Dates:	20 July–3 August 2007

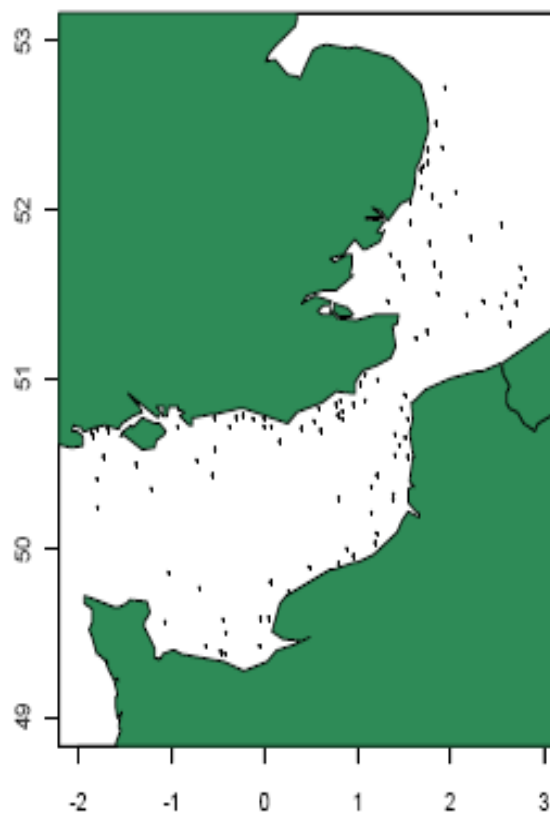
Survey description:	Q3 Eastern English Channel and Southern North Sea survey aims to collect data on distribution and relative abundance, with biological information on commercial fish species in VIId and IVc. The primary target species are sole and plaice, with additional species including lemon sole and cod.				
Gear details:	Steel 4m-beam trawl with chain mat and single flip-up rope, 80mm trawl with 40mm codend cover. Also attached is the SAIV mini CTD.				
Notes from survey (e.g. problems, additional work etc.):	Cefas continues to charter the Corystes in order to carry out this beam trawl survey. The survey was completed without incident. Additionally a number of stations off the Belgium coast were fished in an attempt to get better coverage of the IVc area. A number of stations, 14 in VIId and 5 in VIc, have been reduced from the standard 30 minute tow duration to 20 minutes for logistical reasons, for example benthic catch size and static gear areas.				
Target species catch rates:		Time series mean no. per h	2007 mean no. per h	Time series mean catch weight per h (kg)	2007 mean catch weight per h (kg)
	Sole	47.57	38.10	5.12	4.72
	Plaice	54.76	59.5	13.98	15.36
Number of fish species recorded and notes on any rare species or unusual catches:	70 separate species of finfish were caught. The top 10 by number are:				
	Buglossidium luteum				3631
	Callionymus lyra				4067
	Trisopterus luscus				2507
	Pleuronectes platessa				2261
	Solea solea				1791
	Trisopterus minutus				1449
	Limanda limanda				1268
	Arnoglossus laterna				778
	Trachinus (echiichthys) vipera				712
	Agonus cataphractus				804
Number of infauna species recorded:	79 separate infauna species were observed during the 2007 survey across both ICES divisions.				

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional Invalid	Total Valid	comments
VIII d & IV c	None	4m beam trawl	84	15	7	7	106 7 Additional stations off Belgium fished

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	1299	<i>Gadus morhua</i>	48
<i>Solea solea</i>	933	<i>Platichthys flesus</i>	68
<i>Limanda limanda</i>	478	<i>Scophthalmus rhombus</i>	15
<i>Microstomus kitt</i>	158	<i>Psetta maxima</i>	42

Positions of stations sampled in 2007 on 7d BTS



3.1.3.3 Survey summary England: VIIa and VIIf

Nation:	UK (England and Wales)	Vessel:	RV "Corystes"
Survey:	2/07	Dates:	16 September–6 October 2007

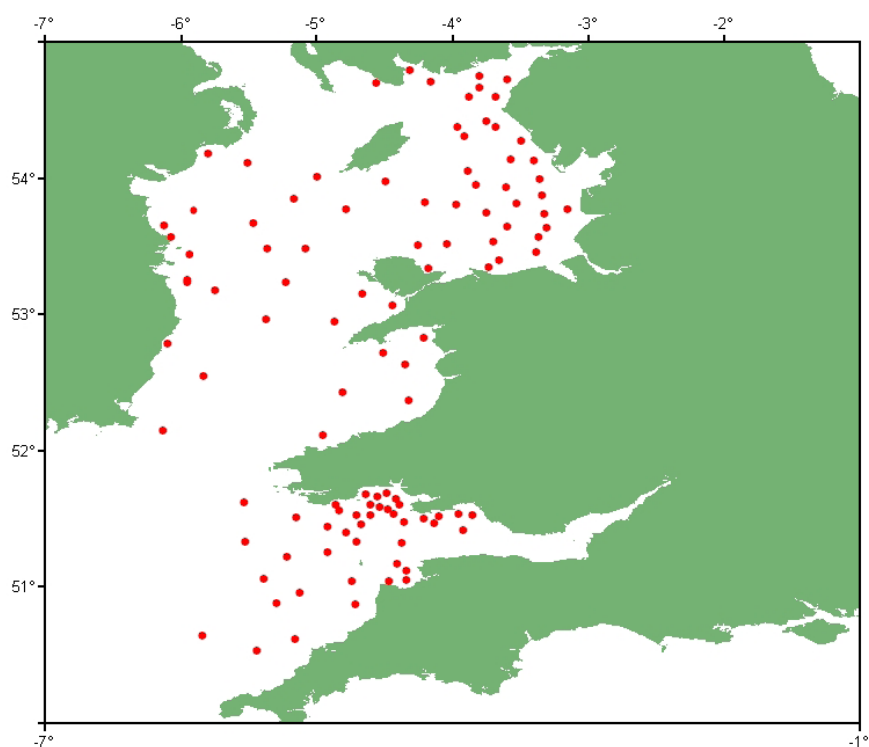
Survey description	Q3 Irish Sea and Bristol Channel survey aims to collect data on distribution and relative abundance, with biological information on commercial fish species in VIIa and VIIf. The primary target species are sole and plaice, with additional species including whiting, lemon sole and cod.				
Gear details:	Steel 4m-beam trawl with chain mat and single flip-up rope, 80mm trawl with 40mm codend cover. Also attached is the SAIV mini CTD.				
Notes from survey (e.g. problems, additional work etc.):	Cefas continues to charter the Corystes in order to carry out this beam trawl survey. The survey was completed without incident. Water sampling at stations in the Bristol Channel was carried out under external contract. Samples of <i>Limanda limanda</i> , <i>Scyliorhinus canicula</i> and various species of ray were collected as part of an ongoing radiological monitoring program within Cefas.				
Target species catch rates:		Time series mean no. per h	2007 mean no. per h	Time series mean catch weight per h (kg)	2007 mean catch weight per h (kg)
	Sole VIIa	35.96	18.51	4.68	2.92
	Sole VIIf	77.93	54.65	8.27	7.32
	Plaice VIIa	202.68	313.43	17.99	25.59
	Plaice VIIf	27.25	33.89	4.82	6.36
Number of fish species recorded and notes on any rare species or unusual catches:	82 separate species of finfish were caught. The top 10 by number are:				
	<i>Limanda limanda</i>			9787	
	<i>Pleuronectes platessa</i>			7549	
	<i>Buglossidium luteum</i>			7179	
	<i>Trisopterus minutus</i>			6679	
	<i>Callionymus lyra</i>			3013	
	<i>Eutrigla gurnardus</i>			1956	
	<i>Arnoglossus laterna</i>			1866	
	<i>Merlangius merlangus</i>			1854	
	<i>Scyliorhinus canicula</i>			1388	
	<i>Solea solea</i>			1321	
Number of infauna species recorded	71 separate infauna species were observed during the 2007 survey across both ICES divisions.				

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional Invalid	Total Valid comments	
VIIa,f	Depth band within stratum area	4m beam trawl	65	42	0	1	108

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	1587	<i>Gadus morhua</i>	51
<i>Solea solea</i>	778	<i>Melanogrammus aeglefinus</i>	74
<i>Limanda limanda</i>	468	<i>Lophius piscatorius</i>	34
<i>Microstomus kitt</i>	161	<i>Scophthalmus rhombus</i>	51
<i>Merluccius merluccius</i>	22	<i>Lepidorhombus whiffiagonis</i>	18
<i>Merlangius merlangus</i>	209	<i>Scophthalmus maximus</i>	25

Station positions for Corystes 2/07 Beam Trawl survey



3.1.3.4 Survey summary England: VIIe

Nation:	UK (England and Wales)	Vessel:	FV "Carhelmar"
Survey:	2/07	Dates:	9–16 October 2007

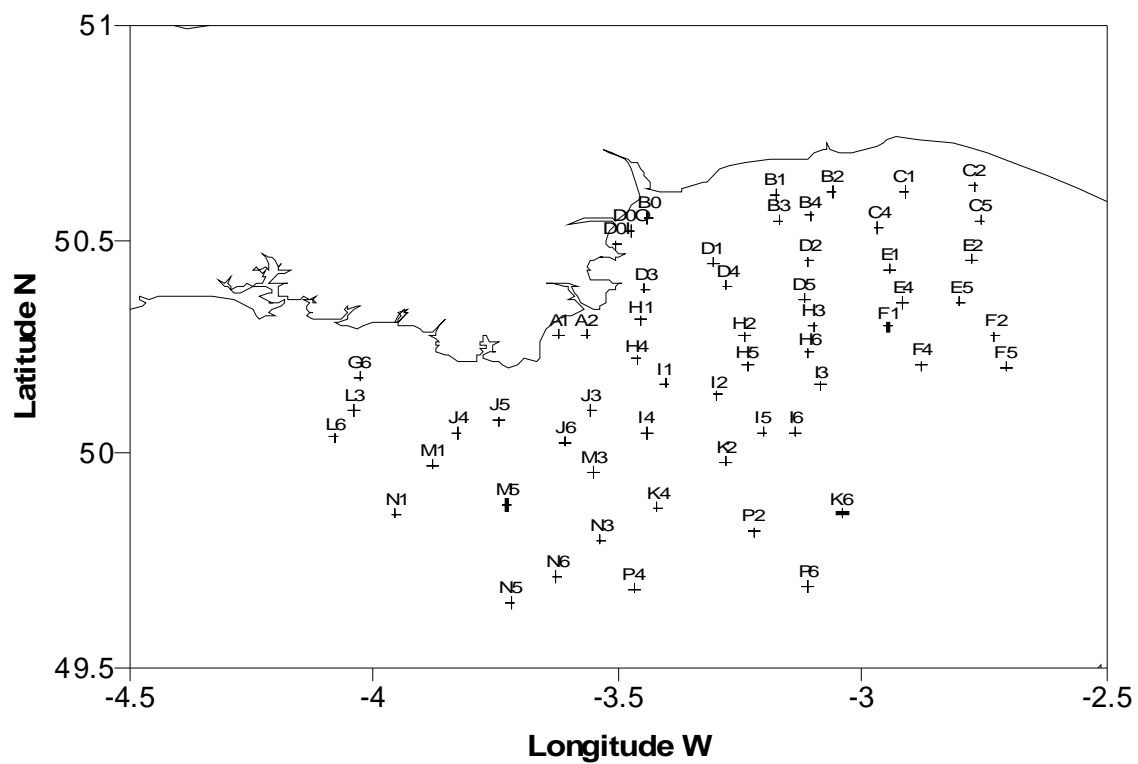
Survey description	Q4 Western English channel beam trawl survey. The primary target species are sole and plaice, with additional species including lemon sole and monkfish.			
Gear details:	Twin steel 4m-beam trawl with chain mat and single flip-up rope, 80mm trawl with 40mm codend cover. From 2006 a SAIV mini CTD has been attached to one beam.			
Notes from survey (e.g. problems, additional work etc.):	Cefas has carried out this survey since 1984, firstly on the FV Bogey1, then from 1998 on the FV Carhelmar. In 2002 the survey was switched to the RV Corystes for 3 years but since 2005 it has returned to FV Carhelmar. In 2007, the survey was completed without incident. Weights are only recorded for individual biological samples.			
Target species catch rates:		Time series mean no. per h	2007 mean no. per h	
	Sole	7.39	8.14	
	Plaice	8.67	6.64	
Number of fish species recorded and notes on any rare species or unusual catches:	82 separate species of finfish were caught. The top 10 by number are:			
	<i>Scylliorhinus canicula</i>			529
	<i>Solea sole</i>			463
	<i>Aspitrigla cuculus</i>			389
	<i>Pleuronectes platessa</i>			383
	<i>Limanda limanda</i>			331
	<i>Eutrigla gurnardus</i>			273
	<i>Buglossidium luteum</i>			272
	<i>Merlangius merlangus</i>			162
	<i>Arnoglossus laterna</i>			160
	<i>Trigla lucerna</i>			136
Number of infauna species recorded	Epibenthos is not recorded on this survey.			

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional Invalid	Total Valid	comments
VIIe	Distance from shore	2 x 4m beam trawl	49	49	9	0	58

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	280	<i>Solea solea</i>	298
<i>Lophius piscatorius</i>	29	<i>Lophius budegasa</i>	1
<i>Microstomus kitt</i>	17	<i>Gadus morhua</i>	4

Station positions for Carhelmar 1/07 Beam Trawl survey



3.1.3.5 Survey summary Germany

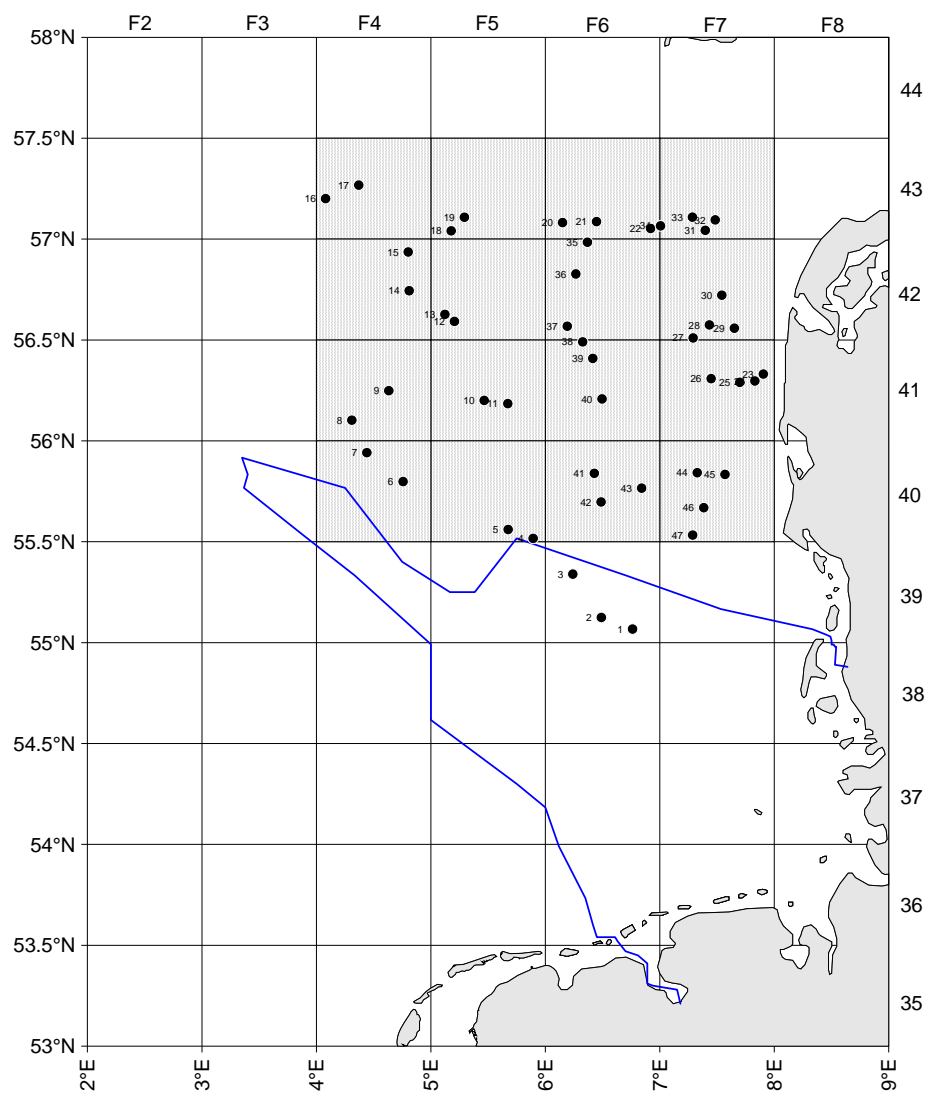
Nation:	Germany	Vessel:	RV "Solea"
Survey:	BTS	Dates:	16–30 August 2007

Survey description:	Q3 North Sea survey aims to collect data on distribution and relative abundance, with biological information, on commercial and other fish and invertebrate species in IVb to the west of Denmark. The distribution of young flatfish, particularly plaice, has particular attention (higher sampling density further inshore.)		
Gear details:	7 meter beam trawl with 5 ticklers, 40 mm mesh in the codend, 80 mm mesh in the net and a flip-up rope.		
Notes from survey (e.g. problems, additional work etc.):	47 hauls were carried out (approx. 23.5 hours fishing time).		
Target species catch rates:	Time series mean no. per h	2007 mean no. per h	
	Sole 4.01	4.0	
	Plaice 265.29	231.07	
Number of fish species recorded and notes on any rare species or unusual catches:	41 separate species of finfish were caught. The top 10 by number are: <i>Limanda limanda</i> 13844 <i>Pleuronectes platessa</i> 4935 <i>Buglossidium luteum</i> 1585 <i>Eutrigla gurnardus</i> 1424 <i>Hippolossoides platessoides</i> 1151 <i>Arnoglossus laterna</i> 875 <i>Callionymus lyra</i> 718 <i>Microstomus kitt</i> 315 <i>Raja radiata</i> 302 <i>Agonus cataphractus</i> 246		
Number of epifauna species recorded:	20 epifauna (attached and free-living) species were observed during the 2007 survey.		

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
North Sea IVb	N/A	7m beam trawl	47	47	**	0	47	

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	1224	<i>Limanda limanda</i>	1001



3.1.3.6 Survey summary France

Nation:	France	Vessel:	NO "Gwen Drez"
Survey:	ORHAGO 07	Dates:	2 November–10 December 2007

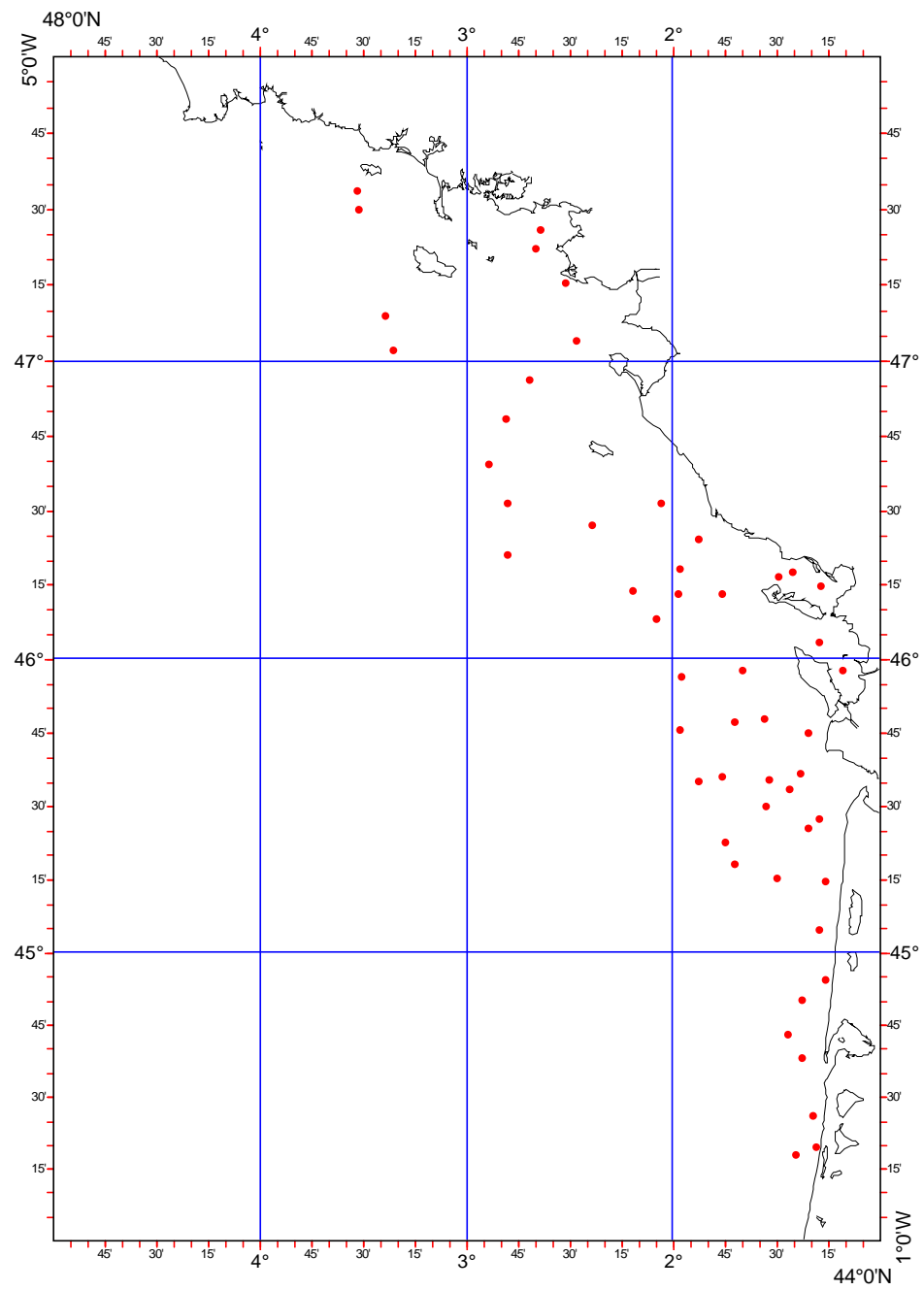
Survey description	Q4 Bay of Biscay survey to collect data on distribution and relative abundance, with biological information on some commercial fish species in VIIIa and VIIIb. The principal target species is sole, with additional species including <i>Nephrops norvegicus</i> , sand sole, thickback sole and senegalese sole.			
Gear details:	Steel 4m-beam trawl with chain mat, 120mm trawl with 100mm codend and 40mm purse.			
Notes from survey (e.g. problems, additional work etc.):	145 hauls were carried out (approx. 66 hours fishing time). 50 replicate tows were made for day-night studies. Bottom temperature was recorded during each haul.			
Target species catch rates:	Mean no. per hour Time series 2007		Mean catch weight (kg) per h Time series 2007	
	Sole (day)	20.08		3.67
	Sole (night)	28.60		4.98
	Sole (total)	24.30		4.32
Number of fish species recorded and notes on any rare species or unusual catches:	64 separate species of finfish were caught. The top 10 by number per h are :			
	Day		Night	
	<i>Arnoglossus laterna</i>	36.00	<i>Trisopterus luscus</i>	101.61
	<i>Trisopterus luscus</i>	25.08	<i>Arnoglossus laterna</i>	38.08
	<i>Merluccius merluccius</i>	21.88	<i>Solea vulgaris</i>	30.68
	<i>Solea vulgaris</i>	21.29	<i>Callionymus lyra</i>	22.69
	<i>Munia</i> sp.	15.63	<i>Dicologlossa cuneata</i>	18.10
	<i>Callionymus lyra</i>	13.33	<i>Microchirus variegatus</i>	16.36
	<i>Dicologlossa cuneata</i>	10.50	<i>Buglossidium luteum</i>	12.28
	<i>Microchirus variegatus</i>	9.33	<i>Trisopterus minutus</i>	10.45
	<i>Glycemeris glycemeris</i>	8.42	<i>Mullus surmuletus</i>	5.23
	<i>Buglossidium luteum</i>	7.92	<i>Merluccius merluccius</i>	5.01
Number of epifauna species recorded	24 separate epifauna species at day and 22 separate epifauna species at night were observed during the 2007 survey across VIIIab ICES division.			

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total valid	comments
VIIIab	N/A	4m beam trawl	50		40	5	140	50 replicate tows for day-night studies.

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

Species	Number	Species	Number
<i>Solea vulgaris</i>	387	<i>Merluccius merluccius</i>	250
<i>Argyrosomus regius</i>	127	<i>Lophius piscatorius</i>	89

Tow positions (day and night)

3.1.3.7 Survey summary Netherlands: Tridens

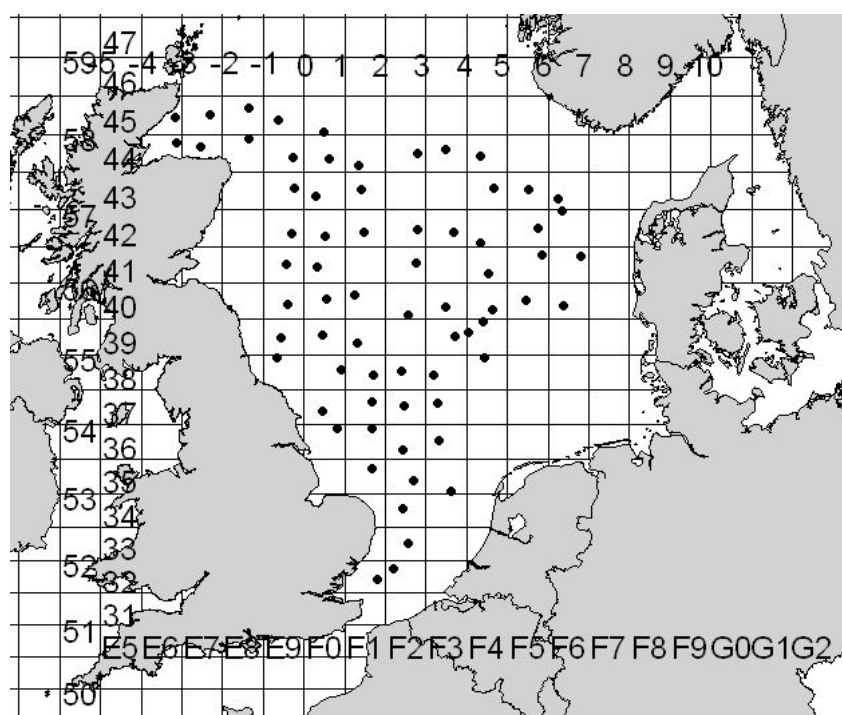
Nation:	Netherlands	Vessel:	RV "Tridens"
Survey:	BTS (Beam Trawl Survey)	Dates:	20 August–13 September 2007

Survey description	The BTS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age composition of flatfish species, (ii) monitor species composition of epibenthos species by counting and weighing (if possible), (iii) create a fishery-independent estimate of age density for plaice and sole in the North Sea for stock assessment, (iv) monitor sex- and length composition of <i>Cancer pagurus</i> , <i>Nephrops norvegicus</i> and elasmobranch species.		
Gear details:	8 meter beam trawl with 8 ticklers, 40 mm mesh in the codend, 120 mm mesh in the net and a flip-up rope.		
Notes from survey (e.g. problems, additional work etc.):	69 hauls were carried out (approx. 34 hours fishing time). The survey was completed with minor incidents. Net damage was repaired within a few hours. Vertical CTD measurements were carried out after each haul.		
Target species catch rates:	Time series mean no. per h	2007 mean no. per h	
	Sole no index		
	Plaice 61.65	114.90	
Number of fish species recorded and notes on any rare species or unusual catches:	62 separate species of finfish were caught. The top 10 by number are: <i>Limanda limanda</i> 24003 <i>Pleuronectes platessa</i> 3886 <i>Hippalosoides platessoides</i> 3786 <i>Eutrigla gurnardus</i> 2058 <i>Arnoglossus laterna</i> 1563 <i>Buglossidium luteum</i> 1371 <i>Microstomus kitt</i> 1357 <i>Callionymus lyra</i> 1221 <i>Merlangius merlangus</i> 1086 <i>Echiichthys vipera</i> 1071		
Number of epifauna species recorded	149 epifauna (attached and free-living) species were observed during the 2007 survey.		

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
North Sea	N/A	8m beam trawl	42	26	0	1	68	

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	1333	<i>Merluccius merluccius</i>	45
<i>Limanda limanda</i>	545	<i>Psetta maxima</i>	28
<i>Microstomus kitt</i>	362	<i>Scophthalmus rhombus</i>	14
<i>Hippoglossoides platessoides</i>	256	<i>Arnoglossus laterna</i>	7
<i>Solea solea</i>	204	<i>Zeugopterus norvegicus</i>	7
<i>Gadus morhua</i>	170	<i>Molva molva</i>	6
<i>Microchirus variegatus</i>	61	<i>Buglossidium luteum</i>	4



3.1.3.8 Survey summary Netherlands: Isis

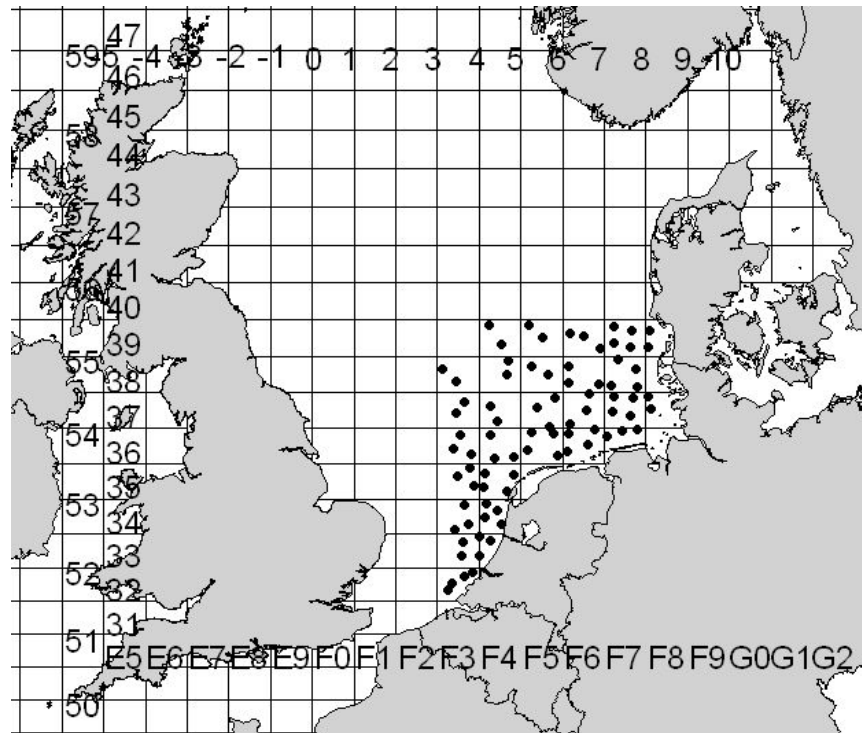
Nation:	Netherlands	Vessel:	RV "Isis"
Survey:	BTS (Beam Trawl Survey)	Dates:	6 August–6 September 2007

Survey description	The BTS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age composition of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent estimate of age density for plaice and sole in the North Sea for stock assessment, (iv) monitor sex- and length composition of <i>Cancer pagurus</i> , <i>Nephrops norvegicus</i> and elasmobranch species.		
Gear details:	8 meter beam trawl with 8 ticklers, 40 mm mesh in the codend, 120 mm mesh in the net.		
Notes from survey (e.g. problems, additional work etc.):	82 hauls were carried out (approx. 40 hours fishing time). All priority ICES rectangles planned were sampled.		
Target species catch rates:	Time series	2007 mean	
	mean no. per hno. per h		
	Sole	47.81	29.63
	Plaice	632.59	621.78
Number of fish species recorded and notes on any rare species or unusual catches:	46 separate species of finfish were caught. The top 10 by number are: <i>Limanda limanda</i> 39058 <i>Pleuronectes platessa</i> 30590 <i>Arnoglossus laterna</i> 7958 <i>Merlangius merlangus</i> 5853 <i>Buglossidium luteum</i> 5372 <i>Callionymus lyra</i> 4537 <i>Agonus cataphractus</i> 1874 <i>Echiichthys vipera</i> 1713 <i>Solea solea</i> 1375 <i>Eutrigla gurnardus</i> 1186		
Number of epifauna species recorded	70 epifauna (attached and free-living) species were observed during the 2007 survey.		

Stations fished:

ICES Divisions			Indices	Priority	Total		Comments
Strata	Gear		stations	stations	Additional	Invalid	Valid
North Sea	N/A	8m beam trawl	78	4	0	0	82

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	1080	<i>Psetta maxima</i>	28
<i>Solea solea</i>	486	<i>Scophthalmus rhombus</i>	61
<i>Limanda limanda</i>	406	<i>Gadus morhua</i>	5
<i>Microstomus kitt</i>	120	<i>Zeugopterus norvegicus</i>	2



3.2 Inshore surveys

3.2.1 Participation and coverage of the area

The inshore surveys in the North Sea are carried out by Belgium (Demersal Young Fish Survey-DYFS), Germany (DYFS), the Netherlands (Demersal Fish Survey-DFS) and UK (Young Fish Survey-YFS).

The Sole Net Survey (SNS), which is carried out by the Netherlands in the North Sea, is classified as an inshore survey, but 'nearshore' may be more appropriate because the area covered is further offshore than the other inshore surveys.

The participating vessels and time of the cruises is listed in Table 3.2.1.1. Details on areas covered by country are given in Annex 10.

Table 3.2.1.1. Overview of inshore surveys during 2007

Country	Vessel	Area	Dates	Gear
Belgium	Hinders/ Broodwinner	Belgian coastal zone	12 – 22 Sep	6 m shrimp trawl
England	F.V. Columbine & F.V. Fisher Lassie	Thames estuary	26 Aug – 4 Sep	2 m shrimp trawl
England	F.V. Challenge	Northeast English coastal zone	26 Aug – 4 Sep	2 m shrimp trawl
Germany	Chartered Cutters	German Bight and German Wadden Sea	3 Sep – 12 Oct	3 m shrimp trawl
Netherlands (SNS)	Isis	Dutch coastal zone	10 Sep – 20 Sep	6 m beam trawl
Netherlands	Schollebaar	Scheldt estuary	10 Sep – 28 Sep	3 m shrimp trawl
Netherlands	Stern	Dutch Wadden Sea	27 Aug – 28 Sep	3 m shrimp trawl
Netherlands	Isis	Dutch coastal zone and German Bight	24 Sep – 19 Oct	6 m shrimp trawl

3.2.2 Survey results

3.2.2.1 Catch results

In 2008, WGBEAM decided on which species to report on for the inshore surveys. The 10 most dominant species from the Dutch and German data for the period 1970-2007 and 1971-2007 respectively are chosen to present in this report. The list is extended with the priority species as decided on by TMAP. As some species are recorded differently by the different countries, it was necessary to categorize these species under their family name (e.g. Gobiidae) or genus unspecified (e.g. *Crangon* sp.). In total, numbers of 17 fish species are reported on for the inshore surveys. In addition, *Crangon* sp. is also included as it is one of the target species of the inshore surveys. The species composition per country per area for the continental surveys (Coastal, Wadden Sea, Scheldt Estuary) and aggregated for Thames and Humber for the UK surveys is listed in Annex 13.

3.2.2.2 Comparative tows

The quality of the conversion factors used to standardize the indices for 0- and 1-group of sole and plaice between gear types has been an item to the WG for a while (see previous reports). Those in use were derived from a series of experiments carried out in the late 1970's (ICES 1985), for most of which the raw data are no longer

accessible. Only for the comparison of English 2-m vs. the Dutch 3-m trawl, original information was available and re-analysed in the two previous reports (ICES 2006, 2007). In order to potentially improve the numerical conversion of the German 3-m to the Dutch 3-m survey trawl (which has a tickler chain additional to the rollers, supposed to augment the catch), additional experiments were carried out by Germany in 2006 and 2007 on board chartered shrimp trawlers. The double rigging allows simultaneous deployment of different gears on either side of the ship. It should be noted that these experiments can only be evaluated in respect to 0-group plaice, because 1-group plaice and young sole are generally too scarce in the German survey area to yield statistically relevant results. Thus all of the following refers to 0-group plaice.

The table of results of the 2006 hauls can be found in last year's report (ICES 2007c), together with an ad-hoc statistical analysis: based on pairwise t-tests, it was concluded that there was no statistically significant difference between the gears.

With the addition of 18 hauls realized in 2007, the dataset has grown to 47 valid hauls (3 hauls are disregarded because of zero catches on both sides), and a fresh analysis is attempted here. It shall include the exploration of ways towards the assessment of the statistical power in detecting a difference between gears under the observed variability.

Numerical conversion can most conveniently (though not uniquely) be done through an arithmetic factor. Considering the wide spread of numbers caught, a regression approach appears appropriate. After testing for significance, the slope of a regression line can be used as a generalized ratio if the function passes through the origin.

Still, the slope of the standard least squares regression approach (b_{yx} : slope of the regression of y on x) does not yield an unbiased ratio between the variables. Instead, for such purposes Ricker (1973) proposed a "Functional Regression", in particular the "Geometric Mean" regression, the slope of which is always higher than b_{yx} , unless the data are without scatter. For practical purposes, it has the convenient feature that $b_{GM} = b_{yx} / r$, with r as the correlation coefficient. Both values can easily be obtained from standard statistical routines.

Figure 3.2.2.2.1 shows the scatterplot for the given data with the standard regression lines with and without intercept, together with the GM line (dashed).

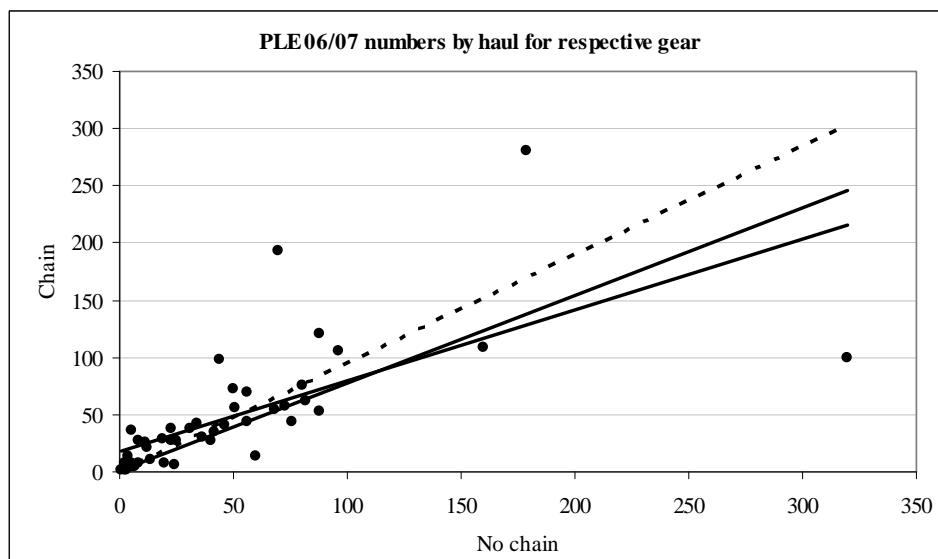


Figure 3.2.2.2.1. Numbers per haul for plaice in gear with chain (y-axis) vs. without chain (x-axis).

With 0.949 , $b_{GM} < 1$, which is not suggesting any difference between gears. The same message comes from comparing the total numbers caught (2161 for no chain vs. 2139 with chain).

However, the scatterplot shows that there are some extreme values in the upper range, which is common in natural abundance data, and which are influential in any mathematical evaluation. Figure 3.2.2.2.2 is a plot of half the difference between a data pair on the mean of that pair, as to approximate the residuals from a statistical model. It clearly shows a rising trend of the residuals with the mean, best approximated with a curve which is bent upwards.

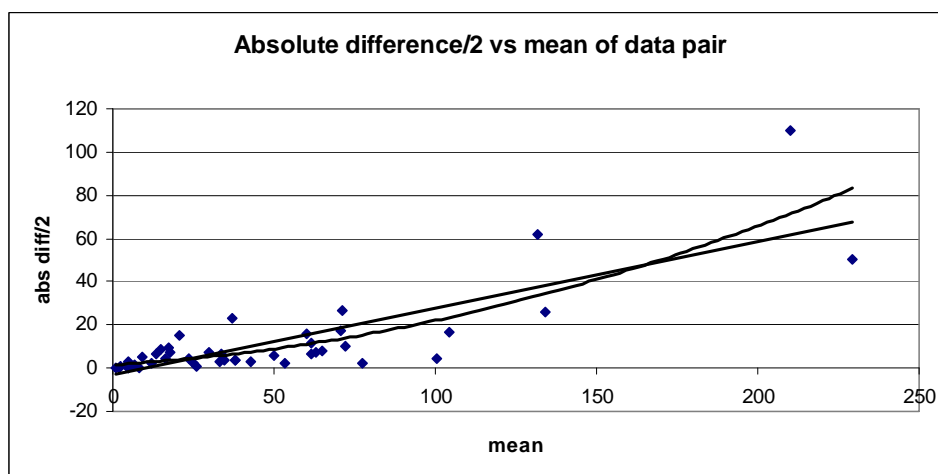


Figure 3.2.2.2.2. Half the difference between a data pair on the mean of that pair, for comparative tows (a second degree polynomial, with the quadratic term positive and significant).

Simulation showed that an input ratio of 1.2 can be recovered from about 50 synthetic hauls with a correlation of $r = 0.7$ (about the value for the given dataset), but under the unrealistic assumption of a bivariate normal distribution.

Further investigations need to be based on approaches for the estimation as well as for the simulations, which properly take into account the variability structure of the given data.

3.2.3 Survey summary sheets inshore surveys

3.2.3.1 Survey summary Belgium

Nation:	Belgium	Vessel:	O.29 'Broodwinner'
Survey:	Inshore Demersal Young Fish & Brown shrimp Survey	Dates:	12–22 September 2007

Survey description	As part of the international Demersal Young Fish (and Brown Shrimp) Survey, an annual autumn sampling survey is carried out in the Belgian coastal waters, to collect data on the abundance of juvenile flatfish (primarily plaice, <i>Pleuronectes platessa</i> , and sole, <i>Solea solea</i>) and brown shrimp (<i>Crangon crangon</i>). Since 1971, 33 fixed sampling stations are fished, (using the research vessel Hinders from 1971 to 1982) from 1983 onwards using the training and research vessel O.29 'Broodwinner' (LOA 27.2 m; engine power 221 kW). The location of the sampling area matches with the main flatfish nursery grounds along the Belgian coast.						
Gear details:	All DYFS sampling stations are fished for approx. 30 min, with a standard shrimp beam trawl (beam length 6 m; codend mesh size 18 mm).						
Notes from survey (e.g. problems, additional work etc.):	All 33 sampling stations were fished as planned. 32 stations were valid.						
Target species catch rates:							
2007 data	species	size class	average per 1000 km ²	species	size class	average per 1000 km ²	
	sole	<13	0.83	cod	<22	0.65	
		13 - 19	0.96		22 - 35	0.01	
		20 -23	0.23	dab	>35	0.01	
		>23	0.21		<11	19.21	
	plaice	<13	1.63		11 - 14	0.11	
		13 - 19	2.37		15 - 19	0.34	
		20 - 24	0.35		>19	0.30	
		>24	0.08				
	whiting	<22	9.41				
		22 - 30	0.23				
		>30	0.00				
Number of fish species recorded and notes on any rare species or unusual catches:	The DYFS measures only the commercial fish species to the cm below being sole, plaice, dab, cod, whiting, brill and turbot. In the future, the species list will be extended and covering all fish species caught.						
Number of epifauna species recorded	Appr. 500 brown shrimp per station are measured in 5 mm size classes. No other epifauna species are recorded.						

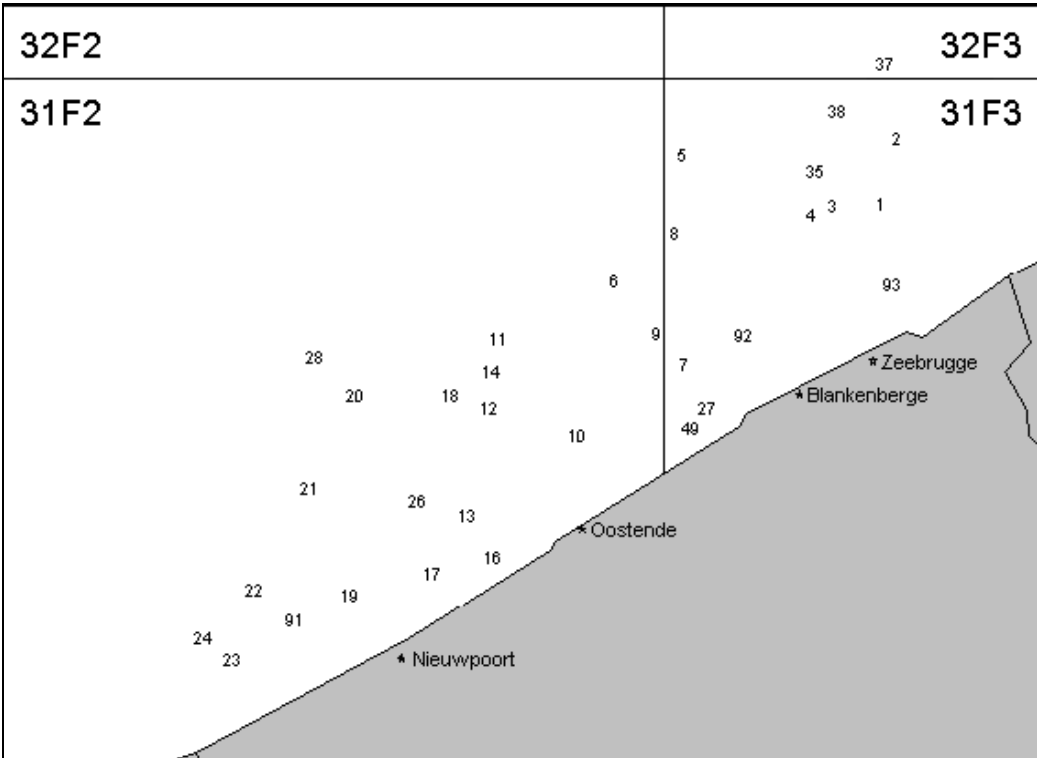
Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Valid	Comments
IVc	N/A	6m beam trawl	133	33	0	0	32	

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

none

DYFS sampling stations in the Belgian coastal waters



3.2.3.2 Survey summary: UK

Nation:	UK (England and Wales)	Vessel:	FV "Challenge", (NE coast & Humber) FV "Fisher Lassie" (N Thames), FV "Columbine" (S Thames)
Survey:	Humber 1/07; Thames 1/07	Dates:	26 August–4 September 2007

Survey description	The North Sea Young Fish Survey aims to collect data on the distribution and relative abundance of small fish (primarily juvenile sole and plaice) caught in inshore waters between the River Humber and Margate. Biological information is collected for sole and plaice. Temperature and salinities are recorded at each station and the shrimp catch and epibenthos quantified.		
Gear details:	A wooden 2m-beam trawl rigged with a fine mesh net with a codend liner of 4 mm knotless mesh, a light chain footrope and three tickler chains stretched loosely between the shoes.		
Notes from survey (e.g. problems, additional work etc.):	The survey was completed as planned without incident. In the River Humber 19 additional observations of dissolved oxygen readings were taken for the UK Environment Agency.		
Target species catch rates:		Time series mean no. per 1000m ² (2000 – 2007)	2007 mean no. per 1000m ²
	Plaice IVc	8.96	10.86
	Sole IVc	7.98	9.53
Number of fish species recorded and notes on any rare species or unusual catches:	37 separate species of finfish were caught. The top 10 by number are:		
	<i>Pomatoschistus sp.</i>	5262	
	<i>Solea solea</i>	1574	
	<i>Pleuronectes platessa</i>	1415	
	<i>Limanda limanda</i>	1022	
	<i>Trisopterus luscus</i>	339	
	<i>Callionymus lyra</i>	238	
	<i>Syngnathus rostellatus</i>	227	
	<i>Echiichthys vipera</i>	216	
	<i>Liparis liparis</i>	195	
	<i>Agonus cataphractus</i>	160	
Number of epifauna species recorded	From 2007 only core epibenthic species are identified to species. 18 separate epifauna species were observed during the 2007 survey under these new protocols.		

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Invalid	Total Valid	comments
Humber 1/07			80	0	80	2 stations not fished due to and weather and change of ground
Thames1/07			79	0	79	
IVc Total	Depth band within stratum area	2m beam trawl	159	0	159	

Number of biological samples (maturity and age material):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	99	<i>Solea solea</i>	113

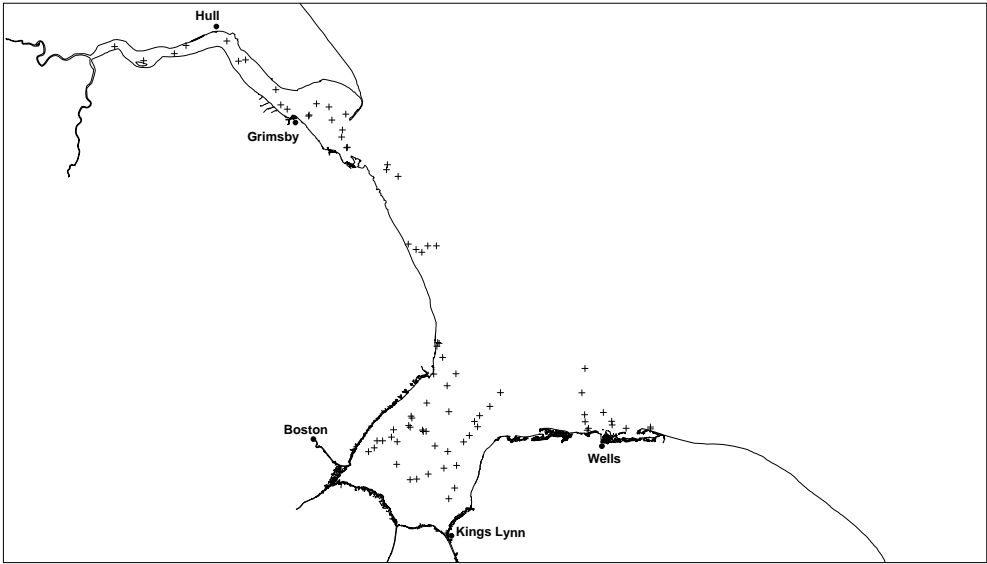


Figure 1a. Station positions for Humber 1/07.

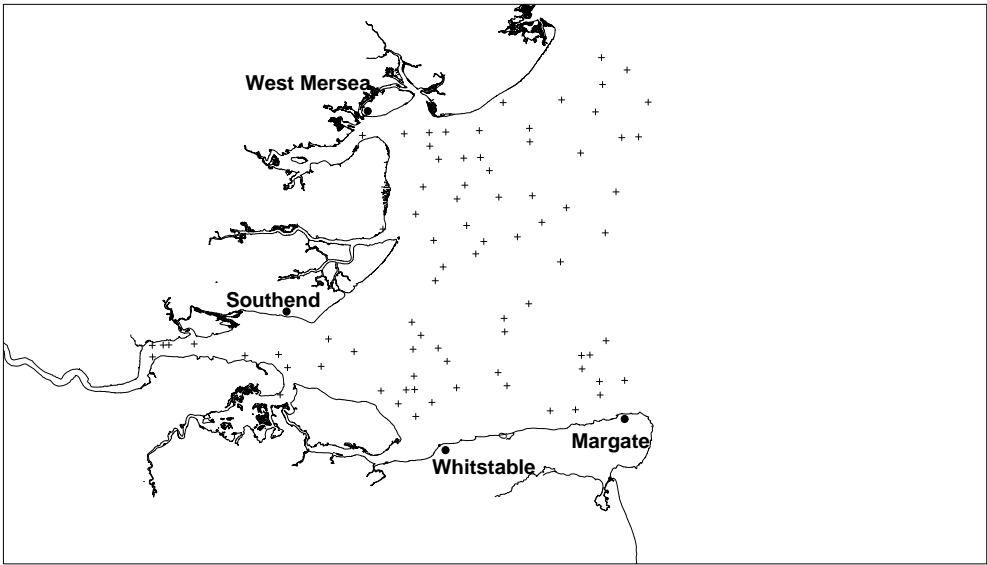
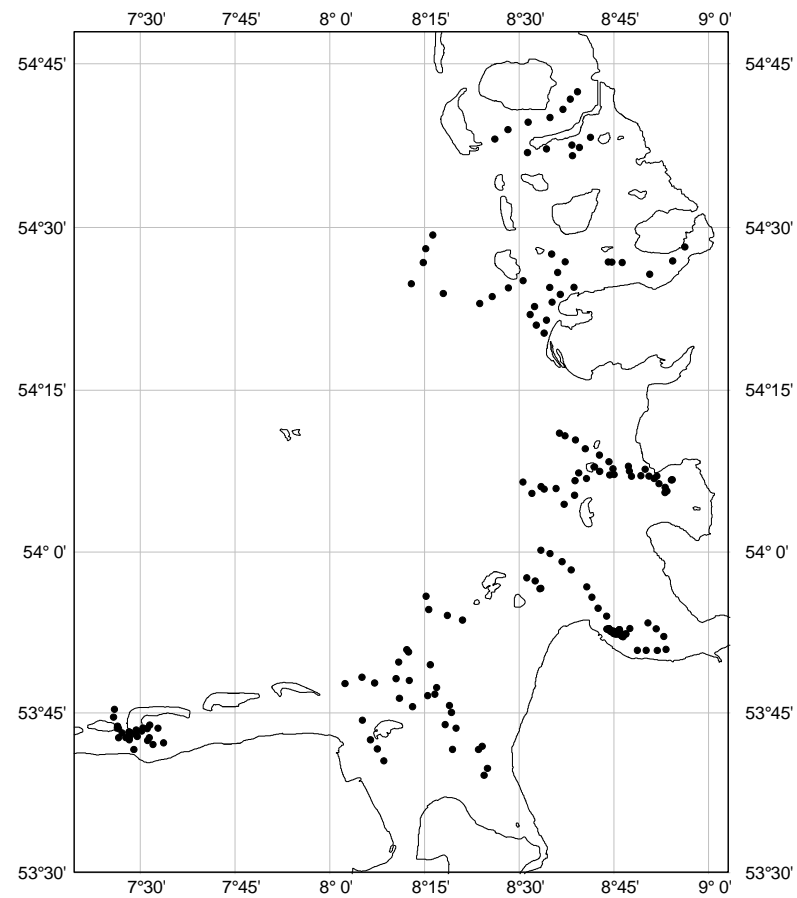


Figure 1b. Station positions for Thames 1/07.

3.2.3.3 Survey summary Germany

Nation:	Germany	Vessel:	Chartered Cutters			
Survey:	DYFS 2007	Dates:	03 September–12 October 2007 19 days fishing			
Survey description	The DYFS (Demersal Young Fish and Brown Shrimp Survey) aims to collect data on distribution and relative abundance, with biological information on fish and crustacean species in the Wadden Sea region. The primary target species are plaice and sole, with additional species including whiting, cod and brown shrimp.					
Gear details:	Steel 3m- shrimp-beam trawl without tickler chain, 20mm codend. An electronic mini sensor for time, temperature and pressure (light optional) is attached.					
Notes from survey (e.g. problems, additional work etc.):	BFAFi –ISH operates the survey since 1974. Weser estuary and Jade were included from 2005 onwards. Spring series were terminated. There is no fixed position grid, but the same channel systems and all depth strata covered within and outside the island chain down to approx. 12m water depth are sampled on a yearly basis. The deeper gullies are taken into account, too. Single station data are available. Time series indices are only available for Schleswig-Holstein area at present, the other areas are in a validation process. 2006 data are also available for entire German coastal zone. Data of only a limited number of “standard” invertebrates are stored in the ISH database. (Species list has changed also over years)					
Target species catch rates:		Time series mean (Schleswig-Holstein only) n/1000m²	2007 mean (Schleswig-Holstein only) n/1000m²	Time series mean	2007 mean (coastal Zone all along Germany) n/1000m²	
	Plaice	14.40	5.41		7.45	
	Sole	0.97	0.05		0.76	
	Cod	0.98	2.65		2.59	
	Whiting	2.23	2.66		4.09	
	Brown shrimp	1899			618.32	
Number of fish species recorded and notes on any rare species or unusual catches:	The top 10 by number are:					
	54 taxa of finfish were caught from 2001 to 2005. The top 10 by number in 2007 out of 36 taxa:					
	<i>Pleuronectes platessa</i>			6424		
	<i>Osmerus eperlanus</i>			3933		
	<i>Clupea harengus</i>			2867		
	<i>Agonus cataphractus</i>			2598		
	<i>Merlangius merlangus</i>			2399		
	<i>Pomatoschistus minutus</i>			2311		
	<i>Gadus morhua</i>			1762		
	<i>Limanda limanda</i>			1482		
<i>Platichthys flesus</i>			1022			
<i>Ciliata mustela</i>			435			
Number of epifauna species recorded	All epifauna found are recorded on protocols, however, only selected species are available in the ISH database. For 2007 they were					
	<i>Crangon crangon</i>			538102		
	<i>Macropipus holsatus</i>			20293		
	<i>Carcinus maenas</i>			5003		
	<i>Syngnathus rostellatus</i>			1681		
	<i>Asterias rubens</i>			1096		
	<i>Pandalus montagui</i>			948		
	<i>Paguridae</i>			457		
	<i>Ophiurida</i>			401		
	<i>Mytilus edulis</i>			176		
<i>Crangon allmanni</i>			18			



Stations sampled in the German DYFS 2007.

3.2.3.4 Survey summary Netherlands: Schollevaar

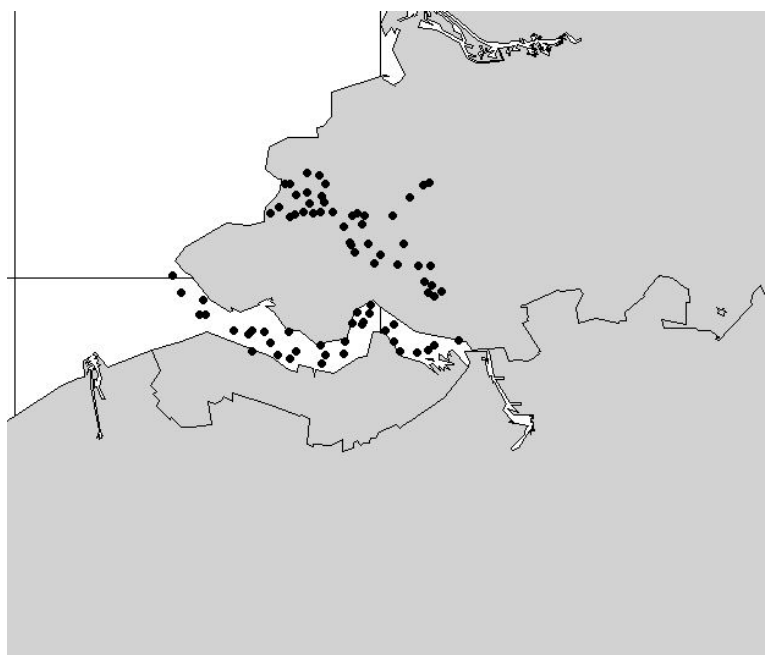
Nation:	Netherlands	Vessel:	RV "Schollevaar"
Survey:	DFS (Demersal Fish Survey)	Dates:	10–28 September 2007

Survey description	The DFS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age compositions of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent index of abundance by age group (0- and 1-group) for plaice and sole in the North Sea for stock assessment, (iv) collect data on length frequency distribution of brown shrimp (<i>Crangon crangon</i>).																																
Gear details:	3 meter beam trawl with 1 tickler chain and a bobbin rope (“shrimp net”).																																
Notes from survey (e.g. problems, additional work etc.):	77 hauls were carried out. A CTD was attached to the net.																																
Target species catch rates:	<table><thead><tr><th></th><th>Time series mean no./1000m²</th><th>2007 mean no. per 1000m²</th></tr></thead><tbody><tr><td>Sole</td><td>3.17</td><td>6.31</td></tr><tr><td>Plaice</td><td>14.93</td><td>11.99</td></tr></tbody></table> <p>Note: without area based weighting as used in the index calculations</p>				Time series mean no./1000m ²	2007 mean no. per 1000m ²	Sole	3.17	6.31	Plaice	14.93	11.99																					
	Time series mean no./1000m ²	2007 mean no. per 1000m ²																															
Sole	3.17	6.31																															
Plaice	14.93	11.99																															
Number of fish species recorded and notes on any rare species or unusual catches:	<p>34 separate species of finfish were caught.</p> <p>The top 10 by number are:</p> <table><tbody><tr><td><i>Pomatoschistus</i> sp.</td><td>7142</td><td></td></tr><tr><td><i>Pleuronectes platessa</i></td><td></td><td>3587</td></tr><tr><td><i>Solea solea</i></td><td></td><td>1706</td></tr><tr><td><i>Clupea harengus</i></td><td></td><td>1462</td></tr><tr><td><i>Limanda limanda</i></td><td></td><td>1097</td></tr><tr><td><i>Trisopterus luscus</i></td><td>603</td><td></td></tr><tr><td><i>Platichthys flesus</i></td><td>531</td><td></td></tr><tr><td><i>Dicentrarchus labrax</i></td><td></td><td>227</td></tr><tr><td><i>Merlangius merlangus</i></td><td></td><td>217</td></tr><tr><td><i>Gobius niger</i></td><td></td><td>111</td></tr></tbody></table>			<i>Pomatoschistus</i> sp.	7142		<i>Pleuronectes platessa</i>		3587	<i>Solea solea</i>		1706	<i>Clupea harengus</i>		1462	<i>Limanda limanda</i>		1097	<i>Trisopterus luscus</i>	603		<i>Platichthys flesus</i>	531		<i>Dicentrarchus labrax</i>		227	<i>Merlangius merlangus</i>		217	<i>Gobius niger</i>		111
<i>Pomatoschistus</i> sp.	7142																																
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<i>Dicentrarchus labrax</i>		227																															
<i>Merlangius merlangus</i>		217																															
<i>Gobius niger</i>		111																															
Number of epifauna species recorded	33 epifauna (attached and free-living) species were observed during the 2007 survey.																																

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: Scheldt estuary	area & depth class	3m beam trawl	77		0	0	77	

Number of biological samples (maturity and age material):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	130	<i>Solea solea</i>	151



Station positions for Schollevaar.

3.2.3.5 Survey summary Netherlands: Stern

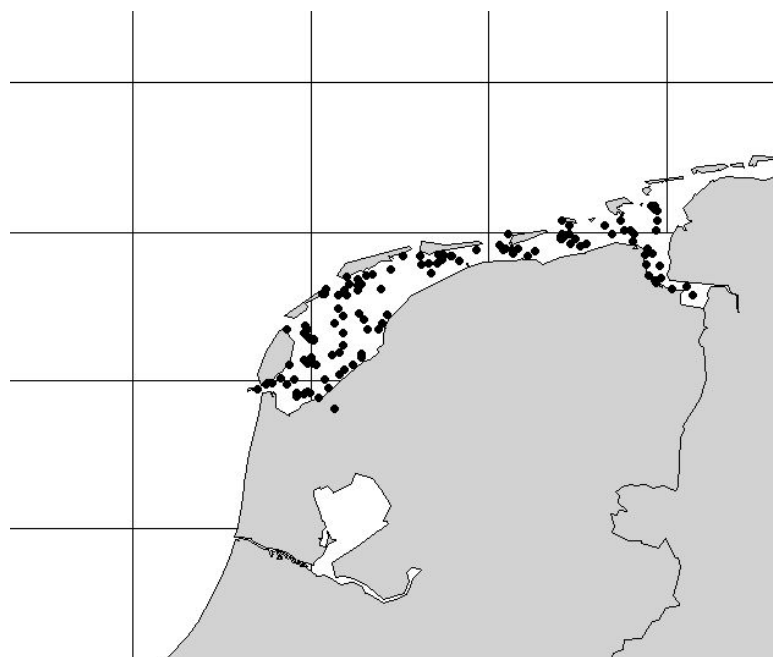
Nation:	Netherlands	Vessel:	RV "Stern"
Survey:	DFS (Demersal Fish Survey)	Dates:	27 August–28 September 2007

Survey description	The DFS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age compositions of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent index of abundance by age group (0- and 1-group) for plaice and sole in the North Sea for stock assessment, (iv) collect data on length frequency distribution of brown shrimp (<i>Crangon crangon</i>).		
Gear details:	3 meter beam trawl with 1 tickler chain and a bobbin rope ("shrimp net").		
Notes from survey (e.g. problems, additional work etc.):	133 hauls were carried out. A CTD was attached to the net.		
Target species catch rates:	Time series mean no/1000m ²	2007 mean no/1000m ²	
	Sole 4.31	2.05	
	Plaice 30.07	6.98	
	Note: without area based weighting as used in the index calculations		
Number of fish species recorded and notes on any rare species or unusual catches:	39 separate species of finfish were caught. The top 10 by number are: <i>Clupea harengus</i> 10598 <i>Pomatoschistus</i> sp. 6050 <i>Pleuronectes platessa</i> 3843 <i>Limanda limanda</i> 2169 <i>Osmerus eperlanus</i> 1118 <i>Solea solea</i> 855 <i>Platichthys flesus</i> 854 <i>Merlangius merlangus</i> 618 <i>Ciliata mustela</i> 397 <i>Syngnathus rostellatus</i> 216		
Number of epifauna species recorded	44 epifauna (attached and free-living) species were observed during the 2007 survey.		

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: Wadden Sea	area & depth class	3m beam trawl	133		0	0	133	

Number of biological samples (maturity and age material):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	209	<i>Scophthalmus rhombus</i>	1
<i>Solea solea</i>	177	<i>Platichthys flesus</i>	204
<i>Limanda limanda</i>	54	<i>Psetta maxima</i>	1



Station positions for Stern.

3.2.3.6 Survey summary Netherlands: Isis (DFS)

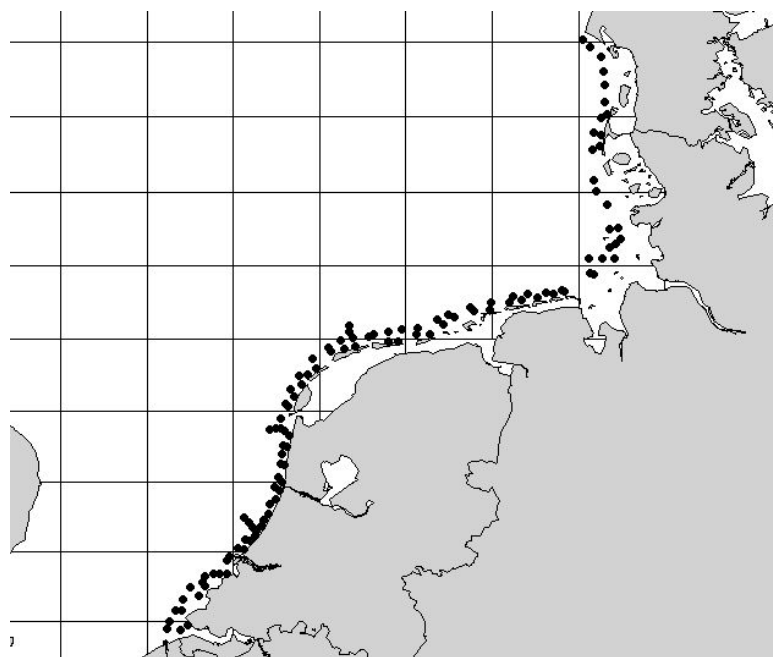
Nation:	Netherlands	Vessel:	RV "Isis"
Survey:	DFS (Demersal Fish Survey)	Dates:	24 September–19 October 2007

Survey description	The DFS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age compositions of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent index of abundance by age group (0- and 1-group) for plaice and sole in the North Sea for stock assessment, (iv) collect data on length frequency distribution of brown shrimp (<i>Crangon crangon</i>).		
Gear details:	6 meter beam trawl with 1 tickler chain and a bobbin rope ("shrimp net").		
Notes from survey (e.g. problems, additional work etc.):	114 hauls were carried out. A CTD was attached to the net.		
Target species catch rates:	Time series mean no/1000m ²	2007 mean no/1000m ²	
	Sole 5.83	0.47	
	Plaice 34.18	7.00	
	Note: without area based weighting as used in the index calculations		
Number of fish species recorded and notes on any rare species or unusual catches:	41 separate species of finfish were caught. The top 10 by number are: <i>Pomatoschistus</i> sp. 51372 <i>Limanda limanda</i> 21387 <i>Merlangius merlangus</i> 7587 <i>Pleuronectes platessa</i> 5532 <i>Buglossidium luteum</i> 3698 <i>Callionymus lyra</i> 2283 <i>Clupea harengus</i> 2146 <i>Sprattus sprattus</i> 1632 <i>Ammodytes</i> sp. 1337 <i>Arnoglossus laterna</i> 923		
Number of epifauna species recorded	29 epifauna (attached and free-living) species were observed during the 2007 survey.		

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: Wadden Sea	area & depth class	6m beam trawl	114	0	0	0	114	

Number of biological samples (maturity and age material):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	348	<i>Scophthalmus rhombus</i>	8
<i>Solea solea</i>	138	<i>Platichthys flesus</i>	78
<i>Limanda limanda</i>	336	<i>Psetta maxima</i>	15



Station positions for Isis (DFS).

3.2.3.7 Survey summary Netherlands: Isis (SNS)

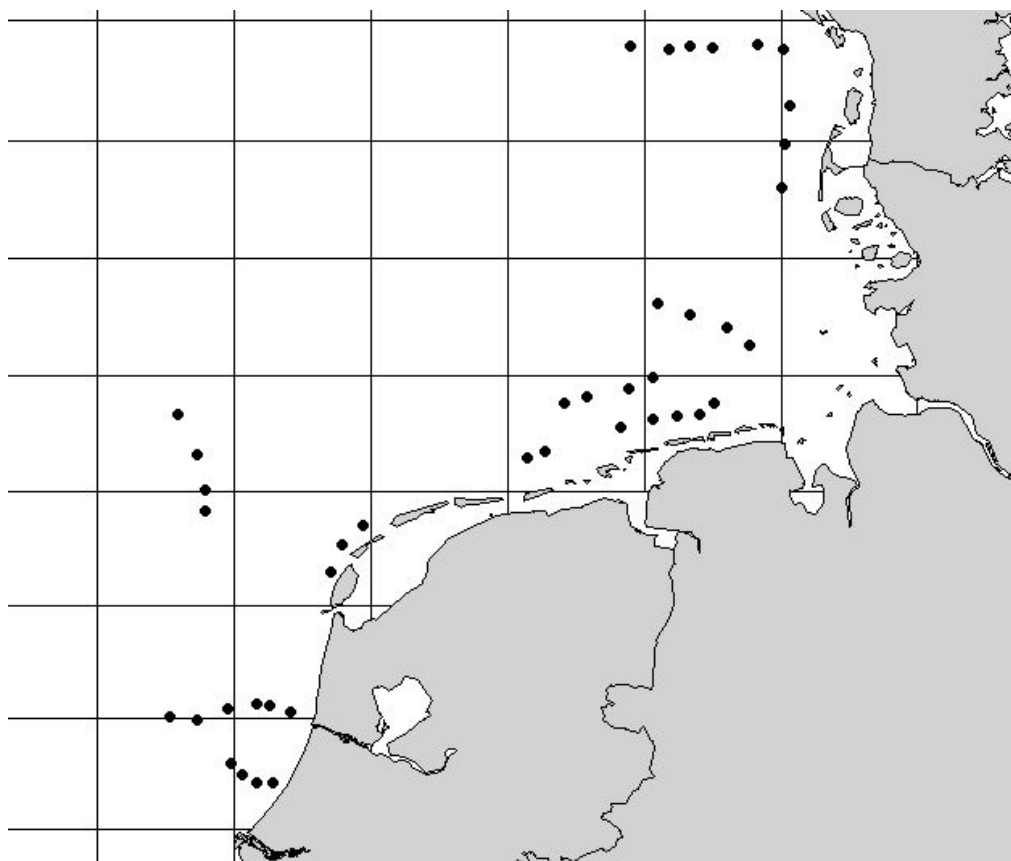
Nation:	Netherlands	Vessel:	RV "Isis"
Survey:	SNS (Sole Net Survey)	Dates:	10–20 September 2007

Survey description	The SNS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age compositions of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent index of abundance by age group (1-, 2-, 3- and 4-group) for plaice and sole in the North Sea for stock assessment.		
Gear details:	6 meter beam trawl with 4 tickler chains, mesh size 40 mm in the codend.		
Notes from survey (e.g. problems, additional work etc.):	42 hauls were carried out (approx. 10 hours fishing time). A CTD was attached to the net. Due to bad weather conditions, not all stations were fished (planned stations=50)		
Target species catch rates:	Time series mean no/100 h	2007 mean no/100 h	
	Sole	6933	2334
	Plaice	64953	57088
Number of fish species recorded and notes on any rare species or unusual catches:	36 separate species of finfish were caught. The top 10 by number are: <i>Limanda limanda</i> 12178 <i>Pleuronectes platessa</i> 5203 <i>Merlangius merlangus</i> 4011 <i>Buglossidium luteum</i> 3167 <i>Callionymus lyra</i> 2843 <i>Arnoglossus laterna</i> 2519 <i>Pomatoschistus</i> sp. 2363 <i>Agonus cataphractus</i> 1259 <i>Trisopterus luscus</i> 507 <i>Gadus morhua</i> 341		
Number of epifauna species recorded	25 epifauna (attached and free-living) species were observed during the 2007 survey.		

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: Wadden Sea	area & depth class	6m beam trawl	42	0	0	0	42	

Number of biological samples (maturity and age material):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	487	<i>Scophthalmus rhombus</i>	10
<i>Solea solea</i>	223	<i>Platichthys flesus</i>	39
<i>Limanda limanda</i>	349	<i>Psetta maxima</i>	29



Station positions for Isis (SNS).

4 Population abundance indices (ToR b)

ToR b) calculate population abundance indices by age-group for sole and plaice in the North Sea, Division VIIa and Divisions VIId-g

4.1 Abundance indices by age-group for plaice and sole provided to the assessment WG's

The surveys carried out in the North Sea and area VII provide age based abundance indices for plaice and sole used by a number of assessment Working Groups. Increasingly, the surveys have been used both to tune the assessments and as recruit estimates for incoming year classes.

4.1.1 Offshore indices

Tables 4.1.1.1–4.1.1.2 and Figures 4.1.1.1–4.1.1.2 present the abundance indices by age for sole and plaice from each of the offshore survey areas separately, updated with the indices for 2007.

A minor revision of the Dutch survey indices (both inshore and offshore) was carried out in 2005. This revision consisted of some database corrections (which affects total catch numbers), and a different approach in dealing with size classes that were caught but not included in the ageing samples (which affects catch numbers per age-group). Although the abundance estimates have slightly changed, the overall trends in year-class strength were not affected. In 2006, some additional database corrections were carried out resulting in (small) changes of the indices for 2004 and 2005.

To ensure consistency with the data given to the WGNSSK, NSDSWG and SSDSWG, Tables 4.1.1.1b-e and 4.1.1.2c-f have been updated to include the UK tuning indices data calculated for each of the working groups. For WGNSSK this gives data for sole and plaice for age groups 1-10+ per hour for an 8m-beam trawl. For the NSDSWG and SSDSWG this gives total catch-at-age for sole and plaice for a 4m-beam trawl with the total distance fished in kilometres.

In 2007, the UK indices for VIIa, VIIf and VIId for plaice and sole were recalculated using a new standardized 'R' script, following updates to the data after recent quality control checks. This data has replaced existing historical data in tables 4.1.1.1d-e and 4.1.1.2d-e.

North Sea sole

Figure 4.1.1.1a shows the time-series trends in sole for the North Sea, based on the Netherlands Isis offshore surveys. This survey indicates that recent year classes have been mainly poor with 2003 and 2004 year classes substantially below the long-term arithmetic mean at all ages. The 2005 year class is close to the average and confirms the trend for generally low recruitment since 1996. The spatial coverage of the Netherlands Tridens survey makes it unsuitable for monitoring sole abundance.

Area VII sole

The indices for sole from area VII stocks are summarized in Figure 4.1.1.1b-e. The two adjacent areas VIId and VIIe both show above average recruitment in recent years but not for the same year classes. In VIId, 2001 and 2004 year classes were above average whereas, in VIIe, 2002 and 2003 appear to be above average at least at age 1. However, there is a lack of resolution on older ages in VIIe and no consistent indication of strong year classes is evident. In both stocks, the 2005 year class appears

very poor at age 1. In VIIIf and VIIa, there has been poor recruitment in 2003-2005, the 2005 year class being one of the poorest for the past 10 years.

North Sea plaice

Trends in the indices for North Sea plaice from the Netherlands Isis and Tridens surveys are shown in Figures 4.1.1.2a and 4.1.1.2 b. The Isis survey covers mainly the southern North Sea, whereas the Tridens extends substantially further north and west. The Isis survey indicates that recruitment has been well below average since the strong 2001 year class. The Tridens survey confirmed the strong 2001 year class and indicated that the 2003 year class was also above average at both 2 and 3 year olds.

The 2006 yearclass at age 1 in the North Sea is well above the long-term mean which is shown by the UK and the Dutch Tridens survey.

Area VII plaice

Plaice indices for area VII stocks are shown in Figures 4.1.1.2c-f. In VIIId, the 2005 year class appears around average. The strong 2003 year class is evident at age 1 and 2 but not at age 3. In VIIe there is some inconsistency between the signals from different year classes. The 2004 year class is below average at age 1 but appears slightly stronger at age 2. Similarly the very poor 2003 year class at age 1 appears average at later ages in the survey. In VIIIfg, recruitment has been poor in recent years with 2001 and most subsequent year classes below average. By contrast, recruitment in the Irish Sea (VIIa) has been increasing recently and there have been above average year classes in 2001-2003. The 2006 yearclass at age 1 is well above the long-term mean.

4.1.2 Inshore indices

The abundance indices for the inshore surveys covering the full time period of each survey are shown in Tables 4.1.2.1–4.1.2.2 and Figures 4.1.2.1–4.1.2.2.

A minor revision of the Dutch survey indices (both inshore and offshore) was carried out in 2005 and is described in Section 4.1.1.

In VIIId, the indices used by WGNSSK are the English inshore beam trawl survey for plaice and the combined English and French surveys for sole. WGBEAM did not have the French survey data available at the meeting and as a result, only the English survey data has been tabulated and discussed. There are no inshore surveys in other parts of area VII which are used by the relevant Working Groups or coordinated by WGBEAM. Since 2007, UK no longer carries out the VIIId inshore survey due to financial reasons.

The DYFS, DFS and YFS indices for the North Sea are combined to derive an international inshore index. The combined indices of 0- and 1-group plaice and sole are used by the WGNSSK to estimate recruitment. Both the national and the international indices are presented in Tables 4.1.2.1 and 4.1.2.2, only the combined index is presented in Figures 4.1.2.1–4.1.2.2.

The SNS (North Sea) abundance indices of plaice and sole for age groups 0–4, are also used by WGNSSK for estimating recruitment and/or for tuning of the XSA model.

A notable change in the abundance indices of the North Sea inshore surveys is the almost complete disappearance of 1 group plaice in the combined index in the last 7-9 years. This decrease is mainly driven by the Dutch indices and less obvious in the Belgian and UK indices. The decrease in abundance of 1 group in the inshore areas is thought to be caused by a change in distribution. In effect, the combined inshore index is currently not sufficiently sampling the distribution area of 1 group plaice.

The results of last year's survey indicate that the 2007 year class of North Sea sole is close to the long-term mean and the strongest yearclass since 2002. This, however, is not clear in the international index.

Table 4.1.1.1: Catch rate of sole from Netherlands and UK surveys in the North Sea and VII d, a, e, f and g.

a) Netherlands: sole (N.hr⁻¹/8m trawl) North Sea (IV) RV "Isis".

YEAR/AGE	0	1	2	3	4	5	6	7	8	9	10+
1985	0.00	2.65	7.89	3.54	1.67	0.62	0.28	0.00	0.00	0.00	0.00
1986	0.00	7.88	4.49	1.73	0.83	0.59	0.22	0.11	0.00	0.02	0.09
1987	0.04	6.97	12.55	1.83	0.56	0.58	0.22	0.23	0.06	0.00	0.02
1988	0.00	83.11	12.51	2.68	1.03	0.12	0.15	0.13	0.10	0.01	0.13
1989	0.49	9.02	68.08	4.19	4.10	0.68	0.13	0.24	0.00	0.05	0.03
1990	0.02	22.60	22.36	20.09	0.61	0.68	0.51	0.08	0.06	0.01	0.01
1991	0.69	3.71	23.19	5.84	6.01	0.10	0.14	0.06	0.04	0.01	0.03
1992	0.01	74.44	23.20	9.88	2.33	2.90	0.06	0.14	0.07	0.02	0.07
1993	0.02	4.99	27.36	0.99	4.37	2.38	4.30	0.02	0.09	0.06	0.07
1994	0.87	5.88	4.99	15.42	0.13	1.41	0.09	1.01	0.01	0.00	0.01
1995	0.46	27.86	8.46	7.04	6.72	0.48	0.91	0.31	0.97	0.05	0.00
1996	0.17	3.51	6.17	1.91	1.49	2.49	0.31	0.41	0.05	0.30	0.06
1997	0.59	173.94	5.37	3.23	0.80	0.77	0.40	0.11	0.04	0.05	0.06
1998	0.31	14.12	29.21	2.00	1.35	0.08	0.02	0.42	0.00	0.00	0.00
1999	6.60	11.41	19.26	16.63	0.63	2.06	0.33	0.22	0.65	0.00	0.32
2000	0.13	14.46	6.53	4.21	1.59	0.28	0.15	0.06	0.01	0.16	0.07
2001	9.98	8.17	10.71	2.34	1.68	0.74	0.08	0.04	0.03	0.00	0.18
2002	6.36	21.90	4.17	3.43	0.91	0.36	0.36	0.02	0.06	0.00	0.07
2003	0.35	10.76	10.55	2.51	1.75	0.38	0.20	0.34	0.00	0.02	0.00
2004	0.66	3.65	4.40	3.62	0.63	0.65	0.12	0.07	0.07	0.00	0.01
2005*	0.09	3.14	3.29	2.38	1.34	0.14	0.14	0.08	0.05	0.00	0.02
2006	0.06	16.82	2.44	0.30	0.76	0.52	0.16	0.10	0.00	0.01	0.03
2007	0.77	5.81	19.97	1.51	0.61	0.33	0.57	0.03	0.01	0.00	0.03

* corrected

Table 4.1.1.1: Continued.

b) United Kingdom: sole (N.hr⁻¹/8m trawl) Eastern Channel (VIId).

YEAR/AGE	0	1	2	3	4	5	6	7	8	9	10+
1988		8.2	14.2	9.9	0.8	1.3	0.6	0.1	0.1	0.2	0.2
1989		2.6	15.4	3.4	1.7	0.6	0.2	0.2	0.0	0.0	0.7
1990		12.1	3.7	3.4	0.7	0.8	0.2	0.1	0.2	0.0	0.0
1991		8.9	22.8	2.2	2.3	0.3	0.5	0.1	0.2	0.1	0.1
1992		1.4	12.0	10.0	0.7	1.1	0.3	0.5	0.1	0.2	0.6
1993		0.5	17.5	8.4	7.0	0.8	1.0	0.3	0.2	0.0	0.4
1994		4.8	3.2	8.3	3.3	3.3	0.2	0.6	0.1	0.3	0.3
1995		3.5	10.6	1.5	2.3	1.2	1.5	0.2	0.3	0.2	0.3
1996		3.5	7.3	3.8	0.7	1.3	0.9	1.1	0.1	0.5	0.4
1997		19.0	7.3	3.2	1.3	0.2	0.5	0.4	0.9	0.0	0.7
1998		2.0	21.2	2.5	1.0	0.9	0.1	0.3	0.0	0.1	0.3
1999		28.1	9.4	13.2	2.5	1.7	1.3	0.2	0.9	1.1	0.5
2000		10.5	22.0	4.1	4.2	1.0	0.6	0.3	0.0	0.2	1.2
2001		9.1	21.0	8.4	1.2	1.9	0.5	0.6	0.3	0.0	1.0
2002		31.8	11.4	5.4	3.5	0.3	0.7	0.4	0.1	0.0	0.6
2003		6.5	28.5	4.1	2.5	1.6	0.3	0.4	0.2	0.1	0.5
2004		7.4	8.5	7.7	1.6	1.4	1.0	0.2	0.4	0.2	0.6
2005		25.0	5.0	2.9	3.5	1.6	1.0	0.7	0.1	0.3	0.4
2006		6.3	29.2	2.8	2.0	1.9	0.3	0.4	0.6	0.0	0.3
2007		2.1	21.9	12.9	1.2	0.8	1.2	0.3	0.2	0.6	1.0

Table 4.1.1.1: Continued.

c) United Kingdom: sole (total numbers for 2*4m beam trawl) Western Channel (VIIe).

YEAR/AGE	0	1	2	3	4	5	6	7	8	9	10+	distance fished (km)
1989		5	56	120	107	34	40	17	5	7	12	165.66
1990		23	52	76	31	24	7	15	3	6	11	175.66
1991		11	231	79	51	23	21	5	17	4	15	171.68
1992		5	140	316	44	36	12	7	5	11	11	196.60
1993		5	54	115	105	14	10	9	3	3	10	189.19
1994		6	47	106	62	44	5	5	2	3	7	205.87
1995		14	37	44	42	26	31	4	5	5	13	187.15
1996		28	112	67	25	32	20	17	3	2	9	184.37
1997		11	130	126	43	14	16	13	14	5	15	184.74
1998		11	141	114	76	22	10	14	6	8	11	185.49
1999		11	97	128	47	23	8	4	4	4	17	187.89
2000		12	136	70	52	23	16	5	3	5	9	180.37
2001		9	197	162	52	31	12	12	4	1	7	177.98
2002		6	37	113	48	27	6	3	2	0	12	179.74
2003		23	124	78	56	28	6	1	1	2	4	182.24
2004		16	110	120	24	15	10	16	9	4	4	163.99
2005		8	110	39	53	12	12	6	2	4	4	186.60
2006		5	120	95	26	37	10	7	9	0	5	184.74
2007		7	184	138	50	11	23	3	3	1	4	182.34

Table 4.1.1.1: Continued.

d) United Kingdom: sole (total numbers for 4m beam trawl) Bristol Channel (VIII f).

YEAR/AGE	0	1	2	3	4	5	6	7	8	9	10+	distance fished (km)
1988	22	60	242	36	14	4	0	0	0	0	6	74.12
1989	132	204	304	162	18	14	6	4	2	2	4	91.91
1990	21	269	219	35	11	3	5	2	0	0	1	69.86
1991	40	297	638	83	21	18	5	0	3	2	1	123.41
1992	5	493	325	174	37	23	12	1	2	1	5	125.08
1993*	3	201	379	51	23	1	2	2	1	1	2	127.67
1994	1	407	473	121	17	9	8	0	0	2	2	120.82
1995	31	142	255	60	13	7	14	1	1	1	4	104.14
1996	3	178	251	64	27	7	3	4	1	3	3	122.11
1997	37	498	207	21	13	14	5	3	6	0	4	116.18
1998	104	885	472	57	11	9	5	2	1	5	5	104.69
1999	29	2922	297	38	16	7	4	5	1	0	9	117.11
2000	16	1086	1608	37	26	6	0	2	1	1	4	105.99
2001	26	449	711	307	23	9	6	2	0	2	8	118.22
2002	9	786	283	151	121	14	7	2	3	0	4	116.92
2003	14	465	628	55	30	56	9	3	3	0	1	111.92
2004	63	862	434	99	15	22	42	4	3	0	5	101.92
2005	44	407	267	38	16	7	5	17	1	2	0	119.11
2006	13	324	238	47	16	8	0	2	12	0	1	120.56
2007	104	424	128	51	16	13	7	3	4	14	3	118.59

* from 1993 onwards recalculated using standard indices calculation 'R' script

Table 4.1.1.1: Continued.

e) United Kingdom: sole (total numbers for 4m beam trawl) in Irish Sea (VII a).

YEAR/AGE	0	1	2	3	4	5	6	7	8	9	10+	distance fished (km)
1988	2	118	196	180	410	76	40	4	0	4	6	100.06
1989	4	218	304	180	74	284	56	32	8	6	16	129.71
1990	4	1712	534	122	42	88	194	40	20	6	4	128.97
1991	4	148	1286	122	26	16	14	55	19	7	4	123.78
1992	2	220	309	657	142	34	22	7	75	17	6	129.52
1993*	0	78	320	158	208	28	16	5	14	39	27	131.19
1994	0	62	431	193	95	128	43	10	11	6	36	124.89
1995	24	246	154	253	110	30	67	12	5	5	24	124.34
1996	4	886	126	32	76	46	23	31	8	2	11	127.49
1997	5	1158	577	72	24	55	27	16	30	7	10	132.86
1998	2	539	716	292	18	6	24	23	5	18	9	129.34
1999	3	385	293	255	203	29	8	26	5	6	21	125.26
2000	0	354	464	147	219	91	13	2	13	6	24	123.22
2001	1	91	284	192	65	96	64	6	3	12	11	127.30
2002	0	205	61	121	126	42	79	49	2	1	19	120.26
2003	0	242	210	51	97	81	40	43	26	1	13	121.00
2004	0	406	240	119	27	77	45	41	17	19	11	113.96
2005	0	53	165	69	25	13	35	25	4	6	17	119.70
2006	0	107	110	90	45	36	9	16	15	10	20	123.74
2007	0	125	93	49	57	41	11	4	6	12	22	126.00

Table 4.1.1.2. Catch rate of plaice from Netherlands and UK surveys in the North Sea and VII d, a, e, f and g.

a) Netherlands: plaice (N.hr⁻¹/8m trawl) North Sea (IV) RV "Isis".

AGE	0	1	2	3	4	5	6	7	8	9	10+
1985	134.65	115.58	179.90	38.81	11.84	1.37	1.05	0.36	0.17	0.10	0.25
1986	9.30	667.44	131.77	51.00	8.89	3.29	0.43	0.34	0.13	0.04	0.21
1987	44.13	225.82	764.29	33.07	4.77	2.04	1.02	0.35	0.09	0.07	0.31
1988	29.62	680.17	146.99	182.31	9.99	2.81	0.81	0.46	0.04	0.11	0.25
1989	31.86	467.88	319.27	38.66	47.30	5.85	0.83	0.31	0.66	0.13	0.07
1990	11.50	115.31	102.64	55.67	22.78	5.57	0.80	0.21	0.37	0.26	0.17
1991	4.38	185.45	122.05	28.55	11.86	4.26	5.71	0.26	0.22	0.10	0.12
1992	7.72	176.97	125.93	27.31	5.62	3.18	2.66	1.14	0.26	0.05	0.09
1993	54.79	124.76	179.10	38.40	6.12	0.93	0.81	0.63	0.47	0.17	0.08
1994	145.59	145.21	64.22	35.24	10.87	2.86	0.64	0.86	0.96	0.40	0.03
1995	92.03	252.16	43.55	14.22	8.11	1.20	0.87	0.36	1.13	0.22	0.13
1996	209.78	218.28	212.32	23.02	4.83	3.40	0.92	0.05	0.17	0.13	0.12
1997	22.71	*	*	19.91	2.79	0.22	0.39	0.17	0.12	0.00	0.03
1998	242.98	342.51	431.90	47.40	8.91	1.44	0.75	0.14	0.08	0.11	0.09
1999	198.94	305.90	130.00	182.52	3.65	2.11	0.14	0.14	0.03	0.03	0.09
2000	178.94	277.61	74.40	31.38	23.99	0.61	0.17	0.54	0.03	0.01	0.06
2001	625.88	222.71	78.44	19.39	9.97	9.47	0.29	0.14	0.04	0.04	0.18
2002	239.01	541.25	47.74	16.05	5.37	2.73	1.42	0.09	0.14	0.00	0.10
2003	170.42	126.11	170.08	10.78	5.94	1.52	1.21	0.68	0.11	0.10	0.02
2004**	127.32	226.20	41.75	66.60	6.62	2.65	1.60	1.02	3.05	0.00	0.01
2005**	199.91	158.45	69.60	7.23	13.74	1.17	1.25	0.31	0.16	0.53	0.04
2006	187.07	135.11	38.99	19.50	3.21	6.34	0.93	0.82	0.04	0.29	0.42
2007	171.18	329.34	72.29	21.22	15.53	3.17	6.55	0.74	0.86	0.17	0.70

* Missing due to ageing problems

** Corrected

Table 4.1.1.2: Continued.

b) Netherlands: plaice (N.hr⁻¹/8m trawl) North Sea (IV) – RV "Tridens".

YEAR/AGE	0	1	2	3	4	5	6	7	8	9	10+
1996	0.00	1.59	5.59	4.40	3.30	2.37	1.84	0.83	0.53	0.18	0.55
1997	0.00	*	*	10.41	3.95	2.84	1.93	0.47	1.10	0.42	0.60
1998	0.02	0.56	30.14	9.93	5.57	2.68	1.35	0.91	0.79	0.31	0.42
1999	0.29	2.39	8.29	36.93	6.47	2.65	2.13	0.60	0.77	0.33	0.15
2000	0.09	4.64	9.45	12.74	17.23	2.94	1.89	1.08	0.95	0.25	0.62
2001	0.32	0.67	6.93	9.05	7.23	7.67	1.21	0.69	0.48	0.60	0.61
2002	0.01	18.48	13.54	11.27	6.87	4.23	4.43	0.74	0.72	0.34	0.98
2003	0.35	4.11	34.84	11.91	8.57	4.75	2.72	3.97	0.70	0.70	1.64
2004**	0.01	5.69	10.64	29.06	7.92	4.19	2.24	1.13	2.46	0.40	1.37
2005**	0.05	7.34	23.70	11.30	16.20	2.57	5.42	1.55	0.54	3.34	2.38
2006	0.00	7.02	17.45	25.06	9.91	11.39	1.93	3.87	0.84	0.72	3.36
2007	0.00	29.71	21.89	17.26	20.79	4.55	9.70	1.83	3.55	0.31	5.31

* Missing due to ageing problems

** Corrected

Table 4.1.1.2: Continued.

c) United Kingdom: plaice (N.hr⁻¹/8m trawl) Eastern Channel (VIId).

YEAR/AGE	0	1	2	3	4	5	6	7	8	9	10+
1988		26.5	31.3	43.8	7.0	4.6	1.5	0.8	0.7	0.6	1.2
1989		2.3	12.1	16.6	19.9	3.3	1.5	1.3	0.5	0.3	1.7
1990		5.2	4.9	5.8	6.7	7.5	1.8	0.7	1.0	0.8	0.4
1991		11.8	9.1	7.0	5.3	5.4	3.2	1.2	1.0	0.1	1.2
1992		16.5	12.5	4.2	4.2	5.6	4.9	3.4	0.7	0.5	0.7
1993		3.2	13.4	5.0	1.7	1.9	1.6	2.0	2.8	0.4	0.6
1994		8.3	7.5	9.2	5.6	1.9	0.8	0.9	1.8	1.2	0.8
1995		11.3	4.1	3.0	3.7	1.5	0.6	0.6	1.3	0.8	0.8
1996		13.2	11.9	1.3	0.7	1.3	0.9	0.4	0.3	0.4	2.8
1997		33.1	13.5	4.2	0.6	0.3	0.3	0.2	0.2	0.2	1.9
1998		11.4	27.3	7.0	3.1	0.3	0.2	0.2	0.1	0.0	1.0
1999		11.3	14.1	15.9	2.9	1.0	0.2	0.1	0.3	0.1	0.9
2000		13.2	21.0	14.4	13.8	3.5	0.9	0.6	0.2	0.4	1.5
2001		17.9	13.0	10.0	7.1	10.9	1.9	0.5	0.3	0.2	1.0
2002		20.7	15.9	7.7	3.5	1.8	3.5	0.7	0.1	0.1	0.6
2003		6.2	22.8	6.0	2.9	1.6	0.8	1.8	0.6	0.1	0.3
2004		36.2	15.0	13.2	3.4	0.9	0.2	0.7	1.2	0.2	0.2
2005		10.8	31.2	13.8	10.3	2.9	1.2	0.8	0.4	0.9	0.7
2006		17.2	16.1	9.2	3.3	2.6	0.8	0.6	0.3	0.1	0.5
2007		46.22	18.8	8.7	3.9	1.7	2.0	0.8	0.3	0.1	1.1

Table 4.1.1.2: Continued.

d) United Kingdom: plaice (total numbers for 2*4m beam trawl) Western Channel (VIIe).

YEAR/AGE	0	1	2	3	4	5	6	7	8	9	10+	distance fished (km)
1989	0	31	70	281	188	23	11	14	8	6	18	165.66
1990	0	25	38	220	87	75	2	6	1	6	7	175.66
1991	2	22	27	63	79	62	41	9	0	1	3	171.68
1992	0	152	44	72	24	40	20	17	3	5	4	196.60
1993	0	21	70	60	24	13	25	13	11	2	2	189.19
1994	0	34	32	98	30	10	2	9	13	8	2	205.87
1995	0	50	46	45	48	12	4	5	6	1	4	187.15
1996	1	33	106	30	17	25	5	1	3	7	8	184.37
1997	0	53	122	197	24	6	12	7	1	1	7	184.74
1998	0	81	125	125	85	9	6	7	4	0	3	185.49
1999	1	38	44	182	53	30	3	2	6	4	2	187.89
2000	0	48	63	125	179	38	22	1	2	0	5	180.37
2001	21	32	64	51	111	97	25	13	0	3	5	177.98
2002	0	138	102	87	23	23	40	5	2	0	2	179.74
2003	0	29	137	60	50	5	18	27	7	0	2	182.24
2004	0	11	33	59	23	10	3	1	10	0	4	163.99
2005	2	30	75	91	70	13	3	3	5	2	3	186.60
2006	0	55	102	103	30	31	3	4	0	5	2	184.74
2007	0	29	100	126	32	26	4	6	0	3	5	182.34

Table 4.1.1.2: Continued.

e) United Kingdom: plaice (total numbers for 4m beam trawl) Bristol Channel (VIII).

YEAR/AGE	0	1	2	3	4	5	6	7	8	9	10+	distance fished (km)
1988	0	77	271	69	0	2	2	0	0	2	0	74.12
1989	2	206	313	72	15	5	0	2	0	0	0	91.91
1990	12	161	215	64	15	6	0	0	2	0	1	69.86
1991	2	841	33	65	21	12	3	0	1	0	0	123.41
1992	3	487	307	13	5	15	2	5	0	0	2	125.08
1993*	4	121	107	43	2	5	0	1	0	0	0	127.67
1994	150	131	39	19	10	1	0	0	0	0	0	120.82
1995	1	275	103	19	3	8	2	0	0	2	0	104.14
1996	10	265	342	37	1	3	1	0	0	0	0	122.11
1997	8	259	117	40	5	2	2	1	0	0	0	116.18
1998	6	272	144	54	10	2	1	0	0	0	1	104.69
1999	192	181	94	34	23	8	0	0	2	0	0	117.11
2000	100	403	75	37	8	7	0	1	0	0	0	105.99
2001	42	251	185	19	10	5	4	2	0	0	0	118.22
2002	1	162	208	95	7	7	2	4	1	0	0	116.92
2003	72	117	95	72	26	3	2	1	1	2	0	111.92
2004	188	297	38	31	15	3	1	1	3	0	2	101.92
2005	3	228	89	25	10	13	3	1	0	0	1	119.11
2006	96	102	121	41	11	2	11	0	3	1	0	120.56
2007	41	178	109	56	18	2	3	1	2	1	0	118.59

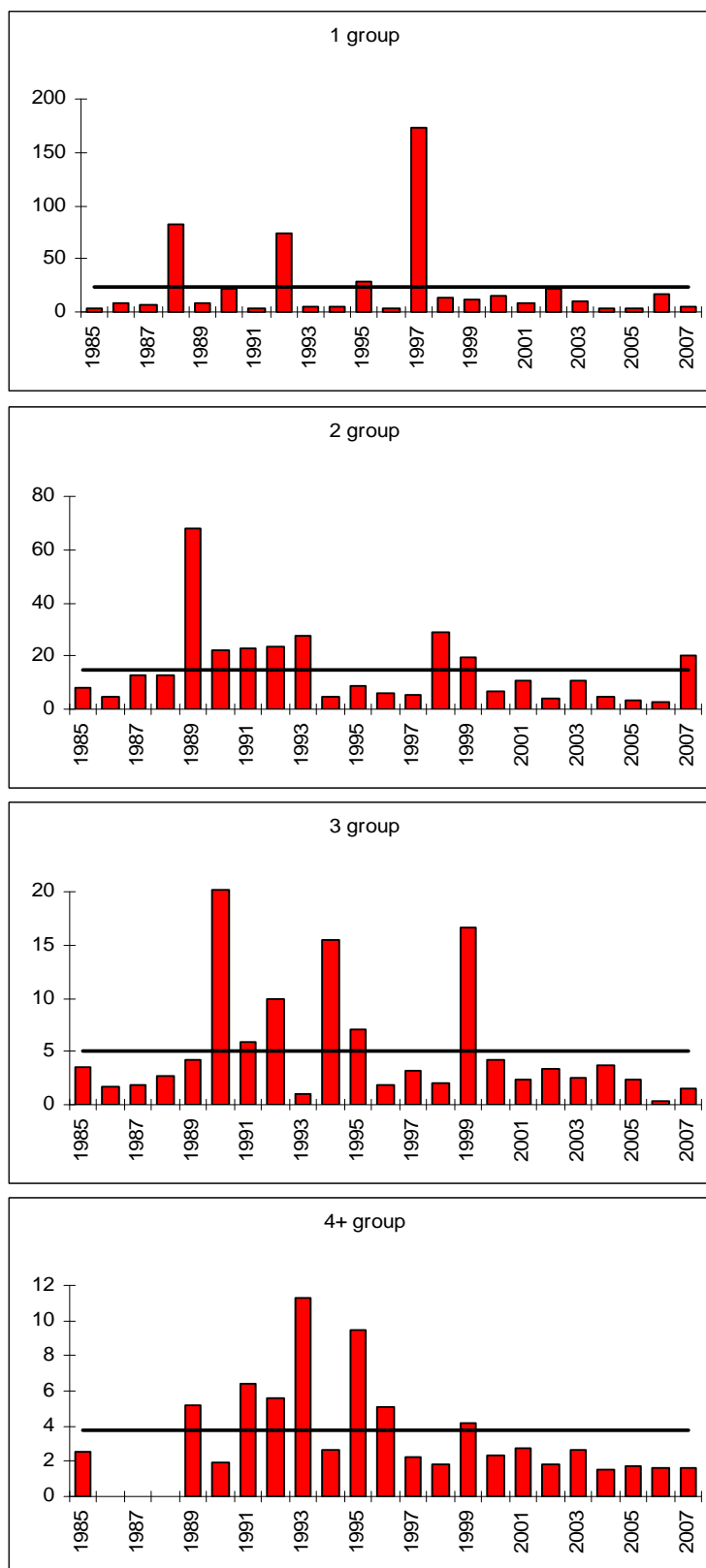
* from 1993 onwards recalculated using standard indices calculation 'R' script

Table 4.1.1.2: Continued.

f) United Kingdom: plaice (total numbers for 4m beam trawl) Irish Sea (VIIa).

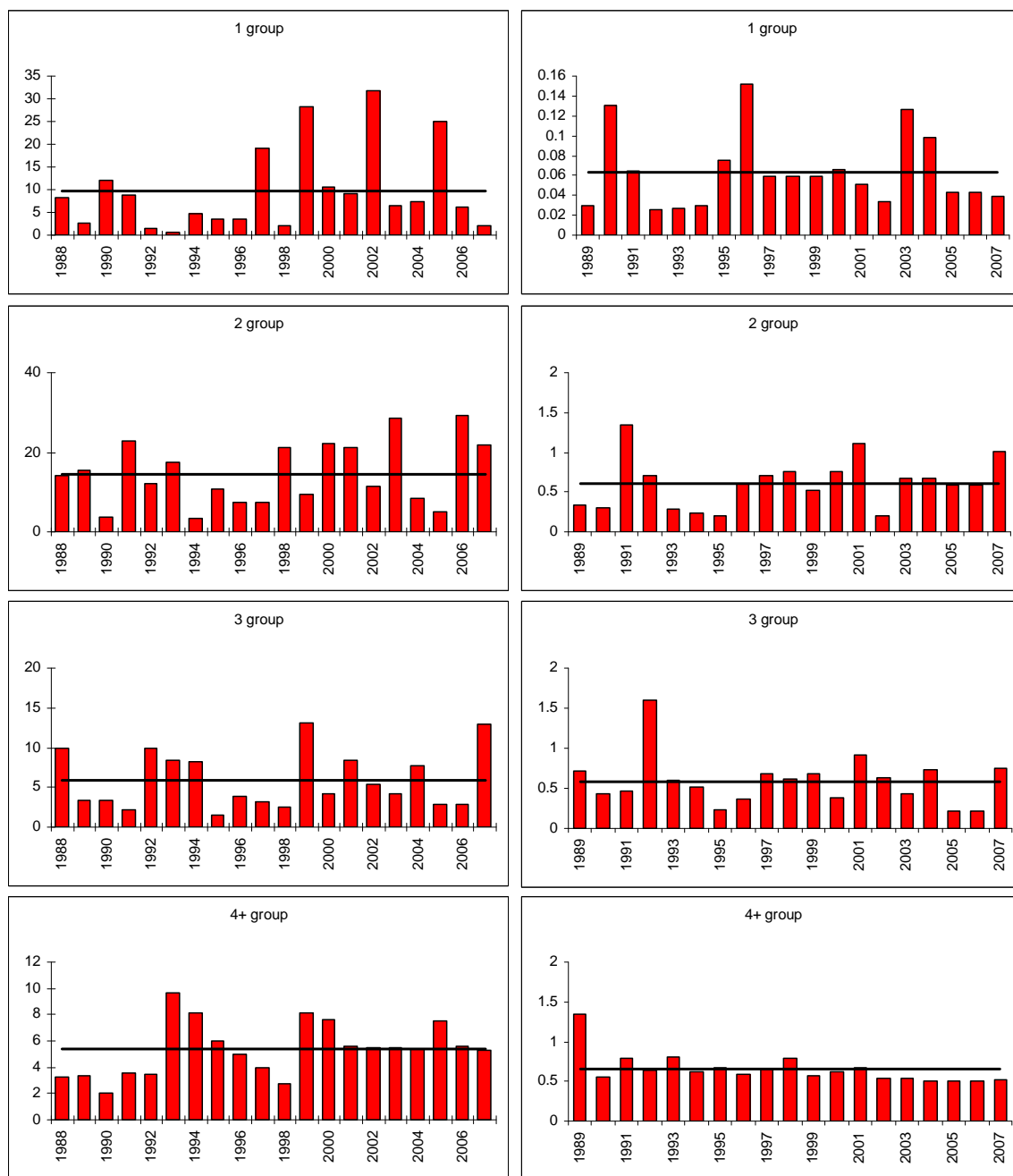
YEAR/AGE	0	1	2	3	4	5	6	7	8	9	10+	distance fished (km)
1988	19	670	1035	275	3	117	13	4	0	8	12	100.06
1989	13	309	441	530	77	13	44	3	0	0	3	129.71
1990	57	1688	405	176	90	54	30	3	1	20	5	128.97
1991	35	591	481	68	47	4	4	24	3	0	8	123.78
1992	41	1043	470	267	23	19	14	14	3	0	11	129.52
1993*	7	1007	836	111	90	11	5	9	2	1	6	131.19
1994	100	736	642	339	63	29	12	16	9	2	9	124.89
1995	281	1283	387	179	84	16	18	0	1	3	8	124.34
1996	105	1701	601	124	74	49	9	11	1	2	8	127.49
1997	31	1363	668	322	65	50	23	8	7	0	7	132.86
1998	169	1167	767	212	95	34	23	14	3	1	7	129.34
1999	180	1189	965	344	113	38	17	7	7	4	0	125.26
2000	132	2112	659	298	141	73	22	7	3	3	5	123.22
2001	249	1468	663	218	130	89	28	10	7	6	4	127.30
2002	16	1734	1615	647	243	79	51	16	17	5	7	120.26
2003	258	1480	1842	827	296	122	62	39	10	4	4	121.00
2004	218	1816	1187	1184	404	261	57	57	14	4	3	113.96
2005	288	869	1295	666	499	297	111	17	17	9	11	119.70
2006	485	1120	840	722	411	178	83	59	16	15	6	123.74
2007	186	2667	1255	525	417	196	95	45	37	6	10	126.00

* from 1993 onwards recalculated using standard indices calculation 'R' script



(a) Netherlands: sole (N.hr⁻¹/8m trawl) North Sea (IV) RV "Isis"

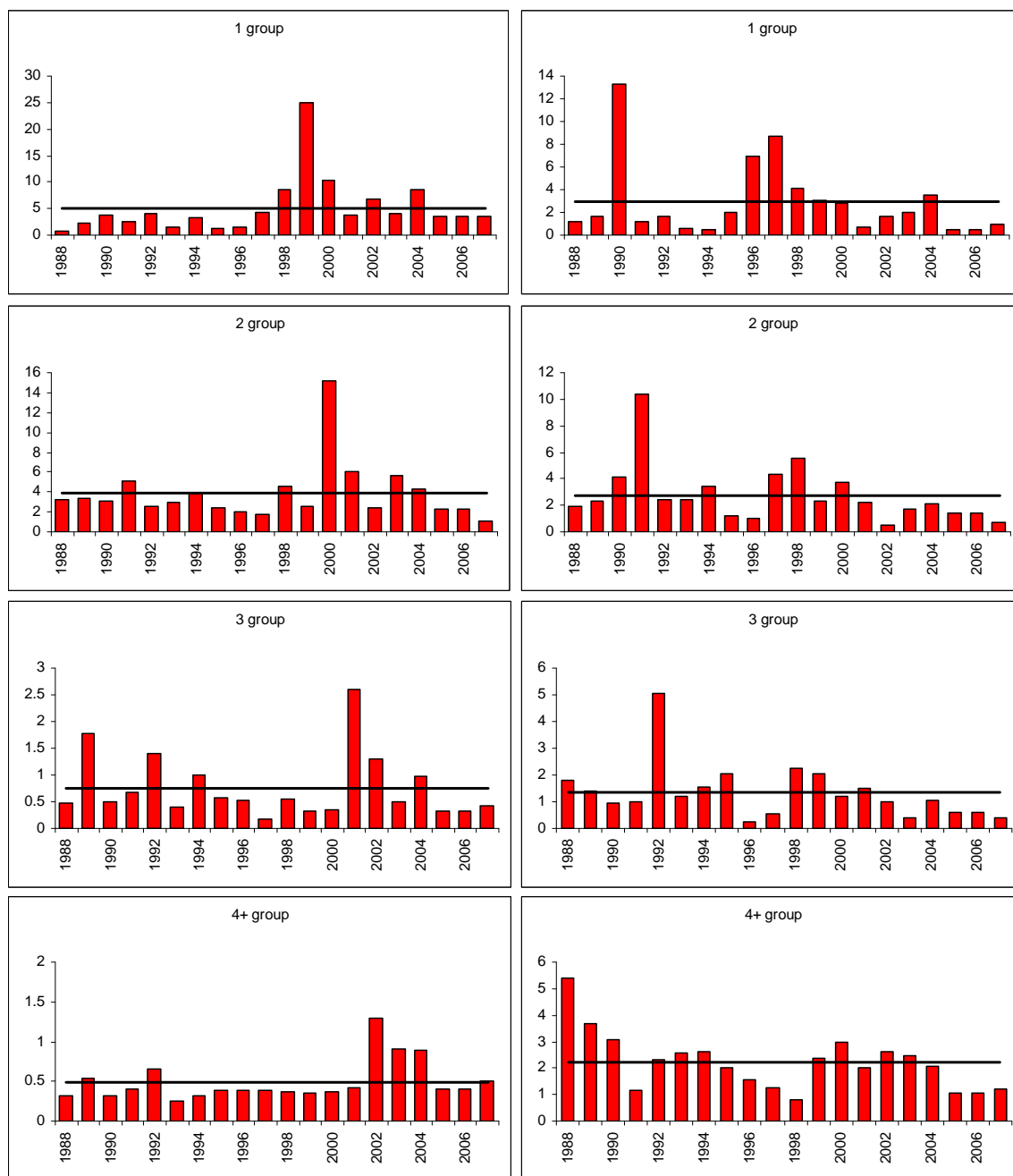
Figure 4.1.1.1. Catch rate of sole from Netherlands and UK surveys in the North Sea and VII d, a, e, f and g.



(b) UK: sole (N.hr⁻¹/8m beam trawl) Eastern English Channel (VIId)

(c) UK: sole (mean numbers per km towed for 2*4m beam trawl) Western English Channel (VIIe)

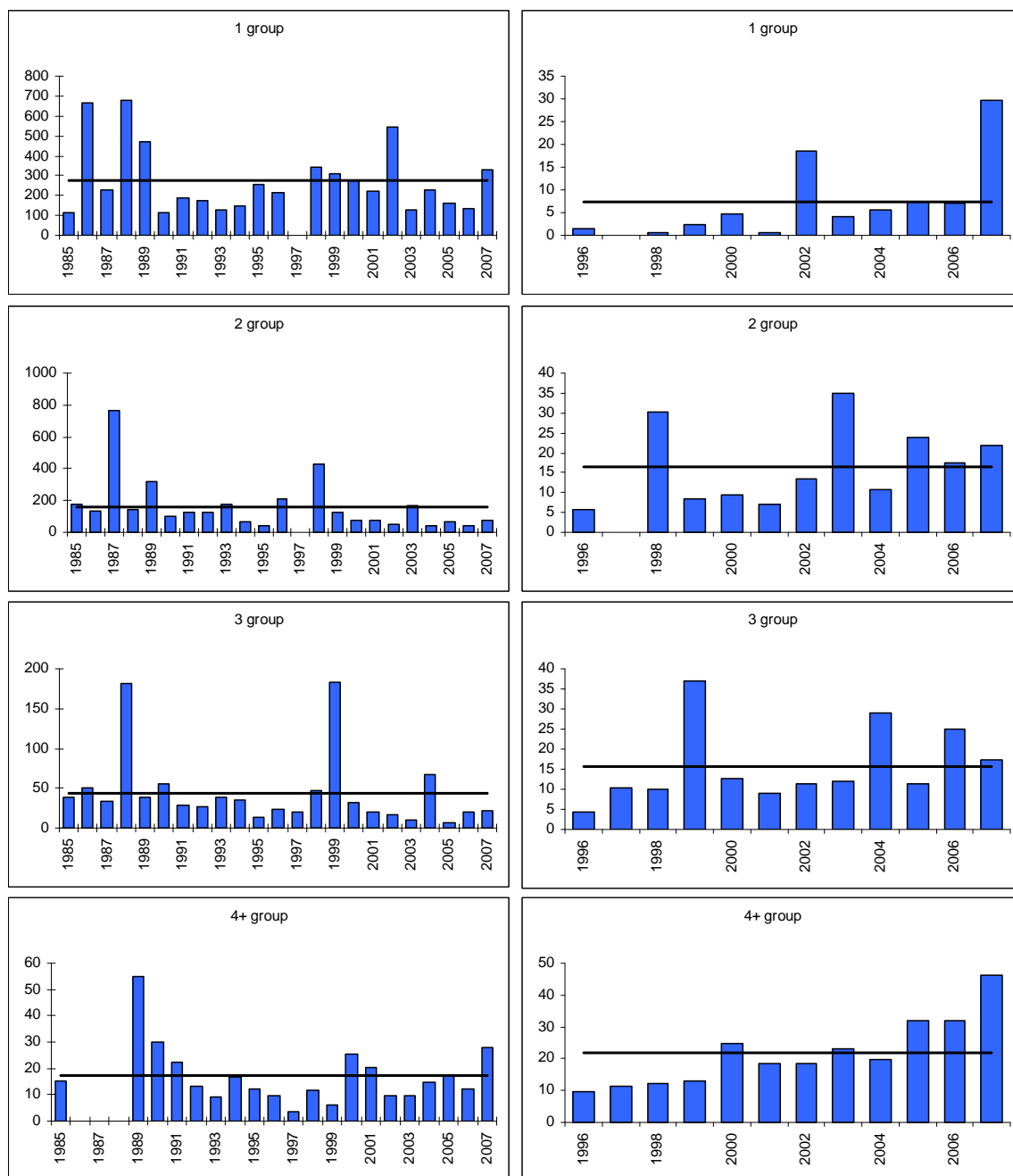
Figure 4.1.1.1: continued.



(d) UK: sole (mean numbers per km towed for 4m beam trawl) Bristol Channel (VIIIf)

(e) UK: sole (mean numbers per km towed for 4m beam trawl) Eastern Irish Sea (VIIa)

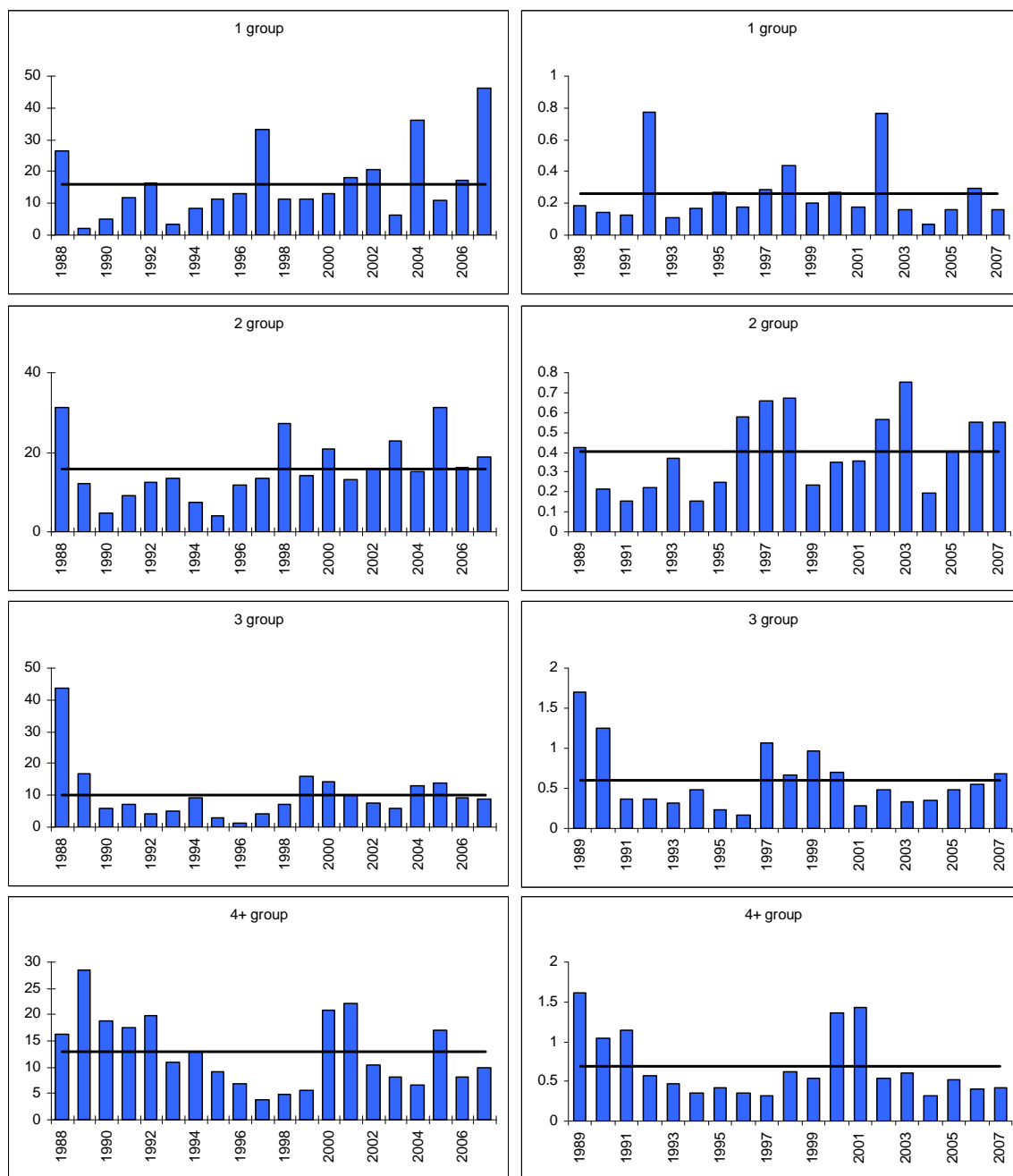
Figure 4.1.1.1: continued.



(a) Netherlands: plaice (N.hr⁻¹/8m trawl) North Sea (IV) RV "Isis"

(b) Netherlands: plaice (N.hr⁻¹/8m trawl) North Sea (IV) RV "Tridens"

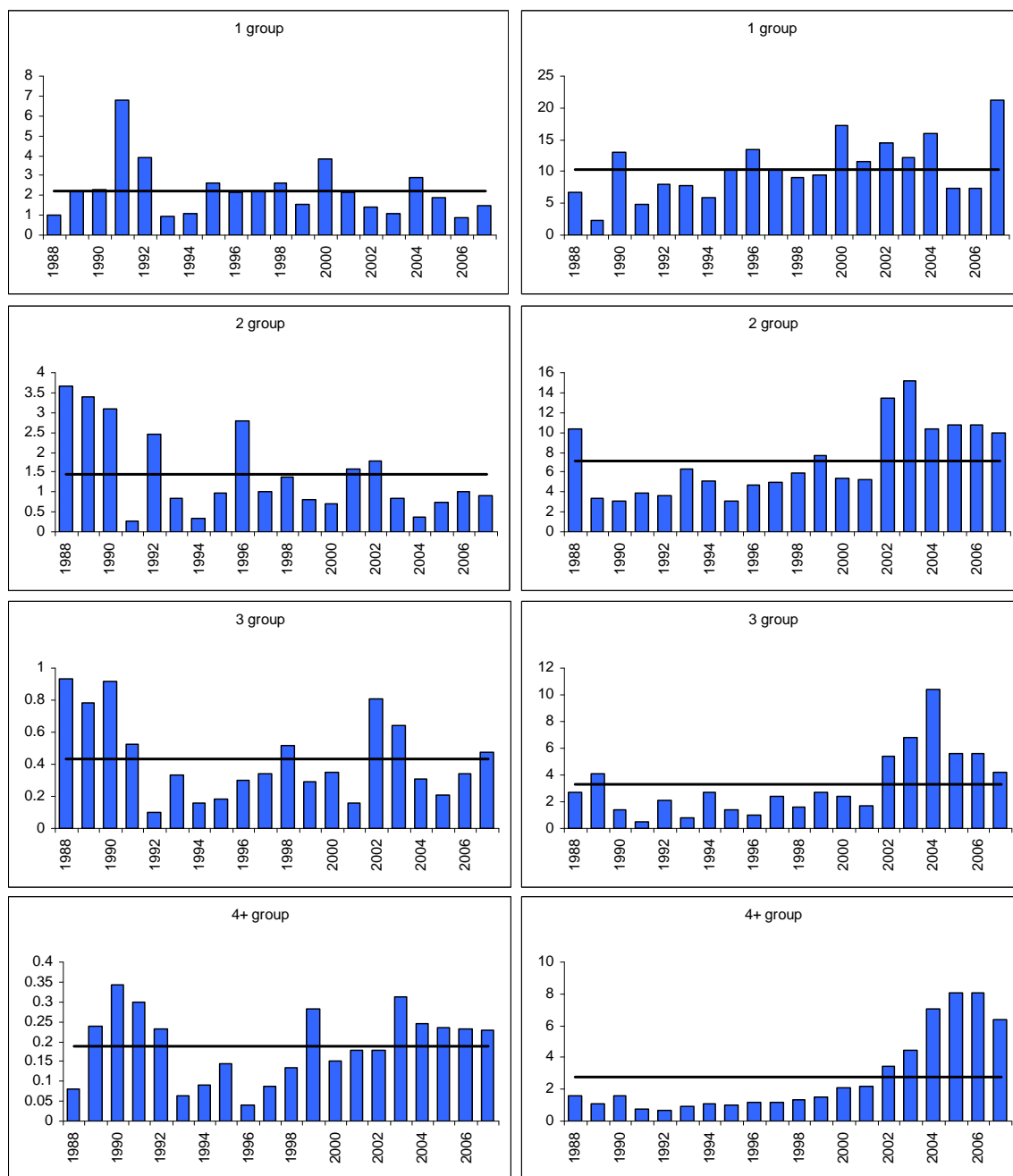
Figure 4.1.1.2. Catch rate of plaice from Netherlands and UK surveys in the North Sea and VII d, a, e, f and g.



(c) UK: plaice (N.hr⁻¹/8m beam trawl) Eastern English Channel (VIIId)

(d) UK: plaice (mean numbers per km towed for 2*4m beam trawl) Western English Channel (VIIe)

Figure 4.1.1.2: continued.



(e) UK: plaice (mean numbers per km towed for 4m beam trawl) Bristol Channel (VIIIf)

(f) UK: plaice (mean numbers per km towed for 4m beam trawl) Eastern Irish Sea (VIIa)

Figure 4.1.1.2: continued.

Table 4.1.2.1. Indices of juvenile sole abundance from inshore beam trawl surveys.

Young fish surveys. Sole abundance indices are given as numbers per 1000 m² (Netherlands, Belgium and Germany) and as millions of fish sampled (UKYFS and international index).

Age	UKYFS (Vild)		UKYFS (IVc)		NETHERLANDS DFS		BELGIUM DYFS		GERMANY DYFS		INTERNATIONAL (IV)	
	0	1	0	1	0	1	0	1	0	1	0	1
1970					25.79	1.96						
1971					19.96	0.97						
1972					0.50	0.11						
1973					6.88	0.25	3.82	0.01				
1974					1.34	0.51	0.20	0.05	0.21	0.31		
1975					9.90	0.12	6.44	0.02	3.79	0.47		
1976					3.47	0.20	1.23	0.08	0.55	0.35		
1977					1.15	0.23	0.77	0.10	2.8	0.93		
1978					2.50	0.02	8.27	0.01	3.1	0.43		
1979					10.64	0.04	63.91	0.02	1.33	0		
1980					20.94	1.05	12.97	6.64	3.56	2.73		
1981	0.11	0.45	32.06	5.99	16.78	0.43	0.92	0.55	2.1	0.87	293.93	13.39
1982	4.63	0.36	26.99	4.02	17.00	0.60	14.20	0.77	1.11	0.17	328.52	14.28
1983	25.45	1.52	70.66	5.64	4.14	0.73	3.65	0.80	2.14	1.28	104.38	20.32
1984	4.33	4.04	59.84	11.3	9.18	0.26	5.49	0.80	1.14	0.36	186.53	11.89
1985	7.65	2.94	20.53	2.8	16.13	0.09	16.27	0.16	0.03	0.18	315.03	3.43
1986	6.45	1.45	28.98	3.1	3.47	0.26	2.47	0.97	0.31	0.7	73.22	10.47
1987	16.85	1.38	20.87	1.89	30.83	0.27	2.36	0.05	1.27	0.4	523.86	6.43
1988	2.59	1.87	35.55	9.7	1.81	0.56	0.67	0.49	3.17	7.11	50.07	35.04
1989	6.67	0.62	47.2	3.78	3.63	0.22	1.06	0.13	0.43	2.12	77.80	11.59
1990	6.7	1.9	36.82	12.27	0.52	0.17	0.35	0.05	0.23	1.37	21.09	11.25
1991	1.81	3.69	22.72	19.69	22.88	0.02	2.17	0.01	0.87	0.37	391.93	8.26
1992	2.26	1.5	33.45	5.21	0.89	0.53	0.08	0.39	0.19	2.06	25.30	17.90
1993	14.19	1.33	36.42	24.46	0.80	0.03	0.25	0.03	0.12	0.51	25.13	10.67
1994	13.07	2.68	27.32	9.14	3.57	0.01	0.65	0.12	0.15	0.81	69.11	6.18
1995	7.53	2.91	33.55	13.04	0.26	0.12	1.71	0.09	0.09	0.99	19.07	9.82
1996	1.85	0.57	50.16	6.78	1.79	0.01	5.20	0.47	0.55	0	59.62	3.99
1997	4.23	1.12	14.87	4.91	2.17	0.31	1.40	0.82	0.03	3.3	44.08	19.02
1998	7.97	1.12	37.99	2.12	*	*	3.63	2.70	0.18	0.32	*	*
1999	2.63	1.47	19.02	7.67	*	*	2.13	0.43	0.1	0.25	*	*
2000	1.16	2.47	13.54	9.76	0.59	0.03	0.56	0.10	0.12	0.08	15.51	4.53
2001	4.75	0.38	42.12	3.83	2.81	0.02	9.91	0.62	0.05	0.1	85.31	3.93
2002	4.45	4.15	31.12	7.30	1.40	0.04	12.19	4.33	0.18	0.43	64.97	18.19
2003	4.55	1.44	8.91	4.46	0.72	0.12	0.75	0.44	0.1	0.07	16.82	5.19
2004	10.19	3.65	20.77	2.40	0.29	0.03	10.98	2.33	0.05	0.01	40.10	8.68
2005	9.97	4.07	16.03	6.79	1.42	0.03	6.10	1.33	0.99	*	46.81	7.09
2006	3.09	2.21	17.56	5.69	0.50	0.16	0.35		0.12	*	14.69	12.68
2007	*	*	35.93	3.67	0.49	0.02	1.70	0.23	0.05	*	23.51	2.32

* No (valid) survey

** Data not yet available

Table 4.1.2.1: Continued.

Sole Net Survey (SNS): Sole abundance indices are given as numbers per 100 hour fishing

NETHERLANDS SNS						
Age	0	1	2	3	4	5
1970	623	5410	734	238	35	4
1971	10685	893	1844	110	3	29
1972	16	1455	272	149	0	28
1973	896	5587	935	84	37	13
1974	174	2348	361	65	0	0
1975	577	529	848	166	47	0
1976	465	1399	74	229	27	6
1977	1585	3743	776	104	43	32
1978	10370	1548	1355	294	28	99
1979	3923	94	408	301	77	0
1980	5146	4313	89	109	61	3
1981	3241	3737	1413	50	20	0
1982	2147	5856	1146	228	7	10
1983	769	2621	1123	121	40	0
1984	3334	2493	1100	318	74	8
1985	2713	3619	716	167	49	4
1986	742	3705	458	69	31	17
1987	13610	1948	944	65	21	0
1988	523	11227	594	282	82	10
1989	1743	2831	5005	208	53	18
1990	51	2856	1120	914	100	50
1991	3640	1254	2529	514	624	27
1992	303	11114	144	360	195	285
1993	231	1291	3420	154	213	0
1994	4693	652	498	934	10	59
1995	1375	1362	224	143	411	7
1996	2322	218	349	30	36	90
1997	803	10279	154	190	26	58
1998	328	4095	3126	142	99	0
1999	2188	1649	972	456	10	21
2000	70	1639	126	166	118	0
2001	8340	970	655	107	35	56
2002	1206	7542	379	195	0	31
2003	*	*	*	*	*	*
2004	162	1370	624	393	69	53
2005	305	568	163	124	0	21
2006	78	4167	382	80	105	0
2007	467	849	911	33	40	14

* No survey

Table 4.1.2.2. Indices of juvenile plaice abundance from inshore beam trawl surveys.

Young fish surveys: Plaice abundance indices are given as numbers per 1000 m² (Netherlands, Belgium and Germany) and as millions of fish sampled (UKYFS and international index).

Age	UKYFS (VIlD)		UKYFS (IVc)		NETHERLANDS DFS		BELGIUM DYFS		GERMANY DYFS		INTERNATIONAL (IV)	
	0	1	0	1	0	1	0	1	0	1	0	1
1970					22.02	9.97						
1971					16.04	2.31						
1972					4.83	5.35						
1973					3.16	10.05	1.21	0.0128				
1974					2.23	2.32	0.01	0.3048	14.38	5.38		
1975					4.35	3.63	1.12	0.0169	9.02	10.31		
1976					7.76	4.64	0.18	0.0787	37.09	2.22		
1977					3.98	7.25	0.13	0.1738	39.12	19.74		
1978					8.06	3.90	1.47	0.1315	26.37	10.94		
1979					18.09	8.98	1.49	0.6257	22.21	14.61		
1980					5.85	11.13	0.11	0.5916	21.48	35.06		
1981	0.55	0.11	59.24	5.95	29.90	8.57	1.69	0.11	34.30	14.33	605.96	169.78
1982	0.58	0.06	11.65	13.15	24.98	15.94	0.54	0.57	6.37	14.47	433.67	299.36
1983	10.71	0.77	74.11	6.86	19.65	8.77	1.02	0.37	26.41	7.32	431.72	163.53
1984	3.62	0.41	76.52	10.85	11.65	6.76	0.45	0.19	6.01	1.04	261.80	124.19
1985	5.18	1.16	48.33	13.74	40.16	5.25	3.76	0.15	5.51	1.81	716.29	103.27
1986	12.53	1.08	23.62	17.93	10.48	15.88	1.60	0.81	3.38	4.68	200.11	288.27
1987	13.95	1.07	20.38	5.41	28.49	11.25	3.16	1.80	13.46	1.32	516.84	195.87
1988	9.31	0.81	28.12	7.72	16.22	5.97	0.72	1.77	14.93	4.74	318.36	116.45
1989	2.26	0.70	27.8	12.9	22.92	6.37	0.38	0.13	19.09	4.89	435.70	125.72
1990	4.73	0.52	31.75	10.25	23.78	6.85	2.39	1.21	23.59	3.18	465.47	130.13
1991	1.34	0.43	14.89	9.06	26.97	7.65	1.19	0.19	21.24	10.79	498.49	152.35
1992	2.92	1.09	26.16	5.64	19.55	6.82	0.31	0.20	4.72	12.03	351.59	137.08
1993	5.77	0.64	43.10	7.96	13.49	3.8	0.14	0.13	3.86	2.73	262.26	75.16
1994	12.63	0.59	19.14	9.38	25.15	0.93	1.03	0.33	7.71	3.42	445.66	30.60
1995	7.42	2.47	51.58	11.65	7.29	0.98	2.83	0.79	10.44	5.56	184.51	37.74
1996	1.22	0.72	60.16	4.07	25.44	6.77	14.25	0.31	41.77	0.45	572.80	116.89
1997	1.20	0.26	11.19	5.48	6.37	10.94	2.02	4.46	16.67	10.71	117.49	193.22
1998	5.23	0.29	40.26	0.92	*	*	3.01	1.74	8.11	1.36	*	*
1999	4.83	0.16	14.38	1.65	*	*	1.20	1.79	2.94	1.07	*	*
2000	0.29	0.72	10.57	4.82	9.30	0.17	1.48	1.10	10.28	1.18	183.83	11.31
2001	2.52	0.05	78.80	1.64	23.40	0.17	1.63	0.63	27.47	0.24	500.43	5.90
2002	0.33	1.61	36.75	3.18	10.40	0.08	4.73	5.28	1.12	2.90	210.70	17.79
2003	8.20	0.16	28.18	3.38	19.11	0.32	2.95	1.35	9.2	0.26	359.59	11.31
2004	12.2	1.46	64.38	1.82	10.68	0.54	4.84	2.16	4.7	0.45	243.15	14.97
2005	3.00	0.21	9.89	4.33	6.55	0.10	4.35	0.30	2.68	*	129.25	6.51
2006	2.63	0.33	37.13	3.96	11.79	0.19	1.24	0.79	4.00	*	232.28	8.38
2007	*	*	56.82	1.04	6.88	0.12	4.63	0.26	5.41	*	175.65	3.45

* No (valid) survey

** Data not yet available

Table 4.1.2.2: Continued.

Sole Net Survey (SNS): Plaice abundance indices are given as numbers per 100 hour fishing

NETHERLANDS SNS						
Age	0	1	2	3	4	5
1970	1200	9311	9732	3273	770	170
1971	4456	13538	28164	1415	101	50
1972	7757	13207	10785	4472	89	84
1973	7183	65639	5046	1578	488	27
1974	2568	15366	16509	1129	160	82
1975	1314	11628	8168	9556	65	15
1976	11166	8537	2403	868	236	0
1977	4373	18537	3424	1737	590	213
1978	3267	14012	12678	345	135	45
1979	29058	21495	9829	1575	161	17
1980	4210	59174	12882	491	180	24
1981	35506	24756	18785	834	38	32
1982	24402	69993	8642	1261	88	8
1983	32942	33974	13909	249	71	6
1984	7918	44965	10413	2467	42	0
1985	47256	28101	13848	1598	328	17
1986	8820	93552	7580	1152	145	30
1987	21335	33402	32991	1227	200	30
1988	15670	36609	14421	13153	1350	88
1989	24585	34276	17810	4373	7126	289
1990	9368	25037	7496	3160	816	422
1991	17257	57221	11247	1518	1077	128
1992	6473	46798	13842	2268	613	176
1993	9234	22098	9686	1006	98	60
1994	26781	19188	4977	856	76	23
1995	12541	24767	2796	381	97	38
1996	84042	23015	10268	1185	45	47
1997	14328	65595	36881	1391	45	7
1998	25522	33666	30242	5014	50	10
1999	39262	32951	10272	13783	1058	17
2000	24214	22855	2493	891	983	17
2001	99628	11511	2898	370	176	691
2002	31350	30813	1103	265	65	69
2003	*	*	*	*	*	*
2004	13537	18202	1350	1081	51	27
2005	27391	10118	1819	142	366	8
2006	51124	12164	1571	385	50	52
2007	40581	14175	2134	140	52	0

* No survey

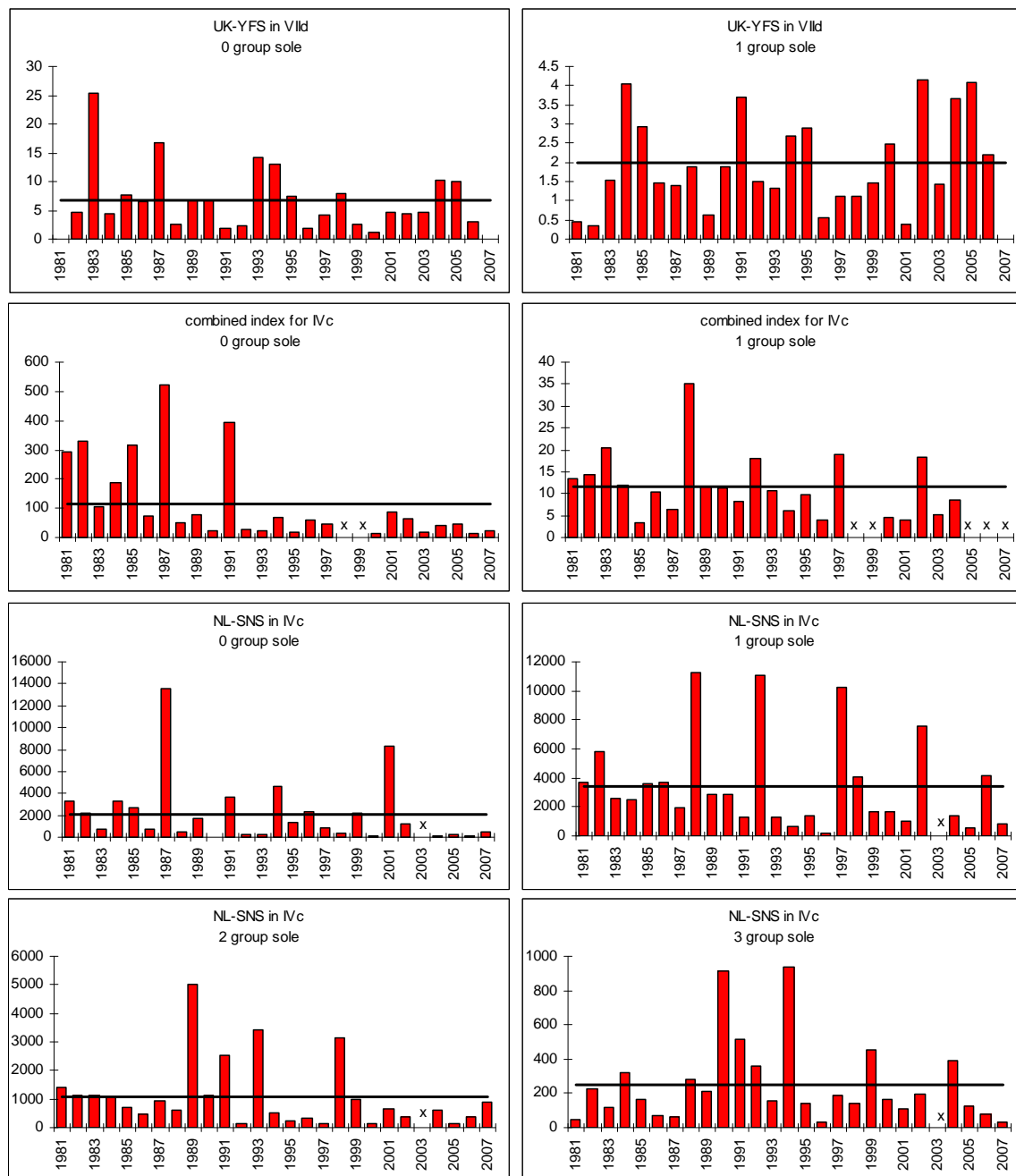


Figure 4.1.2.1. Indices of juvenile sole abundance from inshore beam trawl surveys. Young fish surveys (YFS / DFS / DYFS): abundance indices are given as numbers per 1000 m² (Netherlands, Belgium and Germany) and as millions of fish sampled (UKYFS and international index). Sole Net Survey (SNS): abundance indices are given as numbers per 100 hour fishing.

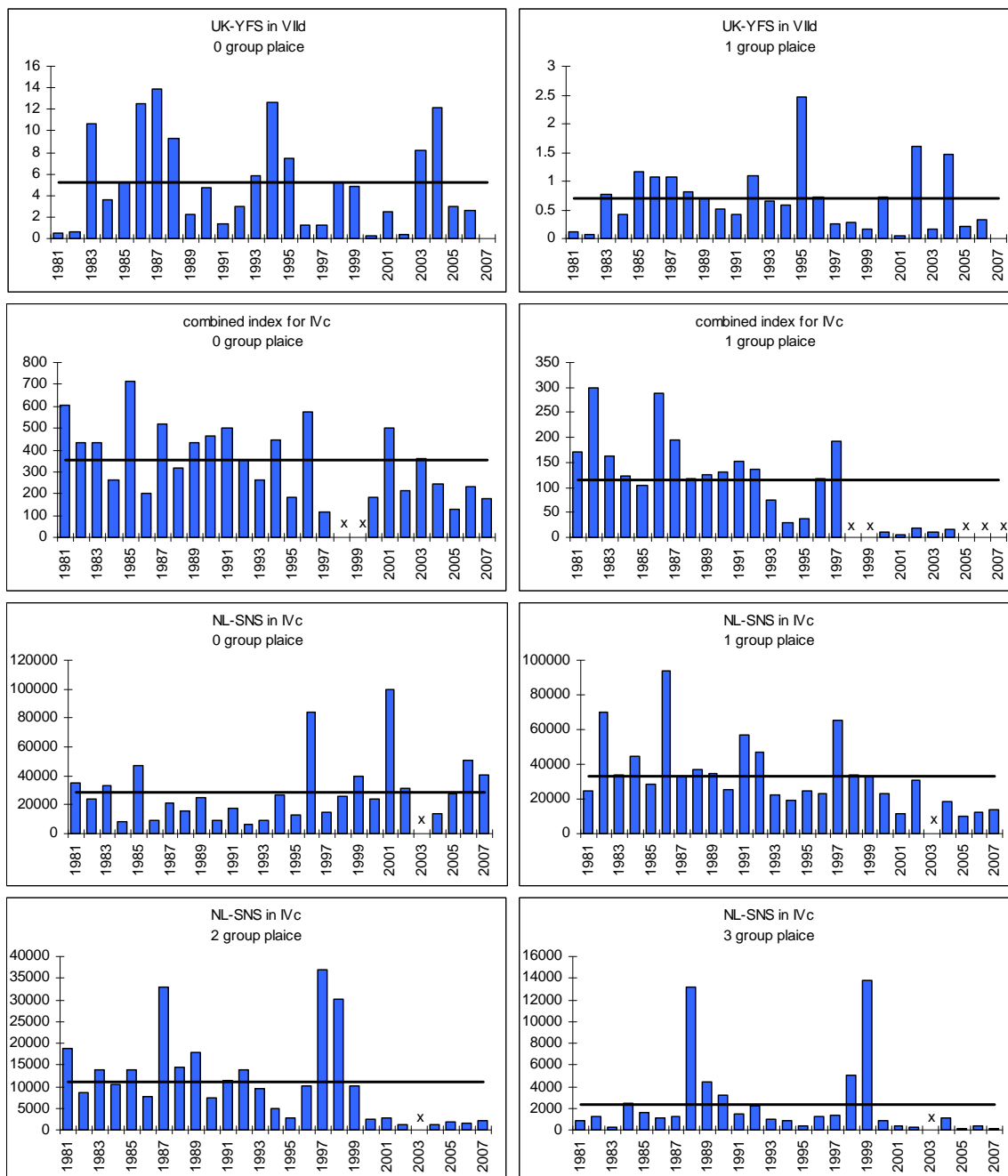


Figure 4.1.2.2. Indices of juvenile plaice abundance from inshore beam trawl surveys. Young fish surveys (YFS / DFS / DYFS): abundance indices are given as numbers per 1000 m² (Netherlands, Belgium and Germany) and as millions of fish sampled (UKYFS and international index). Sole Net Survey (SNS): abundance indices are given as numbers per 100 hour fishing.

5 Coordination and standardisation of beam trawl surveys (ToR c)

ToR c) Further co-ordinate offshore and coastal beam trawl surveys in the North Sea and Divisions VIIa and VII-d-g;

5.1 Offshore beam trawl surveys

Annex 15 lists the offshore surveys together with the geographic area covered, the gear used and the date started.

5.1.1 Timing and area coverage

Table 5.1.1.1. Timing of the offshore surveys in 2008.

COUNTRY	VESSEL	AREA	DATES	GEAR
Belgium	Belgica	southern North Sea	25 Aug – 5 Sep	4m beam
England	Corystes	VII-d	18 Jul-31 Jul	4m beam
England	Corystes	VII-fg, VII-a	16 Sep-6 Oct	4m beam
England	Carhelmar	VII-e	9 Oct-16 Oct	4m beam
France	Gwen Drez	VIII-a, VIII-b	3 Nov – 4 Dec	4m beam
Germany	Solea	German Bight	14 Aug – 29 Aug	7m beam
Netherlands	Tridens	central North Sea	18 Aug – 11 Sep	8m beam + flip-up rope
Netherlands	Isis	southern North Sea	4 Aug – 5 Sep	8m beam

WGBEAM recommends that if time and weather allows, Netherlands will attempt to carry out comparative tows with Germany and Belgium during periods when their surveys overlap in space and time. Regular contact will be kept by survey leaders to assist with this. Annex 14 shows overlaps in sampling areas (based on sampling in 2006 and 2005) in the offshore surveys.

Staff exchange is planned during the 2008 surveys. UK and Netherlands will exchange staff during the UK Q3 IBTS and Dutch Tridens beam trawl survey respectively.

5.2 Inshore surveys

Annex 15 lists the inshore and nearshore surveys together with the geographic area covered, the gear used and the date started.

5.2.1 Timing and area coverage

Table 5.2.1.1. Timing of the inshore surveys in 2008.

COUNTRY	VESSEL	AREA	DATES	GEAR
Belgium	Broodwinner	Belgian coastal zone	8 Sep – 22 Sep*	6 m shrimp trawl
England	F.V. lady Patricia & F.V. St. Richard & F.V. Halcyon	Eastern English Channel coastal zone	1 Sep – 9 Sep *	2 m shrimp trawl
England	F.V. Columbine & F.V. Fisher Lassie	Thames estuary	1 Sep – 9 Sep *	2 m shrimp trawl
England	F.V. Challenge	Northeast English coastal zone	1 Sep – 9 Sep *	2 m shrimp trawl
Germany	BK3	German Bight and German Wadden Sea	1 Sep – 10 Oct *	3 m shrimp trawl
Netherlands (SNS)	Isis	Dutch coastal zone	8 Sep – 19 Sep	6 m beam trawl
Netherlands	Schollevaar	Scheldt estuary	8 Sep - 26 Sep	3 m shrimp trawl
Netherlands	Stern	Dutch Wadden Sea	25 Aug – 26 Sep	3 m shrimp trawl
Netherlands	Isis	Dutch coastal zone and German Bight	22 Sep – 24 Oct	6 m shrimp trawl

* exact dates have to be planned.

6 Evaluation of survey performance

Recently, ICES listed the information that it felt working groups needed from survey groups (ICES, 2006a). This included the characteristics of the survey (distribution, etc.), internal consistency, precision and accuracy of the surveys and long-term changes in distribution by yearclass. WGBEAM has reviewed these aspects in relation to some of the key surveys.

6.1 Performance of offshore survey indices – internal consistency

Last year WGBEAM examined internal consistencies of the various international offshore surveys by examining the degree of correlation between the log-abundance estimates of a cohort at successive ages, with the estimate of internal consistency based largely on the R^2 values. Although very informative, there are two problems with this approach. Statistically speaking, the correlation coefficient only provides information on the proportion of the variance explained, but not on whether there is a significant relationship between the variables. Second, and conceptually of greater importance particularly for longer time-series is that the analysis assumes that the total mortality (Z) is constant across the time-series. The latter cannot be assumed so that correlation is likely curvy-linearly linked with changes in mortality. Over short time-series this is likely to be of minimal impact for the fisheries mortality component as these tend not to change dramatically interannually, but it still applies to variations in natural mortality, which can be substantial particularly in large cohorts.

This year WGBEAM took a more qualitative approach to examine the utility of the surveys and the information contained within each time-series covered by WGBEAM for sole and plaice. Statistical evaluation is possible only in relation to mortality as represented by the assessment, and therefore should be evaluated by assessment working groups.

The approach taken here looked simply at the means-standardized indices of abundance-at-age plotted by cohort to look for consistent trends within surveys and between surveys. Using means-standardized indices avoids the problem of differences in catchability-at-age within and between surveys. The results are shown Figures 6.1.1 (sole) and 6.1.2 (plaice).

WGBEAM also made a first attempt at compiling age-based indices for the offshore Belgian beam trawl survey (BTS-Bel). The series are preliminary only requiring further work with regards to the use of ALK's, but add a number of relevant points to the discussion on combining survey information the results of which are unlikely to be affected by the future revisions.

6.1.1 Sole

Abundance indices in area VII in general show similar patterns of yearclass strength prior to 1992, certainly the 1989 yearclass was universally strong. Since then trends have diverged with yearclass strength showing no very large recruitments, but also fewer low recruitments. The exception is VIIIf where a very large 1998 yearclass overshadows most other trends. In the other areas the reduction in variance is strongest in VIIe followed by VIIa and VIIId. Recruitment in VIIe has been less variable than in VIIId although the general trend of higher recruitment than in the early 1990s is also reflected.

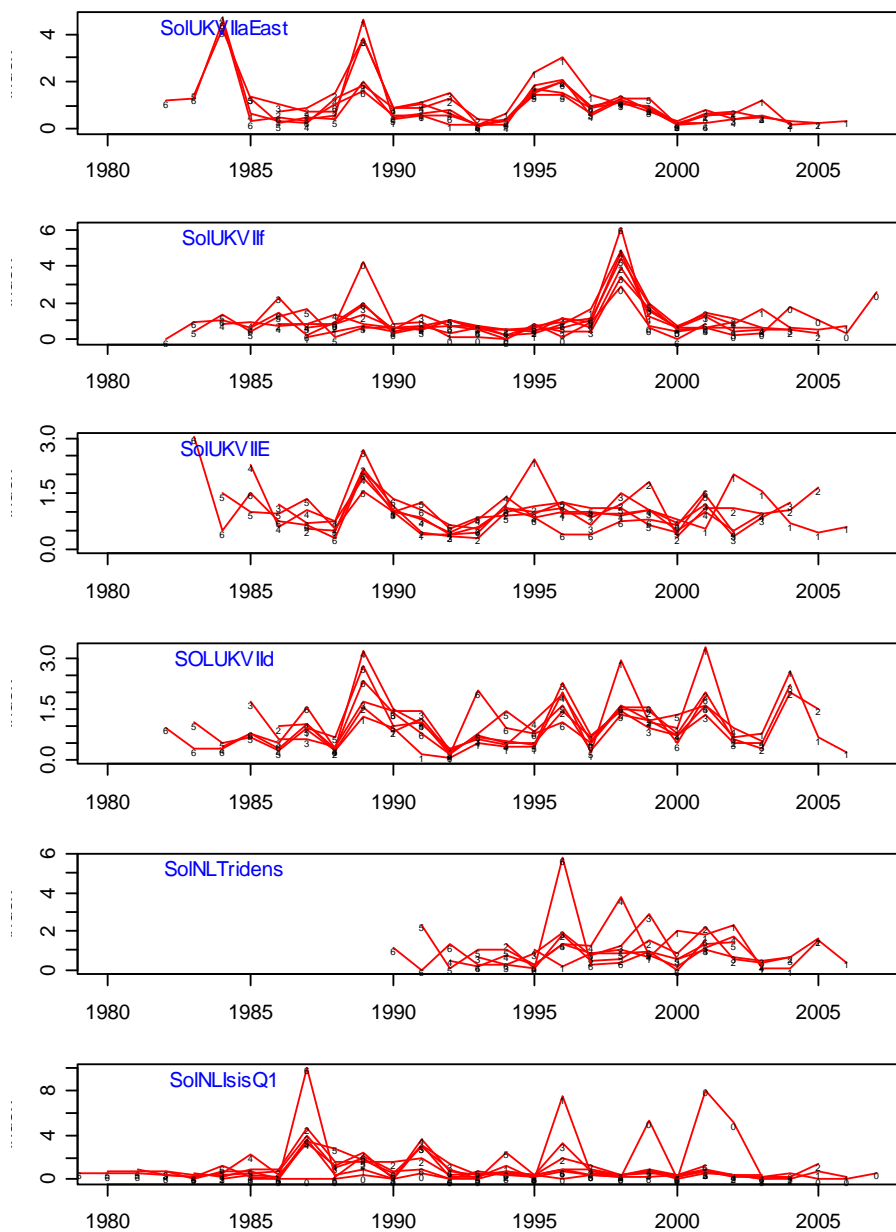


Figure 6.1.1 Means-standardized indices for various beam trawl surveys for sole.

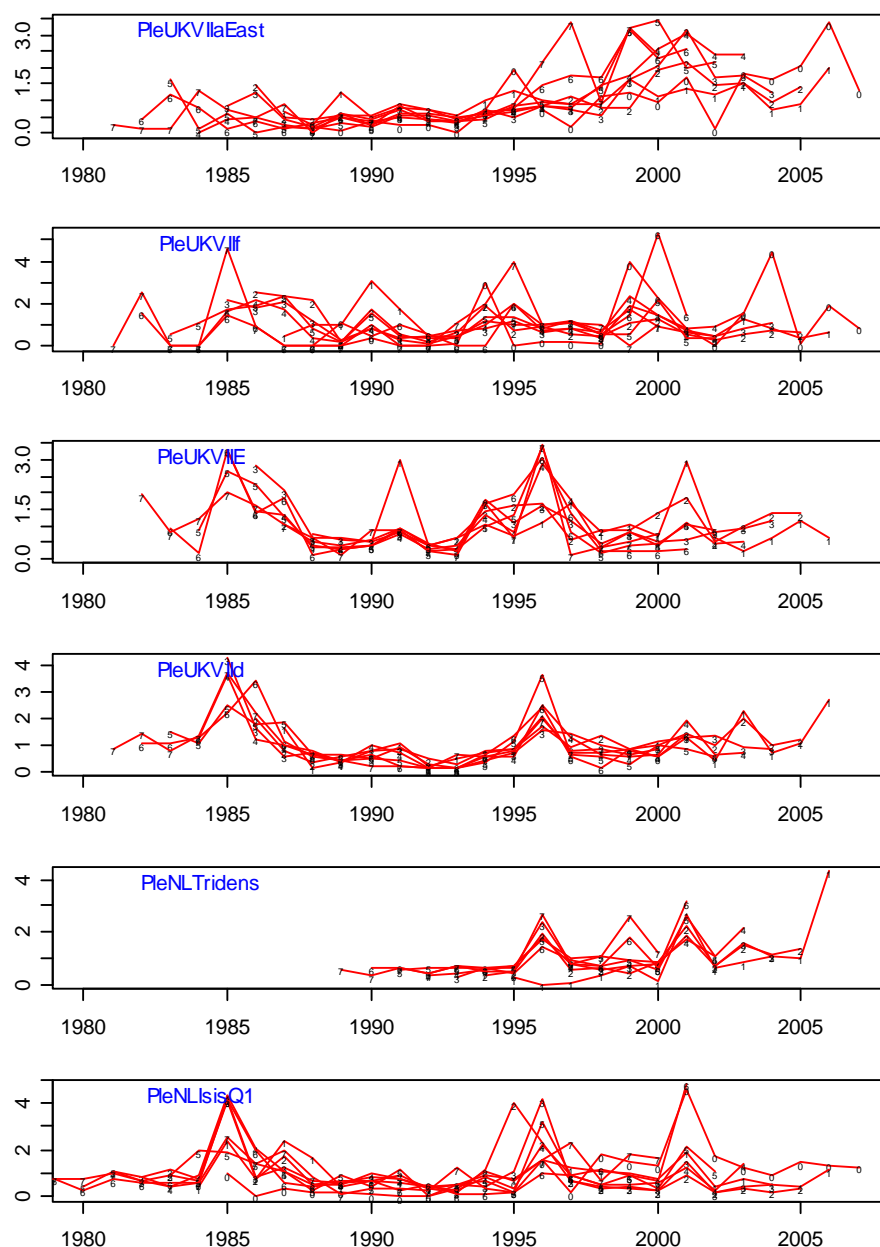


Figure 6.1.2 Means-standardized indices for various beam trawl surveys for plaice.

In area IV the trends are not too dissimilar with a number of the same yearclasses showing up as strong, although the relative size of these does not seem to follow the same pattern. The reduction in variance since the early 1990s is also apparent.

For most of the surveys the estimation of yearclass strength is consistent over the mid range of ages (age 0-7 plotted). Outliers are usually found at the youngest or older ages where generally low samples numbers are occasionally interspersed with high catches due to over dispersed sampling error structures.

The area VI surveys show some very large outliers, but at least for the Isis survey the general perception of yearclass strength is very consistent over most ages.

6.1.2 Plaice

Plaice stock dynamics in area IV and VII show greater commonalities than are seen for sole stocks. Particularly trends in VIIa seem very different with substantial

increases in the abundance in recent years. Areas VIIe,d and IV have historically had similar stock dynamic patterns with strong 1985 and 1996 yearclasses. More recently these trends have become more divergent though, particularly the strength of the 2001 yearclass differs between the areas and surveys.

The internal consistency of the surveys is generally poorer than those for sole. In area VIIa the survey shows a substantial increase in the variance in yearclass strength estimation commensurate with the increases in abundance estimated for the stock. The Isis survey shows the least consistency in terms of estimating yearclass strength although the data used here includes points that have been deleted in the assessment tuning series due to known difficulties with aging and operational complications.

6.1.3 Belgian offshore survey

The development of the Belgian tuning information represents only a first look at the data. The information was worked up separately by the currently implemented strata, with the combined result weighted only by the level of effort in each area. The survey appears to be less internally consistent for both plaice and sole than the other surveys, but there appears to be little contrast in yearclass strength over the time-series observed so that the magnitude of the scaling is different compared to other surveys.

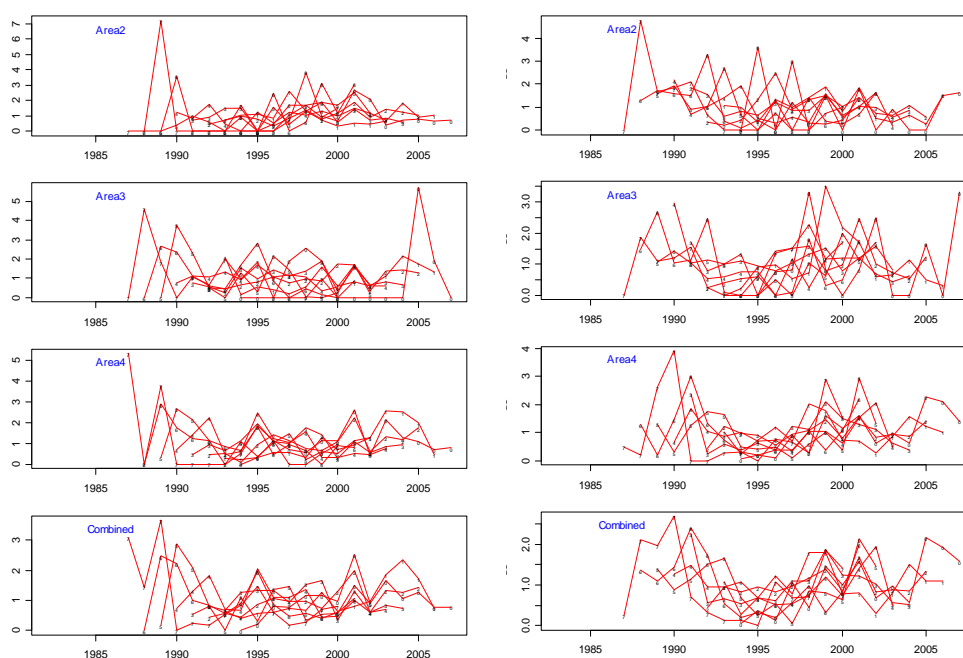


Figure 6.1.3.1. Means-standardized indices for sole (left) and plaice (right).

The combined survey index reflects mostly the trends reflected in area 4, largely because this is the area where most samples were collected. There are some differences in the stock trends observed in the areas, the relevance to the overall stock dynamics of which cannot be decided in isolation without considering the wider stock picture.

6.1.4 Combining Survey Indices

As shown in the case of the Belgian data, deciding on how to combine index information collected independently is very difficult. In that case, this was done within a single survey carried out with the same gear at the same time, so that

differences in trends are due to spatial differences in stock distribution. Weighting of the different components should be according to the contribution that each component has to the stock as a whole. However this is not possible without external information and should ideally be done at the stock assessment level, not a priori.

WGBEAM also considered how to best combine a number of tuning indices collected at different times of the year and on different vessels. The problem for assessment working groups when using XSA is that it uses inverse variance weighting of tuning information. When the stock contribution of the populations sampled by the different tuning series varies between years, as might be the case when different nursery grounds are sampled by different surveys, the assessment is not able to switch between fleets rapidly.

Combining the indices into a single index overcomes the problem if it is representative of the stock as a whole. Usually this is not the case; otherwise there would be little need to conduct more than one survey in the first place.

Without prior knowledge of the proportion of the population that is sampled by any one index it is not possible to combine these. Area weighting is one answer when the surveys are conducted at the same time with similar catchability, but when there is movement between areas over non-synoptic surveys or surveys overlap and used different gears this becomes subjective.

In the long run this will require either spatial models of stock dynamics consistent with the areas surveyed, or likelihood based models that can handle the information at the level of detail that it was collected rather than combining indices in isolation of the assessment process.

This obviously presents some difficulties for assessment groups using XSA or other inverse variance weighted tuning that find diverging trends in different survey. The weighting / inclusion of a series can have significant impacts on the estimates of stock status. A combined index derived from surveys with divergent trends will provide an estimate of stock status roughly in the range of those estimated by the single surveys, dependent on the weightings used. In addition, there is likely to be a penalty through an increase in variance when the survey weightings are incorrect which may reduce the influence of the combined index in an assessment.

In the short term there is no objective a priori way of combining indices in isolation from the assessment. The recommendation from WGBEAM would be to continue using separate surveys, but ensuring that the 'minimum s.e. to shrink to' is large. Shortening conflicting series to the length of the shorter series to minimize the effects of inverse variance weighting should also be considered.

6.2 Comparison of Age-Length-Keys of plaice in the BTS 2007

WGBEAM worked on getting insight in the consistency of the age-length keys for the offshore surveys. This was done by comparing 2007 age-length data for plaice for all age classes for all countries.

Belgium measures length of plaice on board without splitting by sex. Otoliths are collected from three different areas in ICES divisions IVb and IVc off the British coast. The age-length-keys for the different areas are produced with 20 otoliths per cm-class. For every taken otolith the sex of the fish is registered.

Length measurements on board UK survey are done by sex. The age-length-key in ICES division IVc is produced with 1 otolith per cm-class, station and sex.

Germany splits the whole catch of plaice by sex. Afterwards the length measurement is carried out. The age-length-key in division IVb uses 3 otoliths per cm-class, sex and rectangle. The keys are produced for both sexes.

The Netherlands don't do any splitting by sex for length measurements. Age-length-key in division IVa-c is produced with one otolith per cm-class and rectangle. For every taken otolith the sex of the fish is registered.

Age groups 1-6 were covered by all countries. Age groups 7-9 were caught by Belgium, Germany and The Netherlands. The oldest group (10) was not found in Belgium catches. Only the Netherlands caught fish of age group 0.

The difference from the minimum to the maximum length for the age groups 1-4 varies between 3 and 4 cm. From age 5 upwards the difference increases up to 13 cm in age 8. Age groups 1-5 show a usable agreement in the mean length. The discrepancy increases with the older ages. The small sample size for the older age groups is one of the causes for the increase. The difference in maximum length for male and female plaice might be another reason.

From 15 to 40 cm length there were averages from 5 to 83 otoliths per length class for different countries available. The lengths above 40 cm were covered with 1 to 8 otoliths per length class. It is important to intensify the effort to take more otoliths from fish larger than 40 cm if they are in the catch.

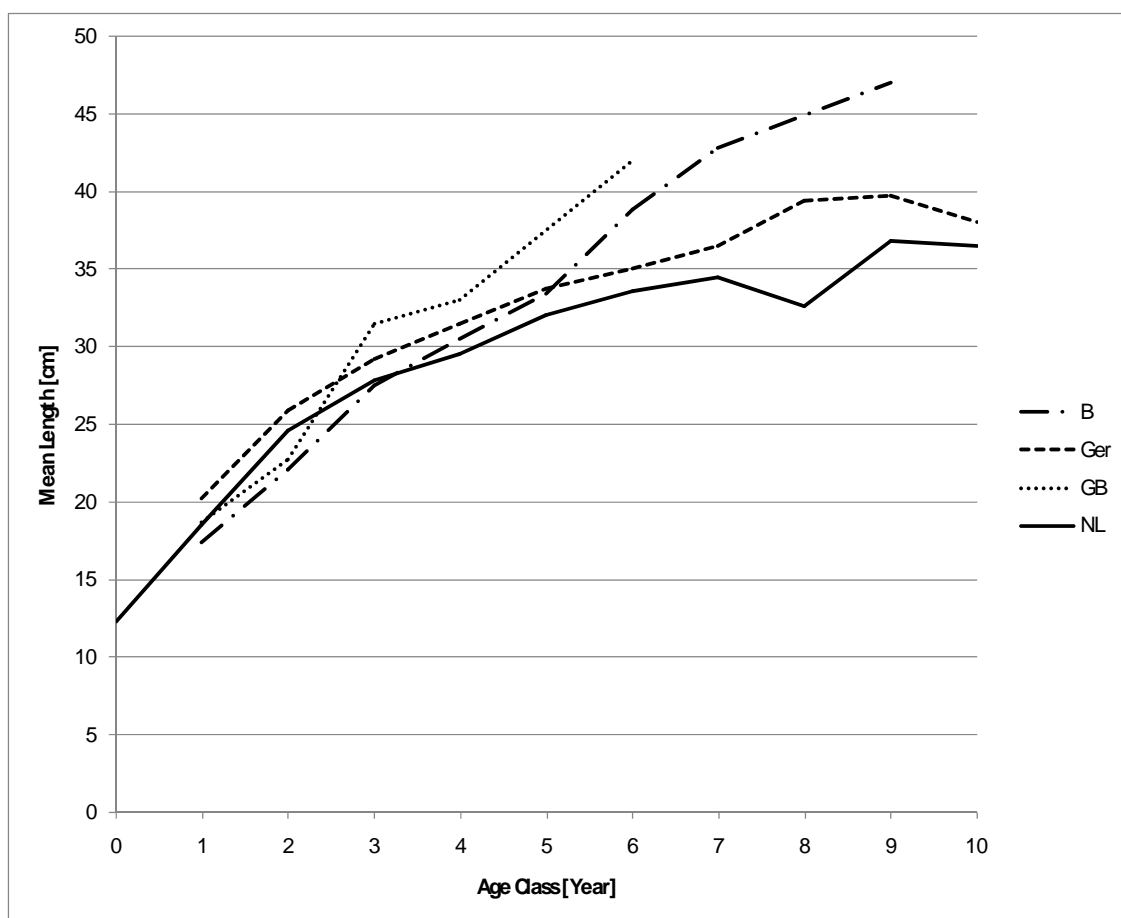


Figure 6.2.1. Mean length by age for plaice in the 2007 offshore surveys.

7 Other ToR's

7.1 Development of manual (ToR e)

ToR e) Continue development of a manual to improve standardisation of sampling protocols, surveys gears and quality control aspects

During WGBEAM 2008 a major step is made in preparing the beam trawl survey manual. Although not yet complete, all sections do contain information which will be extended and revised during next meeting. The main goal of the manual is to give insight in the overlaps and differences in the origin of the beam trawl surveys, the methodology used. The manual will be necessary when discussing standardization of the survey. The draft manual for offshore beam trawl surveys is in Annex 16.

7.2 Database developments (ToR f)

ToR f) Continue work of developing and standardising an international (fish and epifauna) database of offshore beam trawl survey data and co-ordinate such activities with those of the IBTSWG)

In February 2008, four WGBEAM members and people of the ICES secretariat met in Copenhagen and discussed the beam trawl database format and the quality checks to be applied to the data sent to ICES. The report of the workshop is in Annex 17.

WGBEAM worked on the inshore database and agreed on composing this database from a standard format comparable with the DATRAS format. One variable has to be added: tidal phase (in hours before high tide).

WGBEAM agrees with IBTSWG on creating a DATRAS User group.

7.3 Criteria for surveys coordinated (ToR g)

ToR g) Present a list of criteria for surveys that will be coordinated by WGBEAM and consider if the Bay of Biscay Sole survey matches the criteria

In line with IBTSWG, WGBEAM proposes that any request for a survey to be coordinated within the WGBEAM should first be considered and approved by a relevant ICES assessment working group. If an ICES assessment working group has reviewed the utility of an existing non-coordinated survey of relevance to their stock(s) and can justify the importance of the survey for the assessment process. The list of criteria presented in WGBEAM 2007 report is agreed on.

- 1) A brief outline of the management need/context for the survey provided by the assessment working group;
- 2) It is a beam trawl survey (noting that some otter trawl surveys may be better included within other ICES working groups, such as IBTSWG etc.);
- 3) The survey either has appropriate sampling methods and protocols (including gear descriptions) that conform to the requirements encouraged by WGBEAM, or that can be improved after joining WGBEAM;
- 4) The survey should aim to enhance existing WGBEAM surveys and improve data collection for important stocks. For example, proposed surveys for inclusion within WGBEAM should (i) overlap and extend existing surveys and use comparable gear, or (ii) operate on more specific grounds/times of year with a gear more appropriate for the target species;
- 5) Submit their data to the DATRAS database;
- 6) Attend and present data at the annual meetings of WGBEAM;

Based on the above criteria and a willingness to reach consensus on survey design and methodology, WGBEAM can provide whatever support and coordination is possible to the candidate survey. Further, WGBEAM can provide an annual survey summary to the sponsoring assessment working group until such time as both working groups can agree the utility, or not, of the survey. This review period is not envisaged to take longer than five years however.

WGBEAM discussed the need to add criteria on the area sampled and decided not to put any restriction beforehand on spatial grounds because it is more important to be a platform for beam trawl surveys in the complete ICES area.

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Annex 1: List of participants

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Annex 2: Recommendations for 2009

Recommendations

RECOMMENDATION	ACTION
1. WGBEAM recommends that relevant Working Groups review the standard reporting summaries for inshore and offshore surveys and give feedback to WGBEAM.	To be implemented by the ICES secretariat
2. WGBEAM recommends that once the offshore surveys are uploaded to the DATRAS database ICES secretariat should be asked to provide precision estimates for inclusion in the next appropriate WGBEAM report (Section 3.1.1).	ICES secretariat is requested to calculate the precision estimates as standard output from DATRAS
3. WGBEAM recommends that if time and weather allows, Netherlands will attempt to carry out comparative tows with Germany and Belgium during periods when their surveys overlap in space and time (Section 3.1.1).	To be implemented by National institutes (cruise leaders of surveys)
4. WGBEAM recommends to further evaluate the potential for using close-by stations as comparative hauls for the offshore surveys to be able to compare catches of different countries and with the final aim to get a combined survey estimate.	To be implemented by WGBEAM participants
5. WGBEAM recommends to continue using separate survey indices, but ensuring that the 'minimum s.e. to shrink to' is large. (Section 6.2)	To the assessment working groups using beam trawl data
6. In order to assess the affect of the revised data procedures on the abundance indices, WGBEAM that the international inshore indices should be recalculated. The performance of the new time-series should be evaluated by March 2009 (Section 7.2.2 in WGBEAM 2007 report) (Note: this recommendation is dependant on the availability of a complete database for the continental inshore surveys)	WGBEAM 2009

Recommendations from BTDATRAS adopted by WGBEAM

RECOMMENDATION	ACTION
7. WGBEAM recommends to add units for all variables in the DATRAS exchange format	To be implemented by ICES Data Centre
8. BTDATRAS recommends to review the list of variables made by BTDATRAS at WGBEAM meeting in May 2008	To be implemented by WGBEAM participants
9. BTDATRAS recommends to review the list of checks made by BTDATRAS at WGBEAM meeting in May 2008	To be implemented by WGBEAM participants
10. WGBEAM recommends to look into the reason for the DATRAS screening program being slow and make arrangements to deal with the problem in the near future	To be implemented by ICES secretariat
11. WGBEAM recommends to look carefully at the risk of not being able to run queries properly due to overload of the server	To be implemented by ICES secretariat
12. WGBEAM recommends to find a group (WKSAD or another group) to explore the possibilities of creating combined indices based on DATRAS BTS data	To be implemented by WGBEAM participants

Annex 3: Suggested ToRs for 2009

The **Working Group on Beam Trawl Surveys** [WGBEAM] (Chair: Ingeborg de Boois*, The Netherlands) will meet in La Rochelle from 9–12 June 2009 to:

- a) prepare a progress report summarizing the results of the 2008 offshore and inshore beam trawl surveys;
- b) tabulate population abundance indices by age-group for sole and plaice in the North Sea, Division VIIa and Divisions VIId-g;
- c) further co-ordinate offshore and coastal beam trawl surveys in the North Sea and Divisions VIIa, VIId-g and VIIId-b;
- d) evaluate and report on methodology and performance of calculating population abundance indices, taking into account the key issues involved in the index calculation;
- e) continue development of a manual to improve standardization of sampling protocols, surveys gears and quality control aspects;
- f) continue work of developing and standardizing an international (fish and epifauna) database of offshore beam trawl survey data and co-ordinate such activities with those of the IBTSWG;

Supporting Information

Priority:	Essential. Beam trawl surveys provide essential abundance indices for the assessments of North Sea and area VII plaice and sole stocks.
Scientific Justification and relation to Action Plan:	<p>WGBEAM is particularly active in addressing the ICES' action plan Goal 1 issues. The beam trawl surveys are an important source of information (for various taxa only) that allows quantification of stock structure, dynamics, and spatial distribution of commercially and ecologically important demersal fish as well as epibenthic invertebrate species. The aim is to develop a standardized monitoring program that can adequately deliver this information.</p> <p>ToRs a) and b) are standard tasks for WGBEAM i.e. collating data in a standardized manner and making the data and extractions of the data accessible to the scientific community. The results can be used for tuning assessments and ecosystem monitoring. [Action number 1.2.2]</p> <p>ToRs c) There continues to be a need to focus on coordination of both offshore and coastal beam trawl surveys. [Action number 1.11]</p> <p>ToR d) A key issue for the WG is the methodology used for estimating abundance and in particular the issue of gear efficiency [Action number 1.11, 1.13.4]</p> <p>ToR e) The WG will assist in developing standard protocols for sampling, survey design and implementation. [Action numbers 1.11 and 1.13.1]</p> <p>ToR f) Additional work is needed to ensure data from all the surveys can be provided to ICES in compliance with DATRAS [Action number 6.1]</p>
Resource Requirements:	The research programmes which provide the main input to this group are already underway, and resources already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants:	Experts actively involved in the beam trawl surveys should participate.
Secretariat Facilities:	None
Financial:	No financial implications
Linkages To Advisory Committees:	The Terms of Reference are set up to provide ACFM with the information required to respond to requests for advice/information from NEAFC and EC DGXIV. ACE

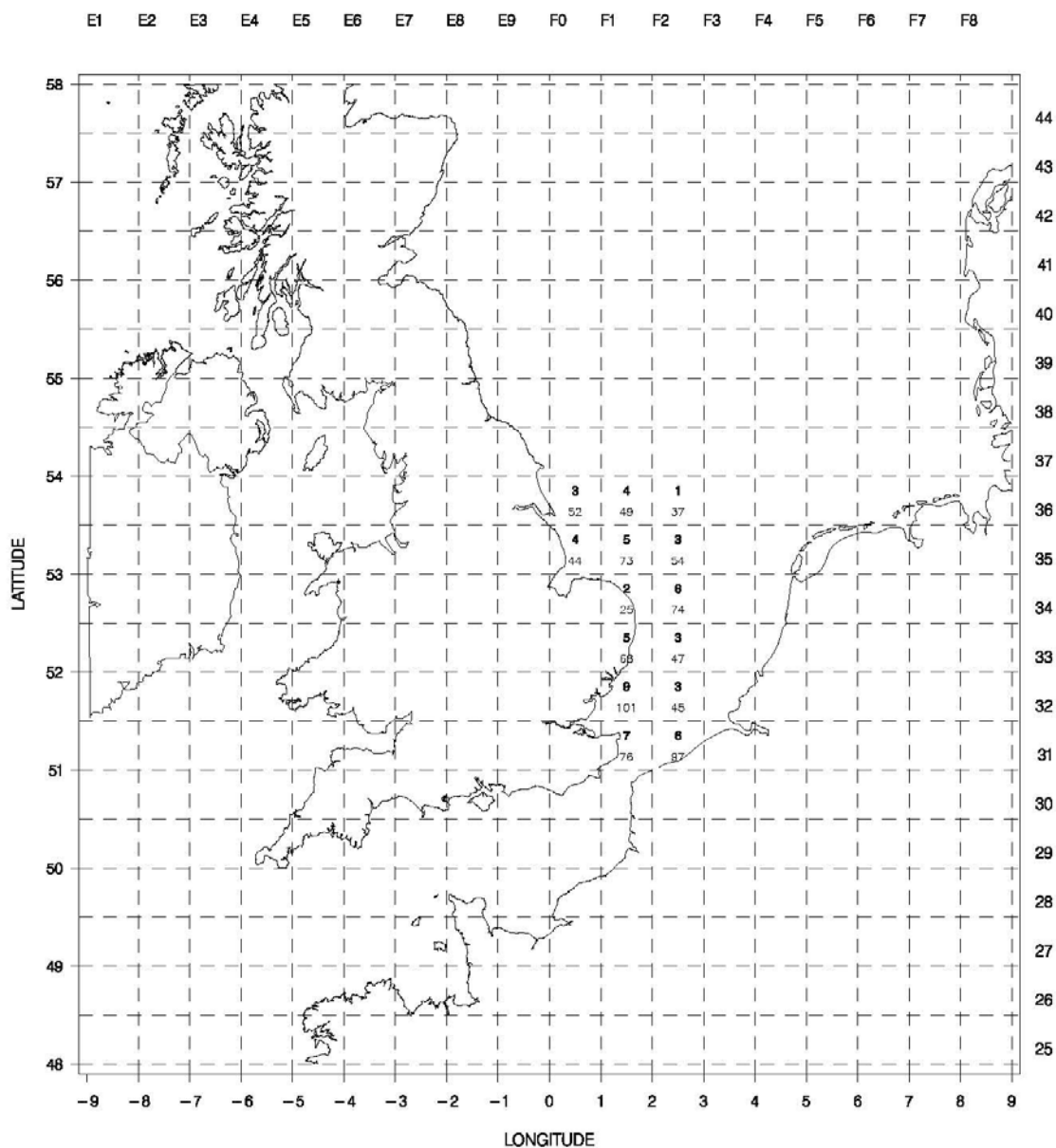
Linkages To other Committees or Groups:	Resource Management Committee, in particular IBTSWG , WGNSSK, WGNSDS & WGSSDS
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Linkages to other Organisations:	None
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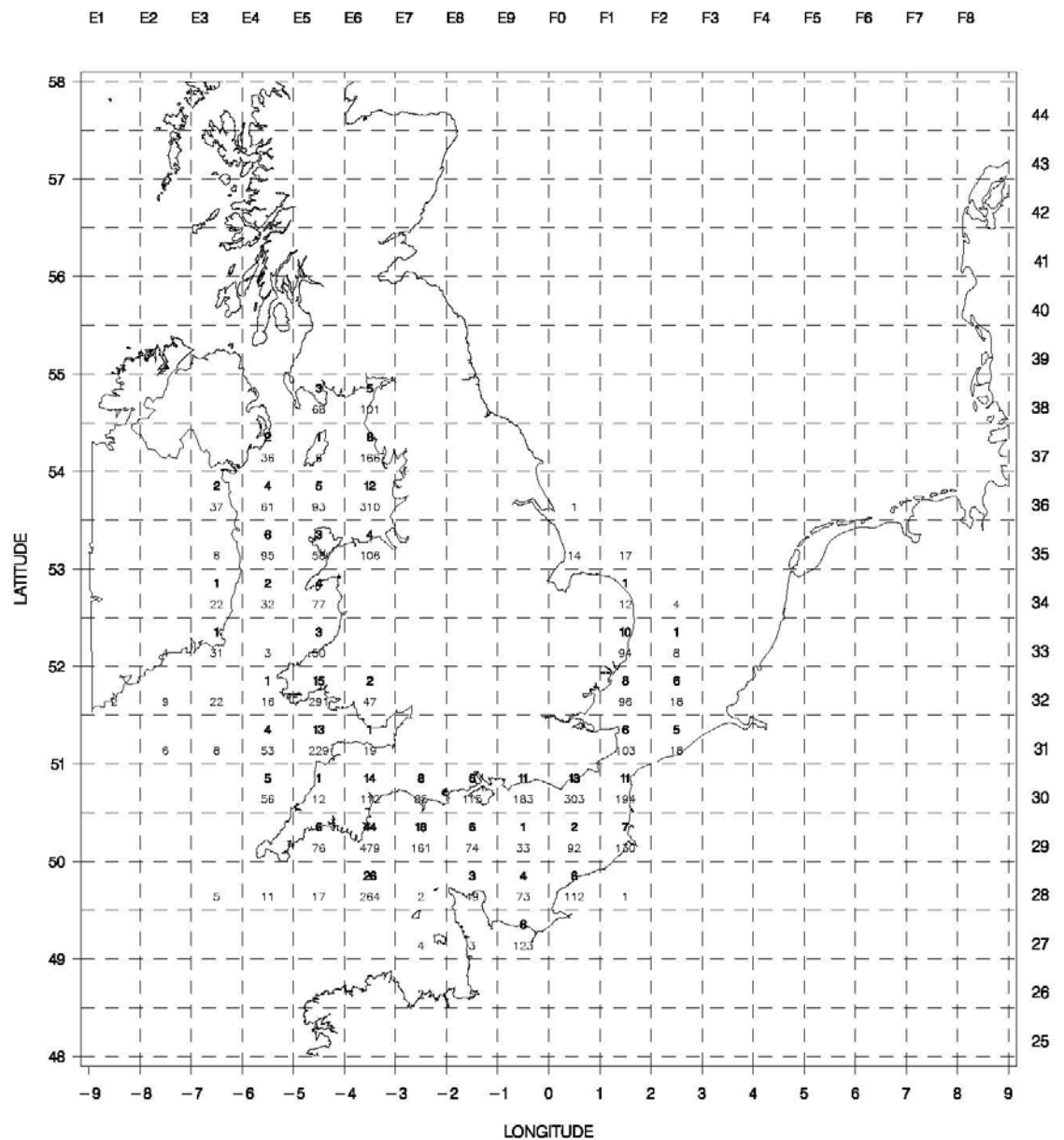
Secretariat Marginal Cost Share:	ICES: NEAFC: EC 75:10:15
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Annex 4: Sampling coverage of offshore surveys

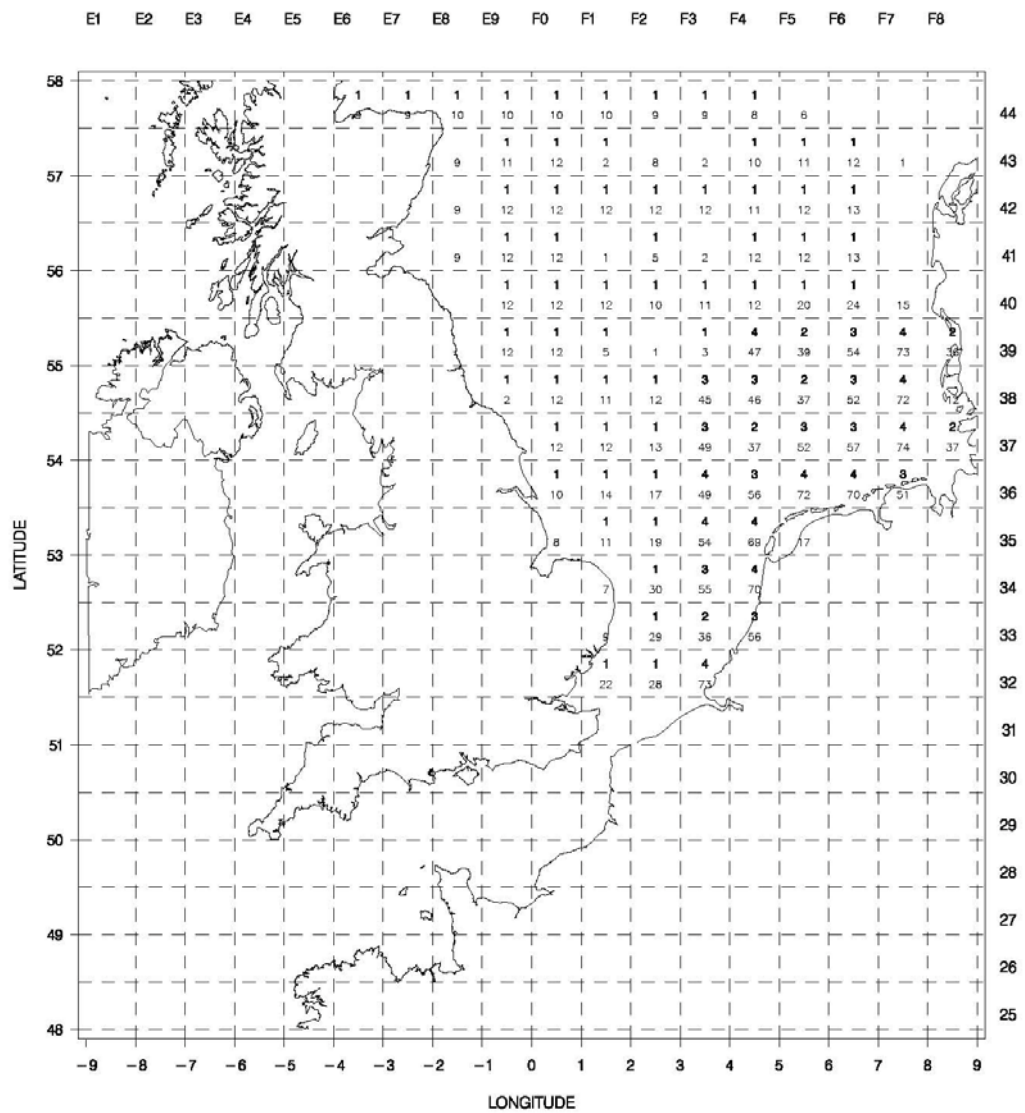
Annex 4.1.1 Total number of offshore beam trawl hauls per rectangle.
Total hauls in 2007 (above) and total for 1992–2007 (below) for BEL .



Annex 4.1.2 Total number of offshore beam trawl hauls per rectangle. Total hauls in 2007 (above) and total for 1990–2007 (below) for ENG.



Annex 4.1.4 Total number of offshore beam trawl hauls per rectangle.
Total hauls in 2007 (above) and total for 1990–2007 (below) for NED .



Annex 5: Spatial distribution of fish species in offshore surveys

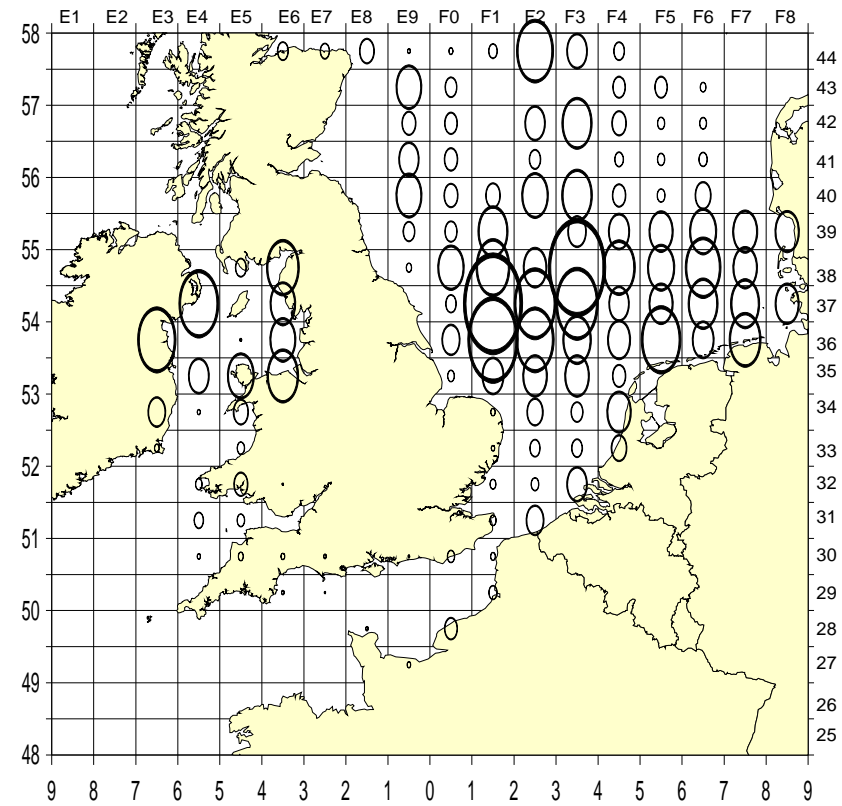
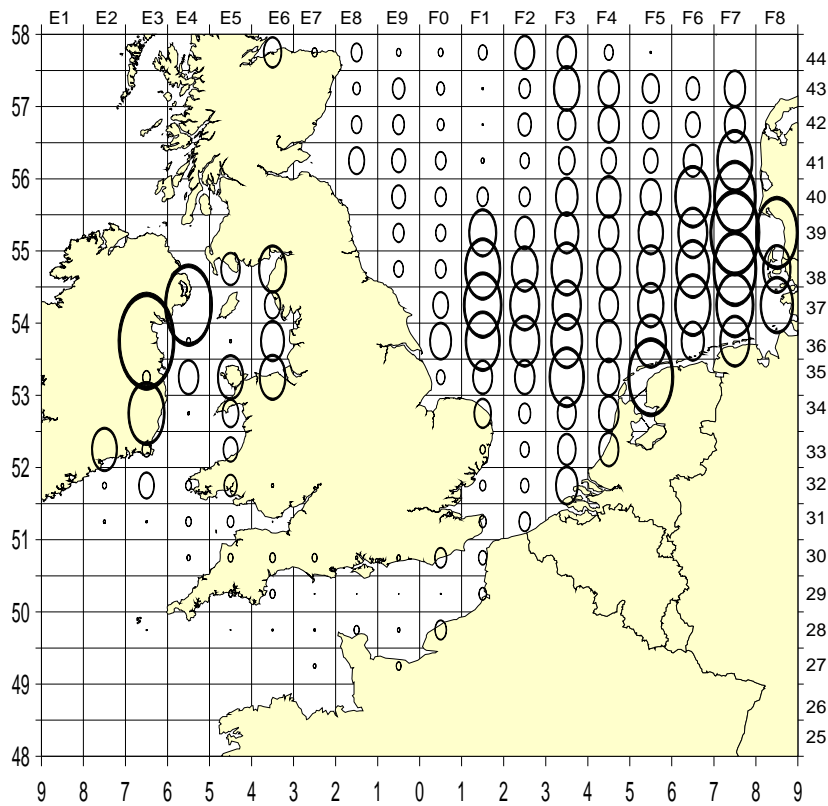
This annex shows distribution bubble plots of the main species caught throughout the beam trawl surveys by rectangle for all surveys combined. The left hand plot shows the mean catch in numbers per hour, raised to 8m-beam trawl, for the time-series. The right hand plot shows the data for the current year.

Annex 5.1.1 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Dab

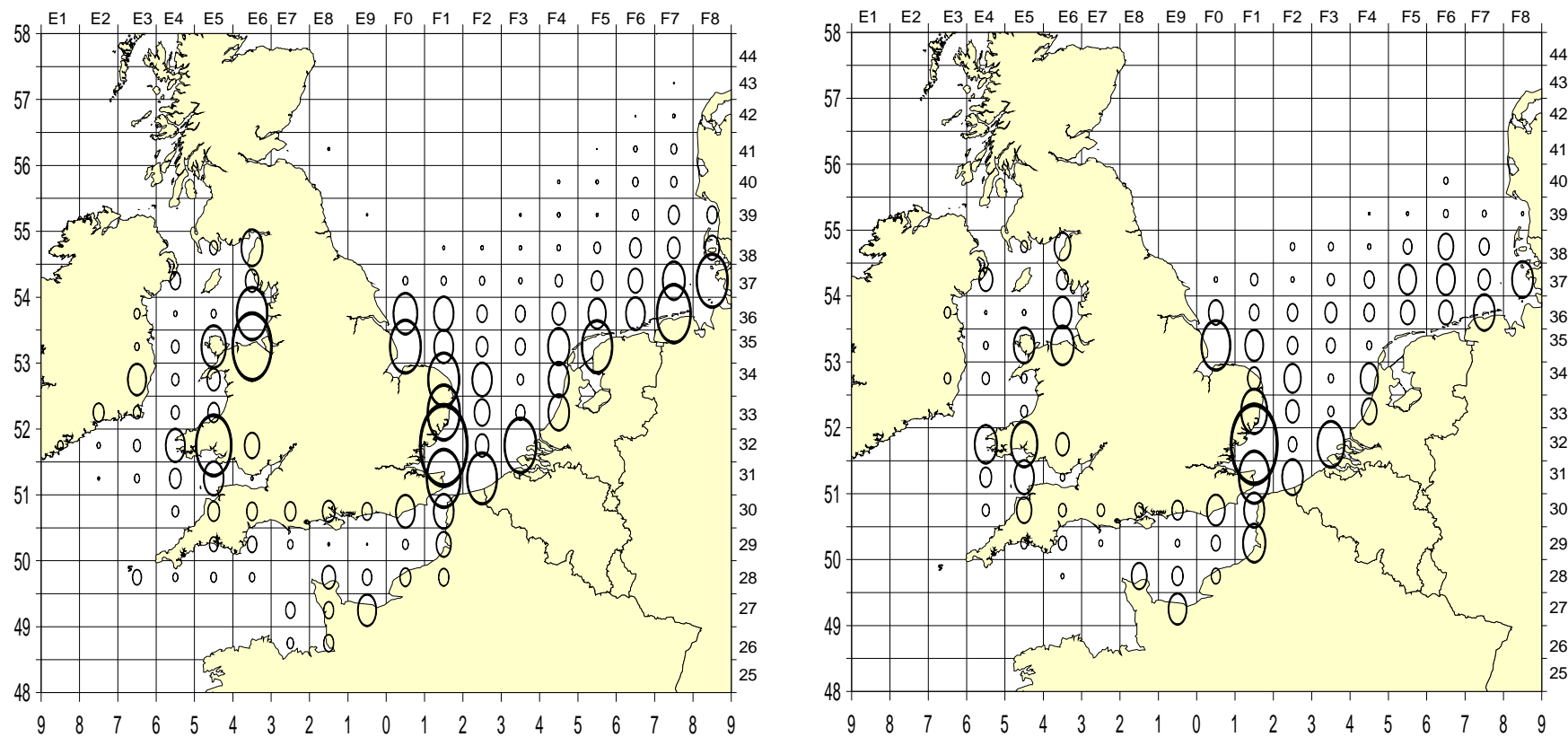


4000 per hr/8m beam

Annex 5.1.2 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Sole

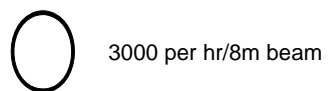
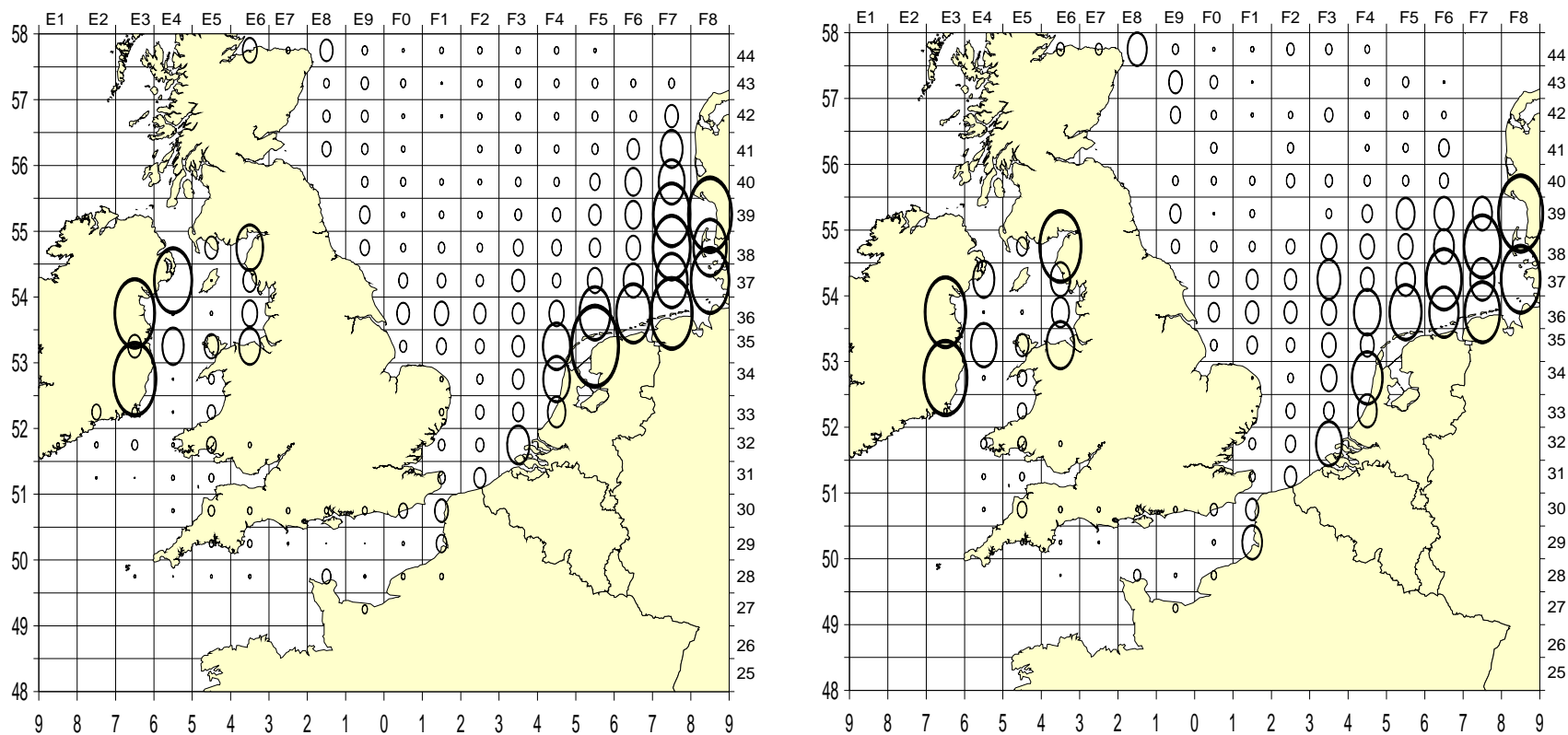
○ 500 per hr/8m beam

Annex 5.1.3 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

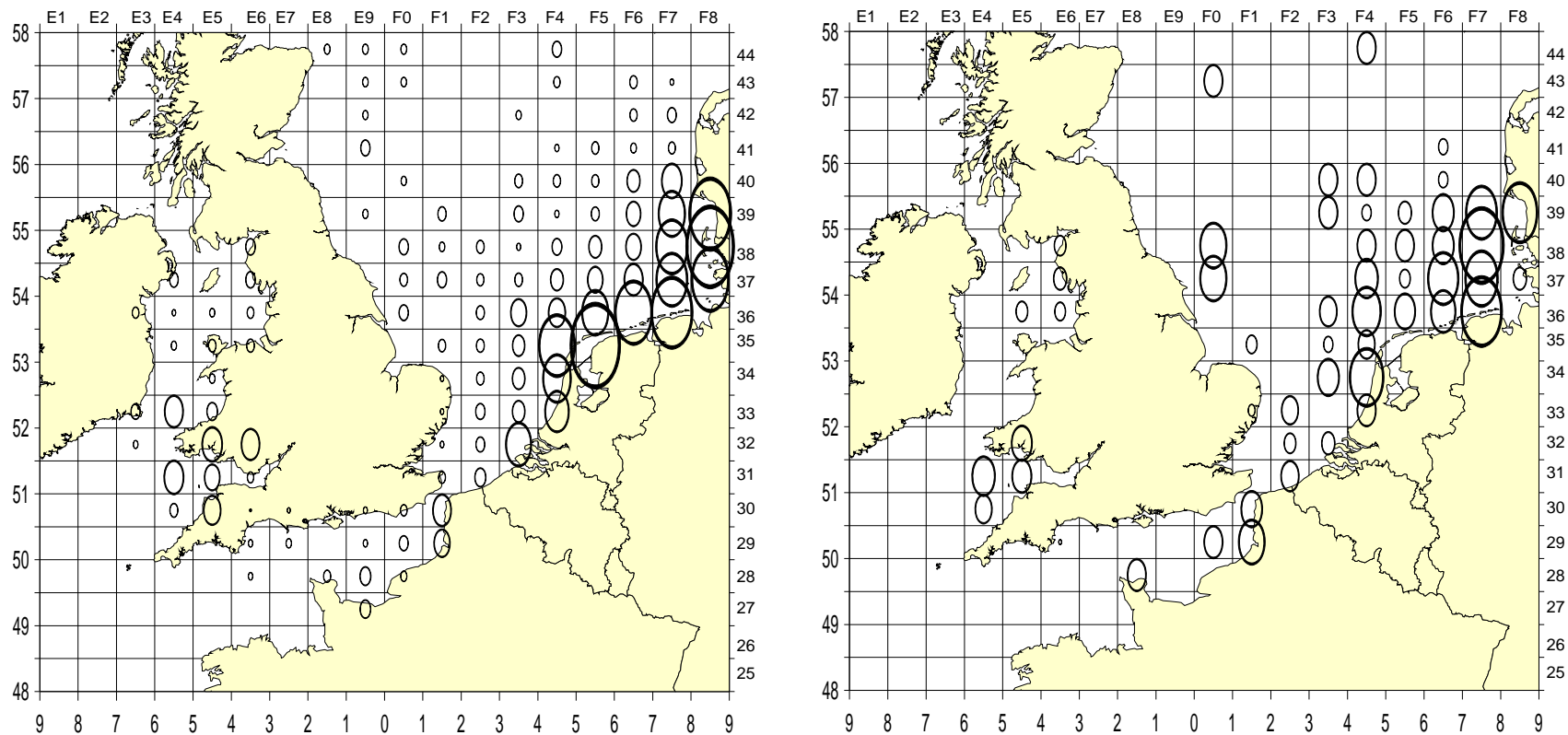
Plaice



Annex 5.1.4 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Turbot

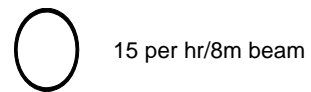
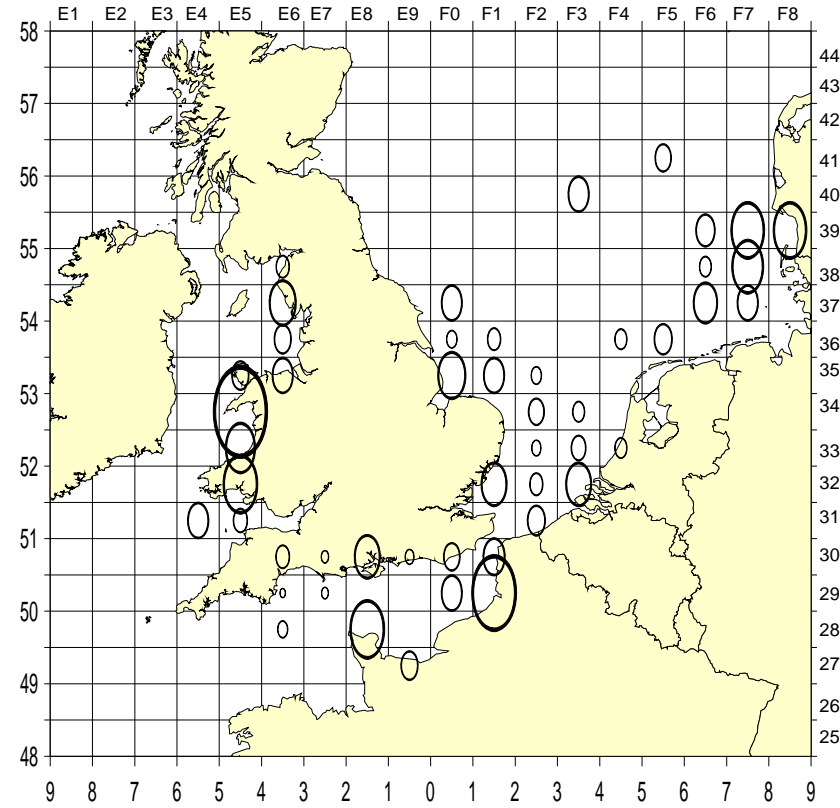
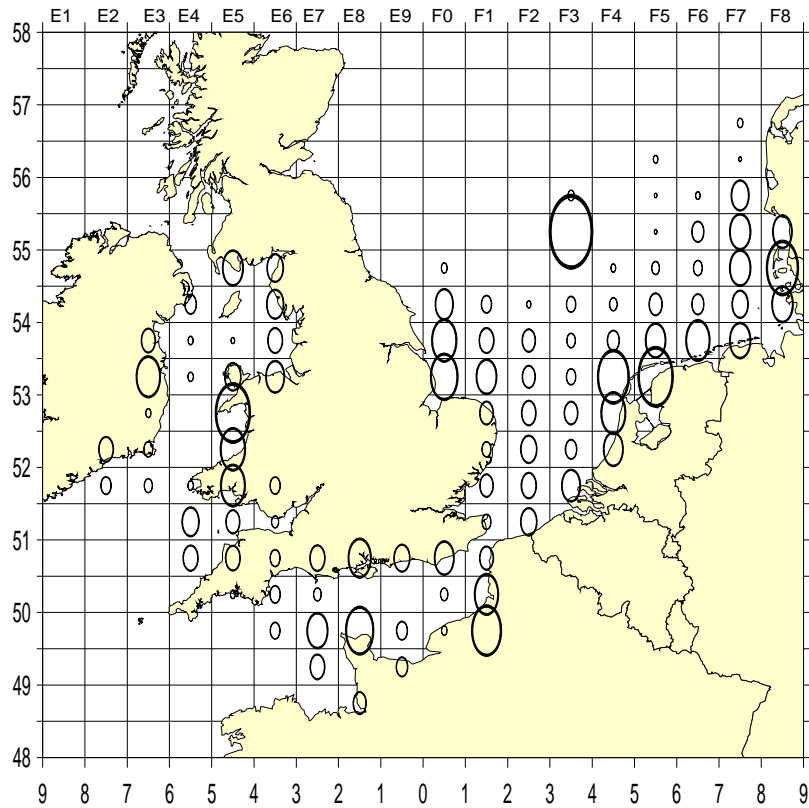
○ 15 per hr/8m beam

Annex 5.1.5 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

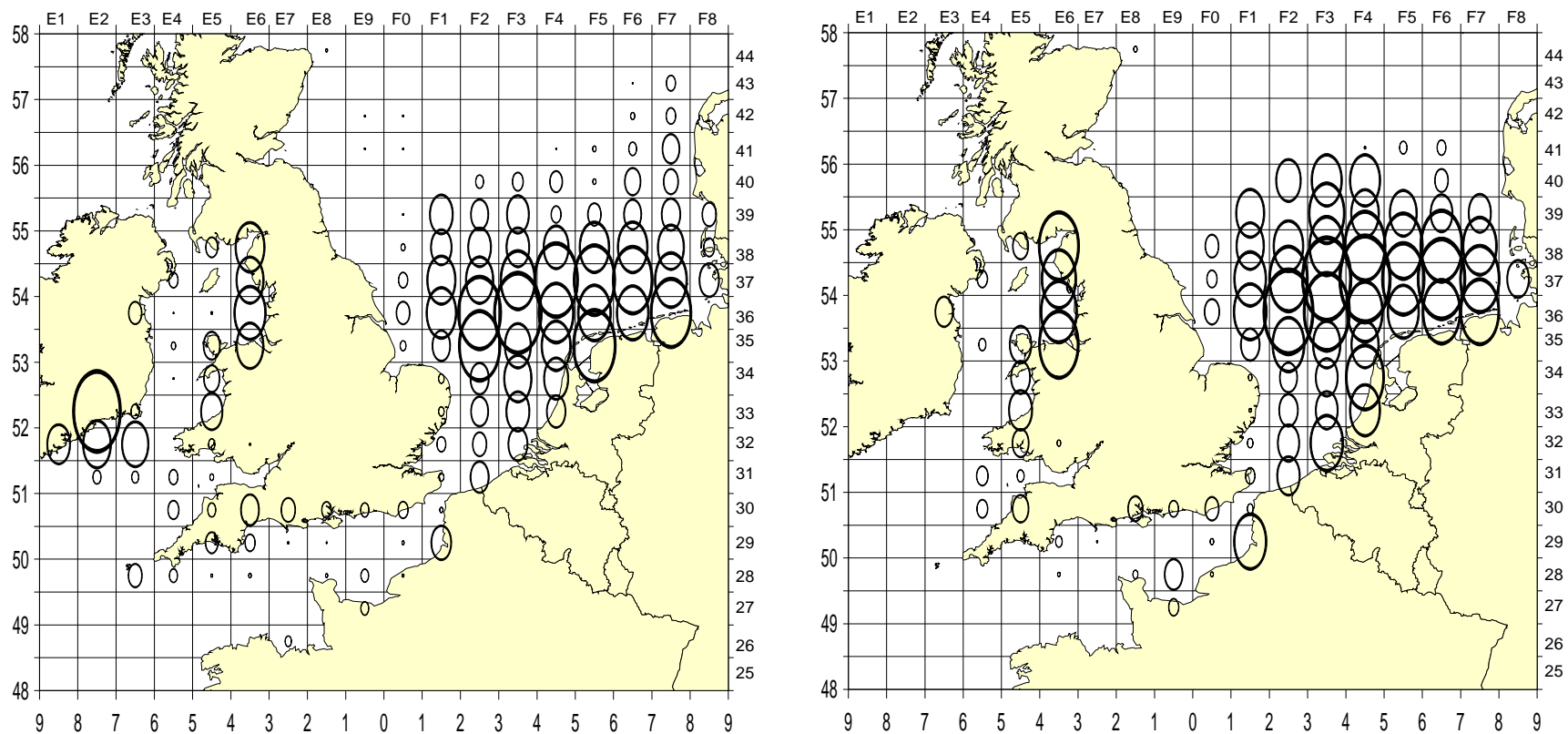
Brill



Annex 5.1.6 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Scaldfish

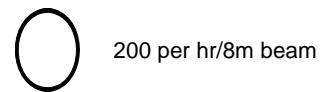
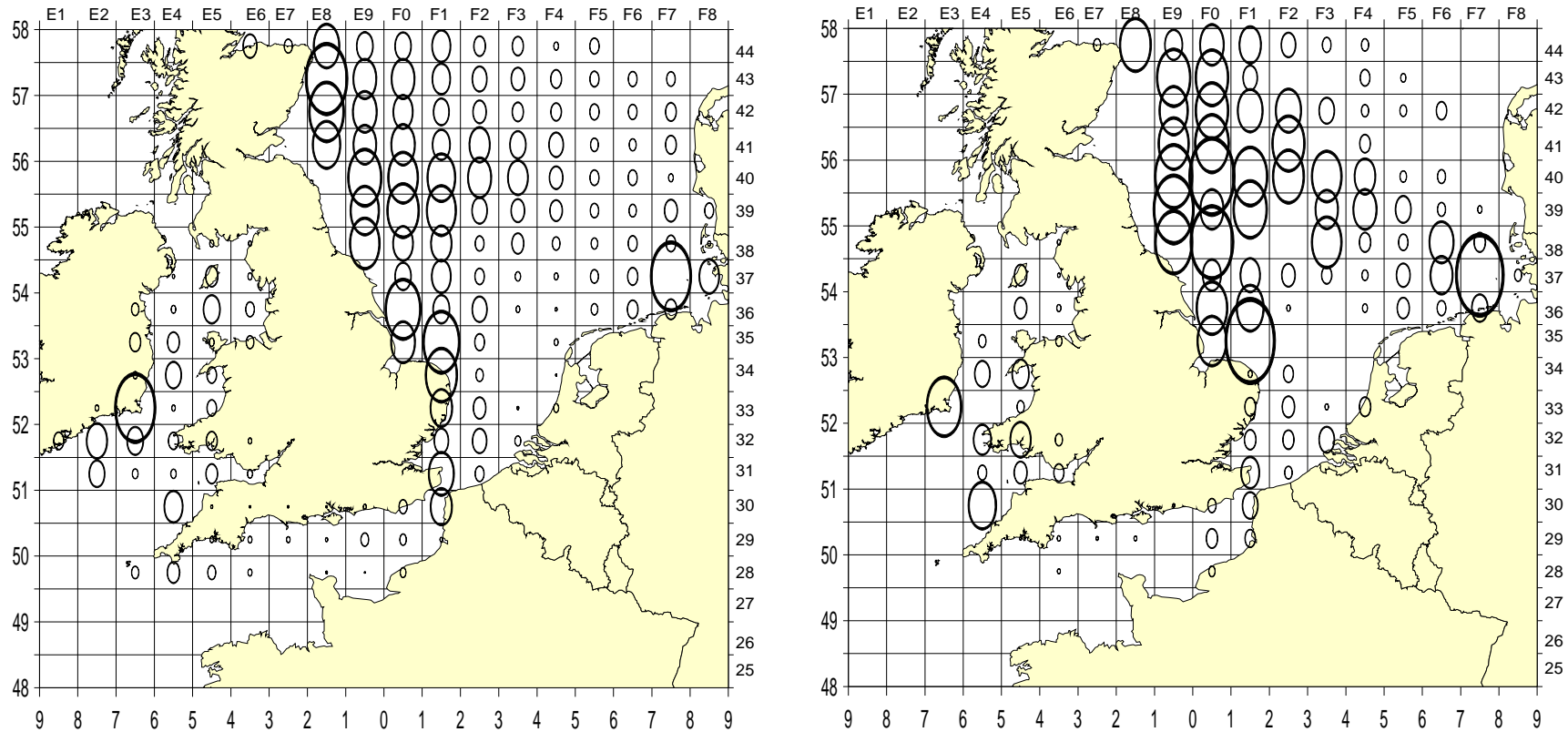
400 per hr/8m beam

Annex 5.1.7 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Lemon sole

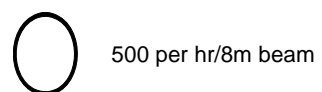
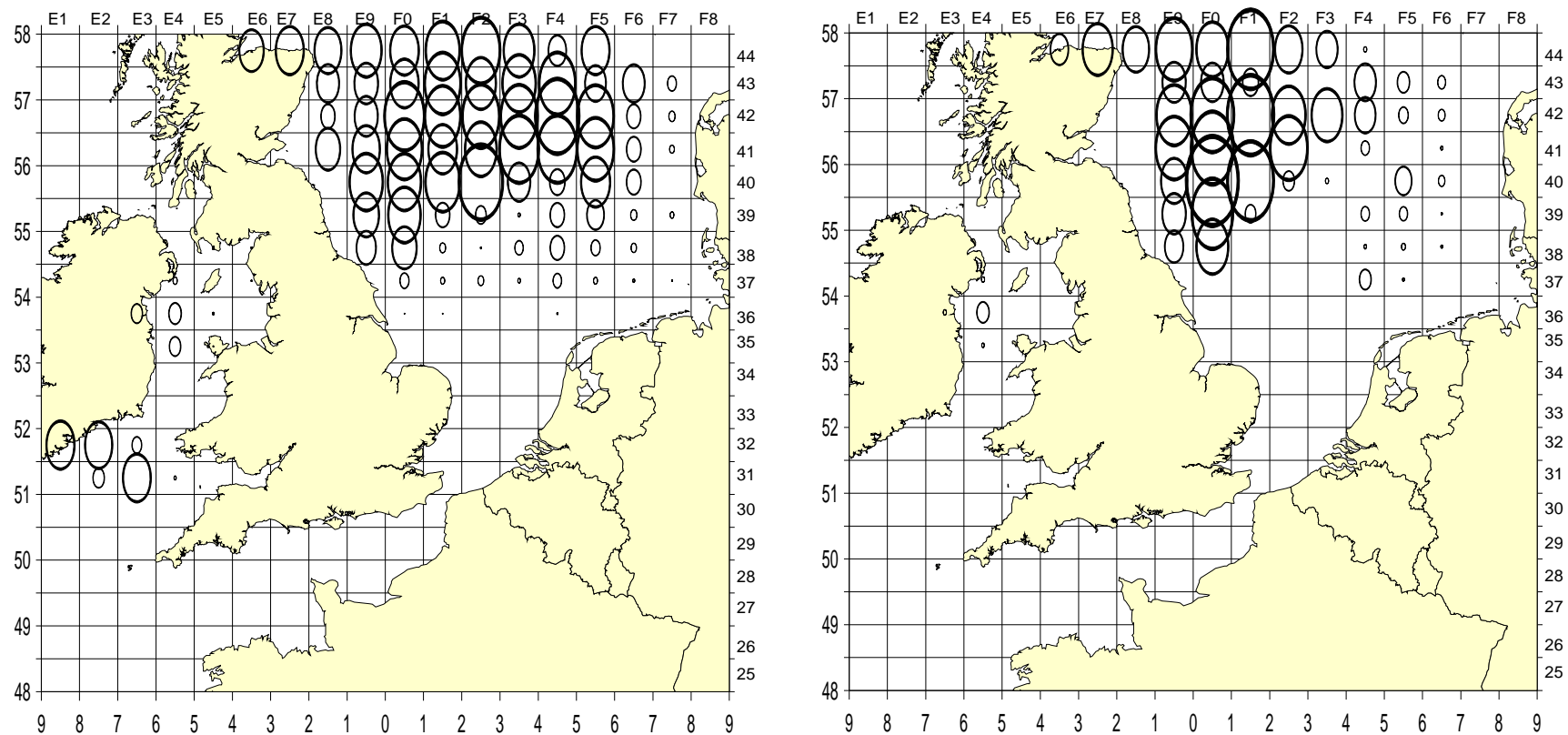


Annex 5.1.8 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

American plaice (long rough dab)

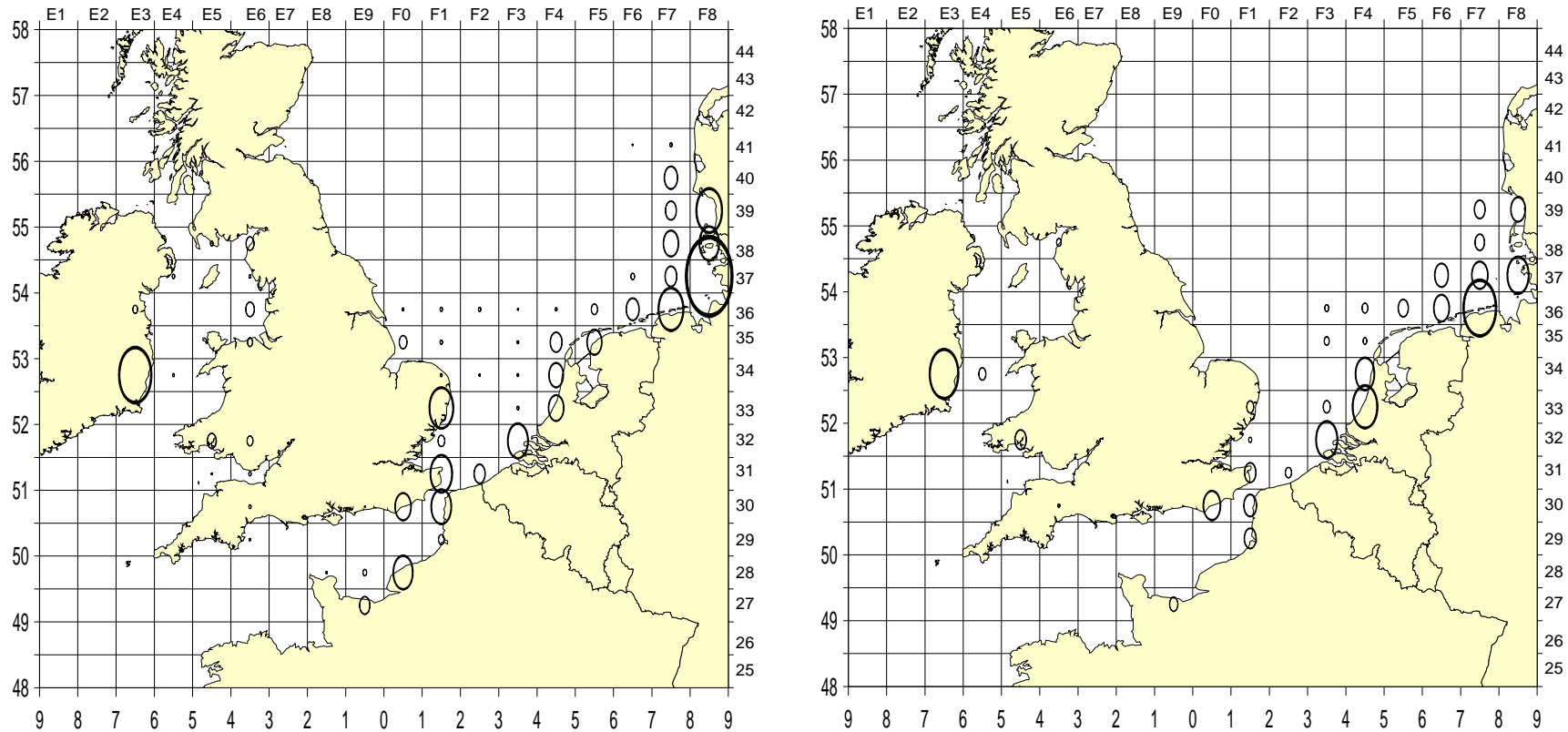


Annex 5.1.9 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Flounder



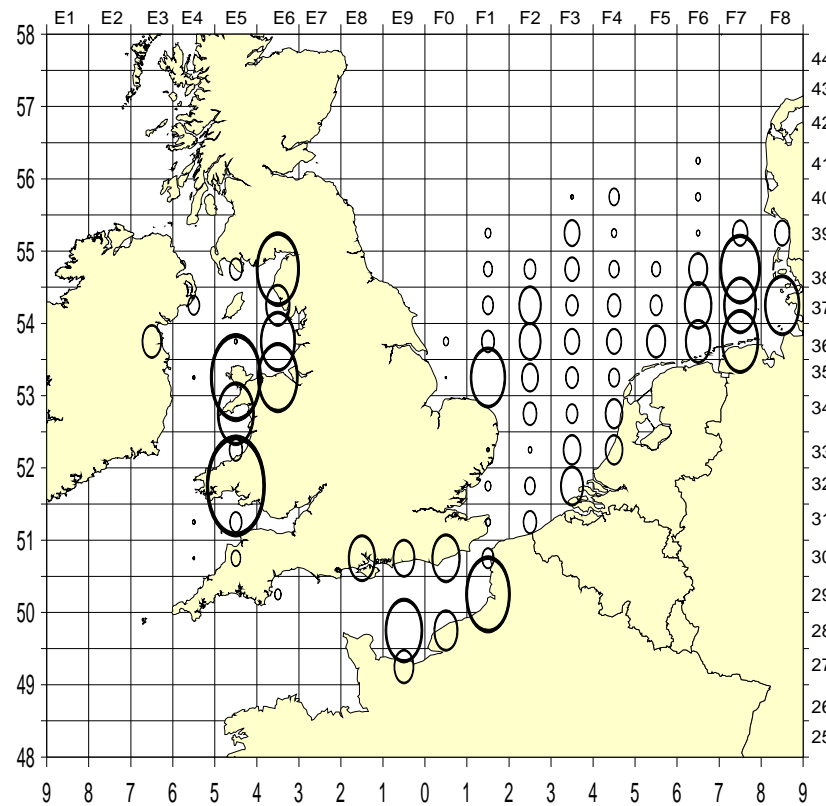
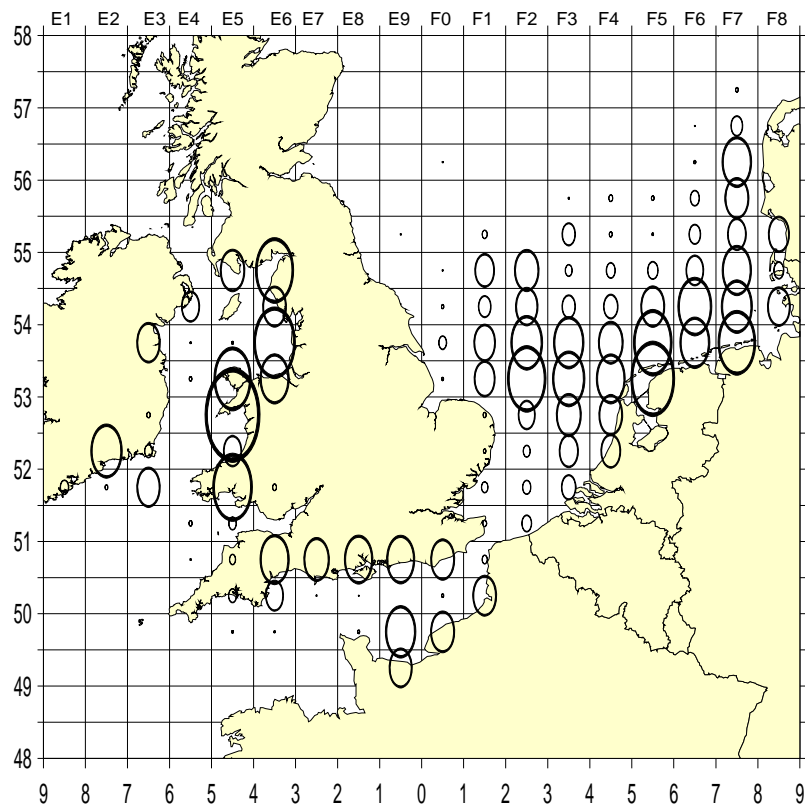
100 per hr/8m beam

Annex 5.1.10 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Solenette



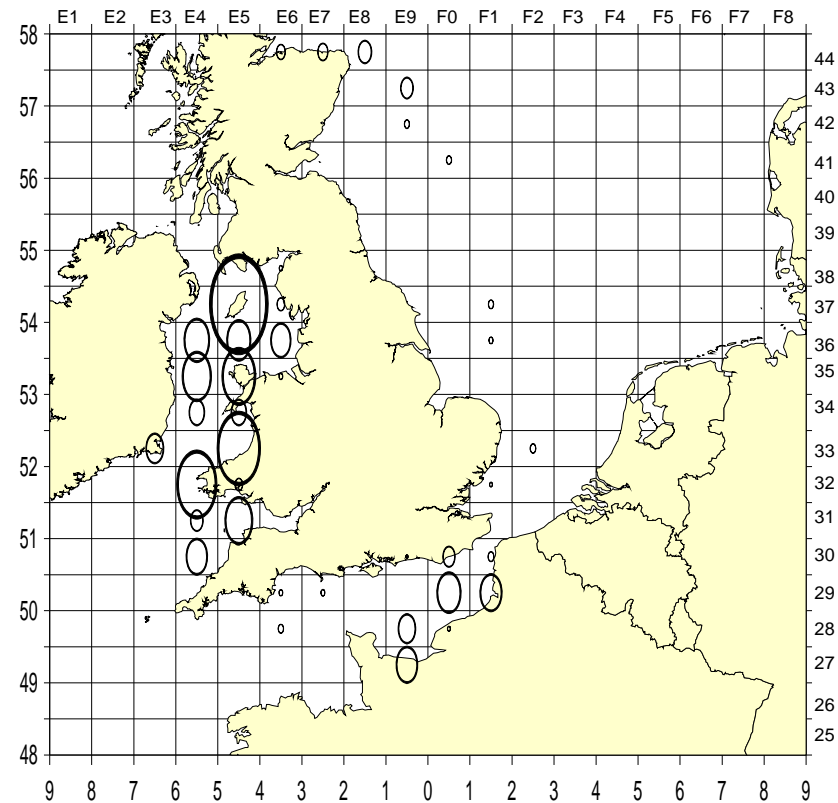
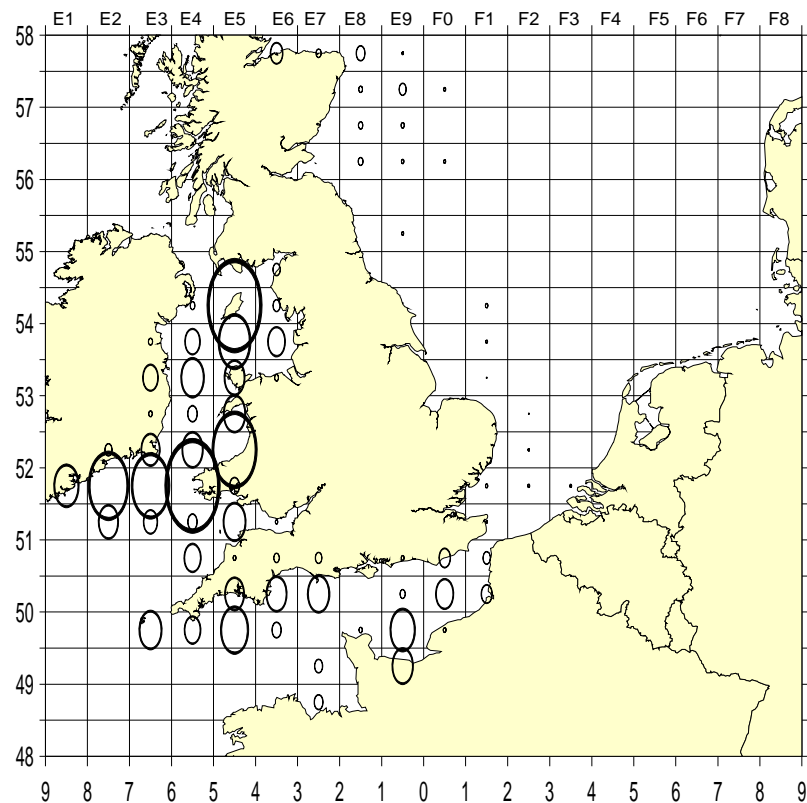
1000 per hr/8m beam

Annex 5.1.11 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Thickback sole

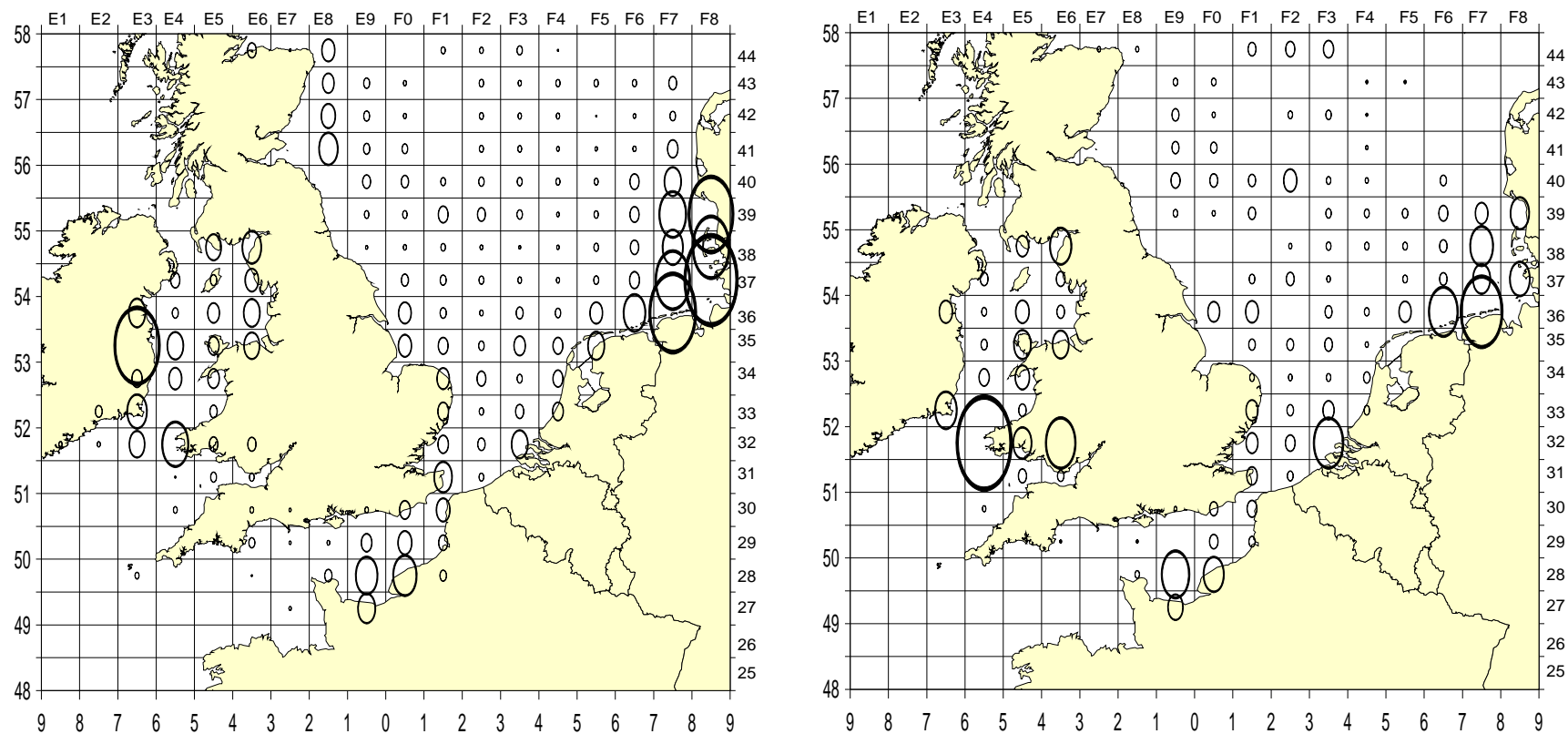


○ 250 per hr/8m beam

Annex 5.1.12 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Pogge

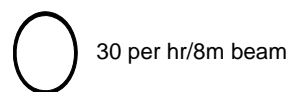
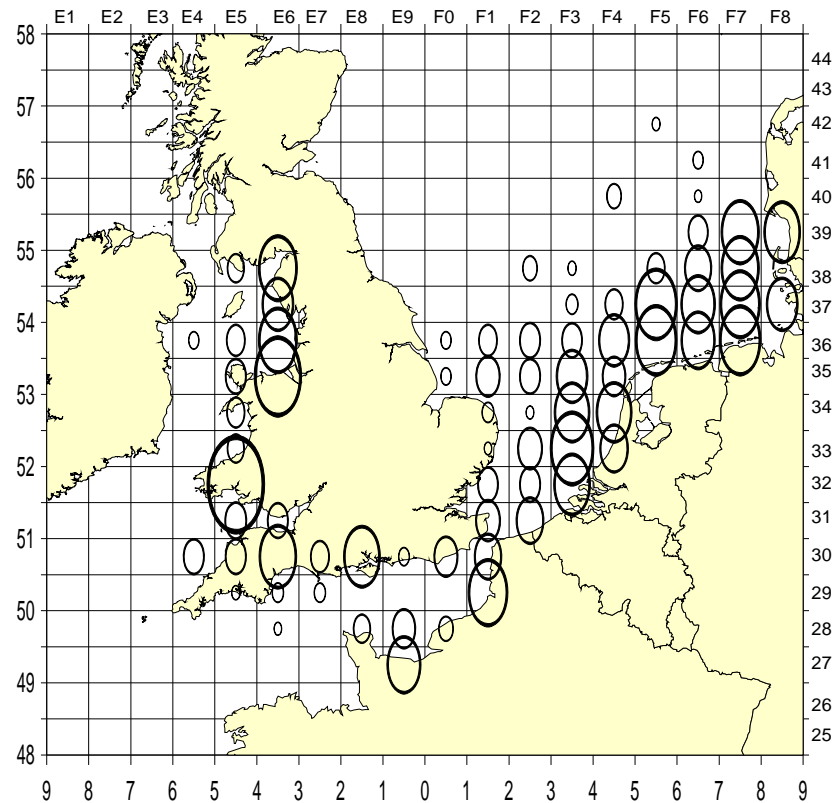
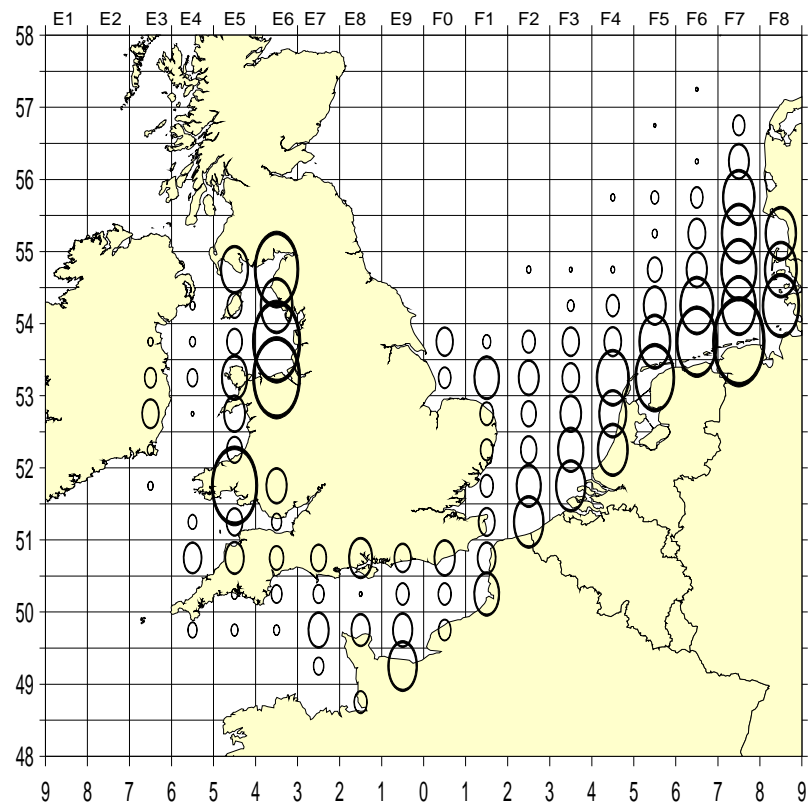
○ 500 per hr/8m beam

Annex 5.1.13 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

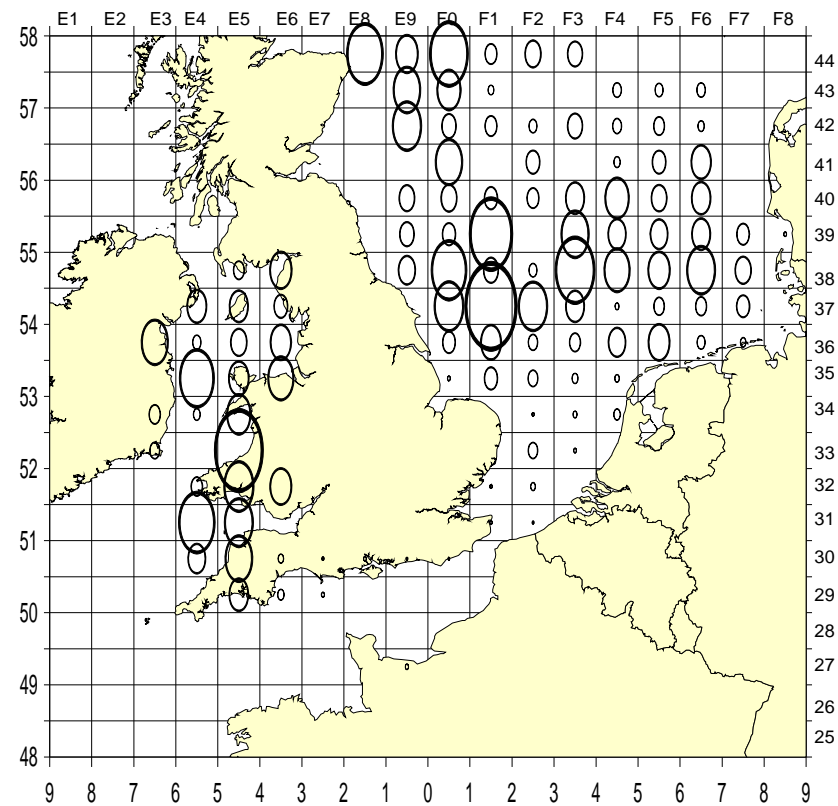
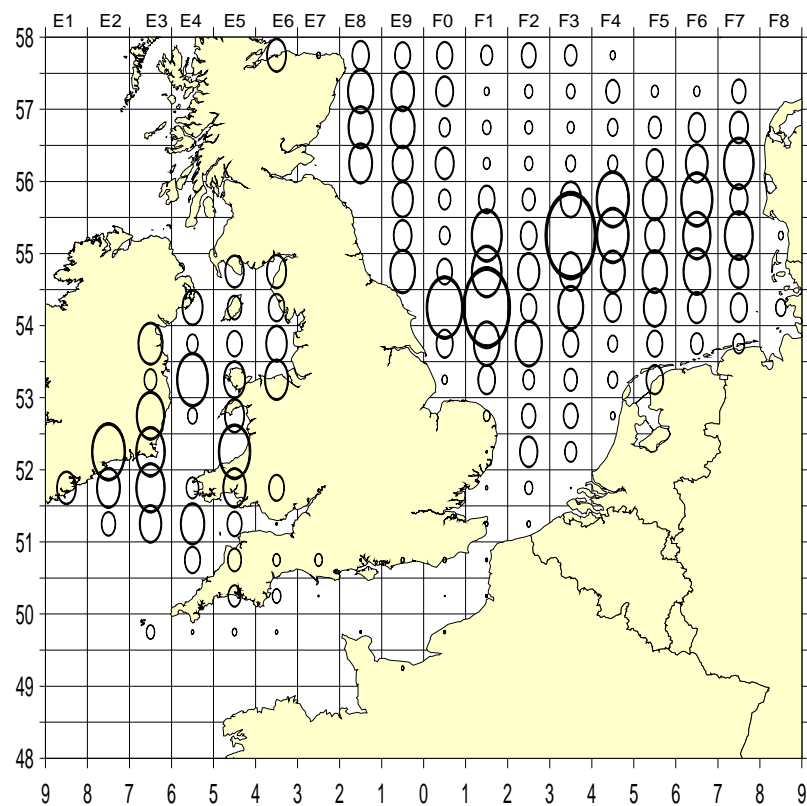
Tub gurnard



Annex 5.1.14 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Grey gurnard

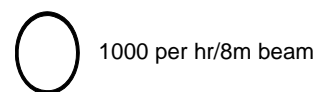
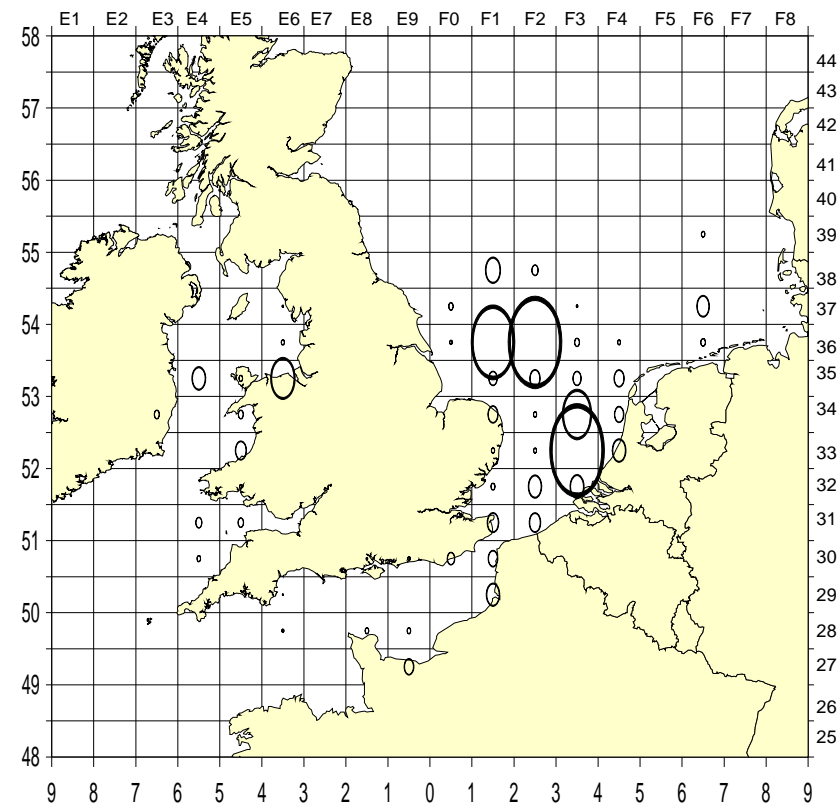
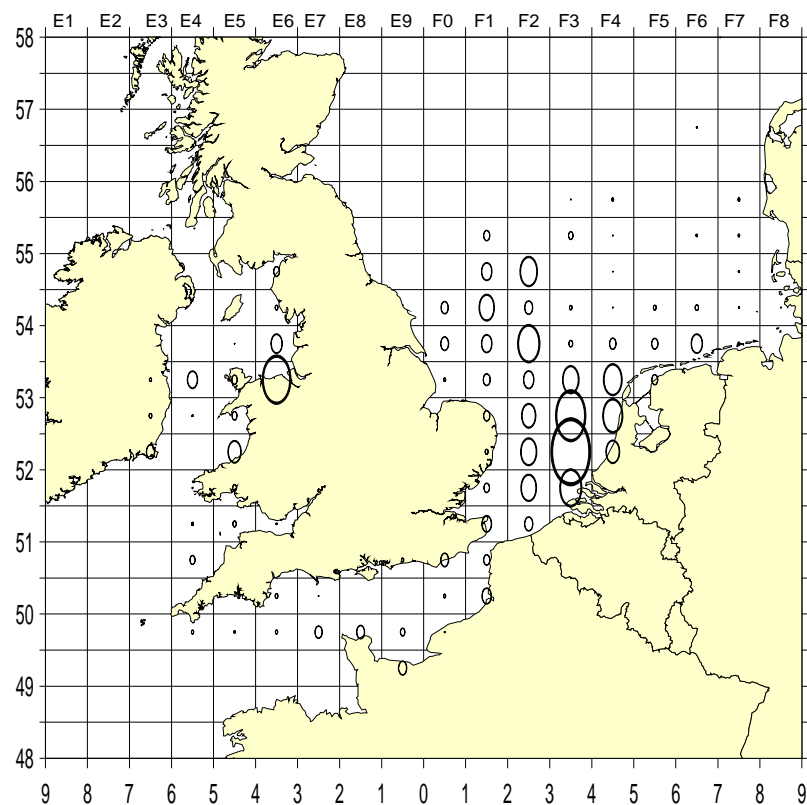
○ 400 per hr/8m beam

Annex 5.1.15 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Lesser weever

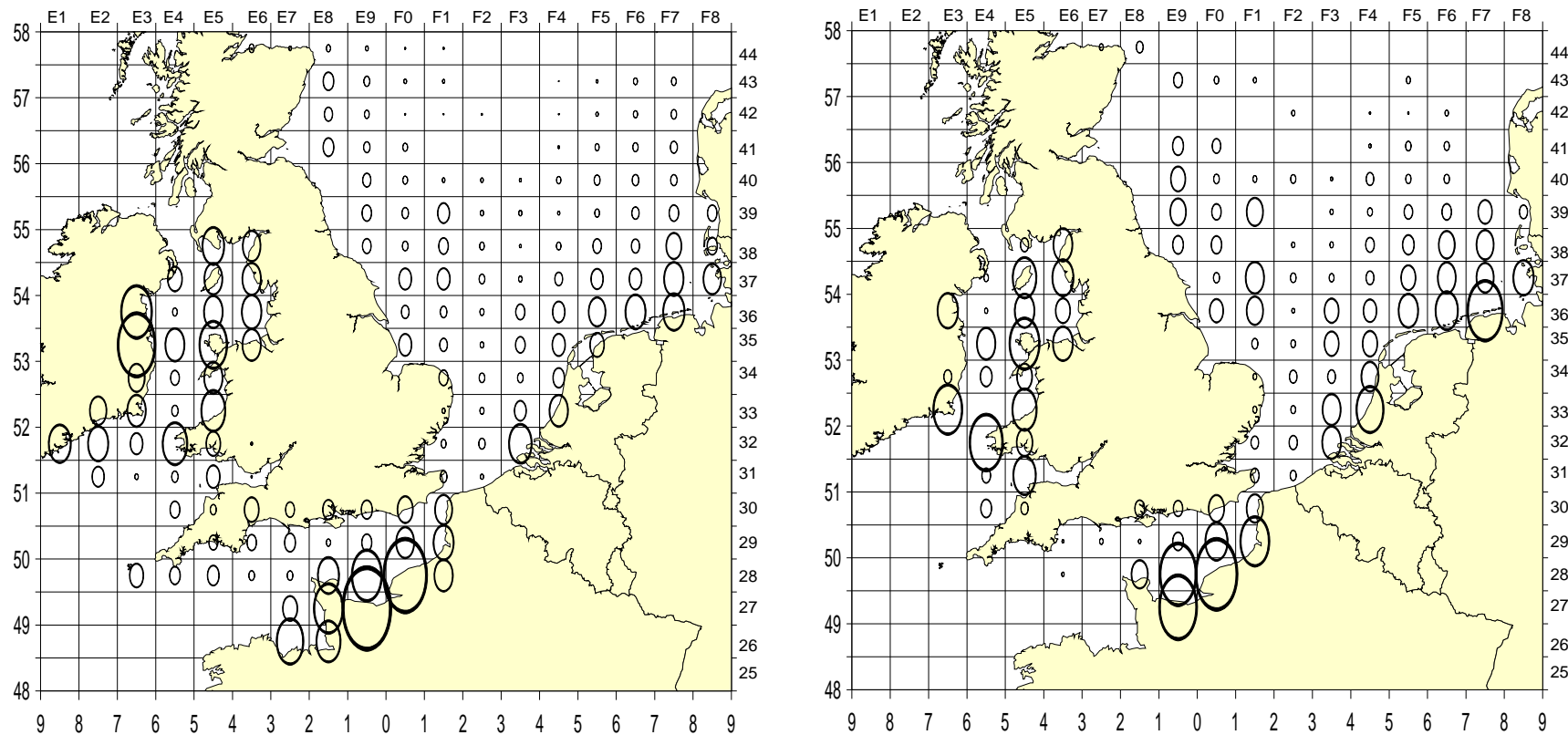


Annex 5.1.16 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Common dragonet



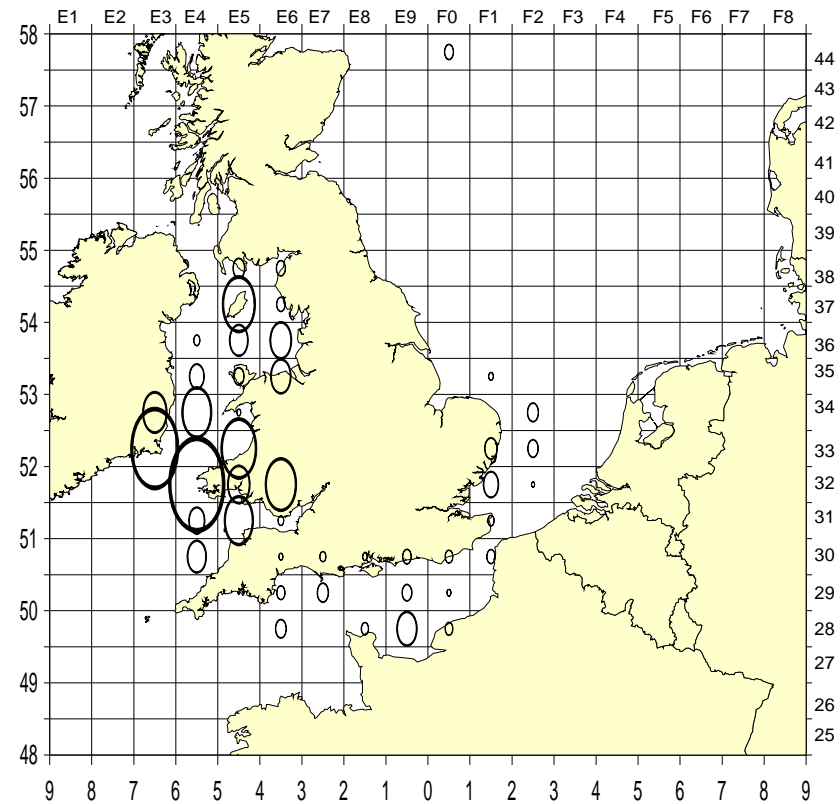
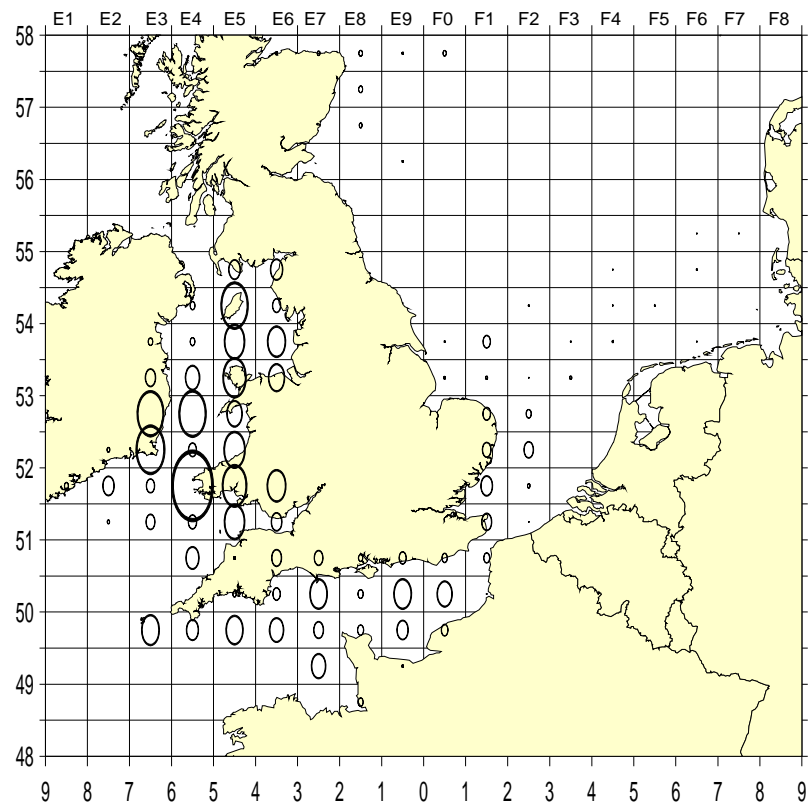
1000 per hr/8m beam

Annex 5.1.17 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Lesser spotted dogfish



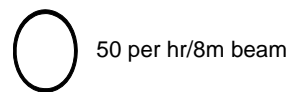
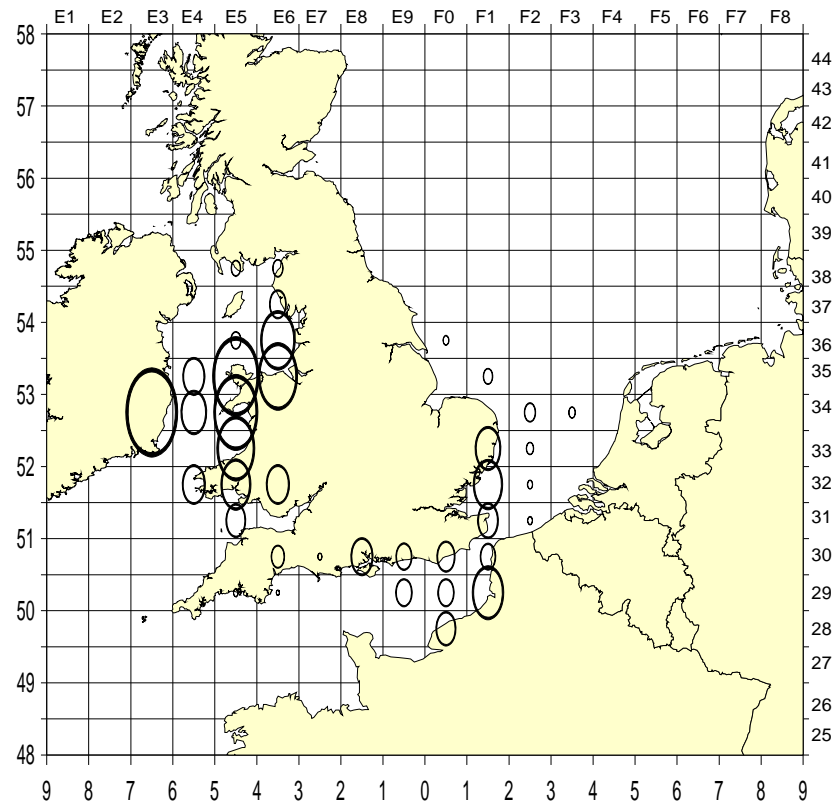
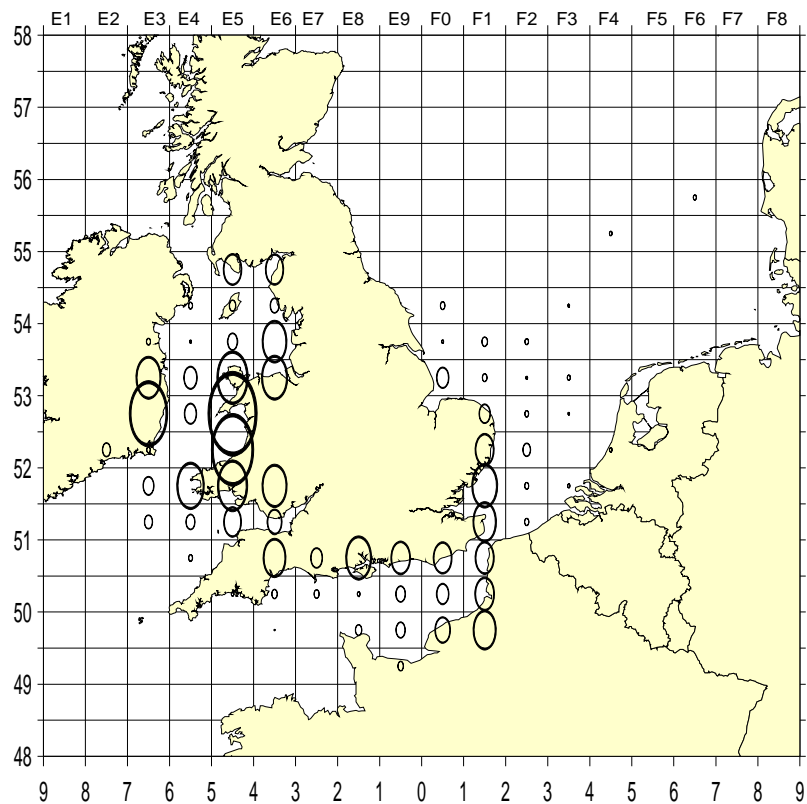
○ 400 per hr/8m beam

Annex 5.1.18 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Thornback ray

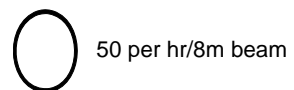
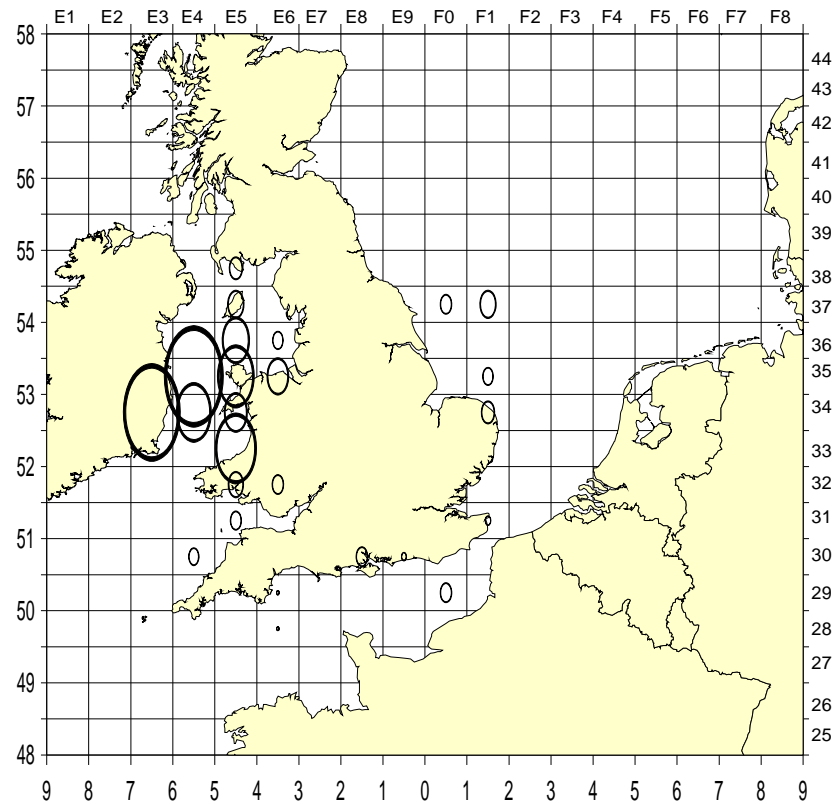
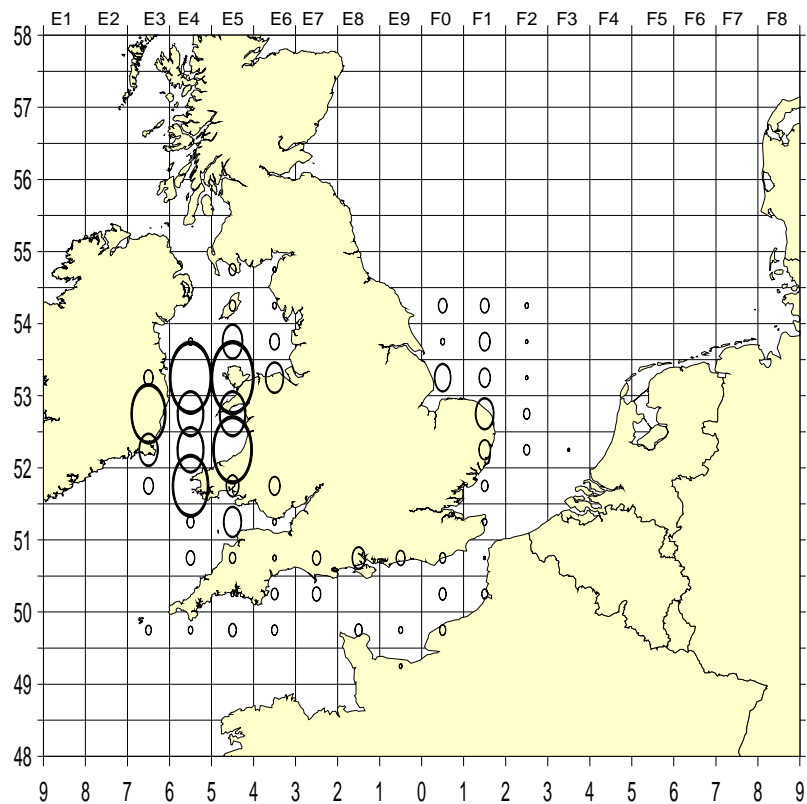


Annex 5.1.19 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Spotted ray

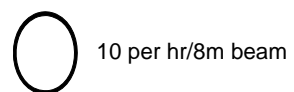
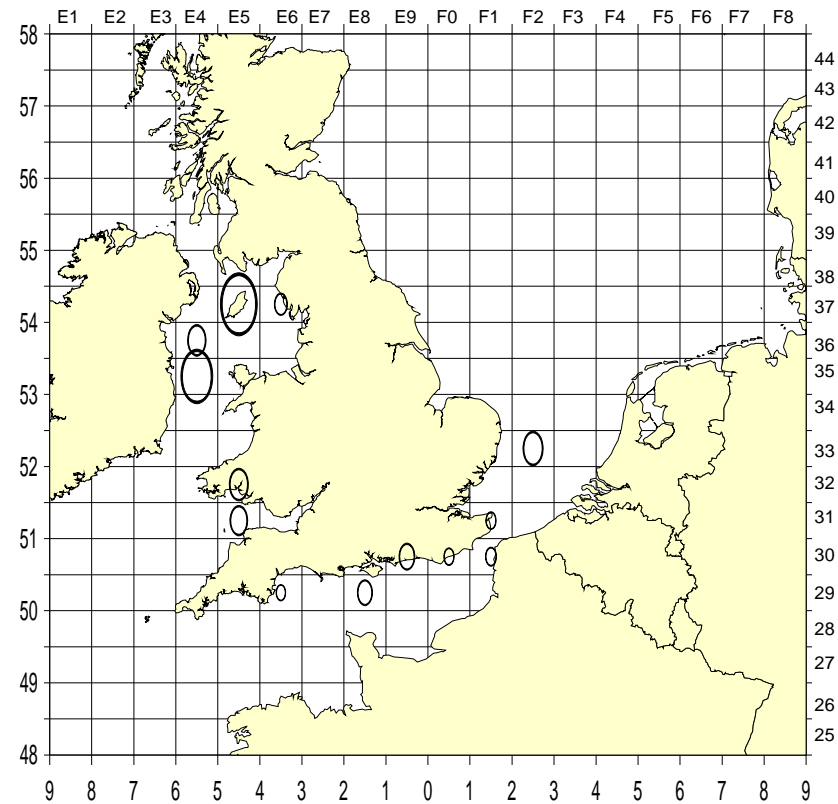
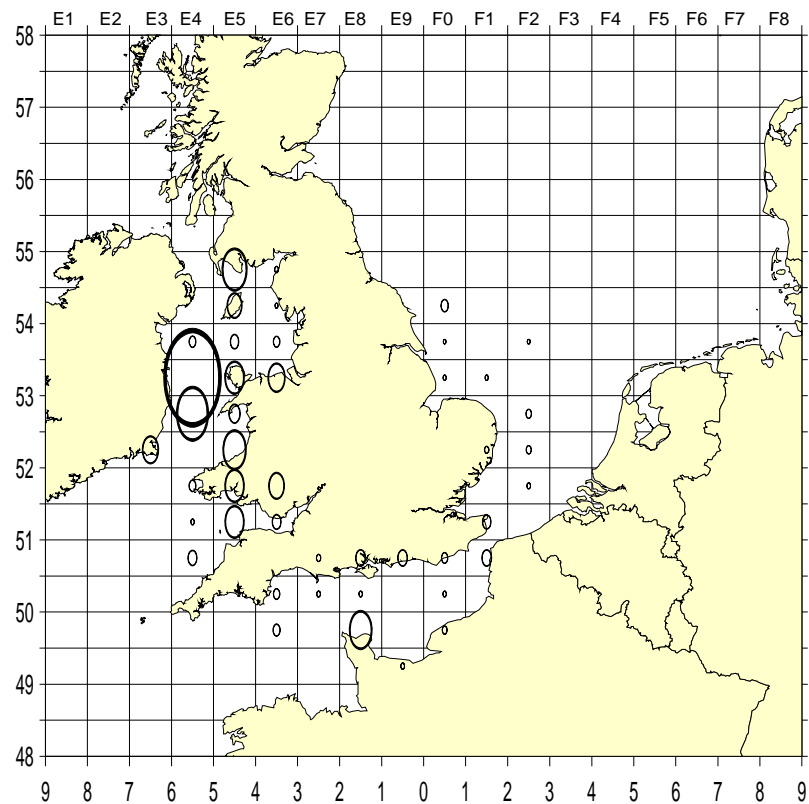


Annex 5.1.20 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Blonde ray

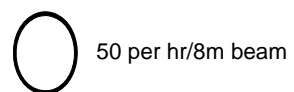
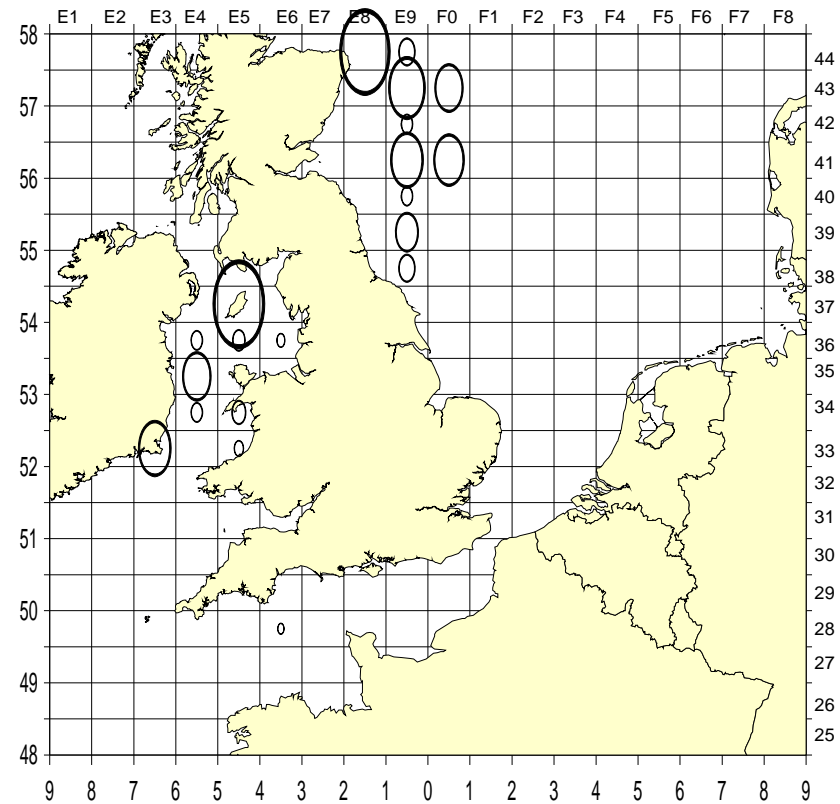
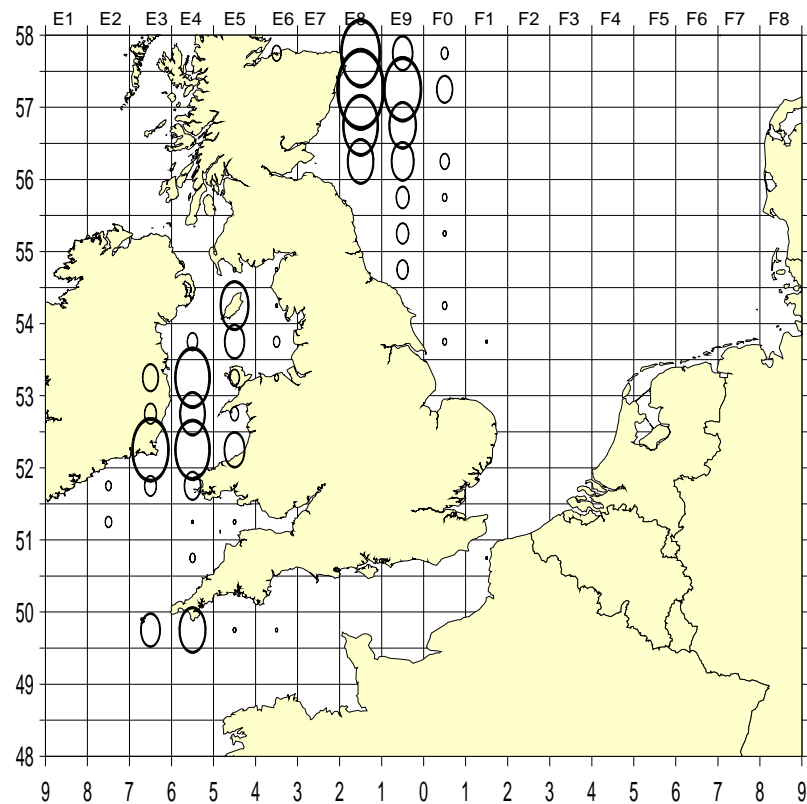


Annex 5.1.21 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

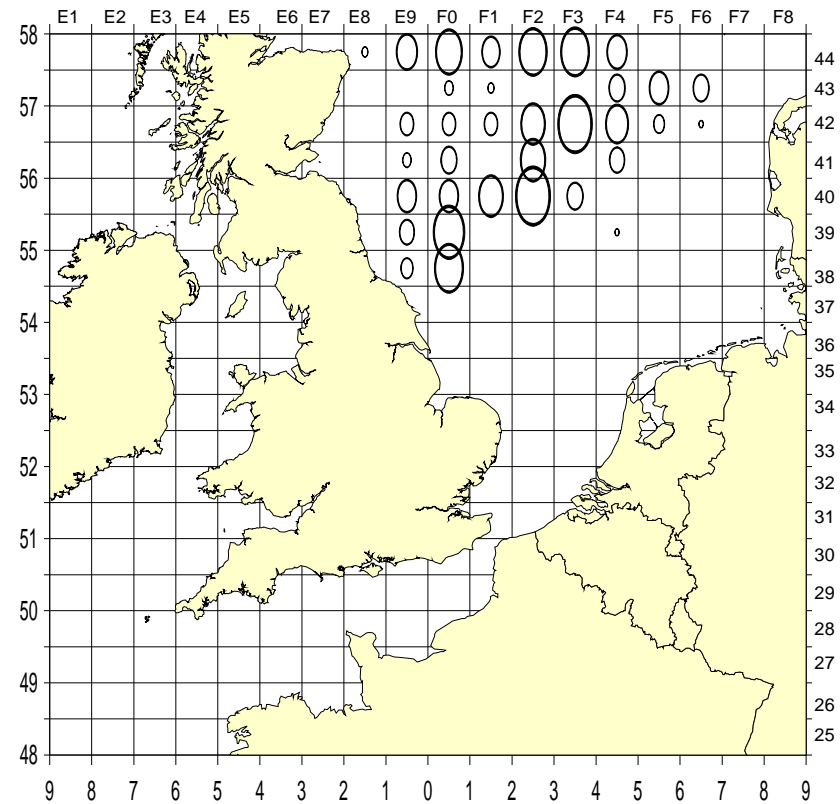
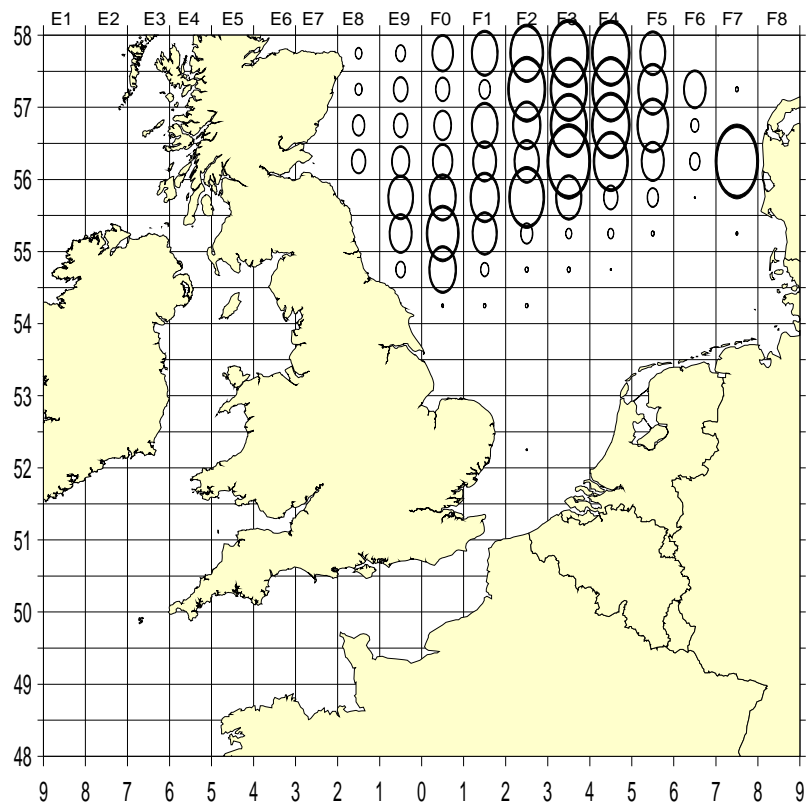
Cuckoo ray



Annex 5.1.22 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Starry ray

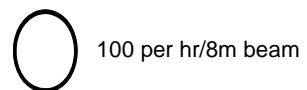
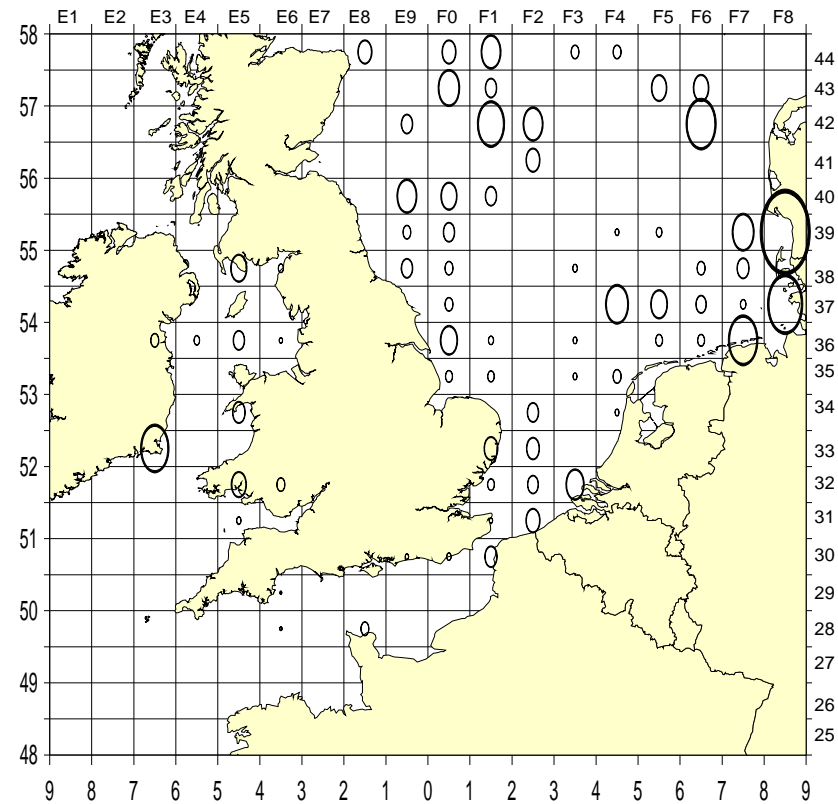
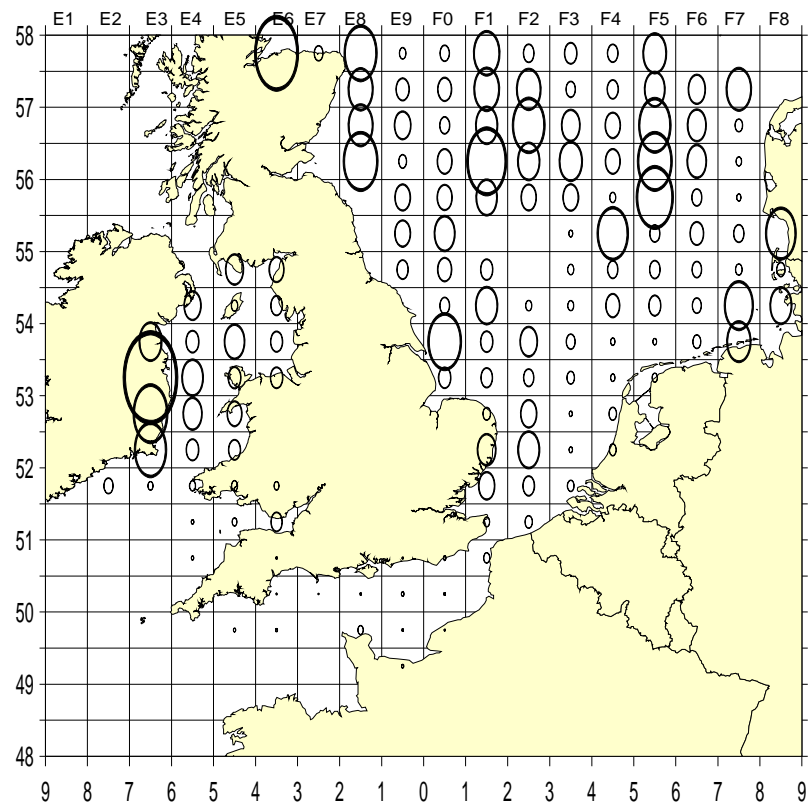
○ 175 per hr/8m beam

Annex 5.1.23 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

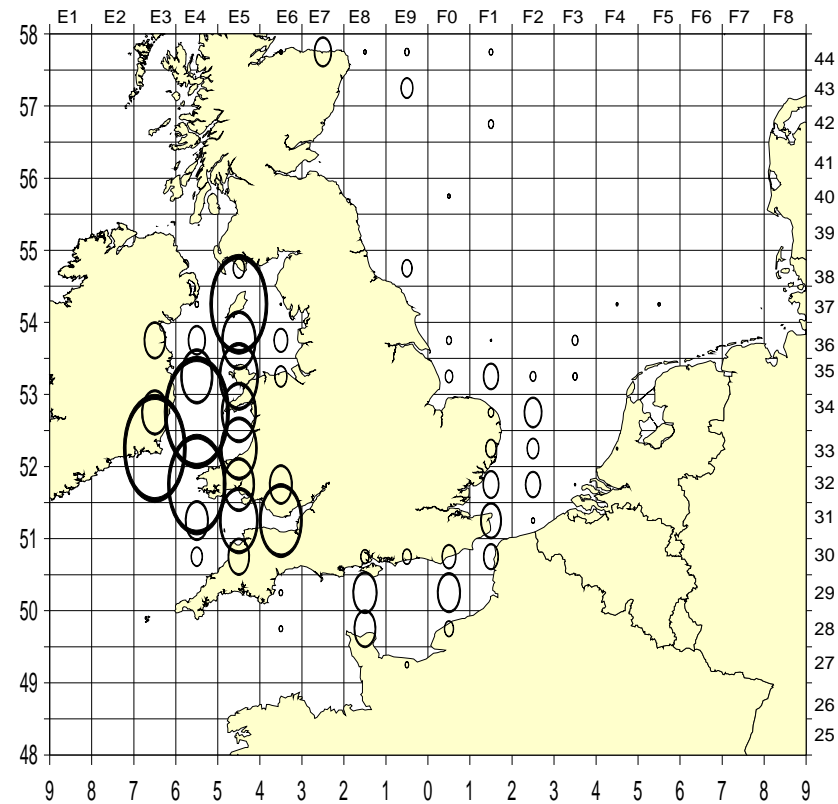
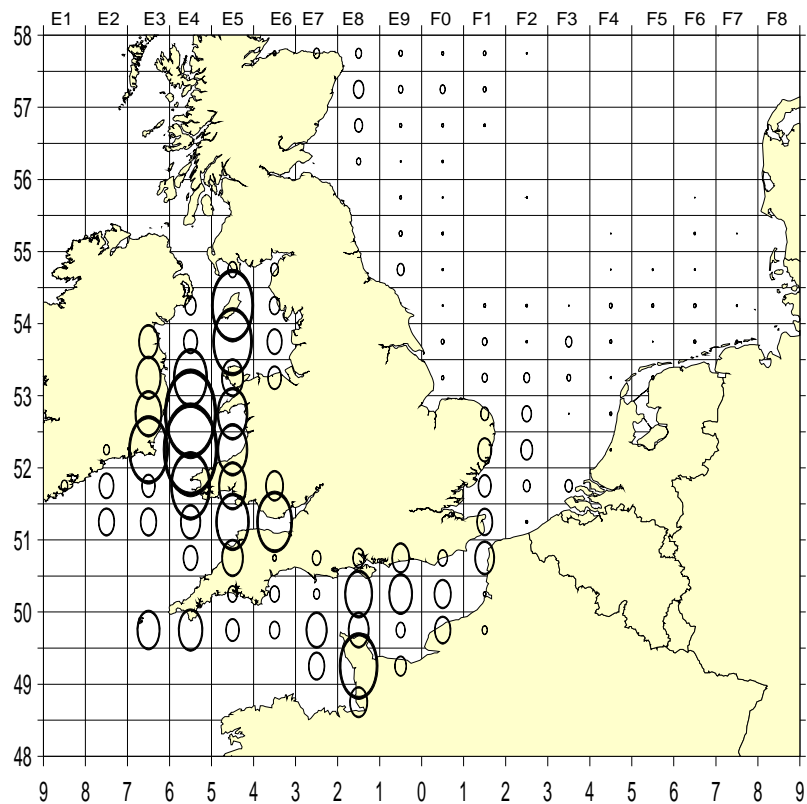
Cod



Annex 5.1.24 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Poor cod

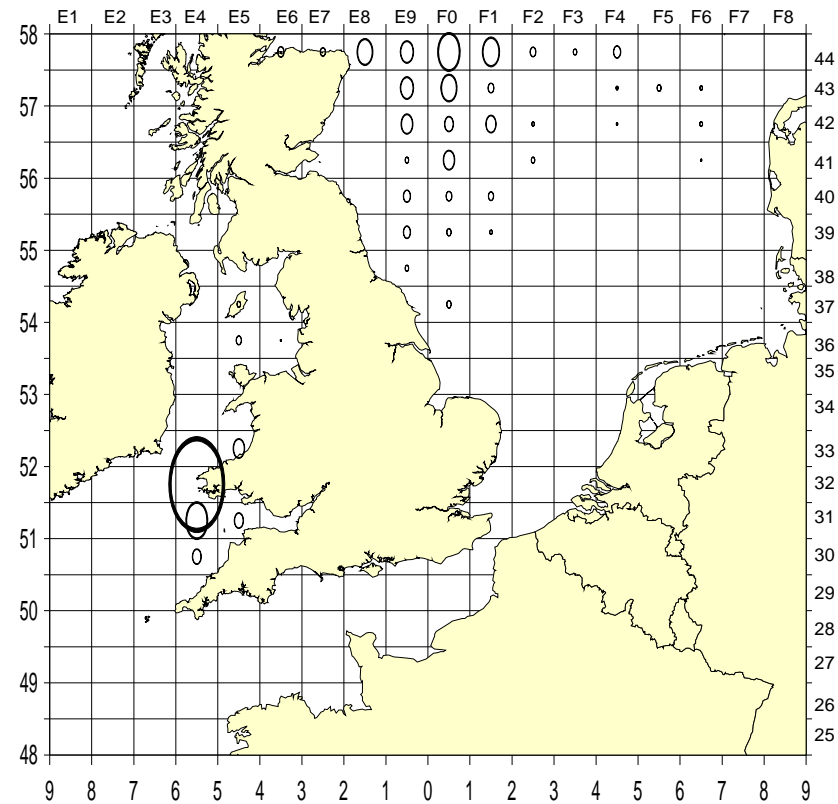
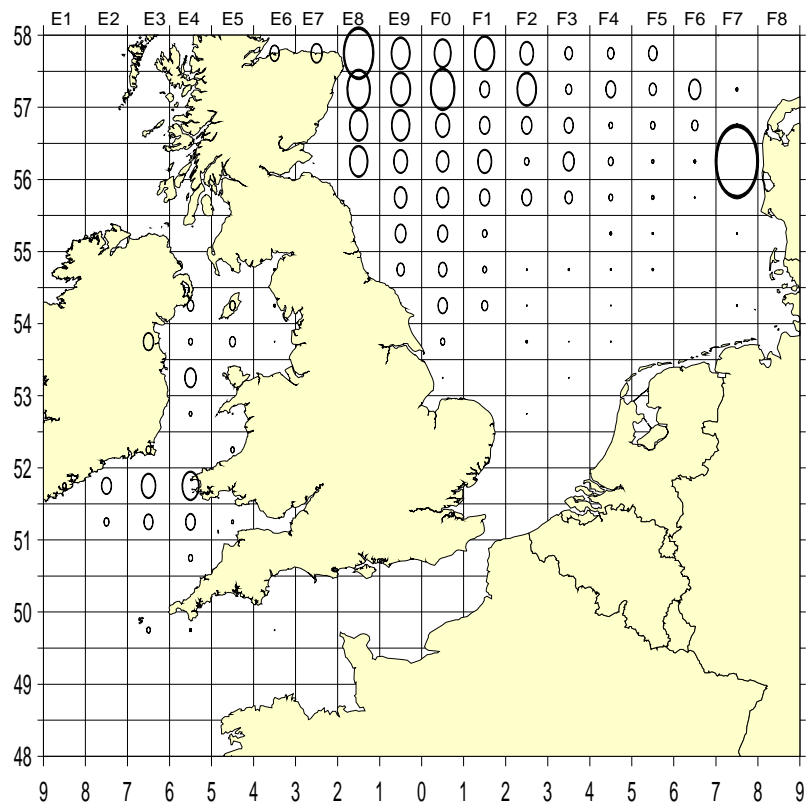
○ 1000 per hr/8m beam

Annex 5.1.25 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Haddock



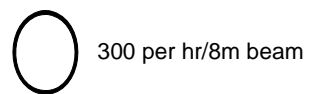
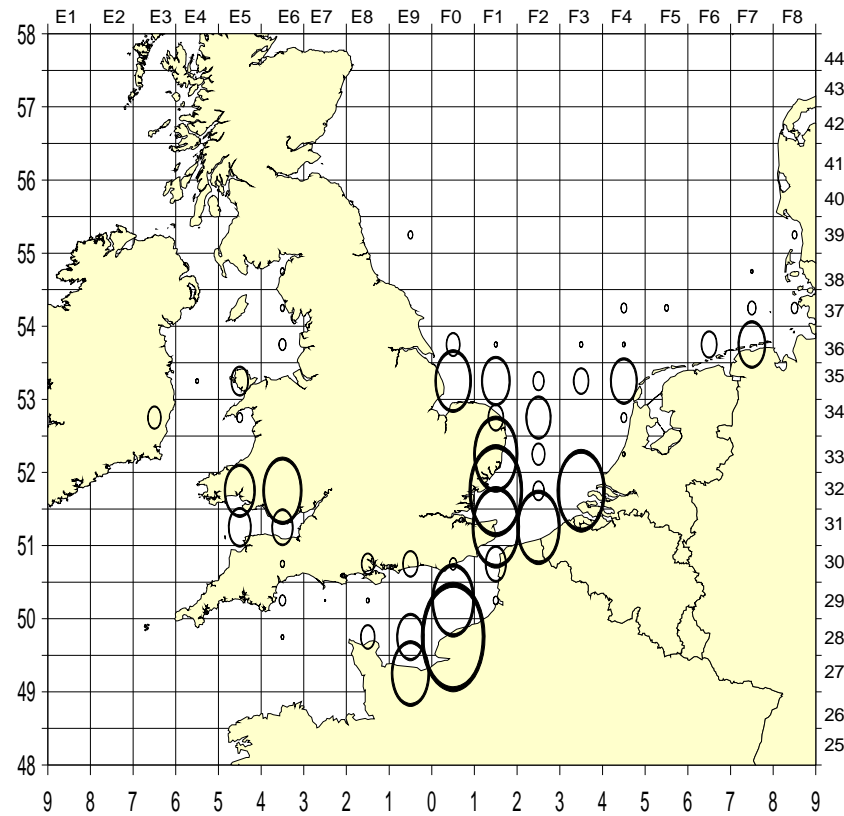
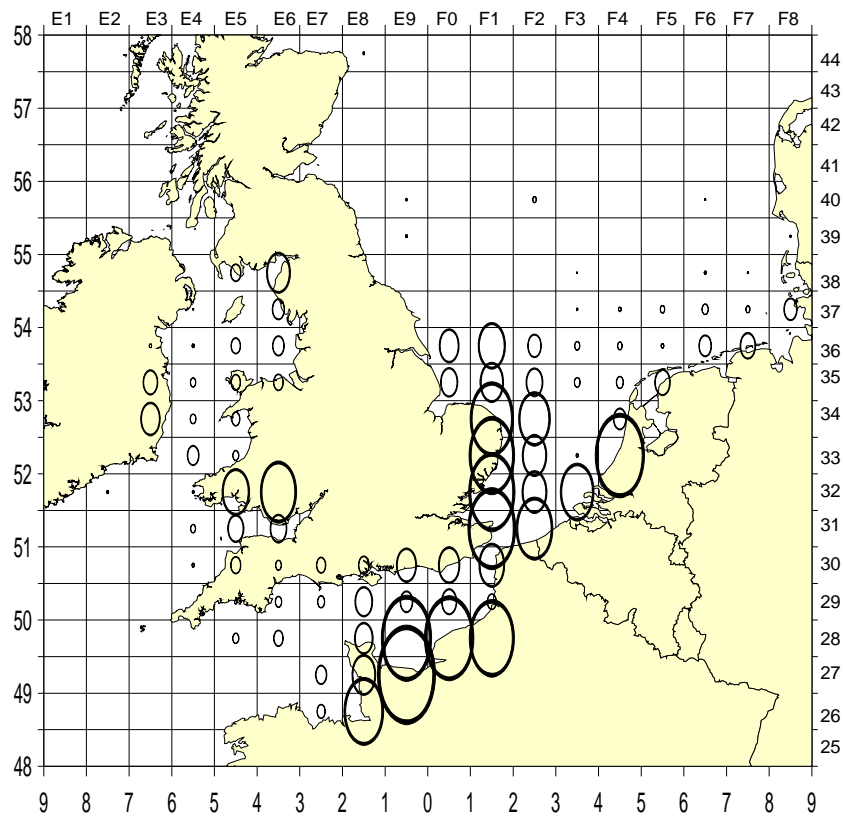
○ 1000 per hr/8m beam

Annex 5.1.26 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Pout whiting

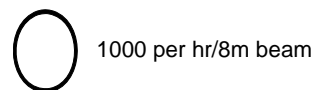
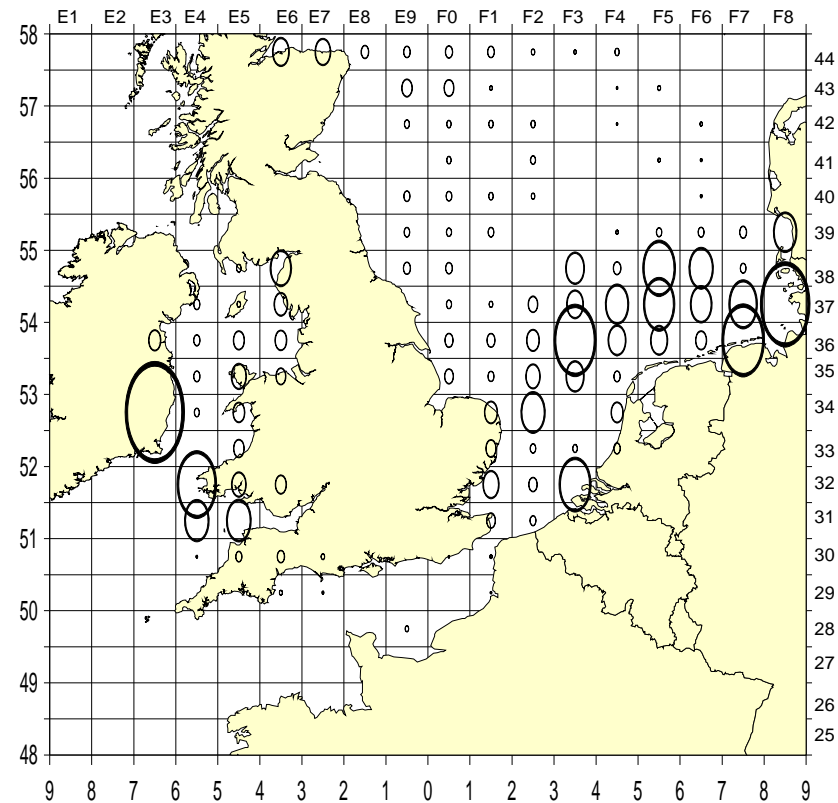
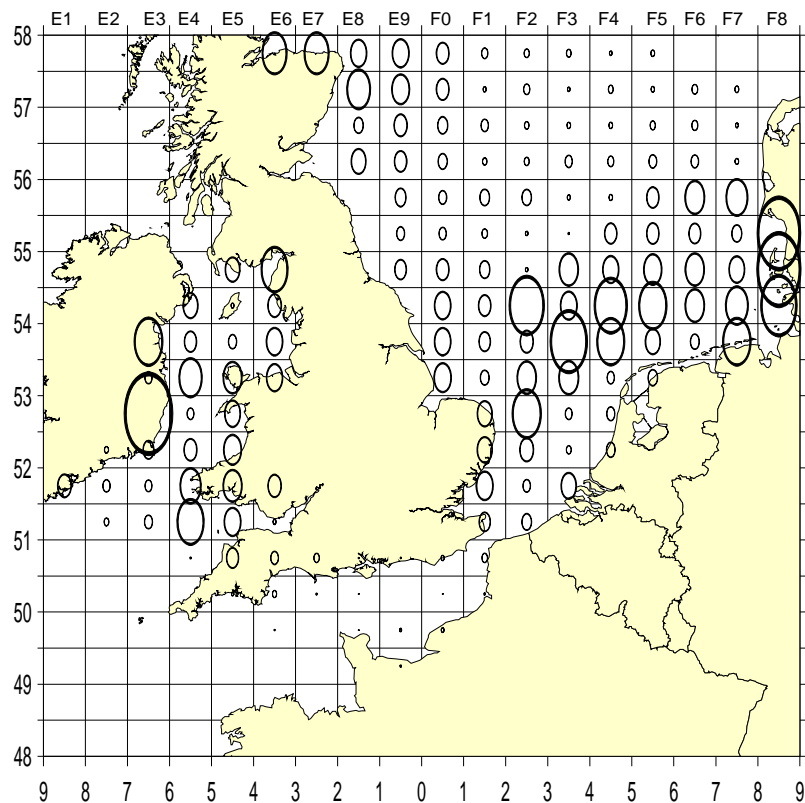


Annex 5.1.27 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Whiting

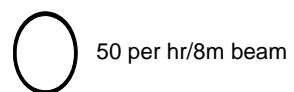
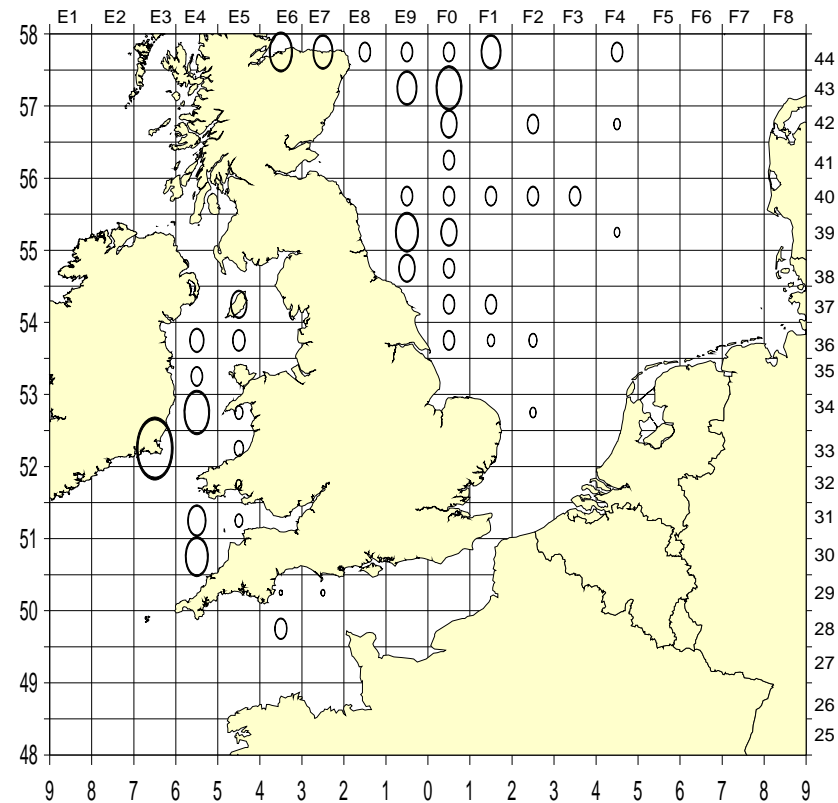
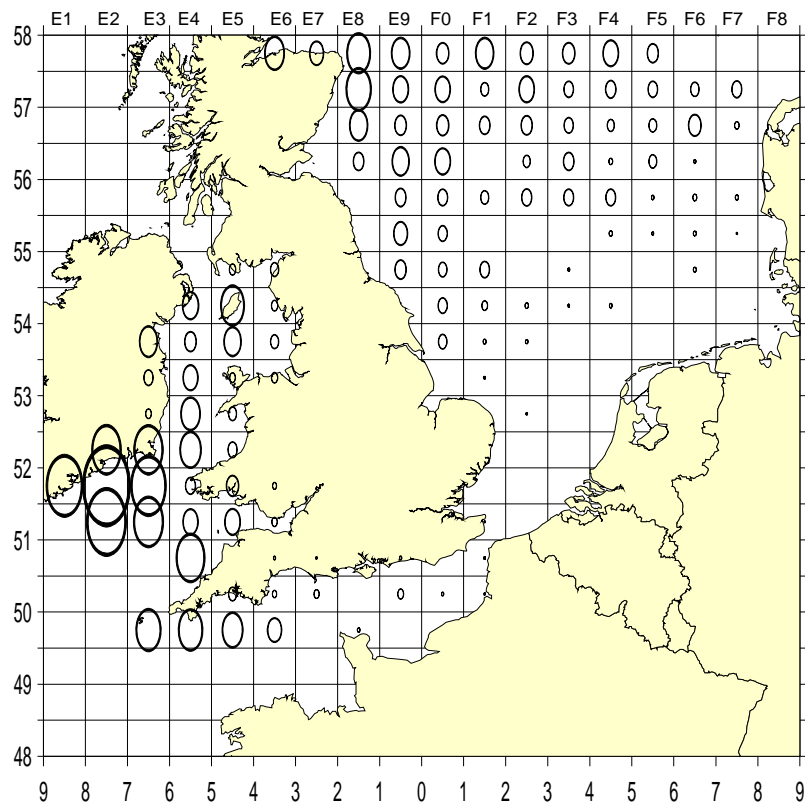


Annex 5.1.28 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

Monkfish

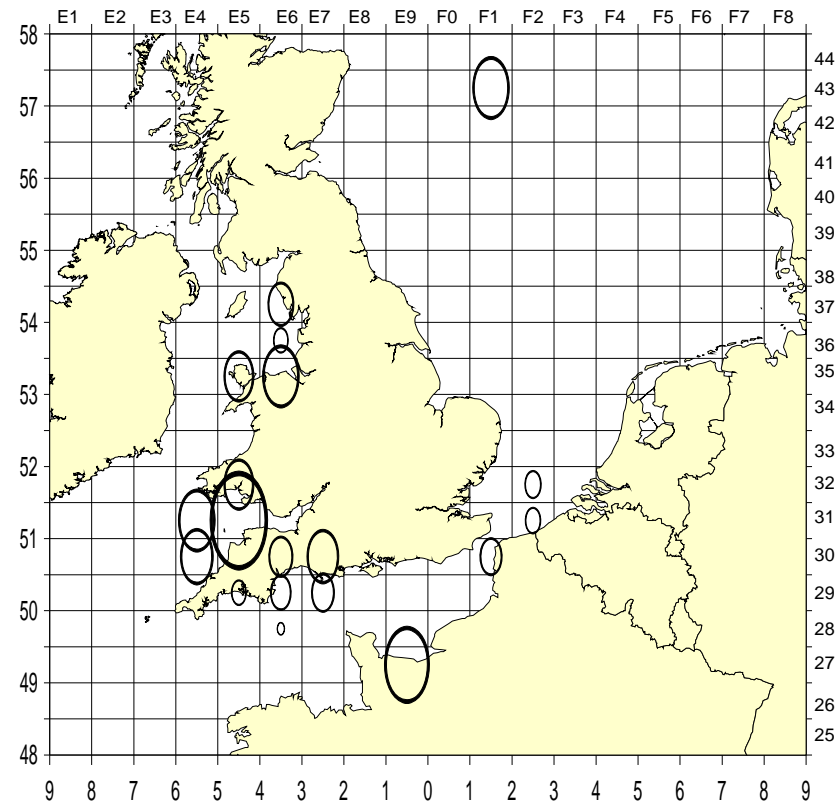
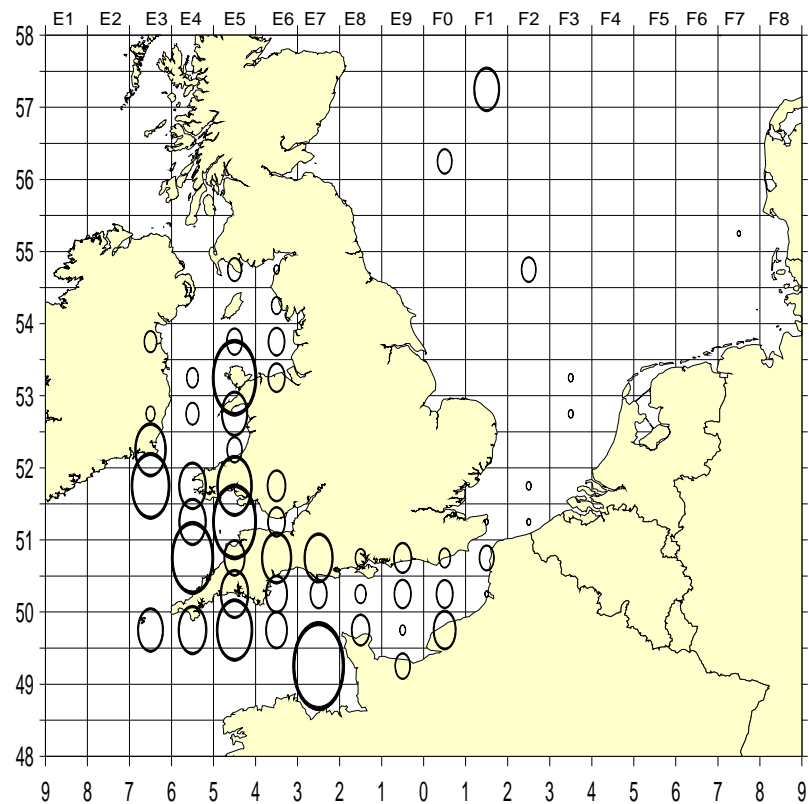


Annex 5.1.29 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

left plot mean of time series, right plot current year.

John Dory



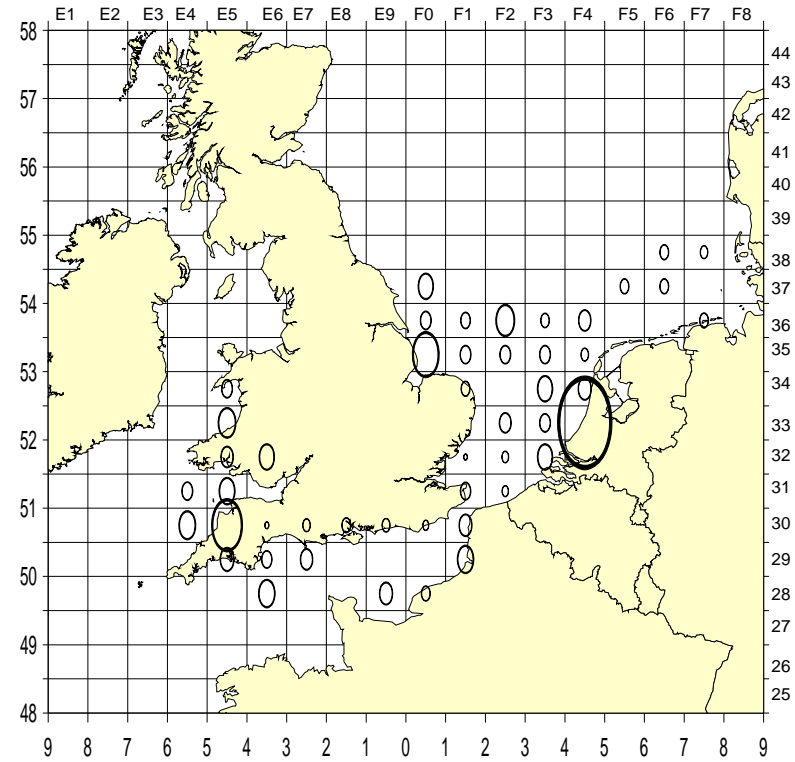
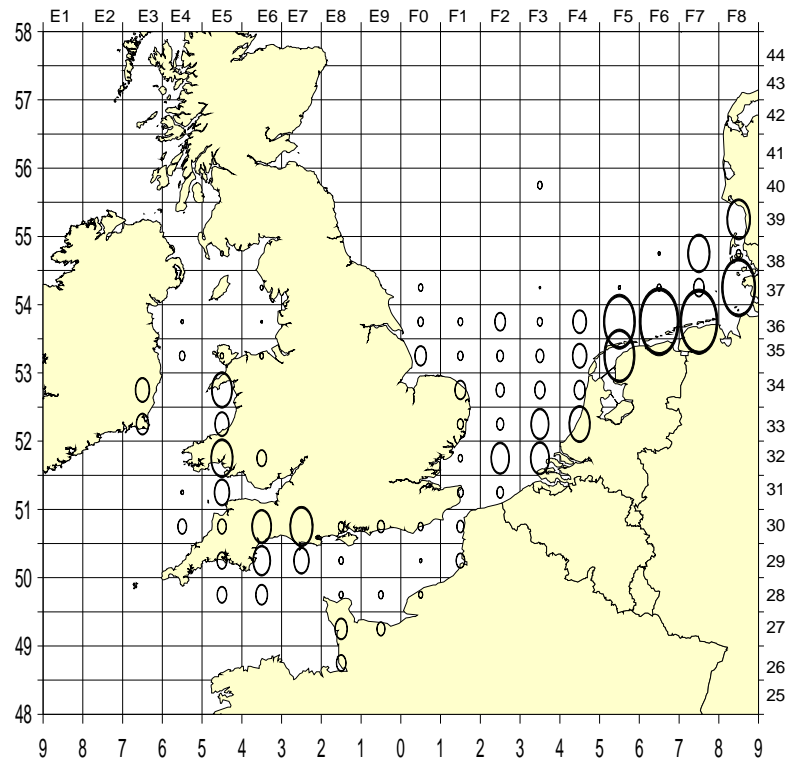
○ 5 per hr/8m beam

Annex 5.1.30 International offshore beam trawl survey 1990-2007

Catches are number/hr/8m beam

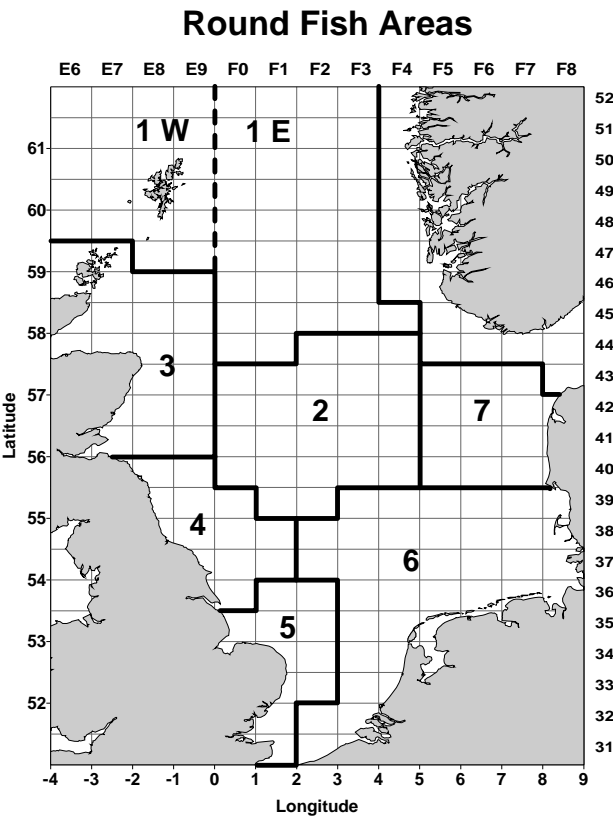
left plot mean of time series, right plot current year.

Red mullet



○ 25 per hr/8m beam

Annex 6: Charts of Roundfish areas



Annex 7: Abundance of fish species by Subdivision

Annex 7 a) Abundance of fish species (per hour fishing) in subarea VIIa per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AMERICAN PLAICE (LR DAB)	10	1	1	2	4	8	4	14	4	3	2	1	1	1	11	2	2	2
ANGLERFISH (MONK)	1	2	2	4	3	3	3	2	2	2	1	2	4	2	2	3	1	1
BRILL	2	2	1	2	1	1	2	1	1	1	1	2	1	1	1	1	1	2
COD	25	10	4	23	15	8	8	6	1	10	11	5	2	1	8	7	5	2
COMMON DRAGONET	131	149	211	197	175	134	127	141	123	162	188	103	124	164	155	97	111	128
DAB	398	348	224	381	549	480	412	586	516	772	724	758	634	1271	1168	801	789	638
EUROPEAN PLAICE	220	142	180	298	273	272	246	358	341	371	456	399	466	546	588	491	519	529
FLOUNDER (EUROPEAN)	2	1	2	1	1	1	1	2	2	1	1	4	1	2	1	2	1	1
GREY GURNARD	46	47	99	90	81	43	45	56	51	56	50	48	33	48	50	45	64	64
HADDOCK	1	1	1	1	12	2	8	4	3	11	3	6	1	7	17	10	23	3
JOHN DORY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LEMON SOLE	3	2	3	13	11	13	9	12	10	8	8	10	11	14	12	7	5	5
LESSER SPOTTED DOGFISH	15	19	27	23	19	18	20	40	34	29	27	38	35	32	62	38	49	40
LESSER WEEVER FISH	9	24	51	45	55	52	19	33	29	26	57	17	33	20	25	18	23	19
POGGE (ARMED BULLHEAD)	56	37	44	65	57	52	46	39	38	32	42	30	35	32	55	30	23	28
POOR COD	170	82	92	219	124	151	104	139	94	179	162	72	94	232	335	204	331	216
RED GURNARD	1	6	3	4	6	3	5	9	10	11	10	11	9	14	12	10	13	18
RED MULLET		1	1	1		1		1	1	1	1	1	1	1	1	1	2	1
SCALD FISH	17	37	36	40	47	33	46	40	49	66	101	94	112	124	97	95	123	106
SOLE (DOVER SOLE)	129	174	161	76	66	59	78	128	112	89	93	62	51	56	66	31	32	32
SOLENETTE	96	249	146	210	196	248	167	240	230	284	304	303	596	304	417	250	276	230
THICKBACK SOLE	8	20	34	30	24	22	26	24	27	26	37	28	31	28	38	20	34	35
TUB GURNARD	5	7	15	8	7	7	9	9	13	10	11	10	9	12	10	11	8	7
TURBOT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WHITING	51	45	78	98	83	171	82	124	101	87	60	80	65	83	207	118	144	57
WHITING POUT (BIB)	27	27	27	7	2	11	3	16	29	11	7	6	7	6	4	2	1	3

Annex 7 b) Abundance of fish species (per hour fishing) in subarea VIId per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ANGLERFISH (MONK)	1			1	1		1	1	1						1	1		
BRILL	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2
COD			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
COMMON DRAGONET	124	211	270	220	297	123	203	254	489	274	184	210	167	184	154	105	207	200
DAB	46	83	187	66	129	68	47	69	33	51	35	62	64	92	69	28	99	41
EUROPEAN PLAICE	51	59	66	58	35	31	63	66	111	53	70	76	71	65	98	80	77	90
FLOUNDER (EUROPEAN)	1	5	12	4	2	2	15	3	3	3	5	4	8	9	8	7	8	4
GREY GURNARD	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
JOHN DORY		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LEMON SOLE	7	3	3	7	11	13	8	3	2	1	4	7	8	12	7	8	5	5
LESSER SPOTTED DOGFISH	3	5	7	11	6	6	5	10	5	6	5	6	9	5	8	9	5	8
LESSER WEEVER FISH	10	5	11	12	11	5	10	5	8	9	12	14	8	9	16	13	23	15
POGGE (ARMED BULLHEAD)	15	24	41	41	43	35	26	53	20	32	19	38	44	33	34	14	42	24
POOR COD	177	81	59	49	96	97	69	55	50	95	40	54	45	79	105	60	18	52
RED GURNARD	8	8	7	7	12	9	12	7	11	9	12	13	9	14	12	8	8	8
RED MULLET	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1
SCALD FISH	6	18	13	15	10	6	8	10	8	14	8	7	9	12	22	10	18	29
SOLE (DOVER SOLE)	30	47	37	58	33	27	29	38	32	55	43	44	64	57	40	41	55	46
SOLENETTE	103	187	156	186	175	77	145	140	92	153	84	90	89	119	155	94	195	185
THICKBACK SOLE	2	4	6	9	7	6	8	9	10	8	9	17	12	19	14	10	14	11
TUB GURNARD	4	2	5	6	4	3	2	3	3	4	2	3	3	5	3	2	5	6
TURBOT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WHITING	1	1	6	1	2	4	1	1	1	1	3	2	9	1	6	4	1	1
WHITING POUT (BIB)	270	38	49	33	61	46	64	91	136	91	20	67	15	139	60	46	50	57

Annex 7 c) Abundance of fish species (per hour fishing) in subarea VIIe per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ANGLERFISH (MONK)	1	1	1	2	1	2	1	1	1	1	1	1	2	2	1	3	2	1
BRILL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
COD			1		1			1	1	1	1	1	1	1			1	1
COMMON DRAGONET	13	42	1	1	1	1	1	1	1	1	2	15	134	206	189	9	11	4
DAB	17	12	8	10	32	21	20	19	16	20	10	42	56	34	15	19	32	12
EUROPEAN PLAICE	19	10	14	9	9	9	15	34	20	21	22	27	15	13	12	12	16	14
FLOUNDER (EUROPEAN)				1		1	1		1	1	1	1				1		1
GREY GURNARD	6	3	2	4	10	3	6	3	6	12	8	1	8	12	6	9	7	10
HADDOCK						1							1	1	1		1	
JOHN DORY	1	1	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1
LEMON SOLE	2	2	1	1	1	1	1	1	1	1	1	1	2	2	3	1	1	1
LESSER SPOTTED DOGFISH	9	2	1	14	11	15	13	28	20	27	13	25	15	23	22	25	25	19
LESSER WEEVER FISH	1	1	1	1	1	1	1	1	1	1	1	1	5	8	4	1	1	1
POGGE (ARMED BULLHEAD)	1	1	1	1	1	1	1	1	1	1	1	1	14	16	15	2	1	1
POOR COD	9	31	5	1	1	1	1	1	1	8	5	6	66	202	112	26	8	5
RED GURNARD	34	8	23	33	51	31	25	21	21	31	28	10	31	34	44	30	32	14
RED MULLET	1	1	1	1	1	2	2	2	1	4	2	4	1	7	3	3	8	2
SCALD FISH	2	1	1	1	1	1	1	1	1	1	1	6	68	94	85	4	1	6
SOLE (DOVER SOLE)	10	20	22	13	11	9	13	18	16	15	14	19	9	19	15	10	13	17
SOLENETTE	1	1	1	1	1	1	1	1	1	1	1	20	339	444	369	8	1	9
THICKBACK SOLE	5	2	1	1	1	1	1	1	1	1	3	4	101	133	112	8	8	2
TUB GURNARD	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	5
TURBOT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WHITING	1	12	5	11	2	4	4	7	4	2	1	5	5	4	1	13	3	7
WHITING POUT (BIB)	13	17	11	8	4	1	5	14	8	2	1	1	5	1	2	2	6	4

Annex 7 d) Abundance of fish species (per hour fishing) in subarea VIIf per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ANGLERFISH (MONK)	1	3	11	5	5	3	2	1	1	9	1	2	6	2	3	5	2	2
BRILL	2	3	2	1	2	3	2	2	1	1	4	1	1	1	1	2	1	2
COD	1	1	1	1	1	1	1	1	1	2	3	1	1		1	1	1	3
COMMON DRAGONET	19	40	76	44	119	50	86	46	40	74	87	43	36	45	65	59	68	115
DAB	63	78	153	99	167	83	105	81	123	179	125	118	94	98	107	150	133	125
EUROPEAN PLAICE	95	122	101	28	37	41	72	48	60	69	69	58	49	38	58	48	41	48
FLOUNDER (EUROPEAN)	1	1	1	1	2	2	1	1	1	1	3	5	3	1	1	1	1	2
GREY GURNARD	15	52	85	53	45	25	23	24	33	56	62	42	43	32	21	45	43	90
HADDOCK					1		1	1			1		1	1	1	1	1	12
JOHN DORY	1	2	1	3	1	1	1	2	1	3	2	6	3	3	3	3	2	2
LEMON SOLE	2	2	3	4	9	6	12	5	4	6	7	9	17	21	19	11	16	26
LESSER SPOTTED DOGFISH	69	86	101	41	40	32	34	47	51	84	47	37	47	24	98	33	67	74
LESSER WEEVER FISH	1	3	1	3	3	3	3	1	2	3	8	4	3	4	6	9	11	5
POGGE (ARMED BULLHEAD)	1	2	3	7	3	4	5	3	16	11	9	7	8	14	19	11	14	41
POOR COD	306	294	335	251	113	113	122	167	381	323	297	80	155	349	275	269	392	308
RED GURNARD	1	5	1	6	10	7	9	6	1	4	5	11	11	12	19	8	6	12
RED MULLET	2	1		1	1	1	1	1		3	2	3	1	9	2	15	6	2
SCALD FISH	1	2	1	1	3	3	4	3	1	2	3	4	4	9	10	13	8	23
SOLE (DOVER SOLE)	113	137	130	68	110	53	59	89	189	417	313	165	128	120	156	97	104	86
SOLENETTE	107	280	153	116	247	116	111	69	141	246	184	153	125	197	460	486	196	438
THICKBACK SOLE	7	27	31	23	24	23	23	16	10	23	28	15	17	12	14	8	13	27
TUB GURNARD	9	7	13	2	9	7	6	6	11	21	10	8	11	11	13	11	11	14
TURBOT	1	2	1	1	2	2	1	1	1	5	3	1	2	1	1	2	1	2
WHITING	81	87	123	138	53	55	91	141	73	178	68	20	63	42	106	93	54	94
WHITING POUT (BIB)	242	100	29	11	5	7	15	158	114	54	12	17	42	22	28	7	9	58

Annex 7 e) Abundance of fish species (per hour fishing) in subarea VIIg per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AMERICAN PLAICE (LR DAB)				22	87	56	42	22					11	15	21	24		
ANGLERFISH (MONK)				13	26	19	9	5	7	9		3	6	9	6	5	6	4
BRILL	4		4	1	1					4						1	1	2
COD				1	1	1	1	1		3				1			1	
COMMON DRAGONET		4	4	51	97	60	42	40	33	67	4	65	32	27	195	96	99	106
DAB		4		75	65	51	43	98	183	340	4	92	40	39	15	76	66	100
EUROPEAN PLAICE		12	4	7	7	8	11	18	52	28	12	4	6	7	3	12	23	18
GREY GURNARD		32	4	62	99	49	38	25	128	133	8	87	46	61	23	47	63	130
HADDOCK				18	44	16	20	17	1	67		21	29	3	8	100	54	301
JOHN DORY				1	1		1			3			3	1	3	3		2
LEMON SOLE				13	19	16	13	6	16	4		4	1	3	3	2	13	10
LESSER SPOTTED DOGFISH			8	10	14	17	15	46	4	36		8	139	207	20	47	46	100
LESSER WEEVER FISH		4			1		1									1		10
POGGE (ARMED BULLHEAD)				19	10	12	5	16	29	41		16	97	15	22	5	98	114
POOR COD	6	468	180	126	68	52	52	162	139	215	232	57	108	77	273	300	263	332
RED GURNARD				3	2	1	1	2	3	1		3			2			2
RED MULLET																		1
SCALD FISH				53	44	41	44	21	87	71		1	12	11	17	16	33	16
SOLE (DOVER SOLE)	6	60	16	13	13	11	8	23	11	53	28	81	16	33	37	33	33	40
SOLENETTE			4	49	44	38	9	21	125	95							37	2
THICKBACK SOLE		8		52	68	65	47	36	61	176		80	133	57	153	49	44	34
TUB GURNARD		4					1	1	1	1				1		1	1	
TURBOT	2		4	1		1			3		4	4	2	1	1	1	1	2
WHITING	10	108	40	43	19	33	29	124	95	793	308	167	47	53	145	118	21	238
WHITING POUT (BIB)		12	4		1			7	1				1	1		3		

Annex 7 f) Abundance of fish species (per hour fishing) in sub-aera VIIIab for 2007.

Species	Day	Night
POGGE (ARMED BULLHEAD)	0	0
SCALD FISH	2	2
RED GURNARD	1	1
SOLENETTE	0	0
DRAGONET	14	23
GREY GURNARD	0	0
TUB GURNARD	1	1
COD	0	0
AMERICAN PLAICE	5	3
DAB	0	0
ANGELRFICHES	1	1
HADDOCK	0	0
WHITING	1	2
THICKBACK SOLE	5	5
LEMON SOLE	0	0
RED MULLET	3	10
FLOUNDER (EUROPEAN)	1	1
EUROPEAN PLAICE	5	5
TURBOT	36	38
BRILL	25	34
LESSER SPOTTED DOGFISH	9	12
DOVER SOLE	9	16
WEEVERFISHES	1	1
WHITING POUT (BIB)	0	1
POOR COD	1	1
JOHN DORY	26	101

Annex 8: Abundance of fish species by roundfish area

Annex 8 a) Abundance of fish species (per hour fishing) in roundfish area 1 per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AMERICAN PLAICE (LR DAB)								17	177		150	101	116	142	218	180	189	212
ANGLERFISH (MONK)								3	9		4	1	7	12	4	3	3	3
COD								31	7		5	5	8	2	9	5	11	8
COMMON DRAGONET									1			1	1	1		1		
DAB								5	109		73	68	54	98	111	83	29	37
EUROPEAN PLAICE								12	10		8	7	5	11	4	17	3	6
GREY GURNARD								4	25		7	3	16	19	15	22	9	66
HADDOCK								45	102		132	56	58	24	48	39	91	82
LEMON SOLE								15	20		9	10	20	8	13	24	4	27
LESSER SPOTTED DOGFISH														1		1		3
POGGE (ARMED BULLHEAD)											1	1		1	4	1		4
POOR COD													1	20	1	1	6	1
TURBOT								1										
WHITING								11	27		66	11	34	11	35	4	8	11

Annex 8 b) Abundance of fish species (per hour fishing) in roundfish area 2 per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AMERICAN PLAICE (LR DAB)							25	36	131	66	49	46	65	62	38	30	50	35
ANGLERFISH (MONK)						1	1	1	1	1	1	1	2	1	1	2	1	1
BRILL		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
COD				1	1	1	7	2	3	3	1	1	1	1	1	1	1	1
COMMON DRAGONET		72	158	205	167	180	80	141	152	302	151	145	138	132	168	158	79	125
DAB		15	33	42	15	39	25	46	82	167	99	62	114	140	138	117	69	142
EUROPEAN PLAICE		23	19	27	17	15	14	14	44	32	30	25	24	19	19	26	24	27
FLOUNDER (EUROPEAN)		1	1	1	1	1	1	9	1	1	2	3	1	1	1	1	1	1
GREY GURNARD		3	1	2	2	6	1	7	9	12	11	10	9	9	13	10	13	9
HADDOCK							1	4	4	5	10	21	14	5	5	3	2	9
JOHN DORY		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LEMON SOLE		3	2	1	1	2	2	3	2	7	4	3	5	6	6	7	7	11
LESSER SPOTTED DOGFISH		8	5	7	17	11	14	10	17	11	13	8	15	11	13	13	16	14
LESSER WEEVER FISH		5	2	3	4	5	2	5	2	3	4	5	5	4	7	8	5	10
POGGE (ARMED BULLHEAD)		8	15	14	20	24	26	15	30	13	19	11	25	29	23	22	9	24
POOR COD		78	67	40	26	41	42	34	25	21	26	30	20	49	125	73	43	12
RED GURNARD		27	10	20	27	40	27	20	14	16	19	20	12	20	24	32	20	21
RED MULLET		1	1	1	1	1	1	1	1	1	2	1	2	1	3	2	1	3
SCALD FISH		4	11	10	10	6	3	3	3	4	5	3	3	20	34	37	8	9
SOLE (DOVER SOLE)		19	25	21	18	11	9	13	23	18	21	17	15	10	14	13	9	19
SOLENETTE		24	49	30	53	40	27	30	31	20	37	36	30	111	149	172	61	91
THICKBACK SOLE		4	3	3	3	3	3	4	5	5	4	7	12	59	85	73	11	13
TUB GURNARD		2	1	3	4	2	2	1	1	2	2	2	1	1	2	1	1	3
TURBOT		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WHITING		1	5	3	1	1	1	5	4	8	4	4	5	6	5	3	5	3
WHITING POUT (BIB)		108	35	48	32	33	29	50	60	87	49	13	35	8	79	30	28	35

Annex 8 c) Abundance of fish species (per hour fishing) in roundfish area 3 per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AMERICAN PLAICE (LR DAB)	7	1	1	2	9	8	7	9	6	10	7	12	7	10	14	10	12	11
ANGLERFISH (MONK)	1	1	3	4	5	3	2	1	1	3	1	1	3	2	2	3	1	1
BRILL	2	2	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	2
COD	16	5	2	10	6	4	3	3	1	5	5	2	2	2	5	6	4	2
COMMON DRAGONET	104	99	160	123	144	87	85	82	80	101	98	72	91	119	116	60	77	96
DAB	296	216	248	234	331	253	212	310	291	438	347	376	304	534	536	337	419	315
EUROPEAN PLAICE	168	112	138	157	133	130	139	181	211	190	212	195	215	242	281	209	248	247
FLOUNDER (EUROPEAN)	2	3	6	2	1	2	3	1	1	1	2	4	4	5	4	4	3	2
GREY GURNARD	32	35	68	55	52	27	27	32	34	45	34	32	27	34	31	31	42	52
HADDOCK	1		1	2	8	2	8	9	5	16	12	18	7	8	11	12	17	15
JOHN DORY	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1
LEMON SOLE	4	2	3	10	12	13	11	9	8	7	9	11	14	23	16	12	12	13
LESSER SPOTTED DOGFISH	17	27	30	21	19	16	17	32	26	31	20	24	32	20	49	25	40	36
LESSER WEEVER FISH	8	16	33	26	26	24	10	20	16	15	26	11	15	12	16	12	16	12
POGGE (ARMED BULLHEAD)	39	20	37	41	32	26	24	22	23	20	24	18	25	22	33	17	21	26
POOR COD	174	111	110	165	103	113	82	111	126	164	117	58	80	188	235	153	239	168
RED GURNARD	2	5	3	4	6	4	6	6	6	6	7	8	7	10	10	7	8	10
RED MULLET	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	4	3	1
SCALD FISH	13	22	23	26	26	19	25	21	25	35	41	38	59	69	62	39	54	53
SOLE (DOVER SOLE)	101	126	122	68	66	47	53	83	94	130	106	73	71	69	74	52	56	45
SOLENETTE	102	231	166	180	203	152	138	160	162	231	177	171	331	283	363	211	182	218
THICKBACK SOLE	6	16	25	24	23	20	20	16	16	19	19	16	22	17	24	11	19	21
TUB GURNARD	5	5	12	5	6	5	5	6	9	9	7	6	6	9	7	7	7	8
TURBOT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WHITING	42	43	68	77	52	86	55	96	67	105	48	44	49	51	113	73	71	54
WHITING POUT (BIB)	97	37	24	9	14	13	7	49	40	22	8	17	15	12	12	9	4	19

Annex 8 d) Abundance of fish species (per hour fishing) in roundfish area 4 per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AMERICAN PLAICE (LR DAB)						39	66	73	103		56	65	68	85	57	53	51	70
ANGLERFISH (MONK)						2	1	2	2		1	1	2	1	1	1	3	3
BRILL				11	3	4	4	3	1	1	1		1	1	1	1	1	1
COD			16	21	3	20	13	176	9	5	5	3	13	4	9	13	4	6
COMMON DRAGONET	64		1	1	1	1	12	9	15	14	39	21	20	22	19	74	52	61
DAB	68		48	632	253	582	692	598	222	548	504	447	347	550	349	564	1467	774
EUROPEAN PLAICE	4		72	187	67	518	70	84	35	89	81	69	76	186	120	155	183	98
FLOUNDER (EUROPEAN)						1												
GREY GURNARD	4				5	48	157	46	40	130	44	81	29	32	48	110	99	68
HADDOCK						12	28	36	29	12	32	34	16	11	6	7	10	4
LEMON SOLE	60		24	91	48	174	92	158	34	34	48	49	78	58	45	56	56	72
LESSER SPOTTED DOGFISH										1					1		1	
LESSER WEEVER FISH			1	1	1	1	72	2	6	9	9	6	16	55	53	5	13	7
POGGE (ARMED BULLHEAD)	16		1	1		1	1	4	2	22	20	9	80	7	15	16	43	12
POOR COD				3				2	1	1	1	1	2		11	5		6
RED GURNARD			64	32	16	34											1	
RED MULLET									1		1		1					1
SCALD FISH						30	75	11	2	14	15	19	11	31	23	92	37	38
SOLE (DOVER SOLE)			80	69	152	260	75	57	55	35	56	15	59	22	9	22	42	18
SOLENETTE						78	74	61	9	5	14	11	4	31	4	33	4	8
THICKBACK SOLE											1					1	1	1
TUB GURNARD			8	27		6					1		1		1			1
TURBOT						2		1			1	1		1		1	1	1
WHITING				40	25	252	49	73	166	17	73	38	72	63	17	22	37	13
WHITING POUT (BIB)				64	84	16	17	36	2	5	19	5	49	4			8	7

Annex 8 e) Abundance of fish species (per hour fishing) in roundfish area 5 per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AMERICAN PLAICE (LR DAB)													1					
ANGLERFISH (MONK)			1							1	1		1			1		1
BRILL	2	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1
COD	1	1	3	1	7	3	4	37	5	3	2	3	3	1	2	5	31	3
COMMON DRAGONET	49	22	3	2	2	35	30	3	5	11	9	38	7	7	17	23	16	24
DAB	80	40	322	97	174	367	406	484	194	320	292	249	249	245	165	287	290	408
EUROPEAN PLAICE	29	30	35	35	73	97	81	98	87	73	68	65	117	78	51	86	63	67
FLOUNDER (EUROPEAN)	9	4	2	1	4	11	6	10	2	8	8	6	32	7	1	3	3	1
GREY GURNARD	8	12	29	9	36	22	28	45	26	32	10	10	15	5	9	19	14	7
HADDOCK									1		1							
JOHN DORY																	1	
LEMON SOLE	12	19	7	37	74	57	88	50	27	19	24	32	33	23	16	13	10	35
LESSER SPOTTED DOGFISH	8	14	4	8	3	3	3	2	4	4	8	5	20	7	26	4	19	15
LESSER WEEVER FISH	33	38	69	26	32	2	66	33	14	21	15	17	24	29	35	22	33	38
POGGE (ARMED BULLHEAD)	37	30	10	15	15	60	53	24	6	12	26	37	16	24	27	17	32	21
POOR COD	131	145	19	19	26	23	9	6	12	20	10	30	28	22	89	41	18	76
RED GURNARD	1	1	3	1	1	16	4	2	1	1	1	1	1	1	1	2	1	1
RED MULLET		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SCALD FISH	21	5	78	49	26	133	69	47	34	45	46	28	41	41	45	109	58	47
SOLE (DOVER SOLE)	125	141	54	228	330	195	135	230	167	200	192	146	163	245	127	249	288	196
SOLENETTE	31	4	125	30	13	150	170	121	81	60	98	48	64	59	27	73	62	54
THICKBACK SOLE		1		1				1	1			1	1	1	1	1	1	1
TUB GURNARD	1	1	4	9	2	1	1	1	1	1	2	1	2	2	2	4	4	4
TURBOT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WHITING	76	15	26	78	79	83	73	79	221	104	118	85	130	77	114	79	85	63
WHITING POUT (BIB)	135	78	17	35	211	187	56	71	186	282	81	196	77	169	131	80	32	155

Annex 8 f) Abundance of fish species (per hour fishing) in roundfish area 6 per year.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AMERICAN PLAICE (LR DAB)	3	2	1	1	2	2	3	8	34	14	6	3	9	5	8	6	6	1
ANGLERFISH (MONK)			1	1	1	1	1				1	1	1	1		1	1	1
BRILL	2	1	3	3	2	1	1	2	2	1	2	1	1	1	1	1	1	1
COD	5	10	3	1	11	9	9	25	4	1	3	2	1	1	1	3	3	6
COMMON DRAGONET		1	1	1	1	139	14	111	103	114	64	54	124	95	65	37	64	84
DAB	1937	1143	1176	1140	1075	769	1483	1391	1387	1275	988	741	798	853	542	627	463	810
EUROPEAN PLAICE	524	668	625	657	599	526	785	1214	1076	817	590	958	759	501	451	463	379	580
FLOUNDER (EUROPEAN)	10	16	5	9	5	8	10	12	5	2	3	3	4	5	6	6	3	5
GREY GURNARD	24	24	35	35	61	37	36	37	60	95	44	20	37	36	36	49	27	27
HADDOCK				1		1			1		1	1	1	1	1	1	1	
JOHN DORY					1		1								1	1	1	1
LEMON SOLE	2	2	1	3	14	10	10	86	7	6	5	6	10	18	10	4	5	18
LESSER SPOTTED DOGFISH	1	1	1	1	1			1		1	1		1	1	1	1	1	1
LESSER WEEVER FISH	28	24	33	44	58	59	19	50	37	48	37	59	41	61	55	37	45	39
POGGE (ARMED BULLHEAD)	45	62	63	40	157	111	58	189	158	40	44	48	86	59	44	23	26	37
POOR COD	3	1	1	1	1	5	2	1	6	2	1	1	2	2	6	1	1	7
RED GURNARD		1	1	1		1	2	1	1	1	1	1	1	1	1	1	1	1
RED MULLET	1	1	1	1	4	2	1	1	1	13	1	1	4	10	2	1	2	1
SCALD FISH	93	70	79	191	92	84	20	43	91	89	78	111	168	226	233	171	80	165
SOLE (DOVER SOLE)	89	52	139	82	53	62	30	161	82	51	40	33	75	34	16	17	44	34
SOLENETTE	79	77	131	178	166	141	37	90	68	297	397	174	269	149	192	137	70	108
THICKBACK SOLE	1	1				1			1			1			1	1	1	
TUB GURNARD	8	6	14	13	11	6	6	4	7	4	6	4	5	8	6	7	7	8
TURBOT	5	4	4	3	5	3	2	3	3	3	5	2	3	4	3	3	3	3
WHITING	370	72	79	80	121	110	40	53	219	172	179	213	104	81	55	33	19	114
WHITING POUT (BIB)	27	3	7	2	7	34	5	57	54	101	23	13	13	14	14	5	4	30

Annex 8 g) Abundance of fish species (per hour fishing) in roundfish area 7 per year.

[illegible]

Annex 9: Abundance of 13 epifauna species by roundfish area

Annex 9 a) Abundance of epifauna species (per hour fishing) in roundfish area 1 per year

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Aphrodita aculeata</i>									120		483	104	79	154	82	46	52	93
<i>Asterias rubens</i>									618	770	166	254	213	1080	16	23	10	20
<i>Astropecten irregularis</i>									270	368	5607	2035	2853	9776	160	402	2292	948
<i>Buccinum undatum</i>									8		36	20	50	220	26	41	40	48
<i>Cancer pagurus</i>														16				8
<i>Corystes cassivelaunus</i>																		4
<i>Echinocardium sp.</i>									1920	4	176	40	46	63	10			16
<i>Liocarcinus depurator</i>									96		214	52	113	109	88	27	138	96
<i>Liocarcinus sp.</i>									138		112	22	67	42	20	48	23	96
<i>Nephrops norvegicus</i>									12		204	43	69	571	16	8	90	54
<i>Ophiothrix fragilis</i>													422	94		33		
<i>Ophiura sp.</i>									30	1888	285	114	98	154	14	36	32	318
<i>Pagurus sp.</i>									36		104	126	326	664	62	232	152	336

Annex 9 b) Abundance of epifauna species (per hour fishing) in roundfish area 2 per year

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Aphrodita aculeata</i>							341	251	75		148	152	224	100	110	88	76	156
<i>Asterias rubens</i>							16677	62620	87	769	1514	731	581	550	745	825	764	735
<i>Astropecten irregularis</i>							13163	5209	575	4101	5968	3748	1851	1757	3428	3424	5379	6785
<i>Buccinum undatum</i>							1322	57	98		203	209	164	121	241	371	335	364
<i>Cancer pagurus</i>							20	20			4	4	6	12	12	6	24	24
<i>Corystes cassivelaunus</i>							1008	728	2	43	57	17	28	27	94	53	38	39
<i>Echinocardium sp.</i>							1156	283	54	321	227	310	145	71	458	391	139	194
<i>Liocarcinus depurator</i>									194	460	22	443	493	103	268	150	286	144
<i>Liocarcinus sp.</i>							967	6268	90		306	94	201	56	131	189	314	294
<i>Nephrops norvegicus</i>								48				117	50	12	19	4	4	5
<i>Ophiothrix fragilis</i>								251			875	207	1523	703	12	163	76	64
<i>Ophiura sp.</i>							17114	4199	87	446	190	85	121	49	60	32	41	53
<i>Pagurus sp.</i>							491	174	100		219	252	186	243	314	340	490	907

Annex 9 c) Abundance of epifauna species (per hour fishing) in roundfish area 3 per year

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Aphrodita aculeata</i>							280	1104	120		195	120	84	68	128	105	72	56
<i>Asterias rubens</i>							9082	51659	790	1896	1214	1807	4998	2692	189	359	877	279
<i>Astropecten irregularis</i>							9568		66	490	648	768	460	720	191	653	876	184
<i>Buccinum undatum</i>							432	6400	64		41	29	54	63	70	53	27	49
<i>Cancer pagurus</i>							14	628	7	6	27	12	48	52	13	10	32	16
<i>Corystes cassivelaunus</i>										8						16		
<i>Echinocardium sp.</i>							7968		81	67	63	104	368	16	10	16	418	331
<i>Liocarcinus depurator</i>									36	64	219	151	115	656	661	426	701	229
<i>Liocarcinus sp.</i>							965	19479	121		124	70	235	273	606	370	168	138
<i>Nephrops norvegicus</i>									76	385	264	637	39	1170	131	1032	512	118
<i>Ophiothrix fragilis</i>								84			120	22	1808	2837	20	11	48	21
<i>Ophiura sp.</i>							992	52245	118	713	124	401	846	120	207	260	226	290
<i>Pagurus sp.</i>							144	1536	173		279	142	195	571	429	277	213	584

Annex 9 d) Abundance of epifauna species (per hour fishing) in roundfish area 4 per year

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Aphrodita aculeata</i>							1848		40		229	130	136	38	80	81	82	86
<i>Asterias rubens</i>							21296	24910	226	822	1180	372	885	583	168	1098	355	1219
<i>Astropecten irregularis</i>							1456	80	178	1547	2144	436	578	687	2445	1457	2281	1682
<i>Buccinum undatum</i>							192		48		1526	47	169	62	22	86	94	178
<i>Cancer pagurus</i>	232						6	10	29	17	37	60	22	14	13	40	12	12
<i>Corystes cassivelaunus</i>									22	51	81	45	26	65	99	122	255	34
<i>Echinocardium sp.</i>							2560		9	200	24	16	16		50	225	28	8
<i>Liocarcinus depurator</i>													330	68	423	270	302	403
<i>Liocarcinus sp.</i>							5133	4274	175		1059	215	542	220	1136	1143	601	1438
<i>Nephrops norvegicus</i>							32				12	16	32	4		4		4
<i>Ophiothrix fragilis</i>									53		77013	23	373	61	276	133	94804	540
<i>Ophiura sp.</i>							528	1488	43	182	201	69	259	58	121	46	70	306
<i>Pagurus sp.</i>							160	272	55		439	150	241	221	387	580	366	437

Annex 9 e) Abundance of epifauna species (per hour fishing) in roundfish area 5 per year

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Aphrodita aculeata</i>	48		16	24			152	39			176	4	103	36	202	866	205	241
<i>Asterias rubens</i>	32	10295	1049	97	872	12	1512	5999	637	2728	7950	9771	1405	1064	821	2069	1423	3743
<i>Astropecten irregularis</i>			43	2488				128	112	368	195		242	581	80	823	1956	4648
<i>Buccinum undatum</i>	16	245	629	142	32		48	96		706	72	12	67	44	158	588	780	164
<i>Cancer pagurus</i>	48	12	7	7	1	569	35	12	176	95	475	1630	132	18	69	19	82	35
<i>Corystes cassivelaunus</i>			505	51					6	32	49	28	26	22	49	85	62	57
<i>Echinocardium sp.</i>	72	2609	6300	53	392		133	210	2		64	356	832	583	1761	1785	1141	5938
<i>Liocarcinus depurator</i>									69	17	5264	9020	211	421	202	496	771	1373
<i>Liocarcinus sp.</i>	208	1746	775	3268	784	256	7419	3507	839	2671	3435	4469	3004	2706	3465	45443	7454	3256
<i>Nephrops norvegicus</i>			5				16	1		18						431	490	2320
<i>Ophiotrix fragilis</i>								32			331	16	477	303109	8	117	228	187
<i>Ophiura sp.</i>	160	536	915	121	416	112	341	99	15	510	691	105	13969	593	420	1482	47113	854
<i>Pagurus sp.</i>	648	2244	769	791	472	360	536	1096	57	2643	349	85	199	138	147	373	630	634

Annex 9 f) Abundance of epifauna species (per hour fishing) in roundfish area 6 per year

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Aphrodita aculeata</i>	212	241	541	291	433	196	795	799	190	401	389	658	281	453	280	331	495	51
<i>Asterias rubens</i>	4009	7396	7529	4964	2852	3912	5308	5358	14469	24168	10136	502	8981	7547	7211	5093	4012	5903
<i>Astropecten irregularis</i>	4001	3407	2651	2268	2127	2023	3510	1333	3099	8055	5139	3016	13182	12222	10419	9274	8490	7222
<i>Buccinum undatum</i>	77	113	68	67	248	66	212	26	942	265	243	28	31	109	135	28	50	863
<i>Cancer pagurus</i>	2	2	1	6	2	4	116	7	25	14	15	14	73	26	18	23	36	28
<i>Corystes cassivelaunus</i>	134	206	275	130	427	188	720	503	185	465	275	188	214	600	436	496	348	160
<i>Echinocardium sp.</i>	2614	2546	1296	2270	1398	952	1582	10814	141	5503	563	373	1343	2810	1286	587	566	486
<i>Liocarcinus depurator</i>											228	191	184	684	445	330	627	223
<i>Liocarcinus sp.</i>	1777	2391	3715	3106	4211	4971	2196	3037	4721	9319	3313	1081	8604	14438	13200	32050	5762	9549
<i>Nephrops norvegicus</i>	20	132	214	69	34	2	45	277	62	53	2637	15	175	114	171	60	869	293
<i>Ophiotrix fragilis</i>	96	99	36	16	16	40	112		50	656	97	232	112	52	768	90	111	36
<i>Ophiura sp.</i>	574	9370	6487	4350	14599	698	44197	18436	4658	12706	5841	433	1870	1221	1232	1037	2679	1983
<i>Pagurus sp.</i>	327	293	285	282	509	168	473	304	704	520	450	116	317	382	227	269	210	457

Annex 9 g) Abundance of epifauna species (per hour fishing) in roundfish area 7 per year

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Aphrodita aculeata</i>	320	371		304			638	3	70		348	561	407	166	369	58	373	147
<i>Asterias rubens</i>	3404	1948		1549			1318	20309	138	2258	849	390	475	2347	523	1073	456	459
<i>Astropecten irregularis</i>	2265	4679		1934			3934	96	2881	5975	5311	2647	2379	1916	2388	4142	11032	6853
<i>Buccinum undatum</i>	48			6			21	464	65		417	178	357	261	166	223	240	222
<i>Cancer pagurus</i>	1	129		4			8	13	4	14	20	60	12	4	4	11	3	8
<i>Corystes cassivelaunus</i>	64	443		81			7080	28	9	172	446	195	102	22	26	72	114	53
<i>Echinocardium sp.</i>	41593	44889		7294			2221	7	9	2240	1848	307	566	219	1774	656	501	333
<i>Liocarcinus depurator</i>											212	138	207	300	509	166	65	325
<i>Liocarcinus sp.</i>	484	255		797			1056	1735	207		523	203	182	175	392	1268	327	823
<i>Nephrops norvegicus</i>		1		5			30			252	28	116	44	230	357	107	9	36
<i>Ophiotrix fragilis</i>	192			16					188		21	112	4	21	16	28		
<i>Ophiura sp.</i>	1333	2571		48			1744	4480	299	417	365	224	238	274	278	66	27	98
<i>Pagurus sp.</i>	201	238		203			349	373	151		163	498	400	745	469	209	235	384

Annex 9 h) Abundance of epifauna species (per hour fishing) in division VIIIa, b for 2007

Species	Day	Night
<i>Aphrodita aculeata</i>	N/A	N/A
<i>Asterias rubens</i>	N/A	N/A
<i>Astropecten irregularis</i>	N/A	N/A
<i>Buccinum undatum</i>	4	4
<i>Cancer pagurus</i>	1	2
<i>Corystes cassivelaunus</i>	N/A	N/A
<i>Echinocardium sp.</i>	N/A	N/A
<i>Liocarcinus depurator</i>	N/A	N/A
<i>Liocarcinus sp.</i>	N/A	N/A
<i>Nephrops norvegicus</i>	9	6
<i>Ophiotrix fragilis</i>	N/A	N/A
<i>Ophiura sp.</i>	N/A	N/A
<i>Pagurus sp.</i>	N/A	N/A

Annex 10: Number of hauls by area and year

Annex 10 a) Number of hauls by area and year for the Dutch inshore survey (Tridens data are excluded).

region	Belgian Coast	Dutch Coast				German Bight				Scheldt Est			Dutch Wadden Sea							
area_code	400	401	402	403	404	405	406	407	631	634	638	610	612	616	617	618	619	620		
1970		6	11	11	22				13	31	26	23		24	16	10	12	20		
1971		9	9	13	19				4	29	30	25		28	14	8	12	22		
1972		8	15	11	20				5	29	28	18		25	11	10	10	20		
1973		8	9	8	19				5	30	31	18	2	24	11	9	9	22		
1974		8	16	11	19				6	32	32	19	7	24	12	10	11	21		
1975		8	11	10	19				4	31	26	21	7	25	14	9	10	21		
1976									6	30	26	21	7	25	13	10	10	21		
1977		10	16	9	23				8	28	27	21	7	26	13	10	11	21		
1978		1	15	10	23	8	16	18	5	30	28	21	7	26	13	10	10	21		
1979		15	8	13	7	18	19	6	28	28	21		26	13	10	10	21			
1980	3	9	7	10	26	7	16	23	6	27	29	21	7	26	13	10	10	21		
1981		10	9	9	25	10	10		6	28	27	19	6	28	13	10	10	21		
1982		18	8	9	28	14	21	6	6	28	27	21	7	26	13	10	10	21		
1983		18	13	6	15	8	21	6	7	27	27	21	7	26	13	10	9	21		
1984		23	13	8	31	15	22	4	6	27	27	22	7	25	12	10	10	21		
1985		17	12	9	28	15	20	7	6	26	27	21	7	26	12	10	8	20		
1986		17	13	9	28	15	21	5	6	26	27	21	7	26	13	10	9	21		
1987		18	13	9	28	15	21	6		30	28	17	7	30	13	10	8	23		
1988		18	14	8	29	14	22	5		24	27	21		26	13	9	8	22		
1989	26	13	9	28	10	23	6		40	30	21		26	13	10	8	23			
1990		25	13	9	28	15	21	6		39	29	21		25	13	11	8	23		
1991		16	13	9	28	15	21	6		31	31	23	5	25	13	10	10	24		
1992		26	16	13	28	15	21	6		36	28	23	6	26	12	6		28		
1993		22	20	9	28	15	21	5		31	27	23		27	14	11	8	29		
1994		21	16	13	28	15	19	6		35	33	24		26	12	10	7	25		
1995		17	13	9	25	14	22	6		41	33	31		23	15	10	9	26		
1996		17	12	10	29	14	21	6		43	33	28	6	28	15	10	9	27		
1997		17	13	9	28	13				43	34	27		28	15	11	9	27		
1998		9	10	8						43	34	27	6	29	15	10	10	27		
1999	17	14	8	14	1				43	35	28		31	14	13	10	22			
2000		15	7	2	17	10	19	6		45	43	42		26	15	11	10	26		
2001			14	6	29	16	20	4		46	50	29		28	15	12	11	27		
2002		21	13	8	26	14				44	41	27		26	13	11	9	26		
2003		16	14	9	28	15	18	6		42	36	29		27	13	9	9	26		
2004		17	13	4	19	15	17	6		41	31	28	6	27	14	10	8	27		
2005		17	14	14	30	15	15	8		43	36	29	6	25	13	11	9	34		
2006		15	14	10	28	15	17	6		41	36	28	7	28	16	8	9	29		
2007		17	16	13	30	15	17	6		41	36	30	9	25	13	11	8	25		

Annex 10 b) Number of hauls by area and year for the German DYFS.

region area_code	German Bight				German/DK Wadden Sea							
	405	406	NF	OF	408	409	410	411	412	413	414	(blank)
1971	4											44
1972									10	8		29
1973	3	1							36	27		34
1974	6	17	1	3	10	18	15	42	6			12
1975		14			9	18	14	46	11			
1976		14		59	8	18	14	46				
1977		14		19	8	18	14	46	59	2	32	
1978		11			4	18	14	45	34			
1979	4	14			8	18	14	46	43			30
1980		11			9	17	14	46	33			55
1981	1	10			8	22	14	43	65			64
1982		10			8	22	14	46	63			79
1983		5			4	11	7	32	47			87
1984	6	8			8	16	13	40	55			78
1985	21	11					70		57			64
1986	29	39				12	15	44	52			69
1987	22	91					5		50			64
1988	18	104							52			78
1989	17	64					24	9	52			82
1990	22	27			3	37	44	30	62			79
1991	23	17			5	16	43	45	54			71
1992	20	20			3	25	35	41	53			84
1993	28	22				27	20	39	54			51
1994	17	28		33	10	29	19	32	50			11
1995	17	28			7	13	14	36	10			60
1996	13	22				45	26	49	48			48
1997	62	36				38	18	51	51			9
1998	30	53			9	46	33	87	45			39
1999	14	51				28	26	70	49			54
2000	29	34			6	34	30	56	48			52
2001	29	32				31	28	58	45			49
2002	21	31				28	26	50	47			47
2003	12	26				29	30	65	46			49
2004	12	28				29	28	48	49			44
2005	8	25			6	16	12	22	21	32		25
2006	5	16			5	14	11	23	28	26		25
2007		2						33	22	31		41

Annex 10 c) Number of hauls by area and year for the Belgian DYFS.

region	Belgian Coast
area_code	400
1973	35
1974	35
1975	35
1976	35
1977	29
1978	27
1979	29
1980	31
1981	33
1982	33
1983	33
1984	32
1985	33
1986	33
1987	33
1988	29
1989	33
1990	33
1991	33
1992	24
1993	33
1994	33
1995	33
1996	33
1997	33
1998	33
1999	31
2000	27
2001	33
2002	33
2003	33
2004	33
2005	33
2006	33
2007	32

Annex 10 d) Number of hauls by year for the English DYFS.

region area_code	Other
1981	290
1982	312
1983	239
1984	304
1985	271
1986	292
1987	288
1988	323
1989	322
1990	367
1991	373
1992	361
1993	385
1994	370
1995	372
1996	373
1997	364
1998	360
1999	377
2000	433
2001	469
2002	469
2003	477
2004	395
2005	407
2006	406
2007	159

Annex 11: Number of Hauls by depth class, year and country

Annex 11 a) Number of hauls by depth class, year and country for the continental coastal areas.

region depth zone country	Belgian Coast						Dutch Coast				German Bight							
	0-5	5-10	10-20	20-25	25-30	30-35	0-5	5-10	10-20	20-25	0-5	0-5	5-10	5-10	10-20	10-20	20-25	20-25
	BEL	BEL	BEL	NED	BEL	BEL	NED	NED	NED	NED	GFR	NED	GFR	NED	GFR	NED	GFR	NED
1970							1	18	25	6								
1971								17	24	9	2			2				
1972								18	30	6								
1973		14	18		3			16	18	10				1		3		
1974		12	16		7			13	30	11	18		5		3		1	
1975		10	22		3			12	23	13	7		7					
1976		10	19		6						53		17		3			
1977		12	16		1		12	15	26	5	7		14		12			
1978		9	18					21	22	6	4		7	16		25		1
1979		11	14		4		1	20	15		10	1	8	20		23		
1980		12	17		2		22	11	15	4	4	22	7	18		6		
1981		9	20		4		22	10	21		3	3	8	4		13		
1982		15	15	3	3		19	18	24	2	2	14	8	13		14		
1983	4	13	15		1		26	9	17		1	13	4	13		9		
1984	2	12	17		1		19	15	31	10	3	5	8	16	3	19		1
1985	3	12	16		2		20	16	26	4	7	11	18	18	7	13		
1986	4	12	14		3		13	23	24	7	23	12	36	11	9	18		
1987	5	15	10		3		27	10	27	4	58	12	46	13	9	17		
1988	3	15	10		1		10	26	30	3	54	3	54	18	14	20		
1989	9	14	9		1		4	37	28	7	40	1	23	20	18	18		
1990		9	21		3		8	40	22	5	14	6	18	14	17	22		
1991	2	17	14				13	21	26	6	12	5	12	23	16	14		
1992	4	12	7		1		19	21	27	16	16	9	14	15	10	18		
1993	3	20	8		2		14	30	29	6	8	6	19	18	23	17		
1994	8	13	11		1		18	17	30	13	43	5	21	12	14	23		
1995	5	14	12		2		11	22	25	6	11	3	16	25	18	14		
1996	5	15	12		1		1	36	27	4	10	1	9	21	14	19	2	
1997	4	16	12		1		1	31	29	6	41		39	7	18	6		
1998	7	18	6		2			12	15		18		39		20		6	
1999	3	17	9		1	1		8	37	8	16		32		17	1		
2000	1	11	15					16	18	7	10		32	13	20	22	1	
2001	4	16	11		2			8	28	13	15		27	2	19	34		4
2002	2	19	9		3		5	27	29	7	14		27	5	10	9	1	
2003	5	16	11		1		9	32	26		7	1	18	26	13	12		
2004	4	17	8			4	1	21	28	3	8		18	17	14	21		
2005	4	18	9		1	1	2	35	29	9	7	2	17	16	8	20	1	
2006	8	10	13		2		3	27	31	6	2	1	14	18	5	19		
2007	4	16	11		1		4	28	36	8	1		1	16		22		

Annex 11 b) Number of hauls by depth class, year and country for the Wadden Sea.

region depth zone country	Dutch Wadden Sea					German/DK Wadden Sea			
	0-6	6-12	13-20	20-	(blank)	0-6	6-12	13-20	20-
	NED	NED	NED	NED	NED	GFR	GFR	GFR	GFR
1970	64	39	2						
1971	50	56	3			28	15	1	
1972	44	40	9	1		7	33	7	
1973	39	51	5			7	82	7	1
1974	37	59	8			85	18		
1975	45	57	5			75	21	2	
1976	53	47	7			72	14		
1977	44	54	11			151	26	2	
1978	46	51	11			101	14		
1979	40	51	10			139	20		
1980	46	52	10			158	16		
1981	41	55	11			187	29		
1982	48	49	11			198	33	1	
1983	56	40	11			154	32	2	
1984	50	48	9			183	26	1	
1985	50	45	9			141	48	1	1
1986	58	42	6	1		130	54	8	
1987	54	42	12			96	23		
1988	55	33	11			114	14	2	
1989	47	40	14			149	18		
1990	45	46	10			204	49	2	
1991	59	45	6			181	45	7	1
1992	45	51	5			192	44	5	
1993	60	44	8			132	51	8	
1994	58	39	7			102	44	4	1
1995	55	50	9			93	43	3	1
1996	62	51	10			147	63	5	1
1997	62	44	10	1		130	31	4	2
1998	54	52	15	3		181	61	15	2
1999	50	54	12	2		174	43	10	
2000	42	71	15	2		181	37	8	
2001	54	56	11	1		152	48	11	
2002	54	45	12	1		159	35	4	
2003	43	59	11			166	44	8	1
2004	40	59	16	3	2	144	44	10	
2005	47	59	19	1	1	96	30	8	
2006	51	55	17	1	1	94	32	5	1
2007	42	56	22	1		56	24	6	

Annex 11 c) Number of hauls by depth class and year for the Scheldt estuary.

region depth zone country	Scheldt Estuary			
	0-5 NED	5-10 NED	10-20 NED	20- NED
1970	11	36	21	2
1971	11	36	15	1
1972	8	44	9	1
1973	11	42	13	
1974	4	47	18	1
1975	3	48	10	
1976	2	29	28	3
1977	1	9	42	11
1978		15	40	8
1979		10	45	7
1980	7	17	29	9
1981		16	41	4
1982		16	43	2
1983		20	37	4
1984	17	20	21	2
1985	8	24	25	2
1986	7	27	25	
1987	10	19	27	2
1988	8	21	19	3
1989	22	14	29	5
1990	1	20	32	15
1991	1	17	40	4
1992	15	19	23	7
1993	1	16	34	7
1994	13	18	27	10
1995	12	22	30	10
1996	15	19	33	9
1997	15	22	30	10
1998	14	21	34	8
1999	14	26	25	13
2000	12	20	48	8
2001	18	27	40	11
2002	22	24	31	8
2003	21	19	26	12
2004	23	20	23	6
2005	17	15	34	12
2006	12	22	32	11
2007	15	23	28	11

Annex 12: Planimetric data continental inshore surveys

The area definitions used for the GIS analyses are presented in Figure 1. These new definitions are an approximation of the old figure (see last years report). The estimation of the surface area (in km²) by area and depth class is presented in Table 1. The aggregation of the data into regions conform the old table with raising factors is presented in the report.

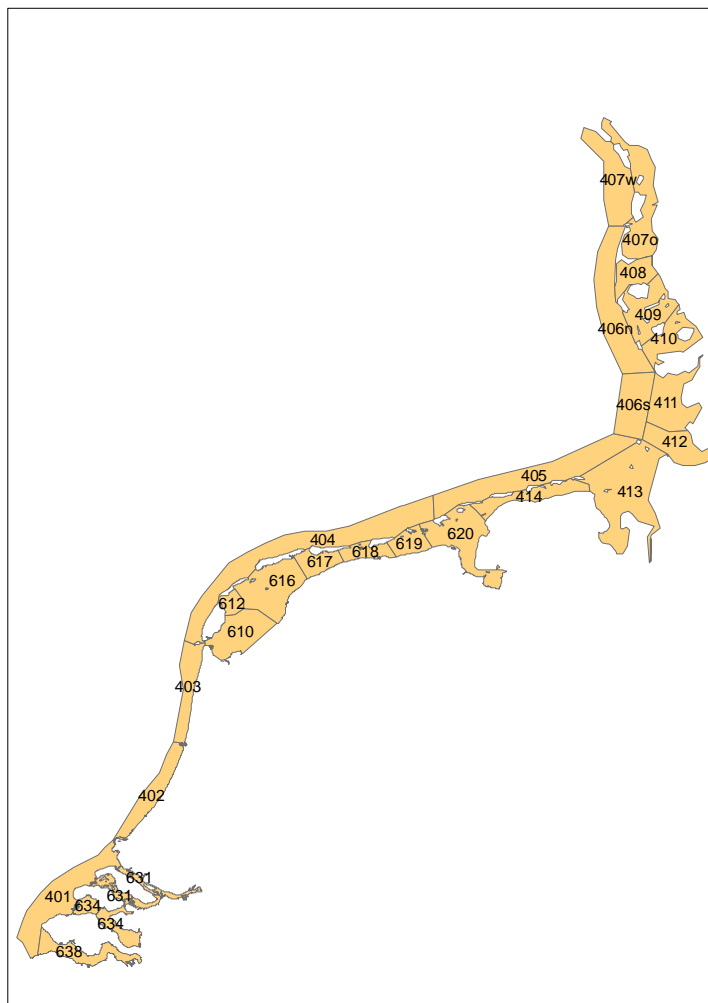


Figure 1. Area definitions for the Dutch DFS and German DYFS.

Table 1. Surface area (km²) by area and depth class for the Dutch DFS and German DYFS.

Area	Depth class							Total	Total
	<0m (>LW)	0-5m	5-10m	15-20m	20-25m	25-30m	>30m	<LW	
401	0.3	329.7	370.2	192.1	58.1	28.0	7.1	985	986
402		44.0	78.3	174.2	199.4	3.1	0.3	499.3	499
403	0.9	50.8	92.5	176.3	121.7	18.9	4.6	464.8	466
404	6.4	275.6	420.1	393.8	484.9	132.4	0.4	1707.2	1714
Dutch coast	8	700	961	936	864	182	12	3656	3664
405	47.2	256.3	271.9	295.5	337.5	104.2	9.2	1274.5	1322
406n	4.3	246.4	322.4	489.0	14.3	1.0	0.0	1073.1	1077
406s	3.2	92.9	214.2	257.6	39.2	20.8	0.1	624.7	628
407w		193.1	323.5	214.3	5.5	0.2	0.1	736.7	737
German Bight	55	789	1132	1256	396	126	9	3709	3764
407o		767.4	26.9	15.4	3.7	2.2	0.8	816.4	816
408	158.5	118.3	19.5	7.6	1.8	0.3	0.1	147.7	306
409	323.0	184.8	47.2	18.2	10.8	4.6	0.2	265.8	589
410	233.2	83.3	39.4	32.6	8.9	2.0	0.2	166.3	400
411	324.3	220.3	56.8	21.3	1.3	0.0		299.9	624
412	198.3	126.2	93.9	46.0	24.5	5.1	0.6	296.3	495
413	740.1	325.8	161.2	106.6	50.7	12.0	1.6	657.9	1398
414	295.7	83.8	9.4	3.6	0.6	0.0		97.4	393
German & Danish WS	2273	1910	454	251	102	26	4	2748	5021
610	13.6	434.6	71.1	40.9	22.0	12.7	5.4	586.7	600
612	20.7	102.3	10.7	1.5	0.1			114.7	135
616	42.5	686.0	52.8	27.7	9.6	2.6	3.1	781.8	824
617	35.5	207.1	15.7	4.5	3.8	1.2	0.5	232.7	268
618	40.5	159.0	16.5	5.6	1.0			182.0	223
619	67.4	169.7	17.4	2.4	0.7			190.2	258
620	281.0	304.9	89.7	78.6	33.5	4.5	1.6	512.7	794
Dutch WS	501	2064	274	161	71	21	11	2601	3102
634	1.4	39.4	11.4	12.6	10.1	6.2	7.1	86.9	88
638	49.8	76.8	92.2	60.6	63.4	29.5	17.0	339.5	389
Scheldt estuary	51	116	104	73	74	36	24	426	478
Total	2888	5578	2925	2678	1507	392	60	13140	16028

Annex 13: Biological data on inshore surveys

Scheldt estuary (Dutch data)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<i>Agonus cataphractus</i>	7.7	2.5	0.31	2.8	4.1	3.2	2.3	6	15	3.7	9.4	7.4	0.76	6	10	1.2	12	6.8	2
<i>Alosa fallax</i>		0.03															0.04		
<i>Ammodytes sp.</i>		0.2	2	0.5	1.9	0.97	0.21	1.1	0.17	0.67	0.62	13	2.1	6.8	5	1.1	1.6	0.18	2.7
<i>Buglossidium luteum</i>							0.04												
<i>Callionymus lyra</i>	1.3	2.7	0.28	1.4	0.82	1.6	1.5	2.2	0.9	3.9	0.59	1.7	1.5	6	12	2	8.5	5.3	7.3
<i>Clupea harengus</i>	9.9	0.87	0.07	16	1.4	0.17	1.4		3.5	6.5	4.6	3.4	3.7	14	31	16	79	25	30
<i>Gadus morhua</i>	0.46	0.4	0.21	0.23	0.22	0.17	0.29	1.1	1.8	4.1	0.36	1.5	0.81	1	0.33	3.4	0.63	1.2	2
<i>Gobiidae</i>	220	182	103	260	110	277	231	66	127	312	591	345	270	206	478	171	262	466	244
<i>Hyperoplus lanceolatus</i>	0.35	0.03		0.2			0.1		1	0.29	1.4					1	0.15	0.23	0.1
<i>Limanda limanda</i>	75	17	11	26	224	36	9.3	164	245	75	314	97	43	103	317	23	330	169	568
<i>Merlangius merlangus</i>	0.64	0.41	1.1	0.96	3.7	1.2	11	3.8	3.1	10	1.1	8.5	2.9	22	1.8	6.5	19	9.5	3
<i>Osmerus eperlanus</i>	2.8	2.4	0.21		0.33		0.17	0.04	0.1		0.04	0.15		0.04					
<i>Platichthys flesus</i>	12	7.2	2.5	2.2	1.5	2	4	6.2	4.6	3	8.1	5.6	1.6	2.4	11	6.4	6.4	5.8	2.2
<i>Pleuronectes platessa</i>	75	42	30	75	44	73	33	70	99	49	154	97	73	164	198	111	468	265	432
<i>Solea solea</i>	126	52	3.7	46	16	20	9.9	25	57	67	216	52	38	55	91	22	25	66	27
<i>Syngnathus sp.</i>	3.6	0.31	0.11	9.5	1.9	4.8	1.7	4.8	2.2	8.3	2.9	1.2	1.1	4.2	2.2	0.94	11	3	0.56
<i>Crangon sp.</i>	10614	11423	8942	14466	7606	7641	9708	3107	5125	14866	11725	7159	8750	10838	15390	7408	22133	11622	5238

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Agonus cataphractus</i>	1.3	2.5	3.2	0.84	0.2		0.78	0.51	4.5	3.7	0.59	5.7	1.9	1.7	1.2	0.83	1.4	0.26	0.32
<i>Alosa fallax</i>	0.03						0.03												
<i>Ammodytes sp.</i>	0.11	1.3	2.2	0.29	0.23	0.48	0.27	2.3	1.5	1.8	0.53	1	0.54	0.47	0.38	2.5	1.2	1	0.39
<i>Buglossidium luteum</i>																	0.51		
<i>Callionymus lyra</i>	2.4	10	0.71	0.98	1.3	8.3	5.2	5.7	0.87	10	3	14	7.2	12	3.7	3.9	4.5	6	1.5
<i>Clupea harengus</i>	2.7	24	14	48	2.3	58	0.08	4.9	66	28	13	44	144	80	116	26	10	40	39
<i>Gadus morhua</i>	0.03	0.07	0.26			0.3	0.06	0.31	0.31	2.1	0.48	0.05	0.25	0.51	0.06	0.05	2.1	0.58	0.71
<i>Gobiidae</i>	138	122	477	230	99	316	63	57	218	228	95	276	205	212	78	251	167	200	188
<i>Hyperoplus lanceolatus</i>	0.33	0.03	0.32	0.57	0.18	0.03	0.37	0.71	0.4	0.26	0.14	0.32	0.21	0.05	0.15	0.17	0.29	0.37	0.35
<i>Limanda limanda</i>	11	46	69	22	5.4	9.7	35	33	7.5	45	24	61	36	19	2.4	10	13	0.07	28
<i>Merlangius merlangus</i>	0.27	1.3	1.2	4.2	0.95	0.48	0.08	8.2	1.6	7.6	4	1.1	3.7	0.14	1.5	1.8	4.4	0.77	5.6
<i>Osmerus eperlanus</i>		0.03				0.12		0.03	0.29	0.46	0.09	0.37	0.28	0.05	0.17	0.2	0.06	0.14	0.17
<i>Platichthys flesus</i>	1.4	0.67	1.5	8.7	1.1	2.3	6.8	12	2	1.7	1.3	1.9	8.2	5.7	3.1	3.7	1.1	1.4	15
<i>Pleuronectes platessa</i>	45	145	34	52	27	53	60	140	61	146	60	97	88	45	122	79	92	64	95
<i>Solea solea</i>	3.1	22	12	13	11	5.1	14	29	19	13	16	46	48	27	16	12	48	12	47
<i>Syngnathus sp.</i>	0.34	4.1	3.2	1.6	0.75	0.26	0.3	0.38	0.77	4	1.2	2.6	0.95	0.64	1.7	0.79	2.9	2.5	0.39
<i>Crangon sp.</i>	4936	1501	5102	17142	2206	7518	1185	3628	4243	1341	1616	1588	4727	2003	1796	1203	3957	2086	1485

Dutch Coast (Dutch data)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<i>Agonus cataphractus</i>	16	148	62	8.8	26	72		36	64	8.5	3.5	76	15	13	27	207	73	64	22
<i>Alosa fallax</i>								1.2			0.14	19	335				0.11		
<i>Ammodytes sp.</i>	9.3	29	224	31	9.8	14		3.7	0.94	0.13	0.95	111	17	3.3	3.9	23	3.8	4.1	9
<i>Buglossidium luteum</i>	54	2.3	2.3	63	44	21		32	3.2	1	3.3	9.2	16	21	31	16	2.2	38	47
<i>Callionymus lyra</i>	121	48	52	335	189	237		140	32	1.6	10	29	189	65	59	61	18	213	80
<i>Clupea harengus</i>	233	5.5	3.2	0.38	2.9	0.25		31	70	381	641	519	2130	703	135	104	63	171	86
<i>Gadus morhua</i>	61	2.2	2.2	2.2	2.5	3.3		12	15	15	9	13	15	33	4	5.8	4.5	2.3	4.9
<i>Gobiidae</i>	1690	4481	1823	5948	4025	3209		794	2189	0.5	5238	8971	1897	2114	446	1873	227	9406	2707
<i>Hyperoplus lanceolatus</i>	0.71	4	1.5	0.43	0.55	0.37		0.5	0.65		0.66	2.4	0.71	0.31	0.57	1.4	0.34	1.5	0.48
<i>Limanda limanda</i>	699	3193	99	668	593	482		141	5839	1396	3642	1076	1243	1627	733	808	918	1774	9818
<i>Merlangius merlangus</i>	69	55	35	35	113	110		150	181	686	274	514	238	999	51	46	117	64	29
<i>Osmerus eperlanus</i>	14		0.07		0.06	0.13				0.38		0.44	16	5.3			0.32	0.36	0.03
<i>Platichthys flesus</i>	2.3	5	3.2	1.3	1.9	6		11	22	1.1	22	7.9	25	17	5.5	2.3	3.3	6.1	2.7
<i>Pleuronectes platessa</i>	682	1695	289	300	135	301		128	365	808	718	1135	1609	1289	403	1817	900	1105	227
<i>Solea solea</i>	1117	1725	27	587	84	448		17	310	1030	1390	584	1374	685	554	497	275	3024	98
<i>Syngnathus sp.</i>	0.32	0.63	2.2	0.59	0.71	0.26		1.6	0.1	15	283	41	134	1.9	0.61	1.9	1.4	2.7	0.75
<i>Crangon sp.</i>	15557	26676	19790	56811	52207	69184		14726	39136	35304	193910	82073	94616	69514	43483	106897	23845	119221	22719

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Agonus cataphractus</i>	10	3.4	26	5.8	29	11	15	24	21	16	19	3.5	15	19	5.7	15	4.9	6.3	13
<i>Alosa fallax</i>	0.92													0.05	0.39		1.4	0.25	
<i>Ammodytes sp.</i>	47	23	28	11	10	25	25	117	25	7.4	50	8.5	5.6	11	7.2	3.5	23	27	58
<i>Buglossidium luteum</i>	26	57	71	159	213	412	73	32	34	13	208	133	48	32	166	160	116	144	170
<i>Callionymus lyra</i>	1899	277	211	324	407	37	57	18	77	506	148	38	55	151	202	101	310	217	85
<i>Clupea harengus</i>	33	39	211	18	37	61	481	319	146	7.5	120	65	38	121	154	45	108	1237	122
<i>Gadus morhua</i>	1.3	1.6	1.2	0.16	0.12	0.8	3.7	2.8	4.6	19	2.4	1.1	9.3	2.8	1.7	6.4	2.6	13	5.9
<i>Gobiidae</i>	5000	1585	2520	1602	2845	1589	2517	4538	6484	574	3859	2102	738	2436	7073	2511	3004	4303	2232
<i>Hyperoplus lanceolatus</i>	4.5	5	3.6	5.9	3.8	11	23	6.8	3.4		3.2	2	1	3.2	9.6	4.8	3.5	1.5	3.6
<i>Limanda limanda</i>	1782	876	1243	541	461	805	1478	655	515	434	614	298	247	223	1320	417	528	199	713
<i>Merlangius merlangus</i>	38	41	44	20	8.8	35	41	23	31	49	45	81	147	241	75	130	38	40	273
<i>Osmerus eperlanus</i>	2.2		1.2				1.4	8.9	0.57		0.47	0.07		1.2	1.6	0.14	1.1	2.1	4.7
<i>Platichthys flesus</i>	1.5	4.7	3.6	2.8	2.5	2.7	3	1.9	1.5	0.46	1.3	2.5	1.1	16	3.1	2.5	0.93	1.5	4.6
<i>Pleuronectes platessa</i>	450	193	540	318	310	204	218	1121	426	223	420	239	371	339	573	398	171	666	193
<i>Solea solea</i>	96	25	1120	36	29	38	17	108	79	45	99	29	193	23	62	10	66	23	14
<i>Syngnathus sp.</i>	3	2.4	0.64	1.7	7	42	4	3.8	6.2	2.3	23	3	5.2	68	14	2.4	4.9	76	11
<i>Crangon sp.</i>	35679	21914	26108	34693	22403	40619	44096	45950	46444	12040	35421	39141	15429	28942	47496	21036	29468	46472	13105

Dutch Wadden Sea (Dutch data)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<i>Agonus cataphractus</i>	20	18	10	23	13	32	5.3	78	70	14	29	14	14	39	65	12	21	37	20
<i>Alosa fallax</i>	0.5	0.15	2		0.5	0.1	0.08	1.4	0.18	0.05	1.3	0.25	27	0.88		4.2	12		
<i>Ammodytes sp.</i>	6.1	0.92	0.53	0.81	1.7	4.8	4.5	2.6	3.7	0.71	0.83	0.48	5.1	6.5	9.6	11	6.4	1.3	3.9
<i>Buglossidium luteum</i>																			
<i>Callionymus lyra</i>	0.83	0.08	0.64	0.55	0.87	1.4	1	5.6	1.8		0.38	2.8	0.83	3.8	4.7	0.43	2.5	0.38	1
<i>Clupea harengus</i>	8.4	3.6	2	15	24	7.9	7.8	7.3	40	112	45	151	185	455	310	149	376	285	81
<i>Gadus morhua</i>	115	1.8	0.49	0.13	2.8	0.04	44	128	166	58	54	15	1.2	98	2.9	16	7.2	2	4
<i>Gobiidae</i>	256	149	337	760	1450	1792	817	99	346	40	414	481	941	540	714	671	20	619	481
<i>Hyperoplus lanceolatus</i>	0.09		0.04	0.04	0.09	0.11		0.32	0.3	0.31	0.09	1.2	1.1	0.22	1.3	3.1	0.36	0.35	0.19
<i>Limanda limanda</i>	2017	1437	150	1921	1893	952	1903	1481	5304	622	1723	893	881	1865	1224	459	748	263	3108
<i>Merlangius merlangus</i>	54	24	26	19	81	50	137	95	197	165	107	94	50	384	93	41	54	160	44
<i>Osmerus eperlanus</i>	19		19	49	123	87	24	31	33	24	96	21	74	145	104	176	100	426	44
<i>Platichthys flesus</i>	22	26	23	94	46	84	54	32	18	19	44	43	21	64	33	7.9	26	27	24
<i>Pleuronectes platessa</i>	373	642	216	649	436	876	1867	657	2672	1229	1064	1731	1131	3408	2039	1728	1015	1723	1811
<i>Solea solea</i>	438	604	59	102	57	76	165	118	324	561	692	209	225	128	145	192	113	869	62
<i>Syngnathus sp.</i>	69	3.4	19	53	41	38	35	10	5.2	5.2	149	100	1918	181	116	2.9	11	241	168
<i>Crangon sp.</i>	77134	94762	74567	82994	88978	86618	110112	20019	86832	97394	130347	43794	128503	112866	119295	110127	86095	173902	81243

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Agonus cataphractus</i>	15	13	24	5	6	87	53	18	68	16	2.7	4.7	4.9	5.4	11	3.4	1.5	1.5	16
<i>Alosa fallax</i>	11	0.2		0.48	0.03	2.1	0.03	0.04	0.37	0.07	0.33		0.08		1.9	0.04	0.26	6	
<i>Ammodytes sp.</i>	2.4	1.2	0.7	0.69	0.23	0.73	1.5	4.5	6.7	3.5	2.6	4	10	15	8.9	24	2.7	0.34	1.6
<i>Buglossidium luteum</i>	0.08														0.04				
<i>Callionymus lyra</i>	1.7	4.1	0.04	0.33	0.51	0.04	0.31	0.07	1	0.83	1.8	0.55	1.3	0.37		0.7	0.03	0.07	0.13
<i>Clupea harengus</i>	48	221	43	93	109	255	794	90	48	108	84	36	85	22	78	260	31	44	433
<i>Gadus morhua</i>	0.64	0.87	8.4	0.21	1.3	14	4.9	8.1	5	9.8	0.29	2.7	9	0.45	0.59	3.4	0.95	2.4	13
<i>Gobiidae</i>	417	302	6915	412	675	1225	455	1889	1020	355	915	288	545	272	252	1299	1236	111	346
<i>Hyperoplus lanceolatus</i>	0.12		0.04	0.15	0.38	0.3	2.4	0.55	0.36	1	0.32	0.69	0.63	0.95	0.66	0.26	0.15	0.25	0.62
<i>Limanda limanda</i>	766	526	1280	206	159	119	440	164	16	55	126	13	761	2.6	5.3	76	20	0.27	89
<i>Merlangius merlangus</i>	22	289	39	57	18	184	41	9.4	6.3	22	27	16	33	6.4	1.7	4.9	5.3	2	40
<i>Osmerus eperlanus</i>	40	138	9.7	52	54	141	69	122	23	29	70	150	46	55	16	14	132	82	82
<i>Platichthys flesus</i>	23	18	35	11	20	112	55	38	15	11	63	57	170	18	38	23	27	38	48
<i>Pleuronectes platessa</i>	821	760	840	240	615	489	617	1567	359	484	314	297	525	131	546	237	176	396	214
<i>Solea solea</i>	67	8.4	233	8.7	45	9.6	8.6	103	69	25	97	107	70	105	21	34	183	60	56
<i>Syngnathus sp.</i>	334	154	186	89	606	245	104	109	186	139	315	141	77	306	295	114	260	19	11
<i>Crangon sp.</i>	57356	24292	105672	50752	60403	90409	37803	136230	75015	27238	87913	57465	75944	37291	55285	97350	72659	41510	42081

German Bight (Dutch data)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<i>Agonus cataphractus</i>									25	29	23	31	99	41	38	52	61	45	90
<i>Alosa fallax</i>											0.04	0.8	20						
<i>Ammodytes</i> sp.									4.2	1.4	7.1	1.7	14	1.2	4.8	15	9.2	9.9	61
<i>Buglossidium luteum</i>									0.88				3.4	0.5	3.3	0.27	2.4	1.1	3.2
<i>Callionymus lyra</i>									38	2.3	2.6	63	91	21	8.2	1.7	6.9	19	21
<i>Clupea harengus</i>									20	37	121	27	474	114	26	42	92	51	27
<i>Gadus morhua</i>									339	637	50	102	13	387	9.6	184	84	27	29
<i>Gobiidae</i>									499		1097	893	2810	166	914	639	309	1242	968
<i>Hyperoplus lanceolatus</i>									5.5	0.17	3.3	1.2	1.8	0.48	2.9	0.4	0.21	5.6	2.8
<i>Limanda limanda</i>									566	709	1150	467	705	979	1112	1391	5299	986	2775
<i>Merlangius merlangus</i>									308	287	99	164	104	1158	95	165	594	146	97
<i>Osmerus eperlanus</i>									6.8	4.1	5.1	30	39	8	2.5	5.7	9.4	11	4.4
<i>Platichthys flesus</i>									16	14	51	36	32	14	22	2.3	7.7	13	10
<i>Pleuronectes platessa</i>									338	706	608	1051	1848	1157	596	1945	5444	938	464
<i>Solea solea</i>									11	134	629	603	52	20	224	335	37	217	28
<i>Syngnathus</i> sp.									0.72	1.4	16	8.9	200	4.2		6.4	1.7	14	1.2
<i>Crangon</i> sp.									18842	35533	85419	28766	94817	18674	36030	38685	38940	69830	38224

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
<i>Agonus cataphractus</i>	53	170	25	23	30	92	70	43	26		3	54	56	31	9.5	20	5.2	2	37	
<i>Alosa fallax</i>															1.3		0.07	1.2		
<i>Ammodytes</i> sp.	22	71	146	45	26	17	92	50	54		2	8.3	3.3	0.57	0.47	6.2	12	142	12	
<i>Buglossidium luteum</i>	12	24	2.8	53	122	44	22		0.62			20	9.9	1.3	26	4	11	3	35	
<i>Callionymus lyra</i>	77	18	14	80	56	88	17	0.71	3.5		4	32	45	4	36	59	16	37	53	
<i>Clupea harengus</i>	14	18		11	44	16	34	18	13			9.5	8.9	0.43	4.4	13	0.39	35	6	
<i>Gadus morhua</i>	5	53	19	3.3	2.1	26	16	103	4.1			3.4	50	0.21	1.8	12	4.8	5.2	21	
<i>Gobiidae</i>	857	329	598	479	688	456	738	3021	1329		64	1092	935	581	1022	3007	1781	1476	552	
<i>Hyperoplus lanceolatus</i>	0.43	0.38	4.4	0.53	0.14	52	6.9	2.9	0.92			5.1	5.5	0.43	4.1	3.4	1.6	0.83	3	
<i>Limanda limanda</i>	1059	1154	647	346	157	173	302	629	203		7	62	299	80	24	393	92	26	325	
<i>Merlangius merlangus</i>	42	1814	80	25	111	396	202	24	11		1	255	716	201	16	55	4.3	11	94	
<i>Osmerus eperlanus</i>	8	2.3	4.2	11	2.1	4.5	24	33	4.5			22	6	0.93	7.6	42	39	43	24	
<i>Platichthys flesus</i>	6.5	7.1	12	12	7	5.6	12	3.3	2.4			3.1	2.5	1.1	4.3	2.6	1.7	10	4.7	
<i>Pleuronectes platessa</i>	626	1021	748	419	317	619	152	787	167		6	217	497	78	284	163	103	127	130	
<i>Solea solea</i>	57	5.3	126	19	12	57	2.2	26	12			3.2	4.2	11	4.7	2	11	4.1	1.8	
<i>Syngnathus</i> sp.	9.4		1.8	41	0.81	11	0.9	11	6.3			108	4.2	163	47	12	28	18	2.2	
<i>Crangon</i> sp.	25017	13095	24791	40439	18740	51177	10671	49547	12052			1568	28703	16874	12105	27057	25414	40865	84103	14800

German Bight (German data)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<i>Agonus cataphractus</i>		1.2		7	3	2.1	2.3	1.6	0.68	2.4	2.5	1.9	0.63	2.9	2	2.6	8.6	8.3	19
<i>Alosa fallax</i>							0				0.02								
<i>Ammodytes sp.</i>		0.84			0.06	0.07	0.05	0.18	0.09	0.07		0.2					0.03	0.12	0.08
<i>Buglossidium luteum</i>				0.08		0.07	0.04	0.38	0.02					0.05			0.17	1.3	0.1
<i>Callionymus lyra</i>		0.64		0.75	0.01			0.78							0.21		0.02		0.29
<i>Clupea harengus</i>					0.09		0.05	0.02	0.68	0.73	0.07	0.08	0.2	0.2	0.79	8.5	1.7	6.4	0.92
<i>Gadus morhua</i>				0.25	0.38	0.3	0.99	1.8	1.9	43	0.56	0.73	0.4		0.27	0.3	0.48	0.25	0.36
<i>Gobiidae</i>				113	130	7.6	24	7.1	2.7	13	5.3	13	23	7.4	20	24	76	6	12
<i>Hyperoplus lanceolatus</i>							0.04	0.09							0.03	0.33	0.21		
<i>Limanda limanda</i>		2.8		8.8	84	11	27	12	5.1	117	6.5	37	7	3	11	38	55	36	59
<i>Merlangius merlangus</i>					2.7	1	3.4	1.2	0.93	0.27	2.1	0.95	0.55	0.2	0.94	0.51	11	9.9	13
<i>Osmerus eperlanus</i>		0.15		5.5	1.3	0.04	0.38	1.1	0.05	0.21	0.52	0.28	0.1	0.7	0.06	0.02	0.47	2.6	10
<i>Platichthys flesus</i>		0.94		0.83	0.68		1.7	0.19	0.32	0.32	0.84	0.38	0.33	0.6	0.16	0.77	0.28	1.1	2.8
<i>Pleuronectes platessa</i>		106		13	12	3.7	17	13	11	54	12	106	9.1	7.1	55	21	52	80	67
<i>Solea solea</i>		1.1		0.08	0.32	0.75	0.19	3.8	0.16	112	0.89	5.6	0.68	2.7	7.1	1.1	3.4	2.9	10
<i>Syngnathus sp.</i>		0.08			1.1	0.14	0.69	36	0.18	3.5	0.02	1.1	0.48	0.2	0.13	1	0.58	0.53	1.3
<i>Crangon sp.</i>		154		675	3133	1317	5779	582	1023	10169	878	1425	1575	1524	937	1471	1712	2806	1388

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Agonus cataphractus</i>	14	7	11	2.2	4.2	17	4	4.1	5.3	1.8		2	4.5	7	1.4	2.4	0.25	0.06	118
<i>Alosa fallax</i>							0.01	0.01		0.1			0.02	0.1		0.04	0.09	0.06	
<i>Ammodytes sp.</i>	0.59	0.23	0.03	0.18	0.05	0.24		0.24	0.04	0.08		0.02	0.08	0.02	0.03		0.05		
<i>Buglossidium luteum</i>	0.16	0.05	2.2	0.64	1.1	5.6	0.56		0.02	0.13		0.78	0.56	0.09	1	3		0.8	
<i>Callionymus lyra</i>	0.35	1.7	0.4	0.39	0.43	0.15	0.01	0.02	0	0.45		2.1	2	1.3	0.79	2.4	0.11	3.8	
<i>Clupea harengus</i>	1.2	5.2	0.3		1.8	5.8	2	0.16	1.3	1.2		0.11	1.5	0.75	0.05	0.38	0.07	0.26	1.6
<i>Gadus morhua</i>	0.2	1.1	1.8	0.01	0.01	0.66	0.6	1.1	0.82	0.9		0.05	1.2	0.01	0.02	0.02	0.03	0.2	5.2
<i>Gobiidae</i>	38	2.8	22	2.8	7.5	20	7.6	38	39	4.4		8.4	11	13	5.9	15	10	27	6
<i>Hyperoplus lanceolatus</i>		0.03		0.04	0.02	0.02			0.02	0.06		0.91	0.05	0.02	0.01		0.05	0.06	
<i>Limanda limanda</i>	24	63	100	20	12	31	12	22	16	31		19	21	5.4	1.7	17	2.3	2.1	4.5
<i>Merlangius merlangus</i>	4.9	21	15	0.7	0.82	4.3	3.7	0.94	0.67	6		1	12	1.2	0.4	0.08	0.04		13
<i>Osmerus eperlanus</i>	2.3	0.4	0.28	0.29	0.22		0.57	0.57	3.7	0.97		0.68	0.97	1.9	0.68	4.1	2.2	1.6	21
<i>Platichthys flesus</i>	0.93	1.1	0.27	0.38	0.07	2.5	0.17	0.1	1.4	0.17		0.22	0.12	0.37	0.15	0.18	0.06	0.13	
<i>Pleuronectes platessa</i>	18	40	79	10	10	16	9.4	91	28	5.9		3.3	12	3.6	2.2	4.4	2.7	10	20
<i>Solea solea</i>	2.7	2.5	2.5	1.1	0.37	0.46	0.1	2.6	1.1	0.18		0.05	0.13	0.58	0.04	0.08	0.2	0.13	
<i>Syngnathus sp.</i>	4.2	0.56	0.18	0.19	9	5.4	0.17	0.29	0.3	0.97		0.79	1.8	3.9	7.4	9.9	5.6	3.6	4
<i>Crangon sp.</i>	1359	468	1171	818	727	2869	692	2186	3555	1139		1247	683	1857	1126	2078	2092	6179	4756

German/Danish Wadden Sea (German data)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<i>Agonus cataphractus</i>		0.41	2.7	6.7	19	10	2.1	11	4.4	3.4	10	12	3.9	5.1	2.8	7.5	7.6	4.4	8.4
<i>Alosa fallax</i>						0.05	0.1	0.05	0.17		0.01		0.01	0.01		0.13	0.33		0.02
<i>Ammodytes sp.</i>		0.04	0.05	0.2	0.47	0.36	0.57	1.4	0.9	0.39	0.3	0.57	1.2	0.35	1.3	0.15	0.23	0.3	0.42
<i>Buglossidium luteum</i>		0.01	0.01	0.06		0.09	0.05	0.35	0.11								0.02	0.28	
<i>Callionymus lyra</i>		0.04	0.07	2.3				1.9		0.04	0.1	0.02	0.07	0.01	0.14	0.05	0.03	0.15	0.01
<i>Clupea harengus</i>		0.02	0.33	0.09	0.23	0.62	0.2	1.3	1.9	5.4	5.7	4	6.3	5.3	8.8	22	14	23	8
<i>Gadus morhua</i>		0.23	0.24	0.41	1.9	2.3	5.8	25	8.3	7.4	11	5.1	1.9	22	2.8	2.4	5.3	0.37	1.5
<i>Gobiidae</i>		1.7	40	40	118	88	57	43	11	29	55	59	57	20	55	122	94	33	26
<i>Hyperoplus lanceolatus</i>								0.01		0.03		0.1	0.03	0.01	0	0.11	0.49		
<i>Limanda limanda</i>		8	9.7	55	121	161	59	157	59	102	205	221	21	23	85	91	69	8.1	33
<i>Merlangius merlangus</i>		0.01	2	1.4	3.3	1.5	2	6.9	5.9	0.89	2.3	3.1	0.94	20	3	1.3	10	5.3	0.52
<i>Osmerus eperlanus</i>		0.6	3.2	2.9	3.2	3.5	3.9	22	33	49	24	18	21	9.3	13	8.5	15	14	7.8
<i>Platichthys flesus</i>		1.2	1.2	1.6	1.5	0.44	0.83	26	16	4.2	9.5	10	7.2	5.6	3.4	2.9	5.6	5.3	16
<i>Pleuronectes platessa</i>		26	14	21	80	54	68	139	94	148	139	182	79	99	42	82	52	43	62
<i>Solea solea</i>		2.7	5.7	9.9	1.1	10	1.3	11	5.2	67	22	14	2.7	5.4	5.4	2.5	8.9	14	15
<i>Syngnathus sp.</i>		0.31	4.7	1.8	7.2	6.1	5.2	4.4	3	1.2	2.5	1.6	7.8	11	0.49	5.7	9.4	3.3	12
<i>Crangon sp.</i>		522	7710	3627	8513	11884	6625	5562	7567	17273	13775	6474	7927	3996	5544	4611	8903	3938	2049

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Agonus cataphractus</i>	16	12	12	9.9	5.1	11	4.5	11	12	6.2		2.8	2.5	5.3	5.5	2.5	1.9	6.3	71
<i>Alosa fallax</i>	0.29	0.12	0.01	0.06	0.04	0.2	0.04	0.12	0.03	0.03		0.22	0.03	0.07	0.07	1.1	0.17	5.2	0.05
<i>Ammodytes sp.</i>	0.59	0.51	0.48	0.45	0.33	0.26	0	0.05	0.21	0.45		0.21	0.28	0.15	0.33	0.19	0.15	1.2	0.72
<i>Buglossidium luteum</i>			0.1	0	0.08	1.7	0.12		0.12			0.01	0.1	0.04	0.22	0.06			
<i>Callionymus lyra</i>	0.02	0.04	0.08	0.03	0.07		0.02		0.14	0.38		1.1	0.71	0.02	0.12	0.16	0.09	0.59	0.12
<i>Clupea harengus</i>	9.1	14	8.1	7.3	21	9.1	1.3	4.3	5.9	3.1		2.8	6.2	3.6	2.2	6.6	0.79	3.5	85
<i>Gadus morhua</i>	2.2	2.2	3.4	0.51	0.37	3.6	1.1	3.2	4.7	7.7		0.6	4	0.08	0.05	0.61	0.39	7.1	30
<i>Gobiidae</i>	145	15	84	145	49	51	5.4	34	115	38		47	30	50	61	69	93	151	57
<i>Hyperoplus lanceolatus</i>		0.09	0.13	0.04	0.34	0.11		0.04		0.07		0.02	0.05	0.04	0.05	0.04	0.03	0.14	0.09
<i>Limanda limanda</i>	82	42	62	27	4.3	2.8	18	11	20	13		4.2	2.6	3.3	0.9	9.5	13	2.7	23
<i>Merlangius merlangus</i>	4.6	36	20	1.3	1.9	11	1.4	0.51	2.1	27		2.9	52	3	0.75	1.6	0.31	1.5	71
<i>Osmerus eperlanus</i>	15	5.6	9.4	19	7.7	41	21	11	22	18		15	17	14	22	29	21	64	91
<i>Platichthys flesus</i>	14	8.4	7.8	9.4	3.7	29	52	7.7	6.6	3.9		6.6	11	6.9	3.8	5.8	3.2	28	29
<i>Pleuronectes platessa</i>	114	91	101	107	48	67	85	167	73	43		36	92	20	39	35	25	248	138
<i>Solea solea</i>	15	6.6	9.9	11	1.9	3.5	7.5	5.9	7	1.7		0.76	0.49	1.1	0.34	0.51	4.2	5.8	5.1
<i>Syngnathus sp.</i>	62	8.7	4.4	59	35	133	2.7	0.26	15	7.9		16	11	54	28	30	23	2477	28
<i>Crangon sp.</i>	10161	3057	9539	9494	7463	18576	3617	5941	7420	5426		6755	3786	7253	7815	6768	12892	57778	13820

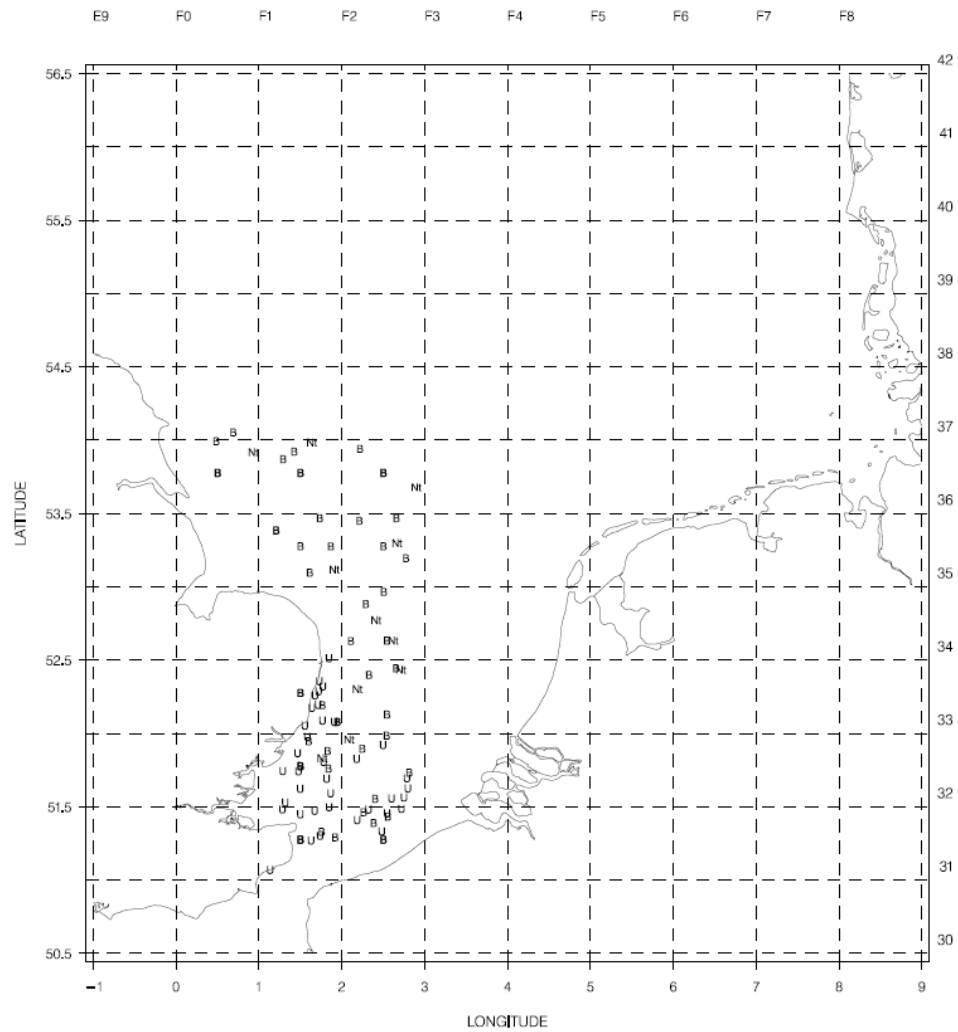
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UK Coast (UK data)

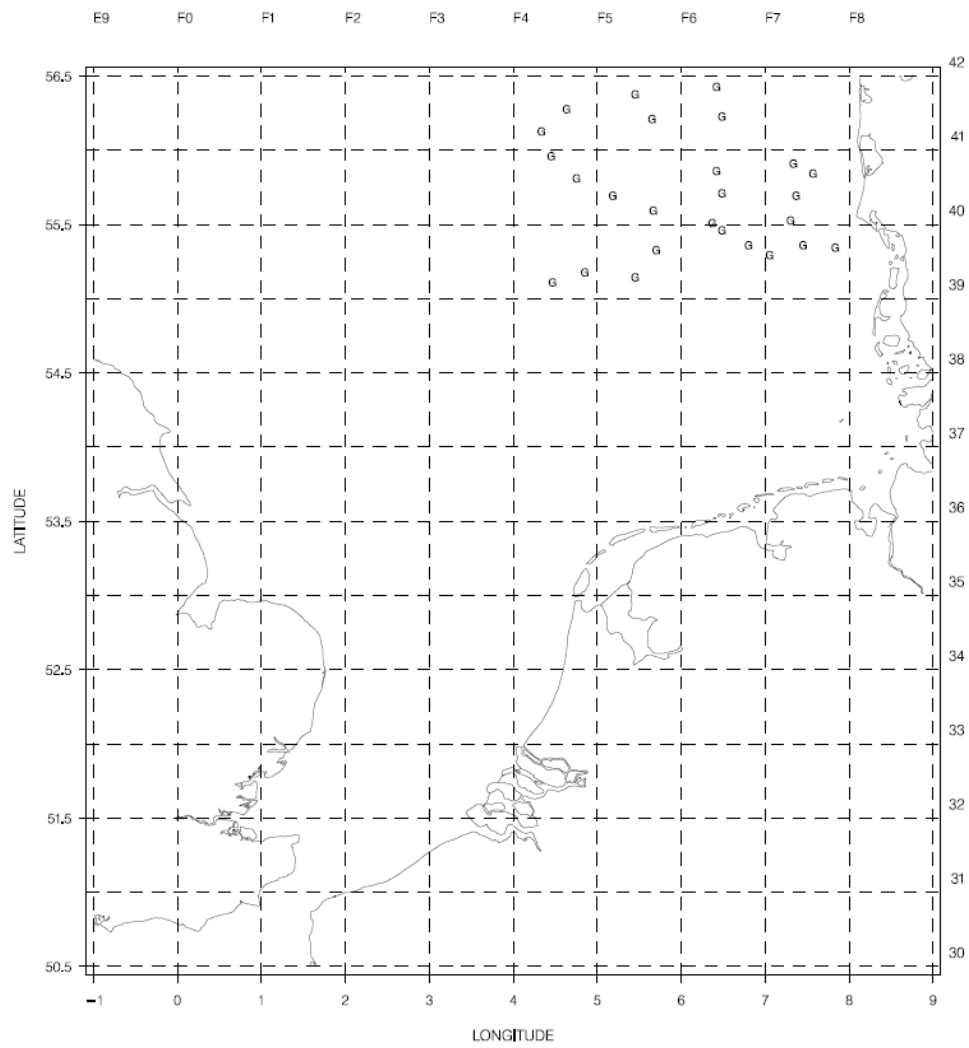
	2000	2001	2002	2003	2004	2005	2006	2007
<i>Agonus cataphractus</i>	13	7.9	12	7.4	4.8	3.7	3.5	7.3
<i>Alosa fallax</i>				0.03				
<i>Ammodytes sp.</i>					0.04	0.07	0.14	
<i>Buglossidium luteum</i>	0.76	0.18	0.19	0.13	0.12	1.7	0.14	0.71
<i>Callionymus lyra</i>	9.2	4.9	6.4	5.7	12	8.8	4.1	13
<i>Clupea harengus</i>	0.74	0.64	0.68	0.5	0.63	0.33	0.5	0.35
<i>Gadus morhua</i>					0.35	0.48	1.8	0.05
<i>Gobiidae</i>	172	0.12	0.66		0.07	0.02		
<i>Hyperoplus lanceolatus</i>								
<i>Limanda limanda</i>	14	101	31	50	104	9.7	28	42
<i>Merlangius merlangus</i>	24	13	6	5	8	12	7.4	6.3
<i>Osmerus eperlanus</i>	1.8	0.11	0.06	1.1			0.78	
<i>Platichthys flesus</i>	2.4	1	0.81	2.2	2.4	1.6	1.3	0.33
<i>Pleuronectes platessa</i>	31	97	53	43	83	21	70	54
<i>Solea solea</i>	46	84	69	26	63	40	53	72
<i>Syngnathus sp.</i>	79	36	24	44	22	27	57	11
<i>Crangon sp.</i>								

Annex 14: Overlapping areas in offshore survey

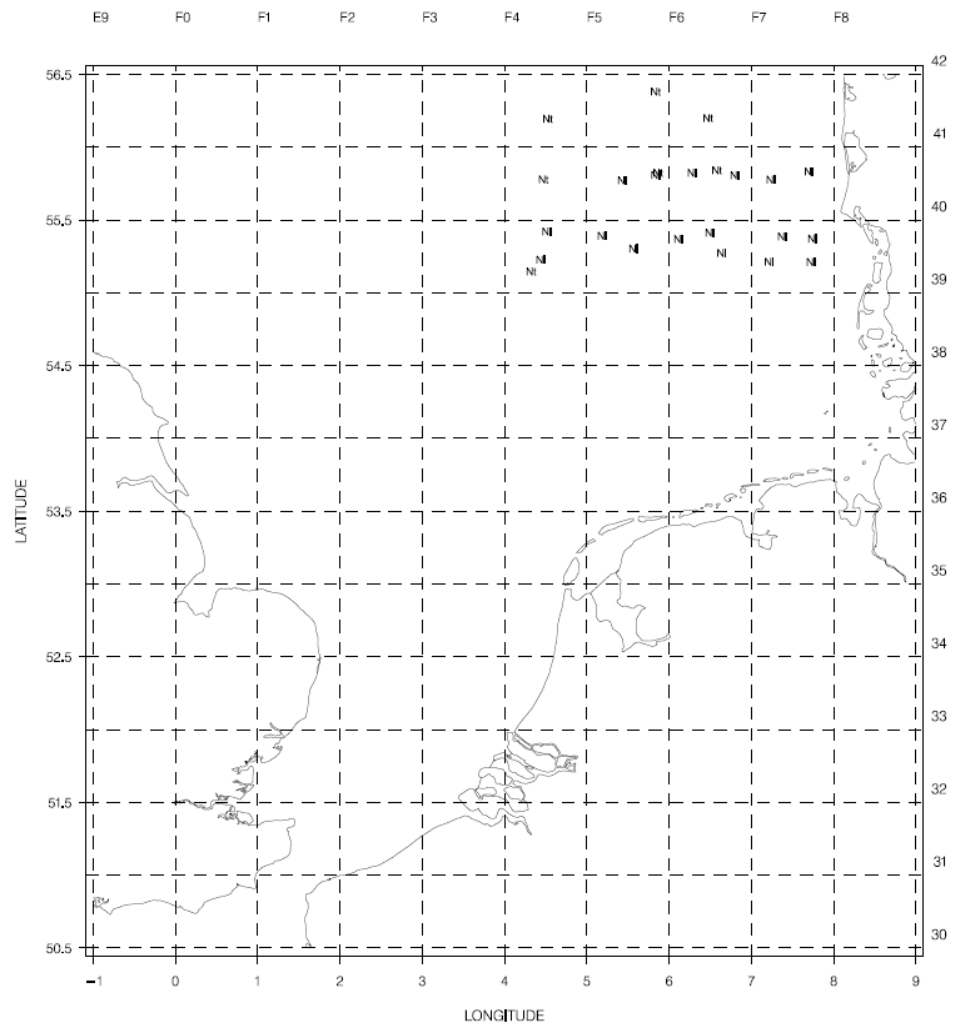
Annex 14.1 Overlap in offshore stations
2006



Annex 14.2 Overlap in offshore stations
2005



Annex 14.2 Overlap in offshore stations
2005



Annex 15: Details on offshore and inshore surveys

Annex 15.1: Details of the beam trawl surveys currently undertaken by each country.

	BELGIUM	GERMANY	NETHERLANDS	NETHERLANDS	UK	UK	UK
Survey area:	IVb and c west	IVb east	IVb and c east	Central N Sea	VIIId	VIIe	VIIa, f and g
Year survey started:	1992	1991	1985	1996	1988	1988	1988
Dates:	August	mid August	August-early September	mid August-mid September	late July	late September/early October	September
Usual start date	week 33	week 32	week 32/33	week 34	week 30	week 39/40	Week 36/37
Number of survey days	10	11	20	16–20	15	8	21–24
Ship:	RV Belgica	RV Solea	RV Isis	RV Tridens	RV Corystes/ RV CEFAS Endeavour	MFV Carhelmar	RV Corystes
Ship length:	50 m	42 m#	28 m	73.5	53 m	22 m	53 m
Beam trawl length:	4 m	7 m	8 m	8 m	4 m	4 m	4 m
Number of beams fished:	1	2	2	2	1	2	1
Number of beams sorted:	1	1	1	1	1	2	1
Trawl duration (min):	30	30	30	30	30	30	30
Tow speed (knots):	4	4	4	4	4	4	4
Cod end stretched mesh (mm):	40	80 Liner: 44 mm	40	40	75 Liner: 40 mm	75 Liner: 40 mm	75 Liner: 40 mm
Number of ticklers:	0	5	8	8	0	0	0
Gear code:	BT4M	BT7	BT8	BT8F	BT4FM	BT4FM	BT4FM
Attachment:	*	(none)	(none)	**	*	*	*
Station positions:	fixed	pseudo-random	pseudo-random	pseudo-random	Fixed	fixed	Fixed
Av No stns/yr	53	63	88	63-73	100	57	94
Benthos sampling since:	1992	1992	1985	1996	1991	1992	1992

new vessel since 2004; previously 35m

* chain mat and flip-up rope

** flip-up rope only

Annex 15.2: Inventory of the inshore beam trawl surveys.

COUNTRY	NETHERLANDS (SNS)		NETHERLANDS (DFS)		ENGLAND (YFS)	BELGIUM (DYFS)	GERMANY (DYFS)	
Geographical Area	Scheveningen (NL) to Esbjerg (DK)	Wadden Sea	Scheldt Estuary	Dutch coast to Danish coast	Eastern/South-Eastern English Coast	Belgian Coast	NiedersachsenWadden Sea +Elbe Estuary	Schlesweig-Holstein Waddensea
Ship	Tridens / Isis	Stern / Waddenzee	Schollevaar	Isis / Beukels / WR17 / GO29	Chartered vessels	Hinders / Broodwinner	Chartered vessels	Chartered vessels
ship size (m)	73m / 28m	21m / 21m	21m	± 28m	8–10m	27m	12–16m	12–18m
Date started	1969	1970	1970	1970	1973-2007	1970	1972	1974
Sampling Period	Apr/May ('69–'89) Sept/Oct	Apr/May ('70–'86) Sept/Oct	Apr/May ('70–'86) Sept/Oct	Apr/May ('70–'86) Sept/Oct	Sept/Oct	Sept/Oct	Apr/May ('74–'04) Sept/Oct	Apr/May ('74–'04) Sept/Oct
Usual Start date	12 Sept	29 Aug	5 Sept	26 Sept	1 Sept	1–14 Sept	15 Sept	5 Sept
Number of days per period	8–9 within 2 weeks	20 within 5 weeks	12 within 3 weeks	16 within 5 weeks	3 surveys x 8 days	7 within 2 weeks	5	5 – 7
Beam trawl type	6m beam trawl	3m shrimp trawl	3m shrimp trawl	6m shrimp trawl	2m shrimp trawl	6m shrimp trawl	3m shrimp trawl	3m shrimp trawl
Tickler Chains	4	1	1	1	3	0	0	0
Mesh size net	80mm	35mm	35mm	35mm	10mm	40mm	32mm	32mm
Mesh size codend	40mm	20mm	20mm	20mm	4mm	22mm	18mm	18mm
Speed fished	3.5–4 knots	3 knots	3 knots	3 knots	1 knot	3 knots	3 knots	3 knots
Time Fished	15 min	15 min	15 min	15 min	10 min	15 min	15 min	15 min
Approx. number of stations per year	55	120	80	100	82	33		
Target species	0– 4 group sole and plaice	0–1 group sole and plaice	0–1 group sole and plaice	0–1 group sole and plaice	0–1 group sole and plaice	0–2 group sole and plaice	0–1 group sole and plaice	0–1 group sole and plaice
Catch rate and LF distribution	All fish species	All fish species <i>Crangon</i>	All fish species <i>Crangon</i>	All fish species <i>Crangon</i>	All fish species	Commercial fish species <i>Crangon</i> (1973–92, 2004–05)	All fish species <i>Crangon</i>	All fish species <i>Crangon</i>
Catch rate	Epibenthos (quantity)	Epibenthos (quantity)	Epibenthos (quantity)	Epibenthos (quantity)	<i>Crangon</i> (volume)	<i>Crangon</i> (weight)	Epibenthos (quantity)	Epibenthos (quantity)
Age data for plaice and sole	All years	All years	All years	All years	Since 2003	None	None	None

Annex 16: Manual for the Beam Trawl Surveys – Revision 1.1

**MANUAL FOR THE OFFSHORE BEAM TRAWL
SURVEYS**

REVISION 1.1, June 2008

The Beam Trawl Survey Working Group

Table of Contents

1	Introduction.....	148
2	WGBEAM surveys.....	148
2.1	History of the surveys.....	148
2.1.1	Belgium	148
2.1.2	Germany	148
2.1.3	Netherlands	148
2.1.4	United Kingdom	149
2.1.5	France	149
2.2	History of the survey gear	149
2.2.1	Belgium	149
2.2.2	Germany	149
2.2.3	Netherlands	149
2.2.4	United Kingdom	150
2.2.5	France	150
2.3	Survey design.....	150
2.3.1	Belgium	150
2.3.2	Germany	150
2.3.3	Netherlands	150
2.3.4	United Kingdom	151
2.3.5	France	151
2.4	Beam trawl construction and rigging	151
2.4.1	Belgium	151
2.4.2	Germany	Error! Bookmark not defined.
2.4.3	Netherlands	152
2.4.4	United Kingdom	152
2.4.5	France	152
2.5	Fishing positions.....	152
2.5.1	Belgium	152
2.5.2	Germany	152
2.5.3	Netherlands	152
2.5.4	United Kingdom	153
2.5.5	France	153
2.6	Standard fishing method	153
2.6.1	Belgium	153
2.6.2	Germany	153
2.6.3	Netherlands	153
2.6.4	United Kingdom	154
2.6.5	France	154
2.7	Current objectives.....	154
2.7.1	Belgium	154
2.7.2	Germany	154
2.7.3	Netherlands	154
2.7.4	United Kingdom	154

2.7.5 France	155
3 Sampling of beam trawl catches	155
3.1 Catch sorting	155
3.1.1 Belgium	155
3.1.2 Germany	155
3.1.3 Netherlands	156
3.1.4 United Kingdom	157
3.1.5 France	160
3.2 Benthos (epifauna)	161
4 Quality assurance	162
5 Environmental data	163
6 Exchange specifications for WGBEAM data	163
Annex 1: Overview of WGBEAM surveys	164
Annex 2: Finfish maturity key	165
Annex 3: Four stage maturity key for Skates and rays (Rajidae)	165
Annex 4: Haul information	165
Annex 5: Length frequency information	168
Annex 6: Smalk	169

1 Introduction

Five countries are participating in the working group on beam trawl surveys (WGBEAM). In total, during 8 offshore surveys data is collected. An overview of the main characteristics of the different offshore beam trawl surveys is given in Annex 1.

The surveys covered by WGBEAM have all their own origin and were not set up as one survey. Due to that, no standardization has taken place in gears. The different countries all have their own sampling area and since the gears used vary, it is not possible to change sampling locations from one country to the other without any thorough scientific study beforehand. However, WGBEAM tries to increase standardization in sampling by staff exchange during the surveys and by publishing this manual.

The paragraphs in chapter 2 are split up by country to point out clearly differences in the surveys. Since collection of the biological and length data is often more or less equal for the countries, from chapter 3.2 onwards, the countries are put together.

2 WGBEAM surveys

2.1 History of the surveys

2.1.1 Belgium

The Belgian offshore beam trawl survey, collecting fisheries independent data primarily for plaice and sole in the South-eastern North Sea, started in 1992. The continuous time-series using a 4 m beam trawl as the standard gear started in 1993. The area covered is IVb,c (southern and central North sea). 62 fixed stations are fished for 30 min at 4 knots. Although target species are plaice and sole, all fish species are measured with some exceptions of which the numbers are recorded. A selection of (epi)benthic species is recorded (numbers).

2.1.2 Germany

-to be added-

2.1.3 Netherlands

The Dutch offshore beam trawl survey started in 1985 by RV Isis. Target species were plaice and sole because those species were (and are) commercially exploited by the Dutch fisheries. The main goal of the survey was to create fisheries independent indices for plaice and sole in the Southeastern North Sea. Although the first focus was on the target species, since the beginning all fish species were measured and for epifauna species numbers were recorded. Otoliths are collected for plaice, sole, dab, brill, turbot and cod since 1985.

In 1996, Tridens started carrying out a beam trawl survey in the Central North Sea. Originally, this was the Q3 IBTS but since Dutch fisheries concentrate on flatfish species, it seemed to be more appropriate to get more information on those species in the Central North Sea and to change the gear from GOV to a beam trawl. In 1996 and 1997 part of the IBTS Q3 was given up to fish with a beam trawl. From 1998 onwards, the complete survey is done as a beam trawl survey.

2.1.4 United Kingdom

UK (Cefas) Eastern English Channel Beam Trawl Survey

A July/August beam trawl survey has been carried out annually by MAFF/DEFRA since 1989 using a commercial 4m beam trawl, and has provided the commercially independent dataset used in the North Sea demersal working group (WGNSSK). The primary aim was to assess the relative abundance of prerecruit plaice and sole in ICES Division VIId. Consequently, most of the sampling was carried out in areas known to be nursery grounds for these species. In 1995 the survey was extended to include the southern North Sea in order to sample the whole population of plaice and sole. In recent years additional stations have been fished off the Belgium coast in order to start a time-series of stations for comparison purposes.

UK (Cefas) Irish Sea and Bristol Channel Beam Trawl Survey

An Autumn Irish Sea groundfish survey has been carried out annually by MAFF/DEFRA since 1979. A Granton otter trawl was used until 1987, then in 1988 the commercial 4m beam trawl that is currently used was introduced. At the same time, a limited beam trawl survey was carried out in the Bristol Channel. From 1988 to 1992 the main survey effort was concentrated in the northeast Irish Sea and the Bristol Channel, and since 1993 a standard survey covering the whole of ICES Divisions VIIa, f&g has been undertaken. In 2002, the survey was extended to cover the survey area in ICES Division VIIe, previously undertaken by the charter vessel MV Carhelmar that had been used since 1988. In 2005 the VIIe survey was moved back to the Carhelmar.

2.1.5 France

The French offshore beam trawl survey started in 2007. It is carried out by IFREMER with the Gwen Drez, a 24 m trawler, in November. The main goal of the survey is to get a fisheries independent index for sole in the Bay of Biscay. Consequently the survey spread over the whole Bay of Biscay sole habitat, from the coast to 100m. Although the target species is sole, all fish species area measured, weighted and counted and benthos species are weighted and counted by group

2.2 History of the survey gear

2.2.1 Belgium

Since 1993 a 4 meter beam trawl is used, equipped with a chain mat and a 40 mm codend.

2.2.2 Germany

-to be added-

2.2.3 Netherlands

The 8 meter steel beam trawl used in the Dutch survey is developed as a gear which can be operated in the North Sea on all grounds. For the stony areas, a flip-up rope is applied to the net. Since the gear has to be used in different areas, its efficiency varies in different sediment types. However, by sampling the same area every year, no major effect is expected in the time-series.

2.2.4 United Kingdom

UK (Cefas) Irish Sea and Bristol Channel and Eastern English Channel Beam Trawl Surveys

Cefas has always used a commercially rigged 4m steel beam trawl, for the duration of this survey. See section 2.4 for a full description. The sampling gear consists of a commercially rigged (1989 style) 4m beam trawl (measured between inside edges of shoes) fitted with a chain mat, flip-up ropes, and a 40mm codend liner. The liner needs to be sufficiently long, that when attached to the forward end of the codend it extends to about 1 metre below the cod-line. The gear is towed at 4 knots (ground speed) for 30 minutes on a warp length appropriate to the depth of water (on *Corystes* a ratio of between 3.5 and 4.0). Fishing is only carried out in daylight on this survey, as catch rates of certain species are known to vary diurnally. We have usually aimed to have the catch on deck 30 minutes before sundown (approximately). All the stations are identified by a unique number (Prime station no.), which never changes irrespective of the cruise station number. All tows (positions) should be stored on a disc held on board *Corystes* with a backup held at the laboratory. There is no particular order in which the stations should be worked, although attention to the historical calendar period would be sensible. If static gear or other restrictions prevent the execution of a primary station there are often alternative tows in the same area. The SIC usually has positions of alternative tows that have been used before, when the primary station was not available.

2.2.5 France

A first survey was carried out in 2006 using a twin otter trawl and it was presented at the IBTS WG at its 2007 meeting. Because the survey aims to get a flatfish index, the IBTS WG advised that this survey should be presented to the WGBEAM. This latter recommended the use of a beam trawl which is considered to be more adapted when aiming at flatfish abundance index. Consequently, the gear was changed to a 4 meter beam trawl in 2007.

2.3 Survey design

2.3.1 Belgium

62 fixed positions are distributed over the area trying to cover adequately the ices rectangles and the population and fishing characteristics. There is no fixed order in which the stations are fished but a similar yearly pattern is executed as much as possible. There are three flatfish areas for the collection of age-length keys. During the span of the time-series, stations can have been moved slightly. The rationale for the new locations has been: within 5 nautical miles, similar grounds and depth.

2.3.2 Germany

-to be added-

2.3.3 Netherlands

For RV *Isis*, the sampling grid is stratified by ICES rectangle. 2-4 hauls per rectangle are taken, depending on the importance of the area for original target species plaice and sole. It is tried to keep the minimum distance between two hauls at about 10 nautical miles. For RV *Tridens*, one haul per ICES rectangle fished, taken in the centre of the rectangle, is the standard. Biological data (weight, sex, maturity, otoliths) are collected per flatfish area (*Isis*) or roundfish area (*Tridens*). *Isis* has 82 first priority

stations planned and 12 additional (which all are covered by Tridens, too) and Tridens has 73 stations planned.

Fishing speed is set at 4 knots, trawl duration is 30 minutes.

2.3.4 United Kingdom

UK (Cefas) Eastern English Channel Beam Trawl Survey

The standard survey had a total of 107 tows of 30 minutes duration, of these 79 were in 107d and 29 were in 104c. All tows in the eastern Channel (107d) have equal priority those in 104c are worked time permitting. Since 1999 the number of tows worked has been reduced to 75 in 107d and 16 in 104c, due to a reduction of cruise time. Additional stations have been added off the Belgium coast in recent years.

UK (Cefas) Irish Sea and Bristol Channel Beam Trawl Survey

The standard survey has a total of 119 tows of which most are fished for a duration of 30 minutes (Primary stations). There are currently 8 primary stations that are only fished for 15 minutes primarily because of large numbers of small fish being caught or a high bycatch of benthic species. Of the 119 primary stations, 68 are in ICES Division VIIa, 51 in ICES Divisions VIIf&g. All primary station positions are fixed and can be identified by a unique prime station number. The stations are stratified by sector and depth-band. The number of primary survey stations within each sector amount to:

ISS – 18 stations; ISN – 16 stations; ISW – 15 stations; SGC – 16 stations; SEI – 11 stations; BCI – 32 stations; BCO – 11 stations.

The 66 stations in sectors ISN, ISS and BCI are given top priority as they contribute to the VPA tuning and recruitment indices at the respective working groups. Three depth bands were used until 2000 - 0-20m, 20-40m and 40+m; in 2001 these were reduced to 2 depth bands - 0-20m and 20+m.

2.3.5 France

The gear is towed at 5 knots (ground speed) for 30 minutes. Fishing is carried out in daylight and in night on the same haul. The sampling programme is to do a minimum set of 50 stations, on the same position every year.

2.4 Beam trawl construction and rigging

2.4.1 Belgium

The Belgian beam trawl survey uses a 4 meter beam trawl equipped with a chain mat. The rigging is checked by the skipper prior to the yearly survey to meet the standard. The gear is trawled from the aft. The warp length is, on average, 7 times the station depth as the warp is used double. The skipper assures that the gear fishes well and is in good contact with the bottom. The chief scientist decides, in accordance with the skipper, when the circumstances are no longer appropriate to deliver valid hauls.

The gear is a commercially rigged 4 m beam trawl equipped with a chain mat and a 40 mm codend.

2.4.2 Germany

-to be added-

2.4.3 Netherlands

The sampling gear is an 8m beam trawl, especially designed for the survey (in 1985). The beam trawl is fitted with 8 chains, of which 4 are connected to the beam and 4 to the net. RV Tridens operates this gear with a flip-up rope to keep boulders out of the net. The area covered by the Isis is mainly sandy, so no flip-up rope is needed. Mesh size in the codend is 40 mm.

2.4.4. United Kingdom

The sampling gear consists of a commercially rigged (1989 style) 4m beam trawl (measured between inside edges of shoes) fitted with a chain mat, flip-up ropes, and a 40mm codend liner (insert relevant figure ref here). The liner needs to be sufficiently long, that when attached to the forward end of the codend it extends to about 1 metre below the cod-line. The Dimensions are listed below:

- **Headline:** 4m x 22mm Combination wire rope.
- **Groundrope:** 10.8m x 22mm 6/19 construction wire rope.
- **Flip-up:** 10.4m x rubber on 22mm corlene rope.
- **Mesh sizes:** 125mm x braided nylon back + 120mm polybraid in belly + 75mm x codend with 40mm liner.
- **Bridles:** 2.9m x 5/8" Grade 40 drag alloy chain.
- **Width:** 4.5m (4m inside shoes).
- **Weight:** Approx 2.5 Tonnes.

2.4.5 France

The gear is derived from commercially beam trawl used by the Belgian fleet in the Bay of Biscay on soft grounds. Because the lack of skill for this kind of gear in France, it was ordered in Netherlands. The French beam trawl survey is carried out using a 4 meter beam trawl in 2007, equipped with 10 tickler chains and a 40 mm codend. The a warp length was about 4 times the depth of water in 2007.

2.5 Fishing positions

2.5.1 Belgium

62 fixed positions are distributed over the area trying to cover adequately the ices rectangles and the population and fishing characteristics. There is no fixed order in which the stations are fished but a similar yearly pattern is executes as much as possible

During the span of the time-series, stations can have been moved slightly. The rationale for the new locations has been: within 5 nautical miles, similar grounds and depth.

2.5.2 Germany

-to be added-

2.5.3 Netherlands

On board Tridens, one haul is done in every rectangle planned. A haul is carried out in the centre of a rectangle, unless fishing is not possible in that area. In that case, the best position in the neighbourhood of the centre of the rectangle is chosen.

On board Isis, 2-4 hauls are carried out in a rectangle. The minimum distance between two hauls is set at 10 nautical miles. The ICES rectangles to be fished are standard.

2.5.4 United Kingdom

UK (Cefas) Eastern English Channel Beam Trawl Survey and Irish Sea and Bristol Channel Beam Trawl Survey

The positions of stations are set historically, originally from areas of deemed of high importance for plaice and sole catches by commercial fisherman. The cruise station number identifies the order of each gear deployment (including invalid tows) of any gear that goes over the side of the vessel during the cruise (i.e. the first deployment is station 1, and subsequent stations are incremental). Prime stations are unique number that do not change, irrespective of the cruise station number, and provide a fixed numbering system for sampling sites.

2.5.5 France

The survey was defined according to information on sole fishing areas. Hauls were provided by fishermen. Station positions were selected to have a complete coverage of the survey area by a systematic sampling with at least one haul in each 10' latitude on 10' longitude rectangles of the fishing area. 4 strata are defined to have a sampling effort in proportion to the abundance of sole and its variability in the Bay of Biscay.

2.6 Standard fishing method

2.6.1 Belgium

A haul consist of 30 minutes trawling during daytime, starting when the gear settles on the bottom and ending when hauling commences. Depending on the circumstances a shorter time period is allowed not dropping below 15 minutes. Trawl speed should be 4 knots over the ground. Warp length is, on average, 7 times the fishing depth (double wire).

2.6.2 Germany

-to be added-

2.6.3 Netherlands

Trawls speed is set at 4 knots over the ground, trawl duration should be 30 minutes. The moment the warp length is set is considered as the beginning of the haul (end of shooting). The end of the haul when hauling of the gear starts. Warp length varies, depending on water depth from 3.5 to 4 times water depth. The catch is always fully processed, even when haul duration is less than 15 minutes. However, if for any reason the haul is shorter than 15 minutes, the haul validity will be set at invalid. Trawling should be conducted in daylight hours, as defined as the time between 15 minutes before sunrise and 15 minutes past sunset, as per ICES (1999). If a tow is conducted outside these hours it must be reported as an additional tow and a valid tow attempted where practicable.

2.6.4 United Kingdom

UK (Cefas) Eastern English Channel Beam Trawl Survey and Irish Sea and Bristol Channel Beam Trawl Survey

Trawl speed should be 4 knots over the ground. Although commercial fishing vessels generally fish at higher speeds for a longer time period, 4 knots is considered appropriate for shorter tows. Trawl duration should be 30 minutes. The start of the trawl should be given as the time that the gear has settled on the bottom, and the end of the trawl should be given as the time that hauling commenced. If for any reason a tow is less than 20 minutes or greater than 40 minutes, then the catch should still be fully processed, though the tow should be classified as an Additional tow, and a valid tow attempted where practicable. A warp length appropriate to the depth of water (on *Corystes* a ratio of between 3.5 and 4.0) is to be used. If for any reason this cannot be followed then you should document reasons why and flag the station as an additional tow and a valid tow attempted where practicable. Trawling should be conducted in daylight hours, as defined as the time between 15 minutes before sunrise and 15 minutes past sunset, as per ICES (1999). If a tow is conducted outside these hours it must be reported as an additional tow and a valid tow attempted where practicable.

2.6.5 France

The trawl speed was fixed to 5 knots, according to advice of a Dutch skipper who was on board during the first survey. They are carried out with the stream. The trawl duration is 30 minutes. The start of the trawl is as the time that the gear has settled on the bottom, and the end of the trawl should be given as the time that hauling commenced. Beginning and ending of the daylight period hauls is set according to astronomic sunset and sunrise.

2.7 Current objectives

2.7.1 Belgium

Commercially independent indices of abundance of sole and plaice in the Southern North Sea. Collection of epibenthos/benthos data for ecosystem purposes.

2.7.2 Germany

-to be added-

2.7.3 Netherlands

The current objectives are:

- Fisheries-independent stock estimate for plaice and sole
- Collection of data on all fish species and epibenthos species for ecosystem purposes

2.7.4 United Kingdom

UK (Cefas) Eastern English Channel Beam Trawl Survey

To provide a commercially independent indices of abundance of all age groups of sole and plaice on the east channel grounds, and an index of recruitment of young (1-3 year old) sole prior to full recruitment to the fishery.

UK (Cefas) Irish Sea and Bristol Channel Beam Trawl Survey

To provide independent (of commercial) indices of abundance of all age groups of plaice, sole, cod and Whiting in the Irish Sea, Bristol Channel and Western English Channel. Provide an index of recruitment of juvenile plaice and sole prior to full recruitment to the fishery to the ICES Northern Shelf Demersal (NSWG) and the Southern Shelf Demersal (SSWG) Working Groups.

2.7.5 France

-to be added-

3 Sampling of beam trawl catches

3.1 Fish

3.1.1 Belgium

Catch sorting

The whole catch is weighted and sorted for all fish species, rays, sharks and shellfish and total weight by species is collected. The subsample for the epibenthos/benthos species is composed of a mixed sample from the total catch, weighted and the number of the individuals, identified to the lowest taxonomic level possible, is recorded

Length composition

All fish species, rays, sharks and shellfish are measured to the cm below except for dragonet species, bullrout species, pogge, lesser weever, sandeel species, rockling species, butter fish, gobies, snake pipefish species, but does register the quantity of those species. Rays are measured for both length and width. Subsampling by species may occur for the length measurements when the numbers are extremely high.

A selection of epibenthic/benthic species is recorded through sub sampling (numbers of individuals).

Table 3.1.1 shows from which species biological data will be collected. For this report, a Y is noted when age material is collected. Additionally, weight, sex and maturity might be collected.

Sampling for Age, Sex and Maturity

When otoliths are removed, the weight of the individual is collected together with its sex. For sole and plaice, 20 otoliths are collected by cm class and flatfish area. Otoliths are also taken for cod, turbot and brill. Only for rays, the maturity stage is investigated.

3.1.2 Germany

Catch sorting

-to be added-

Length composition

All fish species are measured by all countries from tip of snout to tip of caudal fin, to the cm below. Herring and sprat are measured to the half cm below. As many individuals as needed for a proper length distribution are measured.

Commercial species *Cancer pagurus* and *Nephrops norvegicus* are measured to the mm below, as indicated in Figure 3.1.1. All countries measure by sex. There is an additional category for egg bound individuals.

Sampling for Age, Sex and Maturity

Germany collects three specimen per sex per cm class per rectangle for plaice and dab. If sole is in the catch, the otoliths will be collected. Table 3.1.1 shows from which species biological data will be collected. For this report, a Y is noted when age material is collected. Additionally, weight, sex and maturity might be collected.

3.1.3 Netherlands

Catch sorting

Catch is sorted differently on Isis and Tridens due to different size of the vessels and space for sorting.

On board Tridens, all fish is sorted. Larger or rare epifauna species are sorted, too. The epifauna is collected in baskets. If the quantity of epifauna is more than one fishing basket, a mixed sample (from different baskets) of one basket is created. This sample is sorted and, if necessary, subsampled.

On board Isis, larger fish and larger or rare epifauna species are sorted. Small fish and other epifauna if collected in baskets of which a mixed sample of one basket is created. This sample is sorted and, if necessary, subsampled.

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

Length composition

Length distributions are recorded for all finfish species caught, measured to the cm below. Herring and sprat are measured to the 0.5 cm since 2007. Length is defined as total length (measured from tip of snout to tip of caudal fin). *Nephrops norvegicus* as well as *Cancer pagurus* are measured to the mm below, by sex, as indicated in Figure 3.1.1. Elasmobranch species are measured by sex, to the cm below.

Minimum number of individuals to be measured is 50 per species. Subsampling is allowed as long as minimum 50 fish will be measured.

For epifauna species, on board RV Tridens for most free-living species minimum and maximum length (to mm below) are measured for the sample, per species.

Sampling for Age, Sex and Maturity

Depending on the species, a fixed number of fish per cm class per ICES rectangle, flatsfish area (Isis) or roundfish area (Tridens) is collected. All fish is measured to the mm below, weighted to the gramme and sex is identified. Only for lemon sole maturity is staged.

Numbers of samples to be collected:

- Plaice and sole: 1 per ICES rectangle per cm class
- Turbot, brill, dab, flounder, lemon sole, cod: 5 per flatfish/roundfish area per cm class

- Tridens: all other flatfish species caught during the survey to a maximum of 5 per cm class per flatfish/roundfish area.

Table 3.1.1 shows from which species biological data will be collected. For this report, a Y is noted when age material is collected. Additionally, weight, sex and maturity might be collected.

3.1.4 United Kingdom

Catch sorting

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

Length composition

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

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

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

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

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

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

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

Sampling for Age, Sex and Maturity

Each survey has its own sampling regime that matches its survey design.

Stratified subsamples of otoliths are taken from various species. All individuals that are biologically sampled should be measured, weighed, sexed and given a maturity stage from the relevant Cefas maturity stage key.

UK (Cefas) Eastern English Channel Beam Trawl Survey otoliths, scales and illicia

Species	Code	By sex	Tray	Otolith target
Plaice IVc <i>Pluerenectis platessiodes</i>	PLE	Y	48	1 per cm per sex <20cm, 2 per cm per sex ≥20cm per station
Plaice VIId	PLE	Y	48	1 per cm per sex per station
Brill <i>Scophthalmus rhombus</i>	BLL	N	25	All
Turbot <i>Scophthalmus maximus</i>	TUR	N	25	All
Sole IVc <i>Solea solea</i>	SOL	Y	96	1 per cm per sex per station
Sole VIId	SOL	Y	96	2 per cm per sex <17cm, 3 per cm per sex ≥17cm per station
¹ Anglerfish <i>Lophius piscatorius</i>	MON	N	25	All
Cod <i>Gadus morhua</i>	COD	N	25	All
Lemon sole <i>Microstomus kitt</i>	LEM	N	96	5 per cm per ICES Division
Flounder	FLE	N	25	2 per cm per ICES Division
Dab IVc <i>Limanda limanda</i>	DAB	Y	48	2 per cm per sex =<14cm, 4 per cm per sex >14cm
Dab VIId	DAB	Y	48	4 per cm per sex =<14cm, 8 per cm per sex >14cm, per English and French side
Whiting <i>Merlangius merlangus</i>	WHG	N	25	5 per cm per ICES Division
Skates and Rays		Y		10 per cm per sex per ICES Division
² Bass <i>Dicentrarchus labrax</i>	ESB	N	25	All

¹The illicium should also be collected; ²scales should be collected

UK (Cefas) Irish Sea and Bristol Channel Beam Trawl Survey otoliths, scales and illicia

This survey collects biological samples by the following depth and area stratum.

ISN 0-20 metres, ISN 20+ metres, ISS 0-20 metres, ISS 20+ metres, SGC 0-20 metres, SGC 20+ metres, ISW 0-20 metres, ISW 20+ metres, BCI 0-20 metres, BCI 20+ metres.

Within these stratum the following targets are used.

Species	Code	By sex	Tray	Otolith target
Plaice <i>Pluerenectis platessiodes</i> Target per stratum	PLE	Y	48	1 per cm per sex <5cm, 4 per cm per sex 5 - <20 cm 8 per cm per sex 20-<66 cm 66cm+ All
Brill <i>Scophthalmus rhombus</i> Target for survey	BLL	N	25	All
Turbot <i>Scophthalmus maximus</i> Target for survey	TUR	N	25	All
Sole <i>Solea solea</i> Target per stratum	SOL	Y	96	1 per cm per sex <5cm, 4 per cm per sex 5 - <20 cm 8 per cm per sex 20-<66 cm 66cm+ All
1 Anglerfish <i>Lophius piscatorius</i> Target per stratum	MON	N	25	1 per cm <10cm, 5 per cm 10-<40cm, 40cm+ All
1 Black bellied Anglerfish <i>Lophius budegassa</i> Target per stratum	WAF	N	25	1 per cm <10cm, 5 per cm 10-<40cm, 40cm+ All
Cod <i>Gadus morhua</i> Target for survey	COD	N	25	All
Lemon sole <i>Microstomus kitt</i> Target per stratum	LEM	N	96	20 otoliths <10cm 5 per cm 10-<35cm 35cm+ 20
Dab <i>Limanda limanda</i> Target per stratum	DAB	Y	48	1 per cm per sex <7cm, 4 per cm per sex 7<15cm, 8 per cm per sex 15-<30cm, 8 per sex, 30cm+
Megrim <i>Lepidorhombus whiffiagonis</i> Target per stratum	MEG	Y	25	1 per cm per sex <10cm, 5 per cm per sex 10-<35cm, 35cm+ All
Four Spot Megrim <i>Lepidorhombus boscii</i> Target per stratum	LBI	Y	25	1 per cm per sex <10cm, 5 per cm per sex 10-<35cm, 35cm+ All
Haddock <i>Melanogrammus aeglefinus</i> Target per stratum	HAD	N	25	1 per 2cm <15cm 5 per 2cm 15-<51cm, 51cm+ All

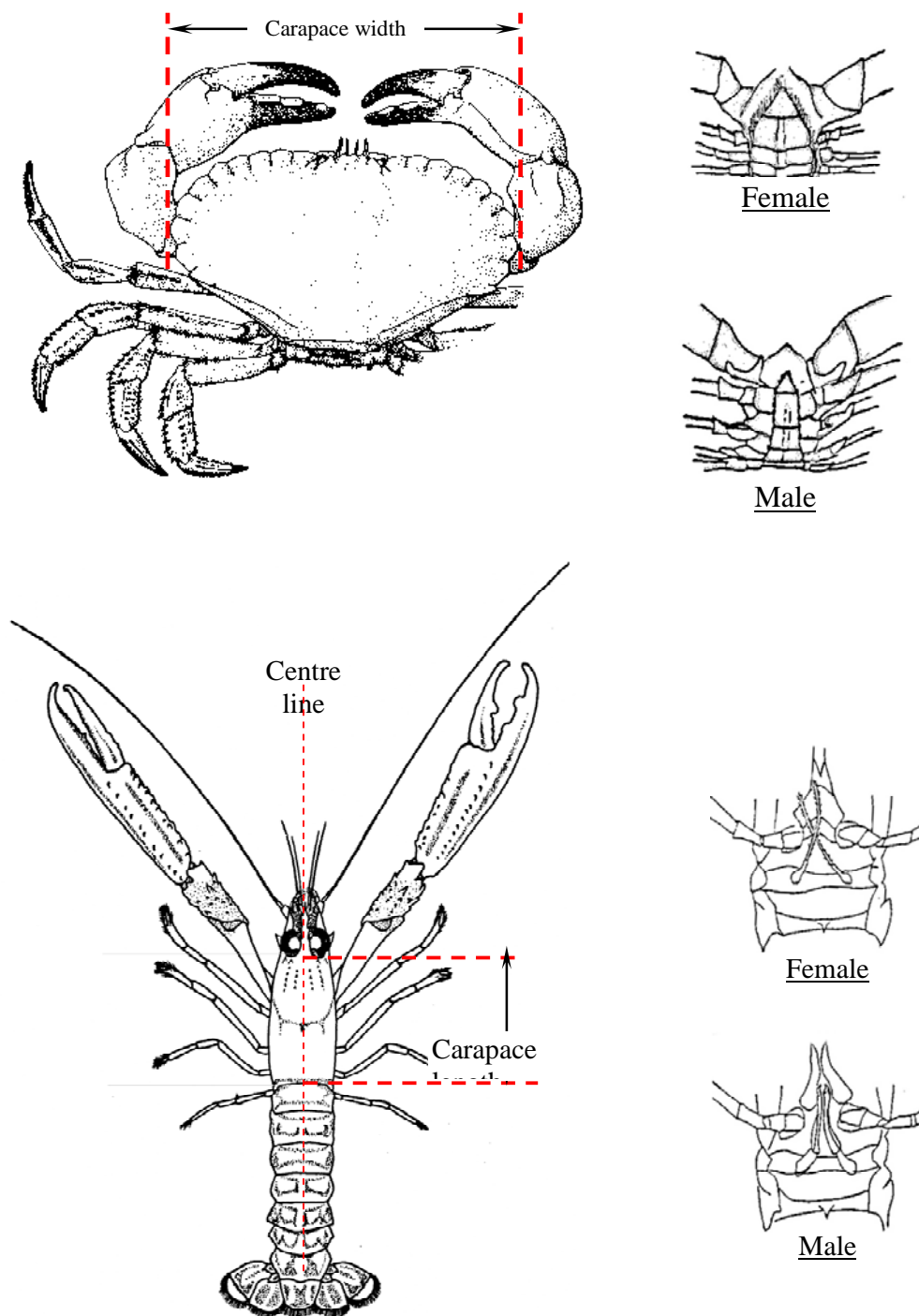


Figure 3.1.1. Measurement of *Cancer pagurus* (upper) and *Nephrops norvegicus* (lower).

3.2 Benthos (epifauna)

Commercial species *Cancer pagurus* is measured by all countries to the mm below, as indicated in Figure 3.4.1. All countries measure by sex. However, the UK and Germany have an additional category for egg bound individuals.

Commercial species *Nephrops norvegicus* is measured to the mm below (see Figure 3.4.1) by all countries except Belgium. Length measurements of *Nephrops norvegicus* are done by sex. UK and Germany have an additional category for egg bound individuals.

Other benthos species are treated differently per country. UK does not sample benthos completely on all stations, but has identified stations on which a complete benthos sample is to be taken. On those stations, a minimum of 32 species will be identified to the taxa. At all other stations, the UK records presence-absence of benthos and records weight and /or number of 9 sentinel species which are regarded as “indicator” species. These species include:

- Pink seafan *Eunicella verrucosa*
- Large colonies of *Sabellaria spinulosa*
- Ross coral *Pentapora foliacea*
- Sea pen *Funiculina quadrangularis*
- Mantis shrimp *Meiosquilla desmaresti*
- Sponge crab *Dromia personata*
- Ocean quahog *Arctica islandica*
- Fan mussel *Atrina fragilis*
- Purple sunstar *Solaster endeca*

In the Dutch, German and Belgian surveys, benthos is sorted if possible to the taxa and at least counted. UK and the Netherlands collect weight per species additionally. For attached species, all countries record presence/absence.

4 Quality assurance

Gear: In the UK and Netherlands, standard gear descriptions are used to maintain the gear. A check is done before or after each survey. If the gear does not match the description, the gear technicians overhaul the gear. If the gear is damaged during the survey, a check will be performed immediately after the survey. Germany does not have a standard gear description to which the gear is checked, because the crew carries out the maintenance. In Belgium, the fishing skipper and the gear technicians check the gear prior to the yearly survey to meet the standard. Every haul, the gear is checked and repaired before deployment.

Identification: WGBEAM will use the outcome of the Workshop on Taxonomic Quality (ICES 2007b) concerning problem taxa. Generally, literature is used on board to identify species. All countries’ sampling procedures allow for continuous feedback on species identification on board. Species that can not be identified at sea, are conserved and taken home for expert identification. In the Netherlands, quality assurance of difficult species is done by internal identification workshops after the survey. For near future, a yearly identification workshop will be planned for all seagoing personnel in the institute. In UK, fish identification tests are carried out on a weekly basis whilst at sea.

Subsampling: for the Dutch survey quality assurance for the fraction and numbers subsampled is defined. At least three times during a survey is checked if the last two fractions in the subsample are equal and the numbers of fish in the subsample is recorded continuously.

General: for the Dutch offshore survey a quality assurance is available in Dutch (2008) but will be available in English within due time.

5 Environmental data

Environmental data collected are temperature, salinity and turbidity. Netherlands collects on board Tridens a vertical CTD sample (with a Seabird CTD) after each fish haul. On board Isis during the haul a continuous CTD sample is taken by a sampler connected on the beam.

6 Exchange specifications for WGBEAM data

Data exchange for WGBEAM data is from 2009 onwards planned to be in DATRAS format. Survey data for all countries will be provided to the ICES database DATRAS. Formats for the different record types are given in Annex 4 (haul information), Annex 5 (length frequency information) and Annex 6 (age information). For the latest version of the exchange format see also <http://www.ices.dk/datacentre/datsu/selrep.asp>.

Each country is responsible for the quality assurance of the data.

Annex 1: Overview of WGBEAM surveys

	BELGIUM	GERMANY	NETHERLANDS	NETHERLANDS	UK	UK	UK
Survey area:	IVb and c west	IVb east	IVb and c east	Central N Sea	VIIId	VIIe	VIIa, f and g
Year survey started:	1992	1991	1985	1996	1988	1988	1988
Dates:	August	mid August	August-early September	mid August-mid September	late July	late September/early October	September
Usual start date	week 33	week 32	week 32/33	week 34	week 30	week 39/40	week 36/37
Number of survey days	10	11	20	16–20	15	8	21–24
Ship:	RV Belgica	RV Solea	RV Isis	RV Tridens	RV Corystes	MFV Carhelmar	RV Corystes
Ship length:	50 m	42 m#	28 m	73.5	53 m	22 m	53 m
Beam trawl length:	4 m	7 m	8 m	8 m	4 m	4 m	4 m
Number of beams fished:	1	2	2	2	1	2	1
Number of beams sorted:	1	1	1	1	1	2	1
Trawl duration (min):	30	30	30	30	30	30	30
Tow speed (knots):	4	4	4	4	4	4	4
Cod end liner stretched mesh (mm):	40	44	40	40	40	40	40
Number of ticklers:	0	5	8	8	0	0	0
Gear code:	BT4M	BT7	BT8	BT8S	BT4FM	BT4FM	BT4FM
Attachment:	*	(none)	(none)	**	*	*	*
Station positions:	fixed	pseudo-random	pseudo-random	pseudo-random	fixed	fixed	fixed
Av No stns/yr	53	63	88	63-73	100	57	94
Benthos sampling since:	1992	1992	1985	1996	1991	1992	1992

new vessel since 2004; previously 35m

* chain mat and flip-up rope

** flip-up rope only

Annex 2: Finfish maturity key

-to be added-

Annex 3: Four stage maturity key for Skates and rays (Rajidae)

-to be added-

Annex 4: Haul information

1	RecordType	2	✓	char	
2	Quarter	1	✓	int	
3	Country	3	✓	char	TS_Country
4	Ship	4	✓	char	TS_Ship
5	Gear	6	✓	char	Gear
6	SweepLngt	3		int	<i>Not used in this format</i>
7	GearExp	2		char	<i>Not used in this format</i>
8	DoorType	2		char	<i>Not used in this format</i>
9	StNo	6	✓	char	
10	HaulNo	3	✓	int	
11	Year	4	✓	char	
12	Month	2	✓	int	
13	Day	2	✓	int	
14	TimeShot	4	✓	char	
15	Stratum	4	✓	char	
16	HaulDur	3	✓	int	
17	DayNight	2	✓	char	TS_DayNight
18	ShootLat	8	✓	decimal4	
19	ShootLong	9	✓	decimal4	
20	HaulLat	8	✓	decimal4	
21	HaulLong	9	✓	decimal4	
22	StatRec	4		char	
23	Depth	4	✓	int	
24	HaulVal	1	✓	char	TS_HaulVal

25	HydroStNo	8		char	
26	StdSpecRecCode	1	✓	char	TS StdSpecRecCode
27	BycSpecRecCode	1	✓	char	TS BycSpecRecCode
28	DataType	2	✓	char	TS DataType
29	Netopening	4		decimal1	<i>Not used in this format</i>
30	Rigging	2	✓	char	
31	Tickler	2	✓	int	
32	Distance	4		int	
33	WarpIngt	4		int	<i>Not used in this format</i>
34	Warpdia	2		int	<i>Not used in this format</i>
35	WarpDen	2		int	<i>Not used in this format</i>
36	DoorSurface	4		decimal1	<i>Not used in this format</i>
37	DoorWgt	4		int	<i>Not used in this format</i>
38	DoorSpread	3		int	<i>Not used in this format</i>
39	WingSpread	2		int	<i>Not used in this format</i>
40	Buoyancy	4		int	<i>Not used in this format</i>
41	KiteDim	3		decimal1	<i>Not used in this format</i>
42	WgtGroundRope	4		int	<i>Not used in this format</i>
43	TowDir	3		int	
44	GroundSpeed	3		decimal1	
45	SpeedWater	3		decimal1	
46	SurCurDir	3		int	<i>Not used in this format</i>
47	SurCurSpeed	4		decimal1	<i>Not used in this format</i>
48	BotCurDir	3		int	<i>Not used in this format</i>
49	BotCurSpeed	4		decimal1	<i>Not used in this format</i>
50	WindDir	3		int	
51	WindSpeed	3		int	
52	SwellDir	3		int	
53	SwellHeight	4		decimal1	
54	SurTemp	4		decimal1	

55	BotTemp	4	decimal1	
56	SurSal	5	decimal2	
57	BotSal	5	decimal2	
58	ThermoCline	2	char	<i>Not used in this format</i>
59	ThClineDepth	4	int	<i>Not used in this format</i>

Annex 5: Length frequency information

1	RecordType	2	✓	char	
2	Quarter	1	✓	int	
3	Country	3	✓	char	TS_Country
4	Ship	4	✓	char	TS_Ship
5	Gear	6	✓	char	Gear
6	SweepLngt	3		int	<i>Not used in this format</i>
7	GearExp	2		char	<i>Not used in this format</i>
8	DoorType	2		char	<i>Not used in this format</i>
9	StNo	6	✓	char	
10	HaulNo	3	✓	int	
11	Year	4	✓	char	
12	SpecCodeType	1	✓	char	TS_SpecCodeType
13	SpecCode	10	✓	char	
14	SpecVal	2	✓	char	TS_SpecVal
15	Sex	2		char	TS_Sex
16	TotalNo	9		decimal2	
17	CatIdentifier	2	✓	int	
18	NoMeas	3	✓	int	
19	SubFactor	9	✓	decimal4	
20	SubWgt	6		int	
21	CatCatchWgt	8	✓	int	
22	LngtCode	2	✓	char	TS_LngtCode
23	LngtClass	4	✓	int	
24	HLNoAtLngt	6	✓	decimal1	

Annex 6: Smalk

1	RecordType	2	✓	char	
2	Quarter	1	✓	int	
3	Country	3	✓	char	TS Country
4	Ship	4	✓	char	TS Ship
5	Gear	6	✓	char	Gear
6	SweepLngt	3		int	<i>Not used in this format</i>
7	GearExp	2		char	<i>Not used in this format</i>
8	DoorType	2		char	<i>Not used in this format</i>
9	StNo	6	✓	char	
10	HaulNo	3	✓	int	
11	Year	4	✓	char	
12	SpecCodeType	1	✓	char	TS SpecCodeType
13	SpecCode	10	✓	char	
14	AreaType	2	✓	char	TS AreaType
15	AreaCode	4	✓	char	
16	LngtCode	2	✓	char	TS LngtCode
17	LngtClass	4	✓	int	
18	Sex	2	✓	char	TS Sex
19	Maturity	2		char	TS Maturity
20	PlusGr	2		char	<i>Not used in this format</i>
21	AgeRings	2	✓	int	
22	CANoAtLngt	3	✓	int	
23	IndWgt	5		decimal1	

Annex 17: Report workshop on the beam trawl data delivery to DATRAS (BTDATRAS), 18-20 February 2008, Copenhagen

Executive summary

The workshop on beam trawl data delivery to DATRAS (BTDATRAS) met 18-20 February 2008 in Copenhagen, Denmark. All issues planned were discussed.

- Create one reporting format for the offshore beam trawl surveys

The workshop discussed all variables in the current format and agreed on a beam trawl data format.

- Create one data screening set for the offshore beam trawl surveys

The workshop went through the data checks and agreed on one data screening check.

- Test offshore beam trawl datasets for all countries

The screening of the files was almost impossible during working time (9-17h). The screening program failed a number of times due to overload of the ICES server. Finally, Germany and Belgium tested their first DATRAS format beam trawl dataset. Both countries succeeded in getting the file through the screening program. For the Netherlands and UK already files have been uploaded in DATRAS.

- Plan uploading data to DATRAS

The workshop planned to upload at least the 2006 (Belgium) and 2007 (Germany) before WGBEAM in May 2008. UK and Netherlands will upload datasets with invertebrate species before December 2008 in addition to the already uploaded fish data. UK will upload the complete VIIa,f,g and VIIe datasets before WGBEAM in May 2008.

Opening of the meeting

The chair (Ingeborg de Boois) opened the meeting at 18th February 2008, 10.30. Participants of the meeting are in Annex 1.

Adoption of the agenda

The agenda is in Annex 2. A presentation by Vaishav Soni is scheduled for Tuesday afternoon. The agenda was adopted.

The ToR's for the meeting are in Annex 3.

State of the art

Before the start of the meeting, the Netherlands uploaded all Dutch offshore beam trawl data, UK uploaded the data of the VIId offshore beam trawl survey for all years, Germany applied the IBTS data format to the offshore beam trawl dataset and tested the dataset. Belgium created the format during the workshop.

At this moment, there are five different selections of data delivery: 2 Dutch beam trawl defined by ship (Isis, Tridens II), 3 UK beam trawl define by area (IVc/VIIId, VIIa/f+g and VIIe). The workshop went through all data formats in order to create one beam trawl data format in which all beam trawl datasets can be screened. The workshop suggests to, like IBTS, create one survey in the screening and uploading program for the offshore Beam trawl survey (BTS).

Data formats

The workshop reviewed the DATRAS Beam Trawl Survey-Eastern Channel and southern North Sea format (VIId/IVc).

HH-Haul information

The workshop recommends ICES Data Centre to add units for all variables in the format, especially:

Position variables: degrees.decimal

Distance: in meters

GroundSpeed: in knots

WindDir: in degrees

WindSpeed: not clear if it is in m/s or in knots

4.1.1 Addition 'Not used in this format' –and so no checking on the variables- for the following variables

Nr	Variable
6	SweepLngt (does not apply for a beam trawl)
7	GearExp (does not apply for a beam trawl)
8	DoorType (does not apply for a beam trawl)
29	Netopening (does not apply for a beam trawl)
33	WarpLngt (data not useful to register in DATRAS)
34	WarpDia (data not useful to register in DATRAS)
35	WarpDen (data not useful to register in DATRAS)
36	DoorSurface (does not apply for a beam trawl)

37	DoorWgt (does not apply for a beam trawl)
38	DoorSpread (does not apply for a beam trawl)
39	WingSpread (does not apply for a beam trawl)
40	Buoyancy (does not apply for a beam trawl)
41	KiteDim (does not apply for a beam trawl)
42	WgtGroundRope (does not apply for a beam trawl)
46	SurCurDir (not recorded)
47	SurCurSpeed (not recorded)
48	BotCurDir (not recorded)
49	BotCurSpeed (not recorded)
58	ThermoCline (not recorded)
59	ThClineDepth (not recorded)

4.1.2 Removal of 'Not used in this format' for the following variables

Nr	Variable
15	Stratum (WGBEAM will provide a list of strata to ICES)
30	Rigging
31	Tickler

4.1.3 Addition of variable

Side: P (portside) or S (starboard). At the moment, for the UK data this variable is incorporated in gear. However, the gear used is always rigged in the same way and thus it creates noise and exists the risk of misinterpretation of the different values in Gear. The workshop asks ICES to explore the possibility to add an extra field to the HH table and to derive the values for the UK from the Gear field.

4.1.4 Addition of values to existing variables

Nr	Variable	New value
15	Stratum	Countries using this variable for indices calculation will give ICES a list of valid Stratum codes used
24	HaulVal	A (additional (valid) stations that will not be used for index calculation)
27	BycSpecRecCode 2	(open-ended fish species list and limited benthos list) For limited list of invertebrate species reported on: see Annex 6.
30	Rigging	T (tickler chains); the combination will be FM, FT, T , M

4.1.5 Change of mandatory fields

Nr	Variable
25	HydroStNo not mandatory

4.1.6 Change description of value

Nr	Variable
50	WindDir: 0=variable (was: 'calm')

4.1.7 Specific WGBEAM appointments

Nr	Variable	
23	Depth	is considered being Shooting depth
32	Distance	defined as Haul length (distance trawled during the haul duration)

HL-Length information

Addition of values to existing variables

Nr	Variable	New value
14	SpecVal	5 (only observed; a species is not measured, not counted, but only presence/absence is registered)

4.2.1 Addition 'Not used in this format' –and so no checking on the variables- for the following variables

Nr	Variable
6	SweepLngt (does not apply for a beam trawl)
7	GearExp (does not apply for a beam trawl)
8	DoorType (does not apply for a beam trawl)

4.2.2 Add description of variable

Nr	Variable
16	TotalNo: total number of fish by haul, species, sex and subfactor (NoMeas*SubFactor)
18	NoMeas: total fish measured by haul, species, sex and subfactor (sum of HINoAtLngt)

CA-Age information

4.3.1 Addition 'Not used in this format' –and so no checking on the variables- for the following variables

Nr	Variable
6	SweepLngt (does not apply for a beam trawl)
7	GearExp (does not apply for a beam trawl)
8	DoorType (does not apply for a beam trawl)
20	Plusgr (all fish aged has value for age)

4.3.2 Change of mandatory fields

Nr	Variable	
19	Maturity	not mandatory

WGBEAM will supply a list of beam trawl area index codes per country to ICES used for otolith sampling and how they compare to ICES statistical rectangles.

The workshop recommends WGBEAM to review this list at its meeting in May 2008 and check if more variables will be needed for the import of offshore beam trawl data in DATRAS.

Data checks

There are a number of checks carried out on the data as it is being loaded to the screening program, that are not described in the overview of checks. E.g. when screening the file a year is set. If the year does not correspond with the year in the file, a message will be created. The workshop thinks these are very useful, and would like these to be available in the overview of checks.

The workshop would like to have the option to ask for a summary report on errors and warnings. The advantage will be that anyone screening a file will be able to see all kind of messages that appear on the file, even if the number of messages exceeds the maximum number of messages asked for. This will create the possibility of solving all errors in a file at once and will reduce the activities on the server.

HH-Haul information

5.1.1 Checks to be removed

Nr	Variable	Check	Reason
5	Gear	Gear is not consistent with GearExp	no variable
5	Gear	Gear is not consistent with DoorType	no variable
6	SweepLngt	Not in the Range Specified	no variable
7	GearExp	Field value is invalid	no variable
8	DoorType	Field value is invalid (Rel)	no variable
29	Netopening	Not in the Range Specified	no variable
33	WarpLngt	Not in the Range Specified	no variable
34	Warpdia	Not in the Range Specified	no variable
35	WarpDen		no variable
36	DoorSurface	Not in the Range Specified	no variable
37	DoorWgt	Not in the Range Specified	no variable
38	DoorSpread	Not in the Range Specified	no variable
39	WingSpread	Not in the Range Specified	no variable
40	Buoyancy	Not in the Range Specified	no variable
41	KiteDim	Not in the Range Specified	no variable
42	WgtGrndRope	Not in the Range Specified	no variable
45	SpeedWater	Not in the Range Specified	no variable
46	SurCurDir	Not in the Range Specified	no variable
47	SurSurSpeed	Not in the Range Specified	no variable
48	BotCurDir	Not in the Range Specified	no variable
49	BotCurSpeed	Not in the Range Specified	no variable
58	ThermoCline	Not in the Range Specified	no variable
59	ThClineDepth	Not in the Range Specified	no variable

5.1.2 Change of range

Nr	Variable	Check	New range
16	HaulDur	Not in the Range Specified	15-60
18	ShootLat	Not in the Range Specified	48-62
19	ShootLong	Not in the Range Specified	-12-10
20	HaulLat	Not in the Range Specified	48-62
21	HaulLong	Not in the Range Specified	-12-10
23	Depth	Not in the Range Specified	5-300
28	DataType	DataType inconsistent with CatIdent	C(1),S/R(1-5)
32	Distance	Not in the Range Specified	1850-7500
32	Distance	The calculated (...) more than 300 m (...)25% and to disregard if Distance = -9	
44	GroundSpeed	Not in the Range Specified	3.5-4.5
53	SwellHeight	Not in the Range Specified	0-5

5.1.3 Change from error to warning

Nr	Variable	Check	Reason
2	Quarter	Quarter is not consistent with Month	Start survey in June
3	Country	Country is not consistent with Ship (rel)	Charter of another ship
4	Ship	Ship is not consistent with Gear (rel)	Change of gear
17	DayNight	Day/night is NOT within the legal range	Expert judgement
53	SwellHeight	Not in the Range Specified	if HaulVal=I
	SwellHeight	might be >5	

5.1.4 Add checks

Nr	Variable	Check
16	HaulDur	If HaulDur < 15, then check HaulVal (has to be I or A)
30	Rigging	Field value is invalid
31	Tickler	Tickler inconsistent with Rigging (T>0 if Rigging contains T)
31	Tickler	Not in the range specified Lower:1 Upper: 12
53	SwellHeight	If swell height >5: check HaulVal (should be N)

5.1.5 Questions on data checks

14	TimeShot:	does the check accept e.g. 1181?
23	Depth:	comparison with ETOPOQ2 dataset?

HL-Length information**5.2.1 Checks to be removed**

Nr	Variable	Check	Reason
5	Gear	Gear is not consistent with GearExp	no variable
5	Gear	Gear is not consistent with DoorType	no variable
6	SweepLngt	Not in the Range Specified	no variable
7	GearExp	Field value is invalid	no variable
8	DoorType	Field value is invalid (Rel)	no variable
14	SpecVal	if validity code is 9	no SpecVal=9
22	LngtCode	A length plus group is found	no plusgroup
23	LngtClass	Within one haul (...) length code=9 (...) no LngtCode=9	

5.2.2 Change of range

Nr	Variable	Check	New range
19	SubFactor	Not in the Range Specified	1-1000
20	SubWgt	Not in the Range Specified	0-200000
21	CatCatchWgt	Not in the Range Specified	0-1000000

5.2.3 Modify check

Nr	Variable	Check	Modification
14	SpecVal	If validity code is 4 then NoHour > 0	TotalNo>0
14	SpecVal	If SpecVal=0 then NoHour etc.= -9	TotalNo
14	SpecVal	Only one (...) per haul and species (...) sex, catididentifier, subfact	per haul, species,
24	HLNoAtLngt	For each species; NoHour =sum (...) NoMeas	
24	HLNoAtLngt	For each species (...) species and sex	

5.2.4 Add check

Nr	Variable	Check
23	LngtClass	If LengthClassCode=, then MinLengthClass must be mm units

5.2.5 Change from error to warning

Nr	Variable	Check	Reason
2	Quarter	Quarter is not consistent with Month	Start survey in June
3	Country	Country is not consistent with Ship (rel)	Charter another ship
4	Ship	Ship is not consistent with Gear (rel)	Change of gear
13	SpecCode	LngtClass is larger than allowed...	Expert judgement
13	SpecCode	Inconsistency species & LngtCode	Change of method
16	TotalNo	Not in the Range Specified	Expert judgement
17	CatIdentifier	Not in the Range Specified	Expert judgement
18	NoMeas	Not in the Range Specified	Expert judgement

19	SubFactor	Not in the Range Specified	Expert judgement
20	SubWgt	Not in the Range Specified	Expert judgement
21	CatCatchWgt	Not in the Range Specified	Expert judgement
23	LngtClass	Not in the Range Specified	Expert judgement
23	LngtClass	If LengthClassCode = 5 then (...) > 60	Expert judgement
24	HLNoAtLngt	Not in the Range Specified	Expert judgement

5.2.6 Change from warning to error

Nr	Variable	Check
14	SpecVal	If SpecVal=0 then TotalNo etc.= -9

5.2.7 Specific notes on checks

13	SpecCode:	update of max length class per species by IBTSWG and WGBEAM
23	LngtClass:	range specified 0-1300. In mm or cm?

CA-Age information

5.3.1 Checks to be removed

Nr	Variable	Check	Reason
5	Gear	Gear is not consistent with GearExp	no variable
5	Gear	Gear is not consistent with DoorType	no variable
6	SweepLngt	Not in the Range Specified	no variable
7	GearExp	Field value is invalid	no variable
8	DoorType	Field value is invalid (Rel)	no variable
16	LngtCode	A length plus group is found	no plusgroup
17	LngtClass	Within one haul (...) length code = 9	no LngtCode=9
20	PlusGr	Field value is invalid	no plusgroup
20	PlusGr	Per haul, species and length (...)	no plusgroup
20	PlusGr	If a plus group is defined per (...)	no plusgroup
21	AgeRings	Not in the Range Specified	overlaps with 13

5.3.2 Change of range

Nr	Variable	Check	New range
23	IndWgt	Not in the Range Specified	1-25000

5.3.3 Modify check

Nr	Variable	Check	Modification
13	SpecCode	AgeRings is larger than allowed	AgeRings
13	SpecCode	LngtClass is larger (...) for the species	LngtClass
13	SpecCode	Inconsistency between (...) LngtCode	LngtCode
14	AreaType	AreaCode is not consistent with (...)	AreaCode

5.3.4 Add check

Nr	Variable	Check
23	LngtClass	If LengthClassCode=, then MinLengthClass must be mm units

5.3.5 Change from error to warning

Nr	Variable	Check	Reason
13	SpecCode	AgeRings is larger than allowed	Expert judgement
13	SpecCode	LngtClass is larger than (...) the species	Expert judgement
13	SpecCode	Inconsistency species & LngtCode	Change of method
17	LngtClass	Not in the Range Specified	Expert judgement
17	LngtClass	If LengthClassCode = 5 then (...) > 60	Expert judgement
22	CANoAtLngt	Not in the Range Specified	Expert judgement
23	IndWgt	Not in the Range Specified	Expert judgement

The workshop recommends WGBEAM to review the list of checks at its meeting in May 2008 and check if more variables will be needed for the import of offshore beam trawl data in DATRAS.

Data screening

During the meeting, attempts to screen the German data had difficulties due to the ship and gear not being set up. The ICES data manager updated the essential codes during the meeting. The update was successful, but the data could not be checked, as screening program was not working properly during the meeting.

Part of the Belgian BTS 2006 dataset was put in the agreed format during the meeting and screened successfully.

For all partners it is important to realize that only files can be uploaded for one ship, survey, quarter, gear at a time. If one of those variables varies in the dataset to be uploaded, the screening program will produce error messages.

The screening program is often too slow to work properly during daytime. The workshop strongly recommends that ICES looks into the reason for this and makes arrangements to deal with the problem in the near future.

Uploading data: planning

What's necessary:

ICES: create a new BTS screening and uploading facility. This can be done by the 1st of April 2008. The ICES Data Centre will send an e-mail to the chair of WGBEAM when the process is finished.

WGBEAM members:

Belgium: The schedule for incorporating the Belgian BTS data into DATRAS will be a) construct, screen and upload of the complete 2006 dataset (before WGBEAM in May 2008); b) reorganize the national data structure to the DATRAS format for the 2007 BTS dataset before data transfer to WGBEAM (May 2008) and c) stepwise incorporation of the historical Belgian BTS data.

Germany: a) construct, screen and upload of the complete 2007 dataset (before WGBEAM in May 2008); b) stepwise incorporation of the historical German BTS data

UK: a) construct, screen and upload of the complete VIIa,f,g and VIIe datasets (before WGBEAM in May 2008); b) check on presence of benthos data in the sets already uploaded to DATRAS. If invertebrate species have been registered, the sets already uploaded will be updated with benthos (before December 2008).

Netherlands: a) update sets already uploaded to DATRAS with 13 benthos species (before December 2008).

When most of the WGBEAM beam trawl data are uploaded to DATRAS, the workshop recommends WGBEAM to ask WKSAD for analysis on the data to explore the possibilities for getting combined indices for plaice and sole.

Developments at ICES Data Centre

Vaishav Soni demonstrated the export tool for survey data. Main issues coming up were how we can make sure people read the health warning added to the exported file.

The workshop offered its expertise for checking the calculation of the CPUE per haul per length, CPUE per statistical rectangle per length during the meeting. The results for the DATAS output and the Dutch output calculated by the workshop were equal for the length data. No check was done on the age data. The workshop concluded that CPUE per species, length and haul is equal to the raw data. For this reason, the workshop recommends to create limited access to those data.

The workshop and ICES data centre agreed on shortening the line between them. The ICES data centre will keep in contact with the WGBEAM chair when new developments occur or expertise is needed. The chair will contact WGBEAM members if the subject is urgent and otherwise put it on WGBEAM's agenda.

The workshop and the data centre agreed on creating one format for the beam trawl surveys. This will be applied for the screening program as for the data uploading tool. The workshop supplied a list of distinguishing features for the beam trawl survey (Annex 5).

The workshop recommends ICES to look carefully at the risk of not being able to run queries properly due to overload of the server (see comment in chapter 6).

Annex 1: List of participants

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Annex 2: Agenda

The following agenda was adopted by the participants:

Monday, 18 February

10.30 start of the meeting

- check differences in reporting formats for the Beam Trawl Survey
- discuss the variables in the reporting format: which variables will never be used, which are lacking?

Tuesday, 19 February

- data checking demonstration (Maria): how does it work and which checks are performed on the data?
- discussion on the data checking: are there more variables to be checked, would we like warnings or error messages?
- start creating reporting formats for 2007 sets for all countries

Presentation by Vaishav Soni on the new DATRAS export tool.

Wednesday, 20 February

- creating reporting formats for 2007 sets for all countries
- checking the reporting formats
- plan delivering data to DATRAS

Annex 3: BTDATRAS terms of reference for this meeting

The **Workshop on Beam Trawl DATRAS coordination** [BTDATRAS] (Chair: I. de Boois) met in Copenhagen, Denmark from 18-20 February 2008 to:

- g) create one reporting format for the offshore beam trawl surveys
- h) create one data screening set for the offshore beam trawl surveys
- i) test offshore beam trawl datasets for all countries
- j) plan uploading data to DATRAS.
- k)

The workshop is a result of a WGBEAM 2007 recommendation.

Annex 4: Recommendations

RECOMMENDATION	FOR FOLLOW UP BY:
1. adding units for all variables in the format	ICES Data Centre
2. review this list of variables at meeting in May 2008	WGBEAM
3. review this list of checks at meeting in May 2008	WGBEAM
4. look into the reason for the screening program being slow and make arrangements to deal with the problem in the near future	ICES
5. look carefully at the risk of not being able to run queries properly due to overload of the server	ICES
6. find a group (WKSAD or another group) to explore the possibilities of creating combined indices based on DATRAS BTS data	WGBEAM

Annex 5: Distinguishing features for beam trawl surveys

Country	Ship	Gear	Series
ENG	COR	BT4A	BTS
ENG	COR	BT4P	BTS
ENG	COR	BT4S	BTS
ENG	CAR	BT4P	BTS
ENG	CAR	BT4S	BTS
ENG	END	BT4A	BTS
ENG	END	BT4P	BTS
ENG	END	BT4S	BTS
NED	TRI2	BT8	BTS
NED	ISI	BT8	BTS
GER	SOL2	BT7	BTS
GER	SOL1	BT7	BTS
BEL	BEL	BT4	BTS

**Annex 6: List of invertebrate species WGBEAM decided reporting
on**

1. *Aphrodita aculeata*
2. *Asterias rubens*
3. *Astropecten irregularis*
4. *Buccinum undatum*
5. *Cancer pagurus*
6. *Corystes cassivelaunus*
7. *Echinocardium* sp.
8. *Liocarcinus depurator*
9. *Liocarcinus* sp. (*Liocarcinus holsatus*, *Liocarcinus marmoreus*, *Liocarcinus pusillus*,
Macropipus arcuatus)
10. *Nephrops norvegicus*
11. *Ophiothrix fragilis*
12. *Ophiura* sp. (*Ophiura ophiura*, *ophiura fragilis*)
13. *Pagurus* sp. (*Pagurus bernhardus*, *Pagurus pubescens*, *Pagurus prideauxi*,
Anapagurus laevis)