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Report of the Working Group on Beam Trawl Surveys (WGBEAM)

7-10 June 2011

Hamburg, Germany

ICES International Council for the Exploration of the Sea

CIEM Conseil International pour l'Exploration de la Mer

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Conseil International pour l'Exploration de la Mer

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Contents

Executive summary

The Working Group on Beam Trawl Surveys (WGBEAM), chaired by Brian Harley, UK, met in Hamburg, Germany, 7–10 June 2011. Eight participants from six countries joined the meeting. In addition to the ToRs, WGBEAM was asked to consider the inclusion of the Beam Trawl survey of the Northern Adriatic Sea. Once this survey follows the conditions set out by the surveys working groups (see ICES 2008, section 7.3), WGBEAM will recommend its inclusion.

a) Prepare a progress report summarizing the results of the 2010 offshore and inshore beam trawl surveys;

The majority of the standard outputs were prepared before WGBEAM. 2010 data from Belgium have not been taken into account as they were not available in the required format before the meeting. During WGBEAM an extra study of the distribution patterns of a number of ray species was done.

A request for WGBEAM to coordinate a new survey was received. The Northern Adriatic Sole survey was presented and WGBEAM have started the process of working with the survey leader to meet the criteria required.

An analysis of the brown shrimp length data (LD) was carried out. In the Dutch survey, the peak of the length distribution is about 1 cm lower than that of the German survey. Also, in general, the peak of the distributions in the Wadden Sea is at lower length than in the coastal zone, and the tail at the larger lengths is more pronounced in the coastal area. This corresponds to accepted literature that states that larger shrimp are found offshore.

b) Tabulate, report and evaluate population abundance indices by age-group for sole and plaice in the North Sea, Division VIIa and Divisions VIId-g, taking into account the key issues involved in the index calculation;

North Sea sole: In 2010, the observed number of 1-year olds (2009 year class) was higher than the mean for the first time since 1997.

Area VII sole: In VIId and e the surveys show good recruitment over the entire English Channel. In VIIf and VIIa the number of 1-year olds observed is the lowest of the time-series.

Northern Adriatic sole: This survey indicates that the 2010 age 0 has been mainly poor and substantially below the long-term arithmetic mean.

North Sea plaice: The UK survey confirms the high incoming year class 2009 showing up as 1-year olds. This is also evident in the Isis survey.

Area VII plaice: The most recent years 1-year old are above the long-term mean for VIId and the 2010 1-year olds in VIIe are the highest of the time-series. The sudden high abundances of older plaice in the same year suggest a year effect (especially the large number of 2-year olds in 2010 cannot be explained since the number of 1-year olds in 2009 was among the lowest values ever observed). Recruitment in VIIf is strong at age one and recruitment in the Irish Sea (VIIa) has been increasing over recent years, and has been above average in three of the last four years.

c) Further coordinate offshore and coastal beam trawl surveys in the North Sea and Divisions VIIa, VIId-g and VIIIa-b;

The Netherlands encountered technical problems during the offshore Isis survey. This also influenced the inshore Isis sole net survey (SNS) .For the offshore survey, RV "Tridens II" took over the remaining stations, and for the inshore survey the commercial vessel "Jakoriwi" was hired to partly carry out the survey, using the standard survey gear and design.

Two staff exchanges were carried out in 2010, one on the Cefas Endeavour and one on the German Inshore survey.

In 2011, three exchanges are planned. One on "Cefas Endeavour", one on "Tridens" and one on the "DYFS".

d) Continue development of a manual to improve standardization of sampling protocols, surveys gears and quality control aspects;

A number of revisions were made to both the inshore and offshore manuals.

e) Continue work of developing and standardizing an international (fish and epifauna) database of offshore beam trawl survey data and coordinate such activities with those of the IBTSWG.

ICES Data Centre joined WGBEAM for a pre-working group meeting and progress was made on adapting the current offshore BTS DATRAS format to one useable by the inshore surveys.

f) Look into the details of a (selection of) species caught in inshore or offshore beam trawl surveys. The selection of the species can be done based on the output of ToR a, b or based on an external request;

See a) above.

g) Prepare methods for delivery of the following information to assessment working groups in 2012:

i) Proportion of fish larger than the mean size of first sexual maturation

The WGBEAM surveys are not carried out at the correct time of year to collect maturity information for the majority of species. The alternative options for the calculation of the indicator might be:

1) Derive the mean size of first sexual maturation from the commercial sampling carried out throughout the year, and extrapolate this information to the survey quarter.

2) Take the minimum landing size as a measure of first maturity.

3) Derive the mean size of first sexual maturation from the discard sampling program. It is recommended that the WGBEAM members investigate whether or not the data is available at their institutes.

For our analysis, WGBEAM took the minimum landing size as a measure of first maturity.

ii) Mean maximum length of fish found in research vessel surveys.

This was calculated using a standard methodology , the equation being $Lmax = \Sigma(Lmax_j * N_j) / N$. WGBEAM is able to provide this metric and when all the offshore data from all surveys has been uploaded to DATRAS, ICES Data Centre would be best placed to provide this.

iii) 95th % percentile of the fish length distribution observed.

WGBEAM is capable of creating this metric but would like to have guidance whether the metric should be length or weight based.

Additional requests

There were five additional requests sent to WGBEAM:

- A recommendation from WGNSSK that the UK and Belgian beam trawl survey indices for sole and plaice should be published by WGBEAM whose members should discuss them in the context of patterns and differences observed in the Dutch BTS ("ISIS" and "Tridens") and SNS data. The UK sole and plaice indices are already published by WGBEAM. Because of time constraints, no new discussions on the patterns and observed differences were possible.
- PGCCDBS recommends that survey planning groups (WGBIFS, IBTSWG, WGBEAM) review the WKMSSPDF recommendation to 'put the content of a gonad under a microscope in case of disagreement or doubt on the maturity stage of a fish (if time allows during a survey)', and include it in sampling manuals if appropriate. As none of the current WGBEAM surveys are carried out in the spawning season and given the recommendation of WKMSSPDF, this recommendation is not deemed appropriate to this working group.
- WGCRAN requested that WGBEAM carry out basic quality checks and analyses on available brown shrimp data from DFS and DYFS. The WGBEAM inshore dataset only contains recent shrimp data from the Netherlands. These data are quality checked following standard IMARES procedures. Analysis of the German and Dutch shrimp data were carried out. In the coastal area the length distribution (LD) is almost equal. For the Wadden Sea the LDs vary with a peak of distribution around 1 cm lower for Germany than for the Netherlands.
- WGEF requested that WGBEAM report catch data on the common skate complex using the updated species names for the two species. WGBEAM will implement from 2011, and the manuals will be updated to reflect this.
- WGEF recommended that WGBEAM record the numbers of viable skate egg cases. WGBEAM will implement this from 2011, and the manuals will be updated to reflect this.

1 Opening of the meeting

The Chair opened the meeting at 09:30 on 7 June 2011.

2 Adoption of the agenda

The adopted agenda is published in Annex 2.

3 Introduction

3.1 Terms of reference

The **Working Group on Beam Trawl Surveys** (WGBEAM), chaired by Brian Harley, UK, will meet in Hamburg, Germany, 7–10 June 2011 to:

a) Prepare a progress report summarizing the results of the 2010 offshore and inshore beam trawl surveys;

b) Tabulate, report and evaluate population abundance indices by age-group for sole and plaice in the North Sea, Division VIIa and Divisions VIId-g, taking into account the key issues involved in the index calculation;

c) Further coordinate offshore and coastal beam trawl surveys in the North Sea and Divisions VIIa, VIId-g and VIIIa-b;

d) Continue development of a manual to improve standardization of sampling protocols, surveys gears and quality control aspects;

e) Continue work of developing and standardizing an international (fish and epifauna) database of offshore beam trawl survey data and coordinate such activities with those of the IBTSWG;

f) Look into the details of a (selection of) species caught in inshore or offshore beam trawl surveys. The selection of the species can be done based on the output tor a, b or based on an external request;

g) Prepare methods for delivery of the following information to assessment working groups in 2012:

i) Proportion of fish larger than the mean size of first sexual maturation

ii) Mean maximum length of fish found in research vessel surveys

iii) 95th % percentile of the fish length distribution observed

The information should be provided for all major fish stocks covered by the survey.

3.2 Participants

There were eight participants from six countries. In addition, one member of the ICES Data Centre joined the meeting on the first day. A complete list of participants at the WGBEAM meeting is given in Annex 1 of the report.

4 Review of WGBEAM 2010 recommendations and other requests to WGBEAM

4.1 WGBEAM 2010 recommendations

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

WGBEAM recommends that ICES Data Centre provide these estimates for the surveys that are fully uploaded to DATRAS. WGBEAM will compare these calculations with the WGBEAM indices before they are published. The working group supplied the algorithms used by the WG to ICES Data Centre.

Status: Ongoing

2. WGBEAM recommends that if time and weather allows, overlapping stations between the surveys of two countries should be considered.

Cefas carried out overlapping tows in the Southern North Sea in 2010. The Netherlands carried out comparative fishing between gears, a presentation of which was provided during the working group (see also Section 9.4). Germany carried out a comparative study for the Dutch 6 m and the German 3 m inshore trawls. Data from this study was also presented during the working group (see also Section 9.4).

Status: Complete

3. WGBEAM recommends that Denmark makes effort to extend the inshore survey to the Danish coast, in order to obtain a more complete coverage of the continental coast.

This recommendation has been put forward for a number of years now. However, up to now no action has been taken by Denmark. WGBEAM will remove this from its recommendations in future.

Status: Removed

4. WGBEAM recommends further examination of the spatial distribution patterns in relation to water depth and distance to the coast.

The results in Section 5 go some way to addressing this recommendation. However, further analysis should be carried out for a selection of species (to be determined intersessionally) and this will be carried forward to next year.

Status: Incomplete and ongoing.

5. It is recommended that WGBEAM evaluates the functioning of DUAP at WGBEAM 2011.

For details see Section 9.6

Status: Complete

6. It is the recommendation of the working group that the Belgian offshore beam trawl survey data are uploaded to DATRAS so that a time-series for the sole index can be created, along the lines of the UK index.

The Belgian institute is currently working to facilitate this. This recommendation will be carried forward for next year.

Status: Ongoing.

7. It is recommended that Belgium re-evaluates its biological sampling protocol to increase spatial resolution from an area based ALK to a rectangle based sampling design for the biological data, at least for plaice and sole.

The Belgian institute completed this change for three statistical rectangles for sole in its survey area in 2010, and evaluated the change as useful and feasible. WGBEAM recommends that this be extended to the rest of the survey area and the species biologically sampled, and that the number of individuals per cm-class sampled for biological variables per statistical rectangle, can be lowered compared to the previous area based sampling design.

Status: Complete.

8. WGBEAM recommends that a report is made from all staff exchanges by the members of staff doing the exchange. The reports will be published in the WGBEAM report.

In Section 7.1.2, there is a brief report of the exchange on the Cefas Irish Sea survey, when Kelle Moreau, of the Belgian institute joined the vessel in 2010. The full report will be provided to WGBEAM 2012. In Section 7.2.2, there is a brief report of the exchange on the German Inshore survey, when Gary Burt, of the English institute joined their vessel for two days in 2010. The full report is in annex 18.

9. WGBEAM recommends that the automatic uploading facility as is operational for IBTS since 2010 will be applied in due time for the beam trawl surveys.

Status: Complete.

10. WGBEAM recommends that the French survey area will be incorporated in the range of the allowable values for latitude and longitude.

This will be completed in 2011.

Status: In progress.

11. WGBEAM recommends the upload to DATRAS of all inshore beam trawl survey data as coordinated by WGBEAM. This will create the possibility to work with an agreed international dataset and will enable direct output for the assessments. A one-day meeting will be organized, attended by at least one representative of the ICES Data Centre and representatives of Belgium, Germany, Netherlands and UK with expertise on the data of the inshore surveys (one representative per country). The meeting will be scheduled the day before WGBEAM 2011.

Refer to Section 7.2.3.

Status: Complete.

12. WGBEAM recommends that the full time-series of the international inshore indices will be calculated, taking into account section 6.3.2 of the 2010 report.

See Section 6.3.2 for full details.

Status: Ongoing.

13. Since the manuals of the surveys are published as separate documents on the DATRAS website, it is recommended that the numbering of survey manuals is independent of the survey group report

During IBTSWG 2011, a discussion between Adi Kellermann of ICES and Brian Harley of Cefas put forward a basis for a standard referencing system for survey manuals. A full list of the IBTS and WGBEAM manuals was to be sent to Adi in April;

however this did not occur. These manuals along with a structure for the referencing will be sent to ICES by the end of June 2011.

Status: Ongoing. Check in 2012 to ensure completion.

4.2 Additional requests

WGBEAM received five additional requests:

- *A recommendation from WGNSSK that the UK beam trawl and Belgian survey indices for sole and plaice should be published by WGBEAM whose members should discuss them in the context of patterns and differences observed in the Dutch BTS (ISIS and Tridens) and SNS data.*

  Section 6 includes information on the indices. Because of time constraints, no new discussions on the patterns and observed differences were possible.

- *PGCCDBS recommends that survey planning groups (WGBIFS, IBTSWG, WGBEAM) review the WKMSSPDF recommendation to 'put the content of a gonad under a microscope in case of disagreement or doubt on the maturity stage of a fish (if time allows during a survey)', and include it in sampling manuals if appropriate.*

  None of the current WGBEAM surveys is carried out in the spawning season and given the recommendation of WKMSSPDF, this recommendation is not deemed appropriate to this working group.

- *A recommendation from WGCRAN to carry out basic quality checks and analyses on available brown shrimp data from DFS and DYFS.*

  See section 9.5.3.

- *A recommendation from WGEF to report catch data on the common skate complex using the updated species names for the two species.*

  See section 9.5.1

- *A further recommendation from WGEF that WGBEAM be asked to record the numbers of viable skate egg cases.*

  See section 9.5.1

5 Results of 2010 surveys

a) Prepare a progress report summarizing the results of the 2010 offshore and inshore beam trawl surveys;

5.1 Offshore surveys

5.1.1 Participation and coverage of the area

Nine surveys were carried out, covering the North Sea, VIId, VIIe, VIIfg, VIIa, VIIIa, VIIIb and the Northern Adriatic Sea. The participating vessels and time of the cruises is listed in Table 5.1.1.1.

The coverage of the area by each of the participating countries' surveys and the number of stations sampled in 2010 is shown in Annex 6.

WGBEAM recommends that once the offshore surveys are uploaded to the DATRAS

Database, ICES Data Centre should be asked to provide precision estimates for inclusion in the next appropriate WGBEAM report.

Table 5.1.1.1. Overview of surveys during 2010.

Country	Vessel	Area	Dates	Gear
Belgium	Belgica	southern North Sea	23 Aug – 3 Sep	4m beam
England	Endeavour	IVc, VIId	17 Jul - 31 Jul	4m beam
England	Endeavour	VIIfg, VIIa	10 Sep - 2 Oct	4m beam
England	Carhelmar	VIIe	9 Oct - 16 Oct	4m beam
France	Gwen Drez	VIIIa, VIIIb	30 Oct – 4 Dec	4m beam
Germany	Solea	German Bight	12 Aug – 23 Aug	7m beam
Italy/Slovenia	G. Dallaporta	Northern Adriatic Sea	4 Nov – 18 Nov	3.5m beam
Netherlands	Tridens	central North Sea	23 Aug – 17 Sep	8m beam + flip-up rope
Netherlands	Isis	southern North Sea	9 Aug – 1 Sep	8m beam

5.1.2 Survey results

A summary of each of the surveys is to be found in Section 5.1.3.

The Belgian offshore survey carried out 61 stations. One station was missed because of an anchored vessel on the track.

The German offshore survey was completed out without incident despite stormy weather.

The survey in IVc and VIId was successfully carried out by Endeavour. In the Belgium sector five additional tows were carried out at stations were "Belgica" used to fish. The survey in the Western Channel and Irish Sea went according to plan.

The Dutch offshore survey is usually completed by two vessels, the "Isis" and the "Tridens". This year the survey area covered by "Tridens" was not fully completed because of technical problems with "Isis". "Tridens" took over a part of the area of Isis to ensure that all the stations used for calculation of the indices were completed. One rectangle of Isis index area and two rectangles of "Tridens" index area were not sampled.

5.1.2.1 Catch results

Distribution plots for the offshore survey fish species are presented in Annex 6.2. 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 and for ICES Subdivisions VII and VIII is in Annex 9.

5.1.2.2 Comparative tows

During the Dutch offshore survey Tridens carried out comparative tows with 8m beam trawl with and without flip-up rope. A full description of the exercise and the results can be found in Section 9.1.4.2.

5.1.2.3 Blog from survey vessel

The Dutch research institute IMARES installed a blog for the offshore survey on his website. During the survey Tridens is sending highlights in irregular intervals. The blog can be found on: http://www.imares.wur.nl/NL/Publicaties/Weblogs/bts/blog/.

It is thought that the blog is a useful tool for interaction with the fishers and the general public and WGBEAM would encourage its members to attempt to carry out similar blogs in future.

5.1.2.4 Request to coordinate new survey

In April 2011, a request was made to WGBEAM to consider coordinating a new survey from the Northern Adriatic. In order for WGBEAM to accept the coordination of the survey it must meet the criteria set out in the WGBEAM report of 2008 (ICES, 2008), Section 7.3. At this time the survey meets four of the six criteria and is committed to meeting the remaining 2 criteria within the year.

The following is a brief summary of the survey and gear.

Beam trawl survey in the Northern Adriatic Sea (GSA 17)

The SoleMon project started in 2005 and falls into the frame of the FAO AdriaMed Project aimed to a common management of the Adriatic fishery resources. It is coordinated by the Institute of Marine Research (ISMAR) of Ancona, Italy, and involves the Istituto Superiore per la Ricerca e Protezione Ambientale (ISPRA), Chioggia, Italy, the Institute of Oceanography and Fisheries (IOF) of Split, Croatia, and the Fisheries Research Institute of Slovenia (FRIS), Ljubljana, Slovenia.

The SoleMon project is aimed to assess the state of the stock of sole (*Solea solea*) and other commercial benthic species in the central and northern Adriatic Sea (FAO GSA 17) by using a *rapido* trawl (Figure 5.1.2.4.1). The gear was specifically designed to be conducted on different sediment types and consists of a modified beam trawl with a rigid mouth. It is always in contact with the seabed by an inclined wooden board fit to the front of the iron frame which acts as a spoiler and keeps the skids and the teeth tightly pushed down to the seabed. *Rapido* trawls were provided with DST Logic Temperature and Depth Recorders, the use of these devices and the fixed mouth of the gear allowed knowing exactly the area explored by each *rapido* trawl. This gear is highly efficient for catching benthic species (e.g. *Solea solea*, *Sepia officinalis*, *Pecten jacobeus*, *Melicetus kerathurus*). Therefore, *rapido* trawl surveys can furnish more realistic data on the abundance of such species at sea in respect to the otter trawl surveys carried out in the area to assess the demersal stocks. From this point of view, they can be considered as an additional tool for the assessment of the Adriatic demersal resources.

Eight beam trawl fishing surveys were carried out: two systematic "pre-surveys" (spring and fall 2005) and six random surveys (spring and fall 2006, fall 2007 and fall 2008) stratified on the basis of depth (0–30m, 30–50m and >50m). Hauls were carried out by day using two or four gears simultaneously (stretched codend mesh size = 40,2±0,83mm). A total of 68 stations were sampled in spring 2005, 62 in fall 2005, 42 in spring 2006, and 67 in fall 2006–2010 (Figure 5.1.2.4.2). All the commercial species in the catches were weighed, counted and measured. In addition, sex and maturity stage of gonads (Holden and Raitt, 1974) were identified on the sole specimens.

Standardized (km^{-2}) abundance and biomass indices, spatial distribution maps and size frequency distributions were calculated for all the species showing a high vulnerability towards *rapido* trawl (*S. solea*, *Sepia officinalis*, *Scophthalmus rhombus*, *Psetta maxima*, *Platichthys flesus*, *Aequipecten opercularis*, *Pecten jacobaeus* and *Melicerthus kerathurus*).

Spatial distribution of recruits and spawning females were mapped for sole. Underestimation of small sole specimens in catches was corrected using the selectivity parameters given by Ferretti and Froglia (1975).

In 2009, the Italian Ministry of Agriculture (MIPAF), after the evaluation of its scientific panel, decided to support the SoleMon survey, as ARTS proposal (Adriatic "Rapido" Trawl Survey), to be co-founded in the EC Data Collection Framework.

During the 2010 Regional Coordination Meeting for the Mediterranean and Black Sea (RCM Med&BS) held in Varna (17–21/05/2010), the ARTS proposal was included in the list of proposed surveys for the Mediterranean. The proposed list has been evaluated by an external Review Group in October 2010 during the SGRN 10-03: Review of needs related to surveys. The Subgroup evaluated the ARTS proposal with the highest priority score (1.05) among the proposed surveys in the Black Sea and Mediterranean.

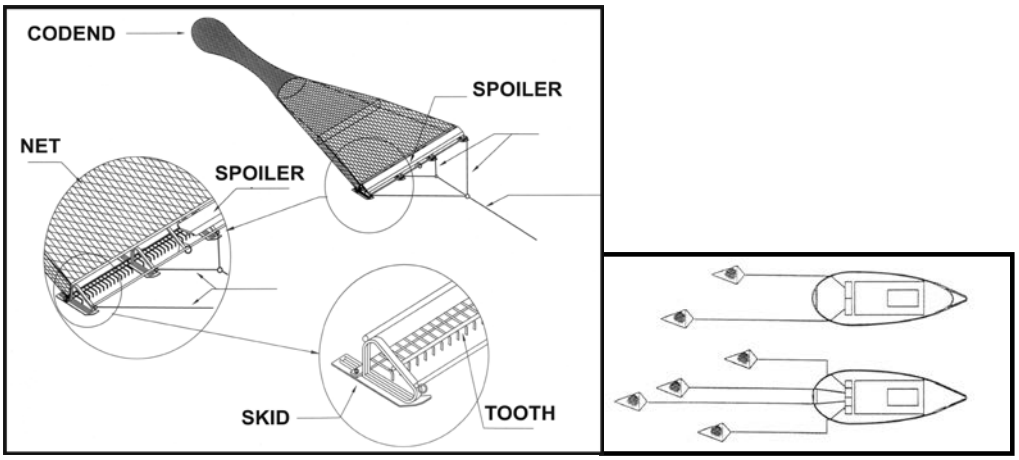


Figure 5.1.2.4.1.Scheme of the "rapido" trawl used for the survey.

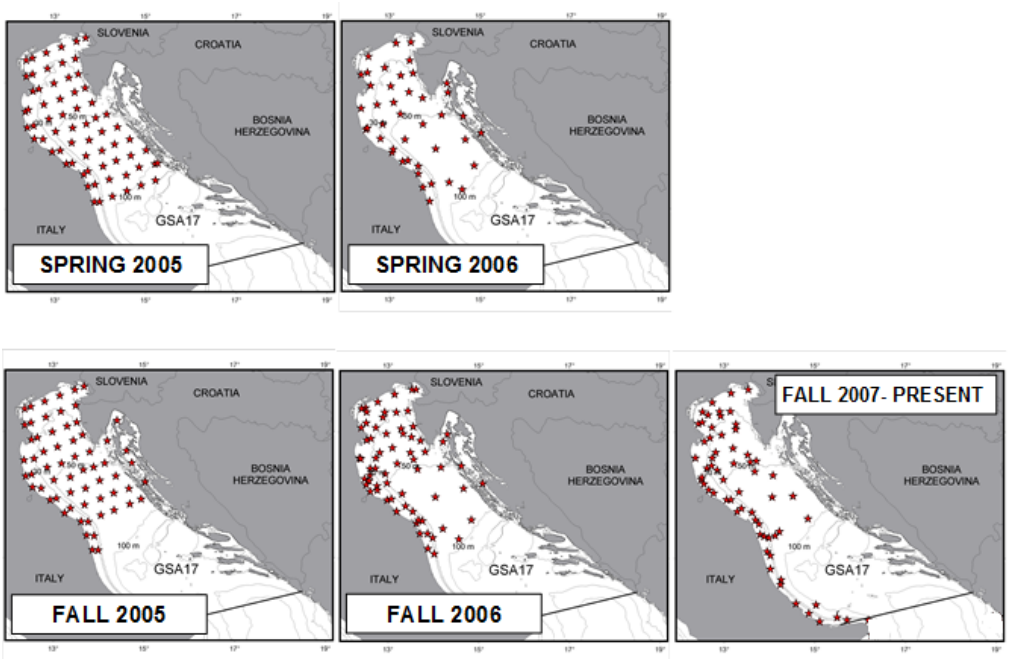


Figure 5.1.2.4.2. Maps of the stations sampled during "rapido" trawl surveys.

5.1.3 Survey summary sheets offshore surveys per country

5.1.3.1 Survey summary Belgium

Nation:	Belgium	Vessel:	RV "Belgica"
Survey:	Offshore North Sea Beam Trawl Survey	Dates:	23 August to 3 September 2010

Survey description:	An annual North Sea Beam Trawl Survey is carried out in the southwestern part of the North Sea (IVb and IVc West) to sample the adult flatfish stocks, primarily targeting plaice Pleuronectes platessa and sole Solea solea. 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, a 40 mm codend and chain mat.
Notes from survey (e.g. problems, additional work etc.):	61 valid stations done. One station (81b) was missed because of the presence of an anchored vessel on the track. Station 2 had to be moved because a windmill has been built there, and station 93 was fished a second time after the catch was partially lost because of a rupture of the codend. No overlap with stations of the UK BTS could be realized because of bad wheather. Number of otoliths: 25 ind per cm size class in BTS Area's for cod, brill, turbot, plaice and sole. For sole in the Statistical Rectangles 31F1, 32F2 and 33F1 (the three overlapping rectangles with the UK offshore survey), the step was made to a rectangle-based sampling design for biological parameters, so here 25 ind per cm size class were sampled in each of the three rectangles. Indices for plaice and sole are the numbers per hour, averaged by ICES rectangle and averaged over all sampled ICES rectangles.

Target species catch rates:

	Time-series mean nr. per hr	2010 mean nr. per hr
Plaice	56.2	90.8
Sole	90.0	63.0

Number of fish species recorded and notes on any rare species or unusual catches:

The NS BTS measures all commercial fish species to the 5 mm below (no subsampling), and also records all other fish species by length (mostly all individuals, but sometimes based on subsamples). 48 different species of fish were caught.

The top 10 by number are:

Species	Total number
Dab *(Limanda limanda)*	5175
Lesser Weever *(Echiichthys vipera)*	2920
Plaice *(Pleuronectes platessa)*	2566
Sole *(Solea solea)*	2363
Whiting *(Merlangius merlangus)*	2193
Common Dragonet *(Callionymus lyra)*	1529
Scaldfish *(Arnoglossus laterna)*	723
Solenette *(Buglossidium luteum)*	640
Lemon Sole *(Microstomus kitt)*	596
Pogge *(Agonus cataphractus)*	580

Number of epifauna species recorded	All individuals of epibenthic/benthic species and occasionally caught pelagic species are recorded on the species-level whenever possible (or the most detailed taxonomical level otherwise) based on complete catches (subsampling only for the bigger catches). A selected list, decided upon by WGBEAM, is presented to the WGBEAM.
Index revisions:	The number of otoliths collected per cm class per species per BTS Area was increased from 20 to 25.

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	comments
VIb, c	62 fixed stations	4 m beam trawl	59	
Number of biological samples (maturity and age material, *maturity only):				

25 otoliths per cm size class are collected per BTS Area for cod, brill, turbot, plaice and sole in BTS Area's, and the fish these came from are also sexed. For sole in the Statistical Rectangles 31F1, 32F2 and 33F1 (the three overlapping rectangles with the UK offshore survey), 25 ind per cm size class were sampled (see WGBEAM 2010 for motivation).

No maturity information is recorded (inappropriate period of the year), but gonads of rays are collected for maturity-studies, and vertebrae for age-studies.

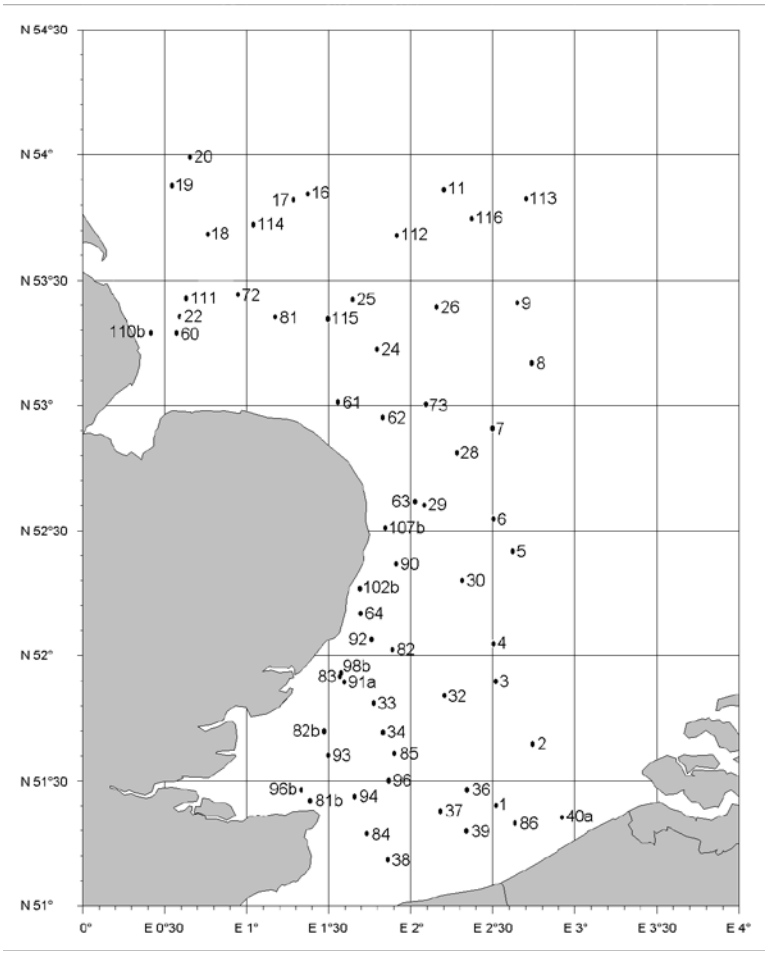


Figure 5.1.3.1.1. Towing positions "Belgica" Beam Trawl Survey.

5.1.3.2 Survey summary England: IVc, VIId

Nation:	UK (England and Wales)	Vessel:	RV "Cefas Endeavour"
Survey:	12/10	Dates:	17 July – 31 July 2010

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.):	A total of 95 valid tows were successfully completed out of a total of 100 stations attempted. It was not possible to collect a valid sample from 5 stations, despite one of these being attempted twice. One tow was invalid on the first attempt but repeated successfully. As in previous years 24 of the deployments were less than the standard 30 minute duration either because large catches of benthos and dead shell were expected of there were similar associated, or other, problems encountered during the deployment of the gear. A number of additional survey aims were successfully completed, which included the collection of data on litter, samples for isotope and radiochemical analysis, as well as the tagging of rays for a survivability study.
At Target species catch rates:	
Number of fish species recorded and notes on any rare species or unusual catches:	67 separate species / genera of finfish were caught. The top 10 by number are:
Number of epifauna species recorded:	109 separate infauna species / genera were observed during the 2010 survey across both ICES divisions.
Index revisions:	

	Time-series mean no. per hr	2010 mean no. per hr	Time-series mean catch weight per hr (kg)	2010 mean catch weight per hr (kg)
Sole	40.32	38.26	4.44	4.18
Plaice	37.61	76.31	9.17	15.91

Pleuronectes platessa	3512
Buglossidium luteum	2905
Callionymus lyra	2784
Solea solea	1691
Limanda limanda	1565
Merlangius merlangus	781
Agonus cataphractus	730
Arnoglossus laterna	557
Trachinus (echiichthys) vipera	445
Scyliorhinus canicula	355

Stations fished:

ICES Divisions	Strata	Gear	Total no. of stns fished	No. of invalids stns	No. of stns fished without results	Total Valid	Comments
VIId & IVc	None	4m beam trawl	102	7	5	95	

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
Pleuronectes platessa	1248	*Scophthalmus rhombus*	32
Solea solea	1052	*Scophthalmus maximus*	19
Limanda limanda	609	*Dicentrarchus labrax*	8
Microstomus kitt	109	*Gadus morhua*	5
Platichthys flesus	62		

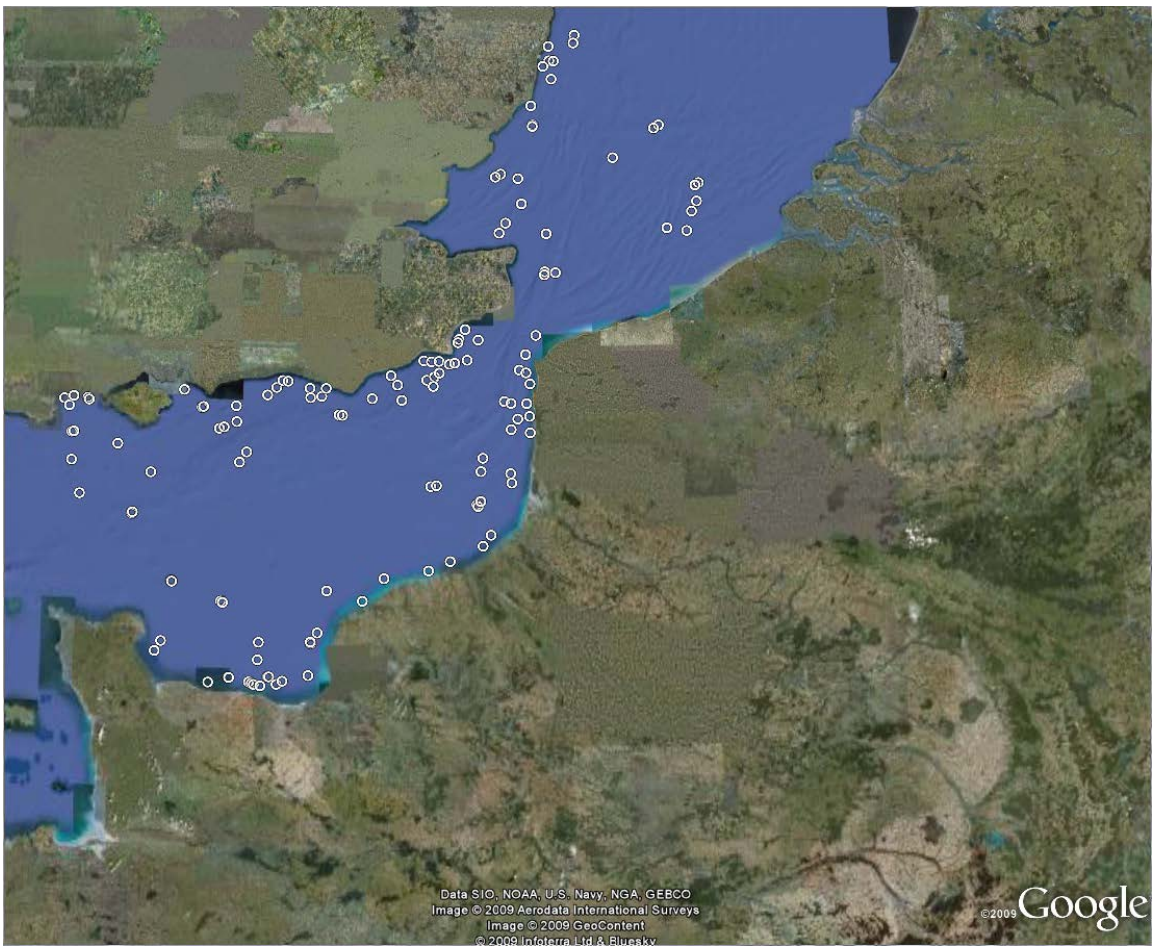


Figure 5.1.3.2.1. Towing Positions "Endeavour" on VIId BTS.

5.1.3.3 Survey summary England: VIIa and VIIf

Nation:	UK (England and Wales)	Vessel:	RV "Cefas Endeavour"
Survey:	14/10	Dates:	10 Sept – 2 Oct 2010

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.):	The survey was completed without incident. At seven stations the tow duration was reduced from 30 to 15 minute tows because of expected large catches of weed, shell/small fish, as a precaution against gear damage. In addition, 8 prime stations were reduced to 15 or 20 minute tows as aprecautionary measure following invalid tows due to damaged gear, new tow positions or exceptionally large catches seen on previous surveys. A few other stations were moved short distances to avoid snagging undersea cables (an increasing problem in this busy sea area) or to avoid static gear. A significant amount of additional aims were carried out. These included quantifying epibenthos at selected stations, collection of water samples for tritium, collection of genetic brill and turbot fin clips, details of litter bycatch, the tagging of ray species for a survivability study and the collection of samples finfish and queen scallop for stable isotope collection.

Target species catch rates:

	Time-series mean no. per hr	2010 mean no. per hr	Time-series mean catch weight per hr (kg)	2010 mean catch weight per hr (kg)
Sole VIIa	31.22	9.53	4.11	1.46
Sole VIIf	75.13	46.82	8.13	7.01
Plaice VIIa	213.33	269.30	18.75	19.96
Plaice VIIf	29.46	43.61	5.11	6.38

Number of fish species recorded and notes on any rare species or unusual catches:

78 separate species / genera of finfish were caught. The top 10 by number are:

Limanda limanda	11228
Pleuronectes platessa	7948
Buglossidium luteum	4776
Callionymus lyra	2399
Trisopterus minutus	2227
Scyliorhinus canicula	1522
Arnoglossus laterna	1351
Solea solea	1214
Merlangius merlangus	1212
Eutrigla gurnardus	726

Number of infauna species recorded	140 separate infauna species / genera were observed during the 2010 survey across both ICES divisions. At 25 selected stations 32 "core species" were quantified.
Index revisions:	

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	43	6	2	116	

Number of biological samples (maturity and age material, *maturity only):			
Species	**Number**	**Species**	**Number**
Pleuronectes platessa	1811	*Lophius piscatorious*	42
Solea solea	646	*Scophthalmus maximus*	36
Limanda limanda	481	*Scophthalmus rhombus*	29
Merlangius merlangus	182	*Zeus faber*	21
Microstomus kitt	140	*Dicentrarchus labrax*	14
Melanogrammus aeglefinus	110	*Merluccius merluccius*	10
Gadus morhua	107	*Mullus surmuletus*	6
Lepidorhombus whiffiagonis	61	*Lophius budegassa*	1

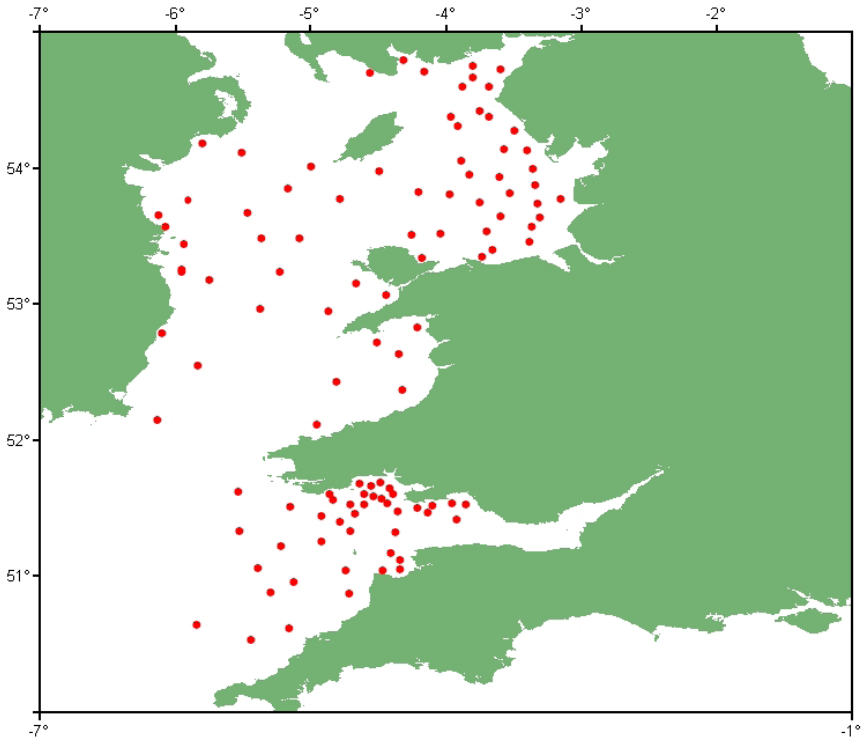


Figure 5.1.3.3.1. Towing Positions "Cefas Endeavour" on VIIa and VIIf BTS.

5.1.3.4 Survey summary England: VIIe

Nation:	UK (England and Wales)	Vessel:	FV "Carhelmar"
Survey:	2/10	Dates:	11–17 October 2010

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". For the 2010 survey all stations were successfully sampled, without any significant problem, althouh prime station L6 had to be repeated because the codend was not secured properly at the first attempt. Problems associated with historically large catches of broken shell / gravel were less of a problem for the 2010 survey that could have been attrituable to preceeding rougher weather conditions. One tow was reduced from 30 to 15 minutes due the trawl becoming full with broken shell/gravel. Weights are only recorded for individual biological samples.
Target species catch rates:	
Number of fish species recorded and notes on any rare species or unusual catches:	60 separate species/ genera of finfish were caught in 2010. The top 10 by number are:
Number of infauna species recorded	Six species of commercial shell-fish (mollusca and crustacea) and cephalopods were measued at each station. 53 other epibenthic species / genera were observed The most common species noted was Asterias rubens that occured at 90% of the stations.

	Time-series mean no. per hr	2010 mean no. per hr
Sole	14.98	21.95
Plaice	18.70	44.62

Pleuronectes platessa	1294
Scyliorhinus canicula	896
Aspitrigla cuculus	847
Limanda limanda	664
Solea solea	629
Merlangius merlangus	525
Trisopterus luscus	371
Eutrigla gurnardus	278
Lophius piscatorius	206
Raja clavata	89

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**
Pleuronectes platessa	440	*Solea solea*	354
Lophius piscatorious	115	*Microstomus kitt*	16
Gadus morhua	2		

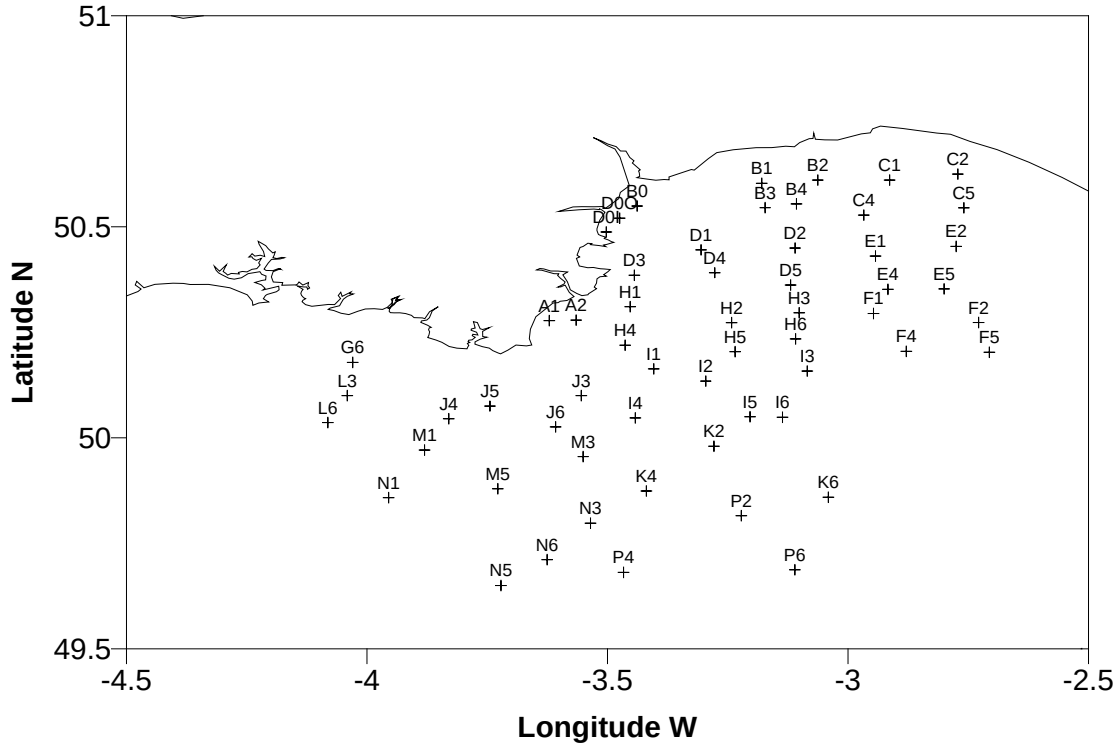


Figure 5.1.3.4.1. Towing Positions "Carhelmar" on VIIe BTS.

5.1.3.5 Survey summary Germany

Nation:	Germany	Vessel:	RV "Solea"
Survey:	BTS	Dates:	12 – 23 Aug 2010

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.
Notes from survey (e.g. problems, additional work etc.):	54 hauls were carried out (approx. 27 hours fishing time).
Target species catch rates:	**TIME-SERIES MEAN NO. PER HR** / **2010 MEAN no. per hr** Sole 4.01 3.3 Plaice 265.29 327.12
Number of fish species recorded and notes on any rare species or unusual catches:	42 separate species of finfish were caught. The top 10 by number are: *Limanda limanda* 15918 *Pleuronectes platessa* 8423 *Buglossidium luteum* 1732 *Pomatoschistus minutus* 1419 *Hippolossoides platessoides* 953 *Eutrigla gurnardus* 843 *Arnoglossus laterna* 686 *Agonus cataphractus* 353 *Callionymus lyra* 286 *Microstomus kitt* 282
Number of epifauna species recorded:	50 epifauna (attached and free-living) species were observed during the 2010 survey.
Index revisions:	

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
North Sea IVb	N/A	7m beam trawl	54	54	**	0	54	

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
Pleuronectes platessa	1229	*Limanda limanda*	1635

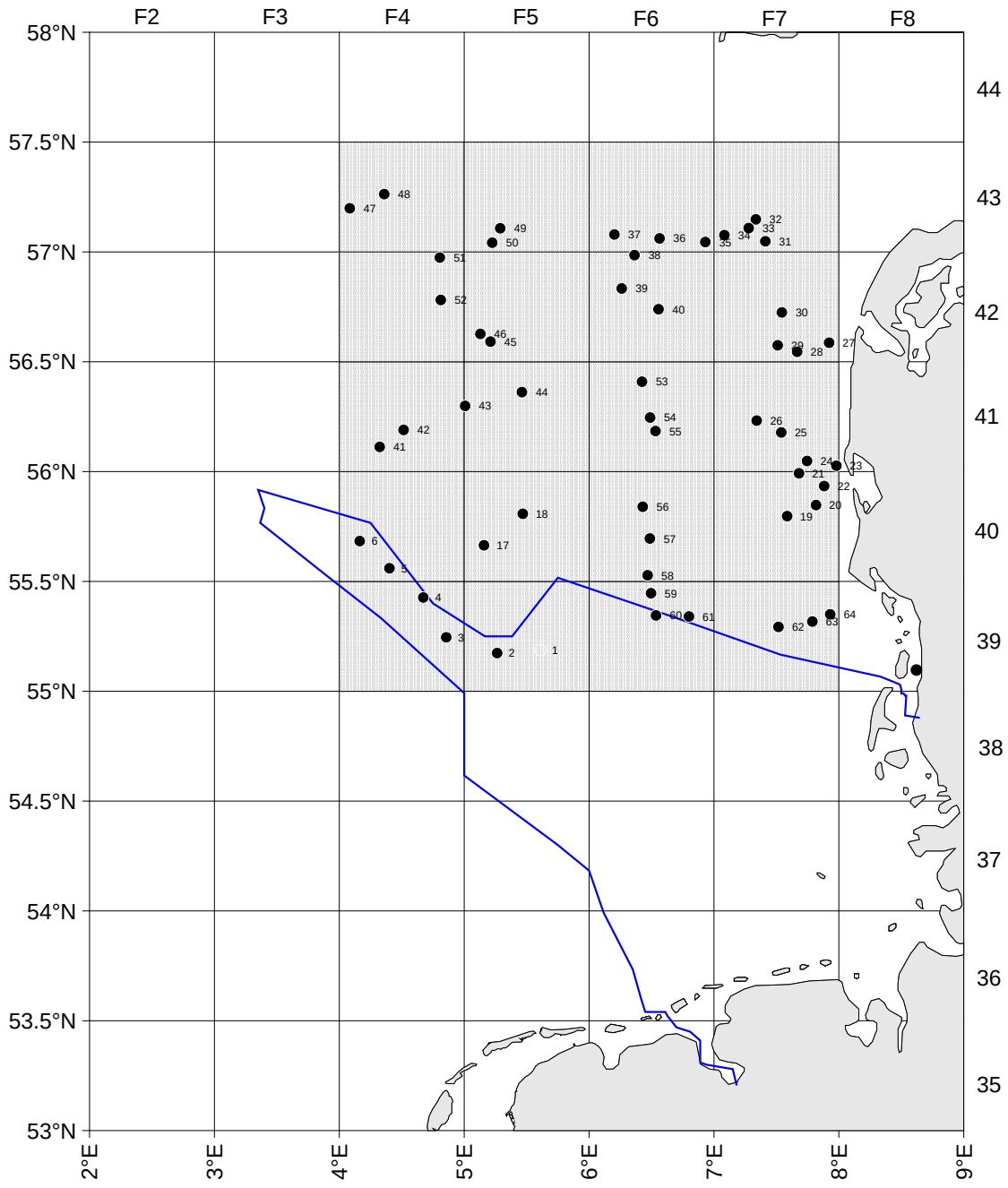


Figure 5.1.3.5.1. Towing positions "Solea" Beam Trawl Survey.

5.1.3.6 Survey summary France

Nation :	France	Vessel :	NO "Gwen Drez"
Survey :	ORHAGO 10	Dates :	30 Oct – 04 Dec 2010

Survey description:	Q4 Bay of Biscay survey to collect data on distribution and relative abundance, with biological information on some commercial fish species in VIIIab. The principal target species is sole, with additional species including Nephrops norvegicus, sand sole, thickback sole and senegalese sole.
Gear details :	Steel 4m-beam trawl with chain mat, 50mm trawl with 45mm codend and 20mm purse.
Notes from survey (e.g. problems, additional work etc.) :	112 hauls were carried out (approx. 54 hours fishing time). 54 replicate tows were made for day-night studies. Bottom temperatures were recorded during each haul.

Target species catch rates :

	Time series mean no. per hr	2010 mean no. per hr	Time series mean catch weight per hr	2010 mean catch weight per hr (kg)
Sole (day)	46.0	57.8	5.7	7.3
Sole (night)	53.1	60.1	6.5	8.4
Sole (total)	49.5	58.9	6.1	7.8

Number of fish recorded and note on any rare species or unusual catches :

67 separate species of finfish were caught at day and 61 separate species of finfish were caught at night. The top 10 by number per hr are :

Day		Night	
Arnoglossus laterna	79.2	*Callionymus lyra*	73.4
Callionymus lyra	60.7	*Arnoglossus laterna*	72.3
Solea solea	58.9	*Buglossidium luteum*	69.2
Buglossidium luteum	56.4	*Solea solea*	61.3
Trisopterus luscus	46.7	*Trisopterus luscus*	54.7
Merluccius merluccius	36.3	*Trisopterus minutus*	44.5
Gobius niger	27.2	*Microchirus variegatus*	44.0
Trisopterus minutus	23.9	*Dicologlossa cuneata*	17.9
Microchirus variegatus	21.6	*Gobius niger*	16.6
Dicologlossa cuneata	19.4	*Merluccius merluccius*	15.1

Number of epifauna species recorded: 36 separates epifauna species at day and 31 separates epifauna species at night were observed during the 2009 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	54		4	0	112	54 replicate tows for day-night studies.

Number of biological samples (*age materiel only)			
Species	**Number**	**Species**	**Number**
Solea solea maturity and age	1 002	*Mullus surmuletus* *	95
Solea solea maturity only	1946	*Merluccius merluccius* *	N/A
Argyrosomus regius *	120	*Lophius sp.**	103

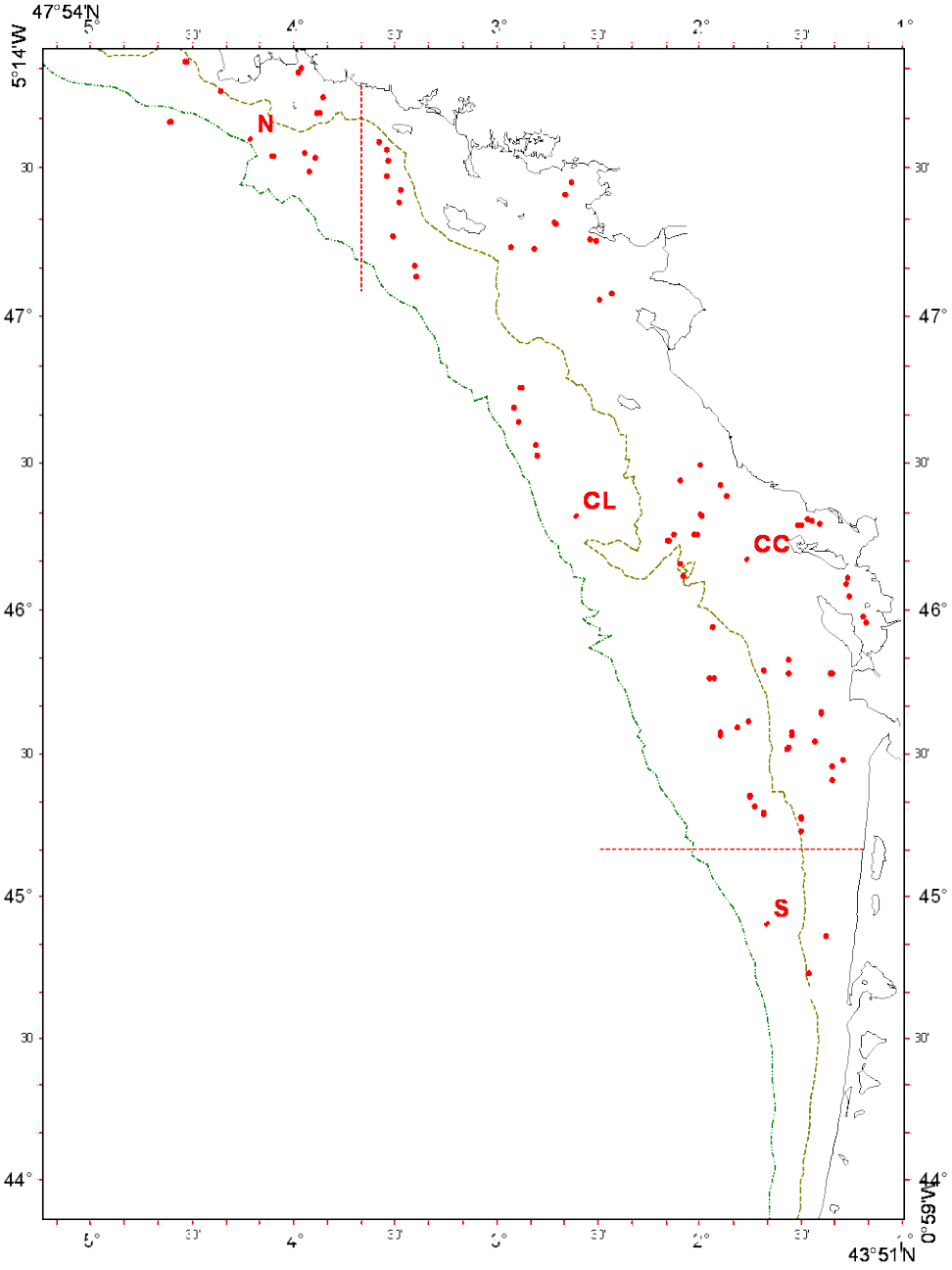


Figure 5.1.3.6.1. Towing positions "Gwen Drez" (day and night).

5.1.3.7 Survey summary Italy and Slovenia

Nation:	Italy and Slovenia	Vessel:	N/O G. Dallaporta
Survey:	SoleMon	Dates:	4 Nov – 18 Nov 2010

Survey description

SoleMon survey aims to collect data on distribution and relative abundance, with biological information on commercial fish species in FAO-GFCM Geographical Sub-Area 17. The primary target species is sole, with additional species including cuttlefish, scallop, queen scallops, turbot, brill, skates, purple dye murex and caramote prawn.

Gear details:

Modified beam trawl with a rigid mouth. The frame is rigged with iron teeth along the lower leading edge. Joined to the iron frame there are 4 skids and a reinforced rubber diamond-mesh net in the lower part to protect the polyamide net bag tied to the iron frame (Width: 3.5 m; Weight: 225 kg; Four 120-mm wide skids; 40-mm codend mesh size). The beam trawl is provided with DST Logic Temperature and Depth Recorders.

Notes from survey (e.g. problems, additional work etc.):

The survey was completed without incident. CTD sampling were carried out in each of the 67 stations. A total of 25 stations had to be fished for less than 30 minutes. This was mainly due to large by catches of benthis and/or as a precaution against gear damage. A significant amount of additional aims were carried out. These incldued Solea solea, Scophthalmus rhombus and Scophthalmus maximus finclips for comparative population genetics structure, collection of samples for TBT contaminants analysis, maturity stages of Sepia officinalis, epibenthos analysis.

Target species catch rates:

	Time series mean no. per hr	2010 mean no. per hr	Time series mean catch weight per hr (kg)	2010 mean catch weight per hr (kg)
Sole GSA17	37.60	21.36	3.37	2.13

Number of fish species recorded and notes on any rare species or unusual catches:

60 separate species of finfish were caught. The top 10 by number per square km are:

Arnoglossus laterna	526.91
Buglossidium luteum	198.83
Gobius niger	71.23
Merluccius merluccius	70.66
Serranus hepatus	61.95
Uranoscopus scaber	52.2
Lepidotrigla cavillone	45.51
Trachinus draco	36.91
Chelidonichthys lucernus	34.83
Pagellus erythrinus	28.41

Number of infauna species recorded

168 separate infauna species were observed during the 2010 survey.

Index revisions:

Stations fished:

GSA	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	comments
17	3 depth strata	2 x 3.5m modified beam trawls	67			0		

Number of biological samples (maturity and age material, *maturity only):		
Species	**Number**	
Solea solea	500	(otolith)

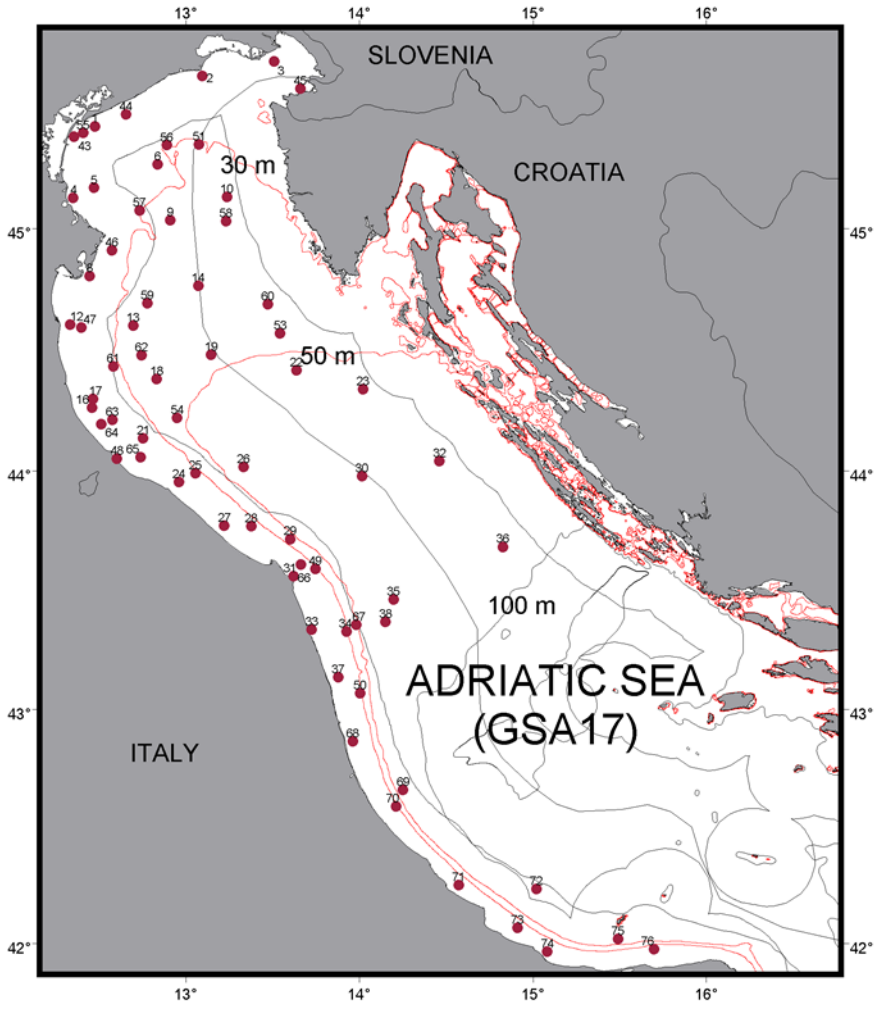


Figure 5.1.3.7.1. Station positions for Northern Adriatic Beam Trawl survey.

5.1.3.8 Survey summary Netherlands: Tridens

Nation:	Netherlands	Vessel:	RV "Tridens"
Survey:	BTS (Beam Trawl Survey)	Dates:	23 Aug – 17 Sep 2010

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 Cancer pagurus, Nephrops norvegicus 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:	74 hauls were carried out (approx. 37 hours fishing time). The survey was not completed due to technical problems with RV "Isis". Tridens took over a part of the stations of RV "Isis" but as a result couldn't finish its own program. Due to bad weather extra delay occurred. Priority was given to the index area and so, only one rectangle of the Isis area was not sampled and two of the Tridens area. 13 stations outside the Tridens index area were skipped. For the Isis stations sampled by Tridens the 8 meter beam trawl withiout a flip-up rope was used. 17 stations were used for the index calculation in the Isis area. Net damage was repaired within a few hours. Vertical CTD measurements were carried out after each haul. In 2010 during the second half of the cruise the net on port side was the Isis net –without a flip-up rope. To study the differences between the nets, for each station starbord and porrtside net were sorted for plaice, sole, turbot and brill. Vertical CTD measurements were carried out after each haul. In 2010, the Tridens took over Isis stations.
Target species catch rates:	

	TIME SERIES	2010 MEAN
	mean no. per hr	no. per hr
Sole	no index	
Plaice	81.750	112.81

Number of fish species recorded and notes on any rare species or unusual catches:

56 separate species of finfish were caught.

The top 10 by number are (including the stations within the Isis area):

Limanda limanda	32959
Pleuronectes platessa	26017
Buglossidium luteum	5910
Arnoglossus laterna	4269
Hippoglossoides platessoides	3913
Eutrigla gurnardus	2980
Merlangius merlangus	2143
Microstomus kitt	1650
Callionymus lyra	1573
Trisopterus esmarkii	941

Number of epifauna species recorded:	155 epifauna (attached and free-living) species were observed during the 2010 survey.
Index revisions:	

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
North Sea	N/A	8m beam trawl	46	11	0	1	56	

Number of biological samples (age material), including hauls with Isis gear:			
Species	**Number**	**Species**	**Number**
Pleuronectes platessa	1174	*Psetta maxima*	60
Limanda limanda	566	*Merluccius merluccius*	52
Microstomus kitt	428	*Scophthalmus rhombus*	45
Solea solea	318	*Microchirus variegatus*	31
Hippoglossoides platessoides	279	*Platichthys flesus*	9
Gadus morhua	210	*Molva molva*	6
Arnoglossus laterna	62	*Zeugopterus norvegicus*	3

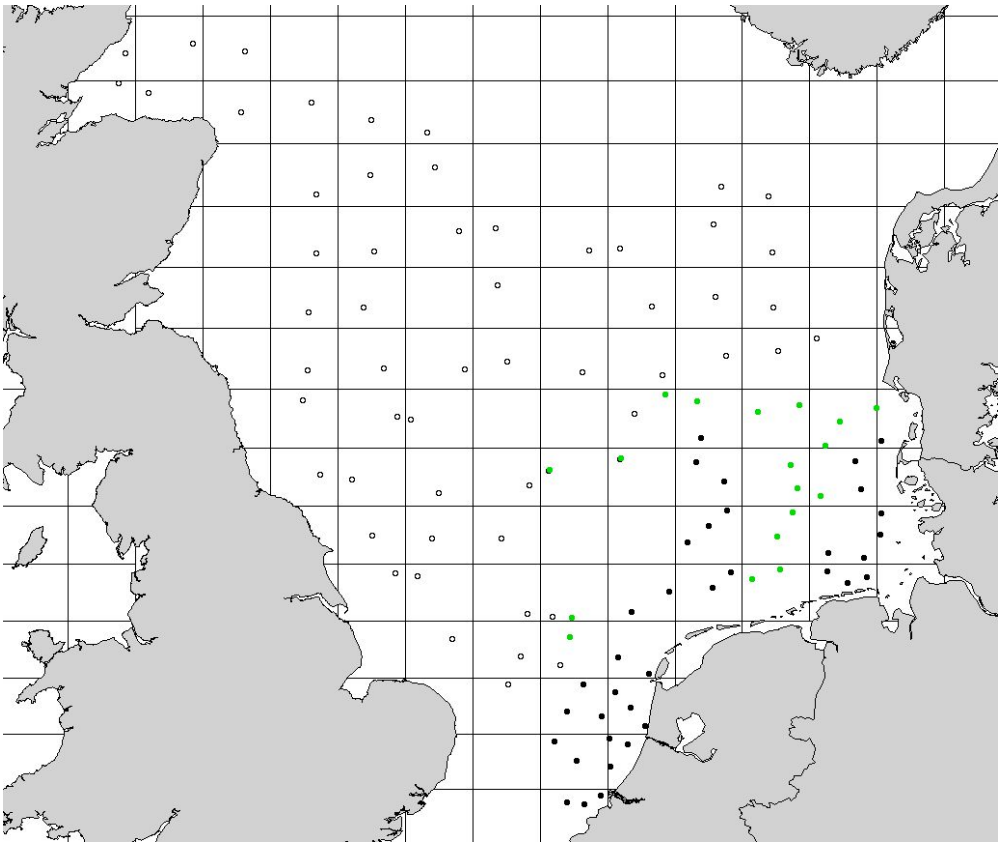


Figure 5.1.3.8.1. Towing positions Dutch Beam Trawl survey: open rounds=Tridens, black bullets=Isis, green bullets=Isis stations sampled by Tridens (in Isis summary sheet).

5.1.3.9 Survey summary Netherlands: Isis

Nation:	Netherlands	Vessel:	RV "Isis"
Survey:	BTS (Beam Trawl Survey)	Dates:	9 Aug - 1 Sep 2010 (Isis), 6–17 Sep 2010 (Tridens)

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 Cancer pagurus, Nephrops norvegicus 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:	37 hauls were carried out (approx. 18 hours fishing time) by Isis. During the third week of the survey it was not possible to fish due to bad weather. In the fourth week (of five) of the survey, the hydraulic system of RV "Isis" broke down. The priority stations were taken over by RV "Tridens" (see survey summary sheet RV "Tridens"). In order to cover the index area, 17 additional samples (approx. 9 hours fishing time) with the Isis gear were taken by "Tridens". On 2 stations data were collected for the Isis index as well for the Tridens index. CTD measurements were taken using a Hydrolab CTD attached to the net.

Target species catch rates:

	TIME SERIES	2010 MEAN
	mean no. per hr	no. per hr
Sole	50.38	72.42
Plaice	793.41	1228.41

Number of fish species recorded and notes on any rare species or unusual catches:

38 separate species of finfish were caught.
The top 10 by number are:

Pleuronectes platessa	31410
Limanda limanda	17768
Arnoglossus laterna	3880
Solea solea	2430
Buglossidium luteum	2258
Callionymus lyra	1545
Agonus cataphractus	1471
Merlangius merlangus	694
Echiichthys vipera	632
Eutrigla gurnardus	593

Number of epifauna species recorded:	40 epifauna (attached and free-living) species were observed during the 2010 survey.
Index revisions:	

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
North Sea	N/A	8m beam trawl	37+18	55	2		57	2 overlapping Tridens/Isis stations taken into account for index

Number of biological samples (age material):			
Species	**Number**	**Species**	**Number**
Pleuronectes platessa	271	*Microstomus kitt*	22
Solea solea	295	*Scophthalmus rhombus*	48
Limanda limanda	122	*Gadus morhua*	1
Psetta maxima	54		

5.1.4 Staff exchange

In the context of staff exchange and standardization of survey methods, ICES WGBEAM 2010 agreed that a member of ILVO (Belgium) would participate in the Cefas (England) offshore Beam Trawl Survey in ICES Divisions VIIfg (Celtic Sea) and VIIa (Irish Sea). The observations on differences and similarities by the staff involved in this exchange should help the involved parties and WGBEAM to better understand and coordinate the surveys from an international perspective.

The above mentioned exchange was successfully organized and a Belgian observer (Kelle Moreau, ILVO) joined the Cefas survey in the third quarter of 2010. The survey was carried out on board of the RV "Cefas Endeavour" that sailed from Lowestoft on 10 September 2010, to return there on 2 October 2010. The Belgian participant stayed on board until 23 Sep 2010 (when he disembarked in Douglas, Isle of Man), and had the chance to contribute to the processing of the catches of 67 hauls in the period 12–22 September, that were divided over the survey sectors in the following way: 32 stations in Inner Bristol Channel, 8 stations in Saint George's Channel, 13 stations in Irish Sea South and 14 stations in Irish Sea North. This experience gave him the opportunity to make a detailed comparison between vessels and practices on the English and Belgian offshore surveys, both focusing on scientifically relevant issues and non-scientific ('human') aspects.

This summary briefly describes some observed differences and similarities.

Vessel properties and logistics

A detailed technical comparison of the RV "Cefas Endeavour" and the RV "Belgica" (used by ILVO) was made regarding vessel properties, logistics and crew facilities (see Annex 17). In terms of vessel dimensions, the most important finding was that the extra available space on the larger Cefas Endeavour creates possibilities for 1) including more tasks to focus on (getting more out of the time at sea, which is to be considered a scarce resource), and 2) a more efficient processing of the catches (see further).

Objectives and survey design

Although the English and Belgian offshore beam trawl surveys were originally not set up as one survey, they nowadays follow the same manual and focus primarily on the same objectives (collecting fisheries independent data for plaice, sole and some additional commercially important species) under the coordination of WGBEAM.

Both surveys annually (quarter 3) attempt to fish a fixed number (119 on "Endeavour", 62 on "Belgica") of fixed stations, with tows lasting 30 min (shorter if large numbers of small fish or high bycatch of benthic species and/or non-biological materials, but not less than 15 min) while fishing at 4 knots over the ground during daytime.

Survey gear and gear deployment

Due to the different origins of the two compared surveys, no standardization in gears has taken place over time. Nevertheless the used gears are very similar: both countries use a 4m steel beam trawl equipped with a chain mat and a 40 mm codend liner, and both vessels trawl from the aft. The English beam trawl is additionally equipped with flip-up ropes.

As opposed to the practice on RV "Cefas Endeavour", where the permanent vessel crew prepares, inspects, deploys and hauls the gear, and brings the catch to the scientists, the ILVO-crew plays an important role in all these tasks on board of RV "Belgica".

Catch sorting and collection of fish data

Both Belgium and England weigh and sort the entire catch for all fish species and the main commercial invertebrates, identify the organisms to the lowest taxonomic level possible and document numbers and weights by species. On the English offshore survey, a selection of species/size categories of species may be identified for subsampling in case of larger catches. Belgium also sorts the remaining fraction of benthos/epibenthos (or – in case of large catches – a 'mixed' subsample that is representative for the entire catch) to the lowest taxonomic level possible and records numbers per taxon, whereas England only documents presence/absence of these taxa.

All fish species and the main commercial invertebrates are measured to the cm below (total length) by Belgium, while brown crab and common lobster are measured to 0.5 cm below. England also records lengths to 1 cm below for all fish (with the exception of herring and sprat that are measured to 0.5 cm below) and implements a resolution of 0.1 cm for shellfish. For elasmobranchs, it is recommended that fish should be measured and weighed by sex. Subsampling may occur on both the Belgian and English surveys when numbers of a certain species are extremely high.

Sampling for age and sex is carried out by Belgium only for cod, turbot, brill, plaice and sole. For plaice and sole, a maximum of 25 otoliths was collected by cm class and flatfish area in 2010 (max. of 20 before 2010). Maturity stages are only investigated for rays. England documents biological parameters (age, sex and maturity) for a larger number of species, adding rays, monkfish, haddock, whiting, sea bass, halibut, dab and lemon sole to the above mentioned Belgian list.

Deck/fish lab layout

In this summary, we only elaborate on the layout of the fish lab on both vessels, and the consequences this has for the data collection.

On RV "Belgica", the sorting of the catches can only take place on one sorting table that is positioned in the fish lab. This set up makes it very difficult for all scientists to participate in this task, meaning that some people are jobless during the process of the sorting. Additionally, there is almost no space to install a sufficient number of sorting trays to sort out all fish species in one go. Sometimes, certain species have to be combined and taken to a second sorting round. On RV "Cefas Endeavour", the sorting takes place outside the fish lab (under a shelter) where there is much more place to install a larger number of sorting trays so the sorting can be carried out more efficiently.

On RV "Belgica", the available working space in the fish lab only permits for the installation of two electronic measuring boards, of which only one is connected to a scale to record individual weights (this one is used for most species, while the one

without scale is only used to record lengths of smaller species without any commercial interest, such as lesser weever, scaldfish, solenette). This way, usually only the recording of lengths (and individual weights, where relevant) can be finished before the next catch arrives on deck. Species for which age, sex and maturity data are collected have to be put in the fridge at that moment, only to be taken out again in the evening/night (when the fishing has ended) to collect otoliths and determine sexes. At this time, individual lengths have to be measured again to be able to connect ages to the corresponding lengths. This procedure leads to very long working days (up to a recorded maximum of 19 hrs) for all scientists, and tired people more easily make mistakes. Which otoliths are stored in what trays, numbers of otoliths that have already been collected per cm class and geographical area, sexes and maturities, all has to be recorded manually and transferred to an electronic format after the cruise, since no computer-driven central system telling the users how many individuals of a certain species still need to be documented for certain parameters in certain area's exists on board of RV "Belgica". On RV "Cefas Endeavour" on the other hand, 7 separate working stations were installed in the fish lab. All of these are connected to a central computer, on which the deck master can follow everybody's activities and keep track of the progress. Each of these working stations consists of an electronic measuring board and a scale, and is equipped with the materials needed to collect otoliths (or other calcified structures), determine sexes and maturities. After defining the species, area, depth band, and recording the individual length, the computer tells the user exactly what data need to be collected for that individual. Obviously, the simultaneous processing of catch fractions by seven persons, and the centralized storage of the data of all working stations on one computer, makes the entire process very efficient and leaves only limited space for errors.

Team Structure

Some major differences were observed when comparing the Belgian and English team structures and the whereabouts of some team members.

First of all, on board of RV "Belgica" the Scientist in Charge (SIC) spends most of his time in the fish lab, from where he keeps in touch with the vessel's captain and with the two skippers, one of which is a full time ILVO employee. The coordinating task of the deck master is also taken care of by the SIC. On RV "Cefas Endeavour", the SIC spends a large proportion of the time in the bridge, while the deck master coordinates the sampling activities in the fish lab.

Scientific team sizes on both surveys were comparable in 2010 (RV "Belgica": 8 persons before mid-cruise break, 9 persons after the break; RV "Cefas Endeavour": 10 persons before the mid-cruise break – including the Belgian and also an Irish observer, 8 persons after the break), but the distribution of tasks during the data collection was somewhat different. Where the length measuring, otolith cutting, otolith collecting, sexing and recording of the data all are separate responsibilities of separate people working in a series (passing on the same fish to each other) on RV "Belgica", all these tasks are being taken care of by the same individual on RV "Cefas Endeavour", with several individuals working in parallel.

Environmental data

The Belgian and English trawling gears are nowadays both equipped with a CTD unit collecting continuous data (e.g. temperature, salinity, turbidity) during the tows. Additionally, on RV "Belgica" abiotic data are also documented at the shooting and hauling positions by the on-board CTD-system. On RV "Cefas Endeavour", a vertical

profile is also carried out at the start and end of each fishing day, with a Niskin bottle attached to take a water sample from the bottom to calibrate the data collected.

Conclusion

Although some differences between the two compared surveys are listed above, they obviously have a lot in common due to their similar objectives and gears, their joint manual and the common coordination by WGBEAM. Differences in approach (mostly caused by different logistics on the two vessels) are not considered to lead to differences in data quality and applicability, but the possibilities on board of RV "Cefas Endeavour" create opportunities for a more efficient catch processing.

5.2 Inshore surveys

5.2.1 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-DYFS) 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 5.2.1.1. Details on areas covered by country are given in Annex 5. Details on depth strata fished are given in Annex 11.

Table 5.2.1.1. Overview of surveys during 2010.

Country	Vessel	Area	Dates	Gear
Belgium	Broodwinner	Belgian coastal zone	6 Sep – 20 Sep	6 m shrimp trawl
England	F.V. Suvera & F.V. Fisher Lassie	Thames estuary	26 Aug – 21 Sep	2 m shrimp trawl
England	F.V. Challenge	Northeast English coastal zone	26 Aug – 21 Sep	2 m shrimp trawl
Germany	BK3	German Bight and German Wadden Sea	31 Aug – 29 Sep	3 m shrimp trawl
Netherlands (SNS)	Isis & Jakoriwi	Dutch coastal zone	13 Sep – 28 Sep	6 m beam trawl
Netherlands	Schollevaar	Scheldt estuary	6 Sep – 23 Sep	3 m shrimp trawl
Netherlands	Stern	Dutch Wadden Sea	30 Aug – 30 Sep	3 m shrimp trawl
Netherlands	Isis	Dutch coastal zone and German Bight	29 Sep – 2 Nov	6 m shrimp trawl

5.2.2 Survey results

A summary of each of the surveys is to be found in Section 5.2.4.

During the Belgium inshore survey the usual vessel was unavailable and only 28 stations were carried out. One station was invalid.

The UK inshore survey was completed as planned but one station in Thames station was missed because of dredging activity in the area.

The German inshore survey did not face any difficulties.

Netherlands encountered technical problems during the Isis sole net survey in the Dutch coastal zone and German Bight. It was not possible to start the survey using Isis, so the commercial vessel "Jakoriwi" was hired to partly carry out the survey, using the standard survey gear and design. The Isis demersal fish survey lost 5 stations due to weather conditions.

5.2.3 Catch results

The species composition per country per area for the continental surveys (Coastal, Wadden Sea, and Scheldt Estuary) and aggregated for Thames and Humber for the UK surveys is listed in Annex 14. The selection of species is described in the WGBEAM 2008 report (ICES, 2008).

An analysis of the brown shrimp length data were carried out and the full results can be found in Section 9.1.1.2

5.2.4 Survey summary sheets inshore surveys per country

5.2.4.1 Survey summary Belgium

Nation:	Belgium	Vessel:	O.29 'Broodwinner'
Survey:	Inshore Demersal Young Fish & Brown shrimp Survey	Dates:	6–20 September 2010

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, *Pleuronectes platessa*, and sole, *Solea solea*) and brown shrimp (*Crangon crangon*). Since 1973, 33 fixed sampling stations are fished. Untill 1982, the research vessel Hinders was used, from 1983 onwards the survey was carried out with the training and research vessel O.29 'Broodwinner' (LOA 27.2 m; engine power 221 kW). The location of the sampling area matches 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 11 mm, no tickler chains), at 3 knots against tide.
Notes from survey (e.g. problems, additional work etc.):	Due to unavailability of the usual vessel O.29 during part of the intended survey-period, only 28 sampling stations were fished as planned. 27 stations were valid (station 9 invalid).

Target species catch rates:

2010 data

	2009 mean nr. per 1000 m²	2010 mean nr. per 1000 m²
Plaice	7.03	2.53
Sole	5.51	21.07

Number of fish species recorded and notes on any rare species or unusual catches:

The DYFS focuses on measuring the most important commercial fish (value and/or volume) species to the cm below being cod, whiting, plaice, flounder, dab, sole, brill and turbot. From 2009 on, the species list is extended to cover all commercial fish species caught (e.g. including lesser spotted dogfish, gurnards, lemon sole, …). In this way, 11 species were documented in 2010. Ordered by number, these are:

Species	Total number
Whiting (*Merlangius merlangus*)	5678
Sole (*Solea solea*)	4327
Dab (*Limanda limanda*)	4015
Plaice (*Pleuronectes platessa*)	1194
Horse Mackerel (*Trachurus trachurus*)	134
Flounder (*Platichthys flesus*)	126
Tub Gurnard (*Chelidonichthys lucernus)*	24
Cod (*Gadus morhua*)	11
Turbot (*Psetta maxima*)	5
Mackerel (*Scomber scombrus*)	2
Thornback Ray (*Raja clavata*)	1

Number of epifauna species recorded:	Appr. 500 brown shrimp per station are measured in 5 mm size classes. No other epifauna species are recorded.
Index revisions:	No

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc	N/A	6m beam trawl	33	33	0	1	27	6 stations not fished (see above)

Number of biological samples (maturity and age material, *maturity only):
None

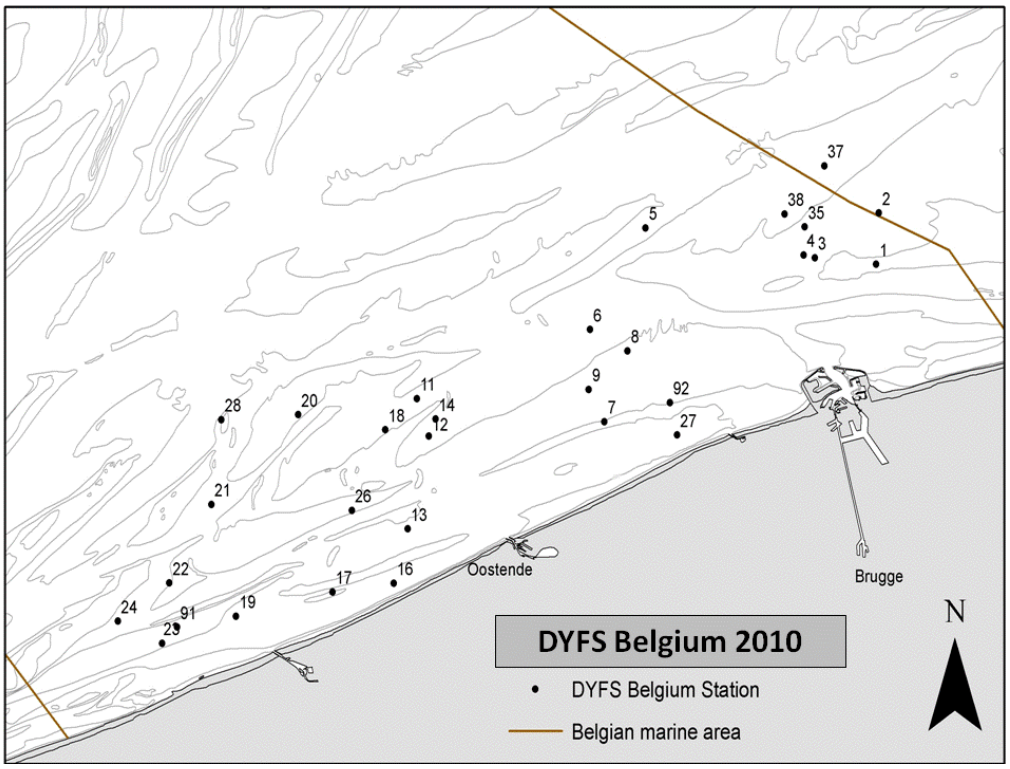


Figure 5.2.3.1.1. DYFS sampling stations in the Belgian coastal waters.

5.2.4.2 Survey summary UK

Nation:	UK (England and Wales)	Vessel:	FV "Challenge", (NE coast & Humber) FV "Fisher Lassie" (N Thames), FV "Suvera" (S Thames)
Survey:	Humber 1/10; Thames 1/10	Dates:	26 August –21 September 2010

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. A total of 161 (81 – NE coast and Humber; 80 – Thames) stations are surveyed annually between late August and early September. Biological information is collected for sole and plaice. Temperature and salinities are recorded at each station, dissolved oxygen content recorded at the Humber stations and the shrimp catch and the epifauna quantified. The survey stopped in 2010.
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 and a total of 160 stations were sampled. It was not possible to complete one of the Thames stations because of dredging activity in the area.

Target species catch rates:

	Time series mean no. per 1000m² (2000 – 2010)	2010 mean no. per 1000m²
Plaice IVc	7.69	5.27
Sole IVc	7.74	6.94

Number of fish species recorded and notes on any rare species or unusual catches:

36 species / genera of finfish were caught. The top 10 by number were:

Gobies (*Pomatoschistus* spp)	112
Dab (*Limanda limanda*)	15
Nilsson's Pipefish (*Syngnathus rostellatus*)	14
Sole (Dover Sole; *Solea solea*)	10
European Plaice (*Pleuronectes platessa*)	7
Pogge (Armed Bullhead; *Agonus cataphractus)*	5
Whiting-Pout (Bib; *Trisopterus luscus*)	4
Lesser Weever Fish (*Echiichthys (Trachinus) vipera*)	2
Sea Snail (*Liparis liparis*)	1
Common Dragonet (*Callionymus lyra*)	1

Number of epifauna species recorded:

Epifauna species / genera were identified and quantified from a standard list at each station as follows:
Up to 7 species / genera of colonial species were observed.
Up to 33 species /genera of free living species were counted.
The shrimp catch was quantified volumetrically.

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Total Valid	Comments
Humber 1/10			81	81	
Thames 1/10			80	79	1 station was not fished because of dredging activity.
IVc Total	Depth band within stratum area	2m beam trawl	161	160	

Number of biological samples (maturity and age material):

Species	Number	Species	Number
Pleuronectes platessa	90	*Solea solea*	111

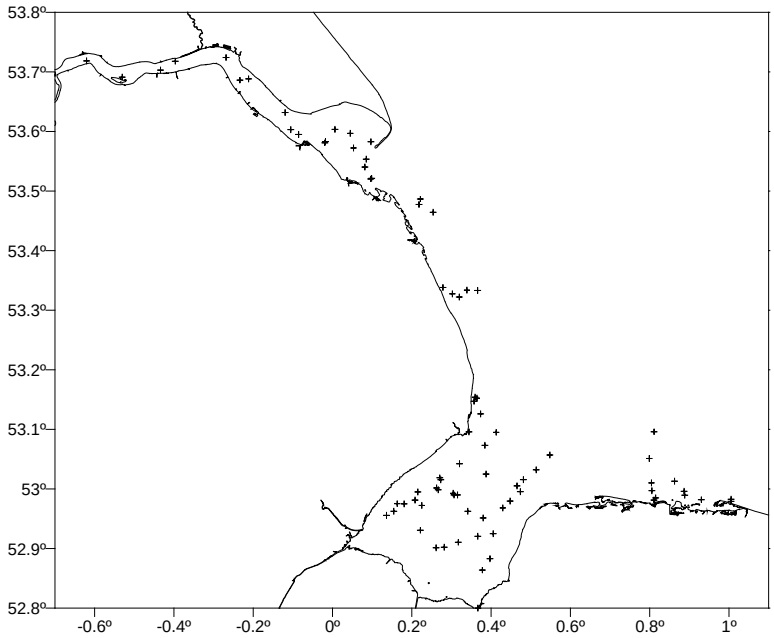


Figure 5.2.3.2.1. Station positions for Humber 1/10.

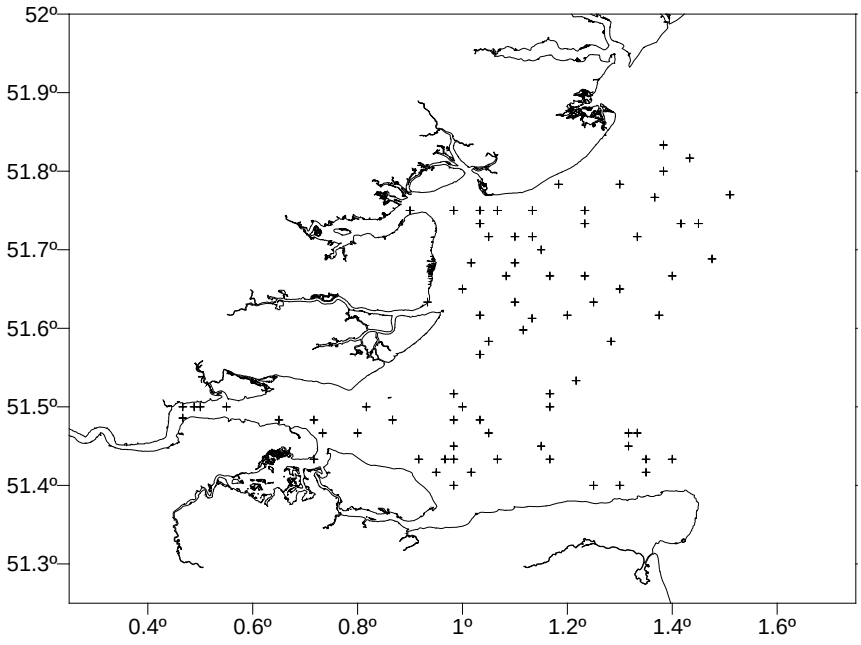


Figure 5.2.3.2.2. Station positions for Thames 1/10.

5.2.4.3 Survey summary Germany

Nation:	Germany	Vessel:	Chartered Cutters
Survey:	DYFS	Dates:	31 Aug – 29 Sep

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.):	vTI-SF 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 avilable 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 SF database. (Species list has changed also over years) In total 151 valid hauls of 157 total haulswere carried out.

Target species catch rates:

	Time-series mean (Schleswig-Holstein only) n/1000m²	2009 mean (Schleswig-Holstein only) n/1000m²	Time-series mean	2009 mean (coastal zone all along Germany) n/1000m²
Plaice	14.40	17.30		16.41
Sole	0.97	0.23		0.59
Cod	0.98	0.66		0.59
Whiting	2.23	1.70		1.21
Brown shrimp	1899	2064.26		2118.19

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 2010. The top 10 by number in 2010 out of 40 taxa:

Pleuronectes platessa	10338
Pomatoschistus minutus	3778
Osmerus eperlanus	3150
Agonus cataphractus	2071
Syngnathus rostellus	1971
Platichthys flesus	1387
Clupea harengus	786
Liparis liparis	675
Myoxocephalus scorpius	417
Merlangius merlangus	2356

Number of epifauna species recorded:	All epifauna found are recorded on protocols, however, only selected species are available in the SF database. For 2010 they were:
	Crangon crangon 1394187
	Macropipus holsatus 13287
	Carcinus maenas 2669
	Asterias rubens 985
	Ophiurida 340
	Paguridae 234
	Ensis 119
	Pandalus montagui 46
	Mytilus edulis 21
	Echinocardium cordatum 10
Index revisions:	

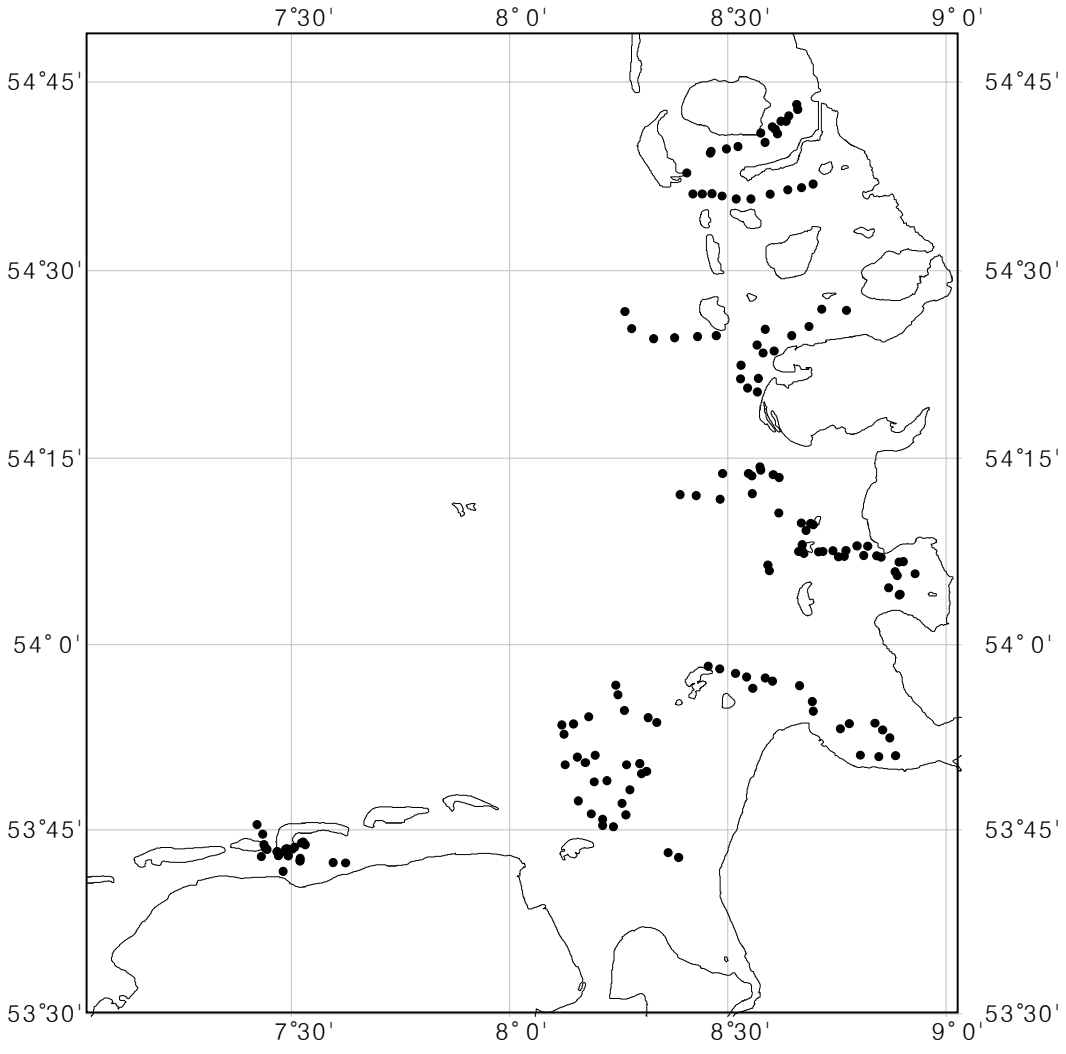


Figure 5.2.3.3.1. Stations sampled in the German DYFS 2010.

5.2.4.4 Survey summary Netherlands: Schollevaar

Nation:	Netherlands	Vessel:	RV "Schollevaar"
Survey:	DYFS (Demersal Fish Survey)	Dates:	06 –- 23 Sep 2010

Survey description	The DYFS 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 (*Crangon crangon*).
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:

	TIME-SERIES	2010MEAN
	mean no./1000m²	no. per 1000m²
Sole	3.55	2.32
Plaice	10.24	9.75

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:

36 separate species of finfish were caught.
The top 10 by number are:

Pomatoschistus sp.	3967
Pleuronectes platessa	2997
Clupea harengus	932
Dicentrarchus labrax	756
Platichthys flesus	714
Solea solea	593
Myoxocephalus scorpius	274
Syngnathus rostellatus	192
Agonus cataphractus	159
Zoarces viviparus	150

Number of epifauna species recorded:	30 epifauna (attached and free-living) species were observed during the 2010 survey.
Index revisions:	No

Stations fished:

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

Number of biological samples (maturity and age material):			
Species	**Number**	**Species**	**Number**
Pleuronectes platessa	111	*Limanda limanda*	35
Solea solea	110	*Scophthalumus rhombus*	11
Platichthys flesus	91		

5.2.4.5 Survey summary Netherlands: Stern

Nation:	Netherlands	Vessel:	RV "Stern"
Survey:	DYFS (Demersal Fish Survey)	Dates:	30 Aug - 30 Sep 2010

Survey description	The DYFS 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 (*Crangon crangon*).
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.):	130 hauls were carried out. A CTD was attached to the net.

Target species catch rates:

	TIME-SERIES	2010 MEAN
	mean no/1000m²	no/1000m²
Sole	5.41	2.35
Plaice	33.49	14.42

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:

37 separate species of finfish were caught.
The top 10 by number are:

Pomatoschistus minutus	7671
Pleuronectes platessa	7233
Osmerus eperlanus	3951
Syngnathus rostellatus	1859
Agonus cataphractus	1153
Solea solea	1013
Clupea harengus	710
Platichthys flesus	622
Myoxocephalus scorpius	513
Zoarces viviparus	420

Number of epifauna species recorded:	21 epifauna (attached and free-living) species were observed during the 2010 survey.
Index revisions:	No

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: Wadden Sea	area and depth class	3m beam trawl	130		0	0	130	

Number of biological samples (maturity and age material):			
Species	**Number**	**Species**	**Number**
Platichthys flesus	212	*Scophthalmus rhombus*	8
Pleuronectes platessa	201	*Limanda limanda*	4
Solea solea	169	*Psetta maxima*	3

5.2.4.6 Survey summary Netherlands: Isis

Nation:	Netherlands	Vessel:	RV "Isis"
Survey:	DYFS (Demersal Fish Survey)	Dates:	29 Sep – 02 Nov 2010

Survey description	The DYFS 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 (*Crangon crangon*).
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.):	108 hauls were carried out. A CTD was attached to the net. Due to the weather, about 5 stations could not be fished.

Target species catch rates:

	TIME-SERIES	2010 MEAN
	mean no/1000m²	no/1000m²
Sole	6.41	3.12
Plaice	22.78	15.17

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:

40 separate species of finfish were caught.
The top 10 by number are:

Pomatoschistus sp.	63389
Limanda limanda	33839
Pleuronectes platessa	11964
Osmerus eperlanus	2924
Solea solea	2409
Merlangius merlangus	2097
Buglossidium luteum	1725
Syngnathus rostellatus	1305
Callionymus lyra	1214
Ammodytes sp.	1085

Number of epifauna species recorded:	26 epifauna (attached and free-living) species were observed during the 2009 survey.
Index revisions:	No

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: Dutch coast	area and depth class	6m beam trawl	108	0	0	0	108	

Number of biological samples (maturity and age material):

Species	Number	Species	Number
Limanda limanda	401	*Platichthys flesus*	100
Pleuronectes platessa	346	*Psetta maxima*	18
Solea solea	175	*Scophthalmus rhomus*	13

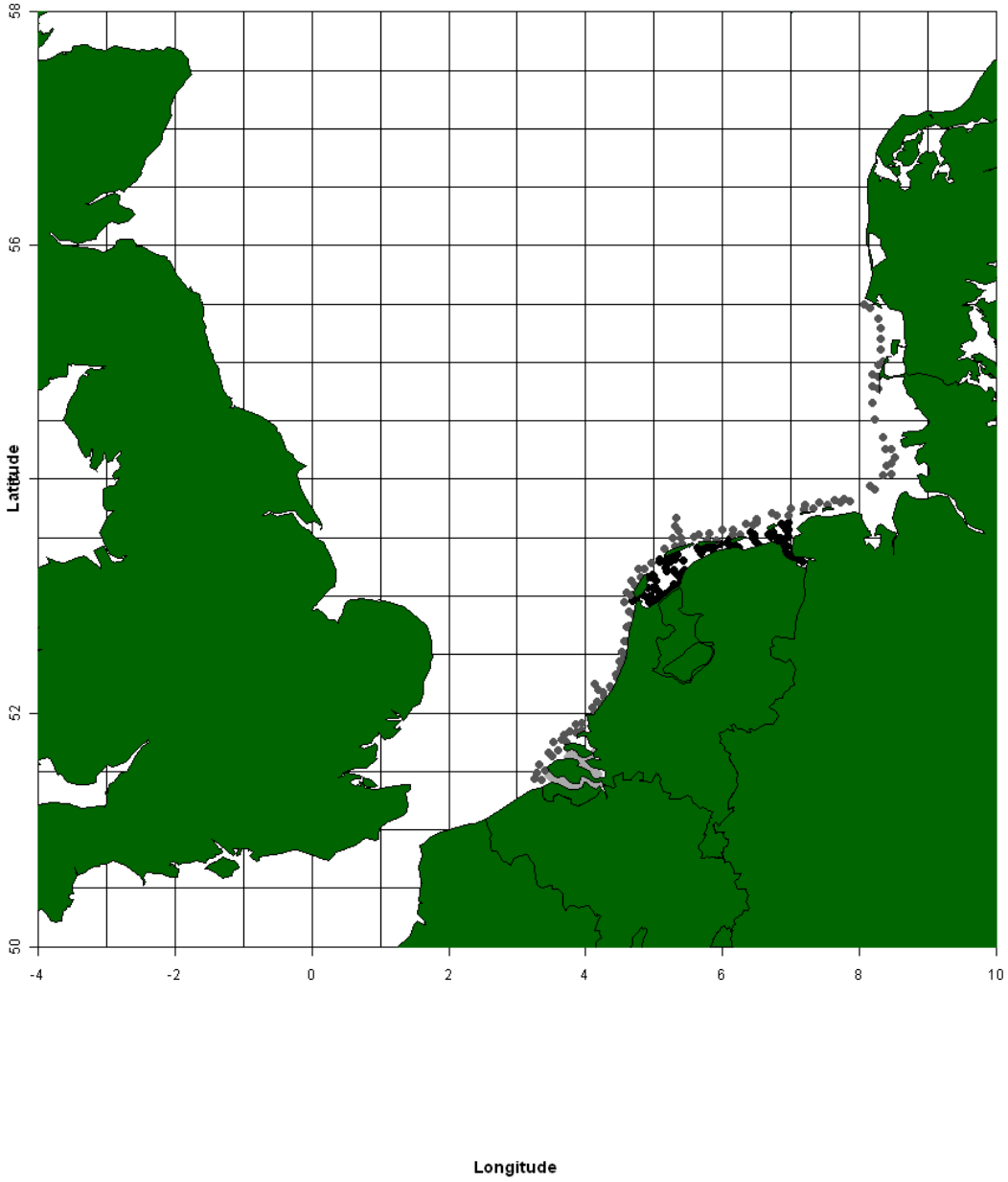


Figure 5.2.3.6.1. Station positions for Isis (dark grey), Schollevaar (light grey) and Stern (black; DYFS).

5.2.4.7 Survey summary Netherlands: Isis (SNS)

Nation:	Netherlands	Vessel:	FV "Jakoriwi" and RV "Isis"
Survey:	SNS (Sole Net Survey)	Dates:	13 - 28 Sep 2010

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.):	50 hauls were carried out (approx. 13 hours fishing time). A CTD was attached to the net. Due to technical problems of RV "Isis" a commercial vessel was hired to carry out the survey.

Target species catch rates:

	TIME-SERIES	2010 MEAN
	mean no/100 hr	no/100 hr
Sole	6628	3340
Plaice	66711	63700

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:

Pleuronectes platessa	7603
Limanda limanda	7167
Pomatoschistus sp.	2971
Buglossidium luteum	2768
Arnoglossus laterna	1781
Merlangius merlangus	1522
Callionymus lyra	1351
Agonus cataphractus	1131
Solea solea	351
Echiichthys vipera	291

Number of epifauna species recorded:	33 epifauna (attached and free-living) species were observed during the 2010 survey.
Index revisions:	

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: Wadden Sea	area and depth class	6m beam trawl	50	0	0	0	50	

Number of biological samples (maturity and age material):

Species	Number	Species	Number
Limanda limanda	630	*Platichthys flesus*	48
Pleuronectes platessa	602	*Psetta maxima*	24
Solea solea	172	*Scophthalmus rhombus*	14

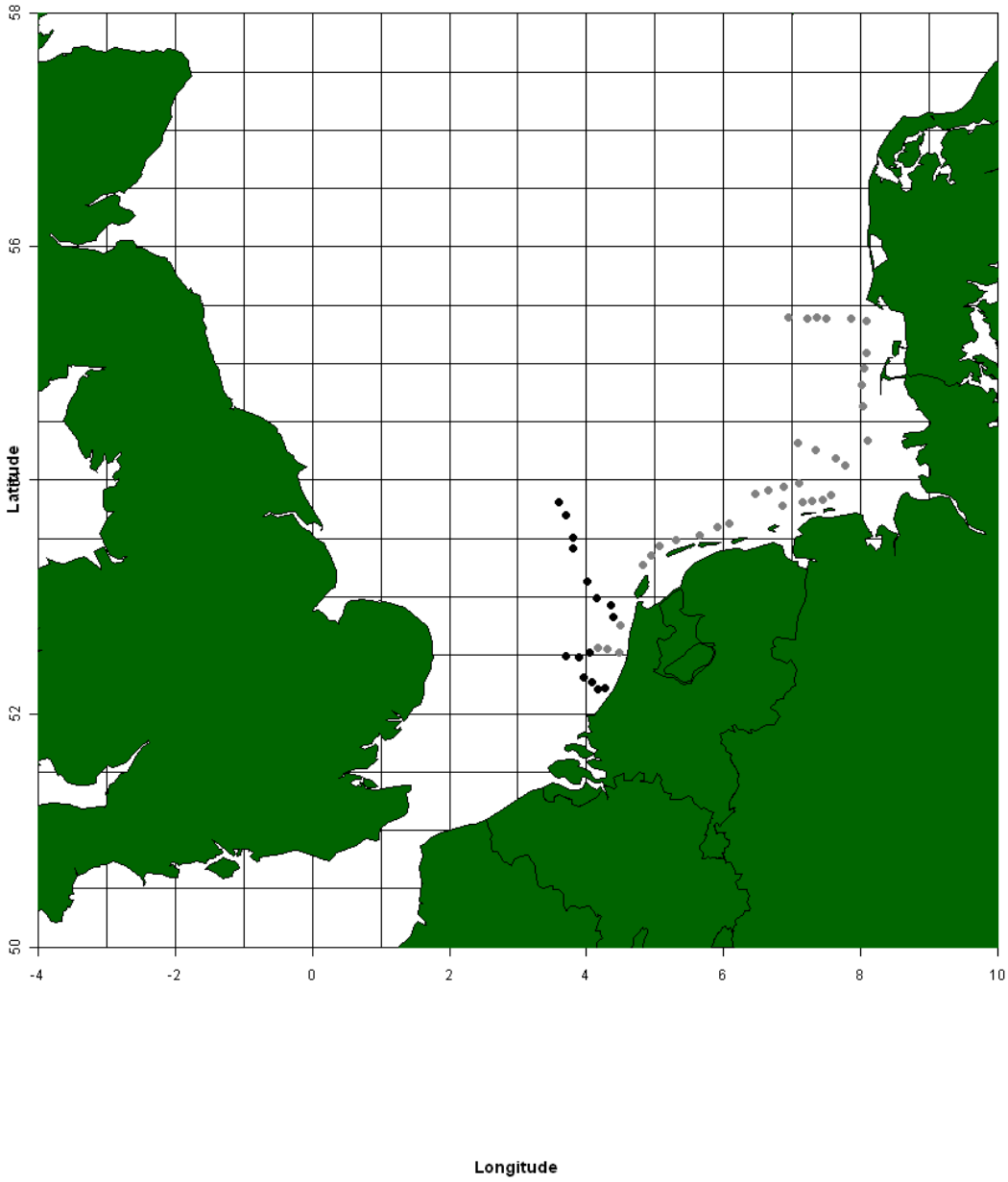


Figure 5.2.3.7.1. Station positions for "Isis" (black) and "Jakoriwi" (grey; SNS).

5.2.5 Staff exchange

During the 2010 meeting of the ICES WGBEAM it was agreed that a member of Cefas (England) staff would participate in a staff exchange with vTI (Germany) for the inshore beam trawl survey. A staff exchange was successfully organized for Cefas staff to participate in two of the three days, for the part of the German survey that was undertaken by FV "Gerda-Bianca" (ACC1) that sails from Dornumersiel.

Cefas staff travelled to Dornumersiel on 14 September where it was possible to meet the scientific staff from vTI and the skipper and crew of the FV "Gerda-Bianca". Over the two days a total of fifteen deployments were observed. The survey areas were reached within about an hour of leaving the port each day. There were strong south-westerly winds (between force 5 and 7), which happened to be off the land that meant that conditions aboard the vessel were good.

Detailed observations were made regarding the port and vessel, team structures, daily routines, deck layout, gear and gear deployment, catch composition, processing of the catch and documentation of the survey data. After some time was spent observing, Cefas staff were able to fully integrate with the German team and were hence able to make a valuable contribution towards the successful completion of the survey. Upon return to Lowestoft a comprehensive report (annex 18) was compiled, which made a direct comparison of these observations with the Cefas inshore survey.

In summary, although there were some significant differences between the two surveys it is clear that they had very much in common. The main difference in the design of the surveys was that the German stations were variable, whereas the Cefas ones remain fixed. Different gears are being used. The German survey was dominated by common shrimp, whereas for the English survey a variety of epibenthic species often dominate. Essentially, the sampling practices undertaken by vTI and Cefas were very similar, although for the German survey raising factors were calculated by weight as opposed to division for the Cefas survey, common shrimp were collected by vTI to obtain length frequency distributions, and the Cefas survey collects age data for sole and plaice. Similar environmental data were collected. Fishing vessels are chartered that return to port each night, logistically they are very similar as were the sizes of the teams and the "attitudes" of the scientific staff and crew implementing the survey. However, the working environment available to scientific staff was very different because of the differences in the size and layout of the vessels.

The inshore exchange proved to be a success and it was possible to disseminate information about the survey to individuals both within and outside WGBEAM, as intended.

6 Population abundance indices (ToR b and f)

b) Tabulate, report and evaluate population abundance indices by age-group for sole and plaice in the North Sea, Division VIIa and Divisions VIId-g, taking into account the key issues involved in the index calculation;

6.1 Abundance indices by age-group for plaice and sole for the offshore surveys

Annex 10 and Figures 6.1.1.1–6.1.1.2 present the abundance indices by age for sole and plaice from each of the offshore survey areas separately, updated with the indices for 2010.

The revision history until 2010 can be found in the WGBEAM 2010 report (ICES, 2010c).

Belgian data were not available for 2010, and were not taken into account in the tables and species plots. WGBEAM recommends that Belgium (ILVO) streamlines the survey data processing in order to meet the deadlines for data delivery.

6.1.1 Sole

North Sea sole

Figure 6.1.1.1a 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. In 2010, the observed number of one year olds (2009 year class) was higher than the mean for the first time since 1997. The good 2005 year class, that was still clearly visible in 2008 and 2009, was becoming less abundant in the population in 2010. The spatial coverage of the Netherlands Tridens survey makes it unsuitable for monitoring sole abundance.

Time-series trends for sole in the Southern North Sea, based on the UK offshore survey, are depicted in Figure 6.1.1.1b. These data show numbers of one, two and three year olds that were slightly lower than the long-term mean for this part of the North Sea. The disappearing of the good year class 2005, as observed by the Netherlands Isis offshore survey, is confirmed by this UK survey.

Area VII sole

The indices for sole from area VII stocks are summarized in Figure 6.1.1.1c-g. In recent years the two adjacent areas VIId and VIIe have both shown above average recruitment but not for the same year classes, however in 2008 both areas are showing poor, below average recruitment, while the opposite was observed in 2010 with good recruitment over the entire English Channel for all ages (only the 3 group was slightly below the long-term mean in VIId). 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 2006 year class appears to be very poor. In VIIf, there has been poor recruitment in 2003–2007, with a better incoming year class 2007 observed in 2008, and still visible in 2010. The number of one year olds observed in 2010 however, was the lowest of the time-series. Of all sole stocks discussed in this report, VIIa obviously harbours the stock in the poorest condition. The trend of poor recruitments in 2003–2009 for all ages was continued in

2010, with the smallest number of observed one year olds from the time-series in this year.

Northern Adriatic Sea sole

Figure 6.1.1.1g shows the time-series trends in sole for the Northern Adriatic Sea, based on the SoleMon offshore beam trawl surveys. Although sole otoliths were collected since 2007, for financial constraints it was not possible to analyse these for the age. So age slicing, based on Von Bertalanffy parameters (L_{inf}: 39.6; k: 0.44, t_0: -0.46), was carried out using LFDA 5.0.

This survey indicates that the 2010 age 0 group has been mainly poor and substantially below the long-term arithmetic mean. There was a clear increase in the number of one year olds caught in the 'Solemon' survey. This 2010 year class appeared as 0 year olds in 2009. Adults (age-groups 2–5+) showed substantially lower values than the long-term arithmetic mean, with the exception of the plus group.

6.1.2 Plaice

North Sea plaice

Trends in the indices for North Sea plaice from the Netherlands Isis and Tridens surveys are shown in Figures 6.1.1.2a and 6.1.1.2b. The Isis survey covers mainly the southern North Sea, whereas the "Tridens" extends substantially further north and west. In 2010, some trawls were carried out by the "Tridens" in the traditional Isis survey area using the Isis nets due to technical problems on-board Isis. The data that were generated this way were taken into account in the Isis-calculations.

The Isis survey indicates that recruitment has been well below average since the strong 2001 year class, and stayed below average in 2010. 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. Additionally, above average incoming year classes were observed from 2007 onwards, with the observed number of one year olds in 2010 being one of the highest of the time-series.

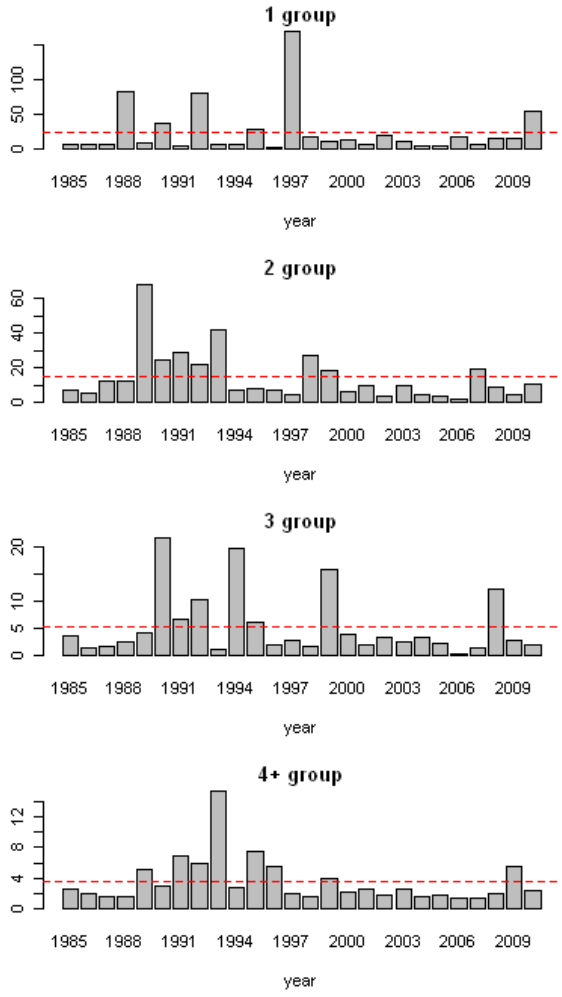
The 2006 year class in the North Sea is well above the long-term mean which is shown by the UK and the Dutch "Tridens" survey. This is also evident in the 'Isis' survey at age 1 but not at the older ages. The older age-groups (including the 2006 year class) in the "Tridens" survey show an increase, a pattern that is also visible in the combined Isis-Tridens population abundance time-series (WGBEAM 2009; Figure 6.1.1.2c). It is not clear where this increase comes from.

Figure 6.1.1.2d, depicting the population abundance series for plaice in the Southern North Sea from the UK offshore survey, confirms the high incoming year class 2009 showing up as one year olds in 2010. Since ships, gears, timing and on board-practices have not changed in relation to previous years, there is no obvious explanation for the observed increase in abundance of the older age classes for plaice in 2010. The time-series in Figure 6.1.1.2d only goes back in time to 2006; therefore it is recommended that the UK extends the population abundance indices for this stock to the complete survey time-series.

Area VII plaice

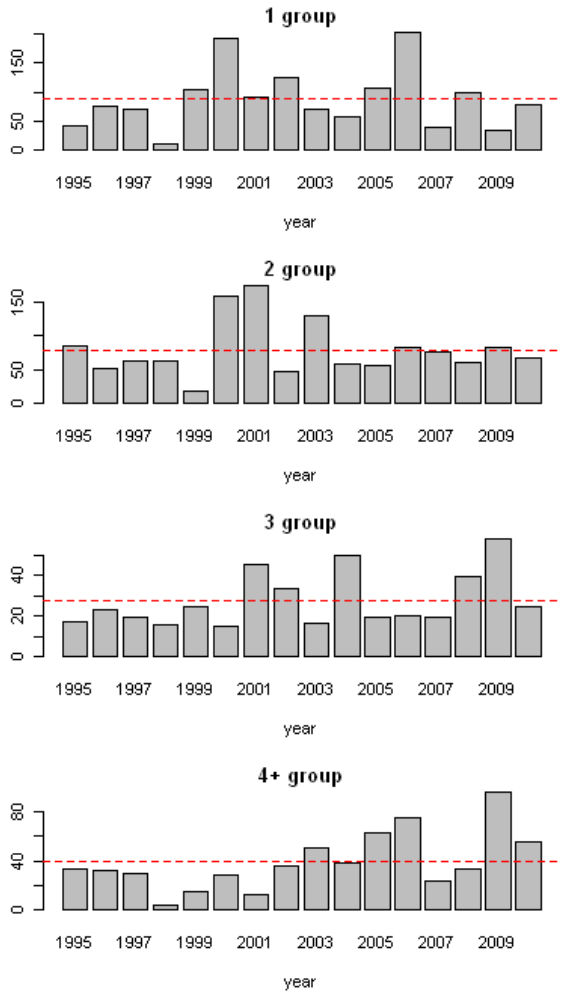
UK Plaice indices for area VII stocks are shown in Figures 6.1.1.2e-h. In VIId, the 2005 year class appears around average, with better 2006 and 2007 year classes followed by 2008 and 2009 year classes showing the largest numbers of one year olds of the

time-series. This was also the case in VIIe in 2010 (2009 year class), but the sudden high abundances of older plaice in the same year suggest a year effect (especially the large number of two year olds in 2010 cannot be explained since the number of one year olds in 2009 was among the lowest values ever observed). Furthermore, there is still some inconsistency between the signals from different year classes. As for North Sea plaice (see above), there is no obvious explanation for the observed increase in abundance of plaice of age 2 in 2010. In VIIf, recruitment has been poor in recent years with 2001 and most subsequent year classes below average, however there has been an above average catch of the 2006 year class (at age 2), which was not evident at age 1. The 2010 survey in VIIf documented a strong year class 2009 well above the long-term arithmetic mean. Recruitment in the Irish Sea (VIIa) has been increasing over recent years, and there have been above average year classes in 2001–2003. The 2006 year class at age 1 is well above the long-term mean and is continuing to show at the older ages. The 2009 year class was again above average, around the levels of year classes 2001–2003.



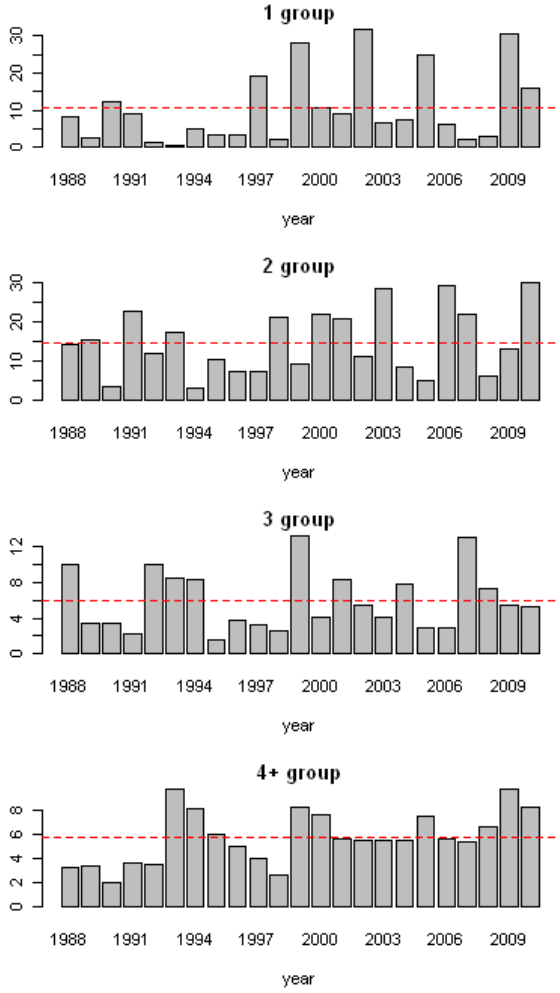
(a). Netherlands: sole (N.hr^-1/8m trawl) North Sea (IV) RV "Isis".

Figure 6.1.1.1. Catch rate of sole from Netherlands and UK surveys in the North Sea and VII d, e, f and a. (Horizontal line=long-term mean for the period presented).



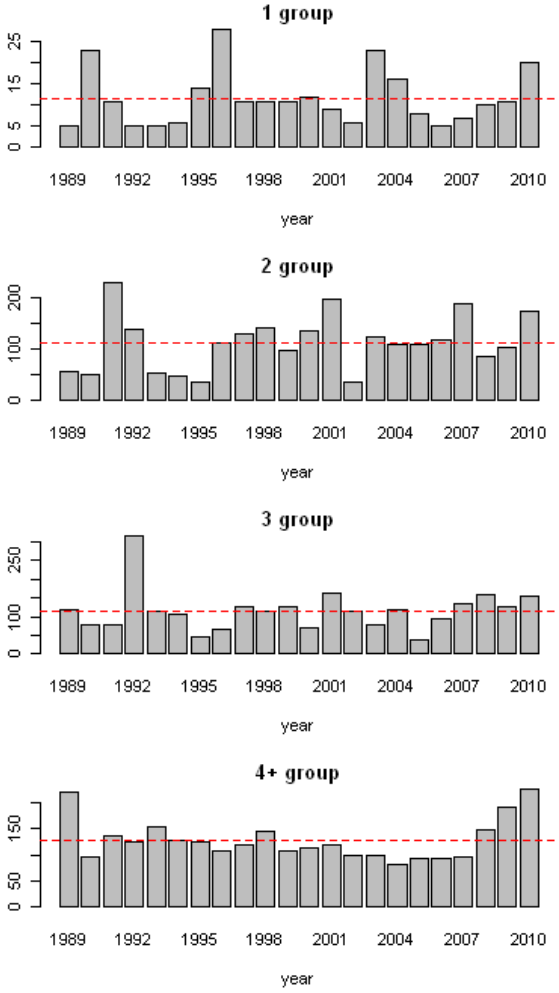
(b). UK: sole (mean numbers per km towed for 4m beam) Southern North Sea (IVc)

Figure 6.1.1.1: continued.



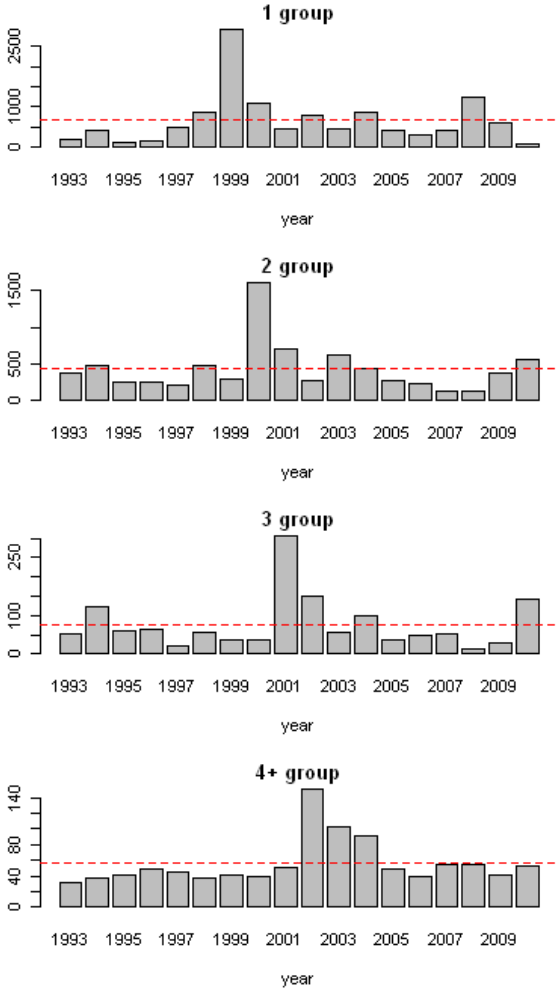
(c). UK: sole (N.hr^-1/8m beam trawl) Eastern English Channel (VIId).

Figure 6.1.1.1: continued.



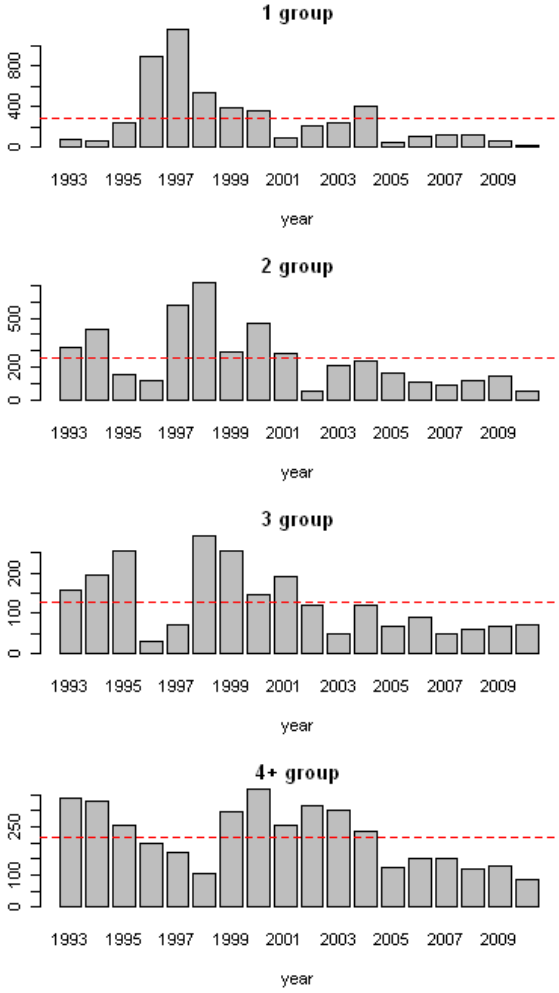
(d). UK: sole (mean numbers per km towed for 2*4m beam trawl) Western English Channel (VIIe)

Figure 6.1.1.1: continued.



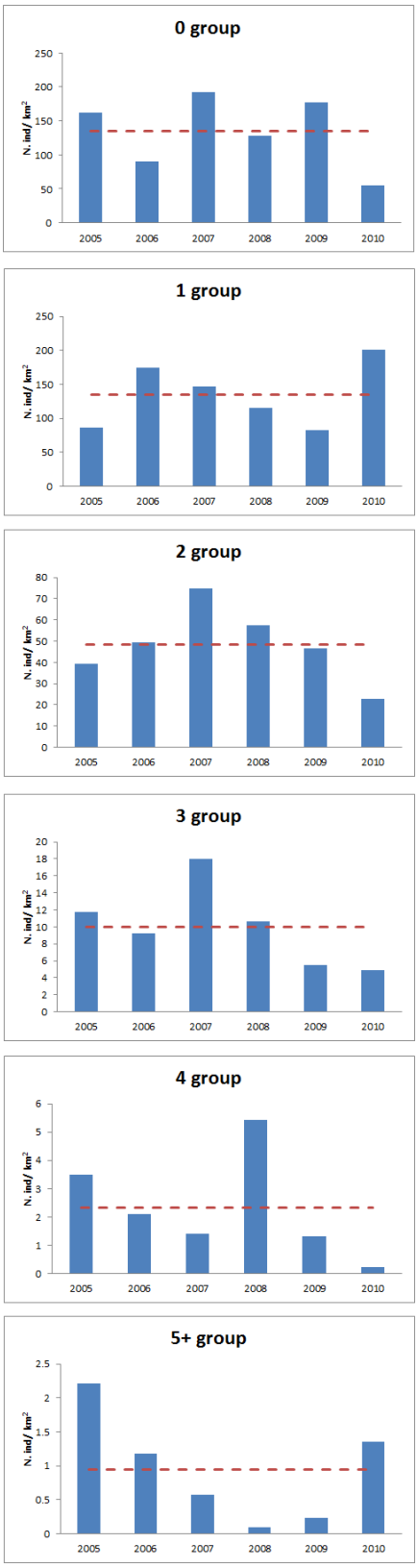
(e). UK: sole (mean numbers per km towed for 4m beam trawl) Bristol Channel (VIIf).

Figure 6.1.1.1: continued.



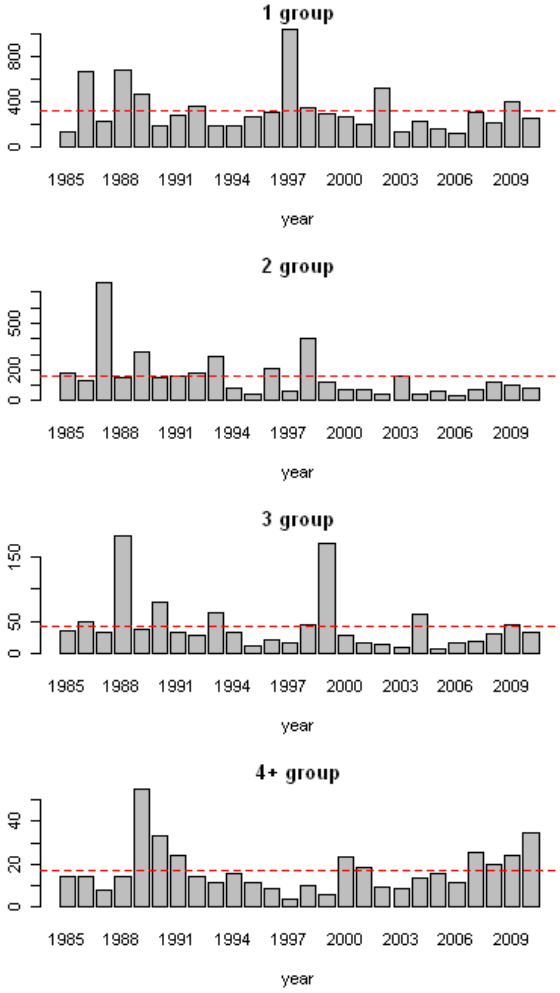
(f). UK: sole (mean numbers per km towed for 4m beam trawl) Eastern Irish Sea (VIIa).

Figure 6.1.1.1: continued.



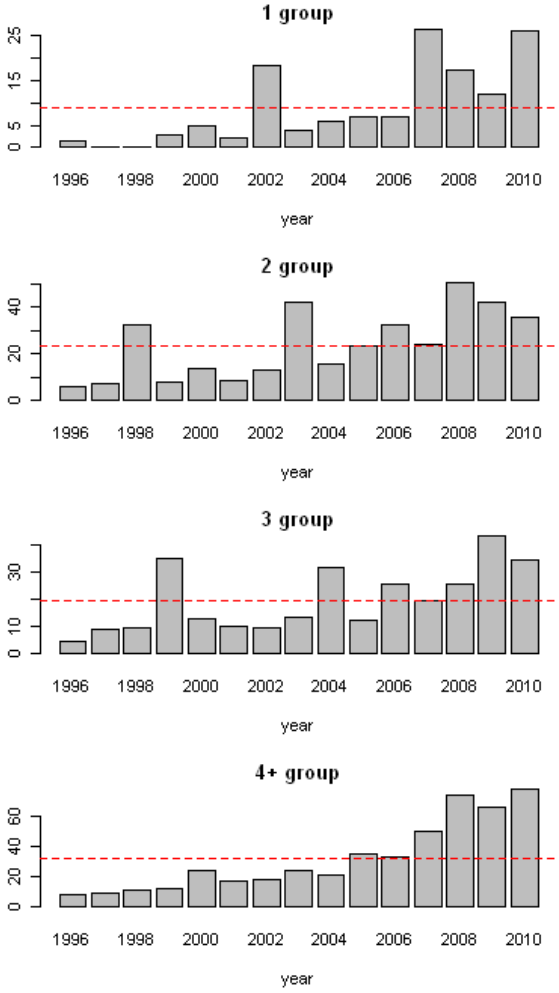
(g) Italy: Catch rate of sole from Northern Adriatic beam trawl survey. (Horizontal line=long-term mean for the period presented).

Figure 6.1.1.1: continued.



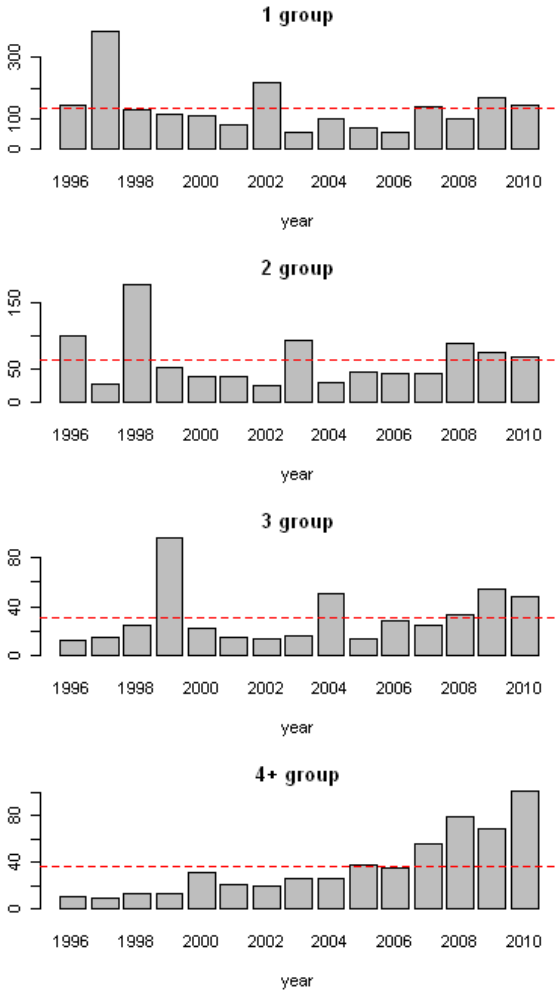
(a) Netherlands: plaice (N.hr^-1/8m trawl) North Sea (IV) RV "Isis".

Figure 6.1.1.2. Catch rate of plaice from Netherlands and UK surveys in the North Sea and VII d, e, f and a. (Horizontal line=long-term mean for the period presented).



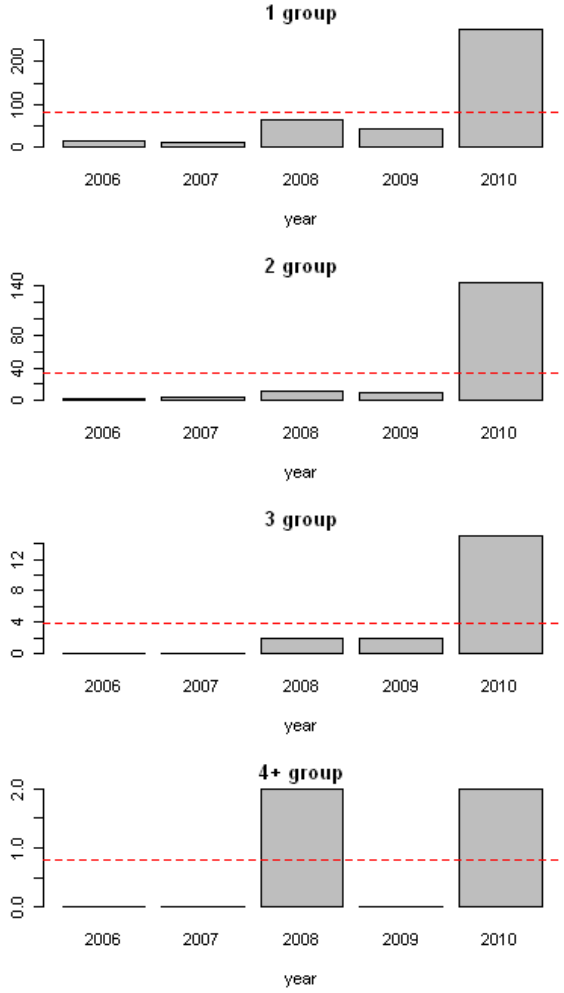
(b) Netherlands: plaice (N.hr^-1/8m trawl) North Sea (IV) RV "Tridens".

Figure 6.1.1.2: continued.



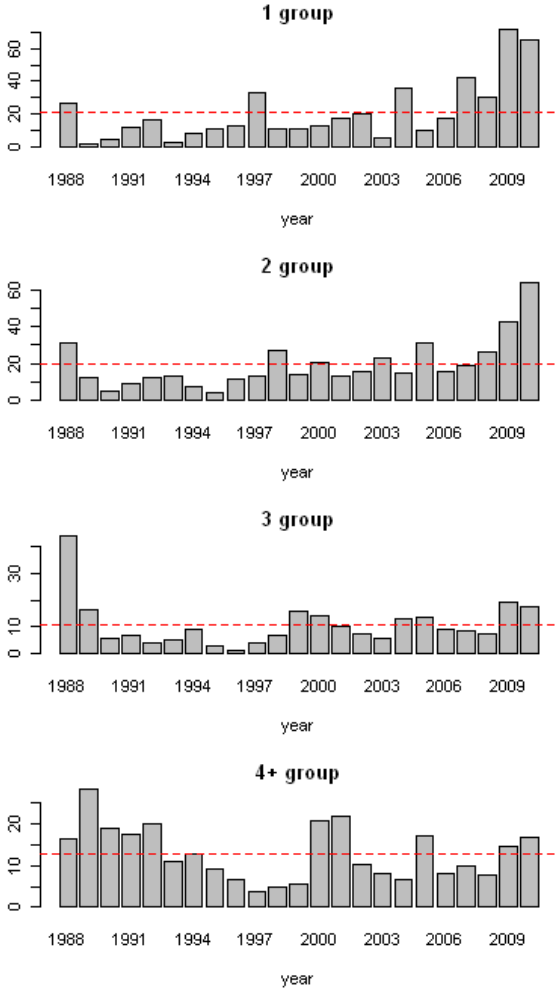
(c) Netherlands: plaice (N.hr^-1/8m trawl) North Sea (IV) RV "Isis" and RV "Tridens".

Figure 6.1.1.2: continued.



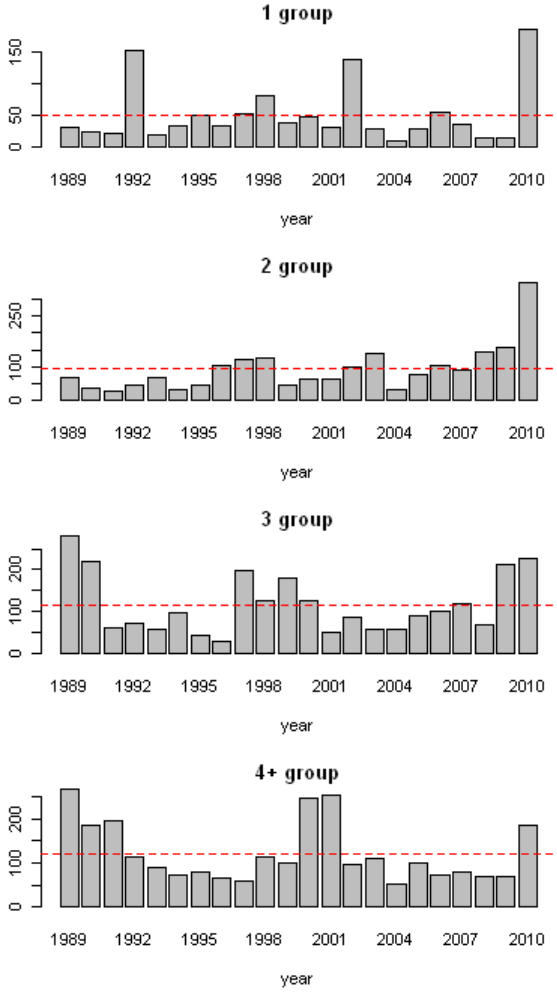
(d) UK: plaice (mean numbers per km towed for 4m beam trawl) Southern North Sea (IVc).

Figure 6.1.1.2: continued.



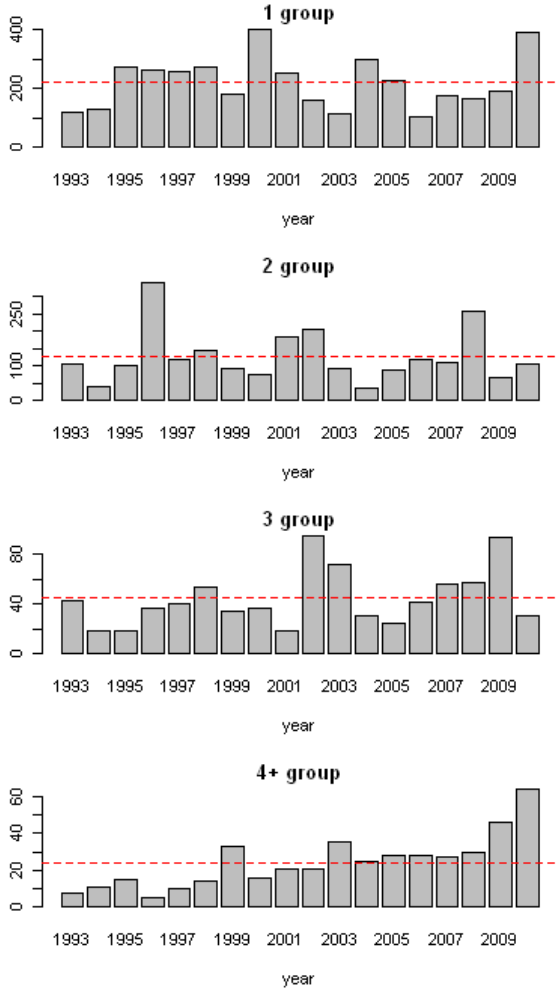
(e) UK: plaice (N.hr^-1/8m beam trawl) Eastern English Channel (VIId).

Figure 6.1.1.2: continued.



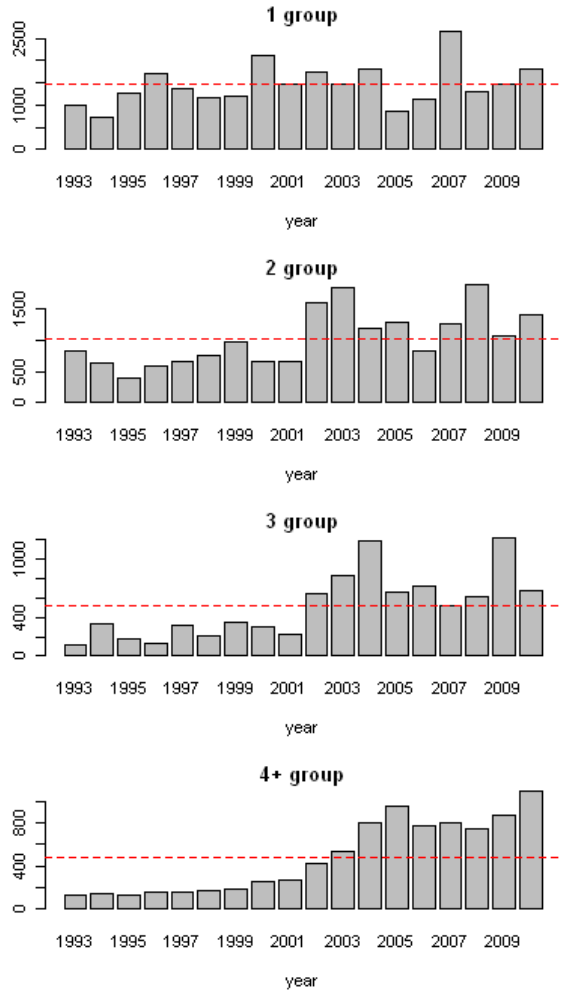
(f) UK: plaice (mean numbers per km towed for 2*4m beam trawl) Western English Channel (VIIe).

Figure 6.1.1.2: continued.



(g) UK: plaice (mean numbers per km towed for 4m beam trawl) Bristol Channel (VIIf).

Figure 6.1.1.2: continued.



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

Figure 6.1.1.2: continued.

6.2 Abundance indices by age-group for plaice and sole for the inshore surveys

Belgian data were not available for 2010, and were not taken into account in the tables and species plots. WGBEAM recommends that Belgium (ILVO) streamlines the survey data processing in order to meet the deadlines for data delivery.

6.2.1 Population abundance indices

The abundance indices for the inshore surveys covering the full period of each survey are shown in Annex 15 and Figures 6.2.1.1–6.2.1.2.

In VIId, the indices used by WGNSSK are the English inshore beam trawl survey for plaice and the combined English and French surveys for sole. WGBEAM does not coordinate the French survey (CGFS) as it is not a beam trawl survey and therefore the data were not available for the meeting. Only the English survey data have 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 VIId inshore survey due to financial reasons.

The Dutch SNS (North Sea) abundance indices of sole (annex 15.1b) and plaice (annex 15.2b) for age-groups 1–4, are used by WGNSSK for estimating recruitment and for tuning of the XSA model.

The Dutch, Belgian and German DYFS and English YFS abundance indices of 0- and 1-group plaice and sole in the North Sea are combined to derive international inshore indices. These international indices are used by the WGNSSK to estimate recruitment. Both the national and the international indices are presented in Annex 15, only the international index is presented in Figures 6.2.1.1–6.2.1.2.

As earlier noted, the almost complete disappearance of 1 group plaice in the international inshore index in the last decade has continued and was still apparent in 2010. This decrease is mainly driven by the Dutch indices and less obvious in the Belgian and UK indices (for Belgium, a ten year average was used for 2010 due to the delayed delivery of the inshore survey data). It is still believed that this decrease in abundance of 1 group plaice in the inshore areas is caused by a change in distribution (Grift *et al.*, 2004). In effect, the combined inshore index is currently not sufficiently sampling the distribution area of 1 group plaice.

For North Sea sole, the combined index shows a slight increase of group 0 in 2010 compared to the four previous years (around the level of 2005, and the mean of the past 20 years), but still below the longer term arithmetic mean.

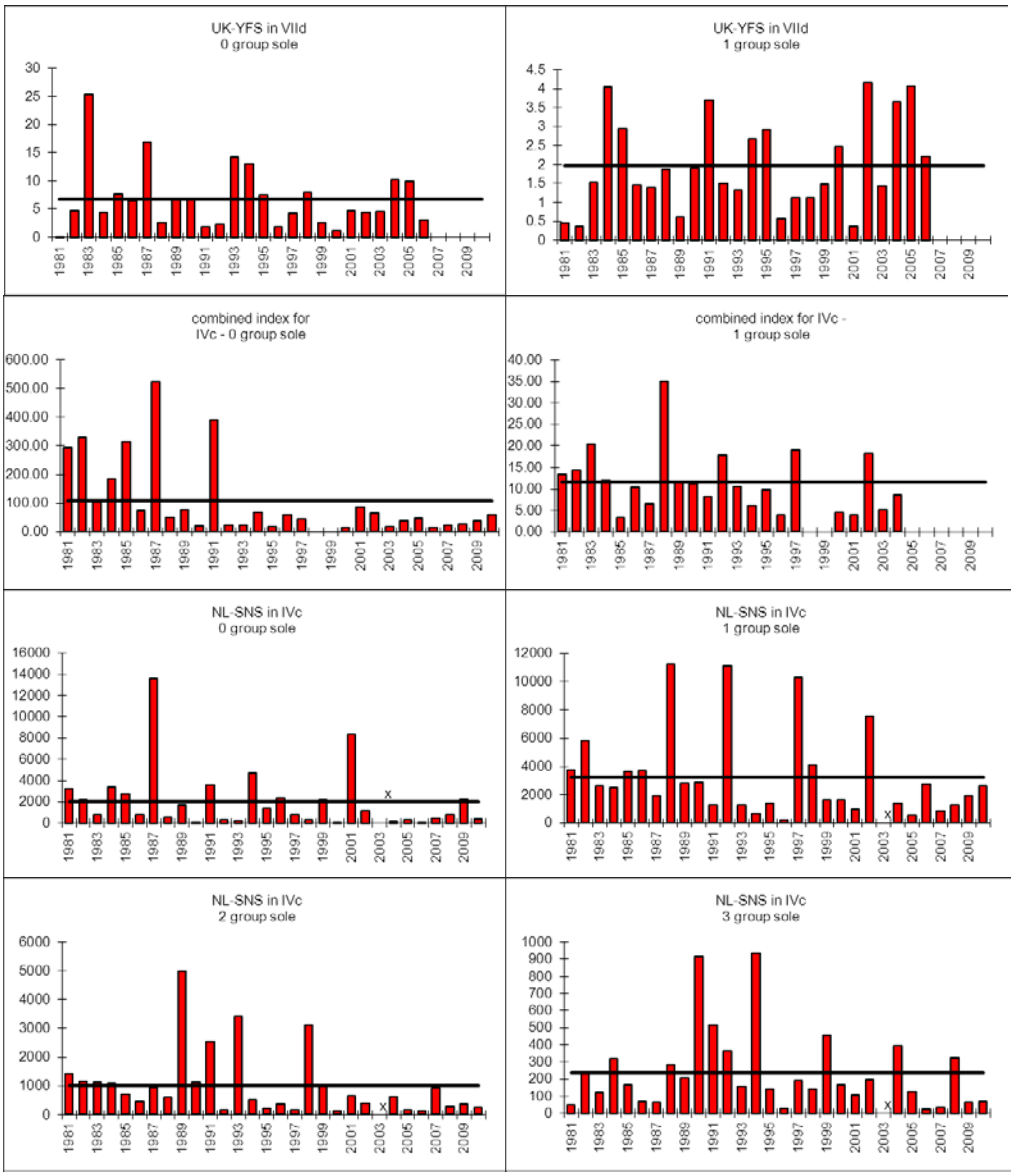


Figure 6.2.1.1. Indices of juvenile sole abundance from inshore beam trawl surveys. Young fish surveys (YFS / DYFS): abundance indices are given as numbers per 1000 m² (Netherlands, Belgium and Germany) and as millions of fish sampled (UKYFS and international index). Sole Net Survey (SNS): abundance indices are given as numbers per 100 hour fishing. (Horizontal line=long-term mean for the period presented, x=no data available).

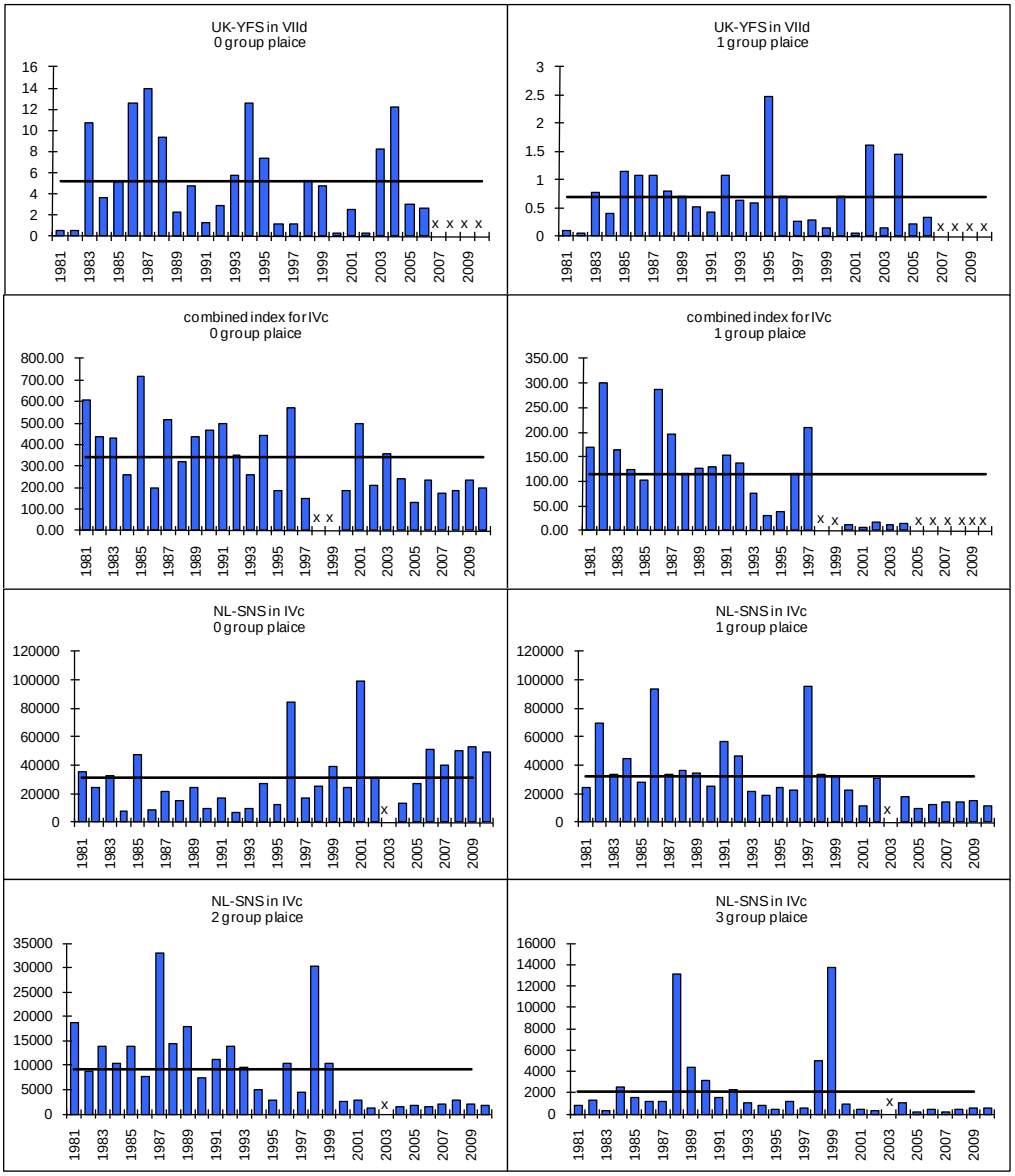


Figure 6.2.1.2. Indices of juvenile plaice abundance from inshore beam trawl surveys. Young fish surveys (YFS / DYFS): abundance indices are given as numbers per 1000 m² (Netherlands, Belgium and Germany) and as millions of fish sampled (UKYFS and international index). Sole Net Survey (SNS): abundance indices are given as numbers per 100 hour fishing. (Horizontal line=long-term mean for the period presented, x=no data available).

6.2.2 Evaluation of the international inshore indices

From 2011 onwards, international inshore indices covering both continental and UK waters will no longer be available due to termination of the English YFS. A new time-series containing only continental inshore survey data will be constructed. This revision will be combined with an evaluation of several steps in the calculation of the national and international indices:

1) Reconsideration of the area weighting used for the calculation of the international indices based on new surface area estimations

2) Reconsideration of the depth strata included in the calculation of the Dutch DYFS indices. Historically, the shallowest stratum didn't get any weight due to insufficient sampling. This is no longer a problem in recent years.

The data will be examined to determine from which year onwards the shallowest stratum can be included in the time-series.

3) Reconsideration of the areas included in the calculation of the German DYFS indices. The spatial coverage of the German DYFS has been increased since the onset of the survey and some of the new areas are not included in the German indices. The data will be examined to determine from which year onwards the current survey areas are sampled consistently.

4) Reconsideration of the relative gear efficiency estimates used for the calculation of the international indices, if additional data on gear comparisons become available (see Section 9.4.1).

These evaluations will be completed by April 2012. Based on the evaluation of the German and Dutch survey coverage, it may be advisable to construct a shorter time-series with a (consistent) higher spatial coverage then use the full time-series with a lower spatial coverage.

6.2.3 Change to sampling method for biological samples for sole on Cefas surveys

In response to questions and concerns about animal welfare, in 2010 Cefas changed the biological sampling methods for *S. Solea,* sole. Before 2010, sole were sorted from the catches by sex, however unlike *P. platessa*, plaice, which can be sexed without cutting open the specimen, sole must be cut and the gonad exposed. This method allowed for an actual fish caught sex ratio, and the age composition was calculated using this actual sex ratio information. This sex's separate data were then combined to give a final sexes combined index. For example, the sexed length distribution (LD) is raised using the sexed age length key (ALK) to provide a sexed age composition (AC). This is then combined to give the unsexed AC then the unsexed index.

From 2010, Cefas no longer cut open all sole whilst sorting. Now only the fish that are biologically sampled are sexed and therefore only a representative sex ratio is available and the index now uses this when calculating the index. For example, the sexed ALK is used to provide a ration of males to females then this ration is applied to the unsexed Length Distribution to create a sexed LD. This calculated sexed LD is raised using the sexed ALK to provide a sexed age composition. This is then combined to give the unsexed AC then the unsexed index.

The index before 2010 remains calculated using the old method and from 2010 the index is calculated using the new method.

7 Coordination and standardization of beam trawl surveys

c) Further coordinate offshore and coastal beam trawl surveys in the North Sea and Divisions VIIa, VIId-g and VIIIa-b;

7.1 Offshore beam trawl surveys

7.1.1 Timing and area coverage

Annex 5.1 lists the offshore surveys together with the geographic area covered, the gear used and the date started.

In 2011, a request for a new survey to be coordinated by WGBEAM was received. This survey is carried out in the Northern Adriatic Sea using a 2 x 3.5 m modified beam (Table 7.1.1.1).

WGBEAM recommends that if time and weather allows, overlapping hauls will be carried out by countries operating in the same area.

Table 7.1.1.1. Timing of the surveys in 2011.

Country	Vessel	Area	Dates	Gear
Belgium	Belgica	southern North Sea	22 Aug – 2 Sep	4m beam
UK	Cefas Endeavour	VIId, IVc	20 Jul – 2 Aug	4m beam
UK	Cefas Endeavour	VIIfg, VIIa	10 Sep – 2 Oct	4m beam
UK	Carhelmar	VIIe	9 – 16 Oct	4m beam
France	Gwen Drez	VIIIa, VIIIb	3 Nov – 9 Dec	4m beam
Germany	Solea	German Bight	16 Aug – 1 Sep	7m beam
Northern Adriatic (Italy-Slovenia)	G. Dallaporta	North Adriatic Sea (GSA 17)	12–30 Nov	2 x 3.5 m modified beam
Netherlands	Tridens	central North Sea	22 Aug – 16 Sep	8m beam + flip-up rope
Netherlands	Isis	southern North Sea	8 Aug – 9 Sep	8m beam

7.1.2 Staff exchange

In 2011 there will be up to three exchanges of staff on offshore surveys. Kay Panten from Germany will join the "Cefas Endeavour" Irish Sea beam trawl survey between 10–22 September. England will send one member of staff on the "Tridens" North Sea survey in August. The Netherlands will send a member of staff on the Solea survey. The dates for the exchanges on these two surveys have yet to be decided.

7.1.3 Database developments

ToR e) Continue work of developing and standardizing an international (fish and epifauna) database of offshore beam trawl survey data and coordinate such activities with those of the IBTSWG.

WGBEAM is encouraging the upload of all offshore beam trawl survey data as coordinated by WGBEAM. This will create the possibility to work with an agreed international dataset and will enable direct output for the assessments.

Since the WGBEAM 2010, the German survey data has been uploaded to DATRAS. The access problem to some years of Dutch time-series has been solved but this problem remains for the UK series. Four time-series are still to be uploaded in DATRAS (see Table 7.1.1.3.1), including the Northern Adriatic survey for which specific reference value are to be created by ICES.

Table 7.1.1.3.1. DATRAS offshore beam trawl data.

country	vessel	Data in DATRAS	Products from DATRAS	Plans until WGBEAM 2012	Actions needed to achieve goal
Belgium	Belgica	no	no	Upload 1992–2010 data to DATRAS	Files to be sent.
France	Gwen Drez	no	no	Upload 2007–2010 data to DATRAS	Corrections by France in submitted files.
Germany	Solea	2003–2010	no		
Northern Adriatic (Italy-Slovenia)	G. Dallaporta	2005–2010	no	Upload time-series to DATRAS	Some reference values to be created by ICES. Files to be sent.
Netherlands	Isis	1985–2010	yes		
	Tridens II	1996–2010	yes		
UK	Cefas Endeavour, VIId/IVc	1990–2010*	no		Corrections by ICES to allow combining of BTS and BTS-7a datasets and 2009–2010 (7a) data
	Cefas Endeavour,VIIfg, VIIa	1993–2010*	no		
	Carhelmar	2010	no	Upload time-series to DATRAS	Cefas to allow resoruce to upload time-series

*** operated by Corystes until 2007/2008. 2008 (VIId/IVc) and 2009–2010 (all areas) data cannot be downloaded from DATRAS although the files have been sent to ICES.**

The remote screening utility and upload program in DATRAS is now working for all offshore beam trawl surveys that are currently in DATRAS. However, some data are still not available. The Irish Sea beam trawl survey data has been uploaded for all years but the 2009 and 2010 data are not available for download due to issues in combining the BTS and BTS-7a datasets. WGBEAM recommends that this be resolved as soon as possible by ICES Data Centre and certainly before WGBEAM 2012. The Belgium data are still unable to be uploaded to DATRAS. WGBEAM recommends that the Belgian institute allows resources to upload at least the most recent years data (2011 once complete), by January 2012.

Assistance for submitters was enhanced in the form of an online documentation for the upload procedure, detailed description for the BTS reporting format, and an online help with errors that were found by the screening utility. It is planned that in the next DATRAS version upload tracking and back-up features will be introduced. WoRMS species codes are planned to be introduced to DATRAS instead of the existing code systems in q3 2011. Development of the BTS product calculation procedure

is still under progress. In quarter 3 the national submitters will receive look-up tables between ITIS TSN and WoRMS AphiaID codes for the species active in DATRAS. The additional codes are possible to match in http://www.marinespecies.org/.

7.1.4 Other issues

One of the descriptors for the MFSD is to assess marine litter. In order to collect data, a form has been designed to be used on survey (see annex 20). In line with other surveys working groups covering the North Sea, WGBEAM recommends that all offshore surveys (with exception of ISIS) trial the protocol in 2011.

7.2 Inshore beam trawl surveys

7.2.1 Timing and area coverage

Annex 5.2 lists the inshore surveys together with the geographic area covered, the gear used and the date started.

Due to financial constraints, from 2011 the UK inshore surveys in the Humber/Wash and Thames (YFS) will no longer be carried out. WGBEAM is disappointed that this decision has been made. Although the UK YFS surveys aren't used an individual tuning series, WGNSSK does use a combined index consisting of Dutch, German and Belgian-DYFS and YFS. In the past they have been used for the short term forecast and therefore could have quite an affect on the TAC advice, although in recent years the assessment working group has used the long-term mean. In future the combined index for inshore surveys will no longer consist of the UK YFS and will need to be recalculated.

Table 7.2.1.1. Timing of the surveys in 2011.

Country	Vessel	Area	Dates	Gear
Belgium	Broodwinner	Belgian coastal zone	5 Sep – 16 Sep	6 m shrimp trawl
Germany	Chartered vessels	German Bight and German Wadden Sea	30 Aug – 1 Oct	3 m shrimp trawl
Netherlands (SNS)	Isis	Dutch coastal zone	12 - 22 Sep	6 m beam trawl
Netherlands	Schollevaar	Scheldt estuary	5 – 23 Sep	3 m shrimp trawl
Netherlands	Stern	Dutch Wadden Sea	29 Aug – 30 Sep	3 m shrimp trawl
Netherlands	Isis	Dutch coastal zone and German Bight	26 Sep - 4 Nov	6 m shrimp trawl

The UK survey ceased in 2010.

7.2.2 Staff exchange

The organization of staff exchange on inshore surveys is more complicated than for the offshore surveys since the inshore surveys take place on smaller vessels with less staff on board and so, it is more complicated to exchange experienced staff without causing problems on the own survey.

Table 7.2.1.2 shows information on the logistics of the inshore trips that are relevant to staff exchange.

Table 7.2.1.2. Information on inshore trips.

country	Ship	Sleep ashore	Extra sleeping facilities on board	Trip length
Belgium	Broodwinner*	yes	-	Day
Germany	Commercial cutters	yes	-	Day
Netherlands	Stern, Schollevaar	no	No	Day
	Isis	no	No	Week

***NB: extra staff might cause problems**

In 2011 it is planned for Cefas staff to participate in the Dutch survey. Details will be arranged between the two institutes.

7.2.3 Database developments

Currently, the inshore WGBEAM dataset containing length frequencies and station information is held at IMARES. All countries involved in inshore surveys add their data to these database. Historically, all countries used their own reporting format, which resulted in a lot of work to add the data in one dataset. Since 2009, countries sent the inshore data in DATRAS format, which facilitates data processing of the inshore data. An international index is derived from the inshore data which is used in the assessments for plaice and sole by WGNSSK. The international index is calculated at IMARES.

In 2009, WGBEAM recommended that this inshore data be uploaded to DATRAS. This would create the possibility to work with an agreed international dataset and will enable direct output for the assessments.

To enable upload of inshore beam trawl survey data, the checks as carried out before uploading files to DATRAS have to be decided on by the working group responsible for the data. In order to do this, a delegation of WGBEAM met on June 6, 2011 in Hamburg to discuss the upload of inshore beam trawl survey data to DATRAS. The group consisted of Brian Harley (Chair), Uli Damm, Kelle Moreau, Gary Burt, Kay Panten, Ingeborg de Boois and Anna Osypchuk.

The group discussed the possibilities for the upload in DATRAS, taking into account the parameters available, the legal ranges (including checks), as well as the requirements for new fields in DATRAS to be able to host the DYFS data. The BTS-DATRAS field list and legal ranges were taken as a starting point.

Annex 15 describes the full outcome of the meeting. If there is no comment on a field the description and legal range can be derived from that dataset. Recommendations from the meeting are included in the final recommendations of the WGBEAM 2011, in Annex 4.

8 Development of manual

d) Continue development of a manual to improve standardization of sampling protocols, surveys gears and quality control aspects;

8.1 Offshore beam trawl survey manual

Apart from some regular editing, major revisions/updates were provided for Belgium. New sections were introduced for the newly included Italian/Slovenian ("Northern Adriatic") survey.

For Netherlands, additions, updates and corrections have been made in the following sections:

- Survey design (Fishing positions and stratification): change number of stations "Tridens", correction of stratification of biological sampling for plaice and sole, additional line on maturity staging.
- Beam trawl construction and rigging (Current gear and rigging): addition on net modification 2010/2011.
- Quality assurance: addition about identification tests and workshop for demersal fish and epibenthos, additional text on database entry, including DATRAS checks reference.
- Environmental data: correction of CTD type "Tridens" and addition of "Isis" CTD type.

Annexes 5, 6 and 7 were removed from the manual as the actual format and checks for DATRAS entry are available on website.

In order to make the manuals used by WGBEAM more accessible WGBEAM recommends that ICES develop a referencing regime that allows them to be referenced, independently of a particular annual report.

8.2 Inshore beam trawl survey manual

Following on from WGBEAM 2010 the manual was further edited, with no major alterations. As much progress as possible was made during and meeting and to finalize the manual a request was made by Gary Burt (UK) for the manual to be reviewed by the countries involved with inshore surveys and to coordinate their feedback.

The first version of the manual will be available before the end of 2011.

9 Other subjects

9.1 Quality assurance

ToR f) Look into the details of a selection of species caught in the inshore or offshore beam trawl surveys. The selection of the species can be done based on the output from ToR a, b or based on an external request.

9.1.1 Offshore surveys: rays and skates

It is usual for the working group to produce a combined distribution plot for all ray species. This year extra analysis of the distribution over time (1996–2010) was carried out for six species separately and bubble plots of distribution can be found in annex 20.

Raja brachyura – Blonde Ray

Although the mean catch rates of blonde ray have varied between 1 and 34 per hour per rectangle the distribution of these catches has not changed significantly over the time-series.

Leucoraja naevus - Cuckoo Ray

From the plots it can be noted that over time Raja naevus, the cuckoo ray has extended its range in the Northwestern North Sea from rectangles just off the Scottish coast into those off the Northeast coast of England. Its distribution in area VII has remaining largely unchanged, although catch rates have varied between years, with the most recent years showing an upward trend.

Leucoraja ocellata – Painted Ray

The numbers of this species are very low however they are consistently captured in ICES division VIIf.

Raja montagui – Spotted Ray

The spotted ray is found in both the full extent of area VII that is sampled and in the southern North Sea. Total catch numbers has increased gradually in all areas over the time-series.

Raja clavata – Thornback Ray

Again the Thornback ray is distributed through area VII and in the southern North Sea. Catches are relatively low in the southern North Sea compared with those of area VII, in particular to those in the area of St Georges Channel in the Irish Sea.

Raja undulata – Undulate Ray

The numbers caught of this species are very low; however the data shows a distribution of them in VIId and VIIe.

9.1.2 Inshore surveys: shrimp

As part of the request by WGCRAN (section 9.5.3) for quality assurance, length frequencies for brown shrimp in the continental coastal area and the Wadden Sea for the German and the Dutch inshore survey, 2006–2008, are presented in Figure 9.1.2.1a and b. It was not possible to create a longer time-series as the German data are currently not available in the WGBEAM inshore dataset.

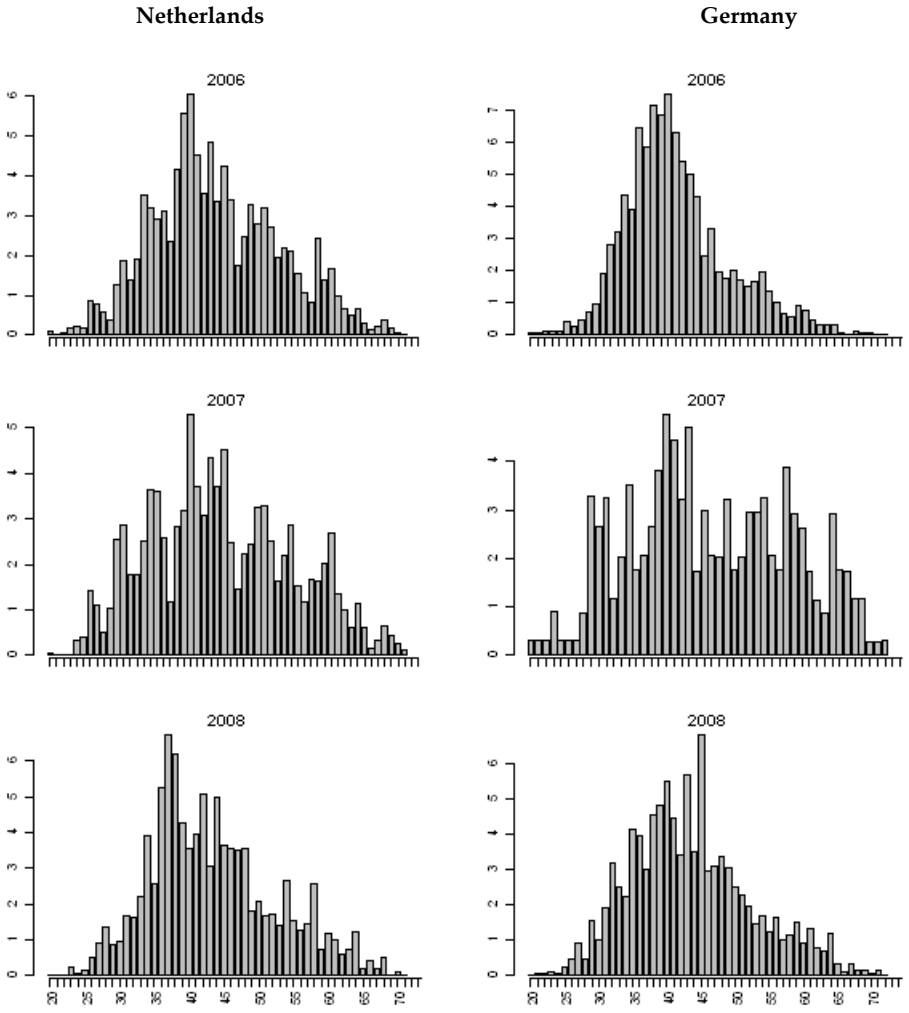


Figure 9.1.2.1a. Brown shrimp length frequency distribution by year (x-axis length in mm, y-axis relative number per length class (100*(number in length class/total number)) for the continental coastal area.

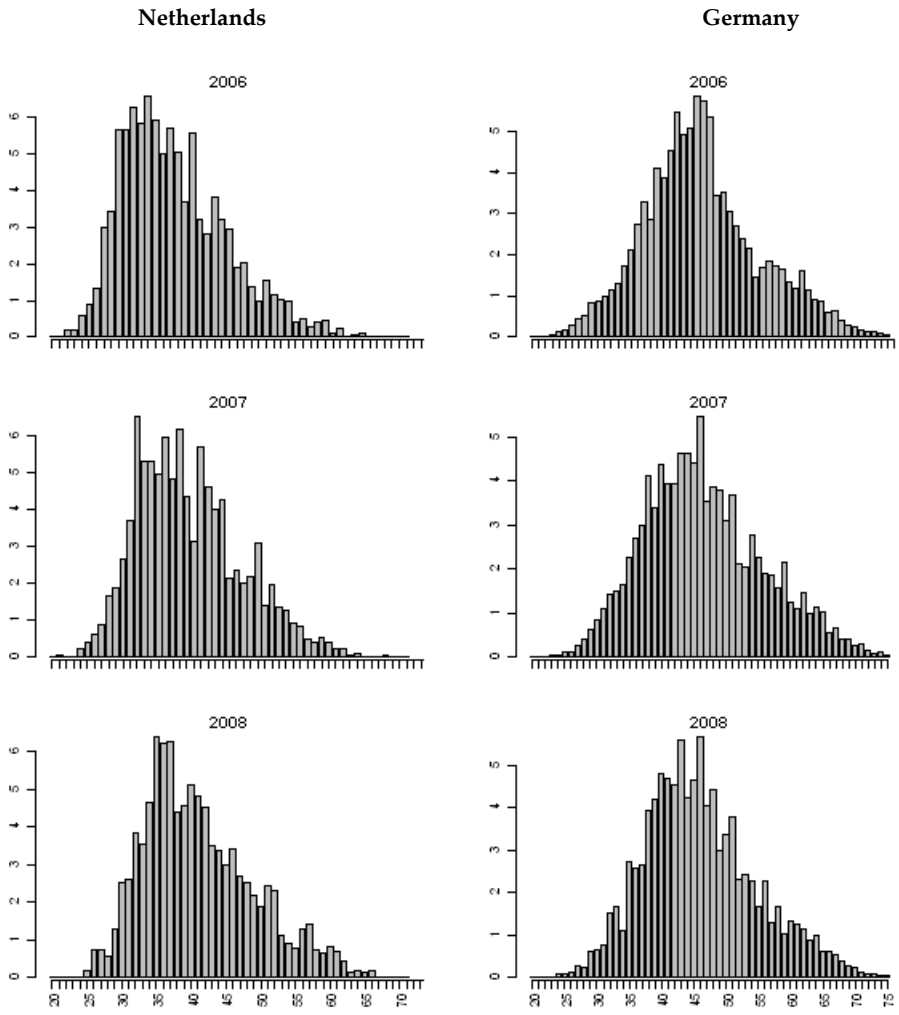


Figure 9.1.2.1b. Brown shrimp length frequency distribution by year (x-axis length in mm, y-axis relative number per length class (100*(number in length class/total number)) for the Wadden Sea.

In the coastal area (9.1.2.1a), the length–frequency distributions look similar for both countries. This implies that the length frequency for shrimp along the North Sea coast, from Netherlands to northern Germany, is more or less equal. According to the preliminary results (refer to Section 9.4.1) the 6-meter trawl catches are bias towards smaller shrimp.

For the Wadden Sea, the length distributions seem to vary between the countries. This might be caused by the main sampling area per country. Netherlands samples in the Dutch Wadden Sea (east-west oriented), Germany samples in the German part of the Wadden Sea (north–south oriented). In the Dutch survey, the peak is about 1 cm lower than in the German survey.

In addition, the length frequencies from the Dutch sampling in the coastal area and the Wadden Sea for 1991–2010 are presented in Annex 17. In general, the peak of the distribution in the Wadden Sea is at lower length than in the coastal zone, and the tail at the larger lengths is more pronounced in the coastal area. This corresponds to accepted literature that states that larger shrimp are found offshore.

9.2 Calculation of metrics

ToR g) Prepare methods for delivery of the following information to assessment working groups in 2012:

i) Proportion of fish larger than the mean size of first sexual maturation

ii) Mean maximum length of fish found in research vessel surveys

iii) *95th % percentile of the fish length distribution observed*

The recommendation is a consequence of the DCF responsibilities. The methodologies used are described in the appendices in SEC 449(2008) and Piet and Jennings (2005).

9.2.1 Proportion of fish larger than the mean size of first sexual maturation

The indicator is the probabilistic maturation reaction norm (i.e. the probability of maturing) and this is derived from the maturity ogive (i.e. the probability of being mature) and from the mean annual growth at age as:

$m(a,s)=(o(a,s)-o(a-1, s-\Delta s(a)))/(1-o(a-1,s-\Delta s(a)))$

where a is age, s is length, o(a,s) is the maturity ogive, and $\Delta s(a)$ is the length gained from age a-1 to a. Estimation of the probabilistic maturation reaction norm thus requires (i) estimation of maturity ogives, (ii) estimation of growth-rates (from length-at-age), (iii) estimation of the probabilities of maturing, and (iv) estimation of confidence intervals around the obtained maturation probabilities.

9.2.1.1 Dilemmas

The beam trawl surveys are carried out outside the recommended maturity staging period as defined by WKMSSPDF 2010 (ICES, 2010a) and WKFLAT 2010 (ICES, 2010b). So, even if there are historical maturity data on the exploited fish species available, there will not be any more from the current surveys. The alternative options for the calculation of the indicator might be:

1) Derive the mean size of first sexual maturation from the commercial sampling carried out throughout the year, and extrapolate this information to the survey quarter. However, for e.g. sole almost all commercially sampled fish are already mature, so the information might be insufficient (ICES 2010b, section 6.2.2).

2) Take the minimum landing size as a measure of first maturity. The advantage is that it is a simple measure, the disadvantage is similar to the option above: a large fraction of the catch might already be mature before reaching the minimum landing size.

3) Derive the mean size of first sexual maturation from the discard sampling program. The advantage would be that at least fish smaller than the minimum landing size are taken into account, however due to the mesh size small specimens won't be caught. During WGBEAM it was unclear if maturity data from discard sampling trips are available. It is recommended that the WGBEAM members investigate whether or not the data are available at their institutes.

Apart from data deficiency, there is information needed from the assessment working groups to calculate the metric. It might even be more convenient to let the assessment working groups calculate this metric as those groups have the data probably avail-

able during the meeting. WGBEAM recommends that there will be communication between WGNSSK and WGBEAM to find the best way forward.

9.2.1.2 Methodology

Proportion of fish larger than the defined size was calculated for sole (24 cm) and plaice (27 cm) as the cut-off length, following option 2 in Section 9.2.1.2. For turbot and brill, taking 32 cm as the cut-off length, as no European MLS has been agreed.

The length frequency was split into 'large' and 'small' fish by species. Numbers per hour were added up by year, country, ship, haul and species. Zero values were added for hauls where the species size class was not caught. The proportion (number based) was calculated by statistical rectangle and finally by ICES division (IV, VII, VIII).

9.2.1.3 Results

The results by division are in Figure 9.1.2.1a-c. There is no clear pattern in the results. For turbot and brill, this might be due to the low catch rates in the surveys. The proportion large plaice in VII has increased over the last years. This is in line with earlier studies by WGBEAM.

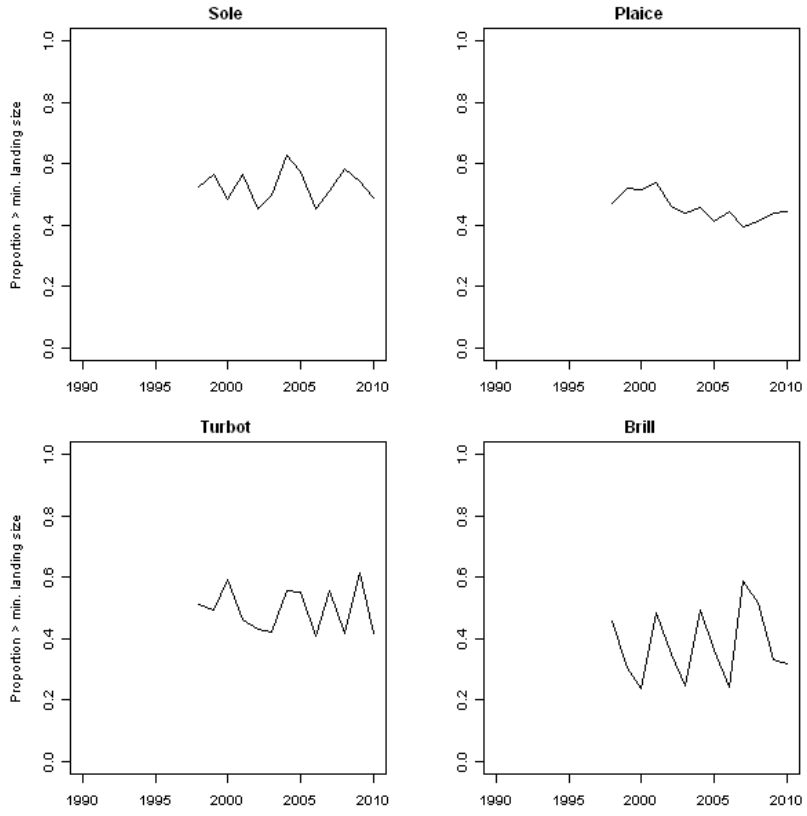


Figure 9.1.2.1a. Proportion (number based) of fish in offshore beam trawl catches larger than minimum landing size in ICES division IV.

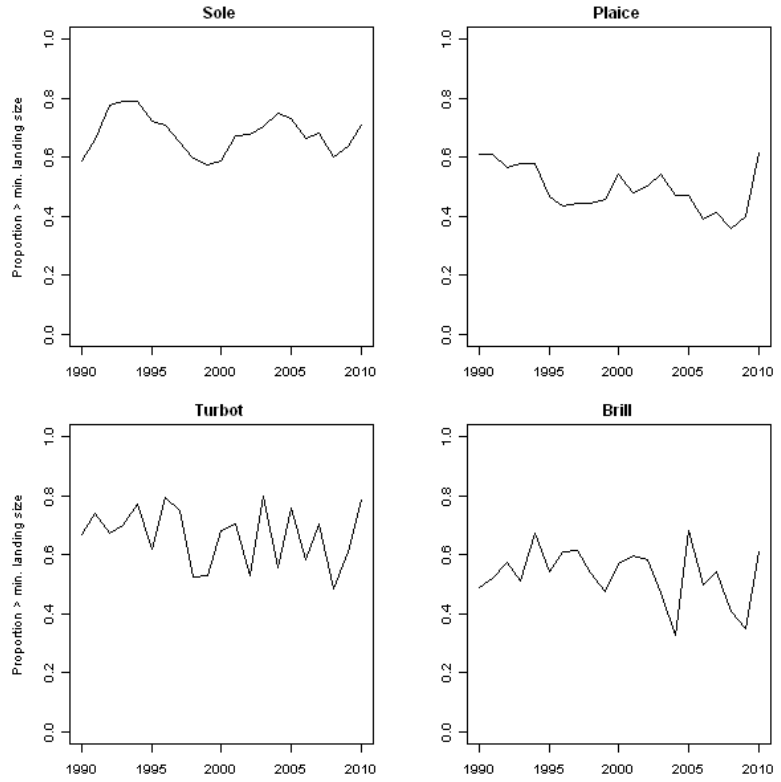
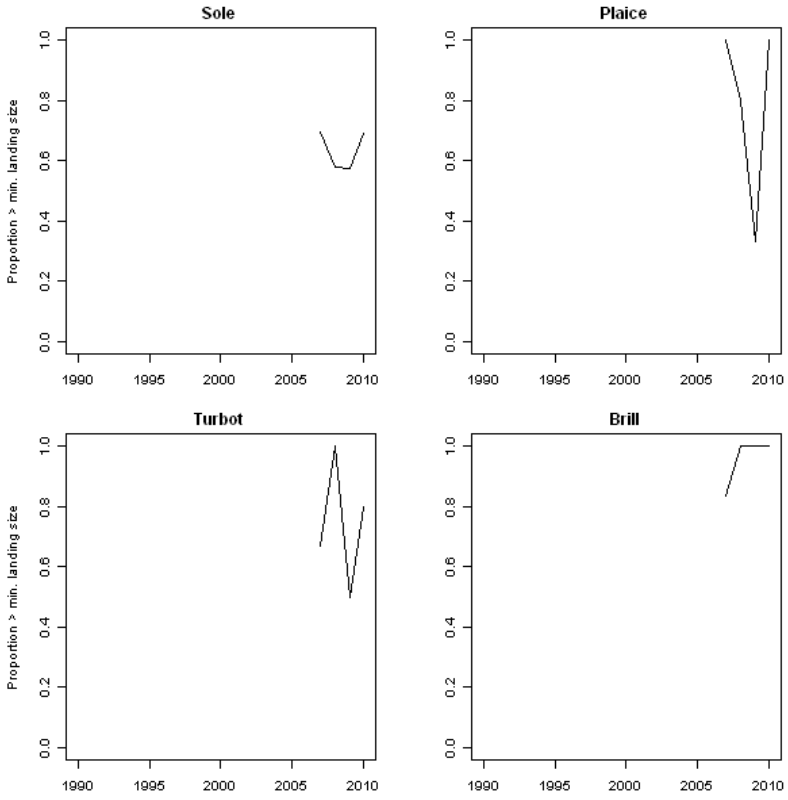


Figure 9.1.2.1b. Proportion (number based) of fish in offshore beam trawl catches larger than minimum landing size in ICES division VII.



9.1.2.1c. Proportion (number based) of fish in offshore beam trawl catches larger than minimum landing size in ICES division VIII.

9.2.2 Mean maximum length of fish found in research vessel surveys

The indicator can be calculated for the entire assemblage that is caught by a particular gear or a subset based on morphology, behaviour or habitat preferences (e.g. bottom-dwelling species only).

9.2.2.1 Methodology

Mean maximum length is calculated as: $\mathbf{L_{max} = \Sigma(L_{maxj} * N_j) / N}$

where $L_{max\ j}$ is the maximum length obtained by species j, N_j is the number of individuals of species j and N is the total number of individuals.

The calculation was carried out for all offshore beam trawl surveys, divided by area (IV, VII and VIII). Belgian data prior to 2008 were excluded as not all fish species were measured. No major influence of the incorporation of the Belgian data from 2008 onwards is to be expected, as the English research vessel carries out a survey in globally the same area, and so, the area coverage is similar over years.

The start of the North Sea is set to 1998 as from this year onwards, the area covered has remained constant. Before 1998, the Dutch survey only covered the southeastern North Sea. The German survey started in 1997 and the English survey in IVc started in 1995.

The few fish that were incidentally not measured were deleted from the file.

L_{maxj} was calculated for the complete time-series, over all areas.

Mean maximum length was (1) calculated per haul, (2) averaged by statistical rectangle and (3) averaged by area. Step 2 was carried out to equally weigh all statistical rectangles.

9.2.2.2 Results

The results for the calculation of the mean maximum length are in Figure 9.2.1.2. For area VII as well as area IV there seems to be an increase of the mean maximum length over the last few years. This means that the catches of the species with a high maximum length have increased, and/or the catches of the species with a lower maximum length have decreased.

For area IV (North Sea) and VII the increase might be due to the increasing numbers of plaice (a larger species).

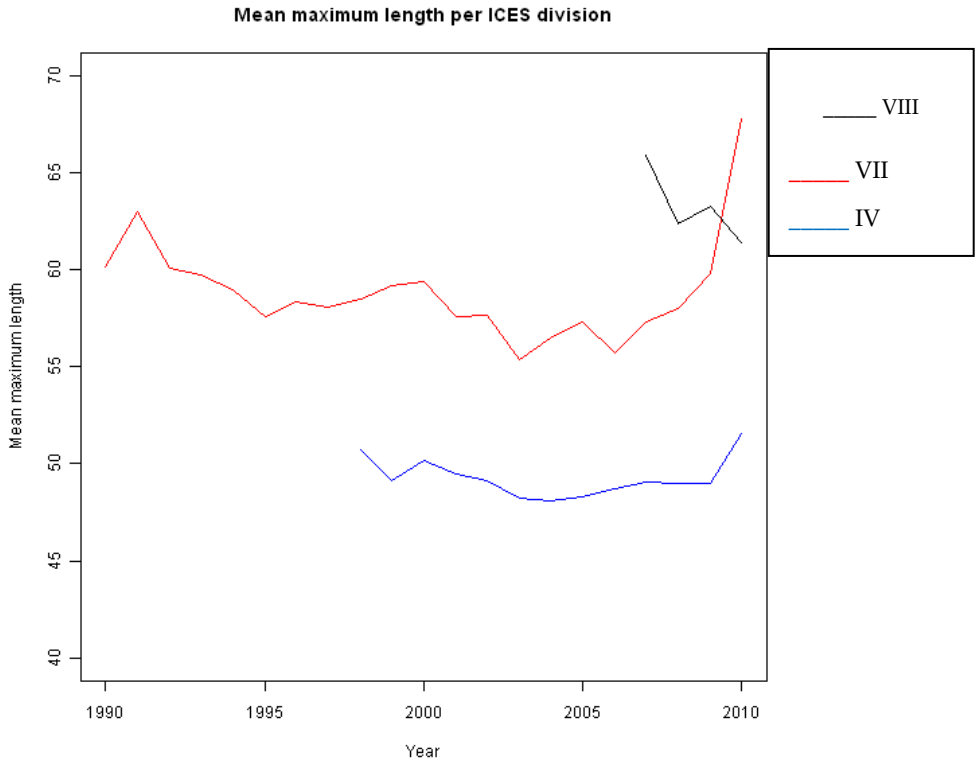


Figure 9.2.1. Mean maximum length per ICES division for the offshore beam trawl surveys.

9.2.2.3 Conclusion

Apart from the short time-series for division VIII, WGBEAM could well provide the information for this metric. When all offshore data are uploaded to DATRAS, it is recommended that ICES Data Centre provides the metric, after WGBEAM has approved a pilot.

9.2.3 95th % percentile of the fish length distribution observed

9.2.3.1 Methodology

The 95% percentile of the fish length distribution observed was calculated for the selection of species as used in 9.2.2 (calculation of mean maximum length), so only demersal fish species were taken into account.

The 95% percentile was calculated for length–frequency by number as well as by weight, using published length-weight relationships (Bedford *et al*., 1986; Coull *et al*., 1989; Robinson *et al*., 2010) where possible.

The formula (following Zar, 1984) used to calculate the 95% percentile is: $95p=ll_{int}+((0.95*N-cum_p)/n_{int})*I$

Where ll_{int} is the lower limit of the interval where the 95% is in, N the total number of observations (number: sum of numbers for the LF-distribution, weight: sum of weight for the LF-distribution), cum_p the cumulative number (or weight) of the previous classes, n_{int} the number of observations (number or weight) in the interval, I the interval size.

The calculation was carried out for all offshore beam trawl surveys, divided by area (IV, VII and VIII). Belgian data prior to 2008 were excluded as not all fish species were measured. No major influence of the incorporation of the Belgian data from

2008 onwards is to be expected, as the English research vessel carries out a survey in globally the same area, and so, the area coverage is similar over years.

The start of the North Sea is set to 1998 as from this year onwards; the area covered has remained constant. Before 1998, the Dutch survey only covered the southeastern North Sea. The German survey started in 1997 and the English survey in IVc started in 1995.

The few fish that were incidentally not measured were deleted from the file.

The 95% (number and weight based) was calculated by statistical rectangle and finally by ICES division (IV, VII, VIII).

9.2.3.2 Results

The results for the 95% of the observed length is shown in Figure 9.2.3.1. The 95% by weight is higher than the 95% by number, which is explained by the fact that the smaller fish make up a numeric larger part of the length–frequency distribution. In weight, however, the small fish is less influential. The patterns for the 95% for weight and length are similar.

The 95% in area VII shows a decline over the period, with extremes (low and high) in the last years. In area IV an continuous increase of the 95% of the length is visible from 1999 onwards. The area VIII time-series is too short to show any pattern.

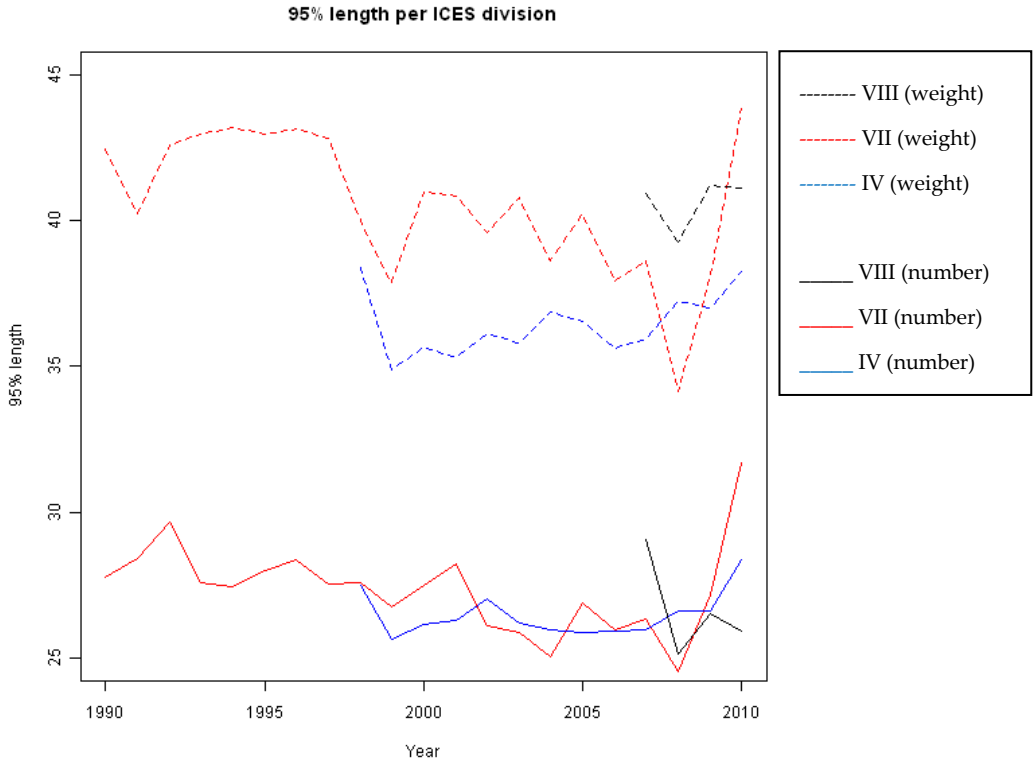


Figure 9.2.3.1. 95% of fish length distribution for demersal fish species in the offshore beam trawl survey by ICES division, by weight (dashed lines) and number (solid lines).

9.2.3.3 Conclusion

WGBEAM is capable to create this metric, but would like to have guidance if the metric should be based on a length–frequency distribution by length or by weight.

9.3 Review of SGRN10-03

The STECF Subgroup on Research needs 10-03 reviewed the fisheries surveys under the Data Collection Framework (DCF).

WGBEAM reviewed the report and the findings are listed below.

ID	Sea region	Acronym	Area	Period	Priority score	Comment
23	Atlantic	WCBTS-Q3	VIIefgh	Oct	1.05	Data submission to DATRAS in progress
28	Atlantic	ORHAGO	VIIIab	Nov	1.45	Data used by assessment WG because the time-series is too short. WKFLAT 2011 (ICES, 2011) indicated that it should be used in future.
66	Mediter-ranean	ARTS	GSA 17	Q4	1.05	At the time of the review the survey was internationally harmonized. From 2011 onwards, the survey will be coordinated by WGBEAM.
74	North Sea	BTS	IVbc, VIId	Aug-Sep	1.30	Manual for the offshore beam trawl surveys is already available since 2009 (http://datras.ices.dk/Documents/Manuals/WGBEAM_Manual.pdf) Data access for ENG, GER and NED via DATRAS. No approval needed. The geographic overlap between countries is only in IVc.
75	North Sea	DYFS	NS coastal waters and estuaries	Aug-Nov (dep on area)	1.55	Different gear types used for different areas: 6 m in coastal areas (BEL, NED); 3 m in continental estuaries (Wadden Sea, Scheldt). Continental survey standardized since 1970's. Survey indices of plaice and sole are being used for forecasting by WGNSSK.
76	North Sea	SNS	IVbc	Sep	1.25	Value in the survey also lies in it's consistency: the survey delivers one of the best tuning series for WGNSSK. There is not technical (gear) overlap with BTS and DYFS.

9.4 Gear comparisons

9.4.1 Inshore comparison: Experimental fishing to compare DYFS 6-m and 3-m inshore gear

In its 2010 meeting, WGCRAN observed a positive bias in comparing shrimp catches in the same area with the 6-m trawl as employed by Netherlands in the DYFS off the islands, to the German standard 3-m device, after correcting for the difference in gear width. Since the discrepancy is critical for deriving joint swept-area biomass estimates, it was suggested that an investigation be done comparing both gears operating as closely as possible to each other, i.e. at the two sides of the same boat.

This was set up as an experiment to be carried out jointly by IMARES and vTI/SF in August 2010 (17–20) on the chartered German shrimper „Poseidon" (ACC12) off the home port of Accumersiel, East Frisia.

9.4.1.1 Material and methods

Ship

The boat has 19.44 m overall length and 300 hp and a crew of two including the skipper. The plan was to take 40 15-min hauls over four day-trips in an area typical of the standard employment of the 6-m gear, which are flat grounds outside the island chain.

Sampling area

In divergence from the plan , due to weather conditions, a part of the hauls had to be taken inside of the islands over an appropriate stretch of even ground. Moreover, for a number of technical reasons (difficulties in handling the gear, gear loss and very large catches to be worked up), no more than 15 successful tows could be performed.

Gears and catch handling

Both gears are rigged with a roller chain (as for shrimping). Additionally, the 6-m trawl has an additional tickler chain in front of the rollers and a chain as groundrope (3-m: nylon groundrope). This results in large volumes of items, dead or alive, which are stirred up and scratched from the ground, filling up to 12 baskets as the total catch of 15 minutes trawling. (However, the typical quantity caught in routine operations during the survey is said to be less, about 2 baskets.) In particular, the trawl picks up light but voluminous material (green algae, hydrozoan skeletons and terrestrial plant residues inside the islands, polychaete tubes outside) which tends to clog the tunnel and the codend meshes, and encloses finer stuff like sand, mud, debris and shells. Most likely, also the retention of the surveyed species is affected.

The volume of the 6-m catch made it necessary to take subsamples (varying proportions) in all instances, while the 3-m catch was always worked up completely.

The unusual length of the net of the 6-m trawl required some modifications in the hauling process, while the far larger towing resistance forced the boat on a circle-arc path. This could be somehow compensated by a slight lifting of the outrigger and an adjusted rudder position, still the crew kept an uneasy feeling towards the gear.

9.4.1.2 Results

Data for shrimp, plaice and sole are analysed in detail (Figures 9.4.1.1a-c, Table 9.4.1.1). All three species are caught in larger quantities by the 6-m trawl than would be expected by just considering the gear width, and at least more of plaice than would be expected due to the tickler chain according to ICES 1985. Catches off the islands are considered separately because of less effect of entangling/clogging material there and because this is the proper area of regular usage. In the scatterplots, raised figures are used, while the size histograms give only the numbers measured.

Shrimp catches show a considerable scatter which is somewhat reduced when narrowing the data to outside the islands. For plaice, the scatter is acceptably low, but for both species it is unclear whether the relationship of catches can be expressed by a simple conversion factor, or whether a regression approach (with intercept) is more appropriate. Data for sole are too scarce to conclude anything specific other than that the 6-m trawl is much more efficient, as can be expected from its outfit with chains.

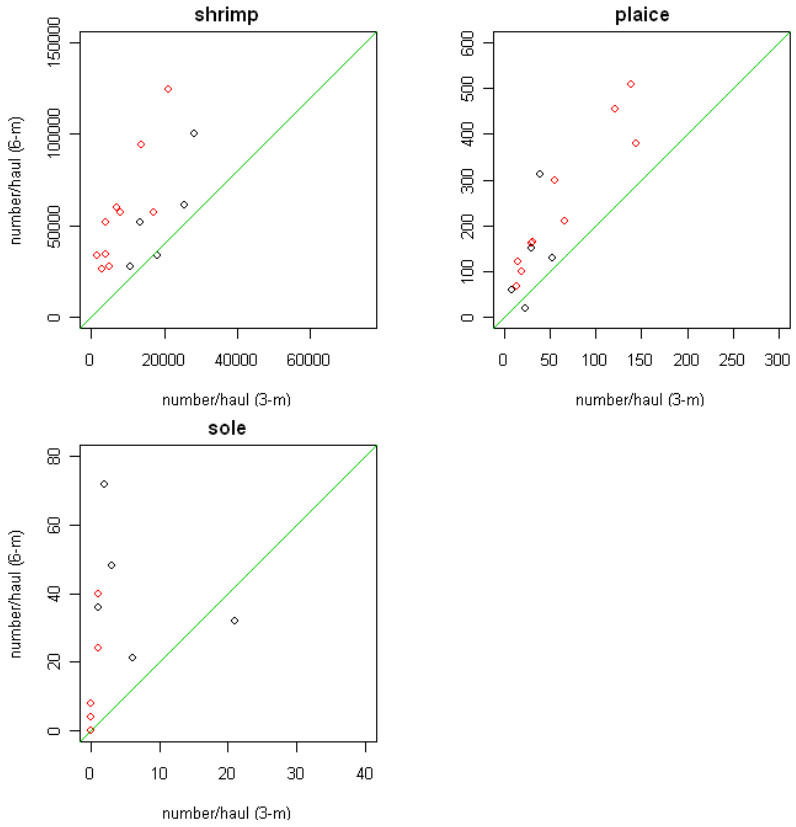


Figure 9.4.1.1a-c Results of the comparison between the 3-m beam trawl (x-axis) and the 6-m beam trawl (y-axis) for shrimp, plaice and sole. The green line represents y=2x. Red dots are stations off the islands, black dots stations located in the Wadden Sea.

The size spectra for shrimp and plaice (Figure 9.4.1.2) differ between gears, with a bias towards smaller sizes of shrimp for the 6-m trawl. Conversely, the 3-m trawl shows a bias for smaller plaice, which at the moment cannot be explained.

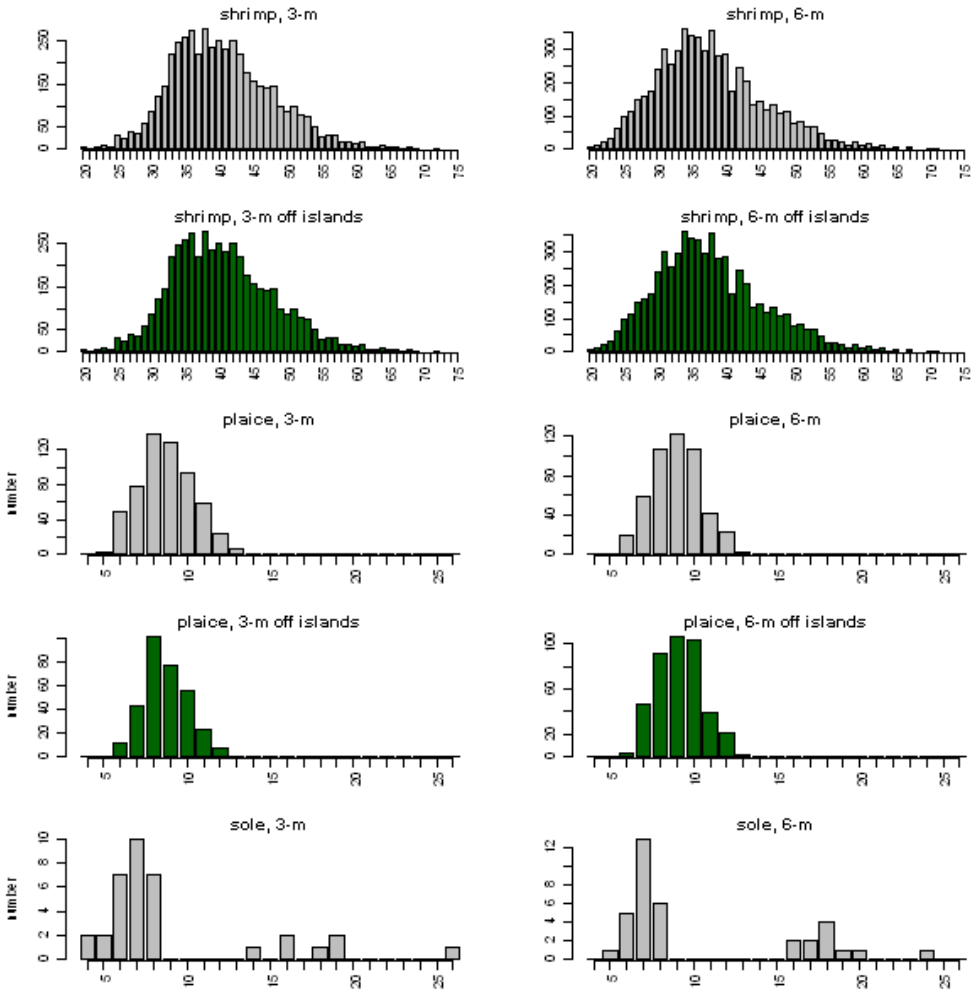


Figure 9.4.1.2. Results of the comparison between the 3-m beam trawl (left) and the 6-m beam trawl (right) length frequencies for shrimp, plaice and sole. The green plots show data off the islands (the original 6-m beam trawl sampling area).

A paired T-test was carried out on the data for shrimp, plaice and sole. For the 6-m beam trawl the Log10((number/2)+1) were used, for the 3-m beam trawl the Log10(number+1), to compensate for the width of the gear.

Table 9.4.1.1. p-values for the different experiments, based on paired T-test.

Ship	nr hauls	Species	p-values
Poseidon	15	Shrimp (n/1000m^2)	< 0.001
Poseidon	15	Plaice (n/1000m^2)	< 0.001
Poseidon	15	Sole (n/1000m^2)	0.004

9.4.1.3 Conclusions

Because of the small number of valid hauls and the remaining uncertainties, it is suggested by WGCRAN that the experiments are continued in 2011, where particular emphasis should be put on selecting (a) clean fishing ground(s).

9.4.2 Offshore comparison

In 2009 and 2010, Netherlands carried out a number of gear comparisons.

1) A. In 2009, there was a proposal to cosmetically modify the Tridens net. The net on portside was modified and the starboard net was kept in the original state. To see the effect of the modification, from all hauls plaice and sole were measured from both nets. Catch from starboard side was processed following the standard method.

2) B. In 2010, a similar comparison was carried out on board of Isis, to study the effect on sole. For all hauls, sole was measured from both nets.

3) In 2010, Isis encountered technical problems. In order to finish the index stations, Tridens took over the remaining stations, using the Isis net (without flip-up rope) on portside. The Tridens net (with flip-up rope) was kept on starboard and from both sides' plaice and sole were measured.

4) In 2009 and 2010 reference samples were collected by sorting and measuring plaice and sole starboard and portside while operating similar nets (with flip-up rope, no difference in net) on both sides, to prevent a side effect from the beam trawls or the ship.

To compare the catches, a paired t-test was carried out on the 10 log transformed (numbers+1), the numbers being standardized to a fished area of 1 ha.

9.4.2.1 Results

The results of the comparisons by number and weight per species per haul are in Table 9.4.2.1 and Figures 9.4.2.1a-c.

Table 9.4.2.1. p-values for the different experiments, based on paired T-test.

Ship	nr hauls	rigging		p-values			
		Starboard	**Port**	**Plaice (n/ha)**	**Plaice (kg/ha)**	**Sole (n/ha)**	**Sole (kg/ha)**
Tridens	49	Standard	Modified	0.848	0.877	X	X
Isis	36	Standard	Modified	X	X	0.171	0.203
Tridens	26	Standard	Without flip-up	0.946	0.804	0.098	0.297
Tridens	26	Standard	Standard	0.405	0.459	0.266	0.314

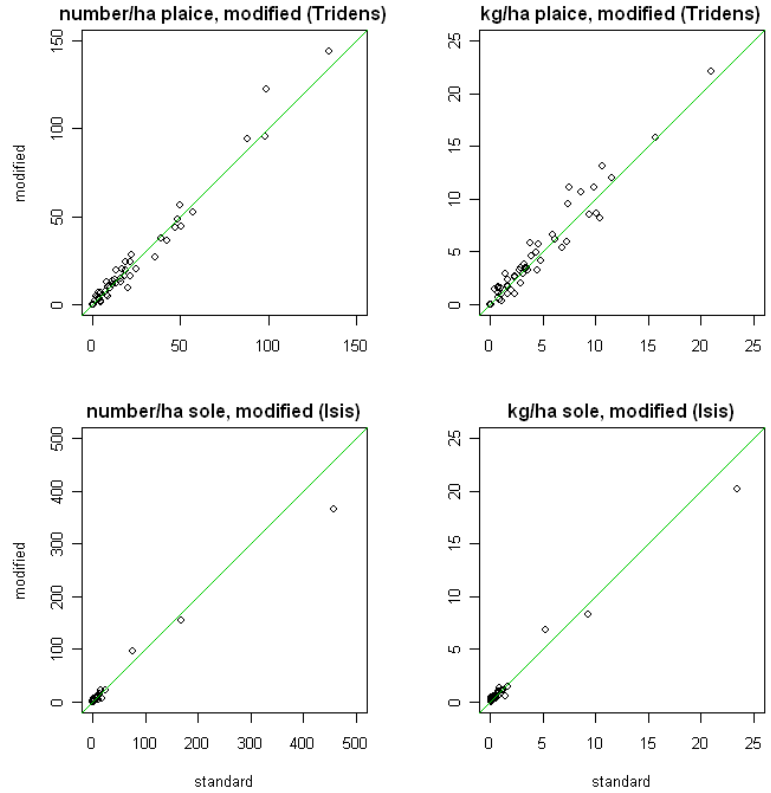


Figure 9.4.2.1a. Results of the comparison between the standard net (x-axis) and the modified net (y-axis) for plaice and sole.

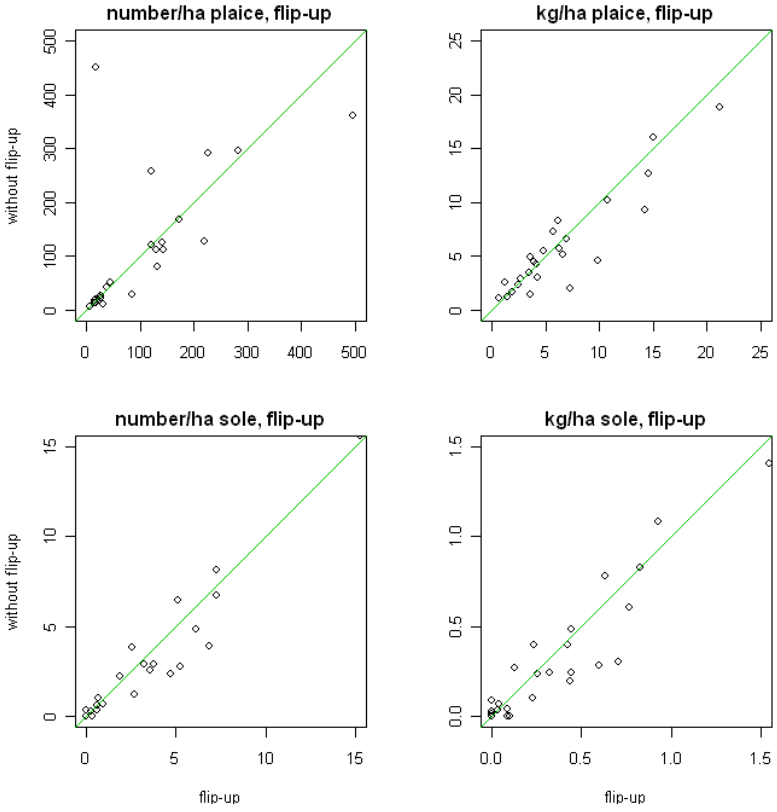


Figure 9.4.2.1b. Results of the comparison between net with flip-up rope (x-axis) and without flip-up rope (y-axis) for plaice and sole.

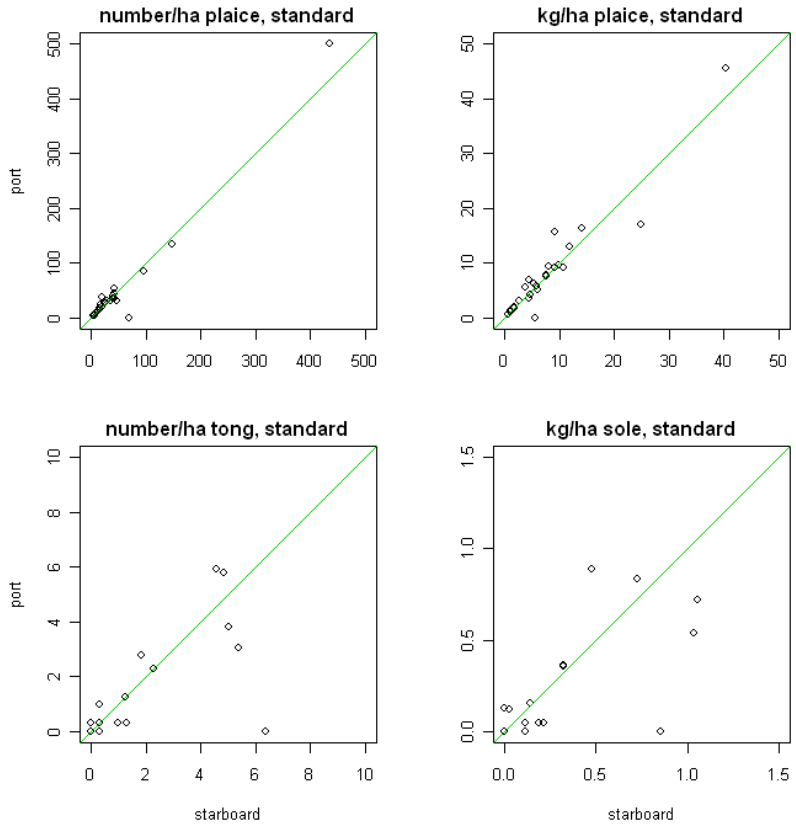


Figure 9.4.2.1c. Results of the comparison between starboard (x-axis) and port side (y-axis), both standard nets, for plaice and sole.

9.4.2.2 Discussion and conclusions

None of the experiments show a significant difference in the catches for plaice and sole. Based on the results of the comparison between the modified net and the standard net, it was decided to let all nets be modified in order to have a new standard net. The modifications are described in section 8.1 and in the manual itself.

Although earlier studies did show a significant difference in catches with and without flip-up rope (Groeneveld and Rijnsdorp, 1990), this couldn't be found in the current comparison. It might be worth to go into detail and analyse the data for different length classes.

The comparison of the catches for starboard and port side conducting similarly rigged nets shows that any effect that could be seen, will not be due to different operation of the gears.

9.5 Other recommendations

9.5.1 Elasmobranch species

WGEF recommends the following:

1) that surveys coordinated by IBTSWG, PGNEACS and WGBEAM report catch data on the common skate complex (*Dipturus batis* and *Dipturus intermedia*) using the updated species names for the two species (see Section 21.1 for further information for some of the morphological characteristics used to distinguish these species).

2) Trawl surveys could usefully provide information on catches of viable (i.e. containing yolk or embryos) skate egg-cases, and it is recommended that IBTSWG and WGBEAM be asked to record the numbers of viable skate egg cases (by species where possible) in future trawl surveys

Ad 1) There is one record on *Dipturus batis* in the WGBEAM dataset (1990–2010), from Netherlands in 2005. From 2011 onwards, WGBEAM participants will do the utmost to separate the species and use the current names. This is, however, also dependent on the transition of DATRAS species coding from ITIS TSN to WoRMS.

Ad 2) This recommendation is put into the offshore and inshore manuals. Netherlands already collects data on viable elasmobranch egg cases. Data submission into DATRAS depends on the incorporation of the maturity field in the DATRAS HL records (see also Annex 16, report of workshop). A website providing more information is http://home.planet.nl/~bor00213/

9.5.2 Flatfish maturity

PGCCDBS recommends that:

1) survey planning groups (WGBIFS, IBTSWG, WGBEAM) review the WKMSSPDF recommendation to 'put the content of a gonad under a microscope in case of disagreement or doubt on the maturity stage of a fish (if time allows during a survey)',

2) include it in sampling manuals if appropriate

Ad 1) as the WGBEAM sampling is outside the recommended sampling period for maturity of flatfish (WKMSSPDF 2010), there is no need to develop a protocol for this recommendation.

Ad 2) Despite the explanation above, WGBEAM is willing to incorporate the protocol as might be developed by IBTSWG and/or WGBIFS in the offshore and inshore manuals.

9.5.3 Shrimp data inshore survey (WGCRAN)

WGCRAN recommends that:

1) basic quality checks and analyses on available brown shrimp data from the inshore surveys are carried out

2) In August 2010 a commercial shrimp trawler was chartered for four days by the Institut für Seefischerei Hamburg and a direct comparison of the two types of gear was carried out in East Frisian waters. Sampling and data collection procedures were carried out according to DYFS standards. Beam trawl catches were sorted and analysed on board to the species level including fish. Due to technical difficulties and bad weather conditions only 15 valid stations could be sampled, 10 stations outside the islands in 6 to 15 m water depth and 5 stations on the inner side of the islands in 2 to 11 m depth. First results indicated that standardized biomass density of *Crangon* in the BT6 was significantly higher than in the BT3.

3) WGCRAN welcomed the German/Dutch initiative as a first step to standardize data and obtain better biomass estimates for the *Crangon* stock. Due to difficulties in the interpretation of differences in the length composition as well as the relatively small number of valid sampling stations, WGCRAN recommended that another campaign should be carried out preferably in August 2011 to obtain a sufficient level of data for a robust

estimate of the biomass correction factor for 3m/6m-beam trawls. These data could also be analysed for commercially exploited fish species and be of great value to WGBEAM.

Ad 1) Currently, the WGBEAM inshore dataset only contains recent shrimp data from the Netherlands. German data are available until 2008. The Dutch shrimp data are quality checked following standard IMARES procedures (checks for length frequency, numbers per length, subsampling factor). The analysis on the brown shrimp is in 9.1.2

Ad 2) WGBEAM encourages comparative fishing for the beam trawl surveys. However, for the inshore index calculation (plaice and sole) there is no direct need for a comparison as there are conversion factors available. WGBEAM recommends that vTI and IMARES put up a list of requirements, including a power analysis to identify the number of hauls needed to carry out a sound statistical analysis and costs, and decide between the two institutes if, how and when the comparison can be carried out. If it is not possible to finance the comparative study in 2011 but it might be possible in 2012, WGBEAM recommends that the study is postponed to 2012.

9.6 DUAP sharepoint

The DUAP (DATRAS User Advisory Panel) was set up in October 2009 to facilitate discussions about DATRAS uploads and downloads.

From the 9 WGBEAM participants, 7 have access to http://groupnet.ices.dk/duap. Most of them, knew what DUAP is meant for but only 2 have used the discussion forum frequently.

Suggestions for improvement are suggested by IBTSWG 2011.

10 References

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Annex 1: List of participants

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Annex 2: Agenda

Agenda WGBEAM 2011, 7–10 June 2011

Tuesday 7 June, start 9.30

Welcome and Logistics

am

General issues:

1. Terms of Reference and main aims
2. Working documents
3. Section responsibilities: see report content index below

Then ICES Data Centre issues

- ICES Data Centre – Anna
- Issues arising (French Data?)

4. Review of recommendations
5. Reports from:
   - IBTS WG – Brian
   - WGDIM – Ingeborg
   - WGNSSK – Uli?
   - WGISUR – Ingeborg/Brian
6. Presentations:
   - Giuseppe Scarcella on Northern Adriatic Sea beam trawl survey
   - Gary on his German Inshore Survey staff exchange
   - Kelle on his experience on the Cefas Irish Sea Beam Trawl Survey
   - Presentation(s) on gear comparisons
7. Additional requests:
   - Carry out basic quality checks and analyses on available brown shrimp data from DFS and DYFS

ToR a) prepare a progress report summarizing the results of the 2010 offshore and inshore beam trawl surveys;

Short feedback on the 2010 by all countries: did people face problems during the survey, how were they solved, involvement of fisheries in the beam trawl surveys: experiences, nice things to know, etc.

Prepare standard output:

- area coverage (Figures 3.1.1- 3.1.4)
- standard reporting formats
- finalize survey summary sheets if not ready

ToR b) Tabulate, report and evaluate population abundance indices by age-group for sole and plaice in the North Sea, Division VIIa and Divisions VIId-g, taking into account the key issues involved in the index calculation;

- as last year: similar plots and text as in 2010 report
- changes in population distribution
- discuss the index calculation methods

Additional:

- WKFLAT on sole indices. It is recommended that WGBEAM evaluates the Belgian and UK (Corystes/Endeavour) surveys in terms of their potential use in assessing the Sole IV stock. Also examine possibility of extending BTS survey for sole to cover this area or explain why this area is not currently included.
- The UK beam trawl and Belgian survey indices for sole and plaice should be published by WGBEAM whose members should discuss them in the context of patterns and differences observed in the Dutch BTS (ISIS and Tridens) and SNS data. We know that large spatial changes in the distribution of plaice in the North Sea have occurred, viz. the migration of juvenile plaice out of the Plaice Box. WGBEAM should investigate spatial changes in the distribution of sole.

pm

ToR d) Continue development of a manual to improve standardization of sampling protocols, surveys gears and quality control aspects;

- check the offshore manual for updates
- continue the creation of the coastal beam trawl manual

Inshore surveys:

- update database inshore surveys
- Loss of UK YFS and affect
- discussion on recalculating inshore indices

Discussion and arrangement of staff exchanges on 2011 beam trawl surveys

If time remains then work on Sections that you are responsible for

Wednesday 10th

am

ToR c) further coordinate offshore and coastal beam trawl surveys in the North Sea and Divisions VIIa, VIId-g and VIIIa-b;

Review all aspects of surveys which could be more effectively coordinated:

- survey timing and gear
- staff exchange
- overlapping of survey days for gear inter-calibration to be discussed
- QA issues, List of fish species in offshore and inshore beam trawl surveys
- For 2011 offshore surveys: concrete exchange plan (including names and who goes where)
- Rubbish

pm

ToR e) Continue work of developing and standardizing an international (fish and epifauna) database of offshore beam trawl survey data and coordinate such activities with those of the IBTSWG.

work on Sections that you are responsible for

Thursday 11th

am

ToR f) Look into the details of a selection of species caught in the inshore or offshore beam trawl surveys. The selection of the species can be done based on the output from ToR a, b or based on an external request.

ToR g) Prepare methods for delivery of the following information to assessment working groups in 2012:

iv) Proportion of fish larger than the mean size of first sexual maturation

v) Mean maximum length of fish found in research vessel surveys

vi) 95th % percentile of the fish length distribution observed

pm

- Recommendations
- Analysis and text writing

Friday 12th

am

Date and time of next meeting

ToRs for 2012 meeting

Recommendations

Text checking

1300 finish

Annex 3: WGBEAM terms of reference for the next meeting

The **Working Group on Beam Trawl Surveys** (WGBEAM), chaired by Brian Harley, UK, will meet in IJmuiden, the Netherlands, 5–8 June 2012 to:

a) Prepare a progress report summarizing the results of the 2011 offshore and inshore beam trawl surveys;

b) Tabulate, report and evaluate population abundance indices by age-group for sole and plaice in the North Sea, Division VIIa and Divisions VIId-g, taking into account the key issues involved in the index calculation;

c) Further coordinate offshore and coastal beam trawl surveys in the North Sea and Divisions VIIa, VIId-g and VIIIa-b;

d) Continue work on standardizing the offshore and inshore surveys such as, the reviewing the manuals, updating database and staff exchanges

e) Look into the details of a (selection of) species caught in inshore or offshore beam trawl surveys. The selection of the species can be done based on the output ToR a, b or based on an external request. Focus in 2012 will be on selection of species, water depth and distance from shore (look at text in report);

The information should be provided for all major fish stocks covered by the survey.

WGBEAM will report by 10 July 2012 (via SSGESST) for the attention of SCICOM, WGISUR and ACOM.

Supporting Information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem affects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority.
Scientific justification	**Term of Reference a)** Several countries are conducting or have recently completed significant studies in this area and the subject would benefit from a review of progress and an evaluation of the results obtained. The last review of significant studies occurred in 1996 by the ICES Study Group on Unaccounted Mortalities. A review of more recent work will determine the need for revision and update on planning and methodology for studying this subject. **Term of Reference b)** All fishing activities have influences that extend beyond removing target species. The approach recommended by FAO is that responsible fisheries technology should achieve management objectives with a minimum of side effects and that they should be subject to ongoing review. WGFTFB members and others are currently undertaking a range of research programmes to provide the means to minimize side effects.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 6–10 members and guests.
Secretariat facilities	None.
Financial	No financial implications.

Linkages to advisory committees	There are no obvious direct linkages with the advisory committees.
Linkages to other committees or groups	There is a very close working relationship with all the groups of the SSGESST. It is also very relevant to the Working Group on Ecosystem Effects of Fisheries.
Linkages to other organizations	The work of this group is closely aligned with similar work in FAO and in the Census of Marine Life Programme.

Annex 4: Recommendations

Recommendation	Adressed to
1. WGBEAM recommends that within the DATRAS database, 'quarter' is considered as a fixed value for a specific survey, and not create an error message when the month is outside the quarter.	ICES Data Centre
2. WGBEAM recommends that ICES Data Centre, as soon as possible, provides a list of species that are currently in DATRAS, containing the scientific name, the TSN code and the WoRMS code, to al data submitters.	ICES Data Centre
3. WGBEAM recommends that ICES Data Centre allows "-9" to be used in 'nomeas' and 'totalno' when "5" is reported in the 'SpecVal' field	ICES Data Centre
4. WGBEAM recommends that calculation of indices, by using ICES Data Centre products, be available ready for WGBEAM 2012	ICES Data Centre
5. WGBEAM recommends that ICES Data Centre resolve the issue of combining the BTS and BTS-7a dataset within DATRAS as soon as possible by and certainly before WGBEAM 2012.	ICES Data Centre
6. WGBEAM recommends that once the offshore surveys are uploaded to the DATRAS Database, ICES Data Centre should be asked to provide precision estimates for inclusion in the next appropriate WGBEAM report..	ICES Data Centre
7. WGBEAM recommends that ICES Data Centre provides the metric for calculating the mean maximum length of fish found on offshore beam trawl surveys.	ICES Data Centre
8.WGBEAM recommends that ICES develop a referencing regime that allows them to be referenced, independently of a particular annual report.	ICES PUBCOM
9. WGBEAM recommends that WGNSSK and WGBEAM collaborate on the best way forward to calculate the proportion of fish larger than the mean size of first sexual maturity.	WGNSSK
10. WGBEAM recommends that marine litter data are collected in all surveys following the excel spreadsheet submitted by WKMAL, and data are made available to national representatives of Descriptor 10 of the MFSD.	All WGBEAM institutes
11. WGBEAM recommends that if time and weather allows, overlapping hauls are to be carried out by countries operating in the same areas.	Beam Trawl surveys coordinated by WGBEAM
12. WGBEAM recommends that the Belgian institute allows resources to upload at least the most recent years data (2011 once complete), by January 2012.	ILVO
13. WGBEAM recommend that ILVO evaluate the number of biological samples collected by area, paying particular attention to the sampling regime used by Cefas, in order to rationalize its numbers of biological samples and bring it's sampling protocol in line with the rest of WGBEAM	ILVO WGBEAM memeber
14. WGBEAM recommends that the UK(England) provide an extended time-series for IVc plaice for WGBEAM 2012.	Cefas
15. WGBEAM recommends that a further campaign should be carried out preferably in August 2011 to obtain a sufficient level of data for a robust estimate of the biomass correction factor for 3m/6m-beam trawls.	IMARES and vTI

Recommendation	Adressed to
16. WGBEAM recommends that vTI and IMARES put up a list of requirements, including a power analysis to identify the number of hauls needed to carry out a sound statistical analysis and costs, and decide between the two institutes if, how and when the comparison in recommendation 15, can be carried out. If it is not possible to finance the comparative study in 2011 but it might be possible in 2012, WGBEAM recommends that the study is postponed to 2012.	IMARES and vTI

ACTIONS	
1. As the DYFS indices are weighted by DYFS area codes, WGBEAM should supply a table to ICES Data Centre containing the total m2 per stratum.	WGBEAM 2012
2. WGBEAM should incorporate the description of the DATRAS field 'LngtCode' into the inshore and offshore manuals.	WGBEAM 2012
3. WGBEAM recommends that WGBEAM incorporates the description of the DATRAS database 'LngtCode', from the IBTS manual, into the DYFS and BTS manual.	WGBEAM 2012
4. It is recommended that WGBEAM provide ICES Data Centre with a closed benthos list for the DYFS, in order to use 'BycSpecRecCode 6' from the DATRAS database, for fully sampled hauls.	WGBEAM members
5. All WGBEAM participating countries upload their offshore data to DATRAS by February 1 2012	WGBEAM members
6. All WGBEAM participating countries send their inshore data to IMARES by April 1 2012	WGBEAM members
7. All WGBEAM participating institutes should investigate whether their countries discard sampling program provides data on mean size of first maturity.	WGBEAM members

Annex 5: Details on offshore and inshore beam trawl surveys

Annex 5.1: Details of the beam trawl surveys currently undertaken by each country.

	Belgium	France	Germany	Adriatic	Netherlands	Netherlands	UK	UK	UK
Survey area:	IVb and c west	VIIIab	IVb east	North Adriatic Sea (GSA 17)	IVb and c east	Central N Sea	VIId	VIIe	VIIa, f and g
Year survey started:	1992	2007	1991	2005	1985	1996	1988	1988	1988
Dates:	August	November	mid August	November	August-early September	mid August-mid September	late July	late September/ early October	September
Usual start date	week 33	Week 44	week 32	Week 45	week 32/33	week 34	week 30	week 39/40	Week 36/37
Number of survey days	10	35	11	18	20	16–20	15	8	21–24
Ship:	RV Belgica	RV Gwen Drez	RV Solea	RV G. Dallaporta	RV Isis	RV Tridens	RV Corystes/ RV Cefas Endeavour	MFV Carhelmar	RV Corystes
Ship length:	50 m	24.5 m	42 m	35.7 m	28 m	73.5	53 m	22 m	53 m
Beam trawl length:	4 m	4 m	7 m	3.5 m	8 m	8 m	4 m	4 m	4 m
Number of beams fished:	1	1	2	2	2	2	1	2	1
Number of beams sorted:	1	1	1	2	1	1	1	2	1
Trawl duration (min):	30	30	30	30	30	30	30	30	30
Tow speed (knots):	4	5	4	5.5	4	4	4	4	4
Codend stretched mesh (mm):	40	20	80 Liner: 44 mm	40	40	40	75 Liner: 40 mm	75 Liner: 40 mm	75 Liner: 40 mm
Number of ticklers:	0	10	5	0	8	8	0	0	0
Gear code:	BT4M		BT7	Rapido	BT8	BT8F	BT4FM	BT4FM	BT4FM
Attachment:	*	(none)	(none)	(none)	(none)	**	*	*	*
Station positions:	fixed	Fixed	pseudo-random	Fixed	pseudo-random	pseudo-random	Fixed	fixed	Fixed
Av No stns/yr	53	120	63	67	88	63-73	100	57	94
Benthos sampling since:	1992	2007	1992	2005	1985	1996	1991	1992	1992

 # new vessel since 2004; previously 35m, * chain mat and flip-up rope, ** flip-up rope only.

Annex 5.2: Inventory of the inshore beam trawl surveys.

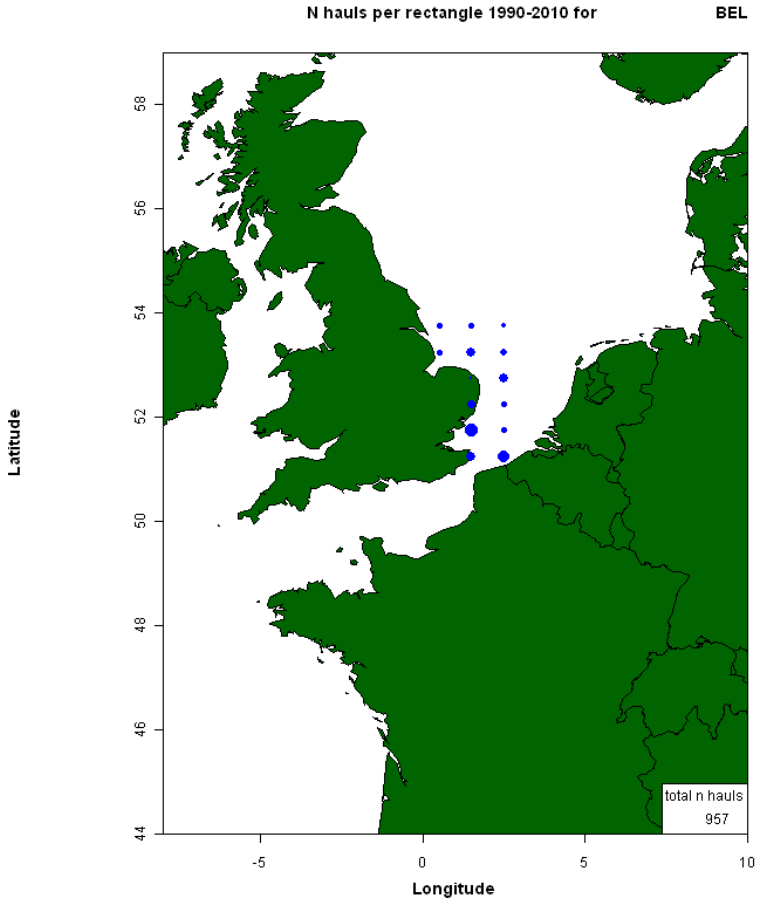
Country	Netherlands (SNS)	Netherlands (DYFS)			UK (YFS)	Belgium (DYFS)	Germany (DYFS)	
Geographical Area	Scheveningen (NL) to Esbjerg (DK)	Wadden Sea	Scheldt Estuary	Dutch coast to Danish coast	Eastern/South-Eastern English Coast	Belgian Coast	NiedersachsenWadden Sea +Elbe Estuary	Schlesweig-Holstein 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 *Crangon*	All fish species *Crangon*	All fish species *Crangon*	All fish species	Commercial fish species *Crangon* (1973–92, 2004–05)	All fish species *Crangon*	All fish species *Crangon*
Catch rate	Epibenthos (quantity)	Epibenthos (quantity)	Epibenthos (quantity)	Epibenthos (quantity)	*Crangon* (volume)	*Crangon* (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 6: Spatial distribution of sampling and fish species for the offshore surveys

Annex 6.1: Spatial sampling coverage per country

Annex 6.1.1: Total number of offshore beam trawl hauls per rectangle for Belgium.

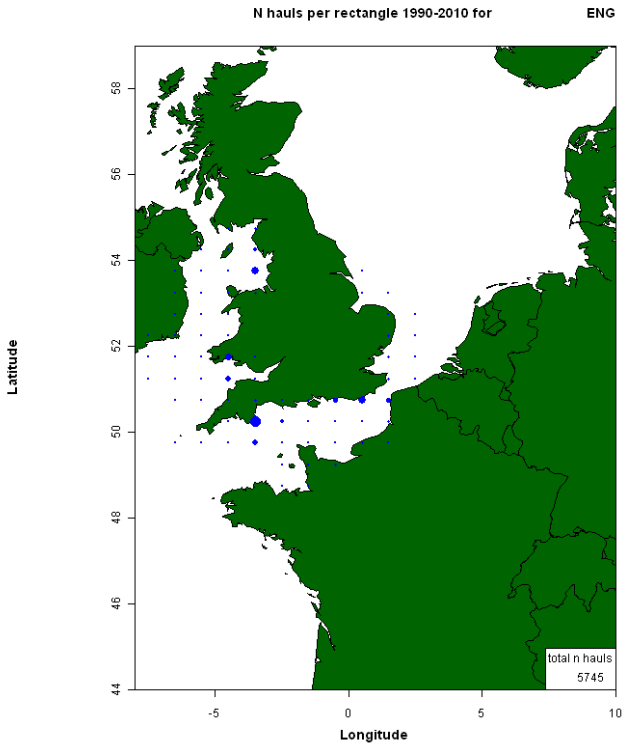
Left plot time-series, right plot current year

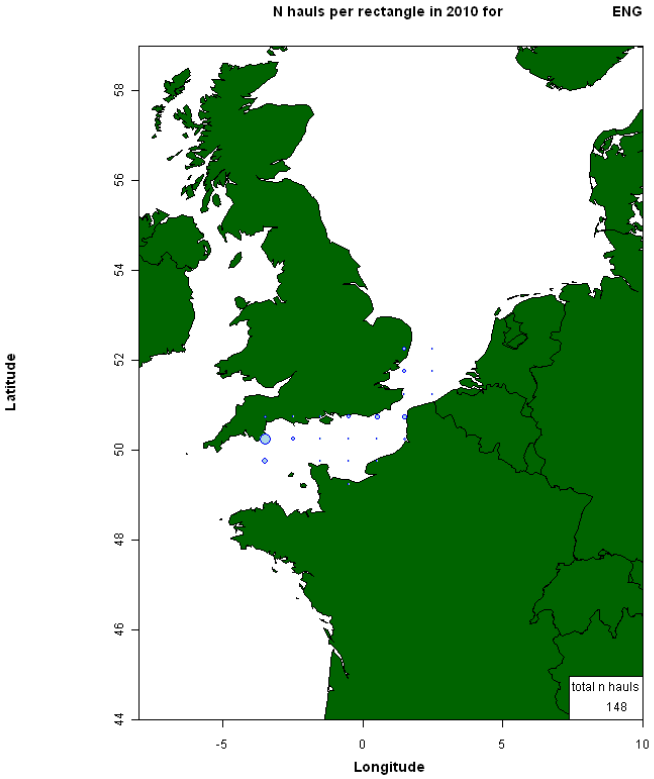


Belgium data for 2010 are unavailable

Annex 6.1.2: Total number of offshore beam trawl hauls per rectangle for England

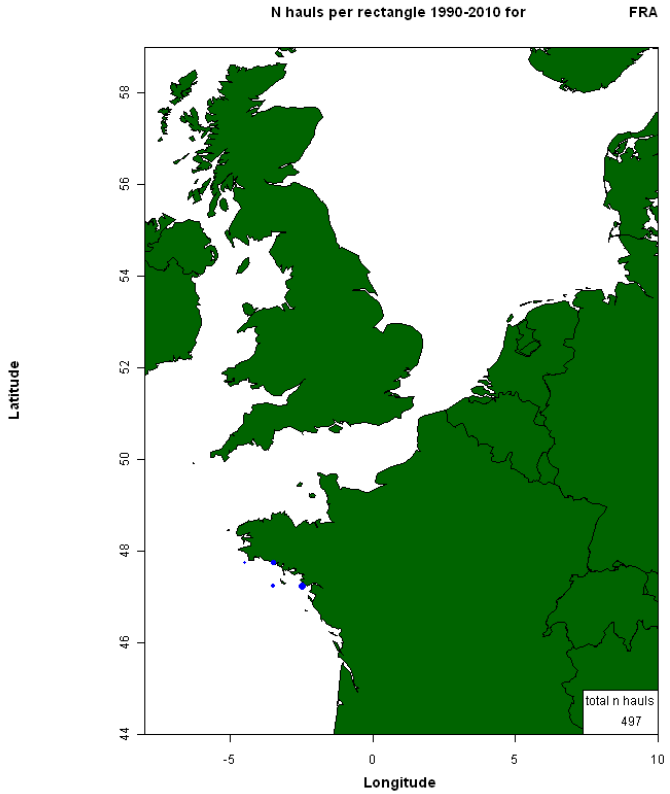
Left plot time-series, right plot current year

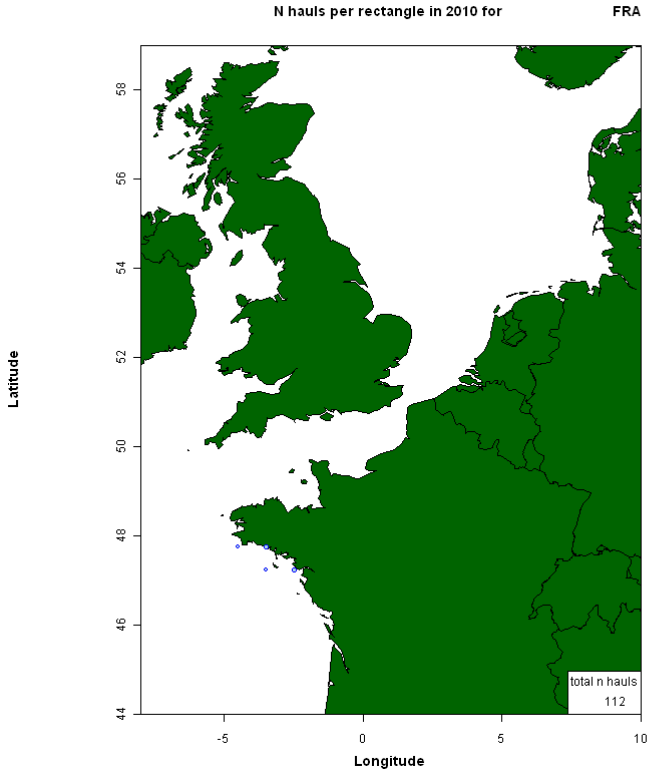




Annex 6.1.3: Total number of offshore beam trawl hauls per rectangle for France

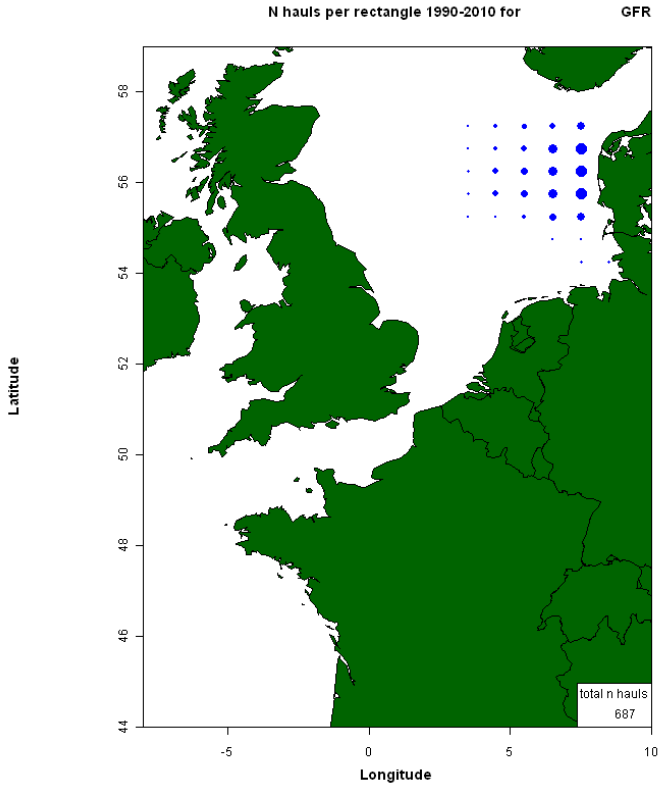
Left plot time-series, right plot current year

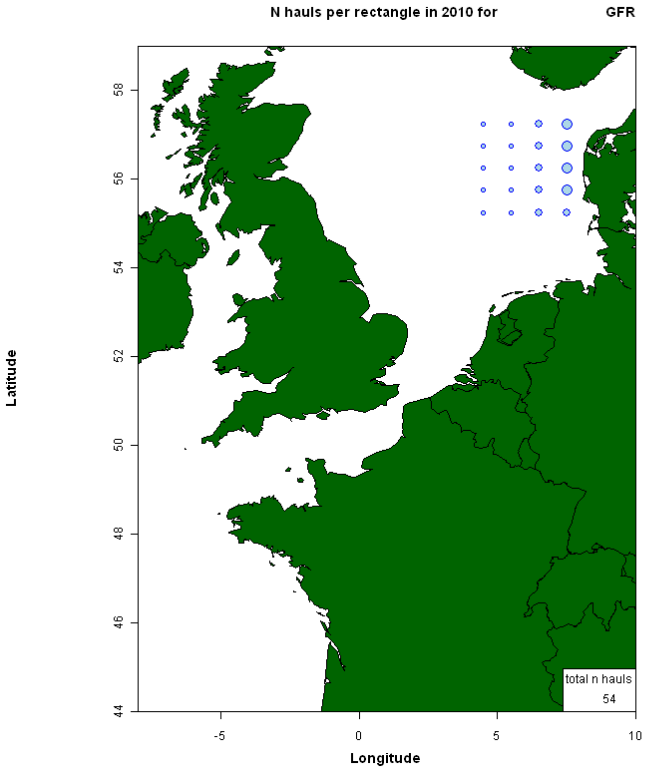




Annex 6.1.4: Total number of offshore beam trawl hauls per rectangle for Germany

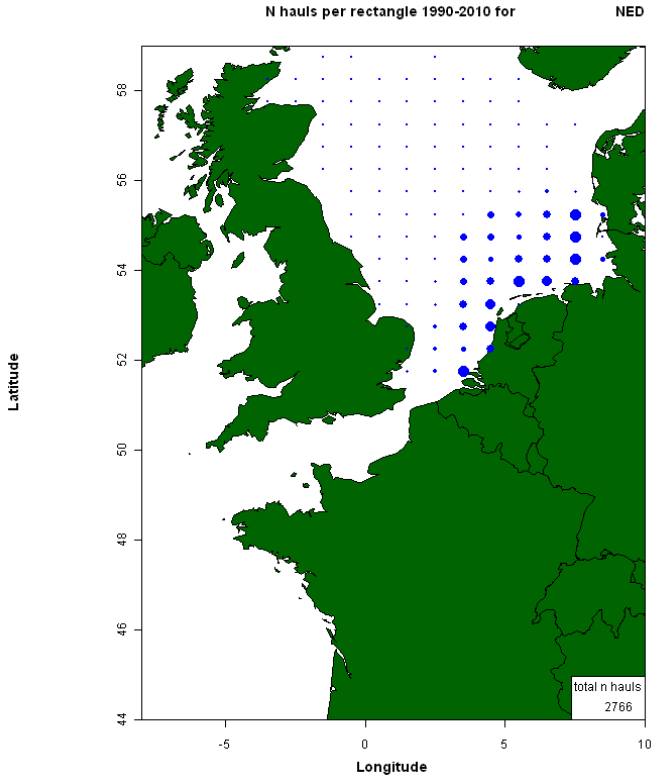
Left plot time-series, right plot current year

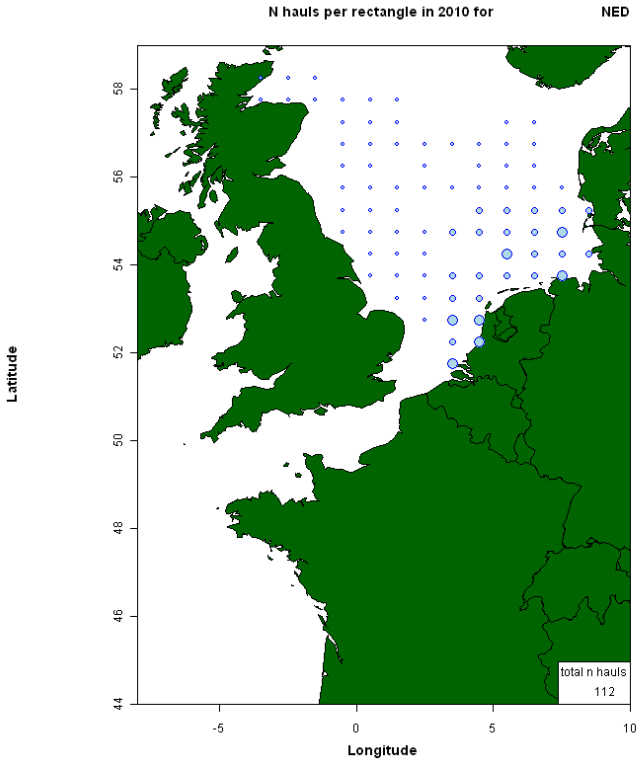




Annex 6.1.5: Total number of offshore beam trawl hauls per rectangle for Netherlands

Left plot time-series, right plot current year





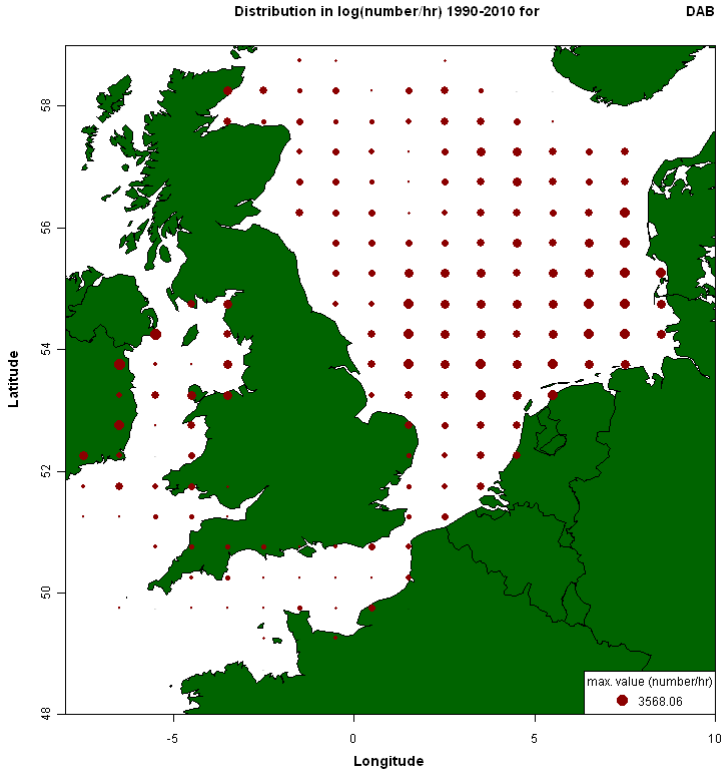
Annex 6.2: Spatial distribution per species

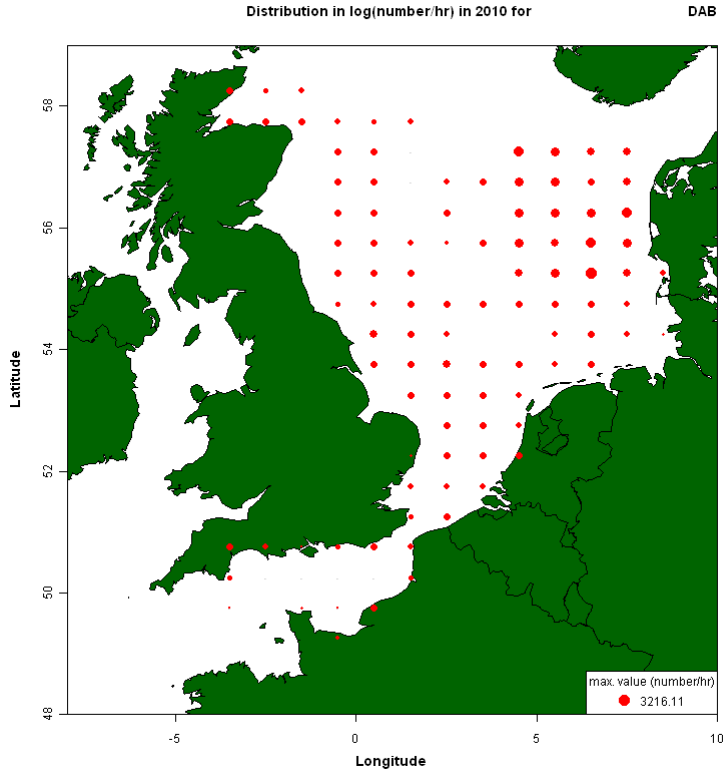
This annex shows distribution bubble plots of the main species caught throughout the beam trawl surveys by rectangle for all surveys combined. The left hand plot shows the mean catch in numbers per hour, raised to 8m-beam trawl, for the time-series. The right hand plot shows the data for the current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

Annex 6.2.1: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Dab

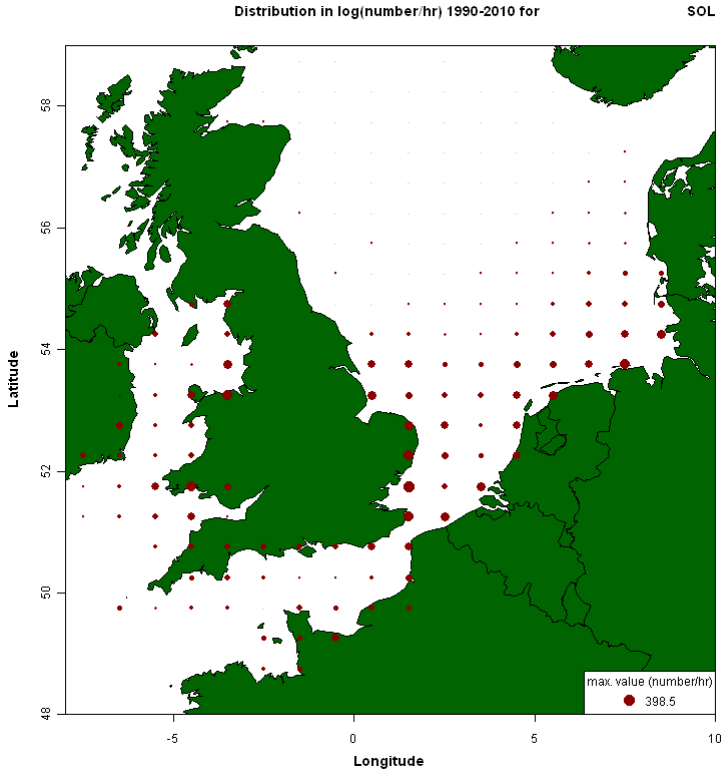


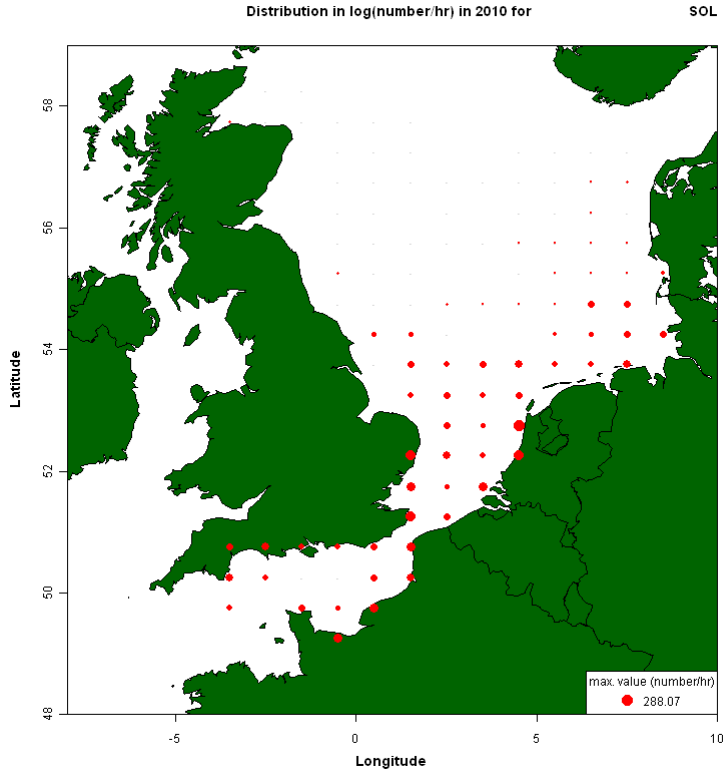


Annex 6.2.2: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Sole

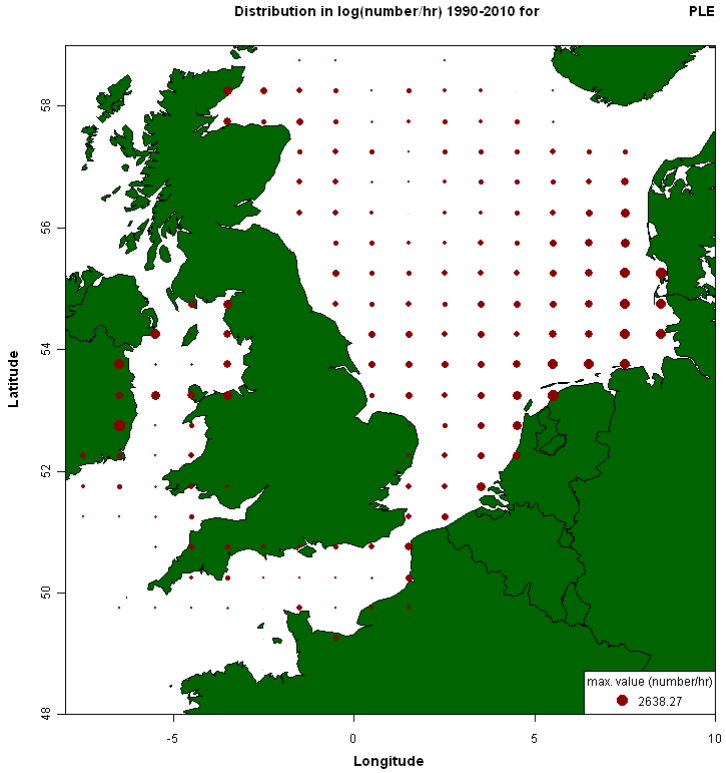


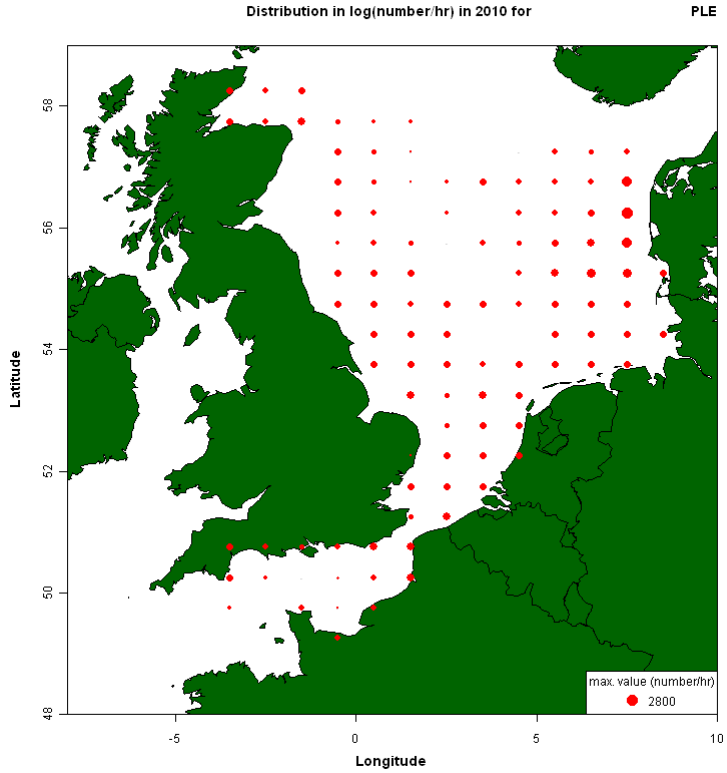


Annex 6.2.3: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Plaice

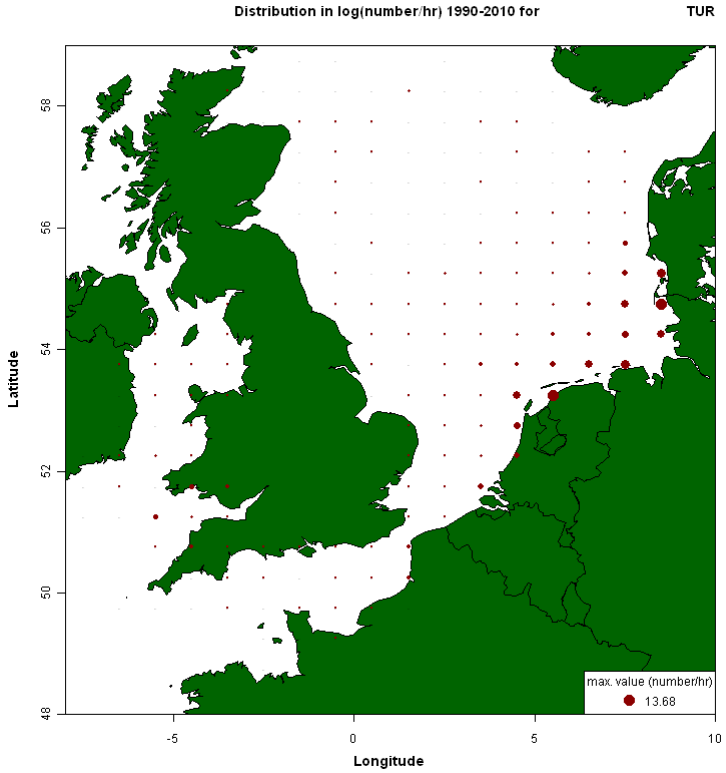


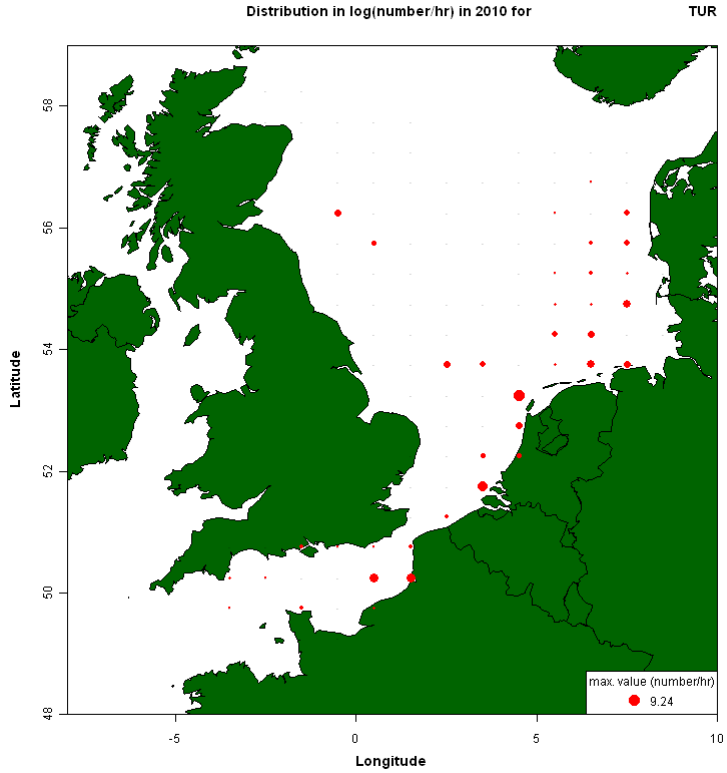


Annex 6.2.4: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Turbot

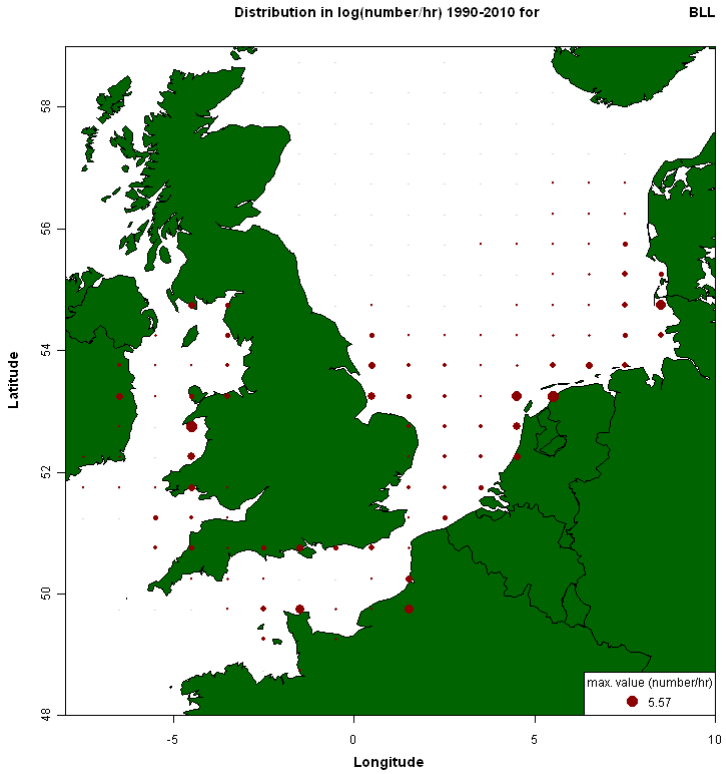


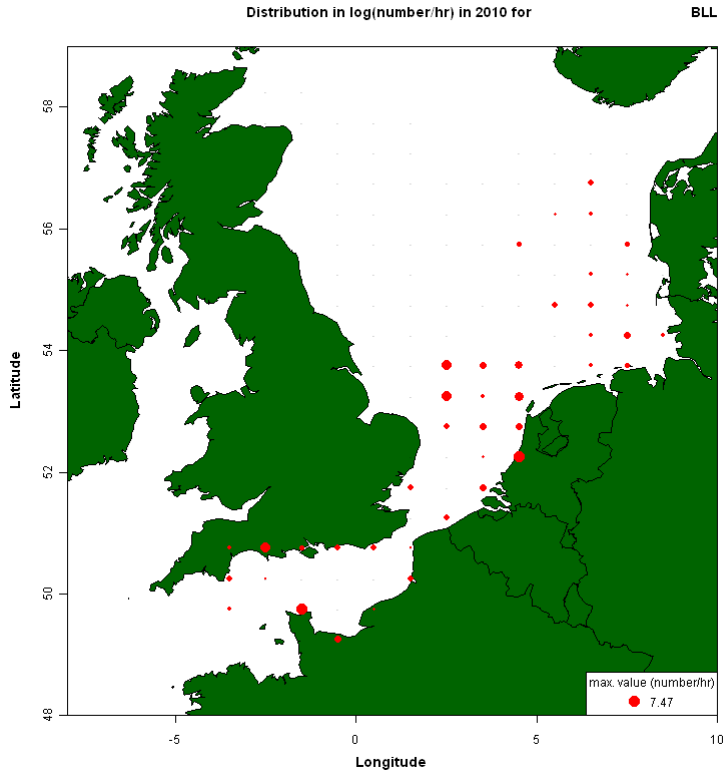


Annex 6.2.5: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Brill

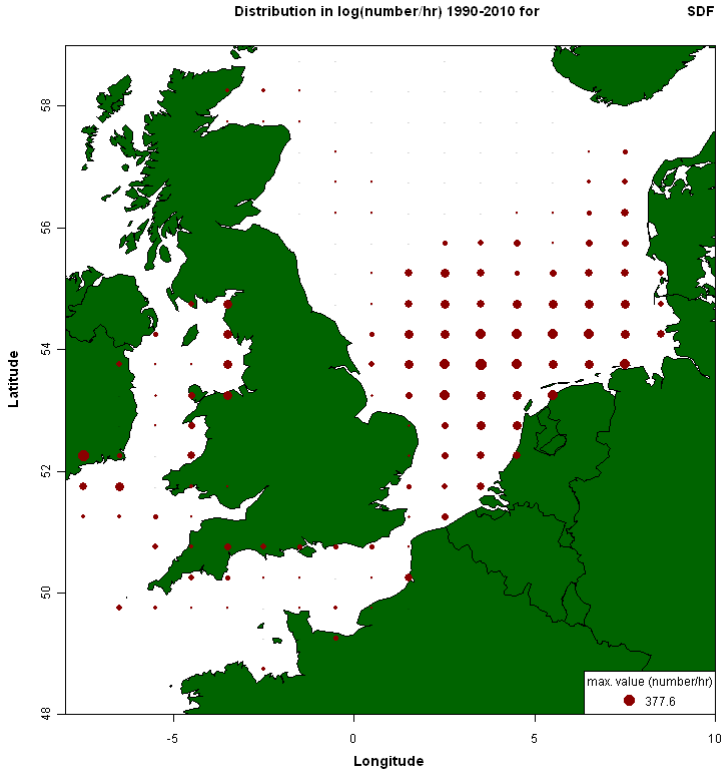


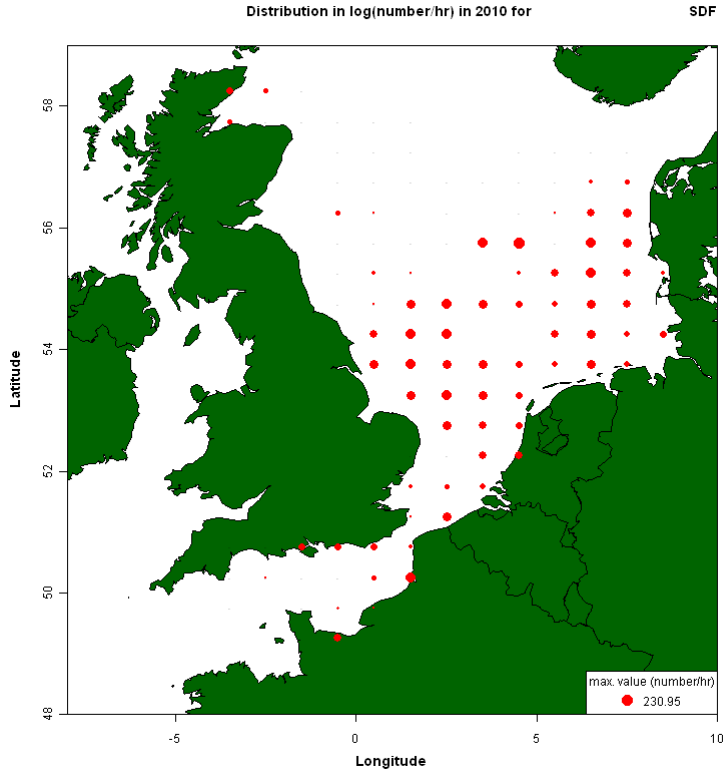


Annex 6.2.6: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Scaldfish

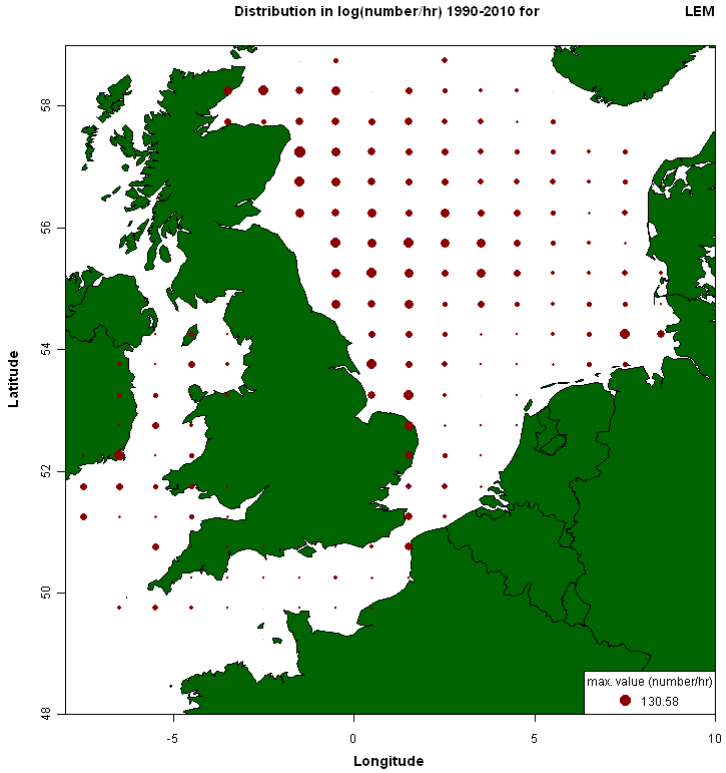


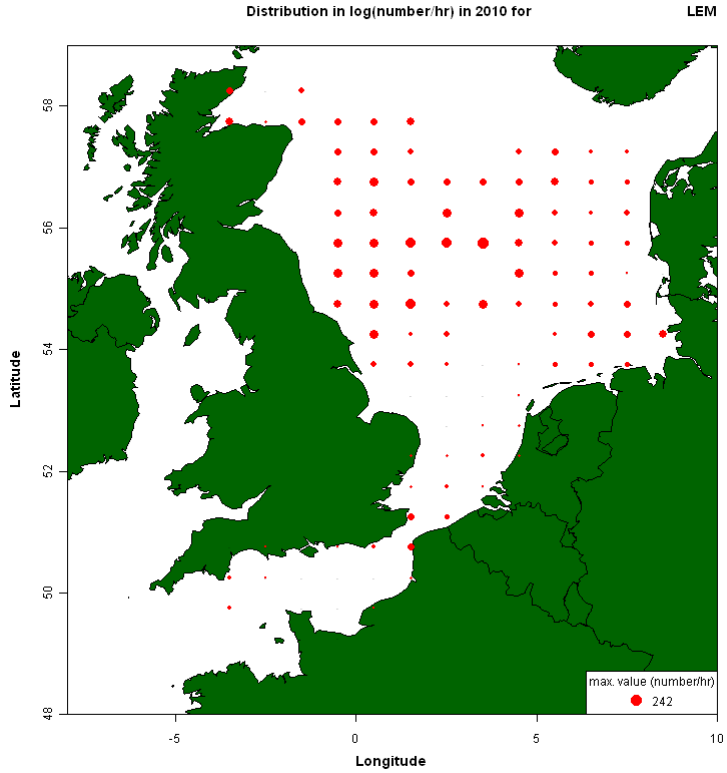


Annex 6.2.7: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Lemon sole

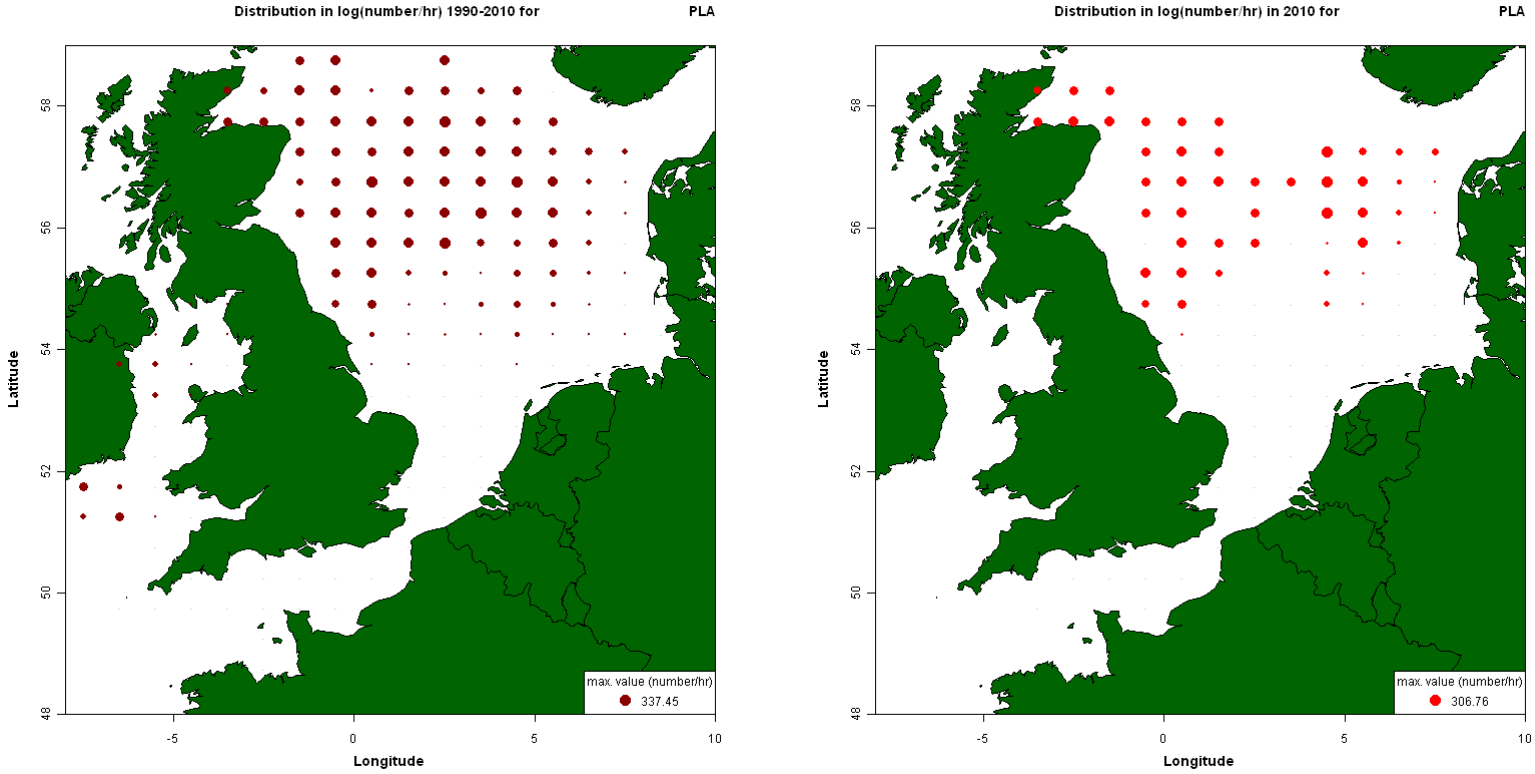




Annex 6.2.8: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

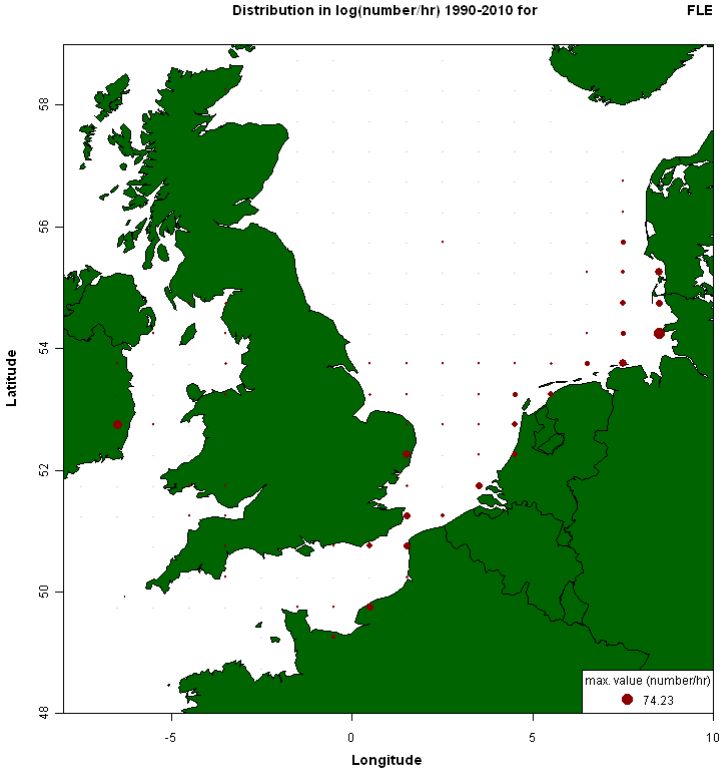
American plaice (long rough dab)

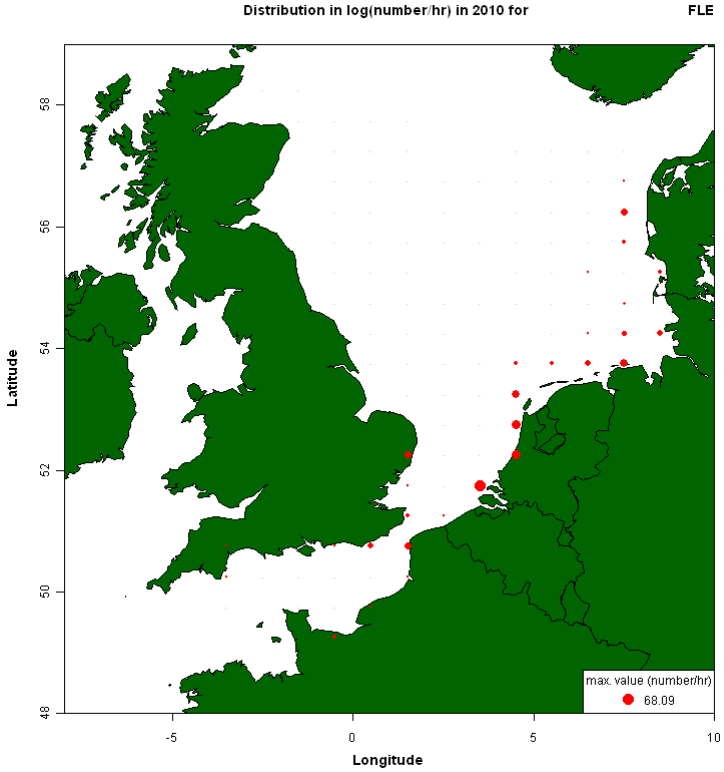


Annex 6.2.9: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Flounder

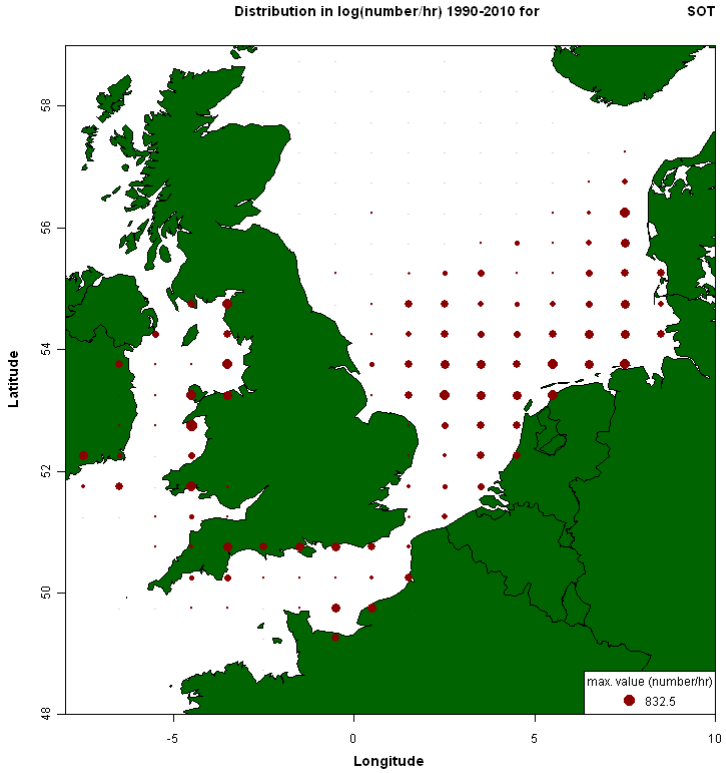


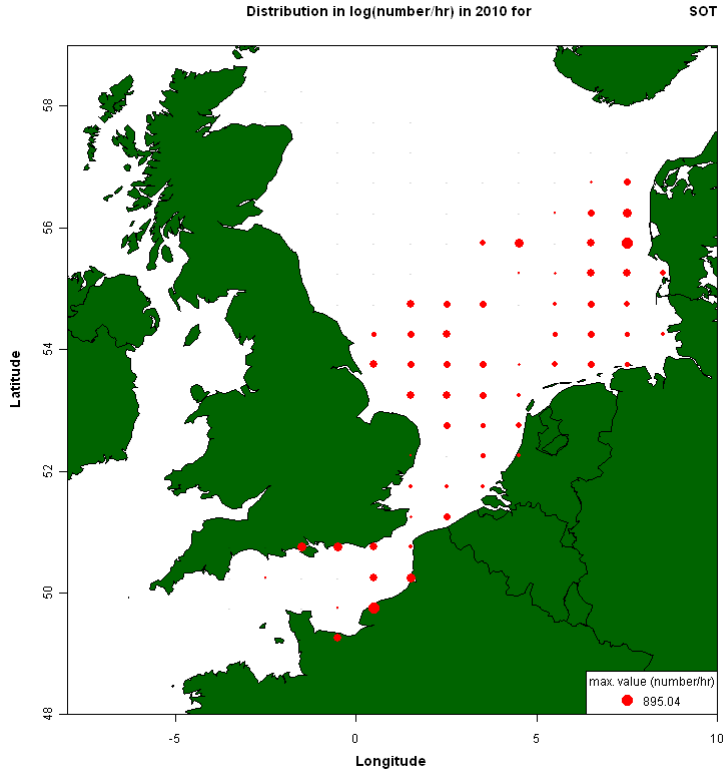


Annex 6.2.10: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Solenette

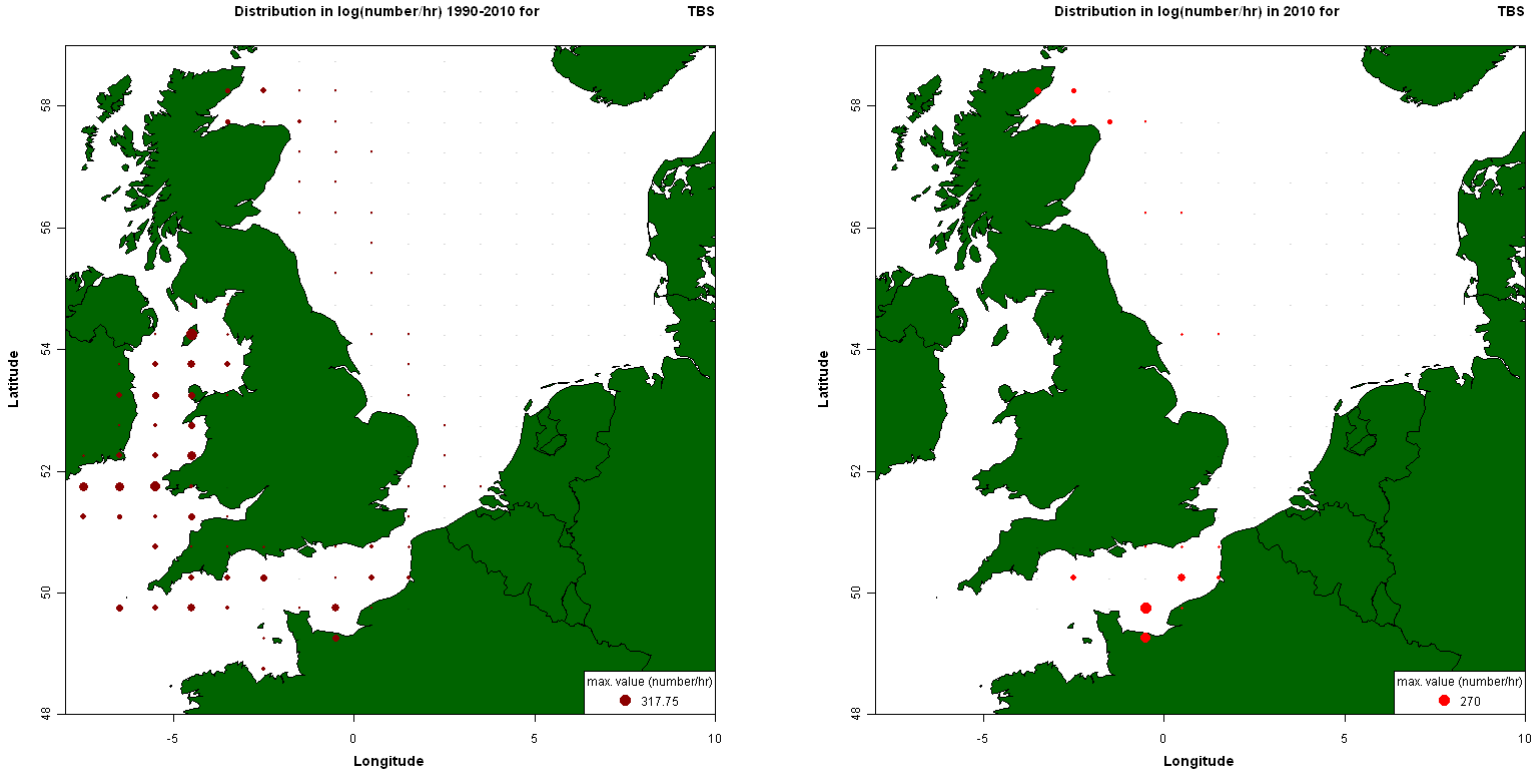




Annex 6.2.11: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

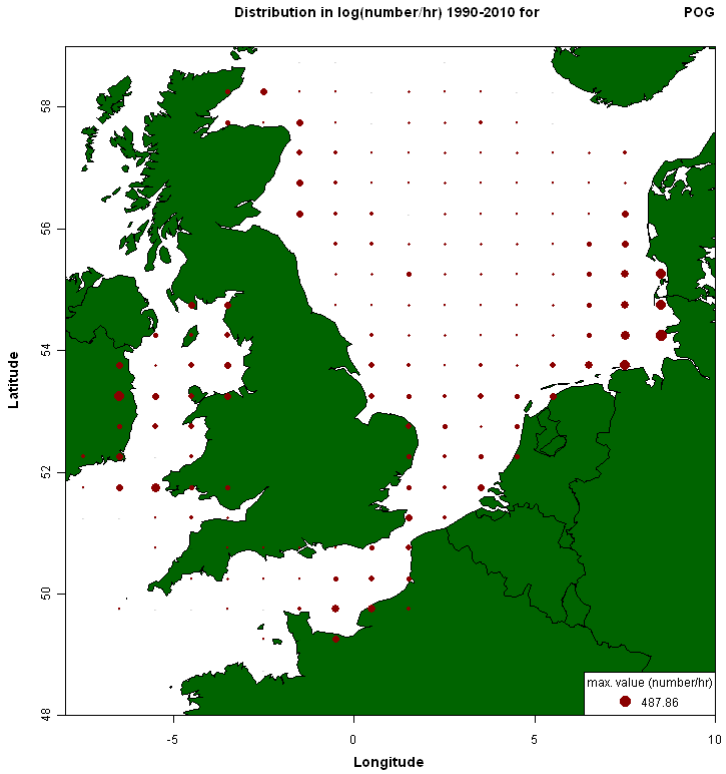
Thickback sole

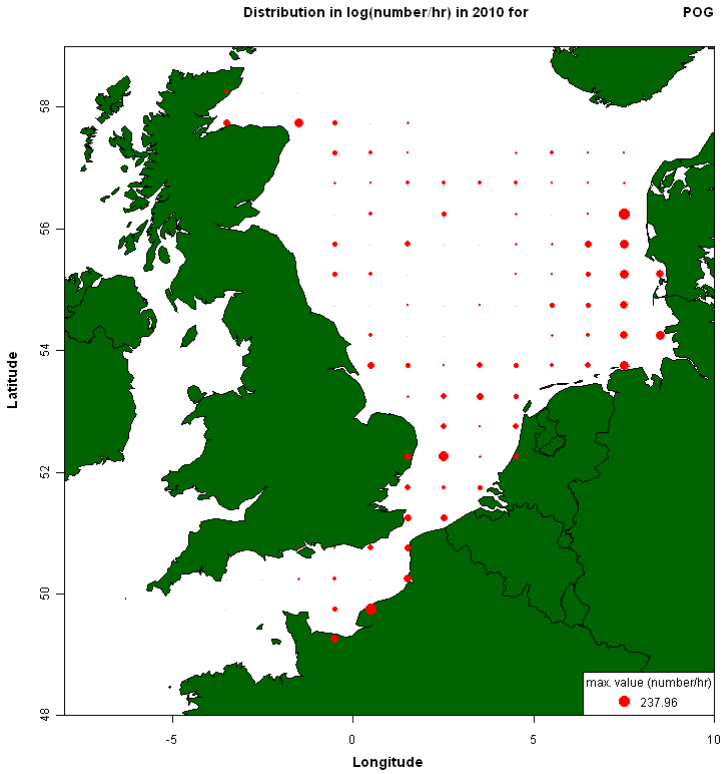


Annex 6.2.12: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Pogge

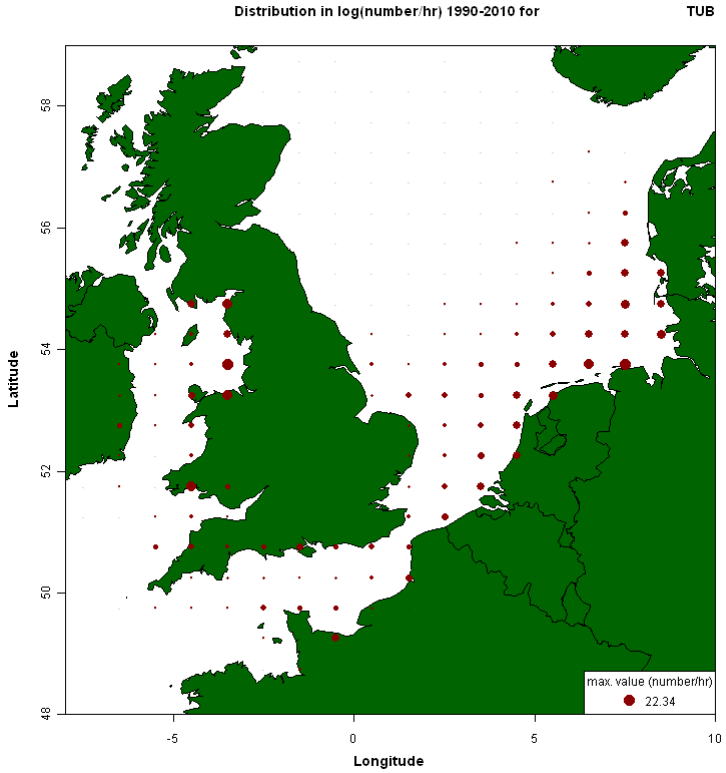


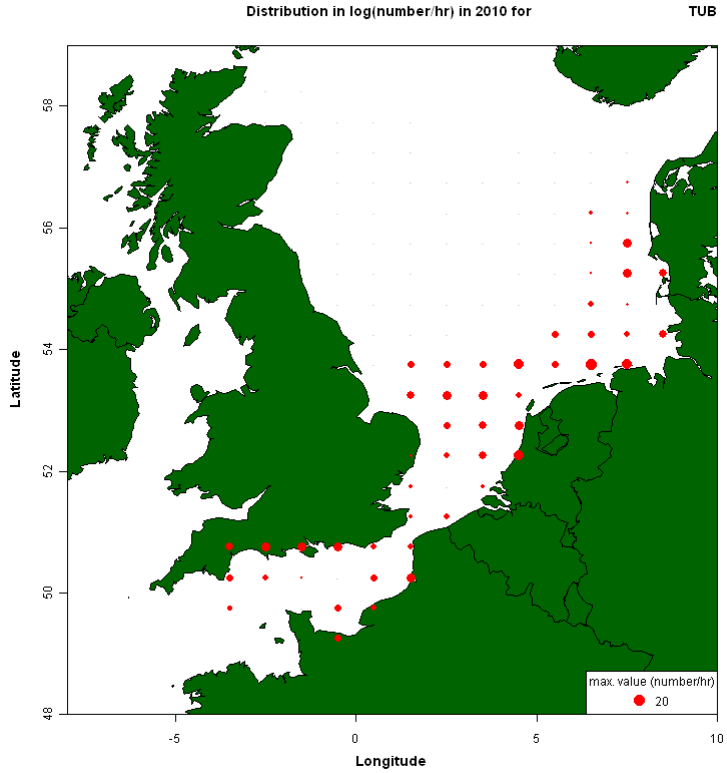


Annex 6.2.13: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Tub gurnard

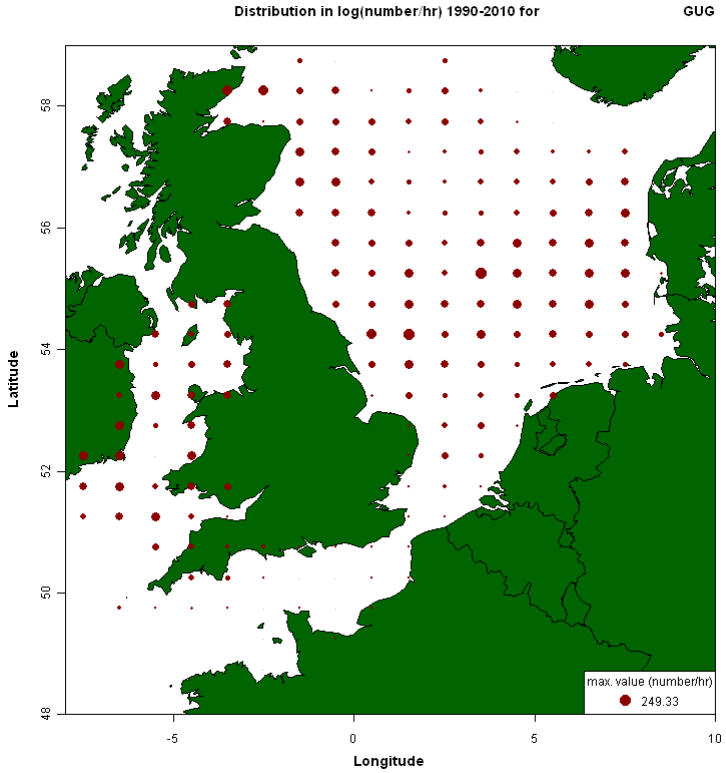


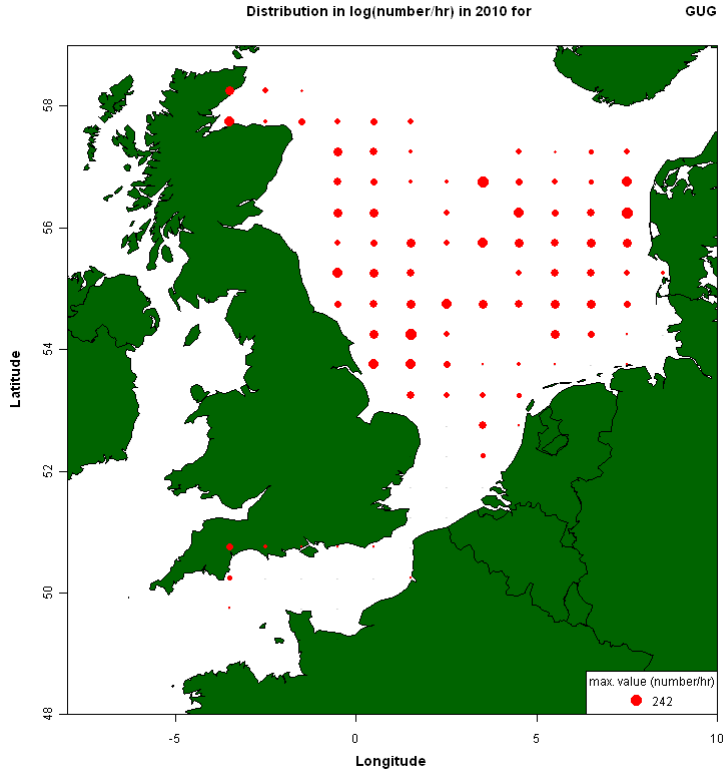


Annex 6.2.14: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Grey gurnard

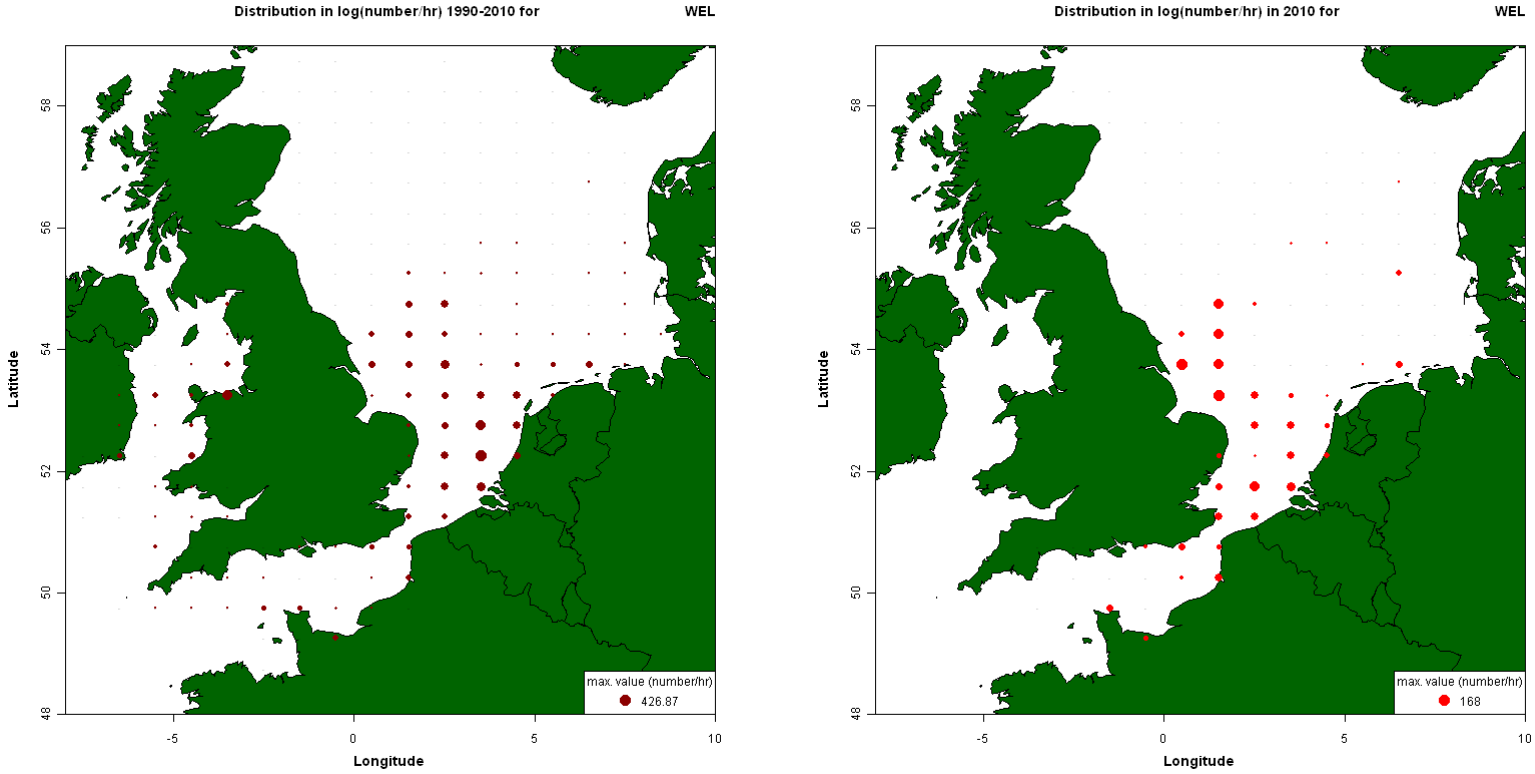




Annex 6.2.15: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

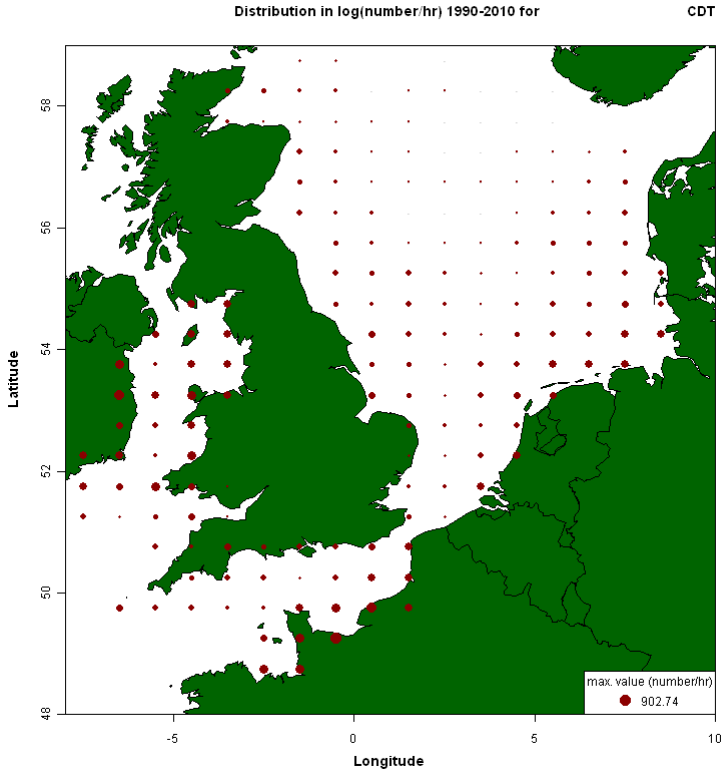
Lesser weever

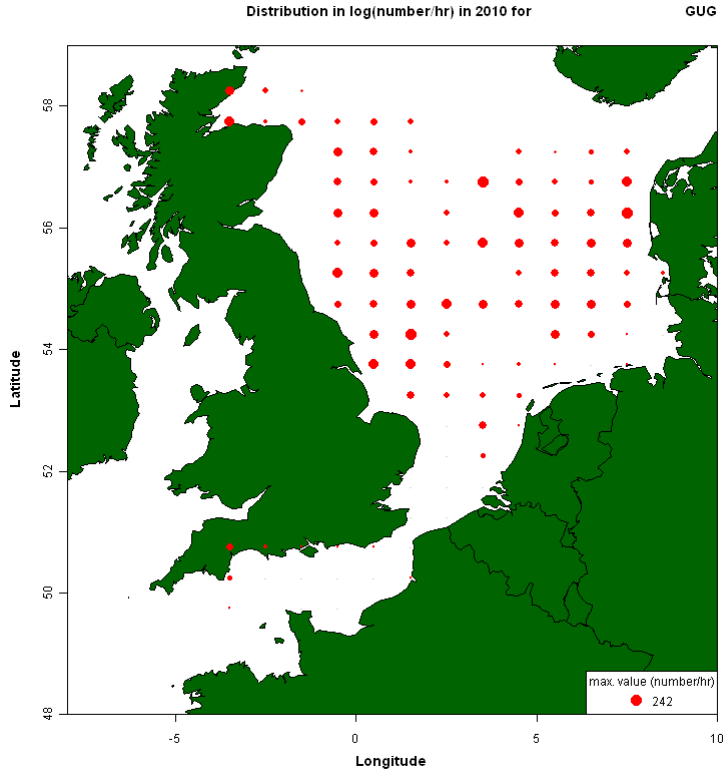


Annex 6.2.16: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Common dragonet

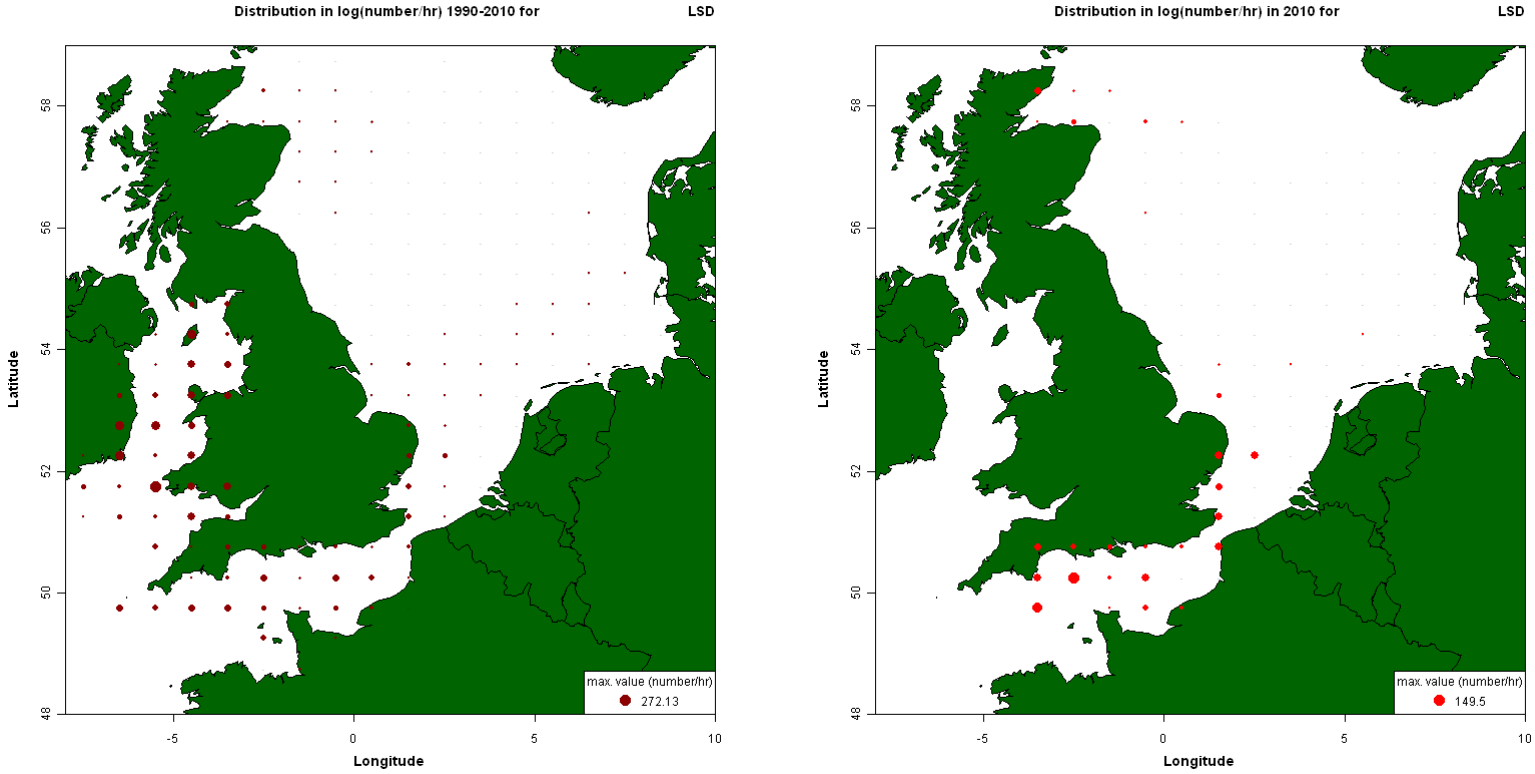




Annex 6.2.17: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

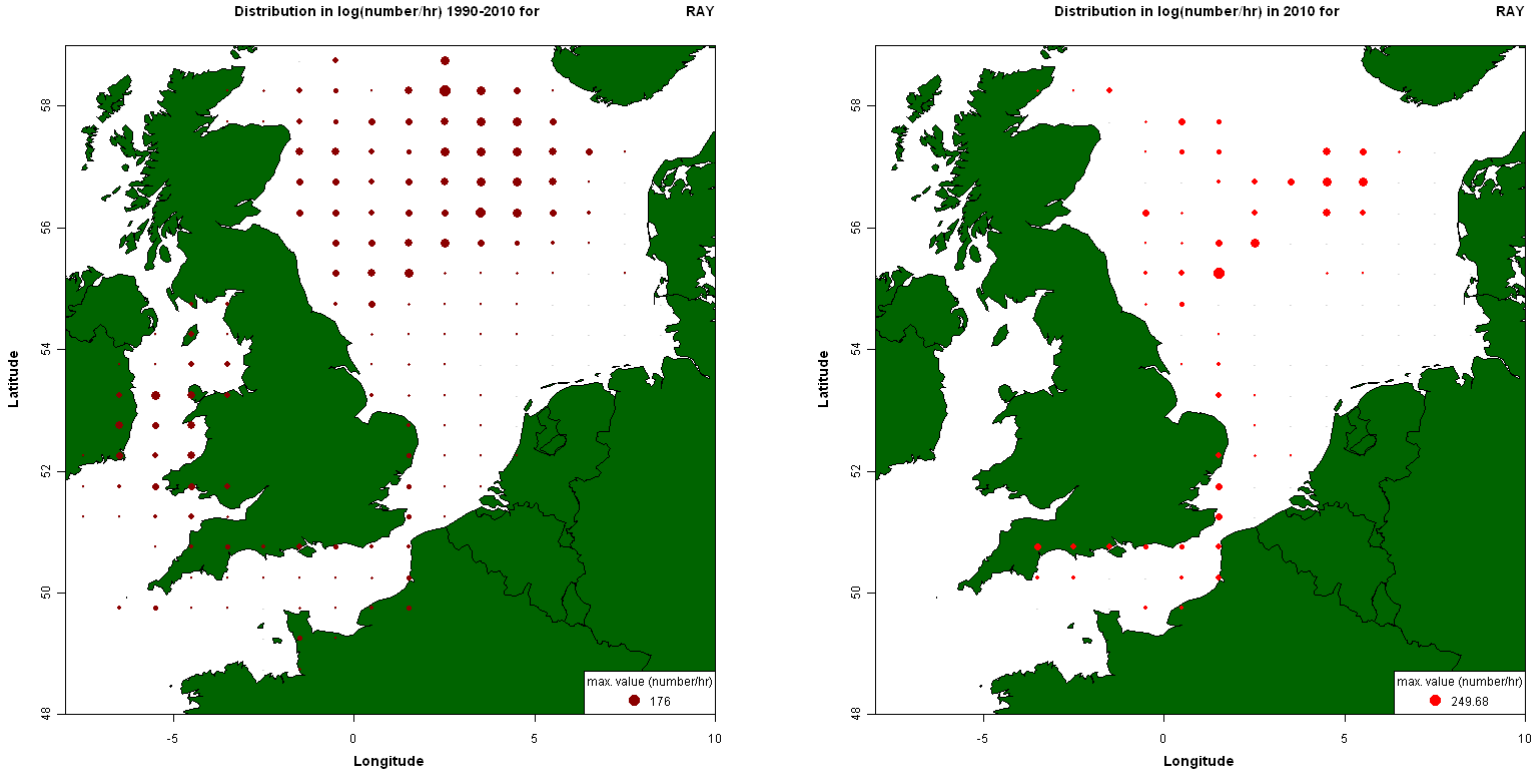
Lesser spotted dogfish



Annex 6.2.18: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

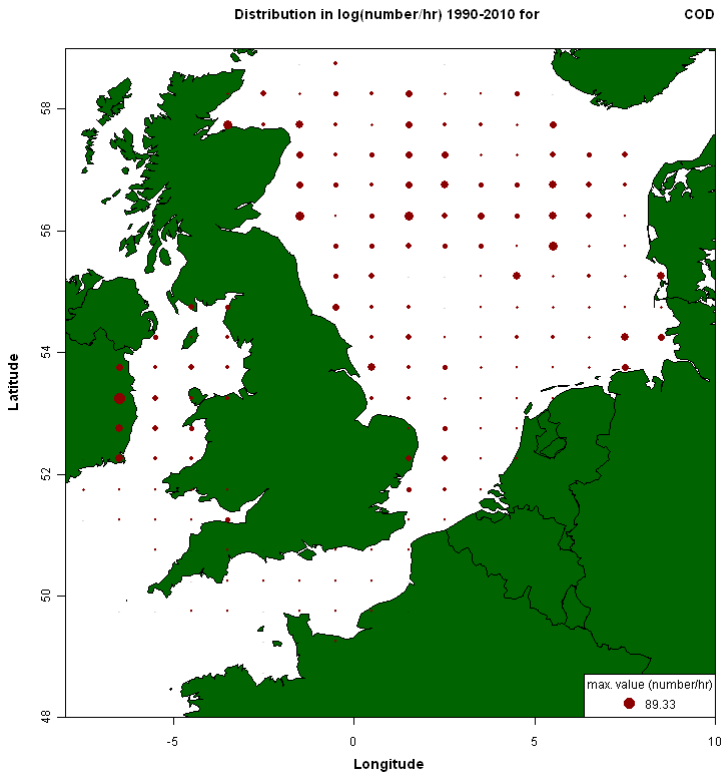
Rays (not specified)

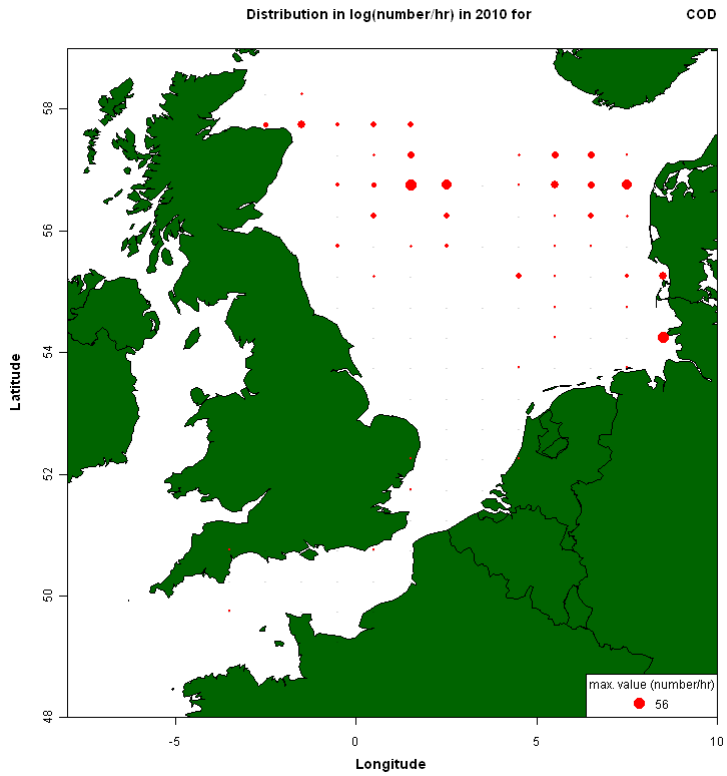


Annex 6.2.19: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Cod

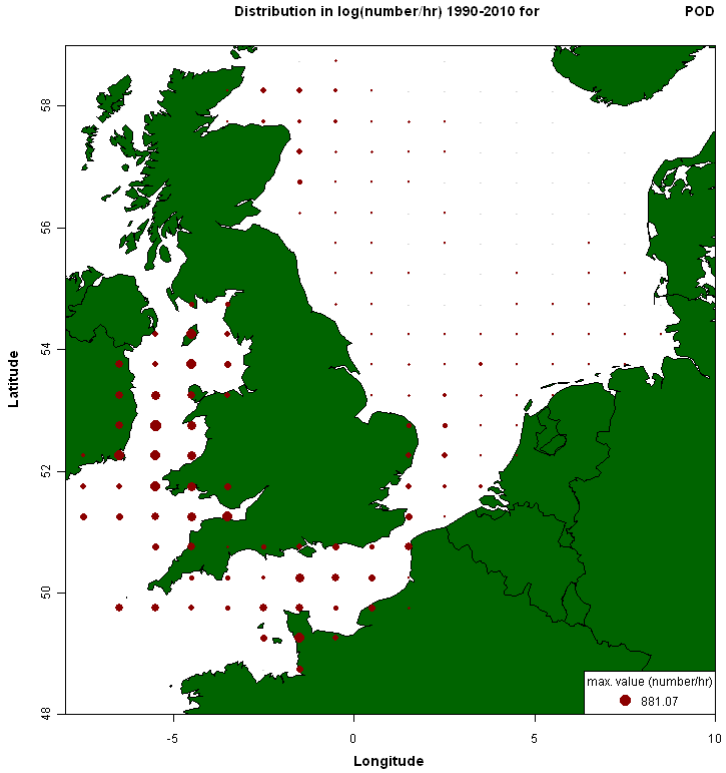


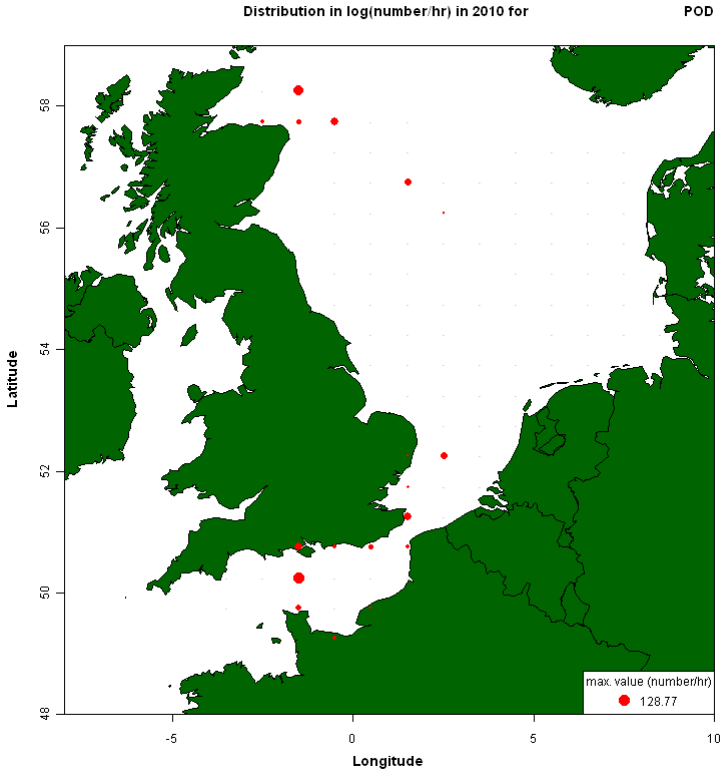


Annex 6.2.20: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Poor cod

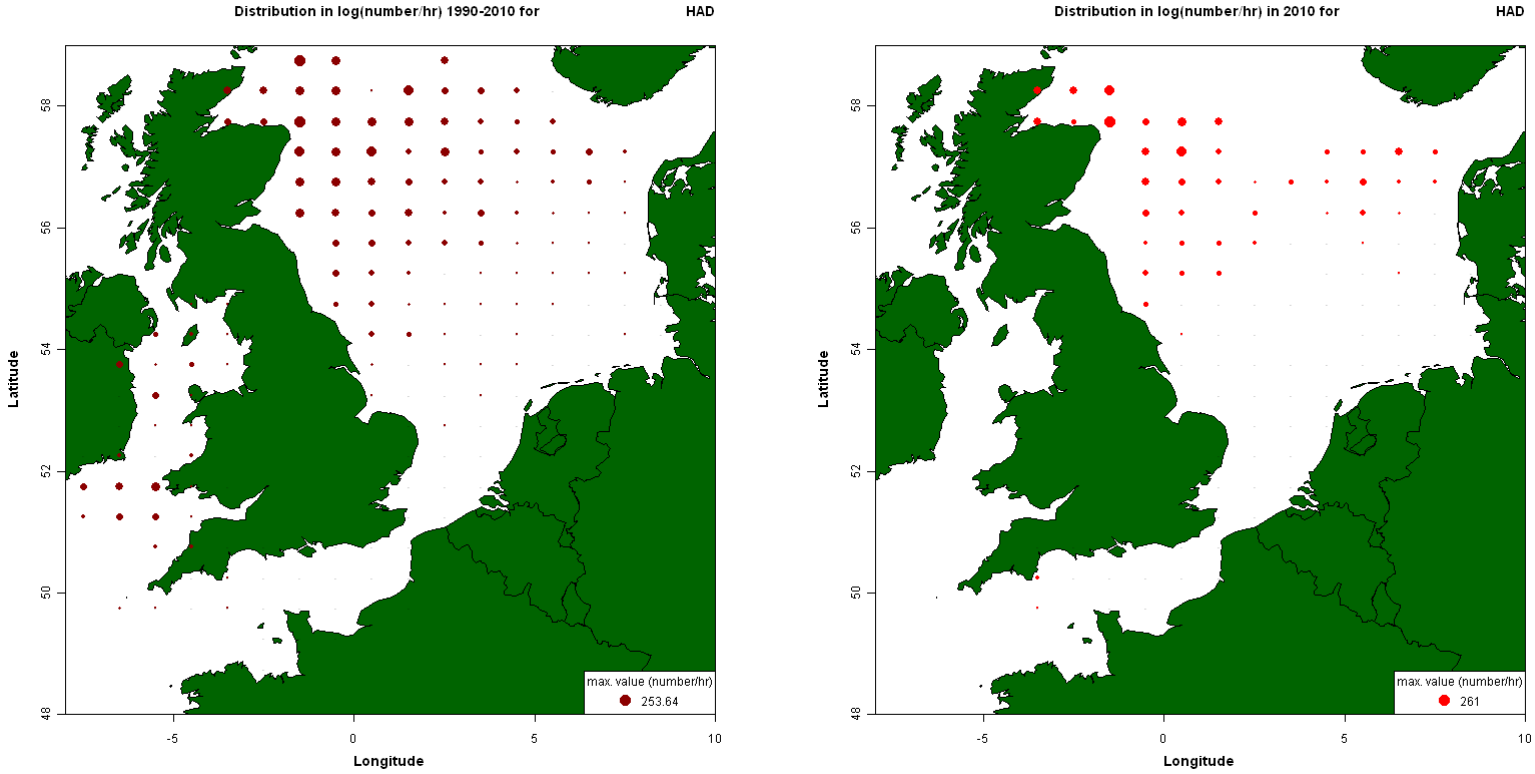




Annex 6.2.21: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

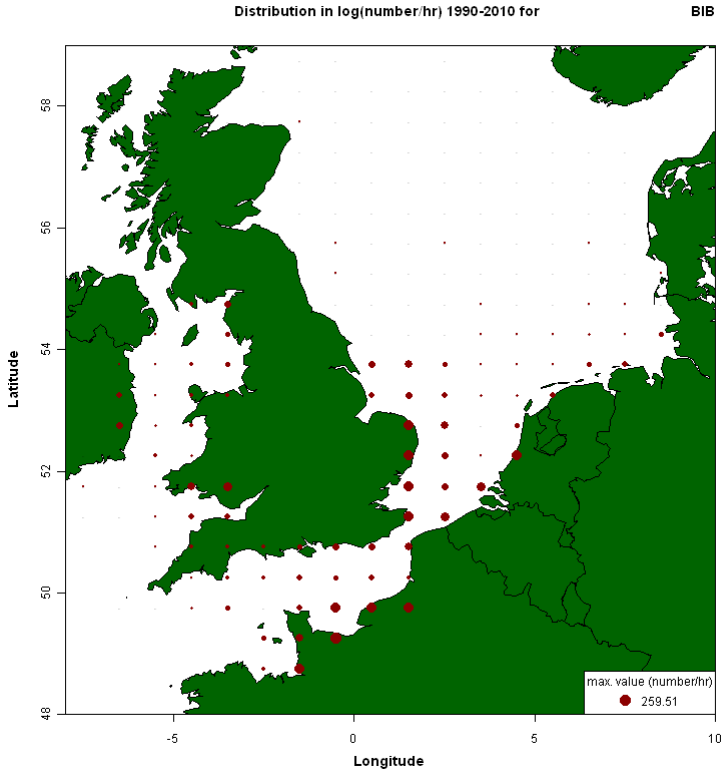
Haddock

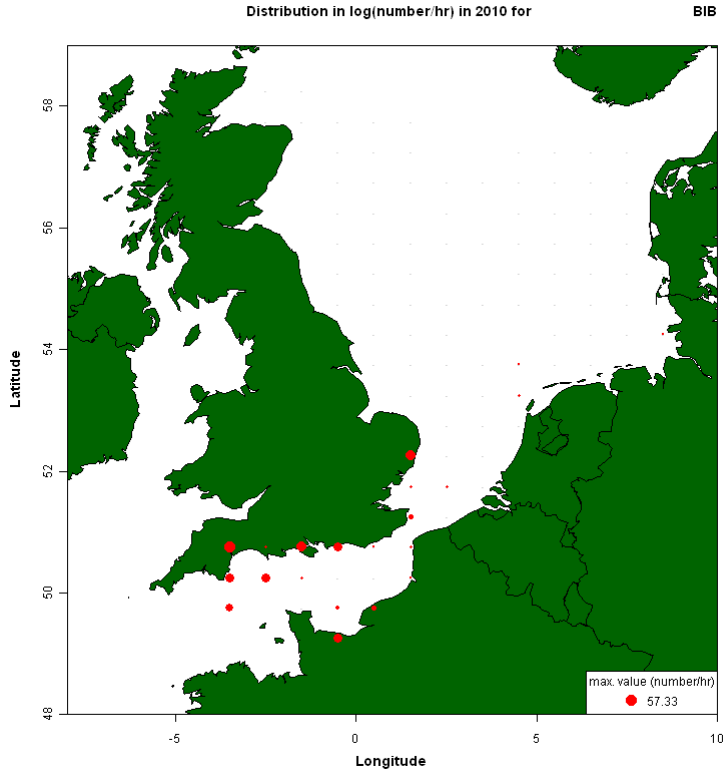


Annex 6.2.22: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Pout whiting

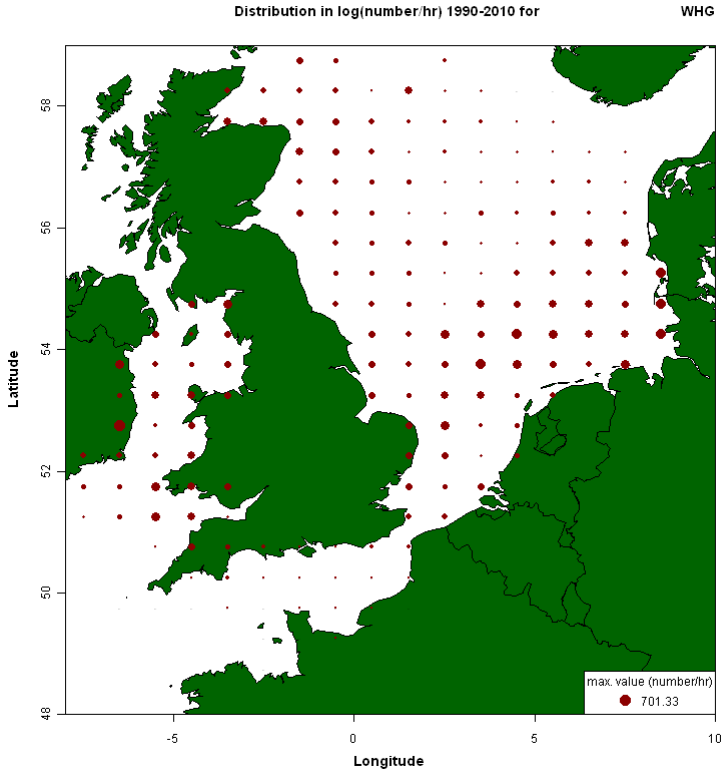


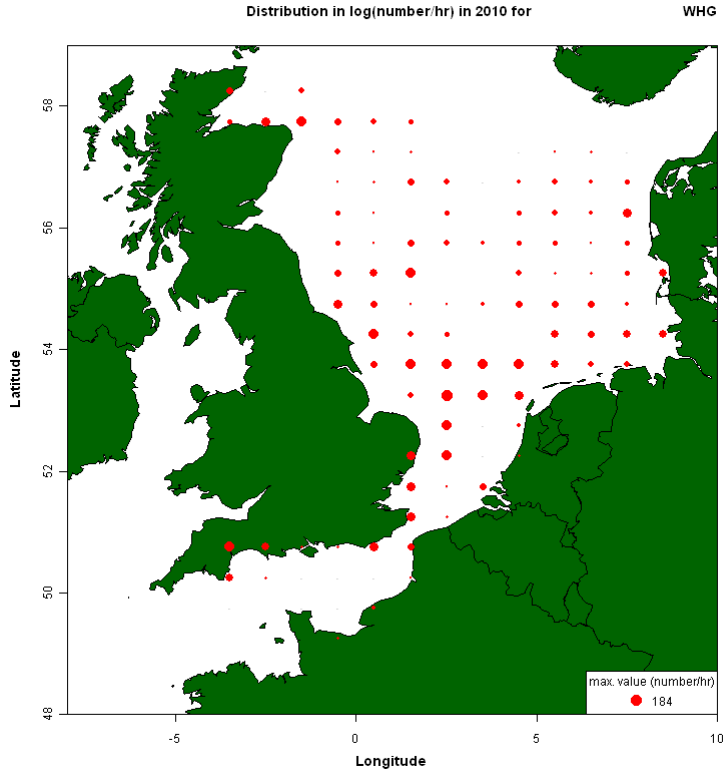


Annex 6.2.23: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Whiting

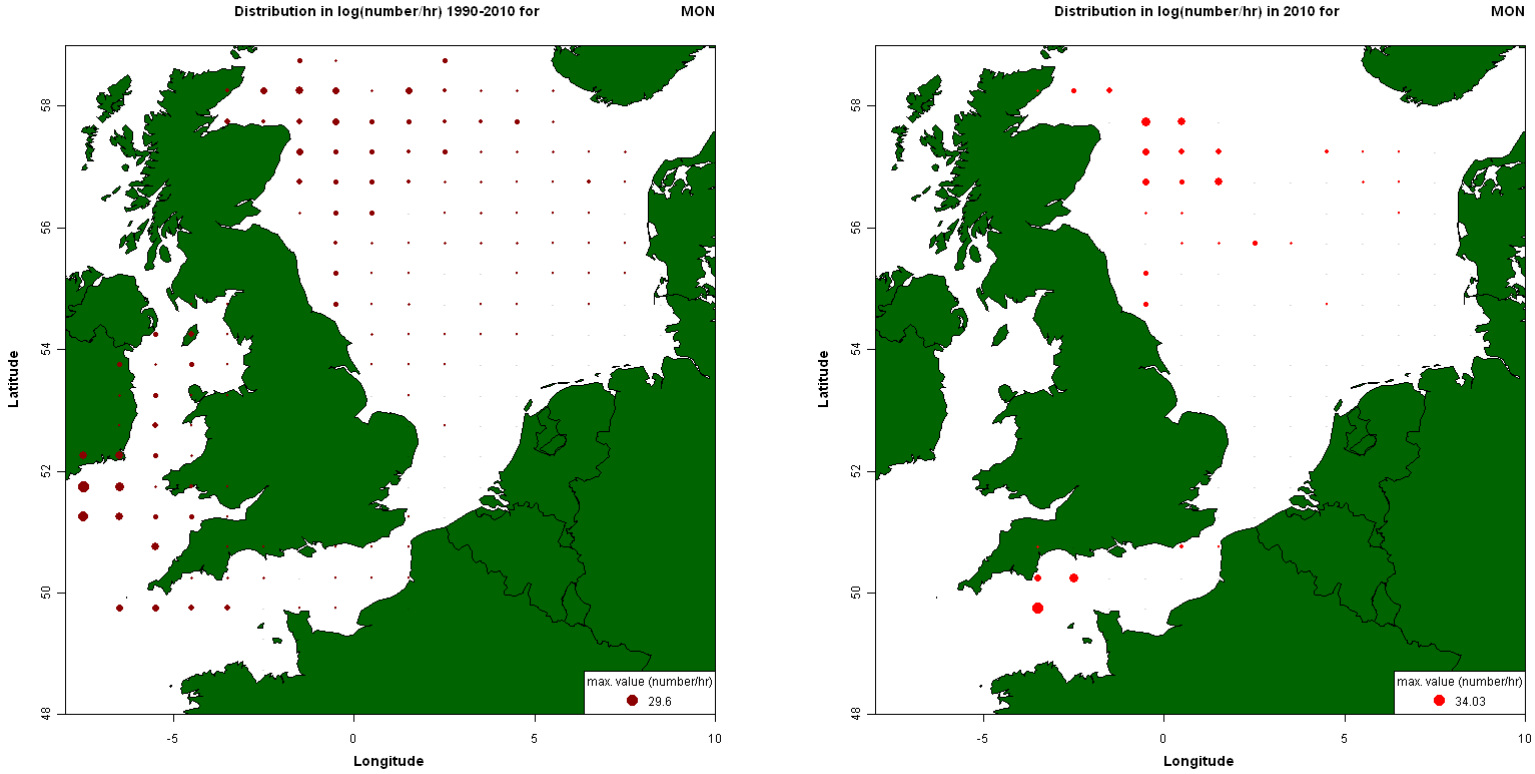




Annex 6.2.24: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

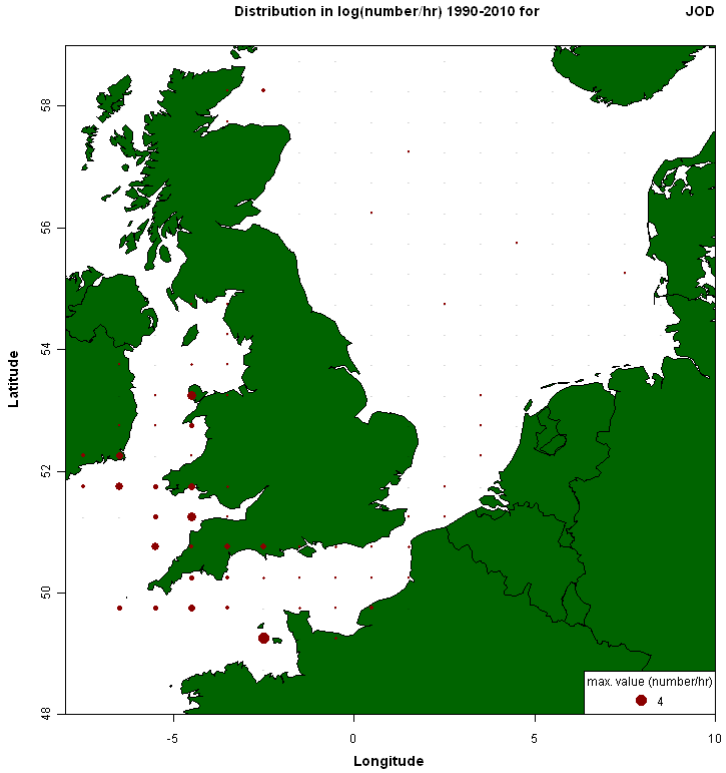
Monkfish

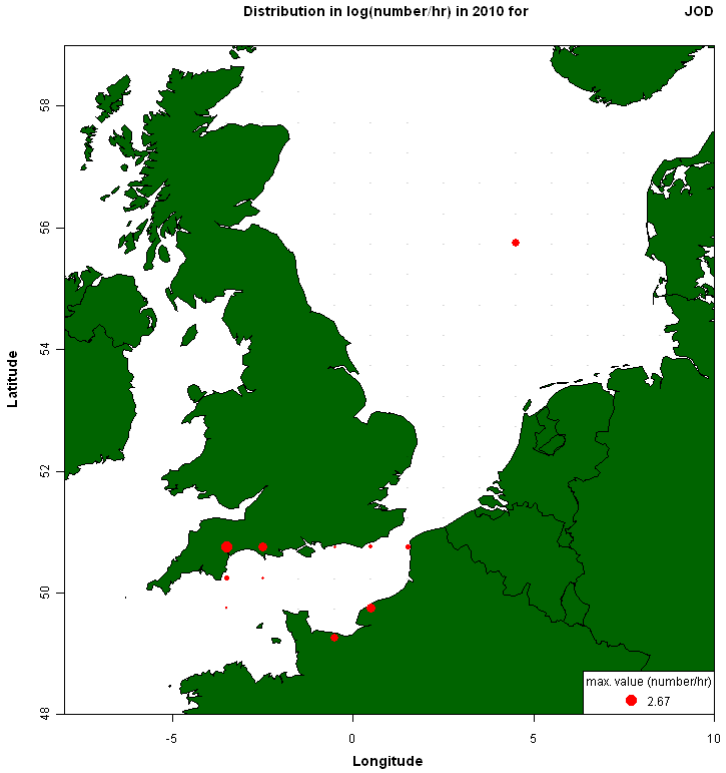


Annex 6.2.25: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

John Dory

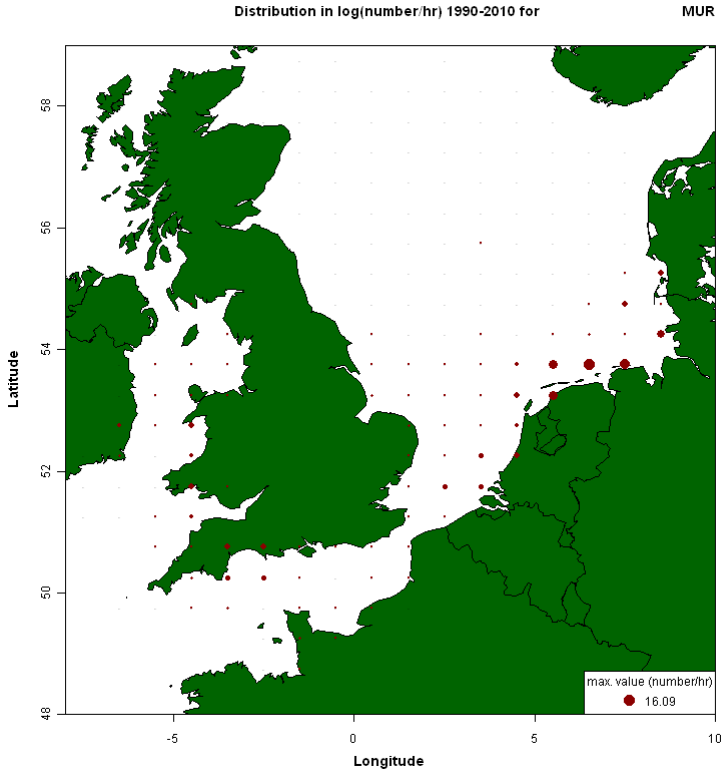


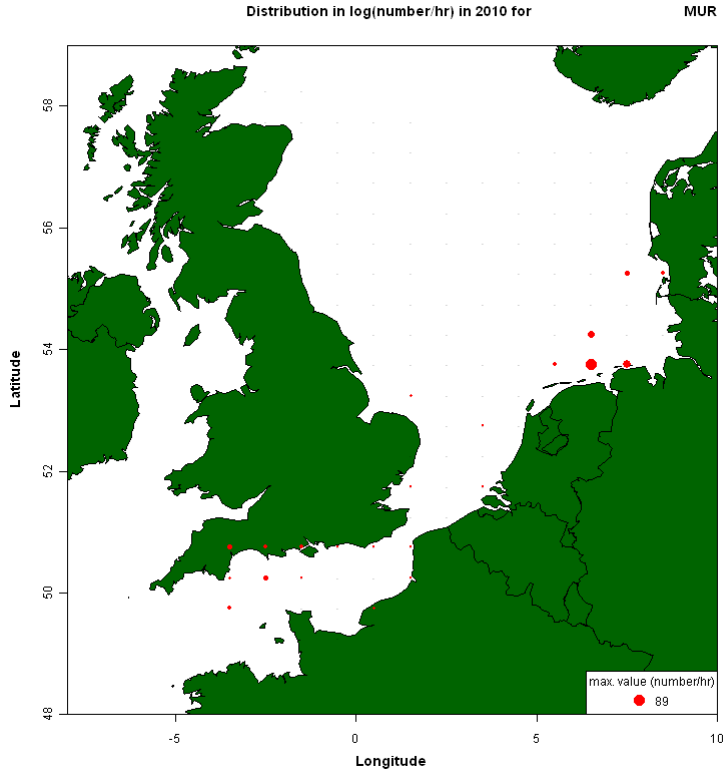


Annex 6.2.26: International offshore beam trawl survey 1990-2010

Catches are number/hr/8m beam; left plot mean of time-series, right plot current year

Red mullet





Annex 7: Abundance of fish species for the offshore surveys by Subdivision

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

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AMERICAN PLAICE (LR DAB)	2	1	1	1	11	2	2	2	1	2	1
ANGLERFISH (MONK)	1	2	4	2	2	3	1	1	1	1	1
BRILL	1	2	1	1	1	1	1	2	2	2	1
COD	11	5	2	1	8	7	5	2	2	3	5
COMMON DRAGONET	188	103	124	164	155	97	111	128	138	99	118
DAB	724	758	634	1271	1168	801	789	638	677	660	970
EUROPEAN PLAICE	456	399	466	546	588	491	519	529	486	418	522
FLOUNDER (EUROPEAN)	1	4	1	2	1	2	1	1	1	2	1
GREY GURNARD	50	48	33	48	50	45	64	64	60	34	24
HADDOCK	3	6	1	7	17	10	23	3	1	6	4
JOHN DORY	1	1	1	1	1	1	1	1	1	1	1
LEMON SOLE	8	10	11	14	12	7	5	5	4	5	6
LESSER SPOTTED DOGFISH	27	38	35	32	62	38	49	40	44	60	55
LESSER WEEVER FISH	57	17	33	20	25	18	23	19	28	21	12
POGGE (ARMED BULLHEAD)	42	30	35	32	55	30	23	28	21	27	34
POOR COD	162	72	94	232	335	204	331	216	173	147	70
RED GURNARD	10	11	9	14	12	10	13	18	16	15	16
RED MULLET	1	1	1	1	1	1	2	1	1	1	0
SCALD FISH	101	94	112	124	97	95	123	106	146	108	76
SOLE (DOVER SOLE)	93	62	51	56	66	31	32	32	34	29	19
SOLENETTE	304	303	596	304	417	250	276	230	292	273	184
THICKBACK SOLE	37	28	31	28	38	20	34	35	45	34	24
TUB GURNARD	11	10	9	12	10	11	8	7	10	11	10
TURBOT	1	1	1	1	1	1	1	1	1	1	1
WHITING	60	80	65	83	207	118	144	57	102	71	55
WHITING POUT (BIB)	7	6	7	6	4	2	1	3	3	1	1

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
ANGLERFISH (MONK)	1			1	1		1	1	1	
BRILL	2	1	1	1	1	2	2	1	1	1
COD			1	1	1	1	1	1	1	1
COMMON DRAGONET	124	211	270	220	297	123	203	254	489	274
DAB	46	83	187	66	129	68	47	69	33	51
EUROPEAN PLAICE	51	59	66	58	35	31	63	66	111	53
FLOUNDER (EUROPEAN)	1	5	12	4	2	2	15	3	3	3
GREY GURNARD	1	1	1	1	1	1	1	1	1	2
JOHN DORY		1	1	1	1	1	1	1	1	1
LEMON SOLE	7	3	3	7	11	13	8	3	2	1
LESSER SPOTTED DOGFISH	3	5	7	11	6	6	5	10	5	6
LESSER WEEVER FISH	10	5	11	12	11	5	10	5	8	9
POGGE (ARMED BULLHEAD)	15	24	41	41	43	35	26	53	20	32
POOR COD	177	81	59	49	96	97	69	55	50	95
RED GURNARD	8	8	7	7	12	9	12	7	11	9
RED MULLET	1		1	1		1	1	1	1	1
SCALD FISH	6	18	13	15	10	6	8	10	8	14
SOLE (DOVER SOLE)	30	47	37	58	33	27	29	38	32	55
SOLENETTE	103	187	156	186	175	77	145	140	92	153
THICKBACK SOLE	2	4	6	9	7	6	8	9	10	8
TUB GURNARD	4	2	5	6	4	3	2	3	3	4
TURBOT	1	1	1	1	1	1	1	1	1	1
WHITING	1	1	6	1	2	4	1	1	1	1
WHITING POUT (BIB)	270	38	49	33	61	46	64	91	136	91

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ANGLERFISH (MONK)					1	1	1		1	1	1
BRILL	1	1	1	1	1	1	1	2	1	1	2
COD	1	1	1	1	1	1	1	1	2	1	1
COMMON DRAGONET	184	210	167	184	154	105	207	200	241	247	222
DAB	35	62	64	92	69	28	99	41	40	146	68
EUROPEAN PLAICE	70	76	71	65	98	80	77	90	96	147	164
FLOUNDER (EUROPEAN)	5	4	8	9	8	7	8	4	6	15	4
GREY GURNARD	1	1	1	1	1	1	1	1	1	1	1
JOHN DORY	1	1	1	1	1	1	1	1	2	1	1
LEMON SOLE	4	7	8	12	7	8	5	5	12	8	8
LESSER SPOTTED DOGFISH	5	6	9	5	8	9	5	8	8	7	13
LESSER WEEVER FISH	12	14	8	9	16	13	23	15	14	17	14
POGGE (ARMED BULLHEAD)	19	38	44	33	34	14	42	24	16	24	39
POOR COD	40	54	45	79	105	60	18	52	55	29	17
RED GURNARD	12	13	9	14	12	8	8	8	15	12	7
RED MULLET	1	1	1	1	1	1	1	1	1	1	1
SCALD FISH	8	7	9	12	22	10	18	29	32	29	30
SOLE (DOVER SOLE)	43	44	64	57	40	41	55	46	30	87	60
SOLENETTE	84	90	89	119	155	94	195	185	140	148	202
THICKBACK SOLE	9	17	12	19	14	10	14	11	19	16	20
TUB GURNARD	2	3	3	5	3	2	5	6	5	8	7
TURBOT	1	1	1	1	1	1	1	1	1	1	1
WHITING	3	2	9	1	6	4	1	1	13	14	22
WHITING POUT (BIB)	20	67	15	139	60	46	50	57	54	30	11

Annex 7 c) Abundance of fish species (per hour fishing) in subarea VIIe per year (no sampling in 2008).

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
ANGLERFISH (MONK)	1			1	1		1	1	1	
BRILL	2	1	1	1	1	2	2	1	1	1
COD			1	1	1	1	1	1	1	1
COMMON DRAGONET	124	211	270	220	297	123	203	254	489	274
DAB	46	83	187	66	129	68	47	69	33	51
EUROPEAN PLAICE	51	59	66	58	35	31	63	66	111	53
FLOUNDER (EUROPEAN)	1	5	12	4	2	2	15	3	3	3
GREY GURNARD	1	1	1	1	1	1	1	1	1	2
JOHN DORY		1	1	1	1	1	1	1	1	1
LEMON SOLE	7	3	3	7	11	13	8	3	2	1
LESSER SPOTTED DOGFISH	3	5	7	11	6	6	5	10	5	6
LESSER WEEVER FISH	10	5	11	12	11	5	10	5	8	9
POGGE (ARMED BULLHEAD)	15	24	41	41	43	35	26	53	20	32
POOR COD	177	81	59	49	96	97	69	55	50	95
RED GURNARD	8	8	7	7	12	9	12	7	11	9
RED MULLET	1		1	1		1	1	1	1	1
SCALD FISH	6	18	13	15	10	6	8	10	8	14
SOLE (DOVER SOLE)	30	47	37	58	33	27	29	38	32	55
SOLENETTE	103	187	156	186	175	77	145	140	92	153
THICKBACK SOLE	2	4	6	9	7	6	8	9	10	8
TUB GURNARD	4	2	5	6	4	3	2	3	3	4
TURBOT	1	1	1	1	1	1	1	1	1	1
WHITING	1	1	6	1	2	4	1	1	1	1
WHITING POUT (BIB)	270	38	49	33	61	46	64	91	136	91

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ANGLERFISH (MONK)					1	1	1		1	1	1
BRILL	1	1	1	1	1	1	1	2	1	1	2
COD	1	1	1	1	1	1	1	1	2	1	1
COMMON DRAGONET	184	210	167	184	154	105	207	200	241	247	222
DAB	35	62	64	92	69	28	99	41	40	146	68
EUROPEAN PLAICE	70	76	71	65	98	80	77	90	96	147	164
FLOUNDER (EUROPEAN)	5	4	8	9	8	7	8	4	6	15	4
GREY GURNARD	1	1	1	1	1	1	1	1	1	1	1
JOHN DORY	1	1	1	1	1	1	1	1	2	1	1
LEMON SOLE	4	7	8	12	7	8	5	5	12	8	8
LESSER SPOTTED DOGFISH	5	6	9	5	8	9	5	8	8	7	13
LESSER WEEVER FISH	12	14	8	9	16	13	23	15	14	17	14
POGGE (ARMED BULLHEAD)	19	38	44	33	34	14	42	24	16	24	39
POOR COD	40	54	45	79	105	60	18	52	55	29	17
RED GURNARD	12	13	9	14	12	8	8	8	15	12	7
RED MULLET	1	1	1	1	1	1	1	1	1	1	1
SCALD FISH	8	7	9	12	22	10	18	29	32	29	30
SOLE (DOVER SOLE)	43	44	64	57	40	41	55	46	30	87	60
SOLENETTE	84	90	89	119	155	94	195	185	140	148	202
THICKBACK SOLE	9	17	12	19	14	10	14	11	19	16	20
TUB GURNARD	2	3	3	5	3	2	5	6	5	8	7
TURBOT	1	1	1	1	1	1	1	1	1	1	1
WHITING	3	2	9	1	6	4	1	1	13	14	22
WHITING POUT (BIB)	20	67	15	139	60	46	50	57	54	30	11

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
ANGLERFISH (MONK)	1	3	11	5	5	3	2	1	1	9
BRILL	2	3	2	1	2	3	2	2	1	1
COD	1	1	1	1	1	1	1	1	1	2
COMMON DRAGONET	19	40	76	44	119	50	86	46	40	74
DAB	63	78	153	99	167	83	105	81	123	179
EUROPEAN PLAICE	95	122	101	28	37	41	72	48	60	69
FLOUNDER (EUROPEAN)	1	1	1	1	2	2	1	1	1	1
GREY GURNARD	15	52	85	53	45	25	23	24	33	56
HADDOCK					1		1	1		
JOHN DORY	1	2	1	3	1	1	1	2	1	3
LEMON SOLE	2	2	3	4	9	6	12	5	4	6
LESSER SPOTTED DOGFISH	69	86	101	41	40	32	34	47	51	84
LESSER WEEVER FISH	1	3	1	3	3	3	3	1	2	3
POGGE (ARMED BULLHEAD)	1	2	3	7	3	4	5	3	16	11
POOR COD	306	294	335	251	113	113	122	167	381	323
RED GURNARD	1	5	1	6	10	7	9	6	1	4
RED MULLET	2	1		1	1	1	1	1		3
SCALD FISH	1	2	1	1	3	3	4	3	1	2
SOLE (DOVER SOLE)	113	137	130	68	110	53	59	89	189	417
SOLENETTE	107	280	153	116	247	116	111	69	141	246
THICKBACK SOLE	7	27	31	23	24	23	23	16	10	23
TUB GURNARD	9	7	13	2	9	7	6	6	11	21
TURBOT	1	2	1	1	2	2	1	1	1	5
WHITING	81	87	123	138	53	55	91	141	73	178
WHITING POUT (BIB)	242	100	29	11	5	7	15	158	114	54

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ANGLERFISH (MONK)	1	2	6	2	3	5	2	2	1	2	3
BRILL	4	1	1	1	1	2	1	2	1	1	1
COD	3	1	1		1	1	1	3	1	10	2
COMMON DRAGONET	87	43	36	45	65	59	68	115	86	54	70
DAB	125	118	94	98	107	150	133	125	114	83	148
EUROPEAN PLAICE	69	58	49	38	58	48	41	48	56	63	85
FLOUNDER (EUROPEAN)	3	5	3	1	1	1	1	2	2	1	1
GREY GURNARD	62	42	43	32	21	45	43	90	56	37	24
HADDOCK	1		1	1	1	1	1	12		10	7
JOHN DORY	2	6	3	3	3	3	2	2	2	1	2
LEMON SOLE	7	9	17	21	19	11	16	26	11	10	12
LESSER SPOTTED DOGFISH	47	37	47	24	98	33	67	74	78	60	61
LESSER WEEVER FISH	8	4	3	4	6	9	11	5	4	8	4
POGGE (ARMED BULLHEAD)	9	7	8	14	19	11	14	41	28	18	9
POOR COD	297	80	155	349	275	269	392	308	375	76	105
RED GURNARD	5	11	11	12	19	8	6	12	1	11	6
RED MULLET	2	3	1	9	2	15	6	2	1	1	1
SCALD FISH	3	4	4	9	10	13	8	23	11	13	17
SOLE (DOVER SOLE)	313	165	128	120	156	97	104	86	155	105	91
SOLENETTE	184	153	125	197	460	486	196	438	248	188	222
THICKBACK SOLE	28	15	17	12	14	8	13	27	21	15	18
TUB GURNARD	10	8	11	11	13	11	11	14	5	5	15
TURBOT	3	1	2	1	1	2	1	2	2	2	3
WHITING	68	20	63	42	106	93	54	94	310	89	50
WHITING POUT (BIB)	12	17	42	22	28	7	9	58	42	3	7

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

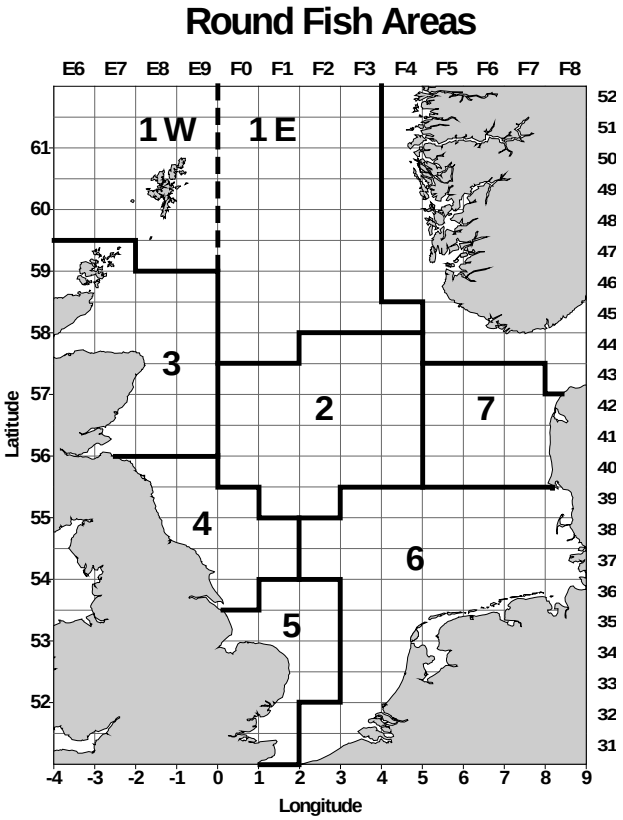
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
AMERICAN PLAICE (LR DAB)				22	87	56	42	22		
ANGLERFISH (MONK)				13	26	19	9	5	7	9
BRILL	4		4	1	1				4	
COD				1	1	1	1	1		3
COMMON DRAGONET		4	4	51	97	60	42	40	33	67
DAB		4		75	65	51	43	98	183	340
EUROPEAN PLAICE		12	4	7	7	8	11	18	52	28
GREY GURNARD		32	4	62	99	49	38	25	128	133
HADDOCK				18	44	16	20	17	1	67
JOHN DORY				1	1		1		3	5
LEMON SOLE				13	19	16	13	6	16	4
LESSER SPOTTED DOGFISH			8	10	14	17	15	46	4	36
LESSER WEEVER FISH		4			1		1			
POGGE (ARMED BULLHEAD)				19	10	12	5	16	29	41
POOR COD	6	468	180	126	68	52	52	162	139	215
RED GURNARD				3	2	1	1	2	3	1
RED MULLET										
SCALD FISH				53	44	41	44	21	87	71
SOLE (DOVER SOLE)	6	60	16	13	13	11	8	23	11	53
SOLENETTE			4	49	44	38	9	21	125	95
THICKBACK SOLE		8		52	68	65	47	36	61	176
TUB GURNARD		4					1	1	1	1
TURBOT	2		4	1		1			3	
WHITING	10	108	40	43	19	33	29	124	95	793
WHITING POUT (BIB)		12	4		1			7	1	

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AMERICAN PLAICE (LR DAB)			11	15	21	24			28	29	22
ANGLERFISH (MONK)		3	6	9	6	5	6	4	5	8	9
BRILL						1	1	2		1	
COD				1			1			1	1
COMMON DRAGONET	4	65	32	27	195	96	99	106	115	52	45
DAB	4	92	40	39	15	76	66	100	162	107	87
EUROPEAN PLAICE	12	4	6	7	3	12	23	18	12	7	14
GREY GURNARD	8	87	46	61	23	47	63	130	142	64	65
HADDOCK		21	29	3	8	100	54	301	19	76	73
JOHN DORY			3	1	3	3		2	2	1	3
LEMON SOLE		4	1	3	3	2	13	10	7	8	18
LESSER SPOTTED DOGFISH	8	139	207	20	47	46	48	100	110	112	57
LESSER WEEVER FISH						1		10		2	
POGGE (ARMED BULLHEAD)		16	97	15	22	5	98	114	111	84	8
POOR COD	232	57	108	77	273	300	263	332	453	69	83
RED GURNARD		3			2			2		2	
RED MULLET								1			1
SCALD FISH		1	12	11	17	16	33	16	22	5	19
SOLE (DOVER SOLE)	28	81	16	33	37	33	33	40	16	29	39
SOLENETTE							37	2	9	4	14
THICKBACK SOLE		80	133	57	153	49	44	34	59	24	19
TUB GURNARD				1		1	1			1	
TURBOT	4	4	2	1	1	1	1	2	1	1	1
WHITING	308	167	47	53	145	118	21	238	482	22	5
WHITING POUT (BIB)			1	1		3			1		

Annex 7 f) Abundance of fish species (per hour fishing) in subarea VIII per year.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AMERICAN PLAICE (LR DAB)											
ANGLERFISH (MONK)								3	4	6	7
BRILL								1	1	1	1
COD											
COMMON DRAGONET								38	66	83	134
DAB											
EUROPEAN PLAICE								1	1	1	1
FLOUNDER (EUROPEAN)											1
GREY GURNARD								9	4	6	14
HADDOCK									1	1	
JOHN DORY								1	1	1	1
LEMON SOLE									1		
LESSER SPOTTED DOGFISH								3	2	5	9
LESSER WEEVER FISH								1	3	6	2
POGGE (ARMED BULLHEAD)											
POOR COD								11	35	75	52
RED GURNARD								1	1	1	1
RED MULLET								8	17	17	22
SCALD FISH								65	106	82	114
SOLE (DOVER SOLE)								58	88	122	122
SOLENETTE								26	64	49	98
THICKBACK SOLE								22	37	43	48
TUB GURNARD								1	1	1	1
TURBOT								1	1	1	1
WHITING								1	4	8	15

Annex 8: Abundance of fish species for the offshore surveys by roundfish area



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

	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

	2008	2009	2010
AMERICAN PLAICE (LR DAB)	187	223	122
ANGLERFISH (MONK)	6	5	7
COD	21	9	10
COMMON DRAGONET	2	1	
DAB	103	140	68
EUROPEAN PLAICE	21	29	22
GREY GURNARD	22	18	27
HADDOCK	85	82	83
LEMON SOLE	22	34	52
LESSER SPOTTED DOGFISH	4	2	2
POGGE (ARMED BULLHEAD)	3	4	2
POOR COD	2	8	
TURBOT	1		
WHITING	6	11	15

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

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
AMERICAN PLAICE (LR DAB)						25	36	131	66	49
ANGLERFISH (MONK)	1	1	2	1	1	1	1	1	1	1
BRILL	1	1	1	1	1	1	1	1	1	1
COD		1	1	1	1	7	2	3	3	1
COMMON DRAGONET	158	205	167	180	80	141	152	302	151	145
DAB	33	42	15	39	25	46	82	167	99	62
EUROPEAN PLAICE	19	27	17	15	14	14	44	32	30	25
FLOUNDER (EUROPEAN)	1	1	1	1	1	9	1	1	2	3
GREY GURNARD	1	2	2	6	1	7	9	12	11	10
HADDOCK					1	4	4	5	10	21
JOHN DORY	1	1	1	1	1	1	1	1	1	1
LEMON SOLE	2	1	1	2	2	3	2	7	4	3
LESSER SPOTTED DOGFISH	5	7	17	11	14	10	17	11	13	8
LESSER WEEVER FISH	2	3	4	5	2	5	2	3	4	5
POGGE (ARMED BULLHEAD)	15	14	20	24	26	15	30	13	19	11
POOR COD	67	40	26	41	42	34	25	21	26	30
RED GURNARD	10	20	27	40	27	20	14	16	19	20
RED MULLET	1	1	1	1	1	1	1	1	2	1
SCALD FISH	11	10	10	6	3	3	3	4	5	3
SOLE (DOVER SOLE)	25	21	18	11	9	13	23	18	21	17
SOLENETTE	49	30	53	40	27	30	31	20	37	36
THICKBACK SOLE	3	3	3	3	3	4	5	5	4	7
TUB GURNARD	1	3	4	2	2	1	1	2	2	2
TURBOT	1	1	1	1	1	1	1	1	1	1
WHITING	5	3	1	1	1	5	4	8	4	4
WHITING POUT (BIB)	35	48	32	33	29	50	60	87	49	13

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AMERICAN PLAICE (LR DAB)	46	67	64	38	33	50	35	97	50	40
ANGLERFISH (MONK)	1	2	1	1	2	1	1	1	8	9
BRILL	1	1	1	1	1	1	1	1	1	1
COD	1	1	1	1	1	1	1	1	1	2
COMMON DRAGONET	138	132	168	158	78	125	115	218	148	131
DAB	114	152	146	117	69	142	114	230	228	153
EUROPEAN PLAICE	24	19	19	26	24	27	47	69	50	77
FLOUNDER (EUROPEAN)	1	1	1	1	1	1	1	2	1	1
GREY GURNARD	9	10	13	10	13	9	12	20	20	22
HADDOCK	14	6	5	3	2	9	2	5	1	6
JOHN DORY	1	1	1	1	1	1	1	1	1	1
LEMON SOLE	5	6	6	7	8	11	11	24	15	21
LESSER SPOTTED DOGFISH	15	11	13	13	16	14	12	2	21	39
LESSER WEEVER FISH	5	4	7	8	5	10	6	8	8	4
POGGE (ARMED BULLHEAD)	25	29	23	22	9	24	15	13	12	20
POOR COD	20	49	125	73	43	12	21	30	15	8
RED GURNARD	12	20	24	32	19	21	11	10	45	40
RED MULLET	2	1	3	2	1	3	1		1	2
SCALD FISH	3	20	34	37	8	9	21	21	18	20
SOLE (DOVER SOLE)	15	10	14	13	8	19	20	7	28	36
SOLENETTE	30	111	149	172	60	91	74	54	63	78
THICKBACK SOLE	12	59	85	73	11	13	7	17	12	14
TUB GURNARD	1	1	2	1	1	3	3	2	4	4
TURBOT	1	1	1	1	1	1	1	1	1	1
WHITING	5	6	5	3	5	3	2	4	6	15
WHITING POUT (BIB)	35	8	79	30	28	35	34	22	22	14

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

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AMERICAN PLAICE (LR DAB)	7	12	7	10	14	10	12	11	8	15	22
ANGLERFISH (MONK)	1	1	3	2	2	3	1	1	1	2	2
BRILL	2	1	1	1	1	1	1	2	1	1	2
COD	5	2	2	2	5	6	4	2	2	4	1
COMMON DRAGONET	98	72	91	119	117	60	77	96	107	68	42
DAB	347	376	304	534	539	337	419	315	493	408	108
EUROPEAN PLAICE	212	195	215	242	283	209	248	247	258	256	190
FLOUNDER (EUROPEAN)	2	4	4	5	4	4	3	2	3	6	4
GREY GURNARD	34	32	27	34	31	31	42	52	47	31	14
HADDOCK	12	18	7	8	11	12	17	15	4	13	14
JOHN DORY	1	2	1	1	1	1	1	1	1	1	1
LEMON SOLE	9	11	14	23	16	12	12	13	14	10	14
LESSER SPOTTED DOGFISH	20	24	32	20	50	25	40	36	43	44	15
LESSER WEEVER FISH	26	11	15	12	16	12	16	12	15	13	8
POGGE (ARMED BULLHEAD)	24	18	25	22	33	17	21	26	24	23	16
POOR COD	117	58	80	188	236	153	239	168	189	83	9
RED GURNARD	7	8	7	10	10	7	8	10	9	10	3
RED MULLET	1	1	1	3	1	4	3	1	1	1	2
SCALD FISH	41	38	59	69	63	39	54	53	75	56	20
SOLE (DOVER SOLE)	106	73	71	69	75	52	56	45	62	65	48
SOLENETTE	177	171	331	283	365	211	182	218	220	178	110
THICKBACK SOLE	19	16	22	17	25	11	19	21	28	18	3
TUB GURNARD	7	6	6	9	7	7	7	8	7	8	7
TURBOT	1	1	1	1	1	1	1	1	1	1	1
WHITING	48	44	49	51	114	73	71	54	140	60	49
WHITING POUT (BIB)	8	17	15	12	12	9	4	19	27	4	15

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

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AMERICAN PLAICE (LR DAB)	56	65	68	85	57	53	51	70	46	40	55
ANGLERFISH (MONK)	1	1	2	1	1	1	3	3	1	3	1
BRILL	1		1	1	1	1	1	1	1	1	
COD	5	3	13	4	9	13	4	6	2	10	1
COMMON DRAGONET	39	21	20	22	19	74	52	61	57	27	73
DAB	504	447	347	550	349	564	1467	774	866	634	166
EUROPEAN PLAICE	81	69	76	186	120	155	183	98	159	174	129
FLOUNDER (EUROPEAN)											
GREY GURNARD	44	81	29	32	48	110	99	68	80	35	106
HADDOCK	32	34	16	11	6	7	10	4	2	2	6
LEMON SOLE	48	49	78	58	45	56	56	72	53	50	86
LESSER SPOTTED DOGFISH					1		1		2		
LESSER WEEVER FISH	9	6	16	55	53	5	13	7	11	258	42
POGGE (ARMED BULLHEAD)	20	9	80	7	15	16	43	12	16	7	9
POOR COD	1	1	2		11	5		6	1	9	
RED GURNARD							1				
RED MULLET	1		1					1			
SCALD FISH	15	19	11	31	23	92	37	38	57	48	56
SOLE (DOVER SOLE)	56	15	59	22	9	22	42	18	13	19	4
SOLENETTE	14	11	4	31	4	33	4	8	39	11	44
THICKBACK SOLE	1					1	1	1	1	1	1
TUB GURNARD	1		1		1			1	1	1	
TURBOT	1	1		1		1	1	1	1	1	
WHITING	73	38	72	63	17	22	37	13	33	14	44
WHITING POUT (BIB)	19	5	49	4			8	7	1	1	

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

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AMERICAN PLAICE (LR DAB)			1								
ANGLERFISH (MONK)	1			1		1		1		1	
BRILL	1	1	1	1	1	1	1	1	1	1	1
COD	2	3	3	1	2	5	31	3	2	1	1
COMMON DRAGONET	9	38	7	7	17	23	16	23	60	5	23
DAB	292	249	249	245	165	287	290	398	172	127	87
EUROPEAN PLAICE	68	65	117	78	51	86	63	65	72	46	100
FLOUNDER (EUROPEAN)	8	6	32	7	1	3	3	1	1	4	5
GREY GURNARD	10	10	15	5	9	19	14	7	3	2	11
HADDOCK	1										
JOHN DORY							1		1		
LEMON SOLE	24	32	33	23	16	13	10	34	12	12	8
LESSER SPOTTED DOGFISH	8	5	20	7	26	4	19	14	29	21	29
LESSER WEEVER FISH	15	17	24	29	35	22	33	37	95	11	32
POGGE (ARMED BULLHEAD)	26	37	16	24	27	17	32	20	24	6	30
POOR COD	10	30	28	22	89	41	18	74	39	15	6
RED GURNARD	1	1	1	1	1	2	1	1	1		1
RED MULLET	1	1	1	1	1	1	1	1	1	1	1
SCALD FISH	46	28	41	41	45	109	58	46	25	32	24
SOLE (DOVER SOLE)	192	146	163	245	127	249	288	190	117	121	122
SOLENETTE	98	48	64	59	27	73	62	53	18	31	25
THICKBACK SOLE		1	1	1	1	1	1	1	1	1	
TUB GURNARD	2	1	2	2	2	4	4	3	2	1	3
TURBOT	1	1	1	1	1	1	1	1	1	1	1
WHITING	118	85	130	77	114	79	85	61	55	34	83
WHITING POUT (BIB)	81	196	77	169	131	80	32	151	81	33	14

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

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AMERICAN PLAICE (LR DAB)	6	4	9	5	8	6	6	1	3	2	2
ANGLERFISH (MONK)	1	1	1	1		1	1	1		1	1
BRILL	2	1	1	1	1	1	1	1	1	1	2
COD	3	2	1	1	1	3	3	6	2	1	3
COMMON DRAGONET	64	68	124	95	65	37	64	83	106	61	45
DAB	988	935	798	853	542	627	463	803	1156	907	424
EUROPEAN PLAICE	590	1209	759	501	451	463	379	575	616	895	278
FLOUNDER (EUROPEAN)	3	4	4	5	6	6	3	5	6	4	9
GREY GURNARD	44	25	37	36	36	49	27	26	23	19	33
HADDOCK	1	1	1	1	1	1	1		1	1	1
JOHN DORY					1	1	1	1	1	1	
LEMON SOLE	5	8	10	18	10	4	5	18	12	8	18
LESSER SPOTTED DOGFISH	1		1	1	1	1	1	1	1	1	1
LESSER WEEVER FISH	37	74	41	61	55	37	45	39	55	22	14
POGGE (ARMED BULLHEAD)	44	60	86	59	44	23	26	37	71	31	25
POOR COD	1	1	2	2	6	1	1	7	4	1	
RED GURNARD	1	1	1	1	1	1	1	1	1	1	1
RED MULLET	1	2	4	10	2	1	2	1	1	4	5
SCALD FISH	78	140	168	226	233	171	80	163	192	224	57
SOLE (DOVER SOLE)	40	42	75	34	16	17	44	34	33	31	41
SOLENETTE	397	220	269	149	192	137	70	107	148	194	50
THICKBACK SOLE		1			1	1	1				
TUB GURNARD	6	5	5	8	6	7	7	8	6	6	6
TURBOT	5	3	3	4	3	3	3	3	3	2	2
WHITING	179	270	104	81	55	33	19	113	67	53	24
WHITING POUT (BIB)	23	16	13	14	14	5	4	29	43	3	1

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

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AMERICAN PLAICE (LR DAB)	116	88	132	70	63	49	47	10	24	32	52
ANGLERFISH (MONK)	2	1	1	1	1	1	1		1	1	1
BRILL	1			1	1	1		1	1	1	1
COD	15	7	7	17	3	4	2	4	1	1	9
COMMON DRAGONET	7	3	5	33	28	24	17	4	31	17	28
DAB	2849	649	485	742	732	723	372	72	541	552	866
EUROPEAN PLAICE	671	89	95	155	145	278	102	31	309	196	684
FLOUNDER (EUROPEAN)	1			1	1	1		1	2	1	2
GREY GURNARD	251	51	37	27	27	95	44	15	40	29	72
HADDOCK	46	13	2	4	3	8	3	1	1	3	12
LEMON SOLE	7	8	11	10	7	6	2	2	7	7	17
LESSER SPOTTED DOGFISH									1		
LESSER WEEVER FISH			1	1				1	1	1	1
POGGE (ARMED BULLHEAD)	24	5	3	13	11	5	3	1	13	9	33
POOR COD											
SCALD FISH	54	15	10	38	57	38	8	4	42	39	42
SOLE (DOVER SOLE)	10	2	1	1	1	1	1	1	1	1	1
SOLENETTE	27	13	14	168	211	50	3	1	198	117	142
TUB GURNARD	2	1	1	1	1	2	1	1	1	1	2
TURBOT	4	1	1	1	1	1	1	1	1	1	1
WHITING	43	153	26	12	10	7	4	1	12	5	14
WHITING POUT (BIB)											

Annex 9: Abundance (n/hour) of 13 epifauna species for the offshore surveys by roundfish area or Subdivision

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

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Aphrodita aculeata	84	20	242	52	79	154	82	46	52	93	40	66	32
Asterias rubens	420	385	83	127	213	1080	16	23	10	20	74	885	4
Astropecten irregularis	183	184	2846	1018	2853	9776	160	402	2292	948	447	308	12
Buccinum undatum	8	24	18	10	50	220	26	41	40	48	99	60	12
Cancer pagurus						16				8	6		4
Corystes cassivelaunus										4			
Echinocardium sp.	1920	2	88	20	46	63	10			16			
Liocarcinus depurator	96		107	26	113	109	88	27	138	96	20	152	124
Liocarcinus sp.	138	116	56	11	67	42	20	48	23	96	33	125	20
Nephrops norvegicus	12		102	21	69	571	16	8	90	54			
Ophiothrix fragilis					422	94		33			4		
Ophiura sp.	30	944	142	57	98	154	14	36	32	318	373	229	100
Pagurus sp.	84	536	52	63	326	664	62	232	152	336	556	512	224

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

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Aphrodita aculeata	171	126	75	98	71	76	224	100	110
Asterias rubens	8340	31310	87	385	702	366	581	550	745
Astropecten irregularis	6581	2605	575	2051	2984	1874	1851	1757	3428
Buccinum undatum	668	29	99	125	101	104	164	121	241
Cancer pagurus	10	10			2		6	12	12
Corystes cassivelaunus	504	364	2	22	28	9	28	27	94
Echinocardium sp.	578	141	57	161	114	155	145	71	458
Liocarcinus depurator			194	230	11	222	493	103	268
Liocarcinus sp.	485	3134	90	262	153	47	201	56	131
Nephrops norvegicus		24				59	50	12	19
Ophiothrix fragilis			251	2109	438	104	1523	703	12
Ophiura sp.	8557	2100	87	232	95	43	121	49	60
Pagurus sp.	247	87	209	196	110	126	186	243	314

	2005	2006	2007	2008	2009	2010
Aphrodita aculeata	93	76	156	97	39	70
Asterias rubens	809	764	735	1031	904	156
Astropecten irregularis	3456	5379	6785	####	####	1477
Buccinum undatum	373	335	364	458	544	128
Cancer pagurus	5	24	24	13	12	5
Corystes cassivelaunus	53	38	39	44	83	41
Echinocardium sp.	391	139	194	275	602	4
Liocarcinus depurator	341	286	144	397	517	360
Liocarcinus sp.	184	314	294	120	394	132
Nephrops norvegicus	4	4	5	12	4	11
Ophiothrix fragilis	163	76	64	72	16	17
Ophiura sp.	32	41	53	38	80	20
Pagurus sp.	334	490	907	888	909	296

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

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Aphrodita aculeata	140	552	120	47	86	56	84	68	128
Asterias rubens	4541	25829	668	942	607	903	4998	2692	189
Astropecten irregularis	4784		66	245	294	384	460	720	191
Buccinum undatum	216	3200	64	28	21	14	54	63	70
Cancer pagurus	7	314	7	3	4	3	48	52	13
Corystes cassivelaunus				4					
Echinocardium sp.	3984		81	34	31	58	368	16	10
Liocarcinus depurator			36	33	110	82	115	656	661
Liocarcinus sp.	483	9739	121	227	62	35	235	273	606
Nephrops norvegicus			76	193	132	297	39	1170	131
Ophiothrix fragilis			84	9	60	11	1808	2837	20
Ophiura sp.	496	26123	118	322	62	215	846	120	207
Pagurus sp.	72	768	307	395	147	69	195	571	429

	2005	2006	2007	2008	2009	2010
Aphrodita aculeata	105	72	56	106	73	48
Asterias rubens	359	877	279	1119	591	158
Astropecten irregularis	653	876	184	195	208	131
Buccinum undatum	53	27	49	157	135	46
Cancer pagurus	10	32	16	12	10	8
Corystes cassivelaunus	16					
Echinocardium sp.	16	418	331			4
Liocarcinus depurator	426	701	229	229	186	97
Liocarcinus sp.	370	168	138	228	229	89
Nephrops norvegicus	1032	512	118		326	164
Ophiothrix fragilis	11	48	21	159	34	7
Ophiura sp.	260	226	290	268	383	87
Pagurus sp.	277	213	584	953	681	520

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

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Aphrodita aculeata	924		40	75	115	65	136	38	80
Asterias rubens	10648	12455	210	411	590	186	885	583	168
Astropecten irregularis	728	56	178	773	1072	218	578	687	2445
Buccinum undatum	96		48	29	763	24	169	62	22
Cancer pagurus	3	5	29	9	18	11	22	14	13
Corystes cassivelaunus			22	25	40	23	26	65	99
Echinocardium sp.	1280		47	100	12	8	16		50
Liocarcinus depurator							330	68	423
Liocarcinus sp.	2566	2137	175	822	529	108	542	220	1136
Nephrops norvegicus	16				6		16	32	4
Ophiothrix fragilis			49	19	38507	11	373	61	276
Ophiura sp.	264	744	59	69	101	35	259	58	121
Pagurus sp.	80	136	94	102	220	74	241	221	387

	2005	2006	2007	2008	2009	2010
Aphrodita aculeata	81	82	86	158	115	104
Asterias rubens	1098	355	1219	1717	1689	231
Astropecten irregularis	1457	2281	1682	4242	1567	244
Buccinum undatum	86	94	178	66	106	59
Cancer pagurus	40	12	12	19	23	28
Corystes cassivelaunus	122	255	34	176	29	18
Echinocardium sp.	225	28	8			12
Liocarcinus depurator	270	302	403	125	76	20
Liocarcinus sp.	1143	601	1438	392	933	313
Nephrops norvegicus	4		4		4	
Ophiothrix fragilis	133	94804	540	696	17	10
Ophiura sp.	46	70	306	360	148	94
Pagurus sp.	580	366	437	765	341	158

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
Aphrodita aculeata	48		16	24			76	39			176
Asterias rubens	32	10295	1049	97	872	12	856	3268	637	1939	4697
Astropecten irregularis		43	2488				16	128	112	184	97
Buccinum undatum	16	245	629	142	32		48	96	3	534	60
Cancer pagurus	48	12	7	7	1	569	34	12	103	54	276
Corystes cassivelaunus			505	51					6	16	41
Echinocardium sp.	72	2609	6300	53	392		100	210	2		64
Liocarcinus depurator									69	8	2632
Liocarcinus sp.	208	1746	775	3268	784	256	3118	2032	839	1555	2981
Nephrops norvegicus			5				16	1		18	
Ophiothrix fragilis									32	64	165
Ophiura sp.	160	536	915	121	416	112	251	90	20	465	431
Pagurus sp.	648	2244	769	791	472	360	448	1096	57	1356	320

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Aphrodita aculeata	2	103	36	202	866	205	241	6		6
Asterias rubens	4886	1405	1064	821	2069	1423	3743	408	5152	250
Astropecten irregularis		242	581	80	823	1956	4648	40	160	105
Buccinum undatum	6	67	44	158	588	780	164	11	96	
Cancer pagurus	753	132	18	69	19	82	35	9	4	12
Corystes cassivelaunus	14	26	22	49	85	62	57	58	46	90
Echinocardium sp.	178	832	583	1761	1785	1141	5938		37	
Liocarcinus depurator	4510	211	421	202	496	771	1373	30	67	200
Liocarcinus sp.	2234	3004	2706	3465	45443	7454	3256	512	3720	307
Nephrops norvegicus					431	490	2320		0	
Ophiothrix fragilis	8	477	303109	8	117	228	187	2		
Ophiura sp.	53	13969	593	420	1482	47113	854	193	926	236
Pagurus sp.	43	199	138	147	373	630	634	228	243	72

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
Aphrodita aculeata	212	241	541	291	433	196	604	428	190	306	375
Asterias rubens	4009	7396	7529	4964	2852	3912	3929	4618	14469	24057	10073
Astropecten irregularis	4001	3407	2651	2268	2127	2023	3510	995	3099	7325	4878
Buccinum undatum	77	113	68	67	248	66	130	17	942	213	237
Cancer pagurus	2	2	1	6	2	4	60	4	25	14	14
Corystes cassivelaunus	134	206	275	130	427	188	720	335	185	434	254
Echinocardium sp.	2614	2546	1296	2270	1398	952	1548	10716	141	5413	526
Liocarcinus depurator											114
Liocarcinus sp.	1777	2391	3715	3106	4211	4971	2129	2471	4721	8487	3286
Nephrops norvegicus	20	132	214	69	34	2	45	265	62	53	1553
Ophiothrix fragilis	96	99	36	16	16	40	112		50	220	70
Ophiura sp.	574	9370	6487	4350	14599	698	22189	18127	4658	11772	5815
Pagurus sp.	327	293	285	282	509	168	456	287	704	431	440

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Aphrodita aculeata	329	281	453	280	331	495	51	121	156	48
Asterias rubens	251	8981	7547	7211	5093	4012	5903	6441	4195	1484
Astropecten irregularis	1508	13182	12222	10419	9274	8490	7222	9457	11438	551
Buccinum undatum	14	31	109	135	28	50	863	440	410	75
Cancer pagurus	3	73	26	18	23	36	28	23	14	33
Corystes cassivelaunus	94	214	600	436	496	348	160	378	265	60
Echinocardium sp.	186	1343	2810	1286	587	566	486	283	2069	34
Liocarcinus depurator	95	184	684	445	330	627	223	383	244	17
Liocarcinus sp.	540	8604	14438	13200	32050	5762	9549	6389	7505	859
Nephrops norvegicus	8	175	114	171	60	869	340	49	110	25
Ophiothrix fragilis	116	112	52	768	90	111	36	102	175	48
Ophiura sp.	217	1870	1221	1232	1037	2679	1983	3037	3353	141
Pagurus sp.	58	317	382	227	269	210	457	542	522	45

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
Aphrodita aculeata	320	371		304			319	1	41	267	174
Asterias rubens	3404	1948		1549			659	10155	138	1129	425
Astropecten irregularis	2265	4679		1934			1967	48	2761	2987	2656
Buccinum undatum	48			6			11	232	65	219	209
Cancer pagurus	1	129		4			4	7	4	7	4
Corystes cassivelaunus	64	443		81			4376	14	9	86	223
Echinocardium sp.	41593	44889		7294			1111	4	9	1120	924
Liocarcinus depurator											106
Liocarcinus sp.	484	255		797			528	867	198	632	262
Nephrops norvegicus		1		5			15			126	14
Ophiothrix fragilis	192			16					188	115	10
Ophiura sp.	1333	2571		48			872	2240	342	210	239
Pagurus sp.	201	238		203			213	187	151	119	82

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Aphrodita aculeata	281	407	166	369	58	380	147	75	80	171
Asterias rubens	195	475	2347	523	1073	466	459	612	3228	2089
Astropecten irregularis	1323	2379	1916	2388	4142	11348	6853	8831	8162	4439
Buccinum undatum	89	357	261	166	223	240	222	109	139	270
Cancer pagurus	12	12	4	4	11	3	8	13	8	11
Corystes cassivelaunus	97	102	22	26	72	118	53	27	117	130
Echinocardium sp.	154	566	219	1774	656	501	333	134	10315	66
Liocarcinus depurator	69	207	300	509	166	68	325	452	396	41
Liocarcinus sp.	101	182	175	392	1268	366	823	813	1127	1279
Nephrops norvegicus	58	44	230	357	107	9	213	289	386	57
Ophiothrix fragilis	56	4	21	16	28					12
Ophiura sp.	112	238	274	278	66	27	98	104	49	121
Pagurus sp.	249	400	745	469	209	245	384	447	543	164

Annex 10: Population abundance indices for sole and plaice, offshore surveys

Annex 10.1: Catch rate of sole from Netherlands and UK surveys in the North Sea and VII a, d, e and f.

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	0.000	7.031	7.121	3.695	1.654	0.688	0.276	0.000	0.000	0.000	0.000
1986	0.000	7.168	5.183	1.596	0.987	0.623	0.171	0.158	0.000	0.018	0.052
1987	0.041	6.973	12.548	1.834	0.563	0.583	0.222	0.228	0.058	0.000	0.022
1988	0.000	83.111	12.512	2.684	1.032	0.123	0.149	0.132	0.103	0.014	0.126
1989	0.490	9.015	68.084	4.191	4.096	0.677	0.128	0.242	0.000	0.051	0.034
1990	0.019	37.839	24.487	21.789	0.778	1.081	0.770	0.120	0.115	0.025	0.048
1991	0.815	4.035	28.841	6.872	6.453	0.136	0.135	0.063	0.045	0.013	0.059
1992	0.024	81.625	22.284	10.449	2.529	3.018	0.090	0.162	0.078	0.020	0.077
1993	0.018	6.350	42.345	1.338	5.516	3.371	6.199	0.023	0.084	0.053	0.061
1994	2.172	7.660	7.121	19.743	0.124	1.636	0.088	0.983	0.009	0.000	0.008
1995	0.429	28.125	8.458	6.268	5.129	0.363	0.805	0.316	0.734	0.039	0.036
1996	0.161	3.975	7.634	1.955	1.785	2.586	0.326	0.393	0.052	0.264	0.055
1997	0.542	169.343	4.919	2.985	0.739	0.710	0.380	0.096	0.035	0.042	0.055
1998	0.371	17.108	27.422	1.862	1.242	0.073	0.015	0.391	0.000	0.000	0.000
1999	6.338	11.960	18.363	15.783	0.584	1.920	0.310	0.218	0.604	0.003	0.310
2000	0.190	14.594	6.144	4.045	1.483	0.263	0.141	0.060	0.007	0.150	0.069
2001	9.200	7.998	9.963	2.156	1.564	0.684	0.074	0.037	0.028	0.000	0.163
2002	5.908	20.989	4.182	3.428	0.886	0.363	0.361	0.032	0.069	0.000	0.052
2003	0.321	10.507	9.947	2.459	1.670	0.360	0.187	0.319	0.000	0.020	0.000
2004	0.685	4.192	4.354	3.553	0.644	0.626	0.118	0.070	0.073	0.000	0.012
2005	0.083	5.534	3.395	2.377	1.303	0.167	0.171	0.077	0.047	0.000	0.018
2006	0.060	17.089	2.332	0.278	0.709	0.479	0.151	0.088	0.000	0.007	0.030
2007	0.714	7.498	19.504	1.464	0.565	0.315	0.537	0.031	0.009	0.000	0.024
2008	3.092	15.247	9.062	12.298	1.313	0.222	0.279	0.202	0.028	0.047	0.000
2009	4.911	15.950	4.999	2.858	4.791	0.252	0.124	0.272	0.079	0.000	0.000
2010	2.462	54.811	10.707	2.027	0.774	1.252	0.143	0.122	0.005	0.027	0.089

b) UK: sole (total numbers per km towed) Southern North Sea (IVc).

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1995	0.53	41.6	86.43	17.13	16.1	9.81	5.19	0.86	0.78	0	0.43
1996	3.33	75.48	52.47	22.89	8.98	8.33	8.77	1.3	1.81	0.73	2.22
1997	4.49	70.49	63.17	19.81	9.34	5.56	3.52	7.1	1.77	1.77	0.97
1998	7.91	10.59	63.34	15.71	1.77	0.89	0.86	0	0.44	0	0.22
1999	8.96	103.75	18.49	24.53	9.36	0.86	0.3	1.09	0.59	1.56	0.99
2000	3.22	192.51	157.89	15.03	14.08	7	2.6	0.67	0.37	0.91	3.01
2001	5.87	91.45	174.9	45.7	2.99	4.57	1.83	0.82	0.63	0.24	1

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
2002	2.22	125.78	47.31	33.28	21.97	3.61	4.39	1.79	0.9	1.15	2.38
2003	0.91	69.91	129.31	16.26	23.56	14.71	0.77	6.43	1.52	0.86	2.5
2004	24.63	58.65	57.77	50.15	12.46	10.14	8.58	0.65	2.15	1.15	3
2005	37.64	107.01	55.54	19.82	37.68	3.29	10.42	5.63	0.56	1.2	4.64
2006	7.02	202.5	82.19	20.64	14.03	35.2	6.72	9.17	5.34	0.36	3.83
2007	9.41	40.71	77.34	19.25	4.4	2.78	11.41	0.94	2.19	1.08	0.96
2008	1	98.84	59.97	39.34	13.45	0.63	3.41	10.73	2.55	1.79	1.32
2009	1.01	35.21	82.39	58.21	56.85	12.23	1.99	3.39	10.18	6.27	5.23
2010	1.43	77.97	67.96	24.52	22.62	17.47	7.01	2.16	3.34	1.36	1.97

c) UK: 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	0.7
1990		12.1	3.7	3.4	0.7	0.8	0.2	0.1	0.2	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	10	0.7	1.1	0.3	0.5	0.1	0.2	0.6
1993		0.5	17.5	8.4	7	0.8	1	0.3	0.2	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	7.3	3.2	1.3	0.2	0.5	0.4	0.9	0	0.7
1998		2	21.2	2.5	1	0.9	0.1	0.3	0	0.1	0.3
1999		28.14	9.44	13.17	2.51	1.73	1.28	0.16	0.93	1.07	0.47
2000		10.49	22.03	4.15	4.24	1.03	0.58	0.28	0.03	0.24	1.2
2001		9.09	21.01	8.36	1.2	1.91	0.54	0.57	0.35	0.04	1.01
2002		31.76	11.42	5.42	3.45	0.27	0.71	0.44	0.09	0	0.56
2003		6.47	28.48	4.13	2.46	1.58	0.3	0.39	0.2	0.07	0.52
2004		7.35	8.49	7.71	1.57	1.45	0.99	0.2	0.44	0.21	0.57
2005		25	5.04	2.86	3.47	1.63	1.02	0.66	0.06	0.31	0.35
2006		6.3	29.18	2.83	1.99	1.95	0.34	0.44	0.57	0	0.34
2007		2.14	21.86	12.9	1.22	0.8	1.2	0.32	0.17	0.59	1.02
2008		2.86	6.46	7.24	4.82	0.25	0.49	0.38	0.27	0.24	0.2
2009		30.54	13.33	5.44	4.34	3.76	0.37	0.2	0.31	0.23	0.48
2010		15.9	30.12	5.32	1.66	2.82	2.38	0.35	0.16	0.55	0.31

d) UK: sole (total numbers for 2*4m beam trawl) Western Channel (VIIe).

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1989	0	5	56	120	107	34	40	17	5	7	12
1990	0	23	52	76	31	24	7	15	3	6	11
1991	0	11	231	79	51	23	21	5	17	4	15
1992	0	5	140	316	44	36	12	7	5	11	11

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1993	0	5	54	115	105	14	10	9	3	3	10
1994	0	6	47	106	62	44	5	5	2	3	7
1995	0	14	37	44	42	26	31	4	5	5	13
1996	0	28	112	67	25	32	20	17	3	2	9
1997	0	11	130	126	43	14	16	13	14	5	15
1998	0	11	141	114	76	22	10	14	6	8	11
1999	0	11	97	128	47	23	8	4	4	4	17
2000	0	12	136	70	52	23	16	5	3	5	9
2001	0	9	197	162	52	31	12	12	4	1	7
2002	0	6	37	113	48	27	6	3	2	0	12
2003	0	23	124	78	56	28	6	1	1	2	4
2004	0	16	110	120	24	15	10	16	9	4	4
2005	0	8	110	39	53	12	12	6	2	4	4
2006	0	5	120	95	26	37	10	7	9	0	5
2007	0	7	188	135	50	11	23	3	3	1	4
2008	0	10	85	158	77	40	2	14	3	6	7
2009	0	11	104	126	96	49	13	13	12	1	8
2010	0	20	175	154	84	59	31	20	7	12	14

e) UK: sole (total numbers for 4m beam trawl) Bristol Channel (VIIf).

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1993	3	201	379	51	23	1	2	2	1	1	2
1994	1	407	473	121	17	9	8	0	0	2	2
1995	31	142	255	60	13	7	14	1	1	1	4
1996	3	178	251	64	27	7	3	4	1	3	3
1997	37	498	207	21	13	14	5	3	6	0	4
1998	104	885	472	57	11	9	5	2	1	5	5
1999	29	2922	297	38	16	7	4	5	1	0	9
2000	16	1086	1608	37	26	6	0	2	1	1	4
2001	26	449	711	307	23	9	6	2	0	2	8
2002	9	786	283	151	121	14	7	2	3	0	4
2003	14	465	628	55	30	56	9	3	3	0	1
2004	64	860	434	99	15	22	42	4	3	0	5
2005	44	407	267	38	16	7	5	17	1	2	0
2006	13	324	238	47	16	8	0	2	12	0	1
2007	108	424	128	51	16	8	7	3	4	13	3
2008	6	1232	124	15	18	7	9	4	3	5	8
2009	1	604	377	29	8	10	4	3	3	2	11
2010	19	101	558	144	20	2	7	9	4	2	8

f) UK: sole (total numbers for 4m beam trawl) Irish Sea (VIIa).

Year/Age	0	1	2	3	4	5	6	7	8	9	10+

1993	0	78	320	158	208	28	16	5	14	39	27
1994	0	62	431	193	95	128	43	10	11	6	36
1995	24	246	154	253	110	30	67	12	5	5	24
1996	4	886	126	32	76	46	23	31	8	2	11
1997	5	1158	577	72	24	55	27	16	30	7	10
1998	2	539	716	292	18	6	24	23	5	18	9
1999	3	385	293	255	203	29	8	26	5	6	21
2000	0	354	464	147	219	91	13	2	13	6	24
2001	1	91	284	192	65	96	64	6	3	12	11
2002	0	205	61	121	126	42	79	49	2	1	19
2003	0	242	210	51	97	81	40	43	26	1	13
2004	0	406	240	119	27	77	45	41	17	19	11
2005	0	53	165	69	25	13	35	25	4	6	17
2006	0	107	110	90	45	36	9	16	15	10	20
2007	0	125	93	49	57	41	11	4	6	12	22
2008	0	126	125	60	21	43	23	6	2	9	17
2009	0	57	150	68	39	23	30	12	7	1	16
2010	0	25	59	73	37	16	5	10	9	3	6

Annex 10.2: Catch rate of plaice from Netherlands and UK surveys in the North Sea and VII

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1985	595.271	136.759	173.893	36.059	10.997	1.273	0.973	0.336	0.155	0.091	0.229
1986	9.303	667.441	131.704	50.173	9.208	3.780	0.400	0.418	0.147	0.070	0.188
1987	44.126	225.822	764.186	33.841	4.880	1.842	0.607	0.252	0.134	0.078	0.186
1988	29.623	680.173	146.993	182.312	9.991	2.810	0.814	0.458	0.036	0.112	0.254
1989	31.862	467.877	319.272	38.660	47.305	5.850	0.833	0.311	0.661	0.132	0.075
1990	27.000	185.344	146.071	79.339	26.351	5.469	0.758	0.189	0.383	0.239	0.198
1991	152.176	291.378	159.424	33.955	13.569	4.313	5.659	0.239	0.204	0.092	0.107
1992	26.814	360.890	174.526	29.253	5.961	3.748	2.871	1.186	0.346	0.050	0.089
1993	74.272	188.988	283.400	62.783	8.272	1.128	1.130	0.584	0.464	0.155	0.071
1994	284.479	193.260	77.139	34.458	10.586	2.667	0.600	0.800	0.895	0.373	0.030
1995	108.101	265.634	40.618	13.218	7.527	1.110	0.806	0.330	1.051	0.202	0.119
1996	222.510	310.287	206.883	21.469	4.470	3.134	0.838	0.044	0.161	0.122	0.110
1997	65.515	1046.845	59.241	17.180	2.670	0.257	0.358	0.157	0.111	0.000	0.031
1998	255.654	347.575	402.657	44.960	8.294	1.224	0.339	0.149	0.213	0.072	0.081
1999	257.559	293.253	121.551	171.254	3.391	1.956	0.127	0.130	0.027	0.030	0.079
2000	209.293	267.473	69.252	29.349	22.359	0.570	0.162	0.502	0.027	0.012	0.052
2001	807.932	206.531	72.236	17.840	9.174	8.716	0.270	0.131	0.038	0.040	0.170
2002	248.356	519.224	44.475	14.901	4.991	2.539	1.321	0.085	0.128	0.000	0.092
2003	225.619	132.754	159.120	10.057	5.550	1.426	1.133	0.638	0.111	0.096	0.018
2004	197.940	233.707	39.623	61.912	6.152	2.464	1.492	0.952	2.842	0.000	0.012
2005	270.775	163.046	66.176	6.759	12.790	1.084	1.164	0.290	0.152	0.492	0.041
2006	250.800	128.615	36.385	18.115	2.982	5.890	0.867	0.757	0.040	0.269	0.387
2007	298.086	311.997	67.169	19.707	14.416	2.942	6.085	0.684	0.831	0.156	0.651
2008	387.592	221.567	120.728	30.108	9.075	7.205	0.618	1.715	0.292	0.229	1.046
2009	555.472	408.995	105.222	45.975	13.013	4.029	3.474	0.574	2.128	0.278	0.929
2010	814.363	261.097	84.254	34.244	20.178	4.662	2.162	3.464	0.207	2.547	1.232

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	-	1.643	6.021	4.451	2.903	2.039	1.566	0.721	0.415	0.190	0.468
1997	-	0.221	7.119	9.127	3.252	2.105	1.523	0.401	0.819	0.354	0.429
1998	-	0.228	32.249	9.572	4.874	2.202	1.274	0.929	0.762	0.304	0.540
1999	0.054	2.692	7.711	35.228	5.558	2.498	1.928	0.633	0.761	0.309	0.331
2000	0.043	4.795	13.445	12.910	16.957	2.882	1.716	0.933	0.805	0.218	0.530
2001	0.178	2.154	8.612	9.901	6.681	7.360	1.055	0.592	0.418	0.505	0.543
2002	-	18.553	12.912	9.541	6.411	4.181	4.420	0.743	0.741	0.394	0.933
2003	0.338	3.975	41.692	13.378	9.059	5.077	2.806	3.920	0.703	0.740	1.562
2004	0.014	5.985	15.784	31.488	9.430	4.316	2.439	1.242	2.500	0.409	1.405

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
2005	0.043	6.876	23.366	12.234	17.672	2.824	6.871	1.565	0.567	3.574	2.482
2006	0.236	6.725	32.192	25.727	11.367	10.918	1.985	3.897	0.864	0.723	3.262
2007	-	26.571	23.735	19.551	23.175	4.900	10.147	1.974	3.786	0.323	5.471
2008	-	17.467	50.462	25.585	18.392	18.974	6.243	12.747	2.657	6.749	8.411
2009	0.116	12.110	41.685	43.331	19.126	12.052	11.768	3.081	10.119	1.567	8.025
2010	0.644	26.180	35.716	34.561	30.093	13.412	5.695	12.234	2.744	6.362	7.706

c) Netherlands: plaice (N.hr^-1/8m trawl) North Sea (IV) Combined (RV "Isis" and RV "Tridens").

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1996	102.136	143.896	99.623	13.280	4.266	3.035	1.653	0.676	0.442	0.214	0.457
1997	24.190	386.840	28.679	14.886	4.010	2.042	1.538	0.428	0.797	0.327	0.407
1998	96.333	131.191	177.631	25.463	7.266	2.500	1.355	0.955	0.808	0.323	0.549
1999	100.264	116.989	53.597	96.348	6.493	3.005	1.926	0.659	0.756	0.314	0.355
2000	81.459	108.393	38.887	22.880	23.680	3.017	1.725	1.113	0.797	0.219	0.526
2001	297.375	80.296	39.788	15.695	8.754	9.300	1.079	0.624	0.420	0.511	0.602
2002	87.786	217.276	26.709	14.029	7.616	4.794	4.643	0.754	0.765	0.385	0.943
2003	87.985	53.579	94.429	15.858	10.305	5.361	3.081	4.007	0.732	0.760	1.534
2004	80.357	101.411	30.306	51.218	11.212	4.961	2.885	1.538	3.402	0.391	1.347
2005	106.916	70.845	45.646	13.806	20.392	3.035	6.942	1.568	0.571	3.570	2.435
2006	97.992	54.855	42.922	29.187	11.748	12.052	2.106	3.938	0.844	0.767	3.258
2007	115.922	139.391	44.429	24.594	26.579	5.681	11.685	2.091	3.947	0.364	5.558
2008	143.963	98.909	89.736	33.838	20.735	20.605	6.330	13.054	2.727	6.718	8.618
2009	219.268	170.840	76.528	54.059	21.482	12.834	12.192	3.139	10.254	1.585	7.941
2010	326.437	144.792	69.544	47.943	40.349	17.914	6.845	15.841	3.179	8.306	8.876

d) UK: plaice (total numbers per km towed) Southern North Sea (IVc).

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
2006	2	16	2	0	0	0	0	0	0	0	0
2007	0	13	4	0	0	0	0	0	0	0	0
2008	1	66	11	2	0	1	1	0	0	0	0
2009	8	45	10	2	0	0	0	0	0	0	0
2010	17	275	144	15	2	0	0	0	0	0	0

e) UK: 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	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	0.8	0.4
1991		11.8	9.1	7	5.3	5.4	3.2	1.2	1	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	1.7	1.9	1.6	2	2.8	0.4	0.6

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
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	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	3.1	0.3	0.2	0.2	0.1	0	1
1999		11.3	14.1	15.9	2.9	1	0.2	0.1	0.3	0.1	0.9
2000		13.2	21	14.4	13.8	3.5	0.9	0.6	0.2	0.4	1.5
2001		17.9	13	10	7.1	10.9	1.9	0.5	0.3	0.2	1
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	2.9	1.6	0.8	1.8	0.6	0.1	0.3
2004		36.2	15	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		42.6	18.8	8.7	3.9	1.7	2	0.8	0.3	0.1	1.1
2008		30.3	26.5	7.2	3	2.3	1.1	0.5	0.4	0.1	0.3
2009		71.6	42.9	19.1	5.7	3.2	2.2	0.8	1.2	0.4	1.3
2010		65.25	63.83	17.27	8.9	3.04	1.9	1.38	0.3	0.36	0.89

f) UK: plaice (total numbers for 2*4m beam trawl) Western Channel (VIIe).

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1989	0	31	70	281	188	23	11	14	8	6	18
1990	0	25	38	220	87	75	2	6	1	6	7
1991	2	22	27	63	79	62	41	9	0	1	3
1992	0	152	44	72	24	40	20	17	3	5	4
1993	0	21	70	60	24	13	25	13	11	2	2
1994	0	34	32	98	30	10	2	9	13	8	2
1995	0	50	46	45	48	12	4	5	6	1	4
1996	1	33	106	30	17	25	5	1	3	7	8
1997	0	53	122	197	24	6	12	7	1	1	7
1998	0	81	125	125	85	9	6	7	4	0	3
1999	1	38	44	182	53	30	3	2	6	4	2
2000	0	48	63	125	179	38	22	1	2	0	5
2001	21	32	64	51	111	97	25	13	0	3	5
2002	0	138	102	87	23	23	40	5	2	0	2
2003	0	29	137	60	50	5	18	27	7	0	2
2004	0	11	33	59	23	10	3	1	10	0	4
2005	2	30	75	91	70	13	3	3	5	2	3
2006	0	55	102	103	30	31	3	4	0	5	2
2007	0	37	91	121	34	27	6	6	1	3	4

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
2008	0	15	146	68	31	12	8	10	4	1	4
2009	3	16	156	214	29	15	11	8	5	1	3
2010	10	186	349	227	112	33	14	18	1	3	4

g) UK: plaice (total numbers for 4m beam trawl) Bristol Channel (VIIf).

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1993	4	121	107	43	2	5	0	1	0	0	0
1994	150	131	39	19	10	1	0	0	0	0	0
1995	1	275	103	19	3	8	2	0	0	2	0
1996	10	265	342	37	1	3	1	0	0	0	0
1997	8	259	117	40	5	2	2	1	0	0	0
1998	6	273	145	54	10	2	1	0	0	0	1
1999	192	181	94	34	23	8	0	0	2	0	0
2000	100	403	75	37	8	7	0	1	0	0	0
2001	42	251	185	19	10	5	4	2	0	0	0
2002	1	162	208	95	7	7	2	4	1	0	0
2003	72	117	95	72	26	3	2	1	1	2	0
2004	188	297	38	31	15	3	1	1	3	0	2
2005	3	228	89	25	10	13	3	1	0	0	1
2006	96	102	121	41	11	2	11	0	3	1	0
2007	41	178	109	56	18	2	3	1	2	1	0
2008	7	167	257	57	19	6	1	3	0	0	1
2009	222	192	66	93	25	13	5	2	0	1	0
2010	170	393	105	31	47	8	5	1	0	1	2

h) UK: plaice (total numbers for 4m beam trawl) Irish Sea (VIIa).

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1993	7	1007	836	111	90	11	5	9	2	1	6
1994	100	736	642	339	63	29	12	16	9	2	9
1995	281	1283	387	179	84	16	18	0	1	3	8
1996	105	1701	601	124	74	49	9	11	1	2	8
1997	31	1363	668	322	65	50	23	8	7	0	7
1998	169	1167	767	212	95	34	23	14	3	1	7
1999	180	1189	965	344	113	38	17	7	7	4	0
2000	132	2112	659	298	141	73	22	7	3	3	5
2001	249	1468	663	218	130	89	28	10	7	6	4
2002	16	1734	1615	647	243	79	51	16	17	5	7
2003	258	1480	1842	827	296	122	62	39	10	4	4
2004	218	1816	1187	1184	404	261	57	57	14	4	3
2005	288	869	1295	666	499	297	111	17	17	9	11
2006	485	1120	840	722	411	178	83	59	16	15	6

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
2007	186	2667	1255	525	417	196	95	45	37	6	10
2008	439	1293	1900	619	339	244	76	55	33	5	0
2009	150	1460	1083	1225	310	189	251	65	31	20	13
2010	481	1806	1407	670	505	185	173	100	60	47	28

Annex 11: Planimetric data for the 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 year's 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.

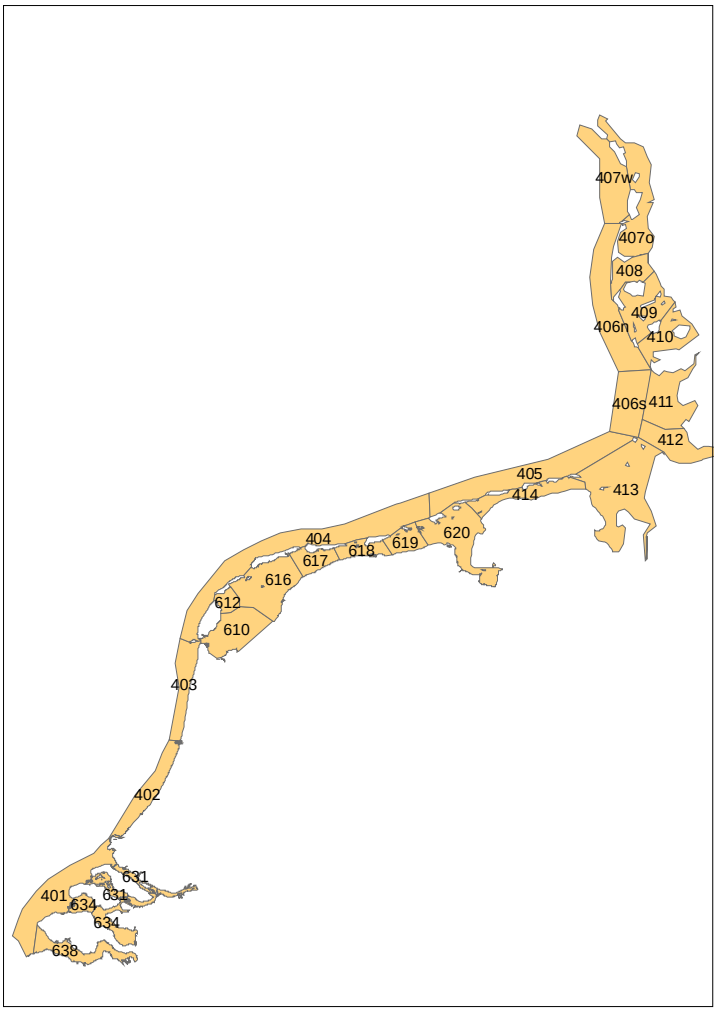


Figure 11.1. Area definitions for the Dutch and German DYFS.

Surface area (km²) by area and depth class for the Dutch 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 12: Number of hauls by area and year for the inshore surveys

Annex 12 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		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	3	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			13	5	28	15	19	3		45	49	28		27	14	11	10	26
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
2008		16	11	8	19	11	4	6		41	37	30	7	24	12	9	9	30
2009		16	13	16	28	15	16	6		44	37	32	6	26	12	10	8	28
2010		17	13	15	26	15	16	6		41	36	31	6	24	13	10	6	28

Annex 12 b) Number of hauls by area and year for the German DYFS.

region	German Bight				German/DK Wadden Sea							
area_code	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	1
1982		10			8	22	14	46	63		79	
1983		5			4	11	7	32	47		87	1
1984	6	8			8	16	13	40	55		78	2
1985	21	11					70		57		64	
1986	29	39				12	15	44	52		69	2
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	1
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	
2008	13	28				15	14	22	22	26	22	1
2009	13	29			24	7	19	10	20	17	13	
2010	13	21			22	7	52		20		13	

Annex 12 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
2008	31
2009	23

No data available for 2010.

Annex 12 d) Number of hauls by year for the English DYFS.

region	Other
area_code	
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
2008	156
2009	161
2010	161

Annex 13: Number of hauls by depth class, country and year for the inshore surveys

Annex 13 a) Number of hauls by depth class, year and country for the continental coastal areas.

region	Belgian Coast						Dutch Coast				German Bight							
depth zone	0-5	5-10	10-20	10-20	20-		0-5	5-10	10-20	20-	0-5	0-5	5-10	5-10	10-20	10-20	20-	20-
country	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			7	26	13	15		27	2	19	31		4
2002	2	19	9		3		5	27	29	7	14		27	5	10	9	1	
2003						33	9	32	26		7	1	18	26	13	12		
2004						33	1	21	28	3	8		18	17	14	21		
2005						33	2	35	29	9	7	2	17	16	8	20	1	
2006						33	3	27	31	6	2	1	14	18	5	19		
2007						32	4	28	36	8	1		1	16		22		
2008	2	16	11		2		7	26	16	5	15	2	16	11	4	8	1	
2009	7	9	7				4	28	33	8	10	1	15	20	14	16	3	
2010							3	31	29	8	9	1	17	15	7	21	1	

Annex 13 b) Number of hauls by depth class, year and country for the Wadden Sea.

region	Dutch Wadden Sea					German/DK Wadden Sea			
depth zone	0-6	6-12	13-20	20-	(blank)	0-6	6-12	13-20	20-
country	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	49	55	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	
2008	44	54	21	2		58	24	7	2
2009	47	47	26	1	1	78	28	4	
2010	41	56	19	2		84	27	3	

Annex 13 c) Number of hauls by depth class and year for the Scheldt estuary.

region	Scheldt Estuary			
depth zone	0-5	5-10	10-20	20-
country	NED	NED	NED	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	17	27	39	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
2008	16	22	29	9
2009	16	22	34	9
2010	15	19	32	11

Annex 14: Abundance of fish species and *Crangon* sp. in the inshore surveys

Annex 14 a) Abundance of fish species and *Crangon* sp. for the continental coastal areas.

Dutch coast

Dutch Coast (Dutch data)															
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Agonus Cataphractus	16	148	62	8.8	26	72		36	64	8.5	3.5	76	15	13	27
Alosa Fallax								1.2			0.14	19	335		
Ammodytes Sp.	9.3	29	224	31	9.8	14		3.7	0.94	0.13	0.95	111	17	3.3	3.9
Buglossidium Luteum	54	2.3	2.3	63	44	21		32	3.2	1	3.3	9.2	16	21	31
Callionymus Lyra	121	48	52	335	189	237		140	32	1.6	10	29	189	65	59
Clupea Harengus	233	5.5	3.2	0.38	2.9	0.25		31	70	381	641	519	2130	703	135
Gadus Morhua	61	2.2	2.2	2.2	2.5	3.3		12	15	15	9	13	15	33	4
Gobiidae	1690	4481	1823	5948	4025	3209		794	2189	0.5	5238	8971	1897	2114	446
Hyperoplus Lanceolatus	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
Limanda Limanda	699	3193	99	668	593	482		141	5839	1396	3642	1076	1243	1627	733
Merlangius Merlangus	69	55	35	35	113	110		150	181	686	274	514	238	999	51
Osmerus Eperlanus	14		0.07		0.06	0.13				0.38		0.44	16	5.3	
Platichthys Flesus	2.3	5	3.2	1.3	1.9	6		11	22	1.1	22	7.9	25	17	5.5
Pleuronectes Platessa	682	1695	289	300	135	301		128	365	808	718	1135	1609	1289	403
Solea Solea	1117	1725	27	587	84	448		17	310	1030	1390	584	1374	685	554
Syngnathus Sp.	0.32	0.63	2.2	0.59	0.71	0.26		1.6	0.1	15	283	41	134	1.9	0.61
Crangon Sp.	15557	26676	19790	56811	52207	69184		15071	39136	35304	194385	82181	94669	69754	44664

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agonus Cataphractus	207	73	64	22	10	3.4	26	5.8	29	11	15	24	21	16	19
Alosa Fallax		0.11			0.92										
Ammodytes Sp.	23	3.8	4.1	9	47	23	28	11	10	25	25	117	25	7.4	50
Buglossidium Luteum	16	2.2	38	47	26	57	71	159	213	412	73	32	34	13	208
Callionymus Lyra	61	18	213	80	1899	277	211	324	407	37	57	18	77	506	148
Clupea Harengus	104	63	171	86	33	39	211	18	37	61	481	319	146	7.5	120
Gadus Morhua	5.8	4.5	2.3	4.9	1.3	1.6	1.2	0.16	0.12	0.8	3.7	2.8	4.6	19	2.4
Gobiidae	1873	227	9406	2707	5000	1585	2520	1602	2845	1589	2517	4538	6484	574	3859
Hyperoplus Lanceolatus	1.4	0.34	1.5	0.48	4.5	5	3.6	5.9	3.8	11	23	6.8	3.4		3.2
Limanda Limanda	808	918	1774	9818	1782	876	1243	541	461	805	1478	655	515	434	614
Merlangius Merlangus	46	117	64	29	38	41	44	20	8.8	35	41	23	31	49	45
Osmerus Eperlanus		0.32	0.36	0.03	2.2		1.2				1.4	8.9	0.57		0.47
Platichthys Flesus	2.3	3.3	6.1	2.7	1.5	4.7	3.6	2.8	2.5	2.7	3	1.9	1.5	0.46	1.3
Pleuronectes Platessa	1817	900	1105	227	450	193	540	318	310	204	218	1121	426	223	420
Solea Solea	497	275	3024	98	96	25	1120	36	29	38	17	108	79	45	99
Syngnathus Sp.	1.9	1.4	2.7	0.75	3	2.4	0.64	1.7	7	42	4	3.8	6.2	2.3	23
Crangon Sp.	106897	23846	119221	22719	35679	21914	26108	34693	22403	40619	44096	45950	46444	12040	35557

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agonus Cataphractus	3.5	16	19	5.7	15	4.9	6.3	13	77	110	26
Alosa Fallax			0.05	0.39		1.4	0.25				
Ammodytes Sp.	8.5	5.8	11	7.2	3.5	23	27	58	32	23	38
Buglossidium Luteum	133	55	32	166	160	116	144	170	126	192	43
Callionymus Lyra	38	58	151	202	101	310	217	85	69	85	43
Clupea Harengus	65	42	121	154	45	108	1237	122	45	14	45
Gadus Morhua	1.1	10	2.8	1.7	6.4	2.6	13	5.9	2.1	2.4	1.2
Gobiidae	2102	797	2436	7073	2511	3004	4303	2232	1389	4524	3072
Hyperoplus Lanceolatus	2	1.1	3.2	9.6	4.8	3.5	1.5	3.6	5.5	3.5	2.5
Limanda Limanda	298	274	223	1320	417	528	199	713	437	1697	188
Merlangius Merlangus	81	164	241	75	130	38	40	273	97	133	105
Osmerus Eperlanus	0.07		1.2	1.6	0.14	1.1	2.1	4.7		1.5	9.9
Platichthys Flesus	2.5	1.2	16	3.1	2.5	0.93	1.5	4.6	5	4.2	4.2
Pleuronectes Platessa	239	414	339	573	398	171	666	193	366	324	676
Solea Solea	29	226	23	62	10	66	23	14	52	45	158
Syngnathus Sp.	3	5.6	68	14	2.4	4.9	76	11	22	8.5	70
Crangon Sp.	39141	16636	28942	47496	21036	29468	46472	13105	35317	57722	48729

German Bight

German Bight (Dutch data)															
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Agonus Cataphractus	25	29	23	31	99	41	38	52	61	45	90	53	170	25	23
Alosa Fallax			0.04	0.8	20										
Ammodytes Sp.	4.2	1.4	7.1	1.7	14	1.2	4.8	15	9.2	9.9	61	22	71	146	45
Buglossidium Luteum	0.88				3.4	0.5	3.3	0.27	2.4	1.1	3.2	12	24	2.8	53
Callionymus Lyra	38	2.3	2.6	63	91	21	8.2	1.7	6.9	19	21	77	18	14	80
Clupea Harengus	20	37	121	27	474	114	26	42	92	51	27	14	18		11
Gadus Morhua	339	637	50	102	13	387	9.6	184	84	27	29	5	53	19	3.3
Gobiidae	499		1097	893	2810	166	914	639	309	1242	968	857	329	598	479
Hyperoplus Lanceolatus	5.5	0.17	3.3	1.2	1.8	0.48	2.9	0.4	0.21	5.6	2.8	0.43	0.38	4.4	0.53
Limanda Limanda	566	709	1150	467	705	979	1112	1391	5299	986	2775	1059	1154	647	346
Merlangius Merlangus	308	287	99	164	104	1158	95	165	594	146	97	42	1814	80	25
Osmerus Eperlanus	6.8	4.1	5.1	30	39	8	2.5	5.7	9.4	11	4.4	8	2.3	4.2	11
Platichthys Flesus	16	14	51	36	32	14	22	2.3	7.7	13	10	6.5	7.1	12	12
Pleuronectes Platessa	338	706	608	1051	1848	1157	596	1945	5444	938	464	626	1021	748	419
Solea Solea	11	134	629	603	52	20	224	335	37	217	28	57	5.3	126	19
Syngnathus Sp.	0.72	1.4	16	8.9	200	4.2		6.4	1.7	14	1.2	9.4		1.8	41
Crangon Sp.	18842	35533	85450	28766	94817	18674	36030	38685	38940	69830	38224	25017	13095	24791	40439

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Agonus Cataphractus	30	92	70	43	26		3	54	61	31	9.5	20	5.2	2	37
Alosa Fallax											1.3		0.07	1.2	
Ammodytes Sp.	26	17	92	50	54		2	8.3	3.5	0.57	0.47	6.2	12	142	12
Buglossidium Luteum	122	44	22		0.62			20	11	1.3	26	4	11	3	35
Callionymus Lyra	56	88	17	0.71	3.5		4	32	55	4	36	59	16	37	53
Clupea Harengus	44	16	34	18	13			9.5	9.4	0.43	4.4	13	0.39	35	6
Gadus Morhua	2.1	26	16	103	4.1			3.4	57	0.21	1.8	12	4.8	5.2	21
Gobiidae	688	456	738	3021	1329		64	1092	1130	581	1022	3007	1781	1476	552
Hyperoplus Lanceolatus	0.14	52	6.9	2.9	0.92			5.1	7.1	0.43	4.1	3.4	1.6	0.83	3
Limanda Limanda	157	173	302	629	203		7	62	345	80	24	393	92	26	325
Merlangius Merlangus	111	396	202	24	11		1	255	808	201	16	55	4.3	11	94
Osmerus Eperlanus	2.1	4.5	24	33	4.5			22	6.3	0.93	7.6	42	39	43	24
Platichthys Flesus	7	5.6	12	3.3	2.4			3.1	2.6	1.1	4.3	2.6	1.7	10	4.7
Pleuronectes Platessa	317	619	152	787	167		6	217	559	78	284	163	103	127	130
Solea Solea	12	57	2.2	26	12			3.2	4.5	11	4.7	2	11	4.1	1.8
Syngnathus Sp.	0.81	11	0.9	11	6.3			108	4.5	163	47	12	28	18	2.2
Crangon Sp.	18740	51177	10671	50790	12052		1568	28703	19071	12105	27057	25414	40865	84103	14800

	2008	2009	2010
Agonus Cataphractus	67	66	15
Alosa Fallax			
Ammodytes Sp.	15	7	20
Buglossidium Luteum	5.6	13	1.5
Callionymus Lyra	36	15	11
Clupea Harengus	42	8.7	46
Gadus Morhua	3	11	3.4
Gobiidae	390	1234	1012
Hyperoplus Lanceolatus	5	1.6	3.1
Limanda Limanda	247	401	15
Merlangius Merlangus	77	96	14
Osmerus Eperlanus		28	176
Platichthys Flesus	4	2.2	3.6
Pleuronectes Platessa	176	456	121
Solea Solea	14	4	3.3
Syngnathus Sp.	13	14	11
Crangon Sp.	24763	28275	38611

German Bight (German data)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Agonus Cataphractus		1.2		7	3	2.1	2.3	1.6	0.68	2.4	2.5	1.9	0.63	2.9	2
Alosa Fallax							0				0.02				
Ammodytes Sp.		0.84			0.06	0.07	0.05	0.18	0.09	0.07		0.2			
Buglossidium Luteum				0.08		0.07	0.04	0.38	0.02					0.05	
Callionymus Lyra		0.64		0.75	0.01			0.78							0.21
Clupea Harengus					0.09		0.05	0.02	0.68	0.73	0.07	0.08	0.2	0.2	0.79
Gadus Morhua				0.25	0.38	0.3	0.99	1.8	1.9	43	0.56	0.73	0.4		0.27
Gobiidae				113	130	7.6	24	7.1	2.7	13	5.3	13	23	7.4	20
Hyperoplus Lanceolatus							0.04	0.09							0.03
Limanda Limanda		2.8		8.8	84	11	27	12	5.1	117	6.5	37	7	3	11
Merlangius Merlangus					2.7	1	3.4	1.2	0.93	0.27	2.1	0.95	0.55	0.2	0.94
Osmerus Eperlanus		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
Platichthys Flesus		0.94		0.83	0.68		1.7	0.19	0.32	0.32	0.84	0.38	0.33	0.6	0.16
Pleuronectes Platessa		106		13	12	3.7	17	13	11	54	12	106	9.1	7.1	55
Solea Solea		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
Syngnathus Sp.		0.08			1.1	0.14	0.69	36	0.18	3.5	0.02	1.1	0.48	0.2	0.13
Crangon Sp.		154		675	3133	1317	5779	582	1023	10169	878	1425	1575	1524	937

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agonus Cataphractus	2.6	8.6	8.3	19	14	7	11	2.2	4.2	16	4	3.3	5.3	1.8	
Alosa Fallax											0.01	0.01		0.1	
Ammodytes Sp.		0.03	0.12	0.08	0.59	0.23	0.03	0.18	0.05			0.24	0.04	0.08	
Buglossidium Luteum		0.17	1.3	0.1	0.16	0.05	2.2	0.64	1.1	5.4	0.56		0.02	0.13	
Callionymus Lyra		0.02		0.29	0.35	1.7	0.4	0.39	0.43	0.07	0.01	0.02	0	0.45	
Clupea Harengus	8.5	1.7	6.4	0.92	1.2	5.2	0.3		1.8	3.2	2	0.16	1.3	1.2	
Gadus Morhua	0.3	0.48	0.25	0.36	0.2	1.1	1.8	0.01	0.01	0.42	0.6	1.1	0.82	0.9	
Gobiidae	24	76	6	12	38	2.8	22	2.8	7.5	15	7.6	35	39	4.4	
Hyperoplus Lanceolatus	0.33	0.21				0.03		0.04	0.02	0.02			0.02	0.06	
Limanda Limanda	38	55	36	59	24	63	100	20	12	28	12	20	16	31	
Merlangius Merlangus	0.51	11	9.9	13	4.9	21	15	0.7	0.82	3.5	3.7	0.92	0.67	6	
Osmerus Eperlanus	0.02	0.47	2.6	10	2.3	0.4	0.28	0.29	0.22	0.52	0.57	0.57	3.7	0.97	
Platichthys Flesus	0.77	0.28	1.1	2.8	0.93	1.1	0.27	0.38	0.07	1.7	0.17	0.1	1.4	0.17	
Pleuronectes Platessa	21	52	80	67	18	40	79	10	10	12	9.4	87	28	5.9	
Solea Solea	1.1	3.4	2.9	10	2.7	2.5	2.5	1.1	0.37	0.44	0.1	2.6	1.1	0.18	
Syngnathus Sp.	1	0.58	0.53	1.3	4.2	0.56	0.18	0.19	9	4.8	0.17	0.29	0.3	0.97	
Crangon Sp.	1471	1712	2806	1388	1359	468	1171	818	727	1494	692	2085	3555	1139	

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agonus Cataphractus	2	4.5	7	1.4	2.4	0.25	0.06	118	1	3.3	9.7
Alosa Fallax		0.02	0.1		0.04	0.09	0.06				
Ammodytes Sp.	0.02	0.08	0.02	0.03		0.05			0.12	0.12	0.02
Buglossidium Luteum	0.78	0.56	0.09	1	3		0.8			0.1	
Callionymus Lyra	2.1	2	1.3	0.79	2.4	0.11	3.8		0.88	1.1	0.02
Clupea Harengus	0.11	1.5	0.75	0.05	0.38	0.07	0.26	1.6	39	0.54	0.57
Gadus Morhua	0.05	1.2	0.01	0.02	0.02	0.03	0.2	5.2	0.07	0.53	0.08
Gobiidae	8.4	11	13	5.9	15	10	27	6	24	5.1	6.2
Hyperoplus Lanceolatus	0.91	0.05	0.02	0.01		0.05	0.06		0.08	0.07	0.04
Limanda Limanda	19	21	5.4	1.7	17	2.3	2.1	4.5	3.7	2.9	0.54
Merlangius Merlangus	1	12	1.2	0.4	0.08	0.04		13	1.7	3.8	1.1
Osmerus Eperlanus	0.68	0.97	1.9	0.68	4.1	2.2	1.6	21	48	4.6	2.9
Platichthys Flesus	0.22	0.12	0.37	0.15	0.18	0.06	0.13		0.59	0.2	1.6
Pleuronectes Platessa	3.3	12	3.6	2.2	4.4	2.7	10	20	15	8.5	20
Solea Solea	0.05	0.13	0.58	0.04	0.08	0.2	0.13		0.07	0.29	
Syngnathus Sp.	0.79	1.8	3.9	7.4	9.9	5.6	3.6	4	27	1.5	4.1
Crangon Sp.	1247	683	1857	1126	2078	2092	6179	4756	3459		

Belgian Coast (Belgian data)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Agonus Cataphractus															
Alosa Fallax															
Ammodytes Sp.															
Buglossidium Luteum															
Callionymus Lyra															
Clupea Harengus															
Gadus Morhua															
Gobiidae															
Hyperoplus Lanceolatus															
Limanda Limanda										150	103	106	47	112	120
Merlangius Merlangus															
Osmerus Eperlanus															
Platichthys Flesus															
Pleuronectes Platessa				8.7	2.3	12	2.7	2.9	8.8	16	8.4	22	7.1	14	6
Solea Solea				26	2.1	49	8.2	6.4	46	390	134	11	76	41	53
Syngnathus Sp.															
Crangon Sp.															

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agonus Cataphractus															
Alosa Fallax															
Ammodytes Sp.															
Buglossidium Luteum															
Callionymus Lyra															
Clupea Harengus															
Gadus Morhua															
Gobiidae															
Hyperoplus Lanceolatus															
Limanda Limanda	152	72	229	312	40	102	26	34	19	43					
Merlangius Merlangus															
Osmerus Eperlanus															
Platichthys Flesus															
Pleuronectes Platessa	62	35	35	36	4.1	23	20	9	5.6	39	61	135	127	86	54
Solea Solea	156	36	18	9.7	8	3.6	44	8.7	9.9	16	26	74	46	86	52
Syngnathus Sp.															
Crangon Sp.															

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agonus Cataphractus											
Alosa Fallax											
Ammodytes Sp.											
Buglossidium Luteum											
Callionymus Lyra											
Clupea Harengus											
Gadus Morhua				0.12			4	10	0.58	0.43	
Gobiidae											
Hyperoplus Lanceolatus											
Limanda Limanda			29	83	93	30	11	343	404	167	
Merlangius Merlangus				74			53	1	223	133	
Osmerus Eperlanus											
Platichthys Flesus										4.7	
Pleuronectes Platessa	48	48	165	74	115	82	33	85	76	121	
Solea Solea	11	190	320	43	234	142	38	39	9.2	111	
Syngnathus Sp.											
Crangon Sp.											

Annex 14 b) Abundance of fish species and *Crangon* sp. for the Wadden Sea.

German/Danish Wadden Sea (German data)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Agonus Cataphractus		0.41	2.7	6.7	19	10	2.1	11	4.4	3.4	10	12	3.9	5.1	2.8
Alosa Fallax						0.05	0.1	0.05	0.17		0.01		0.01	0.01	
Ammodytes Sp.		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
Buglossidium Luteum		0.01	0.01	0.06		0.09	0.05	0.35	0.11						
Callionymus Lyra		0.04	0.07	2.3				1.9		0.04	0.1	0.02	0.07	0.01	0.14
Clupea Harengus		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
Gadus Morhua		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
Gobiidae		1.7	40	40	118	88	57	43	11	29	55	59	57	20	55
Hyperoplus Lanceolatus								0.01		0.03		0.1	0.03	0.01	0
Limanda Limanda		8	9.7	55	121	161	59	157	59	102	205	221	21	23	85
Merlangius Merlangus		0.01	2	1.4	3.3	1.5	2	6.9	5.9	0.89	2.3	3.1	0.94	20	3
Osmerus Eperlanus		0.6	3.2	2.9	3.2	3.5	3.9	21	33	49	24	18	21	9.3	13
Platichthys Flesus		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
Pleuronectes Platessa		26	14	21	80	54	68	139	94	148	139	182	79	99	42
Solea Solea		2.7	5.7	9.9	1.1	10	1.3	11	5.2	67	22	14	2.7	5.4	5.4
Syngnathus Sp.		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
Crangon Sp.		522	7710	3627	8513	11884	6625	5562	7567	17273	13775	6474	7927	3996	5544

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agonus Cataphractus	7.5	7.6	4.4	8.3	16	12	12	9.4	5.1	11	4.5	11	12	6.2	
Alosa Fallax	0.13	0.33		0.02	0.29	0.12	0.01	0.06	0.04	0.2	0.04	0.12	0.03	0.03	
Ammodytes Sp.	0.15	0.23	0.3	0.42	0.59	0.51	0.48	0.13	0.33	0.26	0	0.05	0.21	0.45	
Buglossidium Luteum		0.02	0.28				0.1	0	0.08	1.7	0.12		0.12		
Callionymus Lyra	0.05	0.03	0.15	0.01	0.02	0.04	0.08	0.03	0.07		0.02		0.14	0.38	
Clupea Harengus	22	14	23	8	9.1	14	8.1	6.1	21	9.1	1.3	4.3	5.9	3.1	
Gadus Morhua	2.4	5.3	0.37	1.5	2.2	2.2	3.4	0.45	0.37	3.6	1.1	3.2	4.7	7.7	
Gobiidae	122	94	33	26	145	15	84	141	49	51	5.4	34	115	38	
Hyperoplus Lanceolatus	0.11	0.49				0.09	0.13	0.02	0.34	0.11		0.04		0.07	
Limanda Limanda	91	69	8.1	33	82	42	62	21	4.3	2.8	18	11	20	13	
Merlangius Merlangus	1.3	10	5.3	0.52	4.6	36	20	1.3	1.9	11	1.4	0.51	2.1	27	
Osmerus Eperlanus	8.5	15	14	7.6	15	5.6	9.4	11	7.7	41	21	10	22	18	
Platichthys Flesus	2.9	5.6	5.3	16	14	8.4	7.8	8.6	3.7	29	52	7.7	6.6	3.9	
Pleuronectes Platessa	82	52	43	57	114	91	101	91	48	67	85	167	73	43	
Solea Solea	2.5	8.9	14	15	15	6.6	9.9	9.7	1.9	3.5	7.5	5.9	7	1.7	
Syngnathus Sp.	5.7	9.4	3.3	12	62	8.7	4.4	46	35	133	2.7	0.26	15	7.9	
Crangon Sp.	4611	8903	3938	2041	10161	3057	9539	9116	7463	18576	3617	5923	7420	5426	

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agonus Cataphractus	2.8	2.5	5.3	5.5	2.5	1.9	6.3	71	9.6	8.8	13
Alosa Fallax	0.22	0.03	0.07	0.07	1.1	0.17	5.2	0.05	0.05		0.01
Ammodytes Sp.	0.21	0.28	0.15	0.33	0.19	0.15	1.2	0.72	0.62	0.47	0.04
Buglossidium Luteum	0.01	0.1	0.04	0.22	0.06				0.28		
Callionymus Lyra	1.1	0.71	0.02	0.12	0.16	0.09	0.59	0.12	2.4	0.12	0.05
Clupea Harengus	2.8	6.2	3.6	2.2	6.6	0.79	3.5	85	121	3.5	6.6
Gadus Morhua	0.6	4	0.08	0.05	0.61	0.39	7.1	30	0.75	1	0.58
Gobiidae	47	30	50	61	69	93	151	57	40	83	42
Hyperoplus Lanceolatus	0.02	0.05	0.04	0.05	0.04	0.03	0.14	0.09	0.07	0.06	
Limanda Limanda	4.2	2.6	3.3	0.9	9.5	13	2.7	23	16	17	0.82
Merlangius Merlangus	2.9	52	3	0.75	1.6	0.31	1.5	71	10	11	1.7
Osmerus Eperlanus	15	17	14	22	29	21	64	91	221	45	24
Platichthys Flesus	6.6	11	6.9	3.8	5.8	3.2	28	29	29	9.7	17
Pleuronectes Platessa	36	92	20	39	35	25	248	138	132	94	69
Solea Solea	0.76	0.49	1.1	0.34	0.51	4.2	5.8	5.1	2.4	2.7	
Syngnathus Sp.	16	11	54	28	30	23	2477	28	53	42	17
Crangon Sp.	6755	3786	7253	7815	6768	12892	57778	13820	18089		

Annex 14 c) Abundance of fish species and *Crangon* sp. for the Scheldt estuary.

Scheldt estuary (Dutch data)															
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Agonus Cataphractus	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
Alosa Fallax		0.03													
Ammodytes Sp.		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
Buglossidium Luteum							0.04								
Callionymus Lyra	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
Clupea Harengus	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
Gadus Morhua	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
Gobiidae	220	182	103	260	110	277	231	66	127	312	591	345	270	206	478
Hyperoplus Lanceolatus	0.35	0.03		0.2			0.1		1	0.29	1.4				1
Limanda Limanda	75	17	11	26	224	36	9.3	164	245	75	314	97	43	103	317
Merlangius Merlangus	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
Osmerus Eperlanus	2.8	2.4	0.21		0.33		0.17	0.04	0.1		0.04	0.15		0.04	
Platichthys Flesus	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
Pleuronectes Platessa	75	42	30	75	44	73	33	70	99	49	154	97	73	164	198
Solea Solea	126	52	3.7	46	16	20	9.9	25	57	67	216	52	38	55	91
Syngnathus Sp.	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
Crangon Sp.	10614	11423	8942	14466	7606	7641	9708	3107	5125	14866	11725	7159	8750	10838	15390

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agonus Cataphractus	1.2	12	6.8	2	1.3	2.5	3.2	0.84	0.2		0.78	0.51	4.5	3.7	0.59
Alosa Fallax		0.04			0.03						0.03				
Ammodytes Sp.	1.1	1.6	0.18	2.7	0.11	1.3	2.2	0.29	0.23	0.48	0.27	2.3	1.5	1.8	0.53
Buglossidium Luteum															
Callionymus Lyra	2	8.5	5.3	7.3	2.4	10	0.71	0.98	1.3	8.3	5.2	5.7	0.87	10	3
Clupea Harengus	16	79	25	30	2.7	24	14	48	2.3	58	0.08	4.9	66	28	13
Gadus Morhua	3.4	0.63	1.2	2	0.03	0.07	0.26			0.3	0.06	0.31	0.31	2.1	0.48
Gobiidae	171	262	466	244	138	122	477	230	99	316	63	57	218	228	95
Hyperoplus Lanceolatus	0.15	0.23	0.1	0.48	0.33	0.03	0.32	0.57	0.18	0.03	0.37	0.71	0.4	0.26	0.14
Limanda Limanda	23	330	169	568	11	46	69	22	5.4	9.7	35	33	7.5	45	24
Merlangius Merlangus	6.5	19	9.5	3	0.27	1.3	1.2	4.2	0.95	0.48	0.08	8.2	1.6	7.6	4
Osmerus Eperlanus						0.03				0.12		0.03	0.29	0.46	0.09
Platichthys Flesus	6.4	6.4	5.8	2.2	1.4	0.67	1.5	8.7	1.1	2.3	6.8	12	2	1.7	1.3
Pleuronectes Platessa	111	468	265	432	45	145	34	52	27	53	60	140	61	146	60
Solea Solea	22	25	66	27	3.1	22	12	13	11	5.1	14	29	19	13	16
Syngnathus Sp.	0.94	11	3	0.56	0.34	4.1	3.2	1.6	0.75	0.26	0.3	0.38	0.77	4	1.2
Crangon Sp.	7408	22133	11622	5238	4936	1501	5102	17142	2206	7518	1185	3628	4243	1341	1616

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agonus Cataphractus	5.7	1.9	1.7	1.2	0.83	1.4	0.26	0.32	0.21	0.34	4
Alosa Fallax											0.06
Ammodytes Sp.	1	0.55	0.47	0.38	2.5	1.2	1	0.39	0.7	0.33	3.1
Buglossidium Luteum						0.51					
Callionymus Lyra	14	7.3	12	3.7	3.9	4.5	6	1.5	0.29	0.35	0.28
Clupea Harengus	44	147	80	116	26	10	40	39	77	40	26
Gadus Morhua	0.05	0.25	0.51	0.06	0.05	2.1	0.58	0.71	0.34	0.14	0.1
Gobiidae	276	209	212	78	251	167	200	188	71	86	107
Hyperoplus Lanceolatus	0.32	0.21	0.05	0.15	0.17	0.29	0.37	0.35	0.35	0.47	0.46
Limanda Limanda	61	37	19	2.4	10	13	0.07	28	5.2	18	1.4
Merlangius Merlangus	1.1	3.8	0.14	1.5	1.8	4.4	0.77	5.6	3.8	1.7	2.7
Osmerus Eperlanus	0.37	0.29	0.05	0.17	0.2	0.06	0.14	0.17	0.3	1.3	4.1
Platichthys Flesus	1.9	8.4	5.7	3.1	3.7	1.1	1.4	15	33	24	20
Pleuronectes Platessa	97	90	45	122	79	92	64	95	104	62	80
Solea Solea	46	49	27	16	12	48	12	47	38	28	16
Syngnathus Sp.	2.6	0.97	0.64	1.7	0.79	2.9	2.5	0.39	0.3	0.6	5.6
Crangon Sp.	1588	4825	2003	1796	1203	3957	2086	1485	1562	3574	6762

Annex 14 d) Abundance of fish species for the UK coastal waters.

UK Coast (UK data)											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agonus Cataphractus	13	7.9	12	7.4	4.8	3.7	3.5	7.3	8	12	4.5
Alosa Fallax				0.03							
Ammodytes Sp.					0.04	0.07	0.14		0.8		0.04
Buglossidium Luteum	0.76	0.18	0.19	0.13	0.12	1.7	0.14	0.71	1	2	0.19
Callionymus Lyra	9.2	4.9	6.4	5.7	12	8.8	4.1	13	11	4.9	0.73
Clupea Harengus	0.74	0.64	0.68	0.5	0.63	0.33	0.5	0.35	2.2	0.28	
Gadus Morhua					0.35	0.48	1.8	0.05		0.08	
Gobiidae	172	0.12	0.66		0.07	0.02			306	433	70
Hyperoplus Lanceolatus											
Limanda Limanda	14	101	31	50	104	9.7	28	42	38	16	9.5
Merlangius Merlangus	24	13	6	5	8	12	7.4	6.3	6.3	5.1	2.7
Osmerus Eperlanus	1.8	0.11	0.06	1.1			0.78		0.26	0.66	0.02
Platichthys Flesus	2.4	1	0.81	2.2	2.4	1.6	1.3	0.33	1.4	2.3	0.06
Pleuronectes Platessa	31	97	53	43	83	21	70	54	32	18	4.7
Solea Solea	46	84	69	26	63	40	53	72	58	46	6.5
Syngnathus Sp.	79	36	24	44	22	27	57	11	14	42	0.16
Crangon Sp.											

Annex 15: Population abundance indices for sole and plaice, inshore surveys

Annex 15.1. Indices of juvenile sole abundance from inshore beam trawl surveys.

a) 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).

	UKYFS (VIId)		UKYFS (IVc)		Netherlands DFS		Belgium DYFS		Germany DYFS		International (IV)	
Age	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	0.2	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	0.1	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	14.2	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	0.8	2.14	1.28	104.38	20.32
1984	4.33	4.04	59.84	11.3	9.18	0.26	5.49	0.8	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	5.2	0.47	0.55	0	59.62	3.99
1997	4.23	1.12	14.87	4.91	2.17	0.31	1.4	0.82	0.03	3.3	44.08	19.02
1998	7.97	1.12	37.99	2.12	*		3.63	2.7	0.18	0.32		
1999	2.63	1.47	19.02	7.67	*		2.13	0.43	0.10	0.25		
2000	1.16	2.47	13.54	9.76	0.59	0.03	0.56	0.1	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	6.1	1.33	0.99	*	46.81	*
2006	3.09	2.21	17.56	5.69	0.50	0.16	0.35	2.54	0.12	*	14.69	*
2007	*	*	35.93	3.67	0.49	0.02	1.7	0.23	0.05	*	23.51	*
2008	*	*	28.70	8.40	1.02	0.01	0.47	0.06	0.02	*	26.74	*
2009	*	*	20.30	3.40	1.05	0.04	**	**	0.31	*	39.59	*
2010	*	*	17.99	7.75	2.43	0.04	**	**	0.024	*	58.40	*

*** No (valid) survey**

**** Data not yet available, for international index 2008 values taken**

b) 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	903	1831	113	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	525	864	177	18	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	1128	7547	379	195	0	31
2003						
2004	162	1370	624	393	69	53
2005	305	568	163	124	0	21
2006	16	2726	117	25	30	0
2007	467	849	911	33	40	14
2008	755	1259	259	325	0	10
2009	2291	1932	344	62	103	0
2010	334	2637	237	67	42	23

Annex 15.2. Indices of juvenile plaice abundance from inshore beam trawl surveys.

a) 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).

	UKYFS (VIId)		UKYFS (IVc)		Netherlands DFS		Belgium DYFS		Germany DYFS		International (IV)	
Age	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	0.01				
1974					2.23	2.32	0.01	0.3	14.38	5.38		
1975					4.35	3.63	1.12	0.02	9.02	10.31		
1976					7.76	4.64	0.18	0.08	37.09	2.22		
1977					3.98	7.25	0.13	0.17	39.12	19.74		
1978					8.06	3.90	1.47	0.13	26.37	10.94		
1979					18.09	8.98	1.49	0.63	22.21	14.61		
1980					5.85	11.13	0.11	0.59	21.48	35.06		
1981	0.55	0.11	59.24	5.95	29.90	8.57	1.69	0.11	34.3	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	1.6	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	1.8	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	0.7	27.8	12.90	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	0.2	4.72	12.03	351.59	137.08
1993	5.77	0.64	43.10	7.96	13.49	3.80	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	1.2	0.26	11.19	5.48	6.37	10.94	2.02	4.46	16.67	10.71	149.19	209.92
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	*	*	1.2	1.79	2.94	1.07	*	
2000	0.29	0.72	10.57	4.82	9.30	0.17	1.48	1.1	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	2.9	210.70	17.79
2003	8.2	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	0.21	9.89	4.33	6.55	0.10	4.35	0.3	2.68	*	129.25	*
2006	2.63	0.33	37.13	3.96	11.79	0.19	1.24	0.79	4.00	*	232.28	*
2007	*	*	56.82	1.04	6.88	0.12	4.63	0.26	5.41	*	175.65	*
2008	*	*	22.90	3.40	9.52	0.09	4.24	0.76	2.23	*	186.87	*
2009	*	*	14.20	1.40	11.62	0.17	**	**	9.05	*	235.55	*
2010	*	*	15.58	2.33	9.19	0.06	**	**	15.6	*	200.47	*

*** No (valid) survey**

**** Data not yet available, for international index 2008 values taken**

b) 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	10780	4478	89	84
1973	7183	65643	5133	1578	461	15
1974	2568	15366	16509	1129	160	82
1975	1314	11628	8168	9556	65	15
1976	11166	8537	2403	868	236	0
1977	4372	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	6472	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	17344	95901	4473	497	32	0
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	31202	30809	1103	265	65	69
2003						
2004	13537	18202	1350	1081	51	27
2005	27391	10118	1819	142	366	8
2006	51124	12164	1571	385	52	54
2007	40581	14175	2134	140	52	0
2008	50179	14706	2700	464	179	34
2009	53259	14860	2019	492	38	20
2010	49347	11947	1812	529	55	10

*** No survey**

Annex 16: DYFS to DATRAS workshop 6-6-2011

The suggestions made in the text below, are also supplied to ICES Data Centre as an Excel file.

HH fields

Quarter:

As the DYFS is an autumn survey, some of the samples are in the 3rd and some in the 4th quarter. For this, there is a strong wish to upload all data in the same file. As DATRAS cannot handle two quarters in the same file, it is recommended that 'quarter' is considered as a fixed value for a specific survey, and not create an error message when the month is outside the quarter.

Country:

ICES Data Centre explained that discrepancies in country codes between different databases will be solved in due time, when ICES Data Centre will move to ISO codes for country.

Countries involved in DYFS are BEL, ENG, GFR and NED.

Ship:

Country	Ship	Code	Source
BEL	Broodwinner	11BR	SHIPC_SeaDataNet
ENG	**various commercial vessels**		
GFR	**various commercial vessels**		
NED	Isis	ISI	TS_Ship
NED	**two commercial vessels (historical data)**		
NED	Stern	64ST	SHIPC_SeaDataNet
NED	**Schollevaar**		

The ships that do not have a code (in **bold**), should be added by the responsible country via http://www.ices.dk/Data Centre/requests/Login.aspx It is recommended that a call sign or IMO number is added to guarantee unique values.

Gear:

It was decided by the group to put the gears used under the 'beam trawls' and not to take push nets into account.

Country	Gear	Ship
BEL	BT6	Broodwinner
ENG	BT2	
GFR	BT3	
NED	BT6	Isis and 2 commercial vessels (coastal zone)
NED	BT3	Stern, Schollevaar (Scheldt estuary and Wadden Sea)

Stratum:

As the DYFS indices are weighted by DYFS area codes, WGBEAM should supply a table to ICES Data Centre containing the total m^2 per stratum.

The stratum list is:

Country	Stratum	Comment
BEL	400	Coastal zone
GFR	405, 406, 410, 411, 412, 414	Coastal zone and Wadden Sea
NED	401, 402, 403, 404, 405	Coastal zone
NED	610, 612, 616, 617, 618, 619, 620	Wadden Sea
NED	634, 638	Scheldt estuary
ENG	1-21, 71	see Excel file for description

Statrec:

As statrec is not recorded by all countries, the survey is not stratified by statrec and the risk of extrapolation of inshore data to the complete statistical rectangle by inexperienced users is high, this should not be a mandatory field.

HaulVal:

It was decided that V (valid), I (invalid) and A (additional) are allowed values for this field.

StdSpecRecCode:

Originally, the survey was set up for 0 and 1-year old plaice and sole, and for brown shrimp. Those are the standard species (to be used for index calculation).

BycSpecRecCode:

Additional options:

- open ended fish list and no benthos, except for shrimp (mainly ENG)
- closed fish list (commercial species) and no benthos, except for shrimp (BEL)
- (commercial species include sharks, rays, cod, whiting, gurnards, horse mackerel, mackerel, turbot, brill, dab, plaice, flounder, lemon sole, sole)

It is recommended that WGBEAM provides a closed benthos list for the DYFS, in order to use BycSpecRecCode 6 for fully sampled hauls.

Rigging:

In the DYFS, the rigging is different from the other beam trawl surveys. The existing combination, are:

Country	Rigging
BEL	Bobbin, mixed metal-nylon groundrope
ENG	Tickler
GFR	Bobbin, nylon groundrope
NED	Bobbin, tickler, chain groundrope

Additional fields:

Country	Unit	Range
Tidal phase	mins before next high tide	0-780
Tide speed	m/s	0-4
Mesh opening codend	mm	4-24
Secchi depth	m	0-5
Turbidity	NTU	200-2000

2) HL fields

SpecCode:

ICES Data Centre will change to WoRMS coding system from 3rd quarter 2011 onwards. It is therefore recommended that ICES Data Centre as soon as possible provides a list of species that are currently in DATRAS, containing the scientific name, the TSN code and the WoRMS code, to all data submitters.

SpecVal:

It is recommended that when 5 is reported for this field, -9 is allowed in nomeas and totalno.

Additional requests:

Value	Description
6	Only volume (litre) registered
7	Only weight (gram) registered

LngtCode:

It is recommended that WGBEAM incorporates the description from the IBTS manual in the DYFS and BTS manual.

Additional fields:

Description	Unit	Options
Maturity	no	B (Berried, for crustaceans)
		E (Egg, for elasmobranchs)

As a result, the option B (Berried) could be deleted from the TS_SexCode

3) CA fields

Area type:

Add 2 new area types: DYFS continental index areas and DYFS ENG index areas

Area code:

See stratum list

Plus group:

Will be used in this format.

Additional fields:

As GFR data are aged based on length, and the other data by otolith reading, it would be useful to be able to track the age determination method.

Description	Coding
Age determination method	AGDET

4) Field checks

Demersal Young fish survey (DYFS-DATRAS): new or updated field checks, change of error type as adopted by WGBEAM inshore 06-06-2011

The original checks were derived from BTS-DATRAS. If no comment made, the BTS-DATRAS checks can be used.

Explanation of colour-coding:

Blue: change in check description or error type

Green: add check (derived from NS-IBTS < 2004)

Pink: add check (newly created)

Red: delete check

Yellow: recommendation in WGBEAM 2011 report

Field Checks: HH Haul Information

Position	Field	Check Description	Error Type
2	Quarter	Quarter is not consistent with Month	warning
16	HaulDur	Not in the range specified Lower: 5.000000000000 Upper: 30.000000000000	warning
18	ShootLat	Not in the range specified Lower: 50.000000000000 Upper: 56.500000000000	warning
18	ShootLat	The position is recorded on land	warning
18	ShootLat	There is no statistical rectangle matching the hauling position	warning
19	ShootLong	Not in the range specified Lower: -4.000000000000 Upper: 9.000000000000	warning
20	HaulLat	Not in the range specified Lower: 50.000000000000 Upper: 56.500000000000	warning
20	HaulLat	The position is recorded on land	warning
21	HaulLong	Not in the range specified Lower: -4.000000000000 Upper: 9.000000000000	warning
23	Depth	Not in the range specified Lower: 2.000000000000 Upper: 35.000000000000	warning

31	Tickler	Not in the range specified Lower: 0.000000000000 Upper: 3.000000000000	warning
32	Distance	Not in the range specified Lower: 250.000000000000 Upper: 4000.000000000000	warning
32	Distance	If -9 then groundspeed cannot be -9	error
33	Warplngt	Not in the range specified Lower: 10.000000000000 Upper: 100.000000000000	warning
44	Ground-Speed	Not in the range specified Lower: 0.800000000000 Upper: 4.000000000000	warning
45	SpeedWater	Not in the range specified Lower: 0.800000000000 Upper: 4.000000000000	warning
51	WindSpeed	Not in the range specified Lower: 0.000000000000 Upper: 20.000000000000	warning
53	SwellHeight	Not in the range specified Lower: 0.000000000000 Upper: 2.000000000000	warning
55	BotTemp	Not in the range specified Lower: 1.000000000000 Upper: 30.000000000000	warning
56	SurSal	Not in the range specified Lower: 8.000000000000 Upper: 40.000000000000	warning
57	BotSal	Not in the range specified Lower: 8.000000000000 Upper: 40.000000000000	warning

Field Checks: HL Length frequency distribution

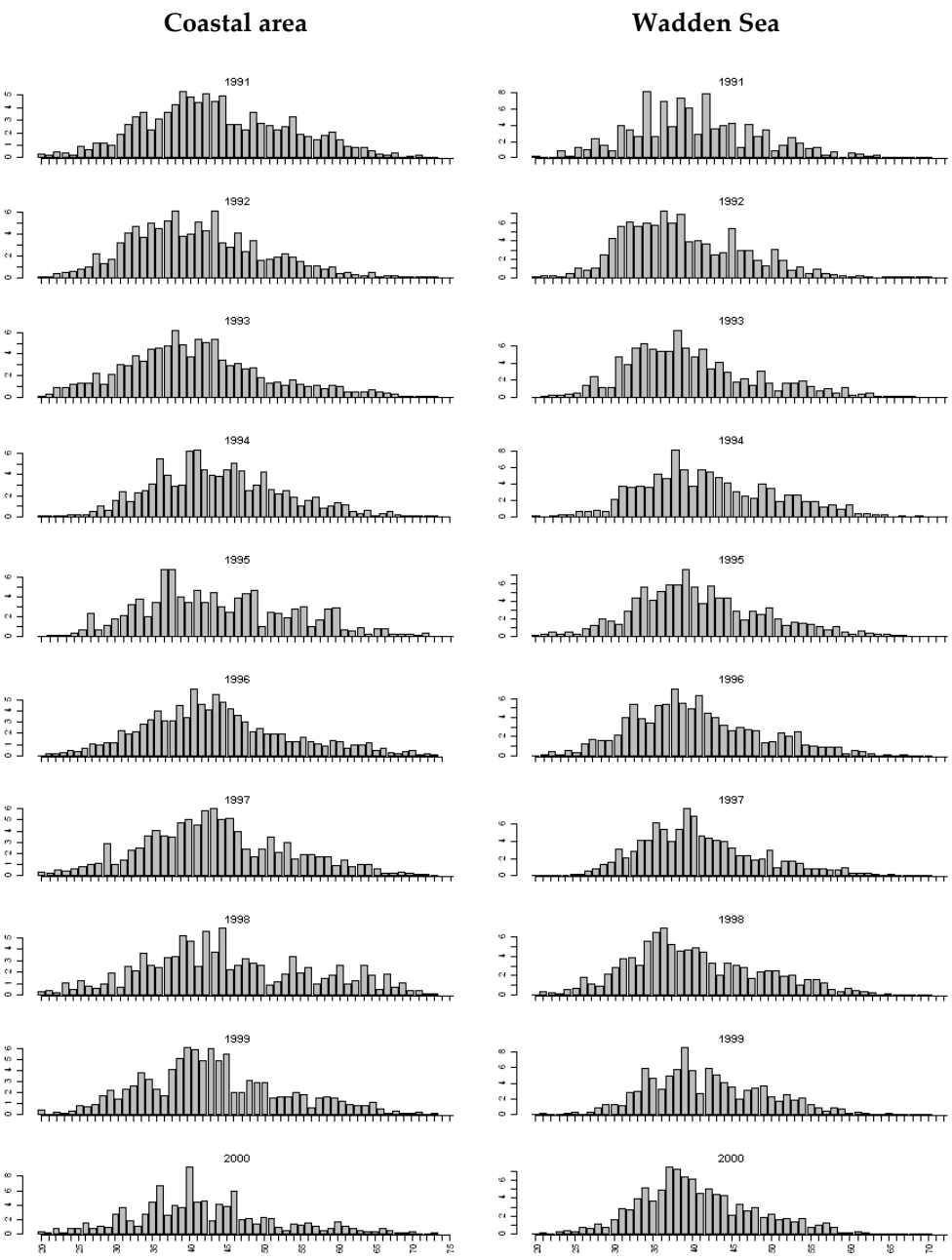
Position	Field	Check Description	Error Type
22	LngtCode	A length plus group is found - the LngtCode must therefore be 9	error

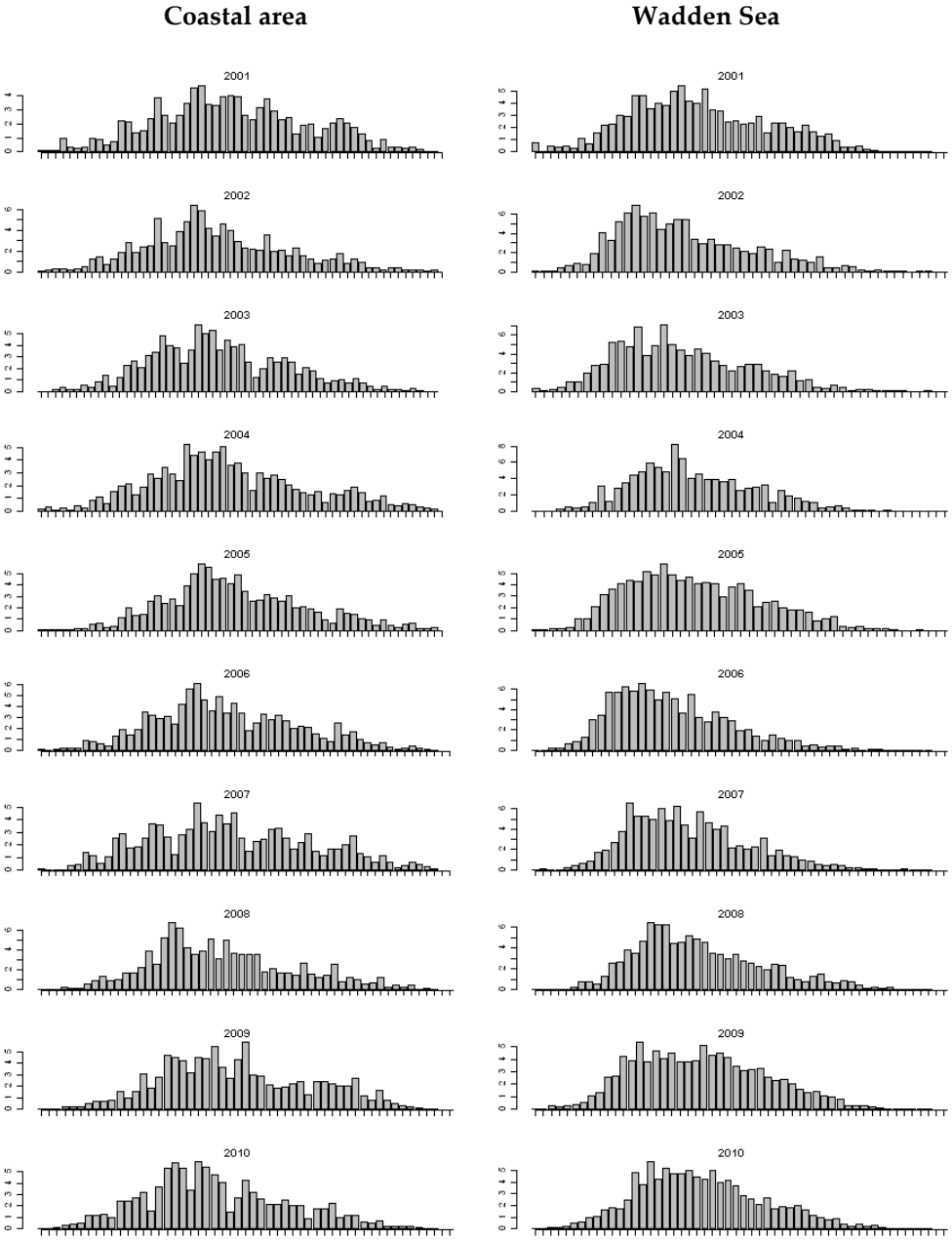
Field Checks: CA SMALK

Position	Field	Check Description	Error Type
16	LngtCode	A length plus group is found - the LngtCode must therefore be 9	error
17	LngtClass	Not in the range specified Lower: 1.00000000000 Upper: 500.000000000000	warning
20	PlusGr	Not used in this format	error
20	PlusGr	Per haul, species and length class only the oldest age group can be PlusGr	error

20	PlusGr	If a plus group is defined per haul/area and species then all records for this species with age => than the plus group must contain the plus identifier	error
21	AgeRings	Not in the range specified Lower: 0.000000000000 Upper: 9.000000000000	warning
23	IndWgt	Not in the range specified Lower: 1.000000000000 Upper: 1000.000000000000	warning

Annex 17 Length frequencies of shrimp, Dutch data 1991-2010




Coastal area
Wadden Sea
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

Annex 18: ICES WGBEAM inshore beam trawl survey staff exchange by the participation Cefas in the vTI Demersal Young Fish Survey (DYFS) Gary Burt (Cefas), October 2010

1. Introduction

During the 2010 meeting of the ICES Working WGBEAM it was agreed that a member of Cefas (England) staff would participate in a staff exchange with vTI (Germany) and RIVO (Netherlands) for the inshore beam trawl surveys. A staff exchange was successfully organized for Cefas staff to participate in two of the three days, for the part of the German survey that was undertaken by FV Gerda-Bianca (ACC1) that sails from Dornumersiel. Unfortunately it was not possible to coordinate an exchange with the Dutch, aboard RV Stern, to coincide with the German survey because of the logistical limitations of both surveys, Cefas staff availability as well as financial constraints.

This report describes only the observations made when participating in the part of the German survey that was based from Dornumersiel, whilst at the same time comparing it to the Cefas survey. The report describes the surveys in some detail, much of which is not necessarily scientifically relevant, in an attempt to anticipate some of the questions that individuals directly associated with the surveys would have. It is hoped that the dissemination of information by staff involved with the exchange to both colleagues in their own institutes and their counterparts in the other countries will help us all to better understand the surveys from an international perspective.

2. Survey background

2.1 vTI Demersal Young Fish survey (DYFS)

History of the survey

The sampling records date back to 1971-1977, depending on the sampling location. Since 1977, four regions were regularly sampled: East Frisia (from Accumersiel), Elbe estuary (from Cuxhaven), Schleswig-Holstein (from Büsum and Husum). In 2005, a new series for the Weser-Jade estuary (from Wremen and Dorum) was initiated. The trips cover the respective estuary, or the local tidal channels plus an adjacent area seawards of the island chain. At present, the survey is conducted only in autumn (end of August to beginning of October). A parallel series in spring (April-May) was abandoned after 2004, following the other countries.

History of the survey gear

Gear rigging has remained unchanged except for replacing wooden with rubber rollers. Presumably, the netting material available changed properties through time.

Survey design

Chartered shrimping vessels are employed throughout, differing between locations and changing through time. Boats are different in size, typically between 12 and 18m length. About 150 stations are covered per year. Fishing is mostly done during daytime (with the exception of Cuxhaven/Elbe). Survey design has changed through time from fixed-number, fixed stations to variable stations with attempted optimum coverage of tidal channels, creeks and depths.

2.2 CefasYoung Fish survey (YFS)

History of the survey

Studies in the early 1960s of coastal waters around England and Wales have shown their importance as inshore flatfish nursery grounds, in particular for plaice and sole. More extensive surveys were undertaken during the 1970s to evaluate the extent of these populations and from 1981 onwards the survey was conducted annually. The extent of the area covered by the survey has changed over this period and has been more extensive than the present study area. The survey once covered the English coastline from Flamborough Head on the northeast coast to Portland Bill on the south coast, as well as Morecambe Bay for a short while.

History of the survey gear

The beam trawl has been rigged the same through-out the duration of the survey. In addition a 1.5m push-net, designed to have similar efficiency and selectivity, was operated at the low water mark in water depths less than 1m. The use of the push-net ceased in 1999.

Survey design

Small inshore fishing vessels are chartered for the survey. The survey is carried out by two teams of scientific staff, one surveying the area between the River Humber to the north Norfolk coast and the other, the Greater Thames Estuary. For the survey the coast is divided into sectors, referred to as mini-areas, which are based on geographic features, and within these fixed prime stations are fished annually between late August and early September. Furthermore, each fixed station is permanently assigned to a stratum based on the chart depth. 161 fixed stations are fished, during the hours of daylight, 81 for the River Humber to the north Norfolk coast and 80 for the Thames Estuary. It is intended for all stations to be fished although no core stations have been identified that require to be completed for the calculation of any indicies.

3. Travel and sailing narrative (all times are central European summertime)

Cefas staff sailed on the overnight car ferry from Harwich to the Hook of Holland, Netherlands and arrived at Dornumersiel 14 September at 14:30. This coincided with the docking of FV Gerda-Bianca that presented the opportunity to meet with scientific staff, Gitta Hemken and Thomas Kehlert from vTI, and the skipper and crew of FV Gerda-Bianca.

The next day FV Gerda-Bianca left Dornumersiel harbour at 07:00 in moderate to rough conditions. Although the wind was a strong force 6 to 7 the conditions aboard the vessel were relatively good because the direction of the wind was southwest that was off the land.

Over the course of the day seven hauls were completed, one of which was deemed to be invalid. Stations were primarily fished south of Langeoog Island. The vessel returned to port at 14:00.

On 16 September FV Gerda-Bianca left port at 08:30 in moderate to calm conditions. The wind was southwest force 5. A further eight stations were successfully fished that were located primarily at the same locations as the previous day, although two stations were fished between Baltrum and Langeoog Islands in much rougher conditions without the protection of the land from the wind. FV Gerda-Bianca arrived back at its port at 14:30, after which scientific staff and the crew proceeded to unload equipment and gear off the vessel that would be transported back to the institute the

following day. During the evening scientific staff were kindly invited to the skipper's house for hospitality.

On both days the survey areas were reached approximately in about an hour after leaving Dornumersiel harbour. It was not possible to survey any of the stations situated outside the islands because of swell.

Cefas staff began their return journey to the UK, via the Harwich to Hook of Holland ferry the next day.

4. Port and vessel

Dornumersiel is a North Sea fishing port, situated in northwest Germany. During the time spent at the port, nine vessels were counted, all of which were between approximately 15 and 20m in length. All of the vessels were rigged to catch common shrimp (*Crangon crangon*), which is the predominant fishery for German vessels operating in the North Sea. Access to the harbour is tidal. FV Gerda-Bianca is a 16.5m shrimp boat that deploys twin 9.5m beam trawls (Figure 1a). The vessel was built in 1986, was skippered by Tom Caspers and appeared to be in excellent condition. The Caspers family have been associated with the survey for the last 30 years.

The English survey charters small inshore vessels that have a length of 10m, or thereabouts (Figure 1b). The vessels are either accessed from a commercial fishing harbour, a mooring situated within a small creek or a jetty. Two of the vessels are restricted by the tides, whereas the other is able sail at anytime because of its deep water mooring, which is accessed by means of small rowing dinghy. For one of the vessels, based at Gibraltar Point, Skegness it is not possible for the vessel to sail at all on low neap tides. Similarly to the charter of FV Gerda-Bianca, the skippers used to charter vessels by Cefas have had a long-standing vested interested in the survey, one of whom has been involved in the survey for the last 30 years too.

5. Team structure

Both the German and English surveys employ a team of two scientific staff, one of whom is appointed as the lead scientist. However, when resources are available the German team engages an additional member of staff. The skipper of FV Gerda-Bianca was supported by a deck hand, which is the case for the English survey, although for one of the chartered vessels the skipper runs the vessel single-handed. The sequencing of stations each day is largely at the discretion of the experienced skippers.

6. Logistics and daily routine

Fishing gear and scientific equipment was transported from the institute using a trailer that was driven to the port by a dedicated driver. The 3m beams could be broken into three sections and the shoes removed for ease of transportation. The gear and equipment was loaded on-board the vessel the day before sailing and collected the day after. Scientific equipment was stored in strong aluminium watertight storage boxes. FV Gerda-Bianca left and returned to port each day for which scientific staff based themselves at a local hotel, each night, for the duration of the survey. Staff supplied their own food for the day, as meals weren't prepared on-board, although hot drinks were.

The logistics and daily routine for the Cefas survey is virtually identical with the German one. The only significant difference is that the gear and equipment is transported by scientific staff in a transit van, which is hired for the duration of the survey. There are no toilet facilities aboard the English vessels, although there was one on FV

Gerda-Bianca. It is worth noting that the Cefas survey is reliant on relatively good weather, where it is possible for delays of up to a week when weather conditions are not favourable for sailing. For the English survey on occasions there are long steams involved that can be as long as three or four hours, before the day's survey area is reached.

7. Deck layout

The size of the vessel allowed scientific staff to process the catch whilst standing at a purpose built sorting table (Figure 2a). There was also ample room, for a POLS balance that was sheltered in a wooden box, powered from the vessels power supply. A tarpaulin was erected over the scientific work area that provided good protection from the elements. Scientific staff had free access to the wheelhouse, which was available for a lap-top computer, linked to a GPS (powered by a car battery), to be set up. A table was also available for the completion of paperwork, if necessary. Meal and drink breaks were taken in the wheelhouse.

The working environment aboard the vessels chartered by Cefas contrasts significantly to that of FV Gerda-Bianca (Figure 2b). Cefas staff remain very much open to the elements, although for one of the chartered vessels limited covered protection is available. Scientific equipment is stored in the fish-hold of the vessels, one of which can be used by staff to shelter from the weather when there are long steams involved. There is no / limited access available to the wheelhouses, primarily due to a lack of space. It is not possible for Cefas staff to stand-up aboard the vessels to process the catch because of the lack of space, the stability associated with a small vessel and the relatively low height of the gunnels. Catches are processed by either sitting on the deck that is stepped, on fish / equipment storage boxes or by kneeling.

8. Gear and gear deployment

The vTI survey uses a single 3m beam trawl rigged as a shrimp trawl with a roller chain and no tickler chain (Figure 3a). The codend mesh opening is 20mm. The gear was towed, for a duration of 15 minutes, using the vessel's steel warp at a speed of 3 knots, usually with the tide. FV Gerda-Bianca deployed the gear from the starboard side.

Cefas uses a light 2m wooden beam trawl rigged with three tickler chains and a 4mm mesh liner (Figure 3b). It is towed for 10 minutes from the stern of the vessel with a rope warp at a speed of 1 knot, again with the tide. The slow speed means that at times the vessel is out of gear and on occasions, when the tide is strong enough, the vessel will drift with the tide that will cause the warp to be at right angles to the vessel.

9. Catch composition

Compared to the English Survey the observed catch compositions were relatively "clean" and were relatively consistent, although the bulk varied. At every station the catch was dominated by shrimp that was virtually all common shrimp (*Crangon crangon*) with the occasional occurance of pink shrimp (*Pandalus montagui).* No groved shrimp (*C. allmanni*) was observed, although this would not be confirmed until the shrimp sample was processed back at the laboratory (see processing of the catch, later).

The most commonly encountered epibenthic species were swimming crab (*Liocarcinus holsatus*) and shore crab (*Carcinus maenas*), that were caught at most, if not every

station. Common starfish (*Asterias rubens*) were also caught in reasonable numbers at some of the stations. Only a few other species occurred that were all relatively infrequent. A variable amount of broken shell was encountered in the catch.

The English catches comprised of a far greater epibenthic component and more bottom substrate, which is to be expected given the greater amount of contact the gear has with the bottom. The catches can be quite variable in terms of both composition and bulk, for example some of the catches can be less than a litre, whereas on some occasions the net can fill with common starfish, green sea urchin (*Psammechinus miliaris*) or sea potatoes (*Echinocardium* spp.). The dominant epibenthic species at each station varies (Table 1). Although common shrimp is the most common dominant species the catch rates are a lot lighter and in a lot of cases negligible. For the Cefas 2009 survey, the shrimp catch was <1l for about 75% of the stations.

Table 1. The most dominant epibenthic species encountered at each station during the Cefas 2009 survey, shown as a % of the total number of stations sampled.

Species	
Common shrimp *Crangon crangon*	31%
Brittlestars (*Ophiura albida, O.ophiura*)	16%
Common starfish Asterias rubens	13%
Shore crab *Carcinus maenas*	11%
Green sea urchin *Psammechinus miliaris*	9%
Curly weed *Alcyonidium diaphanum*	5%
Swimming crabs *Liocarcinus* spp.	3%
Hornwrack *Flustra foliacea*	3%
Hydroids	3%
Sea Potatoes *Echinocardium* spp.	2%
Brittlestar *Ophiothrix fragilis*	1%
Sabellaria spp.	1%
Abra spp.	1%
Slipper limpet *Crepidula fornicata*	1%
Common cockle *Cerastoderma edule*	1%
Hermit crabs Pagurus spp.	1%
Pink shrimp Pandalus montagui	1%
Total number of stations	**160**

The main fish species caught, whilst aboard FV Gerda-Bianca, in roughly descending numbers were flounder (*Platichthys flesus*), plaice (*Pleuronectes platessa*), sand goby (*Pomatoschistus minutus*), Nilsson's pipefish (*Syngnathus rostellatus),* smelt (*Osmerus eperlanus*), bull rout (*Myoxocephalus scorpius*), pogge (*Agonus cataphractus*), eel-pout (*Zoarces viviparus*) and sole (*Solea solea*). Other species noted but in smaller numbers included sea snail (*Liparis liparis*), whiting (*Merlangius merlangus*), tub gurnard (*Trigla lucerna*), butterfish (*Pholis gunnellus*), dab (*Limanda limanda*), five-bearded rockling (*Ciliata mustela*), lemon sole (*Microstomus kitt*) and cod (*Gadus morhua*). The fish species observed whilst aboard FV Gerda-Bianca were similar to those that occur in the Cefas survey, although the occurrence and abundance of some species is very different. For the 2009 surveys (Table 2), six of the top ten species were common to both surveys. *Pomatoschistus* species were very abundant for both surveys, although the length of fish caught during the Cefas survey were smaller compared to those caught during the German survey.

An example of a catch composition for the vTI and Cefas surveys is provided in Figures 4a and b, respectively.

Table 2. The top ten species/taxa caught by number for (a.) the German and (b.) the English 2009 surveys [(1)]. Species common to both surveys are highlighted

(a.)		(b.)	
Species	**No.**	**Species**	**No.**
Pleuronectes platessa	5911	*Pomatoschistus* spp.	9536
Pomatoschistus minutus	5240	*Syngnathus rostellatus*	1142
Osmerus eperlanus	3112	*Solea solea*	923
Syngnathus rostellus	2400	*Pleuronectes platessa*	394
Limanda limanda	1353	*Limanda limanda*	293
Merlangius merlangus	1216	*Agonus cataphractus*	282
Agonus cataphractus	856	*Echiichthys vipera*	174
Liparis liparis	677	*Liparis liparis*	157
Platichthys flesus	611	*Trisopterus luscus*	110
Myoxocephalus scorpius	313	*Callionymus lyra*	97

10. Processing of the catch

The total catch was weighed prior to sorting. In most of the cases the total catch was sorted but if it was considered to be too large for it all to be sampled, a proportion of it was subsampled. All fish were removed from the sample that were weighed and measured (total length) to the cm below or 0.5cm for clupeids. Selected epibenthic species (see Appendix1.2), including pink shrimp, were also removed that were weighed and counted. The weight of the remaining catch was recorded, which essentially comprised of common shrimp and broken shell. A weighed subsample was taken and from this shrimp were extracted and its weight noted, so that the total catch of shrimp could be determined. A 200g sample of shrimp was retained and frozen immediately so that a length frequency distribution could be obtained upon return to the institute. The presence of groved shrimp would be looked for at this stage in the sampling process. For two shrimp samples collected each day, the shrimp would be sexed. Shrimp are measured as total length to the mm below.

For the Cefas survey, all of the catch if first sorted for fish, which are picked out using forceps and no subsampling takes place. All fish species are measured (total length) to the 0.5cm below. Subsampling is usually restricted to *Pomatoschistus* species, Nilsson's pipefish and dab, for which raising factors are determined by division. The epibenthos is then processed and counts for specific species (see Appendix 2.3) obtained and the raising factors noted as accordingly. Shrimps are not measured but an accurate volume of crangonid shrimp (*Crangon crangon* and *C. allmanni*) and pink shrimp is made at each station.

No otoliths are collected for age determination purposes by vTI, although they are from sole and plaice for the Cefas survey.

11. Written documentation

Three record sheets were completed. The skipper completed a gear deployment log-sheet (Appendix 1.1) that acted as a useful back-up for scientific staff, and at each station, station and catch record sheets were completed by the scientific staff (Appendix 1.2 and 1.3, respectively).

Similar written documentation is made for the English survey. Again, the skipper records basic gear deployment data on the skipper's gear deployment log-sheet (Ap-

pendix 2.1) and the scientific staff complete the station and fish catch, and epibenthos record sheets (Appendix 2.2 and 2.3, respectively).

12. Environmental and other observations

Twice a day scientific staff made a number of environmental observations. The surface temperature was recorded and a surface water sample collected that is returned to the institute for processing to determine the salinity. The water visibility was recorded by lowering a "Secci disc" into the water, and observations about the weather were also made.

Continuous depth readings during the tow were recorded using a small depth sensor manufactured by Star-Oddi that was attached to the beam.

A detailed track of the tow was recorded by software on a lap-top linked to a GPS that was operated by the skipper when scientific staff were not available to do so.

Similar environmental observations are made during the Cefas survey. At each station the wind force and direction, sea-state and tide are recorded and a CTD is lowered into the water to collect surface temperature and salinity data. For a small number of stations the dissolved oxygen levels are recorded for another government body that is associated with this part of the survey.

Cefas has developed a GPS data logger log to capture gear deployment data, including the track of the tow, using a lap-top linked to a GPS, for which it is possible for data to be uploaded to the Fishing Survey System (FSS) database. However, the software has only been developed for a specific project and is not currently available for use on the Young Fish Survey.

13. Summary

Although there were some significant differences between the two surveys it is clear that they had very much in common. The most important difference is obviously the difference in the fishing gears and the affects that this may have on the composition of the catch, although this may also be due to the differences in seabed characteristics (i.e. very sandy bottom in continental inshore in the Southern North Sea as opposed to sandy/gravel in the UK waters of the Southern North Sea). The German survey was dominated by common shrimp, whereas for the English survey a variety of epibenthic species often dominate. Essentially, the sampling practices undertaken by vTI and Cefas were very similar, although for the German survey raising factors were calculated by weight as opposed to division, for the Cefas survey, and common shrimp were collected by vTI to obtain length frequency distributions. Similar environmental data were collected.

From a non-scientific view point the surveys were quite similar, fishing vessels were chartered that return to port each night, logistically they were essentially the same as were the sizes of the teams and the "attitudes" of the scientific staff and crew. However, the working environment available to scientific staff is very different because of the differences in the size and layout of the vessels.

14. Acknowledgements

Cefas would like to thank the staff from vTI, namely: Uli Damm; Gitta Hemken and Thomas Kehlert and the skipper and crew of FV Gerda-Bianca for the opportunity, organization and hospitality. Thanks are also due to Marcel Devries from RIVO for his efforts to coordinate the Dutch part of the exchange.

15. References

ICES, 2010. ICES WGBEAM REPORT 2010, Report of the Working Group on Beam Trawl Surveys (WGBEAM). ICES CM 2010/SSGESST:17.

Figure 1. Vessels charted for the surveys: (a) FV Gerda-Bianca (ACC1) moored at Dornumersiel chartered by vTI and (b) FV Challenge (WY133) moored at Gibraltar Point, Skegness chartered by Cefas.

(a)

(b)

Figure 2. Deck layout of (a) FV Gerda-Bianca and (b) FV Challenge.

(a)

(b)

Figure 3. Fishing gear used for the surveys: (a) the 3m beam used for the German survey and (b) the 2m beam used for the English survey, on-board FV Challenge.

(a)

(b)

Figure 4. Examples of catch compositions observed whilst aboard (a) FV Gerda-Bianca and (b) FV Challenge.

(a)

(b)

16. Appendices

Appendix 1. Survey forms used for the German survey

Appendix 1.1 Skipper's gear deployment log-sheet

STRECKENZETTEL

Stationsliste Jungfischreisen Reise-Nr :

Datum

Gebiet : OF

Hol-Nr	Tiefe in m	Breitengrad	Längengrad	Geschw.	Zeit	Kurs	Strecke	Tide
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					
		53°	7°					

Appendix 1.2 Station record sheet

STATIONSPROTOKOLL

SCHIFF: REISE-NR.: DATUM:

FAHRTLEITER NEUDECKER PROTOKOLLFÜHRER

STATION HOLNR. ANZAHL NETZE

GEBIET OSTFRIESLAND
STATIONSTYP DYFS
ICES-RECTANGLE 36F7
REGION 37
SUBREGION
FRIESGEB 414 (binnen) / 405 (buten)
TIDE
ZEITMERIDIAN (Sommerzeit z.B. +2) +2

Fanggerät NETZTYP TBB
FANGGERÄT BK3
NETZÖFFNUNG:
BREITE 3.0 m
HÖHE 0.4 m

Fangbeginn GEO.BREITE 53° N
GEO.LÄNGE 007° E
Hieven GEO.BREITE 53° N
GEO.LÄNGE 007° E

Schleppen Anfang | Ende | Dauer | Richtung
Geschwindigkeit (über Grund) kn
STRECKE m STRECKE nM

Fangtiefe (m) Min Max
Sichttiefe (m)

WINDRICHTUNG °
WINDGESCHWINDIGKEIT m/s
WETTER
BEWÖLKUNG
LICHTVERHÄLTNISSE

GESAMTFANG (ohne Beifang) kg
BEIFANG * kg
Anzahl Arten (ohne Beifang)
VALIDITY (J / N)

UMWELTPARAMETER:

	FANGTIEFE VON	FANGTIEFE BIS	BODEN	OBERFLÄCHE	LUFTTEMPERATUR
TEMPERATUR (°C)					
SALZGEHALT (‰)					

AKTIVITÄTEN

FISCHEREI (X) NÄHRSTOFFE ( ) MEERESCHEMIE ( ) DISCARD ( )
HYDROGRAPHIE ( ) BENTHOLOGIE ( ) PLANKTOLOGIE ( ) ANDERE ( )

BEMERKUNGEN und BEOBACHTUNGEN :
(Eingabe in die Stationsdatei)

**** BEIFANG :***
(Eingabe in die Netzdatei)

Appendix 1.2 Station record sheet (continued)

Erläuterungen zum Stations- und Fangprotokoll

Zeitmeridian	Wenn Ortszeit in Protokoll eingetragen wird, dann ist der Zeitmeridian die Differenz zu GMT (z.B. Nordsee Sommerzeit = +2)
Stratumnr	Nr. des Stratums, in dem die Station liegt, bei Surveys nach dem Stratified Random Sampling System
Fangbeginn	Grundschleppnetz; Netz am Grund Schwimmschleppnetz: Kurrleinen auf Mark
Fangtiefe	Fangbeginn: Bei Netz am Grund (Grundschleppnetz) Bei Kurrleinen auf Mark (Schwimmschleppnetz)
Fanggerät	Eintragung wie z.B. 200 BT, 140 BT, 1216 PT, GOV, etc.
Tätigkeiten	Ankreuzen, was während der Station gemacht wurde
Fangtiefe von-bis	Minimale und maximale Werte während des Schleppens
Lichtverhältnisse	Hell = 1; Dämmerig = 2; Dunkel = 3

Seegang und Wind (Petersen-Skala)

Wind	Bft	kn	m/sec	Seegang	Zustand	Wellenhöhe
Stille	0	0-0.4	0-0.2	0	Ruhig (Spiegelglatt)	0 m
leichter Zug	1	0.6-2.9	0.3-1.5	1	Ruhig (Gerippelt)	0 - 0.1 m
leichte Brise	2	3.1-6.4	1.6-3.3	1	Ruhig (Gerippelt)	0 - 0.1 m
schwache Brise	3	6.6-10.5	3.4-5.4	2	Geglättete, kleine Wellen	0.1 - 0.5 m
mäßige Brise	4	10.7-15.4	5.5-7.9	3	Leichter Seegang	0.5 - 1.25 m
frische Brise	5	15.6-20.8	8.0-10.7	4	Mittlerer Seegang	1.25 - 2.5 m
starke Brise	6	21.0-26.8	10.8-13.8	5	Rauher Seegang	2.5 - 4 m
steife Brise	7	27.0-33.2	13.9-17.1	6	Sehr rauher Seegang	4 - 6 m
stürmisch	8	33.4-40.2	17.2-20.7	7	Hoher Seegang	6 - 9 m
Sturm	9	40.4-47.4	20.8-24.4	7	Hoher Seegang	6 - 9 m
schwerer Sturm	10	47.6-55.2	24.5-28.4	8	Sehr hoher Seegang	9 - 14 m
orkanartiger Sturm	11	55.4-63.4	28.5-32.6	8	Sehr hoher Seegang	9 - 14 m
Orkan	12	63.6-74.7	32.7-36.9	8	Sehr hoher Seegang	9 - 14 m
				9	Keine Beobachtung	

Wetter:

0 Klar, Wolkenlos
1 Teilweise bewölkt
2 Geschlossene Wolkendecke
3 Sand, Staub oder Schneesturm
4 Nebel oder starker Dunst
5 Sprühregen
6 Regen
7 Schneeregen oder Schnee
8 Schauer
9 Keine Beobachtung

Bewölkung:

0 - Wolkenlos
1 - 1/8 oder weniger
2 - 2/8
3 - 3/8
4 - 4/8
5 - 5/8
6 - 6/8
7 - 7/8
8 - 8/8
9 - Keine Beobachtung

Bearbeitungsstatus:

L = Länge bestimmt
S = Geschlecht bestimmt
R = Reife bestimmt
C = Schuppen entnommen
O = Otolithen entnommen
G = Gewicht bestimmt
M = Morphometrik
E = Meristik
N = Nahrung bestimmt oder Magen entn.
P = Parasitenbestimmung
F = Fruchtbarkeit, Gonaden entn.
B = Belegexemplare mitgenommen

Appendix 1.3 Catch record sheet

FANGPROTOKOLL für DYFS (Demersal Young Fish Survey)

Datum : **Reise :** **StationsNr :** **HolNr :** **Netz:**

Gesamtfang(komplett)	kg	MIXProbe :		kg
Unterprobe (UP)	kg	1	4	7
MIX in UnterProbe	kg	2	5	8
MIX in Gesamtfang	kg	3	6	9

FISCHARTEN		CODE	GESAMTFANG		UP (gemessen)		UP	EINZELLÄNGEN u.
			kg	Stck	kg	Stck	kg	Bemerkung
Agonus cataphractus	**STEINPICKER**	13						
Alosa fallax	FINTE	25						
Ammodytes marinus	**KLEINER SANDAAL**	31						
Anguilla anguilla	FLUSSAAL	39						
Arnoglossus laterna	LAMMZUNGE	67						
Buglossidium luteum	**ZWERGZUNGE**	128						
Callionymus lyra	**GESTR.LEIERFISCH**	132						
Callionymus reticulatus	**ORNAMENT LEIERFISCH**	134						
Ciliata mustela	**5-BÄRT.SEEQUAPPE**	178						
Clupea harengus	**HERING**	181						
Eutrigla gurnardus	**GR.KNURRHAHN**	284						
Gadus morhua	**KABELJAU**	293						
Gaidropsarus vulgaris	3-BÄRT.SEEQUAPPE	298						
Gasterosteus aculeatus	3-STACH.STICHLING	306						
Hyperoplus lanceolatus	**GR.SANDAAL**	360						
Limanda limanda	**KLIESCHE**	407						
Liparis liparis	**GR.SCHEIBENBAUCH**	414						
Liparis montagui	**KL.SCHEIBENBAUCH**	415						
Merlangius merlangus	**WITTLING**	468						
Microstomus kitt	**LIMANDE**	479						
Myoxocephalus scorpius	**SEESKORPION**	506						
Osmerus eperlanus	**STINT**	566						
Pholis gunnellus	**BUTTERFISCH**	597						
Platichthys flesus	**FLUNDER**	604						
Pleuronectes platessa	**SCHOLLE**	607						
Pomatoschistus minutus	**SANDGRUNDEL**	617						
Psetta maxima	STEINBUTT	630						
Scophthalmus rhombus	GLATTBUTT	690						
Solea vulgaris	**SEEZUNGE**	716						
Sprattus sprattus	**SPROTTE**	732						
Syngnathus rostellatus	**KLEINE SEENADEL**	750						
Trachurus trachurus	**STÖCKER**	777						
Trigla lucerna	ROT KNURRHAHN	783						
Trisopterus luscus	**FRANZ.DORSCH**	793						
Trisopterus minutus	ZWERGDORSCH	794						
Zoarces viviparus	**AALMUTTER**	816						
Asterias rubens	GEM. SEESTERN	86						
Buccinum undatum	WELLHORNSCHNECKE	125						
Cancer pagurus	TASCHENKREBS	136						
Carcinus maenas	STRANDKRABBE	144						
Crangon allmanni	FURCHENGARNELE	203						
Crangon crangon	NORDSEEGARNELE	204						
Macropipus holsatus	SCHWIMMKRABBE	451						
Mytilus edulis	MIESMUSCHEL	512						
Ophiurida	SCHLANGENSTERNE	560						
Paguridae	EINSIEDLERKREBSE	914						
Pandalus montagui	ROTE GARNELE	579						
Psammechinus miliaris	STRANDSEEIGEL	628						

FANG	**kg**	**Anz. ARTEN**	**RESTFANG**	**kg**

Appendix 2 Survey forms used for the English survey

Appendix 2.1 Skipper's gear deployment log-sheet

Young Fish Survey station record sheet

To be completed by the skipper of each vessel

YFS Region: **Vessel:**

Date	Station	List No.	Shot Latitude	Shot Longitude	Haul Latitude	Haul Longitude	Depth*	Distance (nm)

*Depth to be recoreded in either metres or feet. Note if this is the actual depth or the depth from the keel; if the later note the draw of the vessel.

Appendix 2.2 Station and fish catch record sheet

Vessel		Gear	

Date	Station No	Mini Area	List No	Time shot	Time haul	Distance	Speed	Sampled Area

Shot position	Haul position	Depth (metres)

Wind		Tide		Sea state		Grab sediment (1-4)	

CODE									CODE
RF / CM									RF / CM
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1,5									1,5
2,0									2,0
2,5									2,5
3,0									3,0
3,5									3,5
4,0									4,0
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17,5									17,5
18,0									18,0
18,5									18,5
19,0									19,0
19,5									19,5
20,0									20,0
Total									Total

Salinity bottle number	Temperature	Salinity	Conductivity		Metre wheel
				Start	
				End	

Appendix 2.3 Epibenthos record sheet

INVERTEBRATES (EPIFAUNA) ON THE YOUNG FISH SURVEY

Vessel / cruise:	Date:	Station:	Prime:

Sediment in catch (circle):

Clean	Mud	Sand	Gravel	Shell hash	Broken shells	Pebbles	Rocks	Plant debri

Total volume of epifauna (excludes fish, seaweeds, rocks etc, includes shrimp):

Number of fish boxes:		Litres:	
Number of fish baskets:		Convert catch to litres:	

Colonial species to observe only:

Species	Code	Present
Sponges	PFZ	☐
Hydroids	HYD	☐
Dead mans fingers *Alcyonium digitatum*	DMF	☐
Sabellaria spp.	RCL	☐

Species	Code	Present
Hornwrack *Flustra foliacea*	FAF	☐
Curly weed *Alcyonidium diaphanum*	ALG	☐
Ascidians	SSX	☐

Species to count:

Species	Code	Count	RF	Total
Cnidaria				
Anemone (Unidentified)	AMU			
Annelida				
Sea mouse *Aphrodita aculeata*	AAC			
Crustacea				
Hermit crabs *Pagurus* spp. [1]	PAY			
Harbour crab *Liocarcinus depurator*	LMD			
Swimming crabs *Liocarcinus* spp. [2]	PUZ			
Edible crab *Cancer pagurus (male)*	CRE			
Edible crab *Cancer pagurus (female)*	CRE			
Square crab *Goneplax rhomboides*	GOR			
Shore crab *Carcinus maenas*	CRG			
Velvet swimming crab *Necora puber*	MLP			
Masked crab *Corystes cassivelaunus*	CCV			
Spider crabs [3]	MJX			
Spider crab *Maja brachydactyla*	SCR			
Lobster *Homarus gammarus (male)*	LBE			
Lobster *Homarus gammarus (female)*	LBE			
Common prawn *Palaemon serratus*	CPR			
Mollusca				
Philine aperta	PHP			
Common whelk *Buccinum undatum*	WHE			
Slipper limpet *Crepidula fornicata*	ASL			

Species	Code	Count	RF	Total
Scallop *Pecten maximus*	SCE			
Queen scallop *Aequipecten opercularis*	QSC			
European (native) oyster *Ostrea edulis*	OYF			
Pacific oyster *Crassostrea gigas*	OYG			
Common cockle *Cerastoderma edule*	COC			
Common mussel *Mytilus edulis*	MUS			
Echinodermata				
Sand star *Astropecten irregularis*	API			
Common starfish *Asterias rubens*	STH			
Common sun star *Crossaster papposus*	CTP			
Brittlestar *Ophiothrix fragilis*	OPF			
Brittlestars (*Ophiura albida, O.ophiura*)	BSY			
Green sea urchin *Psammechinus miliaris*	PMM			
Sea Potatoes *Echinocardium* spp.	ECC			
Other				
Dogfish egg cases (live)	DEG			

Species to measure by volume (litres):

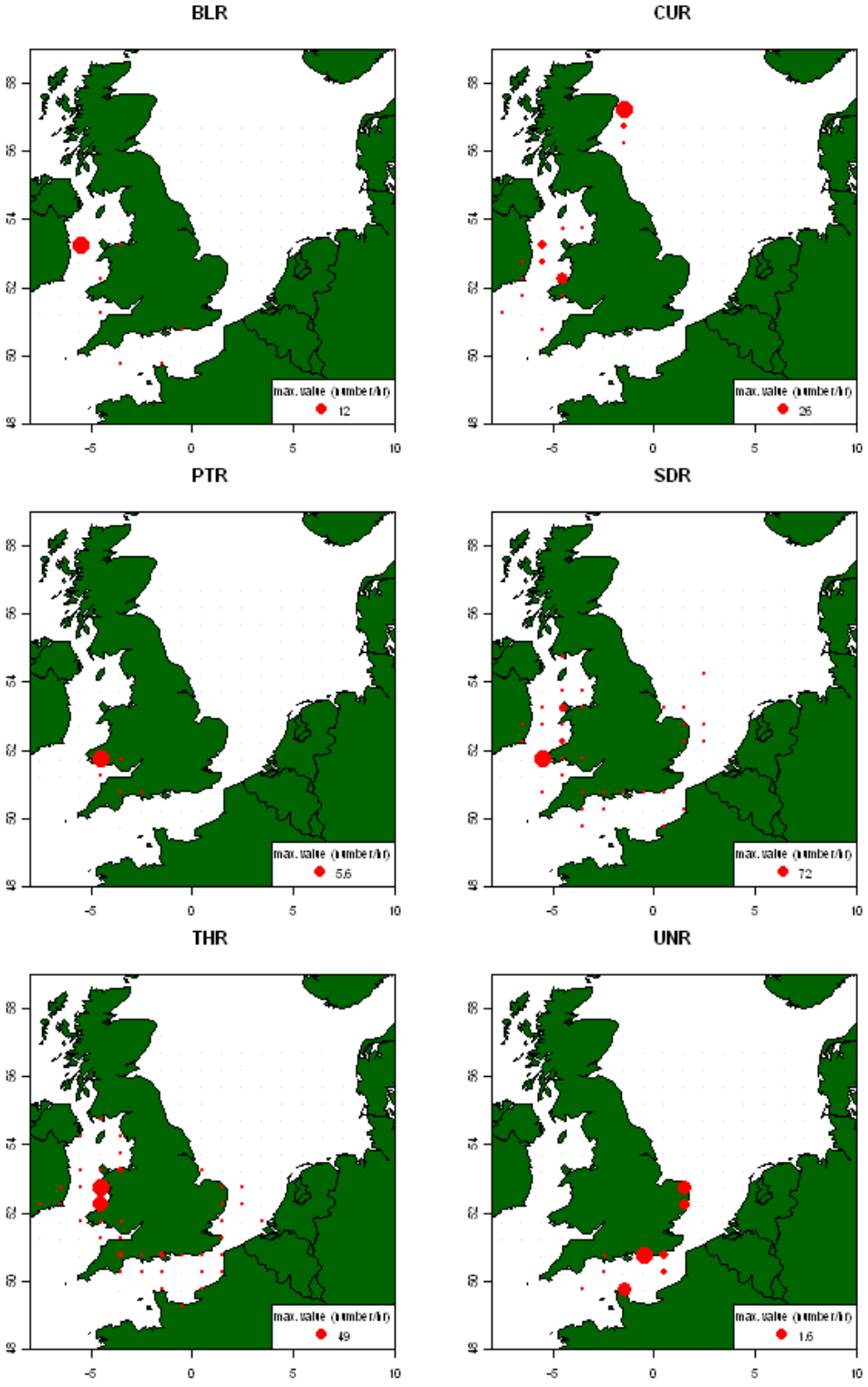
Species	Code	Vol.	RF	Total
Crangonid shrimp[4]	CRN			
Pink shrimp *Pandalus montagui*	PRM			

Dominant fauna (by bulk (excludes fish)):

Comments (including other species of note):

1 - Pagurus spp. (P. bernhardus, P. pubescens, P.prideauxi, Anapagurus laevis)
2 - Liocarcinus spp.(L. holsatus, L.marmoreus, L. pusillus, Macropipus arcuatus)
3 - Spider crabs (Inachus / Macropodia / Hyas etc., all except Maja brachydactyla (previously squinado))
4- Crangonid shrimp (Crangon crangon, C. allmanni)

Annex 19: Distribution plots for selected ray species



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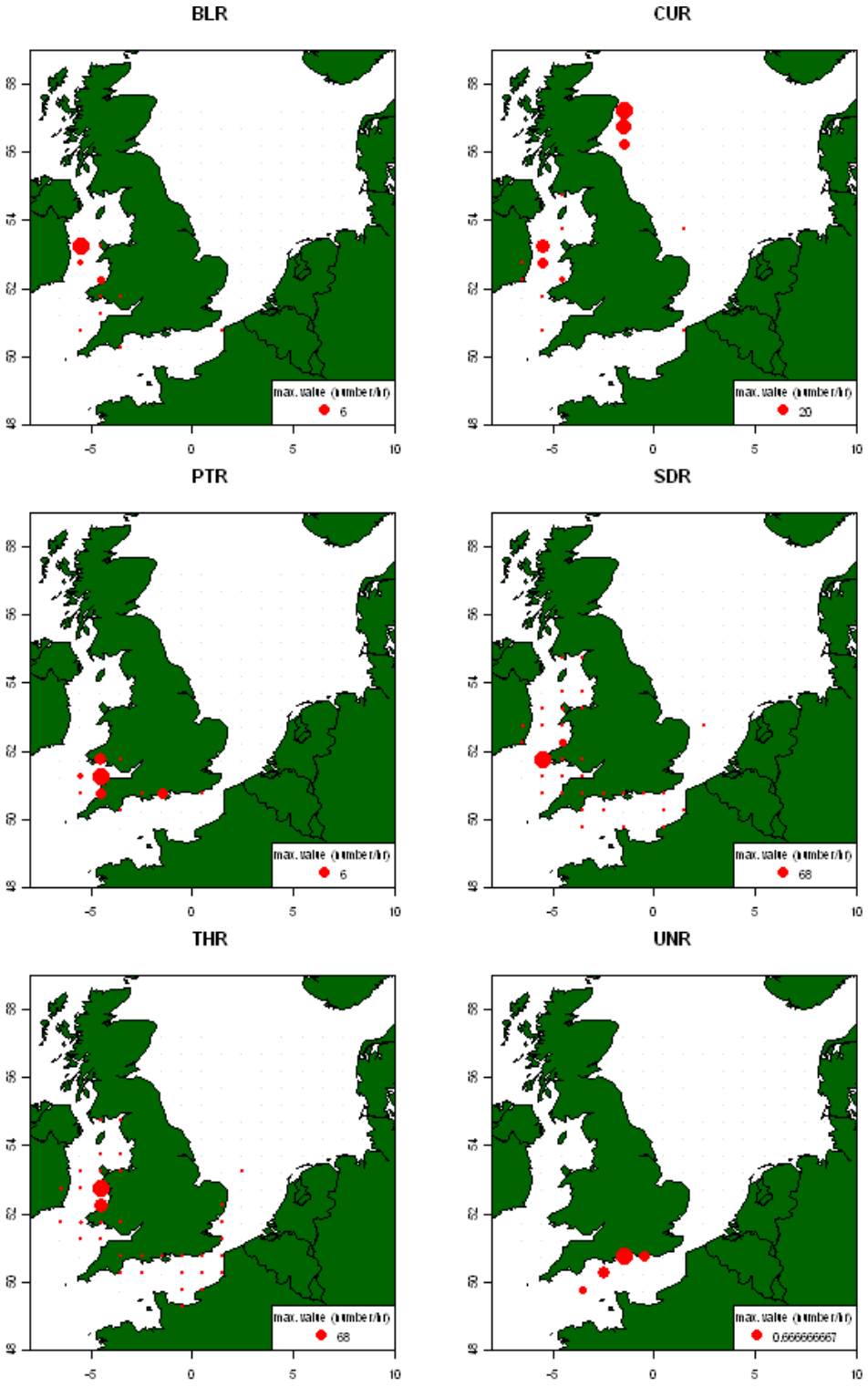
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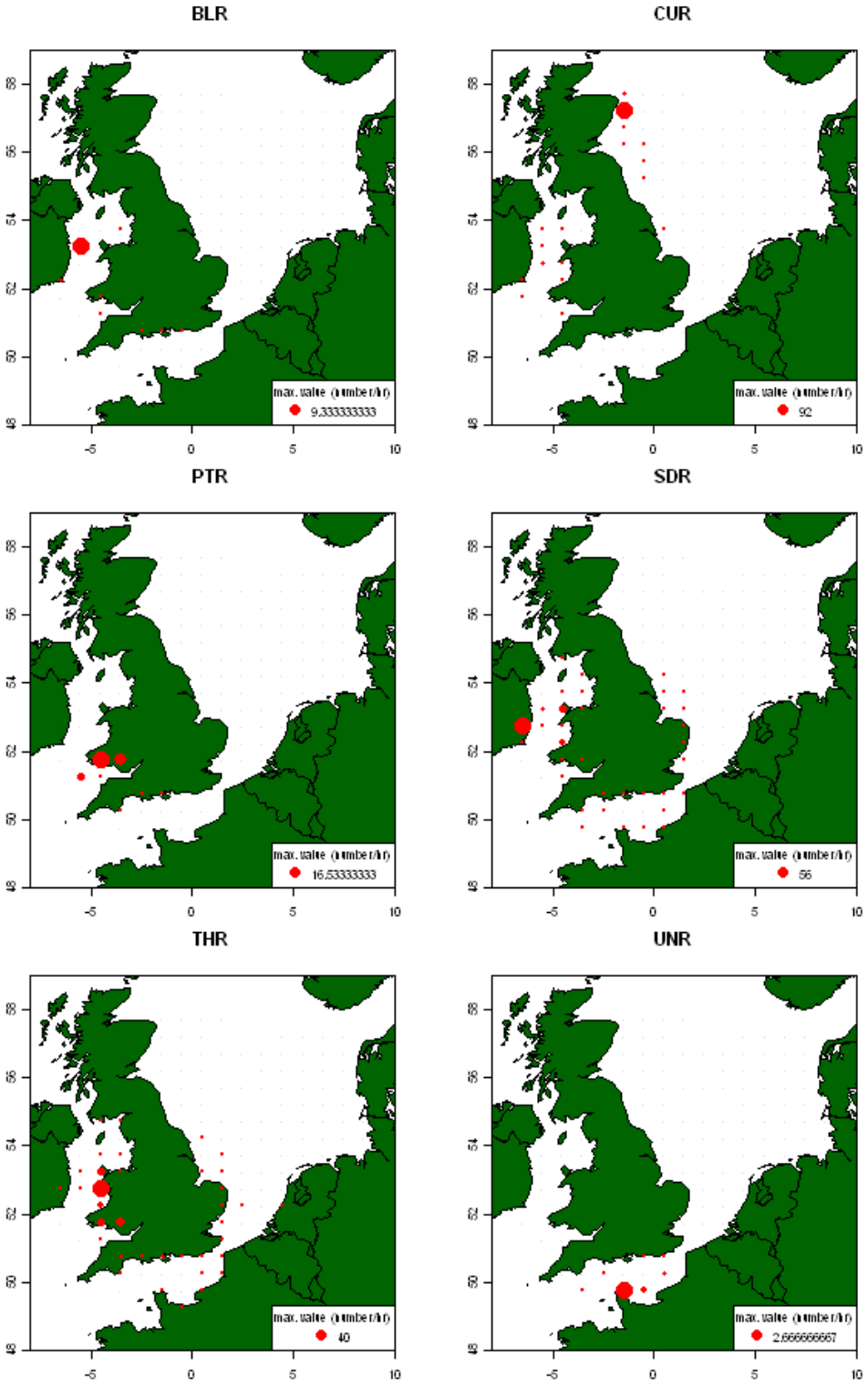
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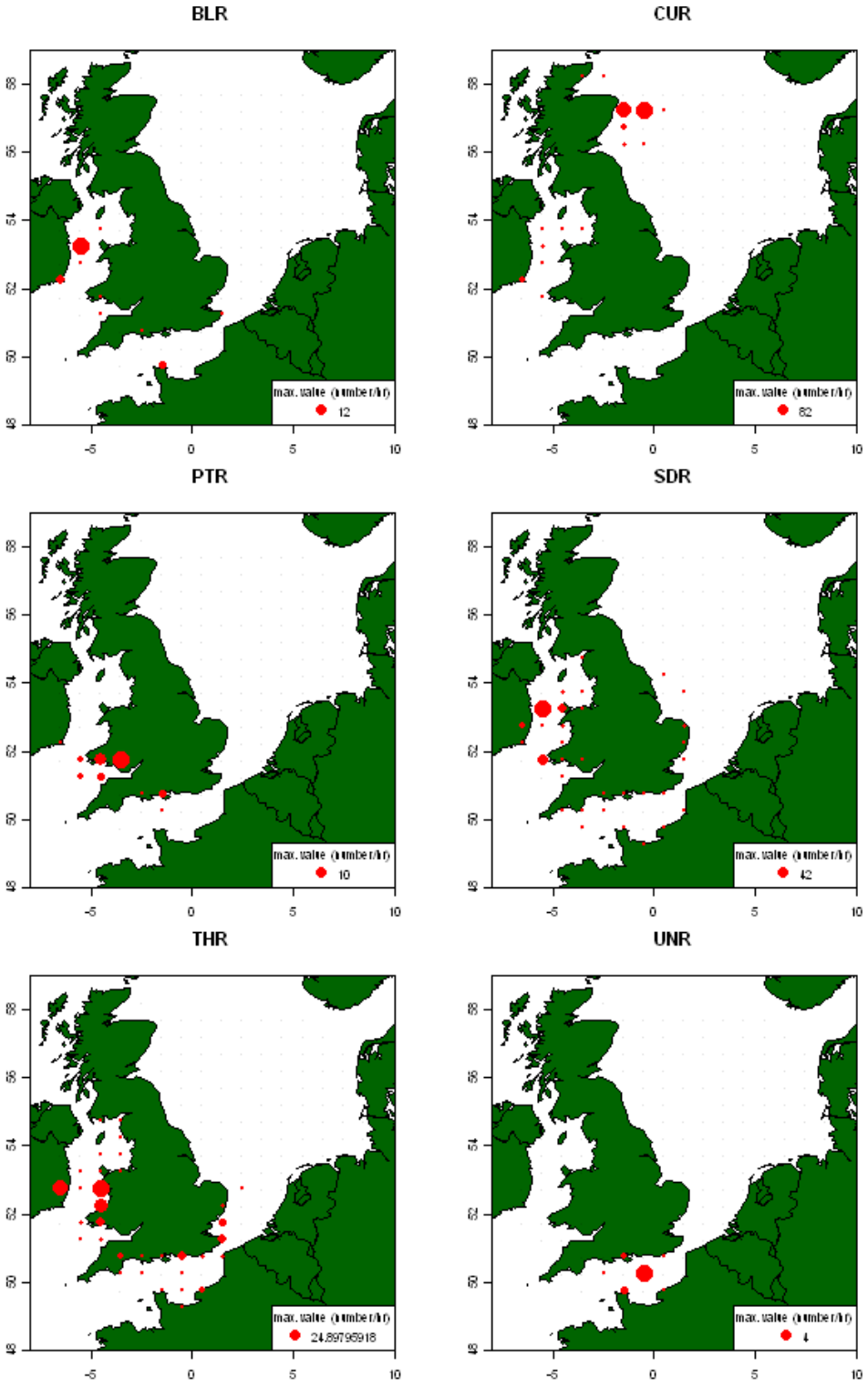
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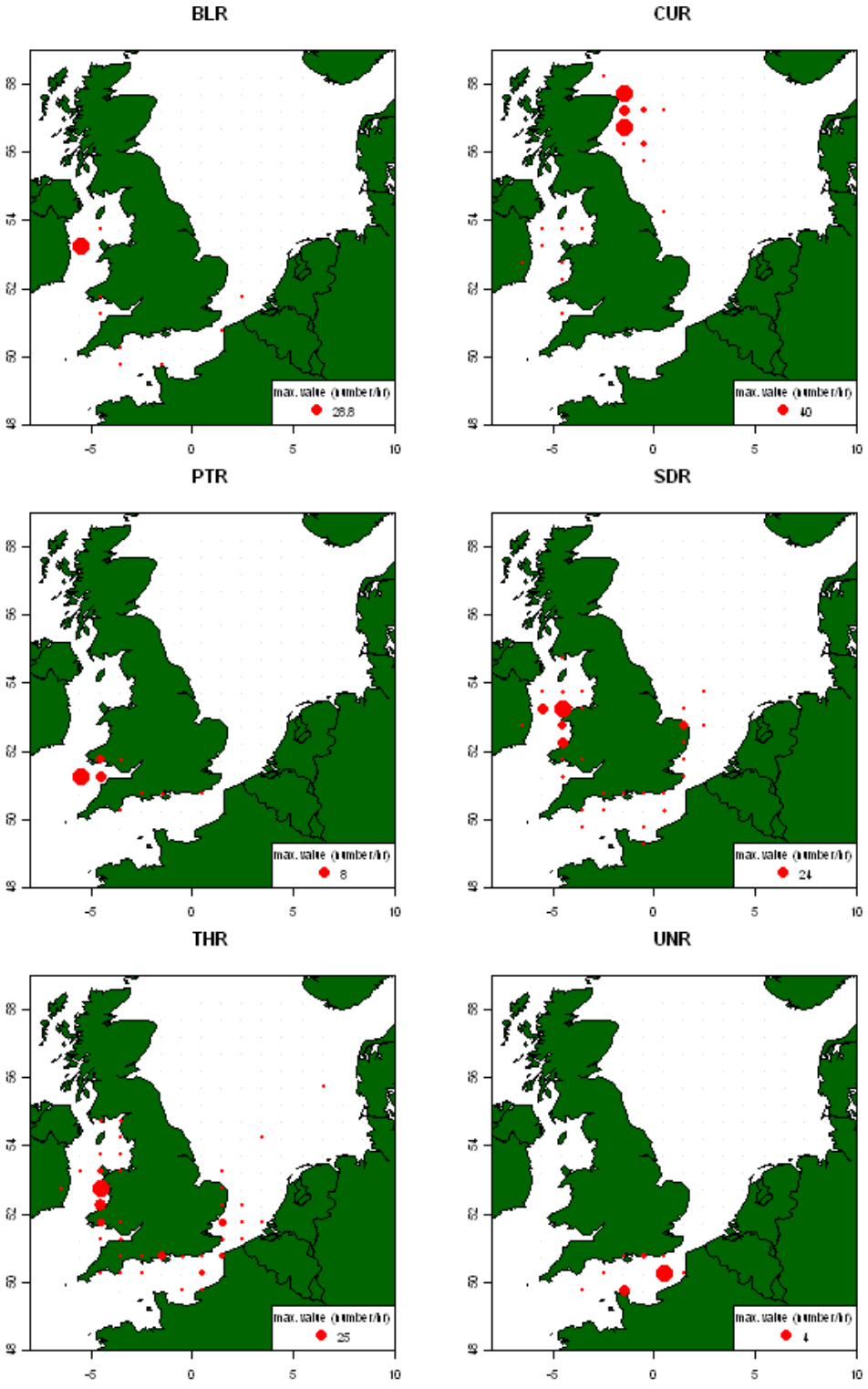
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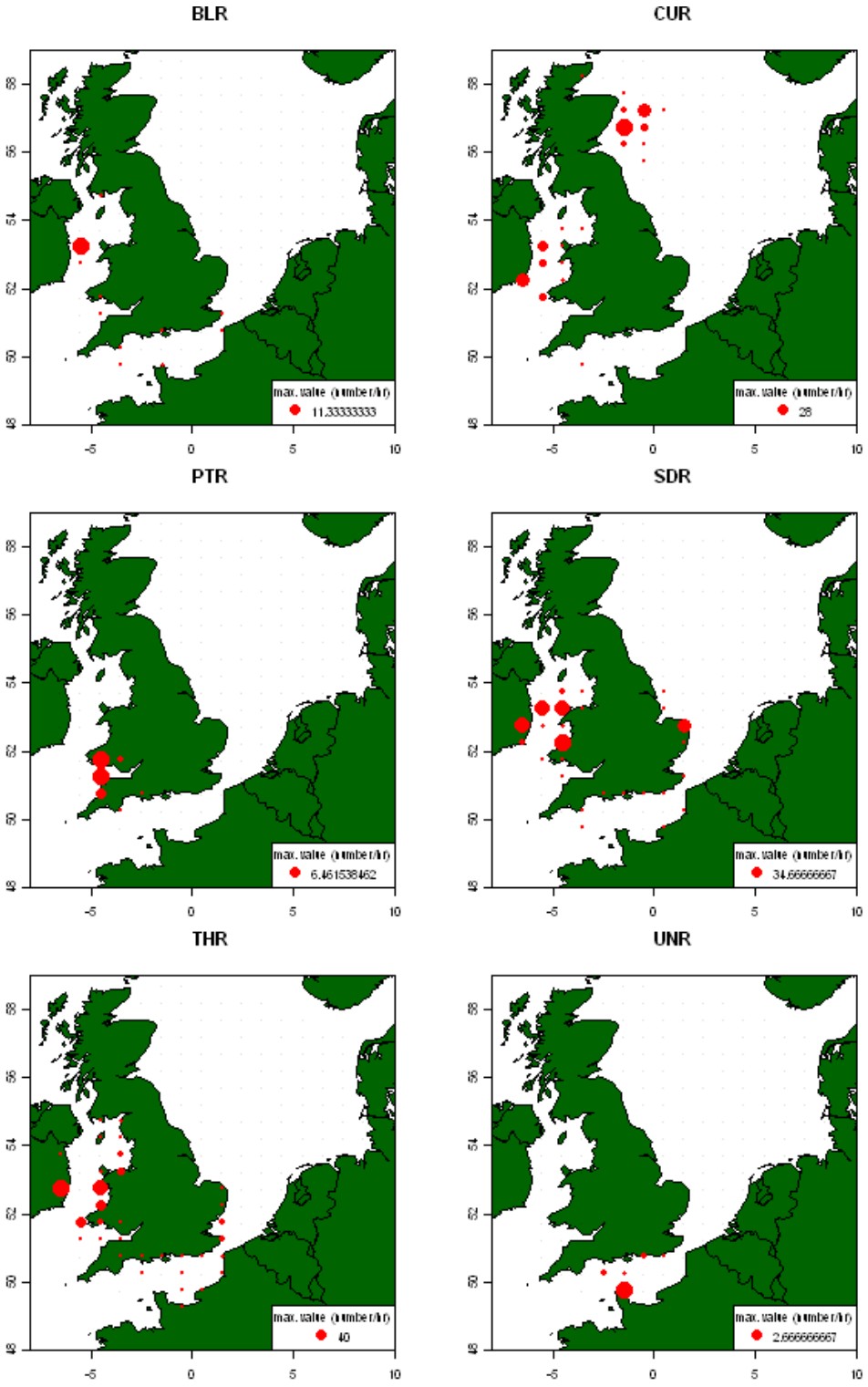
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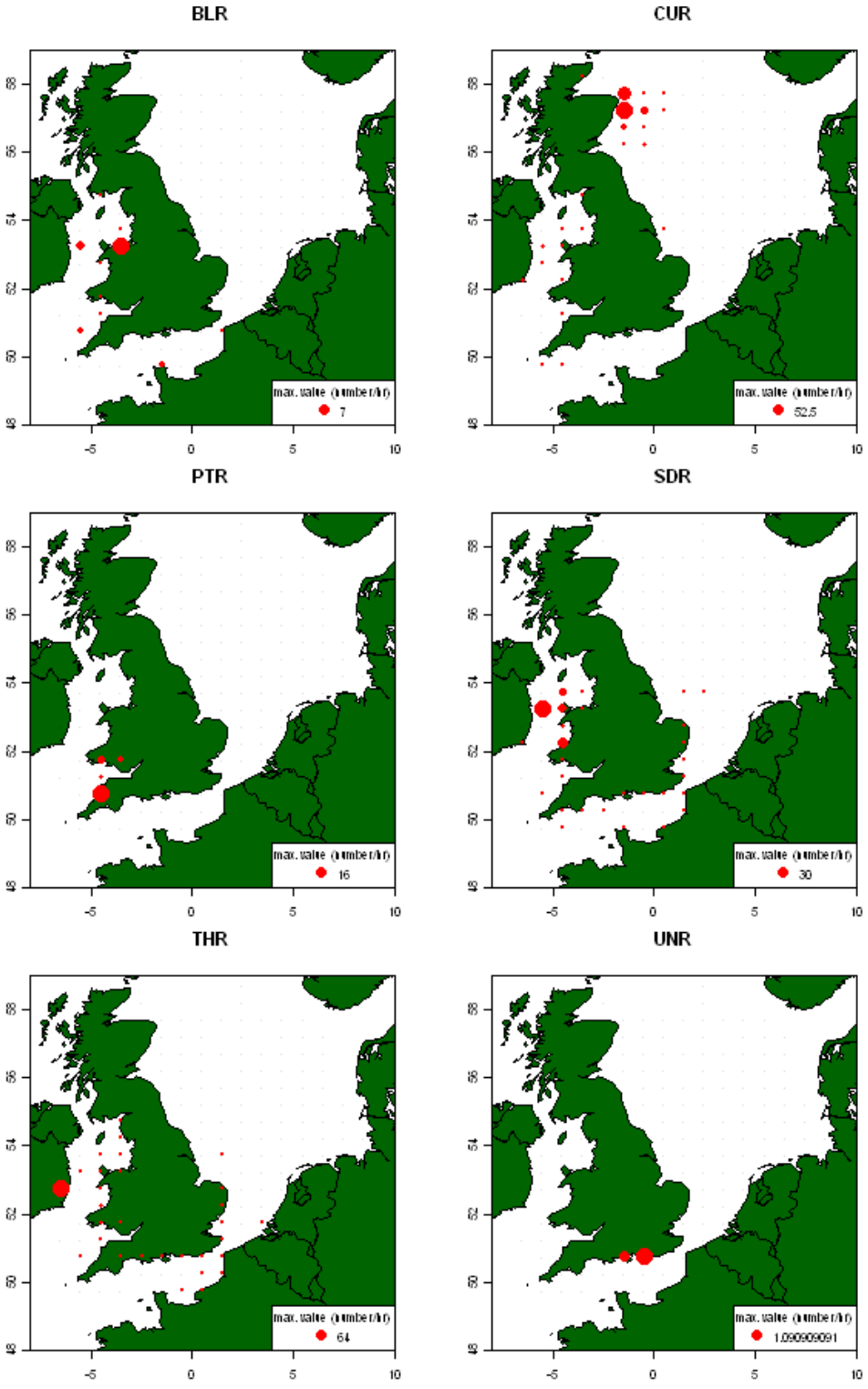
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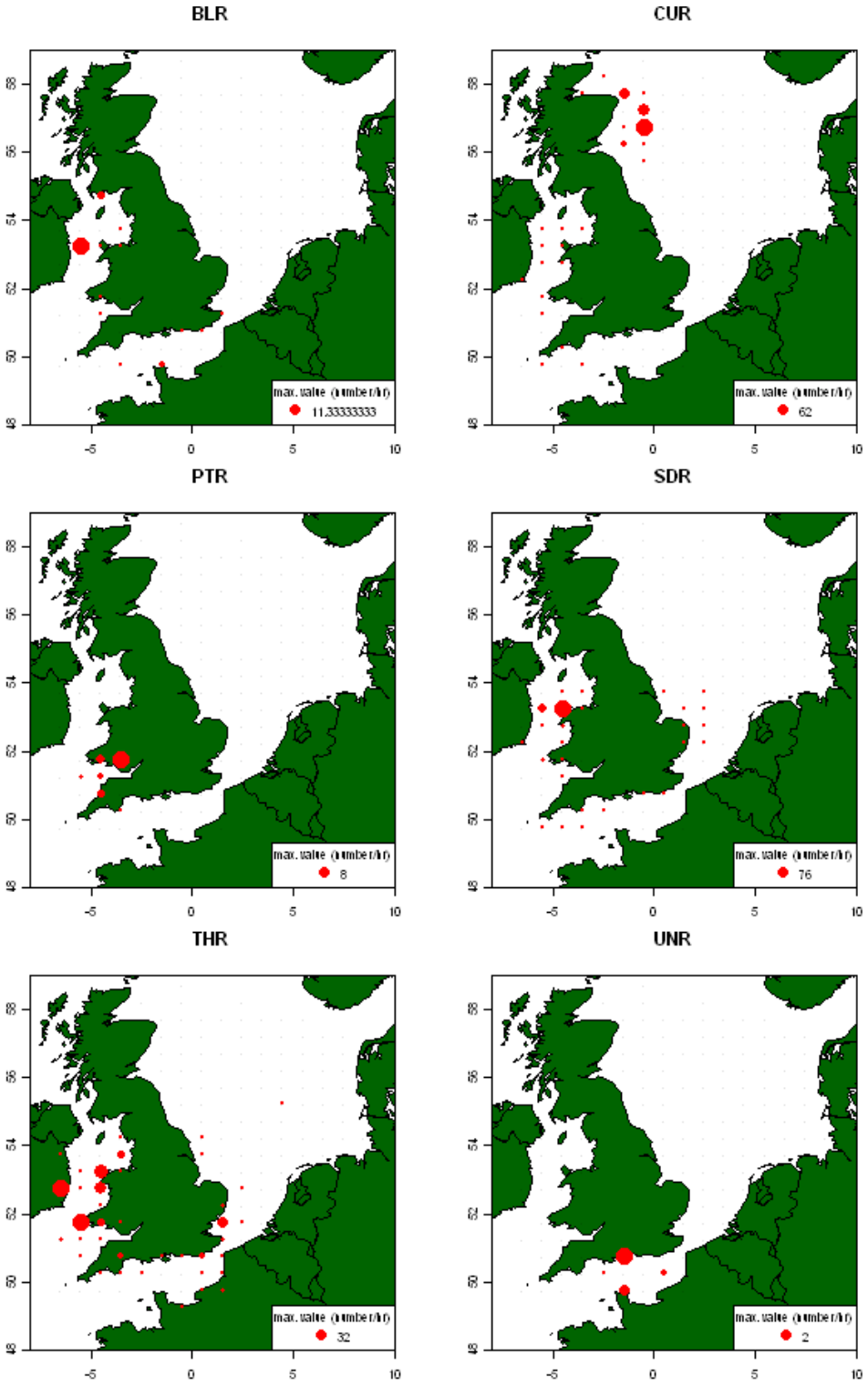
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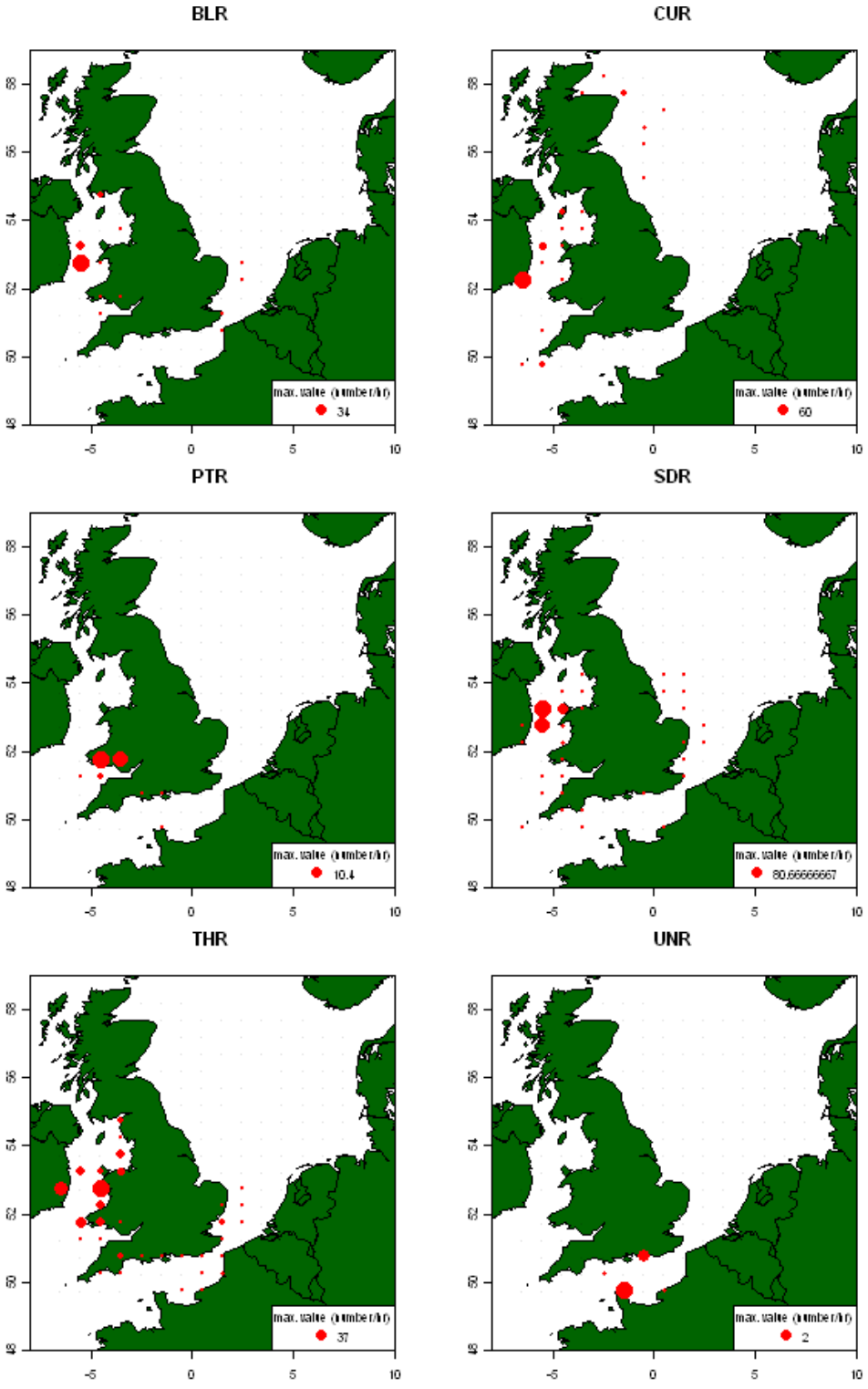
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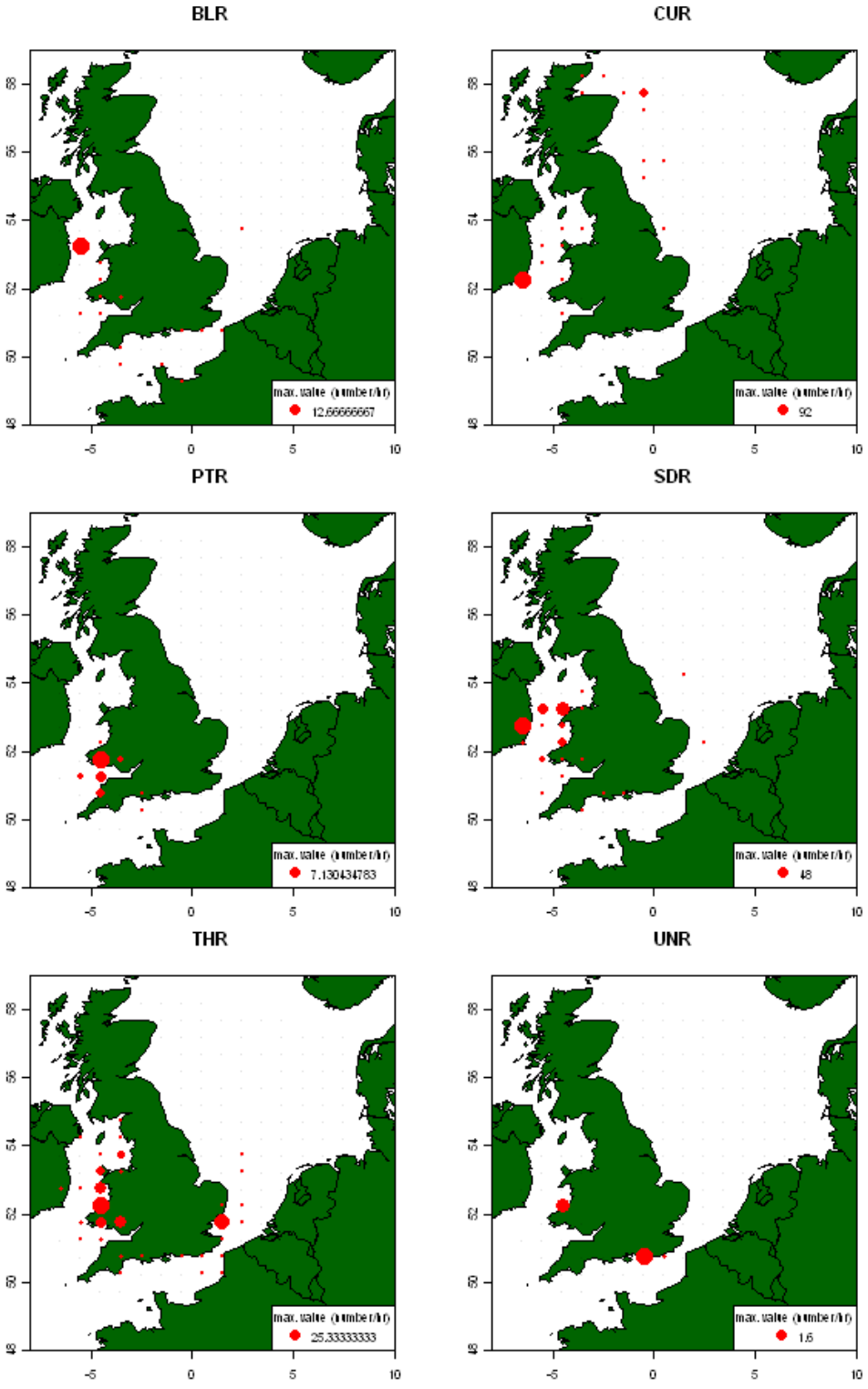
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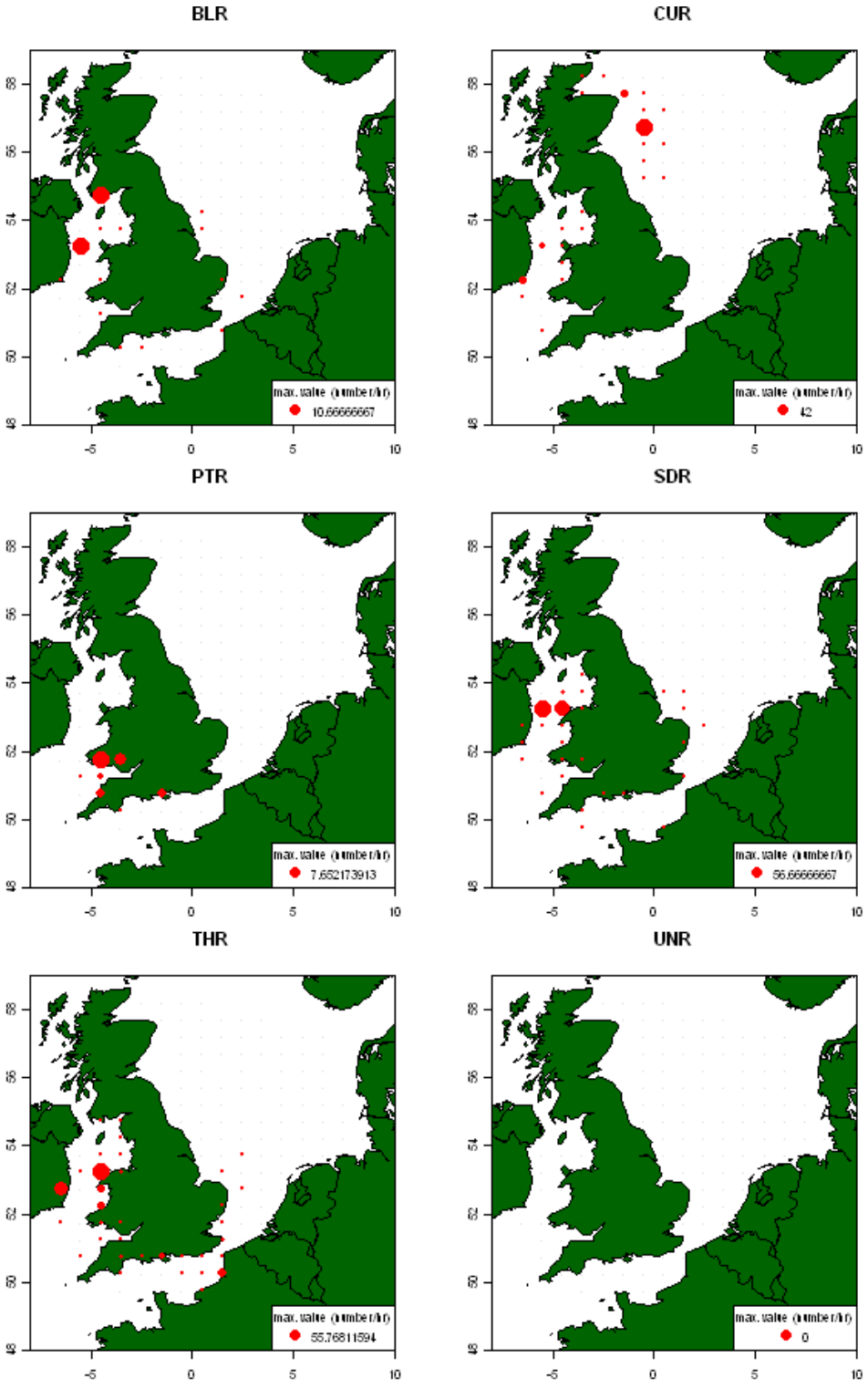
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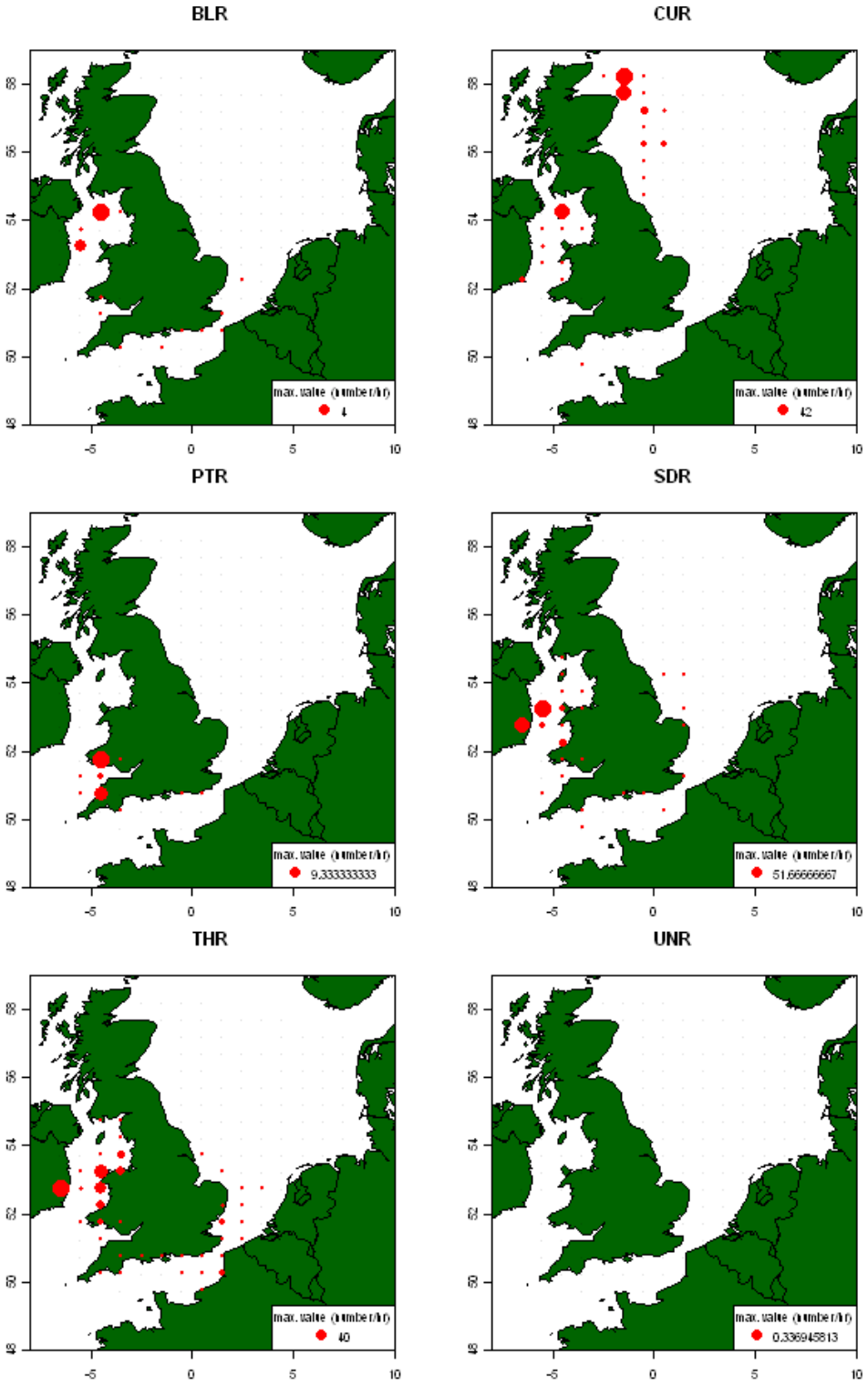
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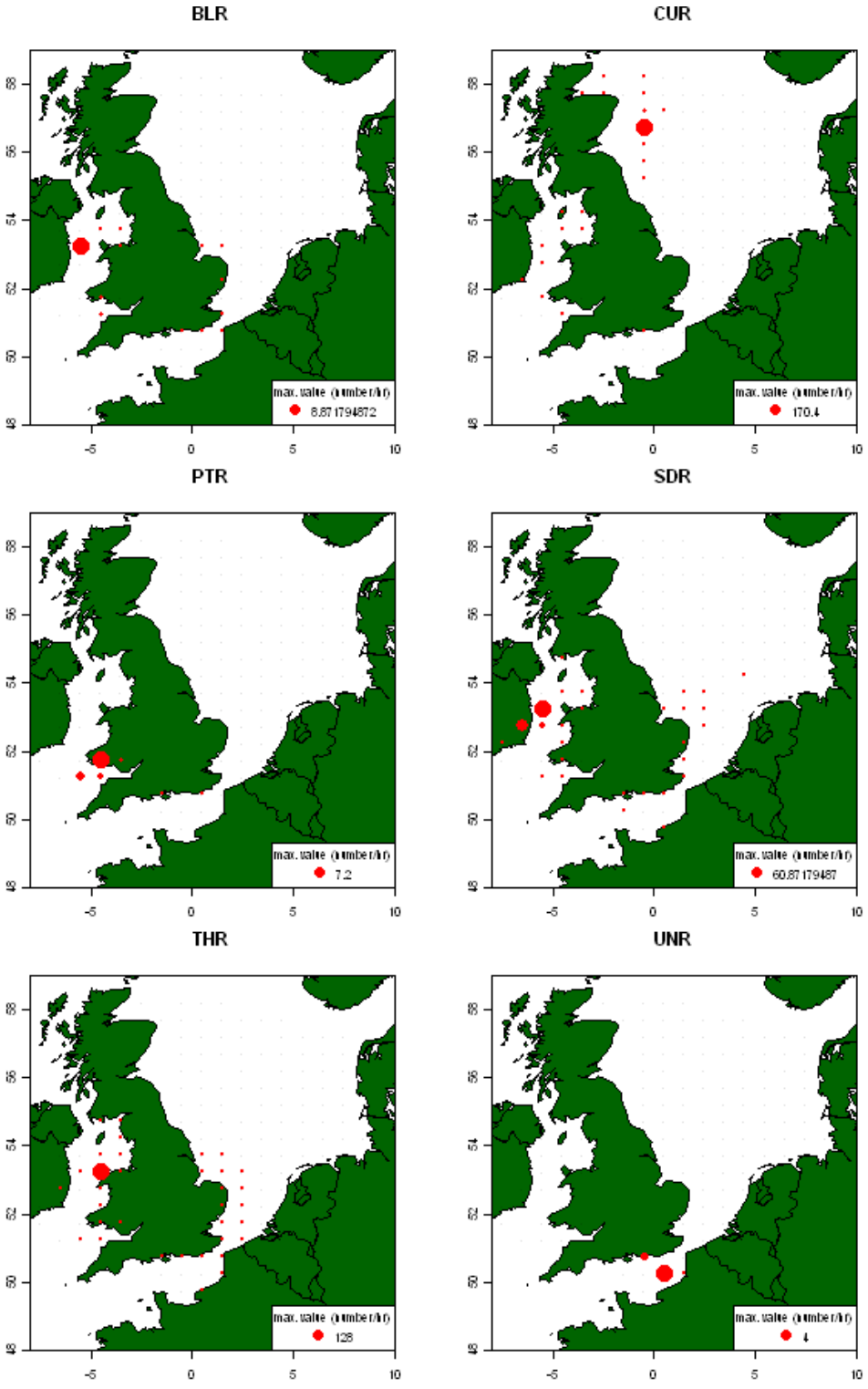
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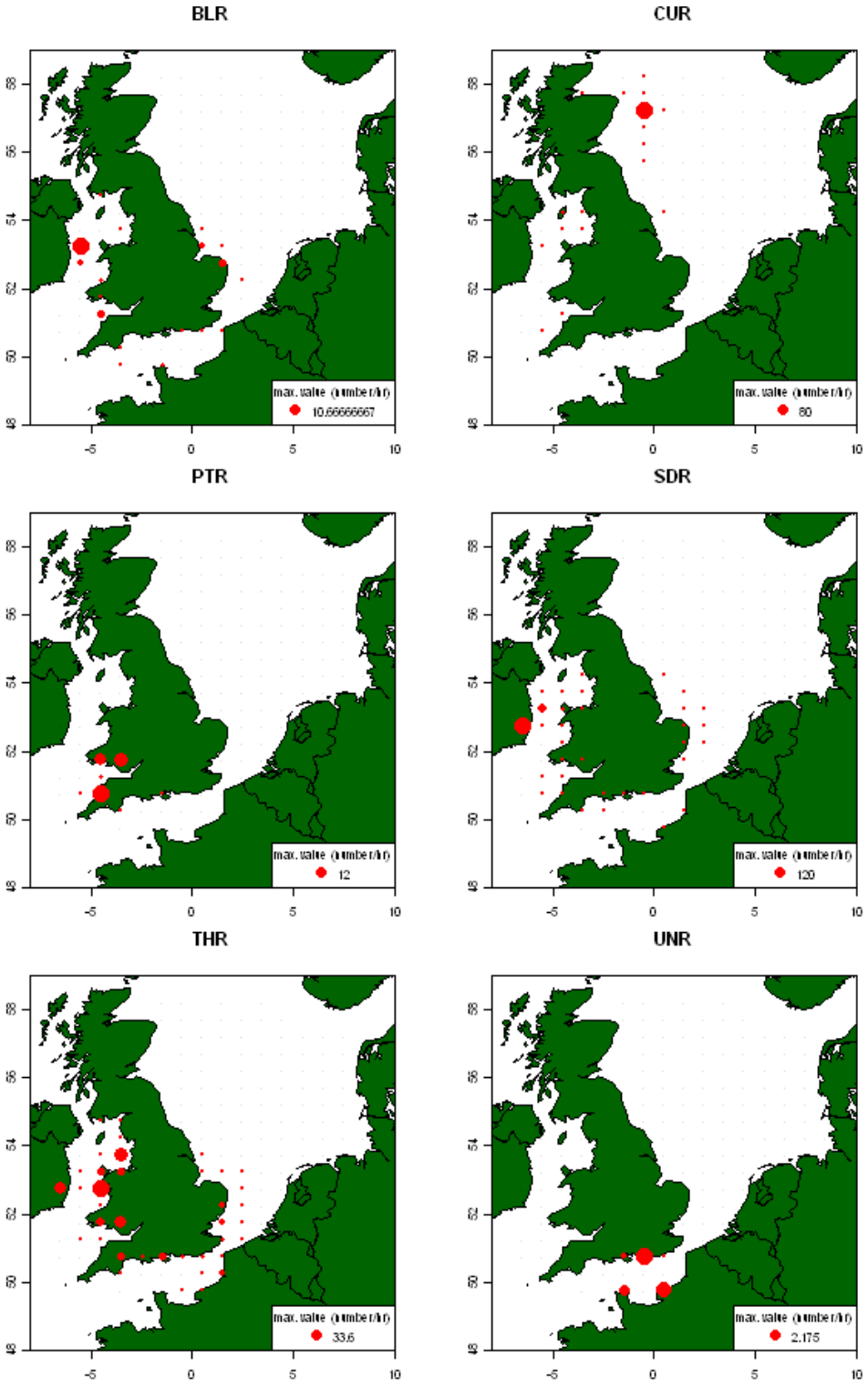
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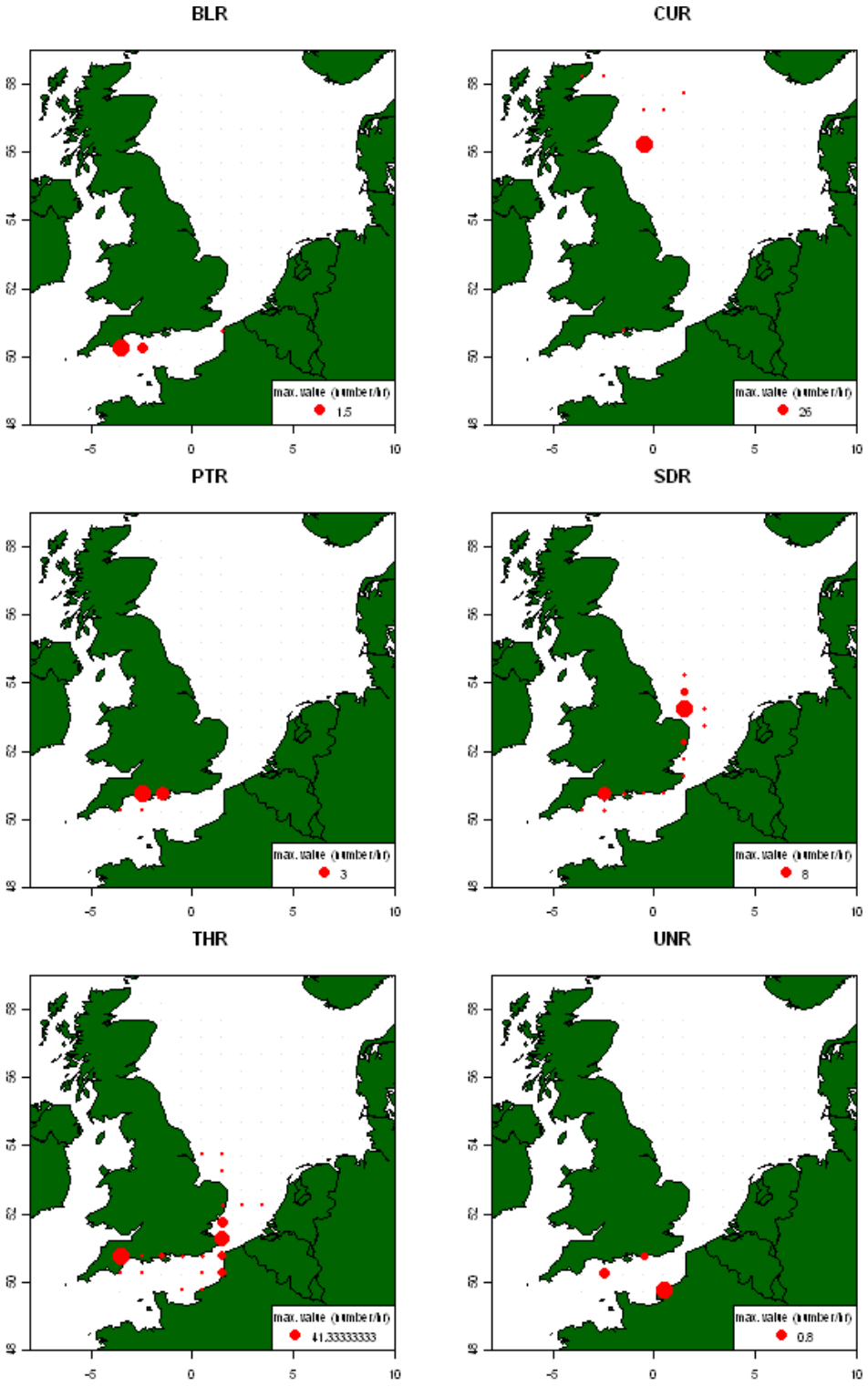
2009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2010

Annex 20: Litter recording sheet for offshore surveys

Litter overview			
A: Plastic	**B: Sanitary waste**	**C: Metals**	**Related size category**
A1. Bottle	B1. diapers	C1. Cans (food)	A: <5*5 cm= 25 cm^2
A2. Sheet	B2. cotton buds	C2. Cans (beverage)	B: <10*10 cm= 100 cm^2
A3. Bag	B3. cigarette butts	C3. Fishing related	C: <20*20 cm= 400 cm^2
A4. Caps/ lids	B4. condoms	C4. Drums	D: <50*50 cm= 2500 cm^2
A5. Fishing line (monofilamen	B5. syringes	C5. appliances	E: <100*100 cm= 10000 cm^2= 1 m^2
A6. Fishing line (entangled)	B6. sanitary towels/ tampon	C6. car parts	F: >100*100 cm = 10000 cm^2= 1 m^2
A7. Synthetic rope	B7. other	C7. cables	
A8. Fishing net		C8. other	
A9. Cable ties			
A10. Strapping band			
A11. crates and containers			
A12. other			
D: Rubber	**E: Glass/ Ceramics**	**F: Natural products**	**G: Miscellaneous**
D1. Boots	E1. Jar	F1. Wood (processed)	G1. Clothing/ rags
D2. Balloons	E2. Bottle	F2. Rope	G2. Shoes
D3. bobbins (fishing)	E3. piece	F3. Paper/ cardboard	G3. other
D4. tyre	E4. other	F4. pallets	
D5. glove		F5. other	
D6. other			

Litter Record Sheet

Cruise:	Station:				Date:	
Litter Type (A1; B2; C...)	Description (Label/ Brand)	Size category (A; B; C..)	Weight (kg)	Picture (number)	attached organisms (yes/no) Taxonomy Info	Comments (Item description if other under litter type)