

# WGBEAM 2016 REPORT

ICES SSGIEOM COMMITTEE

ICES CM 2016/SSGIEOM:20

REF SCICOM, WGISUR AND ACOM

## Final Report of the Working Group on Beam Trawl Surveys

12–15 April 2016

La Rochelle, France



**ICES**

International Council for  
the Exploration of the Sea

**CIEM**

Conseil International pour  
l'Exploration de la Mer

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

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

Recommended format for purposes of citation:

ICES. 2017. Final Report of the Working Group on Beam Trawl Surveys. WGBEAM 2016 Report 12–15 April 2016. La Rochelle, France. ICES CM 2016/SSGIEOM:20. 125 pp.  
<https://doi.org/10.17895/ices.pub.8656>

The material in this report may be reused using the recommended citation. ICES may only grant usage rights of information, data, images, graphs, etc. of which it has ownership. For other third-party material cited in this report, you must contact the original copyright holder for permission. For citation of datasets or use of data to be included in other databases, please refer to the latest ICES data policy on the ICES website. All extracts must be acknowledged. For other reproduction requests please contact the General Secretary.

This document is the product of an Expert Group under the auspices of the International Council for the Exploration of the Sea and does not necessarily represent the view of the Council.

## Contents

---

<b>Executive summary .....</b>	<b>4</b>
<b>1 Administrative details .....</b>	<b>5</b>
<b>2 Terms of Reference a) – e) .....</b>	<b>6</b>
2.1 Multi-annual Terms of Reference .....	6
2.2 Review of WGBEAM 2015 recommendations and actions .....	7
<b>3 Summary of Work plan .....</b>	<b>9</b>
<b>4 Summary of Achievements of the WG during 3-year term.....</b>	<b>10</b>
<b>5 Final report on ToRs, workplan, and Science Implementation Plan .....</b>	<b>11</b>
5.1 Tabulate, report and evaluate population abundance indices by age group for sole and plaice and other species if required in the North Sea, Division 7a and Divisions 7d-g, taking into account the key issues involved in the index calculation. (ToR a). ....	11
5.1.1 Abundance indices by age group for plaice and sole for the offshore surveys.....	11
5.1.2 Abundance indices by age group for plaice and sole for the inshore surveys.....	14
5.2 Trawl surveys in the North Sea and Divisions 7a, 7d-g, 8a-b and the Adriatic, and update and publish the standard as a SISP protocol. ....	15
5.2.1 Results of 2015 surveys.....	15
5.2.2 Coordination and standardization of beam trawl surveys.....	18
5.2.3 Beam trawl survey manuals.....	20
5.3 Analyse the changes in mean length-at-age for sole and plaice in the North Sea, English Channel, Bristol Channel, and Irish Sea .....	20
5.4 Provide index calculations based on DATRAS for plaice and sole for the North Sea.....	21
5.5 Assess the opportunities for providing plaice and sole index calculations based on DATRAS for all other areas. ....	21
5.6 Other issues, requests and actions.....	21
5.6.1 MSFD Monitoring Data Product (MSFD Quality Assured Groundfish Survey Monitoring and Assessment Data Products).....	21
5.6.2 New surveys: The Irish Anglerfish and Megrim Beam Trawl Survey .....	23
5.6.3 New surveys: Beam Trawl Survey plans Iceland .....	25
5.6.4 Database topics .....	26
<b>6 Cooperation.....</b>	<b>29</b>
6.1 Cooperation with other WG.....	29
6.2 Cooperation with Advisory structures .....	29

6.3	Cooperation with other IGOs.....	29
7	Summary of Working Group self-evaluation and conclusions .....	30
8	References .....	31
	Annex 1: List of participants.....	32
	Annex 2: Recommendations .....	34
	Annex 3: WGBEAM terms of reference .....	36
	Annex 4: Details on offshore and inshore beam trawl surveys.....	39
	Annex 4.1: Details of the offshore beam trawl surveys currently undertaken by each country. ....	39
	Annex 4.2: Inventory of the inshore beam trawl surveys. ....	41
	Annex 5: Population abundance indices for sole and plaice, offshore surveys .....	44
	Annex 5.1: Tables of catch rate of sole, offshore surveys.....	44
	Annex 5.2: Tables of catch rate of plaice, offshore surveys. ....	51
	Annex 5.3: Figures of catch rate of sole, offshore surveys .....	60
	Annex 5.4: Figures of catch rate of plaice, offshore surveys.....	68
	Annex 6: Population abundance indices for sole and plaice, inshore surveys.....	75
	Annex 6.1: Indices from the D(Y)FS inshore beam trawl surveys.....	75
	Annex 6.2: Indices from SNS inshore beam trawl survey. ....	80
	Annex 7: WGBEAM self-evaluation.....	85
	Annex 8: Survey summary sheets offshore surveys per country .....	88
	Annex 8.1: Survey summary Belgium.....	88
	Annex 8.2: Survey summary England: 7d and 4c.....	91
	Annex 8.3: Survey summary England: 7a and 7f.....	93
	Annex 8.4: Survey summary England: 7e and Celtic Sea .....	95
	Annex 8.5: Survey summary France .....	98
	Annex 8.6: Survey summary Germany .....	101
	Annex 8.7: Survey summary Italy/Slovenia: Adriatic Sea-GSA17 .....	103

Annex 8.8: Survey summary Netherlands: Tridens .....	105
Annex 8.9: Survey summary Netherlands: Isis .....	107
Annex 9: Survey summary sheets inshore surveys per country .....	109
Annex 9.1: Survey summary Belgium.....	109
Annex 9.2: Survey summary Germany .....	111
Annex 9.3: Survey summary Netherlands: Schollevaar .....	113
Annex 9.4: Survey summary Netherlands: Stern (DYFS).....	115
Annex 9.5: Survey summary Netherlands: Isis (DYFS) .....	117
Annex 9.6: Survey summary Netherlands: Isis (SNS) .....	119
Annex 10: Number of hauls by area and year for the Dutch DFS, German DYFS and Belgian DYFS .....	121
Annex 10.1: Dutch DFS.....	121
Annex 10.2: German DYFS .....	122
Annex 10.3: Belgian DYFS .....	123
Annex 11: Check DATRAS vs. frisbe BTS indices NED.....	124

## Executive summary

---

The Working Group on Beam Trawl Surveys (WGBEAM) met on 12–15 April 2016 in La Rochelle, France. The meeting was attended by 12 people representing seven countries and the ICES Data Centre, and was chaired by Kelle Moreau, Belgium. Data from nine offshore and six inshore surveys were discussed (all surveys under WGBEAM coordination).

WGBEAM 2016 collated an overview of the 2015 results and the 2016 planning of all surveys under its coordination, and provided standard output under the form of updated abundance index time-series for sole and plaice in the offshore and inshore beam trawl surveys. The annual output on spatial sampling coverage and the distribution of a selection of fish species was updated. Progress was made regarding the analysis of changes in mean length-at-age for sole and plaice in the North Sea and the Eastern English Channel, and this work is continued intersessionally.

The group also followed up on its 2015 recommendations and actions, and responded to SSGIEOM requests regarding the skills present in the group and the relation of the group to the different Science Plan Priorities.

### Data

In relation to the ICES Database on Trawl Surveys (DATRAS), actions leading to better data quality were formulated, and ongoing and future development issues were reported and/or discussed.

The index calculation of plaice and sole in the North Sea directly from DATRAS for the Dutch time-series has been finalized in 2016. For safety reasons, the indices sent to the stock assessment groups will be calculated by the Netherlands in the next few years, giving time to compare the consistency of the calculation in DATRAS on new survey data. As the offshore beam trawl survey data for Germany and England have been fully submitted to DATRAS, index calculation for those surveys using the same methodology as for the Dutch data is possible, as well as index calculation for other species.

The data submission of inshore data to DATRAS has been made available for the Demersal Young Fish Survey. For the Sole Net Survey submission facility is still under development.

Litter data for offshore beam trawl survey data have been submitted to DATRAS when available.

### Manuals

The SISP manual for the offshore beam trawl surveys has been sent in for review. Based on the review, the manual for the inshore beam trawl surveys will be modified and also handed in for review.

## 1 Administrative details

---

**Working Group name**

Working Group on Beam Trawl Surveys (WGBEAM)

**Year of Appointment within the current three-year cycle**

2014

**Reporting year concluding the current three-year cycle**

3

**Chair(s)**

Kelle Moreau, Belgium

**Meeting venue(s) and dates**

6–9 May 2014, Hamburg, Germany, (10)

14–17 April 2015, Leuven, Belgium, (9)

12–15 April 2016, La Rochelle, France, (15; one by correspondence)

## 2 Terms of Reference a) – e)

### 2.1 Multi-annual Terms of Reference

The multi-annual terms of reference are listed below, and mainly focused on coordination and standardization of the surveys, data quality and data delivery for assessment purposes.

ToR	Description	Background	Science Plan topics addressed	Duration	Expected Deliverables
a	Tabulate, report and evaluate population abundance indices by age group for sole and plaice and other species if required in the North Sea, Division 7a and Divisions 7d-g, taking into account the key issues involved in the index calculation.	Required to support indices for assessments	113, 121, 141, 144, 161, 162, 173, 211, 251, 252, 311, 321	Annually	WG report chapter
b	Further coordinate and standardize offshore and coastal beam trawl surveys in the North Sea and Divisions 7a, 7d-g, 8a-b and the Adriatic, and update and publish at the standard as a SISP protocol.	Required to ensure consistent approach within and between areas to meet EU directives.	113, 121, 141, 144, 161, 162, 173, 211, 251, 252, 311, 321	Annually	WG report chapter in-shore manual offshore manual database (DATRAS)
c	Analyse the changes in mean length-at-age for sole in the North Sea, English Channel, Bristol Channel and Irish Sea.	a) The large WGBEAM dataset has the potential to elucidate temporal and spatial changes in population parameters. b) Indices are being used by assessments working	145	Expected output in 2015	WGBEAM 2014 update and ultimately ASC presentation



		groups and any changes to age structure of species of interest need to be investigated.			
d	Provide index calculations based on DATRAS for plaice and sole for the North Sea.	Required to support indices for assessments	141, 143, 144	2 years for sole 3 years for plaice	Provision of new indices series to WGNSSK
e	Assess the opportunities for providing plaice and sole index calculations based on DATRAS for all other areas.	Required to support indices for assessments	141, 143, 144	3 years	Provision of new index series to relevant WGs

## 2.2 Review of WGBEAM 2015 recommendations and actions

As the 2015 WGBEAM report only became available during the 2016 meeting, the follow-up on the action points was limited and the recommendations to other groups were not added to the ICES recommendations database, and could not be followed up.

Recommendation	Adressed to	Follow-up
1. WGBEAM recommends that a WK is organized with stock assessors and survey experts to decide on the format of survey sampling variance required for use at assessment working groups, and to produce the methodology to calculate this variance.	SSGIEOM chairs	Not applicable
2. WGBEAM recommends a) that NED and GFR continue to carry out side-by-side or overlapping hauls during their Q3 inshore beam trawl surveys in the context of gear comparisons, mainly to investigate differences in catchability for brown shrimp. b) that a power analysis is carried out (2010, 2014 + newly collected data).	NED, GFR  WGCRAN - WGBEAM	Not applicable
3. WGBEAM recommends that the DATRAS checking procedures be made available in an R-script so national data can be screened prior to the DATRAS screening, making the process more efficient.	ICES Data Centre	Not applicable
4. WGBEAM recommends that ILVO	ILVO	Not applicable

gives priority to the import of beam trawl survey data in their own database and the transmission to the ICES database DATRAS.		
5. WGBEAM recommends that Ifremer gives priority to the upload of beam trawl survey data to the ICES database DATRAS.	Ifremer	Not applicable
6. WGBEAM recommends that if time and weather allows, overlapping hauls should be carried out by countries operating in the same area.	All WGBEAM countries	Not applicable
Action	Adressed to	Follow-up
1. Summarize all information on tag-and-release programmes for demersal elasmobranchs that have been carried out on beam trawl surveys so far. WGBEAM chair to liaise with WGEF chairs on the required information, and to collate this information for the attention of WGEF.	All WGBEAM countries, Kelle Moreau	No follow-up yet
2. Send offshore BTS manual to SSGIEOM-chairs for review in the process towards publication in the SISP-series.	Kelle Moreau	Scheduled for May/June 2016
3. WGBEAM member countries to test the 2014 inshore data against the format description on <a href="http://www.datras.ices.dk">www.datras.ices.dk</a> and upload these data by WGBEAM 2016.	All WGBEAM countries	NED: early 2016, the Netherlands submitted inshore (DYFS) data to the ICES database on Trawl Surveys (DATRAS), 2010-2014 Schollebaar, 2011-2014 Stern, 2011, 2013, 2014 Isis. Other countries have not yet submitted any inshore survey data.
4. Follow-up on the data quality actions listed under 5.6.1.2 of WGBEAM 2015.	All WGBEAM countries	GER, NED carried out
5. Allow data upload for inshore beam trawl surveys to DATRAS.	ICES Data Centre	Completed for DYFS, still pending for SNS
6. Sort out submission of SNS data to DATRAS.	ICES Data Centre, NED	No action

3      **Summary of Work plan**

---

<b>Year 1</b>	Annual standard outputs for a, b. Continue analysis for ToR c, d, e.
<b>Year 2</b>	Annual standard outputs for a, b. Continue analysis for ToR c, d, e sole index output for North Sea.
<b>Year 3</b>	Annual standard outputs for a, b. Combine analysis for previous year and report ToR c.

## 4 Summary of Achievements of the WG during 3-year term

---

In this delivery period, WGBEAM has worked on and achieved the following:

- 1) Update and interpretation of abundance index time-series for sole and plaice in offshore and inshore beam trawl surveys:
  - Incorporation of Dutch index calculation for offshore plaice and sole into DATRAS;
  - Possibility to calculate North Sea indices for plaice and sole for Belgium and Germany based on the same methodology as used for the Dutch indices;
  - Index calculation for dab via DATRAS for the North Sea based on methodology used for plaice and sole;
  - Revision of the combined inshore indices for sole and plaice (national area-expansions, area-weighting);
  - Update and interpretation of abundance index time-series for sole and plaice in offshore and inshore beam trawl surveys.
- 2) Increase standardization of the surveys:
  - Update of offshore beam trawl manual + sent in for review;
  - Progress on inshore beam trawl manual.
- 3) Data quality and availability:
  - Creation of data products from DATRAS;
  - Improvement regarding data quality in DATRAS;
  - Incorporation of inshore beam trawl survey data to DATRAS;
  - Incorporation of Belgian offshore data into DATRAS.
- 4) Other activities:
  - Analysis of the changes in mean length-at-age for sole and plaice in the North Sea, the English Channel, the Bristol Channel, and the Irish Sea (to be continued)
  - Joint session with WGCran leading to expansion of the dataset of comparative tows of the Dutch and German D(Y)FS (2014)
  - Feedback on MSFD GES assessment matters: Marine Litter reporting format (2014), usefulness of beam trawl surveys for biodiversity studies (2014), species richness and LFI (2016)
  - Feedback on the relevance of beam trawl survey data for the effect of pulse fishing

## 5 Final report on ToRs, workplan, and Science Implementation Plan

### 5.1 Tabulate, report and evaluate population abundance indices by age group for sole and plaice and other species if required in the North Sea, Division 7a and Divisions 7d-g, taking into account the key issues involved in the index calculation. (ToR a).

#### 5.1.1 Abundance indices by age group for plaice and sole for the offshore surveys

Figures 5.1.1.1–5.1.1.2 and Tables 5.1.1.1–5.1.1.2 in Annex 5 present the abundance indices by age for sole and plaice from each of the offshore survey areas separately, updated with the indices for 2015.

The full revision history until 2013 can be found in the WGBEAM 2014 report (ICES, 2014) and preceding WGBEAM reports.

#### 5.1.1.1 Sole

##### North Sea – Subarea 4

Time-series trends for sole in the North Sea, based on the Netherlands Isis offshore survey, are shown in Figure 5.1.1.1a in Annex 5.3. This survey indicates that recent year classes have been mainly poor with the 1 group below the long-term arithmetic mean for the last four years (2012–2015). The poor 2011 year class (age group 1 in 2012) resulted in below average age groups up to age group 3 (2014). However, in 2015 this cohort is well above the long-term average. 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 5.1.1.1b in Annex 5.3. Here, the number of one-year olds was below the long-term mean from 2012 to 2014. In 2015 the highest value for age 1 for the whole time-series was observed. The year class 2011 is one of the lowest at age group 1 and below average at age group 2. At age group 3 this year class is again one of the lowest observed in the time-series. In 2015 this cohort shows on average value.

##### Western Waters - Subarea 7

The indices for sole from area 7 stocks are summarized in Figure 5.1.1.1c-f in Annex 5.3.

##### Division 7d

After three years (2009–2011) during which the relative abundance of sole in the Eastern English Channel was either at or above the time-series averages across all age groups, this trend did not continue in 2012 and in 2013, when the numbers of one and two year olds were far below the long-term averages, with the number of one year olds in 2013 (the incoming year class 2012) being the second lowest of the time-series. In 2014 and 2015 the number of one year old sole was again far above the average and among the five highest values recorded. However, the very low observed value for the 2012 year class was not observed at that low level for the 2014 group 2 which was nearly at average. The 2013 year class resulted in above average group 2 in 2015, the below average group 2 of 2014 resulted in a below average group 3 in 2015 and again the above average group 3 in 2014 in above average group 4 in 2015.

The relative abundances for the 1–3 age groups have been quite variable over time, what can often be attributed to strong 1 group recruitments that can be followed through from one year to the next.

### Division 7e

The survey in this area was replaced by a different survey in 2014. From next year onwards the UK survey in Q1 will also be incorporated in the results.

### Division 7f

The relative abundances of the age groups 1 sole in the Bristol Channel was below the time-series average for the years 2009–2014. In 2015 age group 1 shows again above average value. The low observed age group 1 in 2014 resulted in the lowest observed age group 2 value in 2015. The abundance of the 3 group is below the long-term average. The number of age group 4+ was fluctuating around the average for the last three years with a slightly above value in 2015.

### Division 7a

Of all 7 sole stocks, sole in the Irish Sea is clearly in the worst shape according to the beam trawl surveys carried out in this division. Since 2005 the abundances have been below the time-series means for all age groups. In 2015 the numbers of age group 1 was observed for the first time since 2005 above the time-series average. However, the numbers for the 4+ group remain more or less stable at the low 2005–2014 level. As for most other sole stocks, peaks in the abundance of 1 groups can generally be tracked through to following years.

### Division 8a,b

The ORHAGO survey time-series trends of age group abundances of sole in the Bay of Biscay (Figure 5.1.1.1g) is marked by the arrival of two below average and successive year classes in recent years (in 2011 and 2012 at age 1). The yearly advance in age of these two year classes can be followed from age 1 to 3. Their abundance indices in successive years are consistent between them. The three following year classes are close to the mean at age 1 from 2013 onwards. Their abundance indices at age 2 are consistent with age 1 estimates. The 4+ age group abundance indices are over the mean in recent years because the cumulative contribution of the year classes 2007, 2008, and 2009 which are close to or over the mean at ages 4 and older.

### Northern Adriatic Sea

Figure 5.1.1.1h (Annex 5) 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. However the reading process has been started and hopefully soon ALK will be available.

This survey indicates that the 2015 0 age group of sole in the northern Adriatic has been higher than the level of the long-term arithmetic mean (the abundances at this age have only been substantially below the mean in 2006, 2008, 2009, and 2010). Age 1 in 2015 cruise was slightly above the long-term arithmetic mean. At age 2, the 2015 cruise yielded the highest index value of the time-series and the abundance was also above the long-term arithmetic mean for age 3 in this year. The abundance of the 4+ group showed a lower value than 2011.

#### 5.1.1.2 Plaice

##### North Sea – Subarea 4

Figures 5.1.1.2a and 5.1.1.2b in Annex 5.4 show trends in the indices for North Sea plaice from the Netherlands Isis and Tridens surveys. The Isis survey covers mainly the southern North Sea, whereas the Tridens extends substantially further north and west.

The Isis survey indicates that recruitment has been below average in most years since the strong 2001 year class became apparent as one year olds in 2002. In 2014, as detected in 2009, 2011, and 2013, the observed number of one year olds was higher than the long-term mean. In 2015, it was again below the average. The Tridens survey confirmed the strong 2001 year class, but also documented a series of seven consecutive incoming year classes that were above average from 2007 onwards, including 2014. This pattern is visible at all ages in this survey, and the cohorts can be tracked over time really well. The clear increasing trend in the age 4+ group is continuing in 2015 with the highest record of the time-series ever. However, 2015 is the first year since 2010 showing age group 1 below the time-series mean. In the more inshore Isis survey this was only the case to a lesser extent, with above average abundances since 2011 for age group 3 and since 2007 for age 4+. Same as for the Tridens survey time-series the 2015 value for age group 4+ is the highest ever recorded. The combined Isis-Tridens index (Figure 5.1.1.2c in Annex 5.4) shows above average numbers-at-ages 2–4+ in 2015, with an increasing trend since the beginning of the 21st century for ages 3 and 4+. It is not clear where the larger numbers of four year olds in 2007–2009 come from in the Tridens and combined indices.

The population abundance series for plaice from the UK offshore survey (depicted in Figure 5.1.1.2d), tells a different story for the Southern North Sea. Here, the high incoming year classes 2010 and 2013 are apparent as the biggest since 2002. Differently from Dutch surveys the number of incoming recruits at age 1 (year class 2014) is clearly below the long-term average in 2015. The increasing trend in numbers which can be seen from the combined Dutch survey index for age group 3 and 4+ is not that clearly visible in the UK offshore survey in this area, although for age group 3 a strong increase was recorded in 2015 and age group 4+ was above the average for the last four years.

##### Western Waters - Subarea 7

The indices for plaice from area 7 stocks are summarized in Figure 5.1.1.2e-h in Annex 5.4.

##### Division 7d

The abundance at age 1 after the dropping observed in 2012, was again close to the long-term arithmetic mean (year class 2012) in 2013. In 2014 the abundance at age 1 was observed to be exceptional high and is by far the highest record of the time-series. However, in 2015 the number of age group 1 dropped again to the long-term average. In 2014 the observed number of age group 2 was the highest ever observed so far in the time-series, but the value for 2015 was even higher than that. As a result of the good year classes 2009–2011 the numbers of age 4+ were the highest ever observed in the time-series for the years 2013–2015. Cohorts can be generally well tracked into all or some of the following years in this survey.

### Division 7e

The survey in this area was replaced by a different survey in 2014. From next year onwards the UK survey in Q1 will also be incorporated in the results.

### Division 7f

The relative abundance at age 1 increased considerably for plaice in the Bristol Channel in 2013, reaching a value similar to what was observed in 2010 and 2011. This trend continued in 2014 and resulted in the highest record for age group one in the time-series observed so far. However, in 2015 the lowest value ever was recorded. The strong year class 2010 can be tracked over the years, and produced time-series peaks of 3 in 2013 and 4+ year olds in 2014. The numbers in the 4+ group are again the highest of the entire time-series in 2015. Since 2009 the numbers of this age group consistently increased. Earlier in the survey history, abundance peaks of age 1 fish could not always be tracked over the following years as well as in recent years.

### Division 7a

The age 1 abundance of plaice in the Irish Sea in 2014 was above the level of the long-term average with the highest record of the time-series. Since 2002–2003 the abundance figures have remained relatively constant for all age groups (with a lower value for age 1 in 2005–2006 as the main exception), and noticeably above those recorded for the years prior to this date. In 2015 the observed number of age group 1 was well below the time-series mean and the third lowest observed value ever. However, as opposed to sole in this area, plaice in 7a seems to be characterized by a healthy stock status, with numbers for the 4+ group in 2013–2015 being the highest of the time-series and an increasing trend since the beginning of the time-series in 1995. Cohorts can be tracked relatively well over consecutive years in this survey.

#### 5.1.2 Abundance indices by age group for plaice and sole for the inshore surveys

The Belgian Demersal Young Fish Survey (DYFS), the German DYFS and the Dutch Demersal Fish Survey (DFS) together cover most of the coastal and estuarine waters along the continental coast from the French-Belgian border to Esbjerg in Denmark. All these surveys were initiated in the 1970s.

Previously, the three continental surveys and the UK Young Fish Survey (YFS) were combined into international inshore indices for 0 and 1 group plaice and sole. Due to termination of the UK YFS and the spring survey of the German DYFS, the combined 0 group indices are now calculated using Belgian, Dutch and German data, and the combined 1 group indices using Belgian and Dutch data only. The Dutch, and hence the combined indices, are calculated from 1990 onwards, mainly due to a change in the survey design of the Dutch DFS in 1990.

The Dutch Sole Net Survey (SNS) was initiated in 1970 and samples transects further offshore than the other inshore surveys. The SNS survey area overlaps with those of the Dutch DFS and BTS-Isis.

The Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK) uses the SNS indices and the combined inshore indices for recruitment estimates of the North Sea plaice and sole stocks. The SNS indices are also used as tuning fleet in the assessment models for plaice and sole. The combined inshore indices are considered to be suitable for 0 group plaice and sole, but less suitable for 1 group sole and especially for 1 group plaice, because of the spatial coverage



of the survey in relation to the spatial distribution of these age groups. The SNS is considered to be suitable for plaice and sole age groups 1 to 4.

The abundance indices are presented in Annex 6.1 for the D(Y)FS and Annex 6.2 for the SNS. The corresponding combined inshore indices and the SNS indices are plotted for 1990 to 2015 in Figures 5.1.2.1 and 5.1.2.2 respectively (Annexes 6.1 and 6.2).

#### 5.1.2.1 Sole

The combined inshore indices for 0 and 1 group sole were below average in 2015 and are both among the lowest values estimated since 1990 (Figure 5.1.2.1 in Annex 6.1). In the SNS, all age group indices have increased, especially the 2 group index which is now among the highest values estimated since 1990 (Figure 5.1.2.2 in Annex 6.2). The 1, 2 and 4 group indices are above average while the 3 group index is below the average.

A year effect can be observed for sole in 2012, where the total for all age groups was the lowest in the entire time-series since 1990 (Figure 5.1.2.2 in Annex 6.2). This was the year where the SNS was carried out on the RV Tridens instead of the RV Isis (ICES WGBEAM 2013) and the observed year effect may indicate that the change in vessel has caused a bias in the SNS indices. The internal consistency is relatively good until age 3 but becomes weaker for age group 4, especially in the most recent years.

#### 5.1.2.2 Plaice

The combined inshore indices for 0 and 1 group plaice were below average in 2015. The 0 group index is among the lowest values estimated since 1990 (Figure 5.1.2.1 in Annex 6.1). In the SNS, the 1 group and 2 group indices are also below average while the 3 and 4 group indices are above the average (Figure 5.1.2.2 in Annex 6.2).

Although a year effect in 2012 in the SNS is far less evident for plaice than for sole (Figure 5.1.2.2 in Annex 6.2), this year should also be treated with care for plaice. The use of a different vessel in this year may also have affected the catchability of plaice in 2012 (see above). The internal consistency is rather poor for plaice in the most recent survey years.

## 5.2 Trawl surveys in the North Sea and Divisions 7a, 7d-g, 8a-b and the Adriatic, and update and publish the standard as a SISP protocol.

### 5.2.1 Results of 2015 surveys

#### 5.2.1.1 Offshore beam trawl surveys

##### 5.2.1.1.1 Participation and coverage of the area

Nine surveys were carried out, covering the North Sea, 7d, 7e, 7f,g, 7a, 8a, 8b and the Northern Adriatic Sea. The participating vessels and time of the surveys are listed in Table 5.2.1.1. Further details (areas covered, technical specifications) by country are given in Annex 4.1.

**Table 5.2.1.1. Overview of offshore beam trawl surveys during 2015 / early 2016.**

Country	Vessel	Area	Dates	Gear
Belgium	Ramblers	southern North Sea	13–23 Sep 2015	4m beam
England	Endeavour	7d, 4c	18–30 July 2015	4m beam
England	Endeavour	7a, 7f	10–30 Sep 2015	4m beam
England	Endeavour	7e. Celtic Sea	26 Feb–23 Mar 2016	4m beam
France	Côtes de la Manche	8a, 8b	25 Nov–13 Dec 2015	4m beam
Germany	Solea	German Bight	17–31 Aug 2015	7m beam
Italy/Slovenia	G. Dallaporta	northern Adriatic Sea	17 Nov–5 Dec 2015	3.5m beam
Netherlands	Tridens	central North Sea	22 Aug–16 Sep 2015	8m beam + flip-up rope
Netherlands	Isis	southern North Sea	8 Aug–9 Sep 2015	8m beam

#### 5.2.1.1.2 Survey results

A summary of each of the offshore surveys is to be found in Annex 8. The spatial sampling coverage per country is presented in Annex 7.

#### Belgium

Traditionally, RV Belgica is used for the Belgian offshore Beam Trawl Survey, and also in 2015 the survey was planned on board of this vessel (the planned dates were 24 Aug–4 Sep 2015). Unfortunately, a severe incident occurred on RV Belgica in the early morning of Sunday 19 July 2015. Through a hole in the ship's hull seawater filled the engine room up to 1.2 m above the engine room's lower floor. As the repairs and maintenance would take until the end of October 2015 at least, this resulted in the complete loss of ship time for the beam trawl survey, a major setback.

As the survey is compulsory, all alternative options were investigated to ensure that the survey could be carried out within the allowed time frame (that was defined up to the end of September, fishing later would deviate too much from the normal timing – no longer in quarter 3 - and would influence catch compositions and length distributions due to migrations and somatic growth of the fish too much). However, no other (national and foreign) RVs that could serve as replacement for RV Belgica could be identified. The main reasons were full ship agenda's within our possible time frame, insufficient budget (the foreign vessels are often much larger and more expensive per day), and the unavailability of certain crucial sampling equipment on some vessels. However, a Belgian commercial trawler (Z.279 Ramblers) was found prepared to help us out and qualified technically for the beam trawl survey. The period from Saturday 12 until Wednesday 23 of September was an ideal compromise between the agendas of the ILVO staff and the vessel crew.

Apart from using a different vessel (without possibilities for any comparative fishing) and shifting the survey two weeks in time, using a commercial vessel for the North Sea Beam Trawl Survey obviously also affect the amount of work that could be carried out during the survey, mainly because only two scientists could be embarked

instead of the usual minimum of seven scientists. Therefore, all focus went to documenting the commercial fish species (needs to be beard in mind when reading the species table in the Belgian offshore Survey Summary Sheet), and all other work had to be cancelled. In this way no non-commercial fish species and invertebrates could be documented, and no data on marine litter were gathered.

The English eastern English Channel and southern North Sea (7d, 4c) survey was completed without incident, within the time frame and in good weather. In total 76 valid stations were successfully sampled, although it was necessary to reduce the tow duration to 20 min at a number of stations to avoid static gear, and reduce the impact of large catches of shell/gravel. Similarly, there were no major incidents for the Irish Sea and Bristol Channel (7a, 7f) survey. 108 stations were successfully sampled, although it was necessary to reduce tow durations at a number of stations to either avoid static gear or large catches. Five stations were invalid for a number of reasons but were successfully completed. The weather remained generally good for the Q1 western English and Celtic Sea ecosystem survey and it was possible to comfortably complete the survey in the allotted time without major incident. In total 82 and 52 stations were successfully sampled in the eastern English Channel and Celtic Sea respectively.

#### **France**

The vessel for the French ORHAGO survey in the Bay of Biscay switched from the *Antea*, which was used in 2014, to the *Côtes de la Manche*. 49 of the 50 stations were successfully sampled. One station was classed as invalid because of a large catch of mud and mussel.

#### **Germany**

All 63 planned German survey stations were successfully sampled in good weather, without incident.

#### **Italy/Slovenia Adriatic Sea survey**

For the Adriatic Sea survey all 67 hauls were completed, without incident, although 15 stations had to be fished for less than 30 minutes, because of large by catches of benthos and/or as a precaution against gear damage.

#### **The Netherlands**

Two offshore beam trawl surveys were undertaken by the Netherlands, each using a different vessel ("*Tridens*" and "*Isis*"). For the survey conducted by "*Tridens*", 76 valid hauls were carried out, and was completed without major incidents. Although the weather was rough during a large part of the survey, the survey was completed within the time planned. For the "*Isis*" survey, 79 valid hauls were carried out. Although the survey covered most of the planned stations, a few of the stations were taken over by "*Tridens*".

### **5.2.1.2 Inshore beam trawl surveys**

#### **5.2.1.2.1 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) and the Netherlands (Demersal Fish Survey-DFS). UK (Young Fish Survey-YFS) ceased the survey due financial constraints.

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 5.2.1.2. Further details (areas covered, technical specifications) by country are given in Annex 4.2. Details on the strata fished are given in Annex 10.

**Table 5.2.1.2. Overview of surveys during 2015.**

Country	Vessel	Area	Dates	Gear
Belgium	Simon Stevin	Belgian coastal zone	7 Sep–15 Sep	6 m shrimp trawl
Germany	Chartered commercial vessels and FFS Clupea	German Bight and German Wadden Sea	28 Aug–1 Oct	3 m shrimp trawl
Netherlands (SNS)	Isis	Dutch coastal zone	12 Sept–23 Sept	6 m beam trawl
Netherlands	Schollevaar	Scheldt estuary	5 Sep–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	25 Sep–4 Nov (5 weeks in the period)	6 m shrimp trawl

#### 5.2.1.2.2 Survey Results

A summary of each of the surveys is to be found in in Annex 9.

**Belgium** carried out all planned stations and all stations were valid.

The **German inshore survey** did not face any difficulties. In 2015, Germany continued age determination on plaice.

**The Netherlands** carried out all planned inshore surveys without any problems. In the Scheldt estuary a new rigging was used and compared with the old rigging.

### 5.2.2 Coordination and standardization of beam trawl surveys

#### 5.2.2.1 Offshore beam trawl surveys

##### 5.2.2.1.1 Timing and area coverage

Annex 4.1 lists the offshore surveys together with the geographic area covered, the gear used, and date started.

As in previous years, WGBEAM recommends that if time and weather allows, overlapping hauls should be carried out by countries operating in the same area. In 2015, no overlapping hauls were carried out due to time constraints, other priorities and budgetary constraints.

**Table 5.2.2.1. Timing of the offshore beam trawl surveys in 2016 / early 2017.**

Country	Vessel	Area	Dates	Gear	Contact
Belgium	Belgica	southern North Sea	5–16 Sep 2016	4 m beam	loes.vandecasteele@ilvo.vlaanderen.be
UK	Cefas Endeavour	English Channel/Celtic Sea	26 Feb–23 Mar 2017 (Dates provisional)	2x 4 m beam	sven.kupschus@cefas.co.uk Cc: ian.holmes@cefas.co.uk
UK	Cefas Endeavour	7d, 4c	17 Jul–30 Jul 2016	4 m beam	joanne.smith@cefas.co.uk Cc: ian.holmes@cefas.co.uk
UK	Cefas Endeavour	7fg, 7a	10 Sep–30 Sep 2016	4 m beam	stephen.shaw@cefas.co.uk Cc: ian.holmes@cefas.co.uk
France	Côtes de la Manche	8a, 8b	9 Nov–30 Nov 2016	4 m beam	yann.coupeau@ifremer.fr Cc: Gerard.Biais@ifremer.fr
Germany	Solea	German Bight	16 Aug–2 Sep 2016	7 m beam	kay.panten@ti.bund.de
Adriatic (Italy-Slovenia)	G. Dallaporta	North Adriatic Sea (GSA 17)	17 Nov–11 Dec 2016	2x 3.5 m modified beam	giuseppe.scarcella@an.ismar.cnr.it
Netherlands	Tridens	central North Sea	22 Aug–16 Sep 2016	2x 8 m beam + flip-up rope	ingeborg.deboois@wur.nl
Netherlands	Isis	southern North Sea	8 Aug–9 Sep 2016	2x 8 m beam	Ronald.bol@wur.nl Cc: ingeborg.deboois@wur.nl
Ireland	Celtic Explorer	western Celtic Sea	6 Mar–16 Mar 2017 (Dates provisional)	2x 4 m beam	Hans.gerritsen@marine.ie

**5.2.2.1.2 Staff exchanges**

No staff exchanges are planned for the 2016 offshore surveys.

**5.2.2.2 Inshore beam trawl surveys****5.2.2.2.1 Timing and area coverage**

Annex 4.2 lists the inshore surveys together with the geographic area covered, the gear used and the date started.

**Table 5.2.2.2. Timing of the offshore beam trawl surveys in 2016/early 2017.**

Country	Vessel	Area	Dates	Gear	contact
Belgium	Simon Stevin	Belgian coastal zone	19–27 Sep	6 m shrimp trawl	Jurgen.Bossaert@ilvo.vlaanderen.be Cc: loes.vandecasteele@ilvo.vlaanderen.be
German	Chartered	German	4–30	3 m	Holger.haslob@thuenen.de

y	vessels and RV Clupea	Bight and German Wadden Sea	Sep	shrimp trawl	
Netherla nds (SNS)	Isis	Dutch coastal zone	12–23 Sep	6 m beam trawl	Hanz.wiegerinck@wur.nl Cc: Loes.bolle@wur.nl
Netherla nds	Luctor	Scheldt estuary	5–23 Sep	3 m shrimp trawl	Andre.dijkman@wur.nl Cc: Loes.bolle@wur.nl
Netherla nds	Stern	Dutch Wadden Sea	29 Aug– 30 Sep	3 m shrimp trawl	Marcel.devries@wur.nl Cc: Loes.bolle@wur.nl
Netherla nds	Isis	Dutch coastal zone and German Bight	26 Sep–4 Nov	6 m shrimp trawl	Thomas.pasterkamp@wur.nl Cc: Loes.bolle@wur.nl

#### 5.2.2.3 Staff exchanges

No staff exchanges are planned for the 2016 inshore surveys.

#### 5.2.3 Beam trawl survey manuals

##### 5.2.3.1 Offshore BTS manual

During WGBEAM 2016, an updated version of the Manual for the Offshore Beam Trawl Surveys, was sent to Nils Olav Handegard – (8 April 2016) as was agreed to send it in for review.

Some sections still require an update: more gear drawings should be included, the section on extra data should be extended (for instance, more countries are collecting litter data than described here), the protocol for starting a new beam trawl survey could include recent WGISUR-output (or reference to that output).

Furthermore, this manual describes the beam trawl surveys that were coordinated under WGBEAM as in 2015. In 2016 some new members were welcomed (Ireland, Iceland) but nothing on their surveys (Ireland did its first BTS in March 2016, Iceland still needs to start) is included in this manual yet.

##### 5.2.3.2 Inshore BTS manual

The last updates of the draft inshore beam trawl manual were described in WGBEAM 2015, and no further progress was made during WGBEAM 2016 as the group decided to wait for the review of the offshore SISP manual before releasing the inshore manual. Based on the review of the offshore manual, revisions in the inshore manual can be made before letting it being reviewed through the SISP procedure.

### 5.3 Analyse the changes in mean length-at-age for sole and plaice in the North Sea, English Channel, Bristol Channel, and Irish Sea

The objective is to analyse changes in mean length-at-age for sole and plaice in the North Sea, English Channel, Bristol Channel, and Irish Sea. Originally this was only intended for sole, but it was decided to include plaice to widen the scope of this study. The main goal of this study is to examine consistency of trends across areas

and species, to allow formulation and evaluation of hypotheses on the causal factors underlying trends in length-at-age. During the meeting the datasets were updated and analyses were refined. More work is planned to be carried out intersessionally.

#### **5.4 Provide index calculations based on DATRAS for plaice and sole for the North Sea**

During the 2016 meeting, the index product calculation has been finished. Annex 11 marks the changes still to be made in the DATRAS data, or checks still to be carried out on the selection of rectangles. Most of the inconsistencies are related to a mismatch in (re)submitted data. The last revision of the Dutch index series was carried out in 2009, and from then onwards only annual updates (=adding a year to the series) have been carried out. This means that smaller data revisions have not been taken into account in the index, and may be resubmitted in DATRAS.

A full review of the Dutch index series will be carried out early 2017, also taking into account index calculation for dab, and that will be checked against the dab index calculations created by DATRAS.

For safety reasons, the indices sent to the stock assessment groups will be calculated by the Netherlands in the next few years, giving time to compare the consistency of the calculation in DATRAS on new survey data.

#### **5.5 Assess the opportunities for providing plaice and sole index calculations based on DATRAS for all other areas.**

Indices for plaice and sole in the North Sea have also been calculated for Germany 2014 and 2015 during the meeting. The data can be used as input for WKNSEA 2017 for the plaice benchmark.

Additionally, an index calculation was carried out for dab in the North Sea (based on Dutch data), to be used in WKNSEA 2016 for the dab benchmark.

#### **5.6 Other issues, requests and actions**

##### **5.6.1 MSFD Monitoring Data Product (MSFD Quality Assured Groundfish Survey Monitoring and Assessment Data Products)**

The pilot project which aims to produce quality assured Groundfish Survey Monitoring and Assessment data products (GFSM&A DP) for use in the derivation of MSFD was presented to the working group. Quality Assurance documentation is currently being compiled which aims to produce a quality assured dataset for use in MSFD assessment. The BEAM data providers have been instrumental in bringing the DATRAS database closer to the national standard datasets through uploading their corrected data to the DATRAS database. Changes such as correcting species codes, correcting length records, and correcting distance records to match the national database entries, were made.

There are two separate steps in the quality control procedure. (a) Data are checked at the national institution with the original data (as far as possible), then corrected and re-uploaded to DATRAS. By checking this existing data genuine mistakes have been identified. (b) In some cases for a variety of reasons it is not possible to check the original data. In these cases the second step is applied, this is when in individual cases where direct comparisons of historic data are impossible, but expert judgement is needed to achieve consistency and plausibility throughout the dataset. When a reported data point are considered to be highly unlikely, for example a *Sprattus sprattus*

of 28 cm when the reported  $L_{\max}$  is 16 cm, the expert judgement from the data provider in question was that this is a typo, where the 3 letter code for Spotted Ray (SDR) was mistyped as the one for sprat (SPR). This error was picked up by screening the  $L_{\max}$  for every species. Many of these changes have already been made in the DATRAS database, but issues arose with uploading historic data for many of the institutions and some resubmissions of historical data have yet to be completed. When all of the corrected data have been compiled the next step is estimating missing values in the haul chronology and biological datasets. This is completed using a variety of methods outlined in the presentation given and detailed in the MSFD Quality Assurance GFSM&A DP documentation, which the working group has been asked to provide feedback on.

Figure 5.6.1.1 describes the process within ICES and OSPAR to produce the GFSM&A DP. The reviews and feedback from the ICES community is an important aspect of the quality assurance process currently being undertaken. The IBTS and BEAM working group participants have been asked to assess this draft documentation and assure that the methods and protocols being applied to produce the GFSM&A DP are suitable for their individual datasets, and where possible provide suggestions and improvements to the protocols to develop the methodology for data quality assurance which can then be applied to the GFSM&S DP and directly to the DATRAS database. Where information relevant to individual surveys is not available within the documentation, and could have consequences for how the data should be used, WGBEAM has been asked to provide details of this for inclusion in the quality assurance documentation.

Recommendations have been outlined and discussed at the working group the relevant parties to address each of these recommendations have been identified and an action point has been made to inform relevant parties of these recommendations (bullet points below).

#### **WGBEAM**

- All available data should be uploaded to DATRAS for use in MSFD GES assessment
- A common standard to estimate missing parameters should be used
- Historical data quality should be addressed within the group
- Increase annual coverage in ICES Rectangles that just miss out in the survey selection criteria (details will be included in the documentation and sent to the relevant national data providers, for their information)

#### **ICES Data Centre**

- Added transparency to changes made to DATRAS data
- Add L-max checks to DATRAS screening for all fish species
- Add a "health warning" if Aphid Codes are not to species level for fish
- Add further checks to capture outlying data points for gear parameters etc.
- Separate the English Channel data into a new file (part in BTS and part in BTS 7a)

#### **DIG**

- New working group for Data Quality within DATRAS



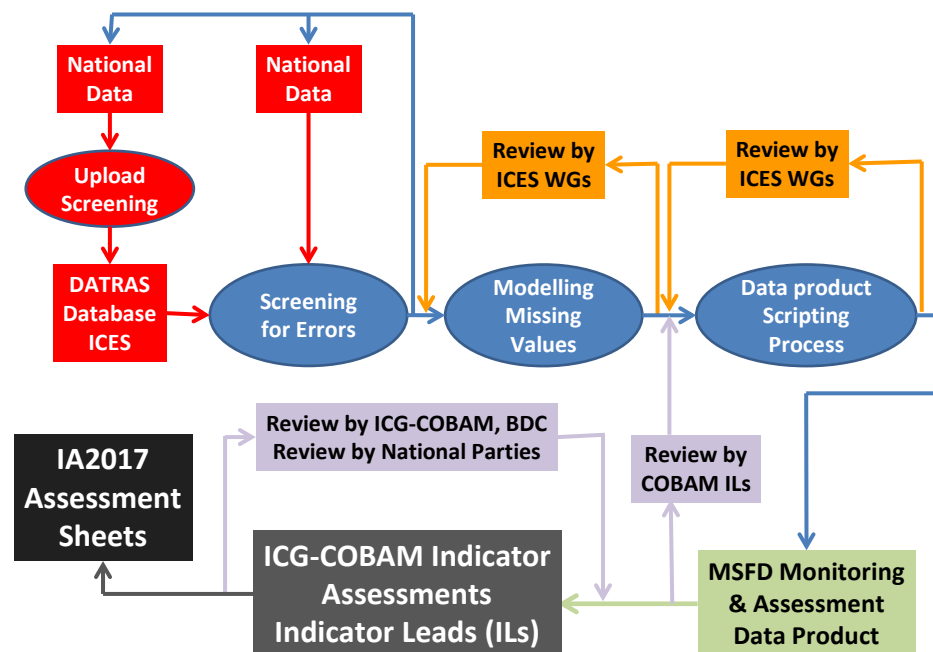


Figure 5.6.1.1. Overview of the full groundfish survey monitoring and assessment process.

## 5.6.2 New surveys: The Irish Anglerfish and Megrim Beam Trawl Survey

### 5.6.2.1 Objectives

The first annual Irish Beamtrawl Ecosystem (IBES) took place on 6–16 march 2016 on RV Celtic Explorer in the Western Celtic Sea.

The main objective of the survey is to connect the Irish Anglerfish and Megrim Survey (IAMS) to the UK beam trawl surveys in the Celtic Sea, English Channel, and Irish Sea, with the purpose of providing a swept-area biomass estimate for anglerfish (*Lophis piscatorius* and *L. budegassa*) in Area 7.

Secondary objectives are to collect data on the distribution and relative abundance of commercially exploited species as well as invertebrates and bycatch species, particularly vulnerable and indicator species. The survey also collects maturity and other biological information for commercial fish species in the western Celtic Sea.

The IBES survey is coordinated with the Cefas Q1 Southwest Ecosystem Survey (Q1SWECOS) and uses the same gear and methods.

An ecosystem-based spatial stratification for the Celtic Sea and western Channel was developed by WGMSFDEMO (2015). These strata are used by IBES as well as Q1SWECOS which covers the area as far west as stratum G (Figure 5.6.2.1). The IBES was designed to cover strata Ia, Ib, IV and A as well as stratum G to allow a comparison between the IBES and Q1SWECOS.

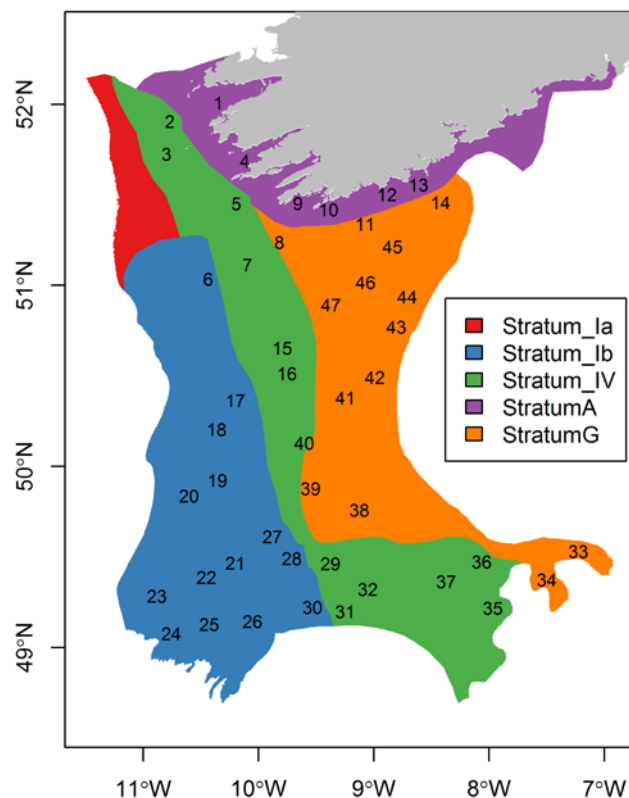


Figure 5.6.2.1 Valid tow positions, the numbers refer to the haul number.

#### 5.6.2.2 Results

A total of 45 valid tows were completed (out of a possible 51), as well as 2 additional tows (these had not been randomly selected but were sampled opportunistically). There were no foul hauls or gear damage

#### 5.6.2.3 Summary statistics

Table 5.6.2.1 Target and achieved number of stations per stratum

Stratum name	Target	Achieved	Area (km <sup>2</sup> )	Swept-area (km <sup>2</sup> )	Swept-area (%)
Stratum A	5	4	6832	0.1782	0.0026%
Stratum_Ia	2	0	2502	0	0
Stratum_Ib	16	14	20065	0.4246	0.0021%
Stratum_IV	14	13	17970	0.3901	0.0022%
Stratum G	14	14	17309	0.4251	0.0025%
Total	51	45	64675	1.4180	0.0026%

Table 5.6.2.2 Catch rates of target species

Species	CatchNum	CatchNumHr	CatchWtKgHr
Megrim	3467	144.0	11.28
Black bellied angler	907	37.7	9.89
Four-spot megrim	474	19.7	1.01
White-bellied angler	230	9.6	9.25

**Table 5.6.2.3 Catch rates of the top 10 species (by number); 57 species of fish were caught.**

Species	CatchNum	CatchNumHr	CatchWtKgHr
Megrim	3467	144.0	11.28
<b>Norway pout</b>	942	39.1	0.38
<b>Black bellied angler</b>	907	37.7	9.89
<b>Boarfish</b>	851	35.3	1.61
<b>Grey gurnard</b>	534	22.2	1.56
<b>Four-spot megrim</b>	474	19.7	1.01
<b>Witch</b>	441	18.3	1.18
<b>Plaice</b>	417	17.3	1.56
<b>Poor cod</b>	343	14.2	0.43
<b>Common dragonet</b>	330	13.7	0.53

### 5.6.3 New surveys: Beam Trawl Survey plans Iceland

Stock assessment for flatfish in Icelandic waters has historically been limited by the lack of data, despite the fact that landed value of the 6 most common species (plaice, lemon sole, witch, dab, rough dab, and megrim) in 2015 was just north of 13 million €. In particular, recruitment data and knowledge of the locations of nursery areas of these species is lacking.

Plaice has historically been the most targeted flatfish in Icelandic coastal waters, with catches exceeding 14 000 tonnes in the 1980s. Overfishing during that period led to lowered catches, and as a result TAC was put in place in 1997, followed by area closures in 2001 to protect the three main spawning grounds for plaice. Despite its importance and value, there is a knowledge gap on the spatial distribution of the species for the first 3 years of their life, or until they start to appear in the fishery and bottom-trawl surveys at 3–4 years old. No recruitment index exists, which increases uncertainty in stock assessment and setting of TAC. Similar story can be said about the other five commercially important flatfish species, lack of recruitment data has been limiting for the stock assessment of those species.

The Marine Research Institute's annual spring survey that was started in 1986 and has over 600 stations around the country does not adequately catch juvenile flatfish due to the type of otter trawl used and the fact that it cannot be used in shallow water (100 m or less) where most of the juveniles are thought to be found. Trials to sample this shallow water in 2006 with a modified *Nephrops* trawl with 40 mm shrimp mesh ended in shreds as the gear was ripped easily on the complex bottom in the shallow water, and earlier trials with modified demersal seine ended similarly. Investigation into other gear to sample the juvenile flatfish around Iceland suggests that beam trawl with chain mats would be ideal.

A pilot study using a 3 or 4 meter beam trawl on approx. 100 selected stations on the west and south coast of Iceland is therefore planned in autumn 2016. The stations will be selected based on knowledge of spawning grounds of the main flatfish species, earlier studies with push net that caught age 0 plaice, and bottom type base on multibeam data. If this pilot study on the west and south coasts is successful, expansion to cover the rest of the country would be in order.

#### 5.6.4 Database topics

##### 5.6.4.1 DATRAS input format changes

WGBEAM recommends that for BycSpecRecCode the value 0 (no bycatch species recorded) becomes a valid value for all BTS (i.e. BTS, BTS-VII, BTS-VIII) and inshore beam trawl surveys in DATRAS. In some cases it has not been possible to collect information on bycatch species (either historic or because of technical issues).

WGBEAM recommends that the columns FishID, GenSamp, StomSamp, AgeSource, AgePrepMet, OtGrading are added to the BTS input format, as defined in the inshore beam trawl survey format already. In this way all the beam trawl survey formats will be aligned, and more information becomes available on the age reading methodology as well as the otolith quality.

##### 5.6.4.2 DATRAS output products

In 2015, the file containing cpue per haul (n/hour and n/ha) became available at the [DATRAS](#) webpage. This file contains cpues per length per species.

##### 5.6.4.3 Recommendation for the inclusion of the Cefas Q1SWECOS (eastern English Channel/Celtic Sea beam trawl survey data in DATRAS (2006 onwards))

Gary Burt, Sven Kupchus and Vaishav Soni discussed the inclusion of the new survey-series and what DATRAS survey this should be attributed to. Currently Cefas submits beam trawl data for three existing surveys to two dataserieS: BTS and BTS-VIIa. BTS-VIIa is solely used by Cefas to accommodate the Cefas NWGFS survey-series. The other two Cefas survey-series (7DBTS and CARHELMAR) are currently included in the DATRAS BTS survey along with data from the Netherlands. The recommendation is to include the Q1SWECOS data in the BTS series and to abandon the DATRAS BTS-VIIa series and move these data to BTS that the ICES Data Centre should be able to undertake, in cooperation with Cefas. As a consequence, this would mean that the English data would have two surveys, in the series, undertaken by the same vessel, gear and quarter, which would have to be addressed by creating an additional gear code to make the differentiation. A summary of the English surveys to be included in BTS is in Table 5.6.4.1.

**Table 5.6.4.1 English offshore beam trawl surveys**

Cefas survey	ICES region	Quarter	Vessels	Gears	Comment
Q1SWECOS	7e, Celtic Sea	Q1	END	4m BT (blinder) 4m BT (no blinder)	DATRAS to generate new gear codes
7dBTS	7d, 4c	Q3	END, COR	4m BT aft	DATRAS to allocate different gear codes for same gear to make distinction between the two surveys
NWGFS	Irish Sea	Q3	END, COR	4m BT aft	
CARHELMAR	7e	Q4	CAR, COR	4m BT port 4m BT stbd 4m BT aft (when conducted on COR)	DATRAS to retain existing gear codes for port and stbd. For 4m BT aft DATRAS to use same gear code as NWGFS, when the survey was undertaken as an extension to the NWGFS in 2002 and 2004.

Further to this, and to maximize the potential of Cefas', DATRAS data, Cefas would like the ICES Data Centre to make the following changes to the DATRAS BTS survey-series to allow for the following to be accommodated:

- Stratum – necessary for the grouping of stations as fixed prime stations (DATRAS: stn) are not used
- Validities of V, A, and I, which would allow for CA records to be included for invalid stations when this has occurred
- Allow for counted species by more than one sex (e.g. spider crabs: M; F; B)

Prior to Cefas requesting the ICES Data Centre to move the NWGFS survey to the DATRAS BTS survey Cefas would ask that all data are made attributable to Q3 as some of the data has been incorrectly classified as Q4, although stations were undertaken during this quarter. Cefas would re-upload data for 2002–2004 to exclude data that formed part of the CARHELMAR survey, which currently creates some confusion. Cefas also stated that it would address the fact in DATRAS that the catch was only partially sampled for the CARHELMAR survey for the majority of the stations. For further information, refer to Burt *et al.*, 2013.

#### 5.6.4.4 Tagging of elasmobranchs – info requested by WGEF

An overview of tagging programmes during the beam trawl surveys was requested by WGEF. WGBEAM 2016 provided information to WGEF before the 2016 WGEF meeting (15–24 June 2016). Only Netherlands and England tag elasmobranchs during the beam trawl surveys occasionally.

#### 5.6.4.5 Litter data

Litter data database: since November 2015, the litter data from trawl catch can be uploaded to the ICES database. The Netherlands and Germany have already submit-

ted their data, England has only submitted data for 2015 and Belgium has not submitted any data.

## **6 Cooperation**

---

### **6.1 Cooperation with other WG**

Over the past years, WGBEAM worked together or provided information to the following ICES groups: Working Group on North Sea and Skagerrak (WGNSSK), Working Group on Elasmobranch Fisheries (WGEF) and Working Group on Crangon Fisheries and Life History (WGCRAN).

### **6.2 Cooperation with Advisory structures**

Over the past years, WGBEAM worked together and/or provided information to the following ICES assessment groups: Working Group on North Sea and Skagerrak (WGNSSK), Working Group on Elasmobranch Fisheries (WGEF) and Working Group on Crangon Fisheries and Life History (WGCRAN).

Furthermore, information for the MSFD assessment has been supplied, for litter as well as biodiversity.

### **6.3 Cooperation with other IGOs**

Not applicable.

## 7 Summary of Working Group self-evaluation and conclusions

---

A self-evaluation was carried out by WGBEAM (full evaluation in Annex 12). One of the planned products (paper on changes in length-at-age) could not be finished within the previous period although progress was made. The work is planned to be continued in 2017.

The group sees a clear reason for continuation: especially the DCF funded surveys need to be coordinated, and integration of surveys and sample collection will be a topic in the next years. The group has expanded over the last decade: it started off with the Netherlands, Germany, England, and Belgium. In 2007 France joined as a beam trawl survey was developed in the Bay of Biscay, followed by Italy (2011) due to the DCF obligation to have a survey internationally coordinated, and Ireland and Iceland (both 2016). Ireland started the beam trawl survey in the Irish/Celtic Sea in March 2016, in line with the English survey in that area. Iceland is developing a beam trawl survey to target younger flatfish year classes.

As for the terms of reference it is proposed to add a new term of reference to work on more ecosystem related information, e.g. provide information for MSFD indicators, analyse fish and epibenthos communities in the North Sea and Celtic Sea.



## 8 References

---

Burt G.J., Ellis J.R., Harley B.F. and Kupschus S.. 2013. The FV Carhelmar beam trawl survey of the western English Channel (1989–2011): History of the survey, data availability and the distribution and relative abundance of fish and commercial shellfish. Sci. Ser. Tech. Rep., Cefas Lowestoft, 151: 139 pp.

## Annex 1: List of participants

Name	Address	E-mail
G�rard Biais	Ifremer L'Houmeau Station PO Box 7 F 17137 L'Houmeau France	gerard.biais@ifremer.fr
Loes J. Bolle	IMARES PO Box 68 1970 AB IJmuiden Netherlands	loes.bolle@wur.nl
Ingeborg de Boois	IMARES PO Box 68 1970 AB IJmuiden Netherlands	ingeborg.deboois@wur.nl
Gary Burt	Cefas Lowestoft Laboratory Pakefield Road NR33 0HT Lowestoft Suffolk UK	gary.burt@cefas.co.uk
Yann Coupeau	Ifremer L'Houmeau Station PO Box 7 F 17137 L'Houmeau France	yann.coupeau@ifremer.fr
Sven Kupschus	Cefas Lowestoft Laboratory Pakefield Road NR33 0HT Lowestoft Suffolk UK	sven.kupschus@cefas.co.uk
Gudjon Mar Sigurdsson	Marine Research Institute Skulagata 4, 121 Reykjavik Iceland	gudjon.mar.sigurdsson@hafogvatn.is
Gr�inne N� Chonch�ir	The Marine Institute Rinville Oranmore Co. Galway Ireland	Grainne.nichonchuir@marine.ie
Holger Haslob	Th�nen Institute Institute for Sea Fisheries Palmaille 9 22767 Hamburg Germany	holger.haslob@thuenen.de

Kelle Moreau Chair	Institute for Agricultural and Fisheries Research (ILVO) Ankerstraat 1 8400 Oostende Belgium	kelle.moreau@ilvo.vlaanderen.be
Kay Panten	Thünen-Institute for Sea Fisheries, Palmaille 9 22767 Hamburg Germany	kay.panten@thuenen.de
Giuseppe Scarcella <i>By correspondence</i>	National Research Council (CNR) Institute of Marine Sciences (ISMAR) - Fisheries Section Largo Fiera della Pesca, 2 - 60125 Ancona Italy	g.scarcella@ismar.cnr.it
Vaishav Soni	International Council for the Exploration of the Sea (ICES) H. C. Andersens Boulevard 44-46 1553 Copenhagen V Denmark	vaishav@ices.dk

## Annex 2: Recommendations

Recommendation	Adressed to
1. WGBEAM recommends that BEL starts ageing of dab on the offshore beam trawl survey for future inclusion in the stock assessment of North Sea dab.	ACOM (Belgium)
2. WGBEAM recommends that a) transparency on changes made to DATRAS data are further improved, by implementing the suggestions (if not already in place) made by WKDATR 2013, in section 3.1.3 b) adding L-max checks to DATRAS screening for all fish species based on the L-max list provided by M. Moriarty	ICES Data Centre, DIG
3. WGBEAM recommends that the English Channel beam trawl survey data that are now in the BTS VIIa dataset should be split into the relevant areas, and that the respective parts are re-uploaded in the BTS and BTS VIIa datasets.	ACOM (UK), ICES Data Centre
4. WGBEAM recommends that the Q1SWECOS data are included in the BTS dataset in DATRAS.	ACOM (UK), ICES Data Centre
5. WGBEAM recommends that the scope and added value of a new working group on “Data Quality within DATRAS” is investigated.	DIG, SSGIEOM
6. WGBEAM recommends that the columns FishID, GenSamp, StomSamp, AgeSource, AgePrepMet, OtGrading are added to the BTS input format	ICES Data Centre
7. WGBEAM recommends that for BycSpecRecCode the value 0 (no by-catch species recorded) becomes a valid value for all BTS (i.e. BTS, BTS-VII, BTS-VIII) and inshore beam trawl surveys in DATRAS	ICES Data Centre
Action	Adressed to
1. Summarize all information on tag-and-release programmes for demersal elasmobranchs that have been carried out on beam trawl surveys so far. WGBEAM chair to liaise with WGEF chairs on the required information, and to collate this information for the attention of WGEF.	Kelle Moreau, Ingeborg de Boois, Gary Burt, Kay Panten, Gérard Biais
2. Continue work on inshore BTS manual and send to SSGIEOM-chairs for review in the process towards publication in the SISP-series.	Kelle Moreau, Ingeborg de Boois, Gary Burt, Holger Haslob, Loes Bolle
3. ILVO to give priority to the import of beam trawl survey data in their own database and the transmission to DATRAS.	ACOM (Belgium)
4. Ifremer to give priority to the upload of beam trawl survey data to DATRAS.	ACOM (France)
5. WGBEAM member countries to continue the upload of: - inshore beam trawl survey data to DATRAS; - offshore beam trawl survey including all taxa.	Ingeborg de Boois, Kelle Moreau, Gary Burt, Kay Panten
6. Sort out submission of SNS data to DATRAS.	ICES Data Centre (Vaishav Sone, Anna Osypchuk), Ingeborg de Boois
7. Continue the work on DATRAS checking procedures to be made available in an R-script so national data can be screened prior to the	ICES Data Centre (Vaishav Sone,

DATRAS screening, making the process more efficient.	Anna Osypchuk)
8. If time and weather allows:	All
- overlapping hauls are carried out by countries operating in the same area;	
- the ICES Rectangles are visited that just miss out in the survey selection criteria for use in MSFD GES assessment (based on list of M. Moriarty);	
- NED and GFR continue to carry out side-by-side or overlapping hauls during their Q3 inshore beam trawl surveys in the context of gear comparisons, mainly to investigate differences in catchability for brown shrimp	

### Annex 3: WGBEAM terms of reference

Approved by SCICOM pending minor updates  
SSGIEOM chair will work with this group to add linkages  
and summary of workplan.

#### 2016/MA2/SSGIEOM11

The **Working Group on Beam Trawl Surveys** (WGBEAM), chaired by Holger Haslob\*, Germany, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2017	4-7 April	Galway, Ireland	Interim report by May to SSGIEOM, SCICOM, WGISUR and ACOM	New chair
Year 2018	TBD	TBD	Interim report by Date Month May to SSGIEOM, SCICOM, WGISUR and ACOM	
Year 2019	TBD	TBD	Final report by Date Month May to SSGIEOM, SCICOM, WGISUR and ACOM	

#### ToR descriptors

ToR	Description	Background	Science Plan topics addressed	Duration	Expected Deliverables
a	Tabulate, report and evaluate population abundance indices by age group for sole, plaice and dab and other species if required in the North Sea, Division 7a, Divisions 7d-g, Divisions 8ab and the Adriatic taking into account the key issues involved in the index calculation.	<p>a) Science Requirements</p> <p>Length-at-age analysis</p> <p>b) Advisory Requirements</p> <p>Required to support indices for assessments</p> <p>c) Requirements from other EGs</p> <p>Specific questions</p>	25,27	Annually	WG report chapter

		from other EGs possible			
b	Further coordinate and standardize offshore and coastal beam trawl surveys in the North Sea and Divisions 7a, 7d-g, 8a-b and the Adriatic, and update and publish the standard as a SISP protocol.	a) Science Requirements b) Advisory Requirements  Required to ensure consistent approach within and between areas to meet EU directives.	31	Annually	WG report chapter inshore manual offshore manual database (DATRAS)
c	Analyse the changes in mean length-at-age for sole in the North Sea, English Channel, Bristol Channel and Irish Sea. (continuation of WGBEAM work in 2014-2016)	a) Science Requirements The large WGBEAM dataset has the potential to elucidate temporal and spatial changes in population parameters. b) Advisory Requirements Indices are being used by assessments working groups and any changes to age structure of species of interest need to be investigated.	xxx	Expected output in 2017	WGBEAM 2017 update and ultimately ASC presentation
d	Provide index calculations based on DATRAS for dab in the North Sea, and plaice and sole in Divisions 7a, 7d-g, 8a-b and the Adriatic.	Required to support indices for assessments	25,27	3 years	Provision of new index series to relevant WGs
e					

### Summary of the Work Plan

Year 1
Year 2
Year 3

### 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. Several indices produced by WGBEAM are already included in Category 1 stock assessments (NS sole, NS plaice, Biscay sole, NS dab since 2016) and data collected on beam trawl surveys are increasingly used to produce indices for Category 3 stock assessments. Consequently, these activities are considered to have a very high priority.
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 10–15 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	As WGBEAM directly calculates and discusses survey indices for stock assessments, and coordinates surveys from which data are used in other stock assessments, there is a clear linkage to ACOM and some of the stock assessment WGs under its coordination (WGNSSK, WGCSE, WGBBI, WGEF).
Linkages to other committees or groups	There is a very close working relationship with all the groups of the SSGIEOM/SSGESST. Joint sessions are sometimes organized (e.g. with WGCRAN in 2014). 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.



## Annex 4: Details on offshore and inshore beam trawl surveys

### Annex 4.1: Details of the offshore beam trawl surveys currently undertaken by each country.

	Belgium	France	Germany	Adriatic	Netherlands	Netherlands	UK	UK	UK
<b>Survey area:</b>	4b and c west	8ab	4b east	North Adriatic Sea (GSA 17)	4b and c east	Central N Sea	7d	7e	7a, f and g
<b>Year survey started:</b>	1992	2007	1991	2005	1985	1996	1988	1988	1988
<b>Dates:</b>	August	November	mid August	November	August-early September	mid August-mid September	late July	late September/early October	September
<b>Usual start date</b>	week 33	week 44	week 32	week 45	week 32/33	week 34	week 30	week 39/40	week 36/37
<b>Number of survey days</b>	10	35	13	18	20	16–20	15	8	21–24
<b>Ship:</b>	RV Belgica	RV Gwen Drez	RV Solea #	RV G. Dallaporta	RV Isis	RV Tridens	RV Cefas Endeavour ##	MFV Carhelmar	RV Cefas Endeavour
<b>Ship length:</b>	50 m	24.5 m	42 m	35.7 m	28 m	73.5	73 m	22 m	73 m
<b>Beam trawl length:</b>	4 m	4 m	7 m	3.5 m	8 m	8 m	4 m	4 m	4 m
<b>Number of beams fished:</b>	1	1	2	2	2	2	1	2	1
<b>Number of beams sorted:</b>	1	1	1	2	1	1	1	2	1

	Belgium	France	Germany	Adriatic	Netherlands	Netherlands	UK	UK	UK
<b>Trawl duration (min):</b>	30	30	30	30	30	30	30	30	30
<b>Tow speed (knots):</b>	4	5	4	5.5	4	4	4	4	4
<b>Codend stretched mesh (mm):</b>	40	20	80 Liner: 40 mm	40	40	40	75 Liner: 40 mm	75 Liner: 40 mm	75 Liner: 40 mm
<b>Number of ticklers:</b>	0	10	5	0	8	8	0	0	0
<b>Gear code:</b>	BT4M		BT7	Rapido	BT8	BT8F	BT4FM	BT4FM	BT4FM
<b>Attachment:</b>	*	(none)	(none)	(none)	(none)	**	*	*	*
<b>Station positions:</b>	fixed	fixed	pseudo-random	fixed	pseudo-random	pseudo-random	fixed	fixed	fixed
<b>Av No stns/yr</b>	53	120	63	67	88	63-73	100	57	94
<b>Benthos sampling since:</b>	1992	2007	1992	2005	1985	1996	1991	1992	1992

# new vessel since 2004; previously 35m, ## Corystes (53 m) in 2009 replaced by Cefas Endeavour, \* chain mat and flip-up rope, \*\* flip-up rope only.

## Annex 4.2: Inventory of the inshore beam trawl surveys.

# Broodwinner (27 m) in 2013 replaced by Simon Stevin

Country	Netherlands (SNS)	Netherlands (DYFS)	UK (YFS)		Belgium (DYFS)	
Geographical Area	Scheveningen (NL) to Esbjerg (DK)	Wadden Sea	Scheldt Estuary	Dutch coast to Danish coast	East-ern/Southeastern English Coast	Belgian Coast
Ship	Tridens / Isis	Stern / Waddenzee	Schollevaar	Isis / Beukels / WR17 / GO29	Chartered vessels	Simon Stevin#
ship size (m)	73m / 28 m	21m / 21 m	21 m	± 28 m	8–10 m	36 m
Date started	1969	1970	1970	1970	1973–2007 - Ceased 2011	1970
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
Usual Start date	12 Sept	29 Aug	5 Sept	26 Sept	1 Sept	1–14 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
Beam trawl type	6m beam trawl	3m shrimp trawl	3m shrimp trawl	6m shrimp trawl	2m shrimp trawl	6m shrimp trawl
Tickler Chains	4	1	1	1	3	0
Mesh size net	80 mm	35 mm	35 mm	35 mm	10 mm	40 mm
Mesh size codend	40 mm	20 mm	20 mm	20 mm	4 mm	22 mm
Speed fished	3.5–4 knots	3 knots	3 knots	3 knots	1 knot	3 knots
Time Fished	15 min	15 min	15 min	15 min	10 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

Country	Netherlands (SNS)	Netherlands (DYFS)	UK (YFS)	Belgium (DYFS)		
<b>Catch rate and LF distribution</b>	All fish species	All fish species <i>Crangon</i>	All fish species <i>Crangon</i>	All fish species <i>Crangon</i>	All fish species	Commercial fish species <i>Crangon</i> (1973–92, 2004–05)
<b>Catch rate</b>	Epibenthos (quantity)	Epibenthos (quantity)	Epibenthos (quantity)	Epibenthos (quantity)	<i>Crangon</i> (volume)	<i>Crangon</i> (weight)
<b>Age data for plaice and sole</b>	All years	All years	All years	All years	Since 2003	None

## Annex 4.2 continued: Inventory of the inshore beam trawl surveys.

Country	Germany (DYFS)		
Geographical Area	NiedersachsenWadden Sea +Elbe Estuary	Schlesweig-Holstein Waddensea	Coastal Area outsidee the island chain
Ship	Chartered vessels	Chartered vessels	Clupea
ship size (m)	12–16 m	12–18 m	28 m
Date started	1972	1974	2012
Sampling Period	Apr/May ('74–'04) Sept/Oct	Apr/May ('74–'04) Sept/Oct	Sept/Oct
Usual Start date	15 Sept	5 Sept	15 Sept
Number of days per period	5	5–7	14
Beam trawl type	3 m shrimp trawl	3 m shrimp trawl	3 m shrimp trawl
Tickler Chains	0	0	0
Mesh size net	32 mm	32 mm	32 mm
Mesh size codend	18 mm	18 mm	18 mm
Speed fished	3 knots	3 knots	3 knots
Time Fished	15 min	15 min	15 min
Approx. number of stations per year	75	75	85
Target species	0–1 group sole and plaice	0–1 group sole and plaice	0–1 group sole and plaice
Catch rate and LF distribution	All fish species <i>Crangon</i>	All fish species <i>Crangon</i>	All fish species <i>Crangon</i>
Catch rate	Epibenthos (quantity)	Epibenthos (quantity)	Epibenthos (quantity)
Age data for plaice and sole	Since 2013	Since 2013	Since 2013

## Annex 5: Population abundance indices for sole and plaice, offshore surveys

### Annex 5.1: Tables of catch rate of sole, offshore surveys.

Netherlands: sole (N.h<sup>-1</sup>/8m trawl) North Sea (4) 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

<b>Year/Age</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10+</b>
<b>2007</b>	0.714	7.498	19.504	1.464	0.565	0.315	0.537	0.031	0.009	0.000	0.024
<b>2008</b>	3.092	15.247	9.062	12.298	1.313	0.222	0.279	0.202	0.028	0.047	0.000
<b>2009</b>	4.911	15.950	4.999	2.858	4.791	0.252	0.124	0.272	0.079	0.000	0.000
<b>2010</b>	2.462	54.811	10.707	2.027	0.774	1.252	0.143	0.122	0.005	0.027	0.089
<b>2011</b>	2.228	26.166	17.387	4.006	1.094	0.778	0.828	0.013	0.000	0.141	0.027
<b>2012</b>	1.089	5.149	18.212	8.863	1.692	0.764	0.257	0.229	0.046	0.000	0.043
<b>2013</b>	0.381	6.844	3.558	12.566	5.385	0.871	0.197	0.105	0.078	0.019	0.082
<b>2014</b>	0.136	18.926	15.576	3.373	6.763	3.208	0.377	0.101	0.020	0.000	0.027
<b>2015</b>	0.196	21.099	25.601	9.660	1.294	4.576	1.502	0.419	0.122	0.150	0.088

**United Kingdom: sole (total numbers per km towed) Southern North Sea (4c).**

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1996	0.75	18.12	21.24	13.20	5.23	5.11	5.27	0.68	0.78	0.40	0.98
1997	1.50	31.45	27.88	10.65	4.92	2.53	2.21	3.58	1.15	0.88	0.75
1998	3.00	4.15	26.20	9.02	2.13	1.58	0.56	0.51	3.19	0.00	0.67
1999	5.25	97.42	21.63	23.14	13.49	4.93	3.51	0.86	2.33	3.72	2.33
2000	3.00	162.50	160.74	12.85	19.80	11.77	3.54	0.98	0.56	1.81	5.95
2001	4.00	40.76	174.02	77.16	5.16	12.28	4.68	1.53	1.46	0.50	2.44
2002	1.87	117.85	44.64	30.73	20.08	3.22	3.79	1.64	0.93	0.99	1.99
2003	0.00	49.41	116.88	15.11	23.68	15.70	0.27	5.96	1.50	1.17	2.04
2004											
2005	52.50	143.36	69.17	24.01	48.73	5.92	13.90	8.55	0.62	2.23	4.00
2006	7.25	145.30	55.42	15.82	10.92	27.24	4.66	7.50	4.34	0.38	3.42
2007	9.43	48.27	87.81	21.33	4.09	3.50	14.18	1.12	3.09	1.65	1.38
2008	1.00	103.36	54.60	47.19	14.51	0.73	4.34	11.04	1.96	1.42	1.25
2009	1.01	35.62	97.53	45.06	58.54	14.38	1.86	3.92	6.05	6.22	3.04
2010	1.60	72.07	58.93	17.70	18.30	12.79	6.86	2.42	2.60	1.19	1.80
2011	5.86	155.22	51.80	15.03	3.57	8.60	4.36	1.27	0.82	0.36	2.03
2012	0.00	38.71	128.17	40.64	9.92	4.72	3.99	6.95	2.12	0.00	3.15
2013	0.00	61.13	50.15	82.43	26.32	8.17	3.05	3.02	6.54	0.00	0.61
2014	10.71	69.12	112.74	17.80	24.96	10.70	3.50	2.64	0.98	0.00	1.50
2015	0.00	232.38	29.19	28.70	14.46	18.54	1.19	1.92	0.27	3.40	1.16

**United Kingdom: sole (N.h<sup>1</sup>-1/8m trawl) Eastern Channel (7d)**

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1989	4.00	3.49	14.50	26.65	28.93	3.65	1.59	1.54	0.66	0.35	1.79
1990	1.19	8.46	8.63	10.14	10.81	11.73	1.59	0.96	1.19	0.93	0.64



<b>1991</b>	0.00	15.94	14.22	10.94	8.26	7.70	4.37	1.79	1.09	0.09	1.13
<b>1992</b>	0.00	20.29	19.26	6.05	6.01	6.53	4.90	2.88	0.48	0.25	0.82
<b>1993</b>	0.00	4.35	20.25	7.35	2.58	2.64	2.19	2.76	3.18	0.55	0.64
<b>1994</b>	0.24	8.50	7.92	9.36	5.44	1.79	0.61	0.87	1.63	1.57	0.72
<b>1995</b>	0.00	13.37	5.77	3.60	5.25	2.03	0.69	0.69	1.35	1.07	1.24
<b>1996</b>	21.69	20.06	15.93	1.60	1.01	1.85	1.17	0.53	0.34	0.59	3.83
<b>1997</b>	0.88	43.79	26.27	10.00	1.14	1.41	0.46	0.51	0.35	0.18	1.74
<b>1998</b>	38.87	27.74	35.08	11.18	4.54	0.62	0.57	0.62	0.29	0.27	1.89
<b>1999</b>	1.24	11.52	9.89	26.76	4.33	1.49	0.28	0.17	0.24	0.12	0.91
<b>2000</b>	1.43	17.73	28.15	17.71	19.13	4.64	1.23	0.67	0.34	0.40	1.89
<b>2001</b>	4.80	25.26	18.70	13.17	9.13	13.91	2.58	0.73	0.41	0.29	1.67
<b>2002</b>	1.21	35.22	24.52	11.82	5.20	2.51	4.96	0.91	0.18	0.15	0.83
<b>2003</b>	2.99	9.70	37.31	9.15	4.16	2.12	1.05	2.45	0.74	0.18	0.42
<b>2004</b>	14.47	48.19	21.15	19.49	4.45	1.05	0.23	0.77	1.23	0.21	0.50
<b>2005</b>	0.31	14.86	34.60	12.23	9.54	3.05	1.01	0.61	0.41	0.95	0.93
<b>2006</b>	5.13	27.63	26.64	15.52	5.52	3.91	1.18	0.96	0.55	0.30	0.87
<b>2007</b>	0.18	49.24	26.87	11.36	5.77	2.95	2.87	0.76	0.55	0.17	1.47
<b>2008</b>	0.12	36.63	37.62	9.80	3.97	3.57	1.70	0.83	0.62	0.14	0.36
<b>2009</b>	8.24	73.09	37.17	19.70	5.52	3.04	2.19	0.76	1.25	0.31	1.24
<b>2010</b>	1.36	64.24	64.70	17.74	9.15	3.12	1.72	1.27	0.18	0.35	0.99
<b>2011</b>	12.10	113.19	110.38	38.90	10.11	6.89	2.81	1.07	0.33	0.69	1.03
<b>2012</b>	0.00	24.69	80.68	56.22	18.76	4.30	3.30	1.06	0.90	0.66	0.95
<b>2013</b>	0.22	32.26	61.02	88.19	45.04	10.24	3.41	1.13	1.08	0.13	0.92
<b>2014</b>	1.05	142.48	153.99	49.80	61.19	26.41	8.85	1.98	1.79	0.90	1.18
<b>2015</b>	0.00	37.99	178.70	63.19	30.15	33.42	15.69	3.30	1.21	0.27	0.44



**United Kingdom: sole (total numbers for 4m beam trawl) Bristol Channel (7f).**

<b>Year/Age</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10+</b>
<b>1995</b>	26.57	123.88	222.1	51.99	11.37	6.27	12.09	1.21	0.97	0.92	3.57
<b>1996</b>	2.55	150.29	211.4	53.56	23.16	5.88	2.48	3.34	0.83	2.42	2.49
<b>1997</b>	32.04	433.35	180.47	17.93	11.18	12.47	4.26	2.68	5.24	0	3.4
<b>1998</b>	90.29	770.05	411.18	50.9	9.85	7.46	4.49	1.79	0.89	4.54	4.69
<b>1999</b>	24.38	2464.28	250.2	32.05	13.68	5.49	3.67	3.98	0.84	0	7.81
<b>2000</b>	13.17	915.67	1355.65	30.83	22.2	5.4	0	1.77	0.77	0.95	3.27
<b>2001</b>	22.3	378.72	599.32	258.58	19.57	7.24	4.9	1.63	0	1.74	6.91
<b>2002</b>	7.75	662.7	238.33	127.23	102.13	11.93	5.7	1.81	2.65	0	3.46
<b>2003</b>	11.83	392.36	529.52	46.78	25.63	46.98	7.81	2.61	2.56	0	0.84
<b>2004</b>	55.7	748.87	377.4	86.6	13.37	18.77	36.96	3.75	2.26	0	4.47
<b>2005</b>	37.17	342.92	224.96	31.87	13.61	5.82	4.49	14.27	0.84	1.62	0
<b>2006</b>	10.73	273.36	200.5	39.29	13.34	6.65	0	2.1	9.81	0	0.83
<b>2007</b>	91.26	357.35	108.04	42.75	13.72	6.85	5.84	2.5	3.39	11.38	2.55
<b>2008</b>	5.1	1038.53	104.26	12.68	15.06	5.87	7.62	3.33	2.54	4.21	6.78
<b>2009</b>	0.84	509.45	317.75	24.17	6.42	8.09	3.19	2.34	2.35	1.62	8.87
<b>2010</b>	17.84	85.08	470.57	121.81	16.87	1.71	3.86	7.49	3.06	1.31	6.99
<b>2011</b>	17.32	501.31	52.26	138.64	69.23	7.06	1.74	6.32	2.5	0	5.19
<b>2012</b>	13.19	542.01	230.89	7.2	52.95	23.8	0.84	0.8	0.84	2.49	8.31
<b>2013</b>	9.39	278.96	517.91	43.35	13.39	24.33	14.76	0.84	4.98	0.83	5.49
<b>2014</b>	33.83	243.96	257.6	76.27	13.56	4.72	23.07	7.57	0.92	0.81	1.69
<b>2015</b>	27.61	746.63	48.35	44.19	31.03	6.83	3.42	13.37	6.2	0	3.44

**United Kingdom: sole (total numbers for 4m beam trawl) Irish Sea (7a).**

<b>Year/Age</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10+</b>
<b>1995</b>	18.8	195.2	122.32	200.46	87.29	24.07	52.85	9.27	4.23	3.57	18.69
<b>1996</b>	3.34	703.15	100.07	25.2	59.94	36.2	18.35	24.9	6.09	1.91	8.6
<b>1997</b>	4.02	919.09	458.01	56.9	18.85	43.86	21.04	12.35	23.52	5.48	7.79
<b>1998</b>	1.59	427.83	568.26	231.5	14.17	5.07	18.99	18.58	4.34	14.41	7.17
<b>1999</b>	2.65	305.21	232.92	202.38	161.09	22.79	6.36	20.3	3.79	4.41	16.49
<b>2000</b>	0	281.1	368.16	116.44	173.52	72.38	10.46	1.68	10.24	4.89	19.3
<b>2001</b>	0.79	72.31	225.42	152.36	51.8	76.34	50.39	4.66	2.39	9.21	9.11
<b>2002</b>	0	162.88	48.56	95.92	100.05	33.72	62.79	39.04	1.94	0.86	15.4
<b>2003</b>	0	192.12	166.5	40.81	76.69	64.57	31.73	33.93	20.64	0.8	9.97
<b>2004</b>	0	322.44	190.81	94.45	21.75	60.77	35.6	32.34	13.58	15.16	8.72
<b>2005</b>	0	43.42	135	56.07	20.72	10.33	28.28	20.45	3.61	5.25	13.67
<b>2006</b>	0	84.53	86.95	71.14	35.52	28.3	7.39	12.76	11.77	7.99	16.08
<b>2007</b>	0	99.1	73.48	39.17	45.29	32.3	8.4	3.09	4.54	9.44	17.32
<b>2008</b>	0	102.96	103.08	49.22	17.45	34.84	18.53	5.13	1.84	7.06	14.11
<b>2009</b>	0	47.49	118.89	54.17	32.07	14.79	23.89	9.82	5.48	0.79	12.64
<b>2010</b>	0	20.28	47.43	58.45	29.13	13.13	3.94	7.16	6.38	2.35	4.65
<b>2011</b>	0	72.28	28.48	50.75	55.48	28.27	10.1	3.51	10.97	5.3	8.85
<b>2012</b>	0	18.29	40.35	13.32	37.97	20.27	9.48	9.24	1.61	4.72	11.89
<b>2013</b>	6.49	59.47	45.06	28.64	16.84	26.44	14.17	17.03	6.75	0.8	7.37
<b>2014</b>	15.01	136.53	33.73	17.17	28.1	10.99	20.39	16.79	11.26	4.42	10.85
<b>2015</b>	0	334.1	119.32	32.88	15.58	17.93	3.59	12.14	22.67	6.58	15.83

## Annex 5.2: Tables of catch rate of plaice, offshore surveys.

Netherlands: plaice (N.h<sup>+</sup>-1/8m trawl) North Sea (4) 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

<b>Year/Age</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10+</b>
<b>2009</b>	555.472	408.995	105.222	45.975	13.013	4.029	3.474	0.574	2.128	0.278	0.929
<b>2010</b>	814.363	261.097	84.254	34.244	20.178	4.662	2.162	3.464	0.207	2.547	1.232
<b>2011</b>	323.428	486.157	148.217	55.305	20.065	12.904	3.945	2.243	2.263	0.232	0.906
<b>2012</b>	454.620	241.840	191.502	58.067	20.904	12.638	5.594	1.787	0.494	1.695	0.789
<b>2013</b>	336.300	449.774	113.177	90.493	27.004	10.642	5.824	1.497	1.519	1.082	1.935
<b>2014</b>	138.248	360.286	145.339	82.281	39.503	22.384	8.475	2.541	2.545	1.659	1.623
<b>2015</b>	139.931	267.285	239.650	84.416	30.278	30.416	11.092	4.052	2.386	1.709	1.908

**Netherlands: plaice (N.h<sup>+</sup>-1/8m trawl) North Sea (4) RV "Tridens"**

<b>Year/Age</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10+</b>
<b>1996</b>	0.000	1.643	6.021	4.451	2.903	2.039	1.566	0.721	0.415	0.190	0.468
<b>1997</b>	0.000	0.221	7.119	9.127	3.252	2.105	1.523	0.401	0.819	0.354	0.429
<b>1998</b>	0.000	0.228	32.249	9.572	4.874	2.202	1.274	0.929	0.762	0.304	0.540
<b>1999</b>	0.054	2.692	7.711	35.228	5.558	2.498	1.928	0.633	0.761	0.309	0.331
<b>2000</b>	0.043	4.795	13.445	12.910	16.957	2.882	1.716	0.933	0.805	0.218	0.530
<b>2001</b>	0.178	2.154	8.612	9.901	6.681	7.360	1.055	0.592	0.418	0.505	0.543
<b>2002</b>	0.000	18.553	12.912	9.541	6.411	4.181	4.420	0.743	0.741	0.394	0.933
<b>2003</b>	0.338	3.975	41.692	13.378	9.059	5.077	2.806	3.920	0.703	0.740	1.562
<b>2004</b>	0.014	5.985	15.784	31.488	9.430	4.316	2.439	1.242	2.500	0.409	1.405
<b>2005</b>	0.043	6.876	23.366	12.234	17.672	2.824	6.871	1.565	0.567	3.574	2.482
<b>2006</b>	0.236	6.725	32.192	25.727	11.367	10.918	1.985	3.897	0.864	0.723	3.262
<b>2007</b>	0.000	26.571	23.735	19.551	23.175	4.900	10.147	1.974	3.786	0.323	5.471
<b>2008</b>	0.000	17.467	50.462	25.585	18.392	18.974	6.243	12.747	2.657	6.749	8.411
<b>2009</b>	0.116	12.110	41.685	43.331	19.126	12.052	11.768	3.081	10.119	1.567	8.025
<b>2010</b>	0.644	26.180	35.716	34.561	30.093	13.412	5.695	12.234	2.744	6.362	7.706
<b>2011</b>	0.174	41.881	71.478	41.593	28.462	31.670	14.284	5.501	11.881	1.172	12.890
<b>2012</b>	0.000	12.989	87.806	65.988	32.006	19.318	16.038	7.147	3.630	8.635	8.989
<b>2013</b>	0.000	15.063	48.685	63.138	39.968	25.028	14.233	10.973	4.235	2.959	12.472
<b>2014</b>	0.188	23.719	74.414	60.682	48.550	30.198	13.066	9.829	6.030	7.125	13.240
<b>2015</b>	0.000	11.013	67.408	73.766	48.299	41.660	23.005	8.757	6.461	7.066	15.765

**Netherlands: plaice (N.h<sup>+</sup>-1/8m trawl) North Sea (4) Combined with gear correction (RV "Isis" and RV "Tridens").**

<b>Year/Age</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10+</b>
<b>1996</b>	102.136	143.896	99.623	13.280	4.266	3.035	1.653	0.676	0.442	0.214	0.457
<b>1997</b>	24.190	386.840	28.679	14.886	4.010	2.042	1.538	0.428	0.797	0.327	0.407
<b>1998</b>	96.333	131.191	177.631	25.463	7.266	2.500	1.355	0.955	0.808	0.323	0.549
<b>1999</b>	100.264	116.989	53.597	96.348	6.493	3.005	1.926	0.659	0.756	0.314	0.355
<b>2000</b>	81.459	108.393	38.887	22.880	23.680	3.017	1.725	1.113	0.797	0.219	0.526
<b>2001</b>	297.375	80.296	39.788	15.695	8.754	9.300	1.079	0.624	0.420	0.511	0.602
<b>2002</b>	87.786	217.276	26.709	14.029	7.616	4.794	4.643	0.754	0.765	0.385	0.943
<b>2003</b>	87.985	53.579	94.429	15.858	10.305	5.361	3.081	4.007	0.732	0.760	1.534
<b>2004</b>	80.357	101.411	30.306	51.218	11.212	4.961	2.885	1.538	3.402	0.391	1.347
<b>2005</b>	106.916	70.845	45.646	13.806	20.392	3.035	6.942	1.568	0.571	3.570	2.435
<b>2006</b>	97.992	54.855	42.922	29.187	11.748	12.052	2.106	3.938	0.844	0.767	3.258
<b>2007</b>	115.922	139.391	44.429	24.594	26.579	5.681	11.685	2.091	3.947	0.364	5.558
<b>2008</b>	143.963	98.909	89.736	33.838	20.735	20.605	6.330	13.054	2.727	6.718	8.618
<b>2009</b>	219.268	170.840	76.528	54.059	21.482	12.834	12.192	3.139	10.254	1.585	7.941
<b>2010</b>	326.437	144.792	69.544	47.943	40.349	17.914	6.845	15.841	3.179	8.306	8.876
<b>2011</b>	120.520	226.465	125.987	58.138	32.752	33.174	15.090	5.808	11.940	1.124	12.808
<b>2012</b>	178.353	118.441	149.626	79.759	35.864	22.166	16.393	7.216	3.544	8.696	9.044
<b>2013</b>	132.569	192.771	90.454	90.344	46.710	27.597	15.369	11.273	4.523	3.224	12.740
<b>2014</b>	50.408	155.222	123.188	83.283	58.532	34.736	14.868	10.569	6.607	7.591	13.729
<b>2015</b>	54.652	116.490	156.634	102.479	57.412	49.160	25.506	9.713	7.029	7.354	16.003



**United Kingdom: plaice (total numbers per km towed) Southern North Sea (4c)**

<b>Year/Age</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10+</b>
<b>1996</b>	6.50	14.00	4.00	0.50	0.25	0.25	0.25	0.00	0.00	0.00	0.25
<b>1997</b>	0.25	12.13	2.13	1.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00
<b>1998</b>	0.75	0.25	13.25	2.25	0.50	0.00	0.00	0.00	0.00	0.00	0.25
<b>1999</b>	1.63	24.73	2.27	3.88	0.50	0.00	0.00	0.00	0.00	0.25	0.00
<b>2000</b>	13.75	25.63	4.46	0.25	2.58	0.33	0.00	0.00	0.00	0.00	0.00
<b>2001</b>	24.50	47.59	22.91	0.50	0.50	0.25	0.00	0.00	0.25	0.00	0.00
<b>2002</b>	1.07	42.67	1.87	1.07	0.00	0.00	0.27	0.00	0.00	0.00	0.00
<b>2003</b>	2.93	12.13	12.13	0.53	0.27	0.27	0.00	0.53	0.00	0.27	0.00
<b>2004</b>											
<b>2005</b>	0.00	14.72	9.28	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.00
<b>2006</b>	1.50	16.83	1.42	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>2007</b>	0.43	16.39	3.46	0.43	0.29	0.00	0.29	0.00	0.00	0.00	0.00
<b>2008</b>	0.25	20.60	3.56	0.50	0.00	0.25	0.25	0.00	0.00	0.00	0.00
<b>2009</b>	2.46	13.98	3.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>2010</b>	4.53	17.72	3.96	0.58	0.27	0.00	0.00	0.00	0.00	0.00	0.00
<b>2011</b>	9.14	35.41	7.67	1.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>2012</b>	0.53	9.70	8.83	1.91	0.80	0.00	0.53	0.00	0.00	0.00	0.00
<b>2013</b>	10.40	16.78	2.87	1.40	1.07	0.27	0.00	0.00	0.00	0.00	0.00
<b>2014</b>	1.14	26.77	3.69	0.36	0.79	0.29	0.00	0.00	0.00	0.00	0.00
<b>2015</b>	3.56	7.24	6.23	2.30	0.27	1.07	0.27	0.00	0.00	0.00	0.00

**United Kingdom: plaice (N.h<sup>+</sup>-1/8m trawl) Eastern Channel (7d).**

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1989	4.00	3.49	14.50	26.65	28.93	3.65	1.59	1.54	0.66	0.35	1.79
1990	1.19	8.46	8.63	10.14	10.81	11.73	1.59	0.96	1.19	0.93	0.64
1991	0.00	15.94	14.22	10.94	8.26	7.70	4.37	1.79	1.09	0.09	1.13
1992	0.00	20.29	19.26	6.05	6.01	6.53	4.90	2.88	0.48	0.25	0.82
1993	0.00	4.35	20.25	7.35	2.58	2.64	2.19	2.76	3.18	0.55	0.64
1994	0.24	8.50	7.92	9.36	5.44	1.79	0.61	0.87	1.63	1.57	0.72
1995	0.00	13.37	5.77	3.60	5.25	2.03	0.69	0.69	1.35	1.07	1.24
1996	21.69	20.06	15.93	1.60	1.01	1.85	1.17	0.53	0.34	0.59	3.83
1997	0.88	43.79	26.27	10.00	1.14	1.41	0.46	0.51	0.35	0.18	1.74
1998	38.87	27.74	35.08	11.18	4.54	0.62	0.57	0.62	0.29	0.27	1.89
1999	1.24	11.52	9.89	26.76	4.33	1.49	0.28	0.17	0.24	0.12	0.91
2000	1.43	17.73	28.15	17.71	19.13	4.64	1.23	0.67	0.34	0.40	1.89
2001	4.80	25.26	18.70	13.17	9.13	13.91	2.58	0.73	0.41	0.29	1.67
2002	1.21	35.22	24.52	11.82	5.20	2.51	4.96	0.91	0.18	0.15	0.83
2003	2.99	9.70	37.31	9.15	4.16	2.12	1.05	2.45	0.74	0.18	0.42
2004	14.47	48.19	21.15	19.49	4.45	1.05	0.23	0.77	1.23	0.21	0.50
2005	0.31	14.86	34.60	12.23	9.54	3.05	1.01	0.61	0.41	0.95	0.93
2006	5.13	27.63	26.64	15.52	5.52	3.91	1.18	0.96	0.55	0.30	0.87
2007	0.18	49.24	26.87	11.36	5.77	2.95	2.87	0.76	0.55	0.17	1.47
2008	0.12	36.63	37.62	9.80	3.97	3.57	1.70	0.83	0.62	0.14	0.36
2009	8.24	73.09	37.17	19.70	5.52	3.04	2.19	0.76	1.25	0.31	1.24
2010	1.36	64.24	64.70	17.74	9.15	3.12	1.72	1.27	0.18	0.35	0.99
2011	12.10	113.19	110.38	38.90	10.11	6.89	2.81	1.07	0.33	0.69	1.03
2012	0.00	24.69	80.68	56.22	18.76	4.30	3.30	1.06	0.90	0.66	0.95
2013	0.22	32.26	61.02	88.19	45.04	10.24	3.41	1.13	1.08	0.13	0.92
2014	1.05	142.48	153.99	49.80	61.19	26.41	8.85	1.98	1.79	0.90	1.18
2015	0.00	37.99	178.70	63.19	30.15	33.42	15.69	3.30	1.21	0.27	0.44



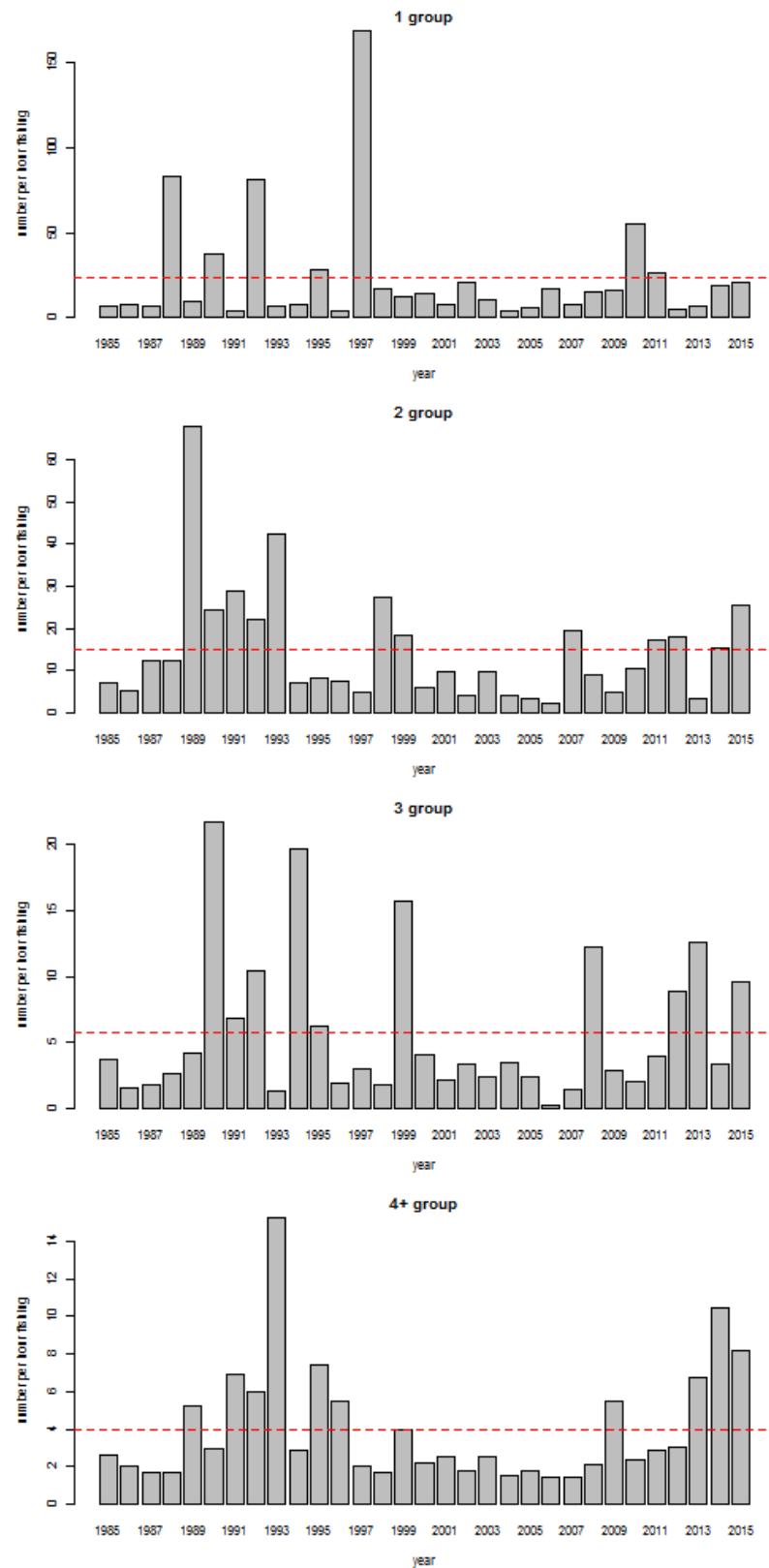
**United Kingdom: plaice (total numbers for 4m beam trawl) Bristol Channel (7f).**

<b>Year/Age</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10+</b>
<b>1995</b>	1.02	239.59	90.48	17.23	2.96	6.84	1.54	0.00	0.00	1.70	0.00
<b>1996</b>	8.10	223.69	288.11	30.78	0.99	2.62	0.80	0.00	0.00	0.00	0.00
<b>1997</b>	6.96	225.37	102.14	34.54	4.25	1.77	1.67	0.86	0.00	0.00	0.00
<b>1998</b>	4.98	237.20	126.22	46.99	8.92	2.00	0.97	0.00	0.00	0.00	0.92
<b>1999</b>	162.19	152.59	79.62	29.03	19.67	7.00	0.00	0.00	1.69	0.00	0.00
<b>2000</b>	84.73	339.63	63.17	31.25	6.56	5.50	0.00	0.89	0.00	0.00	0.00
<b>2001</b>	35.56	211.44	156.14	15.81	8.74	4.23	3.39	1.65	0.00	0.00	0.00
<b>2002</b>	0.94	136.74	175.12	80.45	5.93	6.13	2.03	3.52	0.84	0.00	0.00
<b>2003</b>	60.73	98.37	80.48	60.95	21.83	2.72	1.73	0.84	0.89	1.83	0.00
<b>2004</b>	163.87	258.51	33.41	27.08	13.42	2.19	0.96	0.96	2.48	0.00	1.94
<b>2005</b>	2.59	192.50	75.22	20.87	8.06	10.93	2.51	0.80	0.00	0.00	0.84
<b>2006</b>	80.54	85.78	101.97	34.16	9.57	1.79	9.03	0.00	2.48	0.79	0.00
<b>2007</b>	34.83	150.40	92.25	47.26	15.11	1.67	2.51	0.84	1.67	0.83	0.00
<b>2008</b>	6.27	140.69	217.04	46.79	15.70	4.82	0.82	2.49	0.00	0.00	0.84
<b>2009</b>	186.33	161.81	55.96	78.58	21.45	10.89	4.09	1.59	0.00	0.83	0.00
<b>2010</b>	143.24	331.76	88.54	26.41	39.94	6.68	4.29	0.88	0.00	0.83	1.77
<b>2011</b>	8.28	362.26	300.14	55.04	21.86	21.37	13.99	2.56	2.58	0.85	0.00
<b>2012</b>	17.28	142.13	430.79	100.57	22.36	9.02	12.53	4.94	0.83	0.00	0.00
<b>2013</b>	63.52	329.79	139.06	185.39	46.85	5.77	3.88	7.91	2.80	1.30	0.00
<b>2014</b>	0.00	371.76	202.30	64.65	105.70	23.80	1.79	2.91	1.69	1.68	1.68
<b>2015</b>	19.39	28.36	454.08	162.34	52.37	76.66	48.06	15.23	8.34	3.73	4.33

**United Kingdom: plaice (total numbers for 4m beam trawl) Irish Sea (7a).**

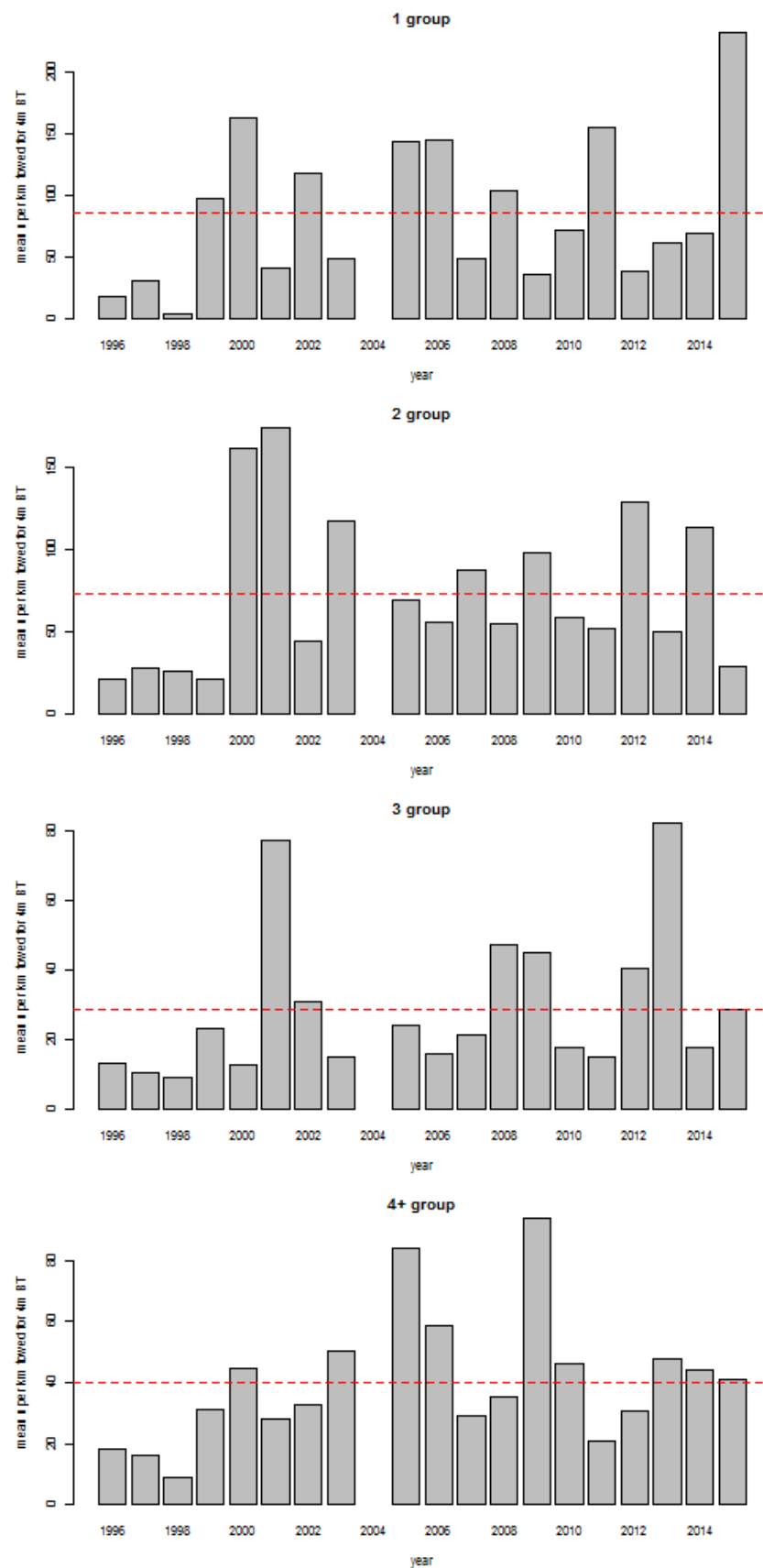
<b>Year/Age</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10+</b>
<b>1995</b>	210.82	1018.39	307.43	142.05	66.34	12.63	13.95	0.00	0.84	2.40	6.67
<b>1996</b>	82.96	1349.92	476.84	98.11	58.74	38.86	7.47	8.60	0.88	1.72	6.66
<b>1997</b>	24.72	1081.33	529.88	255.42	51.50	39.50	17.98	6.54	5.87	0.00	5.34
<b>1998</b>	134.39	926.42	608.71	168.31	75.55	27.03	17.95	10.95	2.30	0.76	5.42
<b>1999</b>	142.92	943.45	765.83	273.12	89.33	30.34	13.34	5.76	5.70	3.40	0.00
<b>2000</b>	104.90	1676.41	523.23	236.12	111.86	57.83	17.43	5.33	2.74	2.55	4.19
<b>2001</b>	197.99	1165.38	526.08	172.91	103.50	70.93	22.21	8.32	5.53	4.55	3.19
<b>2002</b>	12.68	1376.50	1281.68	513.25	192.97	62.48	40.13	12.61	13.42	4.10	5.23
<b>2003</b>	204.92	1174.77	1461.85	656.39	234.76	96.68	49.19	31.07	7.79	3.30	3.45
<b>2004</b>	172.84	1440.89	942.24	939.96	320.48	207.17	45.47	45.50	10.93	2.95	2.63
<b>2005</b>	235.77	710.26	1058.72	544.84	407.78	242.61	90.74	14.09	13.79	7.18	8.70
<b>2006</b>	384.75	888.82	666.27	572.61	326.36	140.61	65.48	46.43	12.83	11.52	4.75
<b>2007</b>	147.46	2116.25	996.39	416.47	331.17	155.34	75.26	35.76	29.36	5.04	7.56
<b>2008</b>	359.35	1057.52	1553.72	506.40	277.59	199.17	62.00	44.94	26.82	3.71	0.00
<b>2009</b>	119.22	1158.79	859.37	971.88	246.11	149.90	198.39	51.77	24.63	16.09	10.41
<b>2010</b>	400.61	1446.78	1121.35	531.83	400.57	145.99	123.21	77.64	47.71	20.04	17.49
<b>2011</b>	186.43	1772.79	1177.06	528.14	265.08	310.05	111.89	98.74	71.49	50.12	52.38
<b>2012</b>	286.65	1587.49	1508.20	540.21	254.72	128.86	118.81	101.27	58.99	72.45	57.79
<b>2013</b>	542.38	1185.15	1318.80	771.94	460.05	298.41	119.90	128.14	65.36	71.58	51.99
<b>2014</b>	100.77	2192.82	1737.55	731.08	601.97	262.65	203.56	151.59	62.76	23.12	60.88
<b>2015</b>	67.48	893.81	2058.32	574.21	440.06	273.10	209.29	94.12	56.20	48.02	95.38

### Annex 5.3: Figures of catch rate of sole, offshore surveys



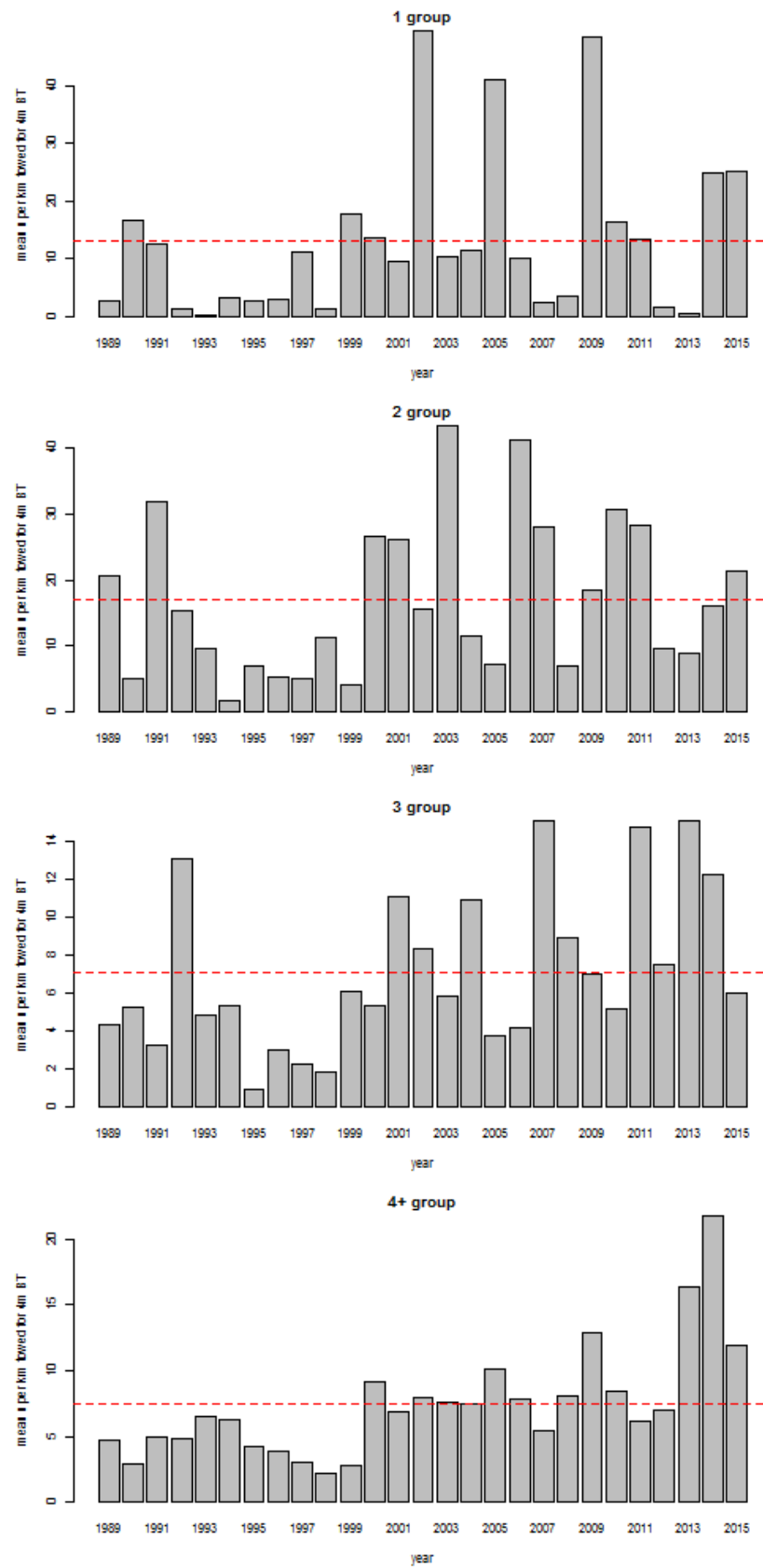
a) Netherlands: sole ( $N.h^{-1}/8m$  trawl) North Sea (4) RV "Isis"

Figure 5.1.1.1. Catch rate of sole, offshore surveys. (Horizontal line=long-term mean for the period presented)



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

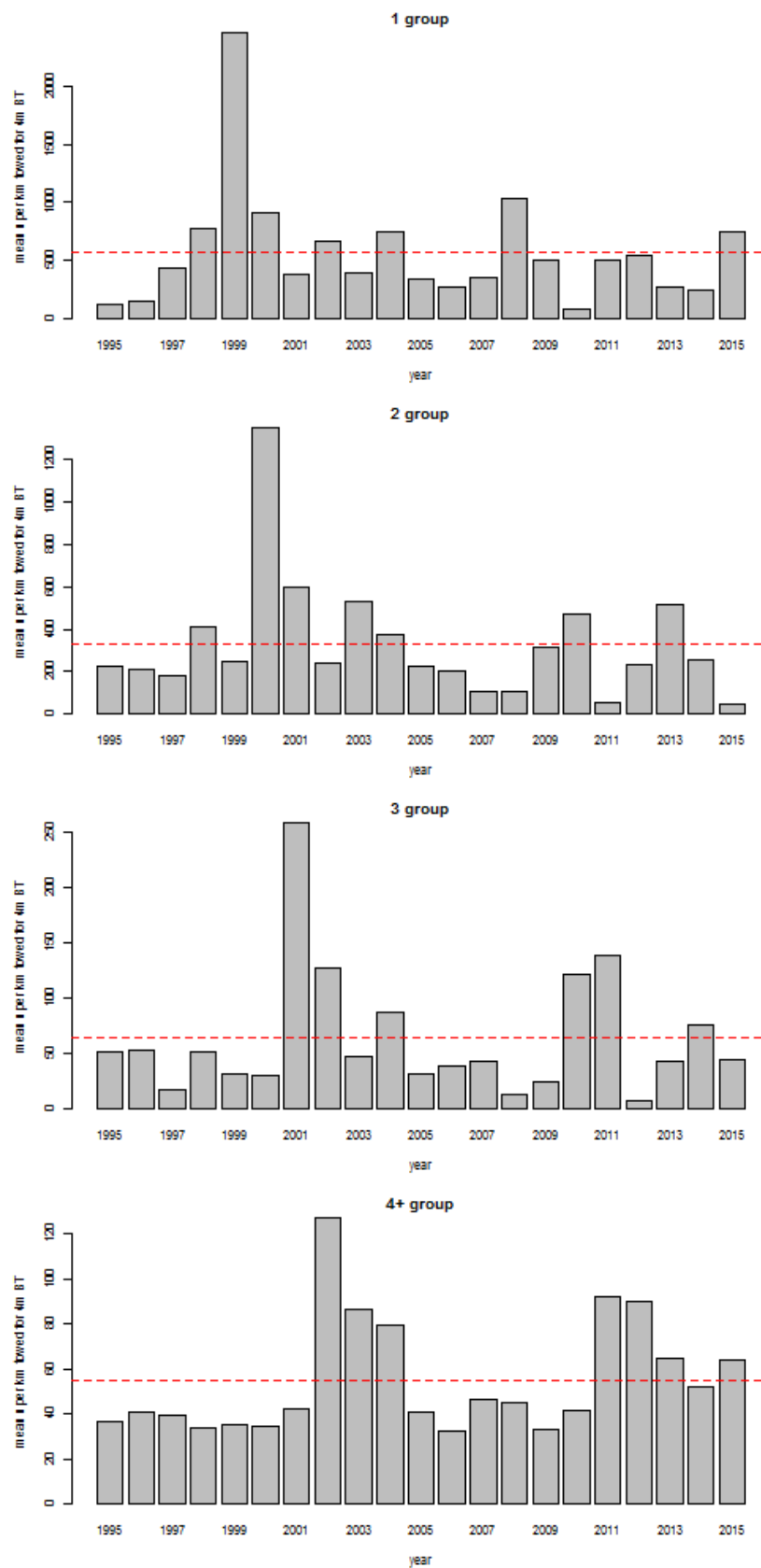
Figure 5.1.1.1. Continued



c) UK: sole ( $N \cdot h^{-1/8m}$  beam) Eastern English Channel (7d)

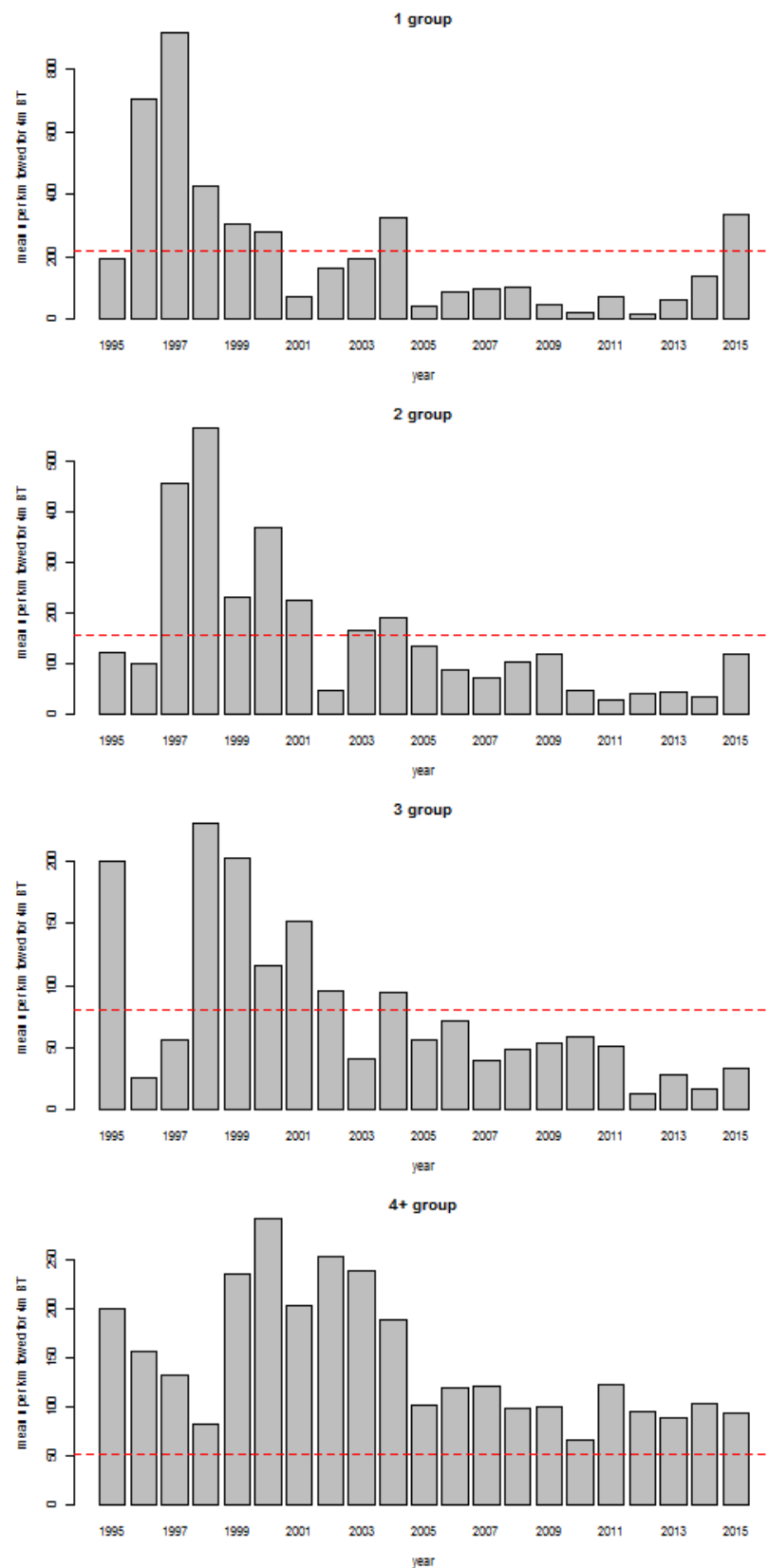
Figure 5.1.1.1. Continued





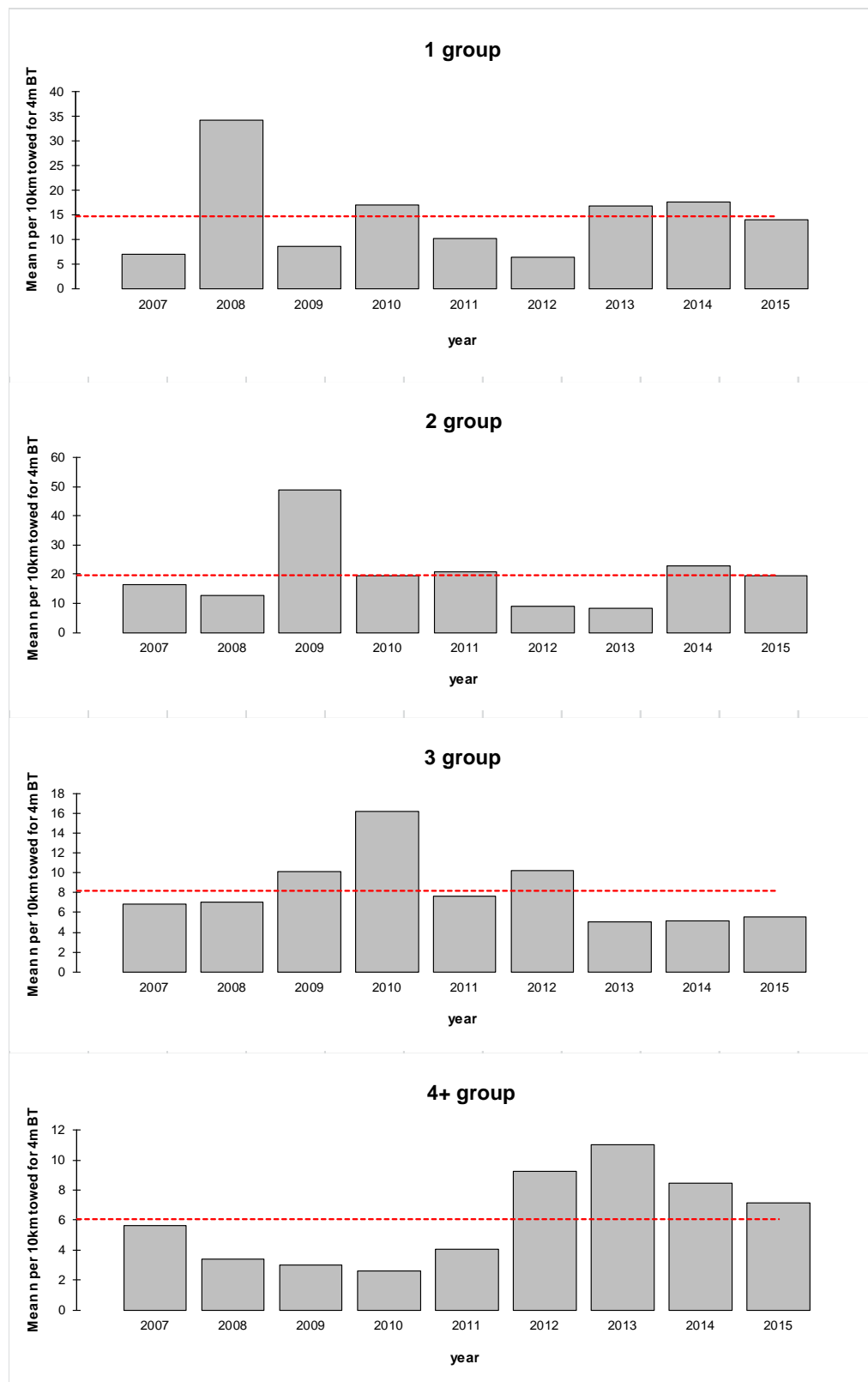
e) UK: sole (mean numbers per km towed for 4m beam trawl) Bristol Channel (7f)

Figure 5.1.1.1. Continued



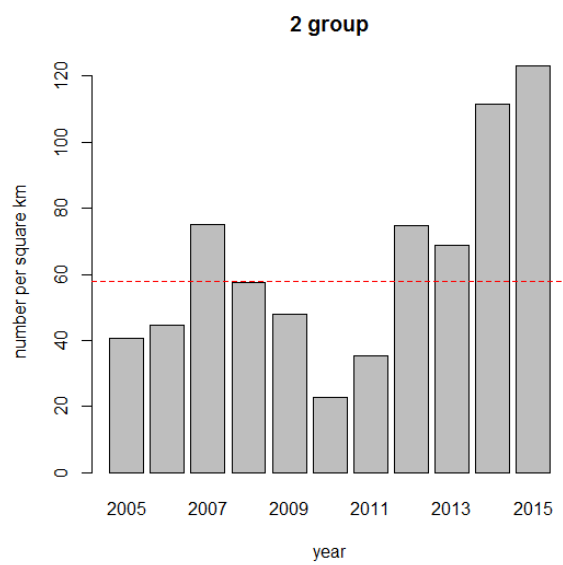
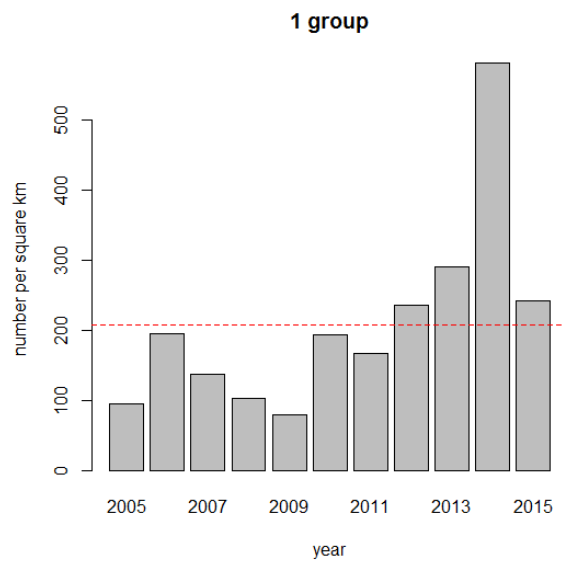
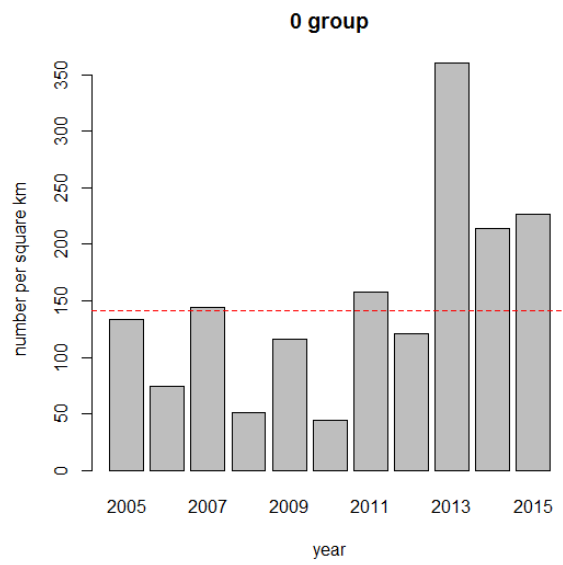
f) UK: sole (mean numbers per km towed for 4m beam trawl) Eastern Irish Sea (7a)

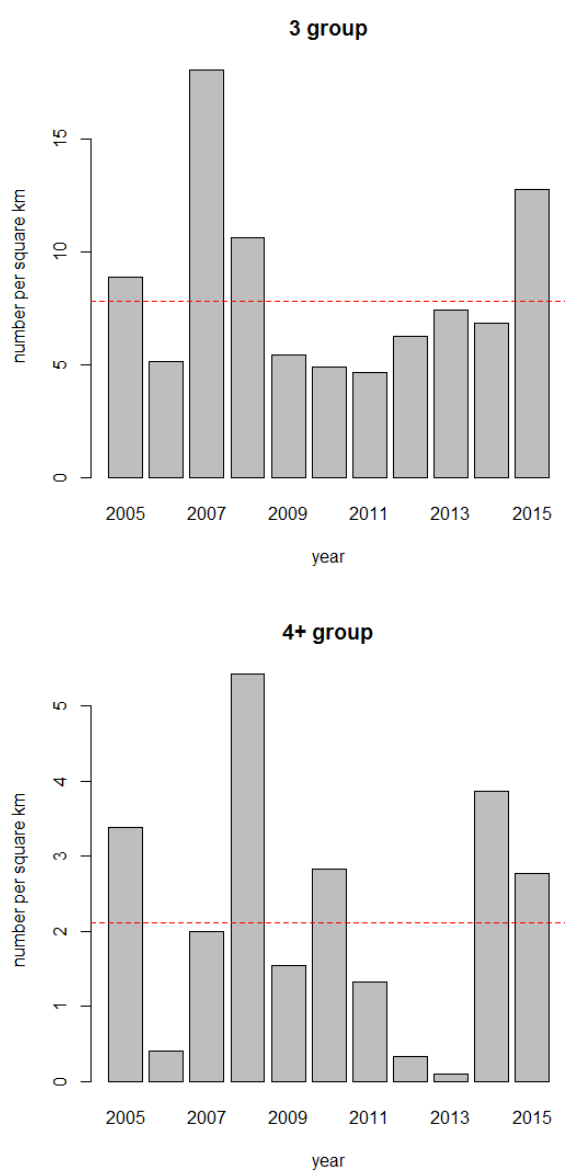
Figure 5.1.1.1. Continued



g) France: Catch rate of sole from French survey in the Bay of Biscay. (mean numbers per 10km towed for 4m beam trawl; Horizontal line=long-term mean for the period presented).

Figure 5.1.1.1. Continued

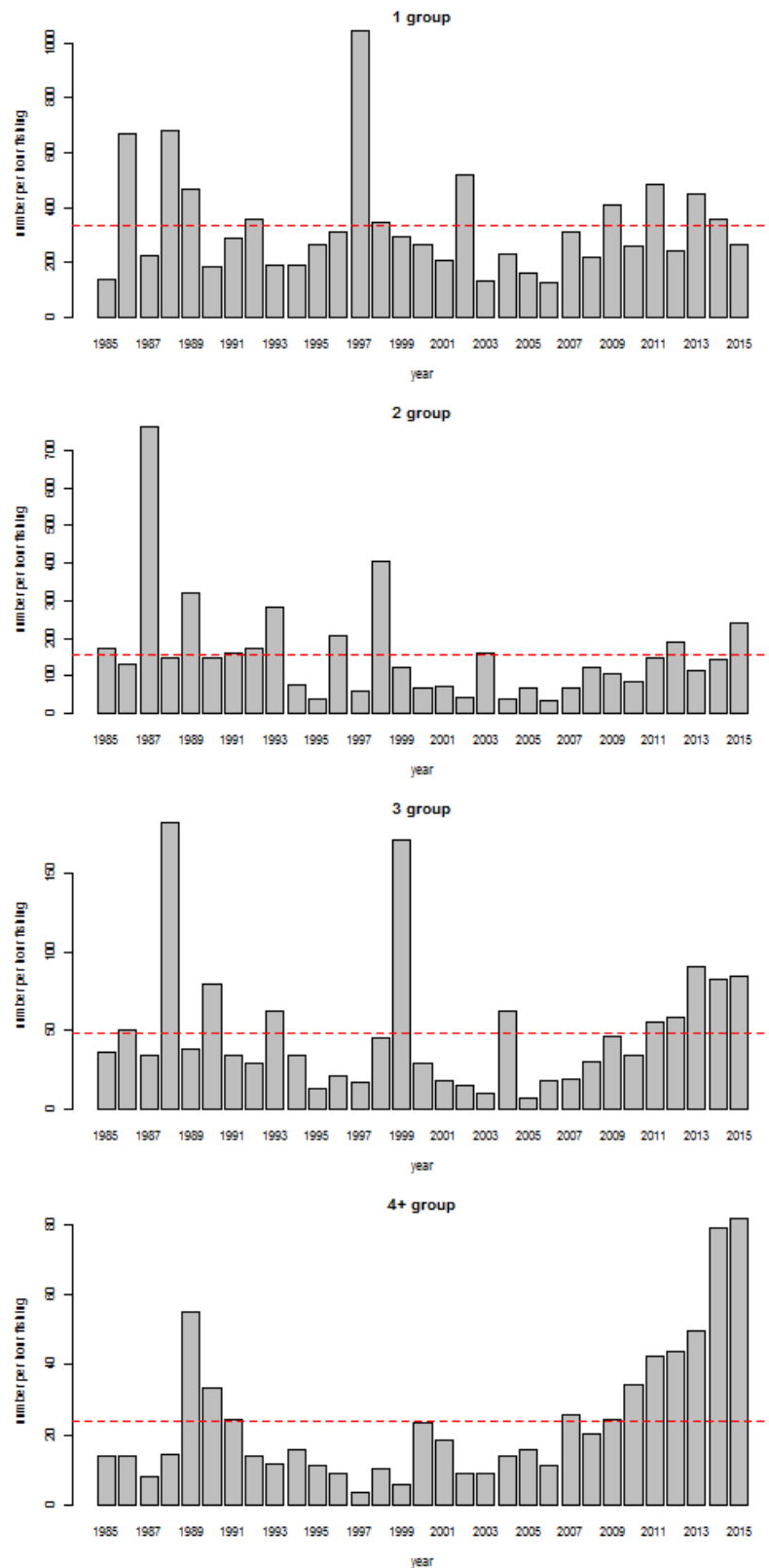




**h) Italy: Catch rate of sole from the Adriatic beam trawl survey. (horizontal line = long-term mean for the period presented).**

**Figure 5.1.1.1. Continued**

### Annex 5.4: Figures of catch rate of plaice, offshore surveys



(a) Netherlands: plaice (N.h<sup>-1</sup>/8m trawl) North Sea (4) RV "Isis"

Figure 5.1.1.2. Catch rate of plaice, offshore surveys. (Horizontal line=long-term mean for the period presented)

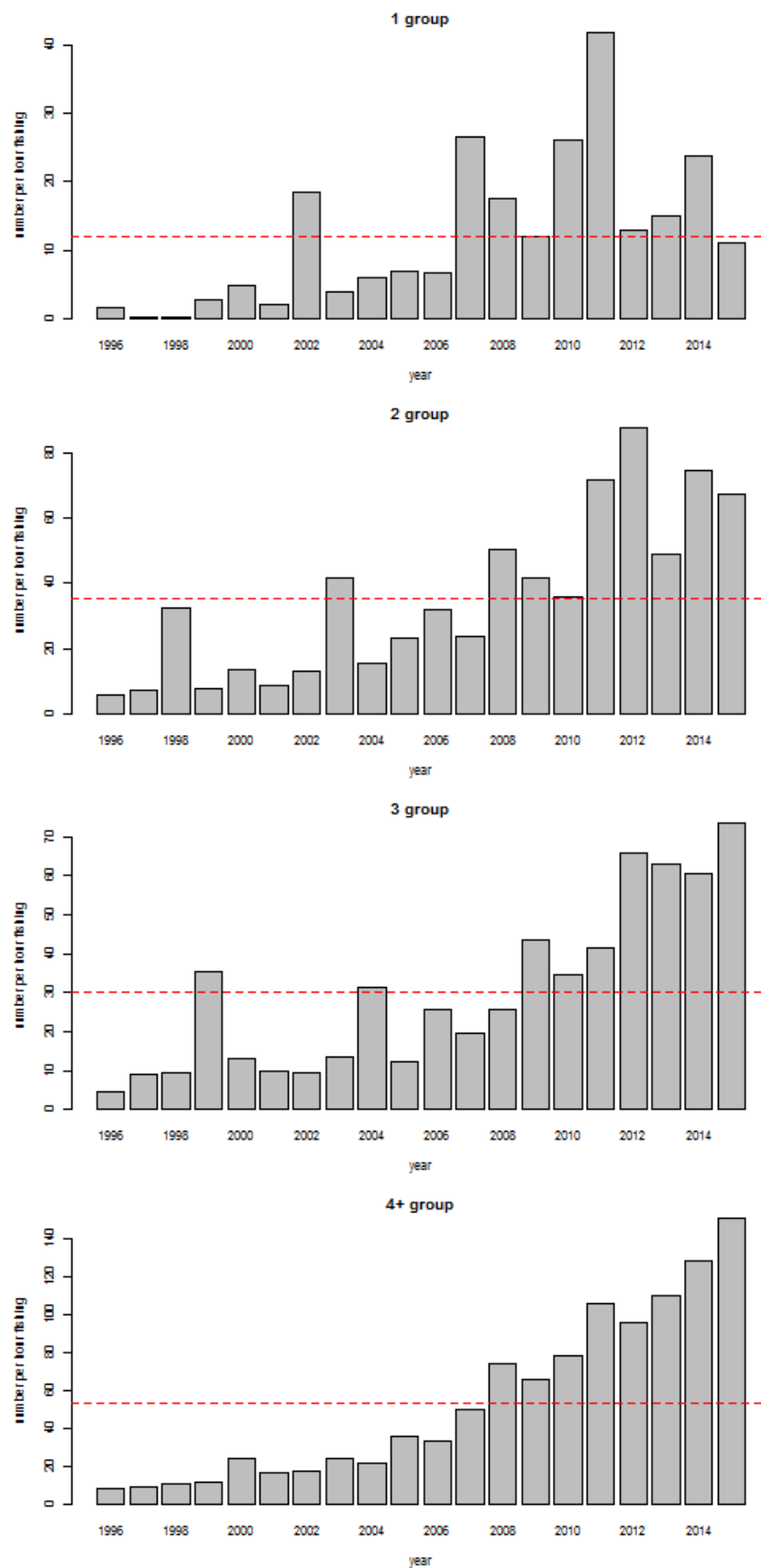
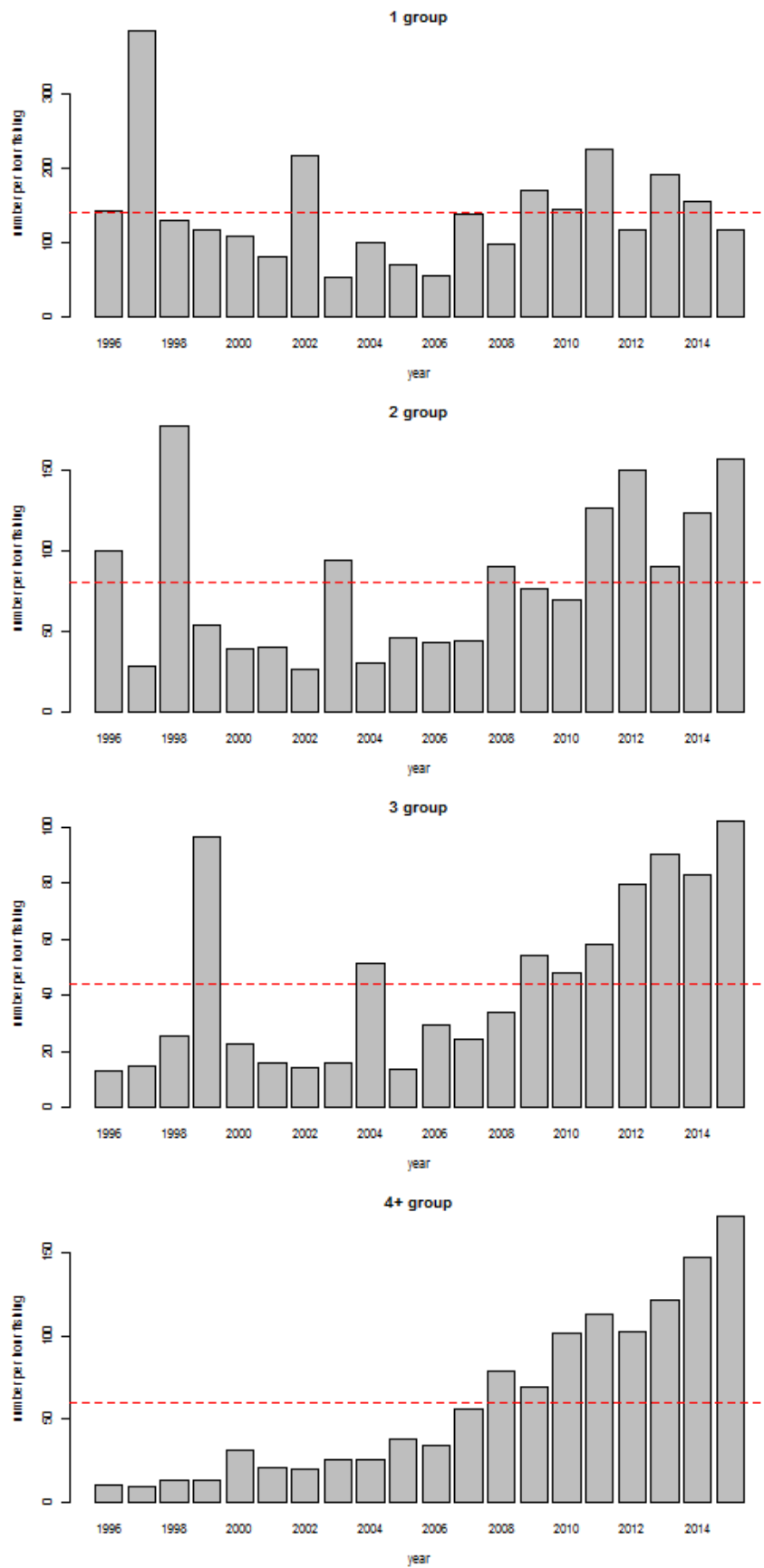
(b) Netherlands: plaice (N.h<sup>-1</sup>/8m trawl) North Sea (4) RV "Tridens"

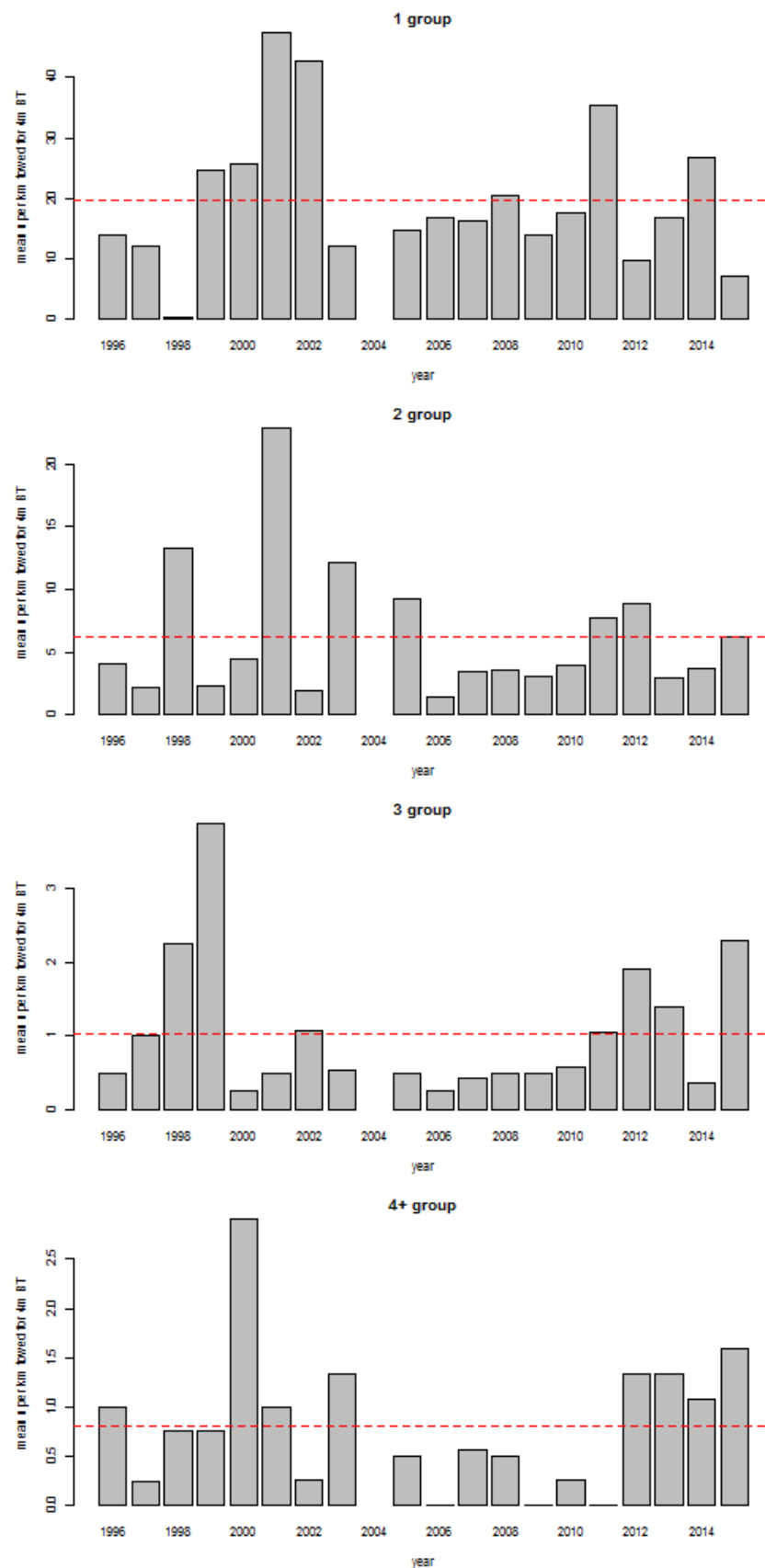
Figure 5.1.1.2: continued.



(c) Netherlands: plaice ( $N \cdot h^{-1/8m}$  trawl) North Sea (4) RV "Isis" and RV "Tridens"

Figure 5.1.1.2: continued.





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

Figure 5.1.1.2: continued.

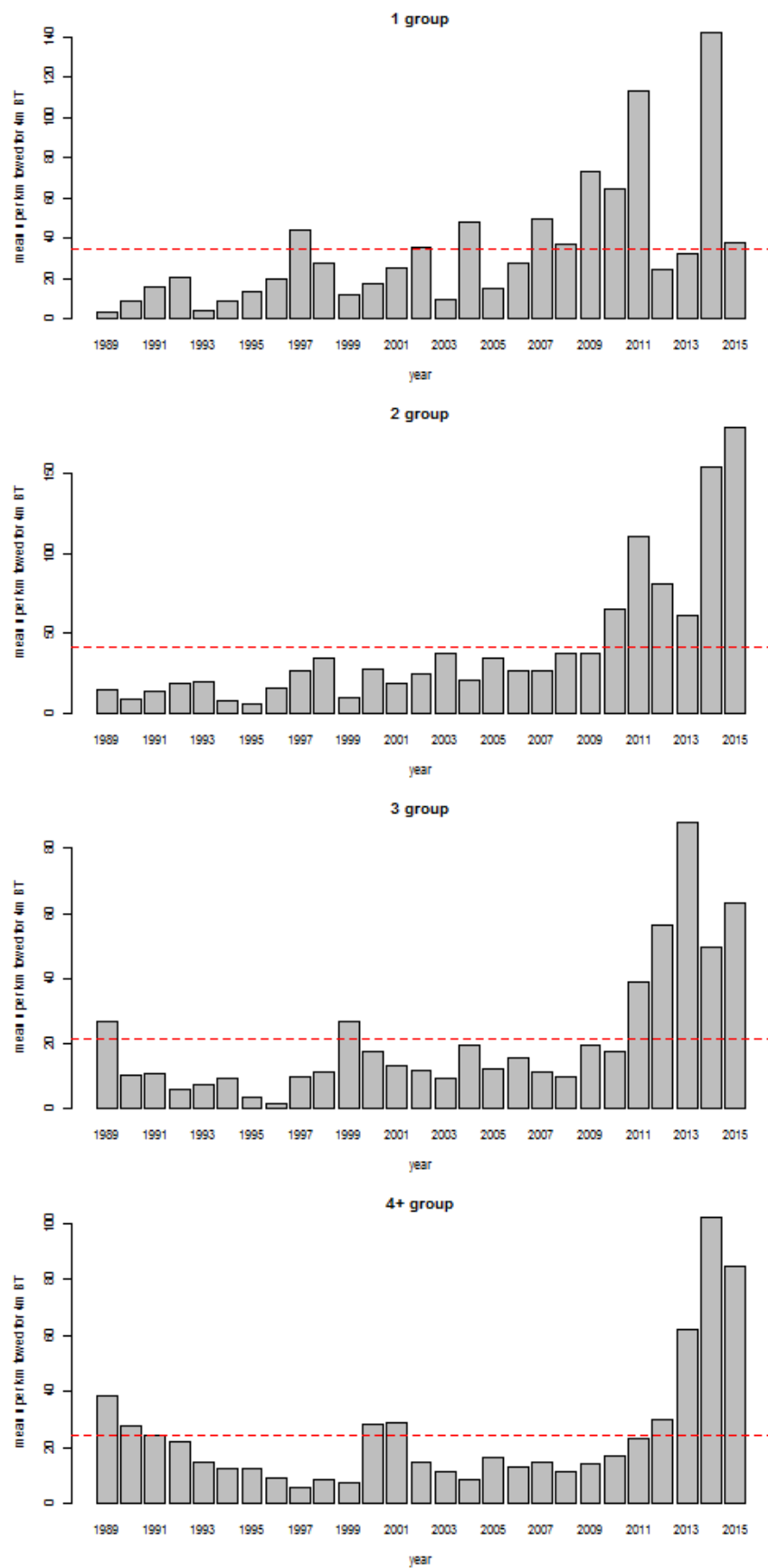
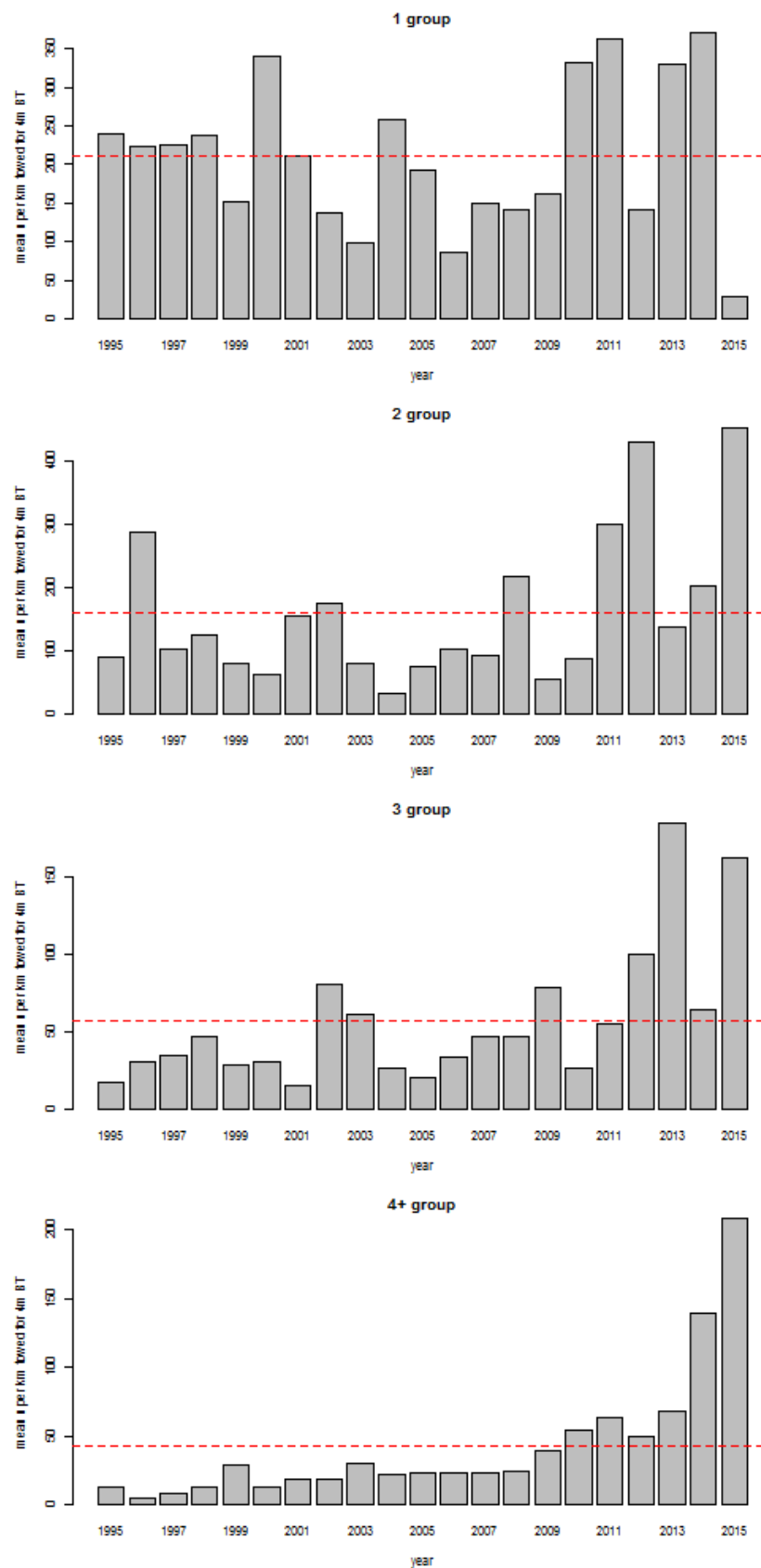
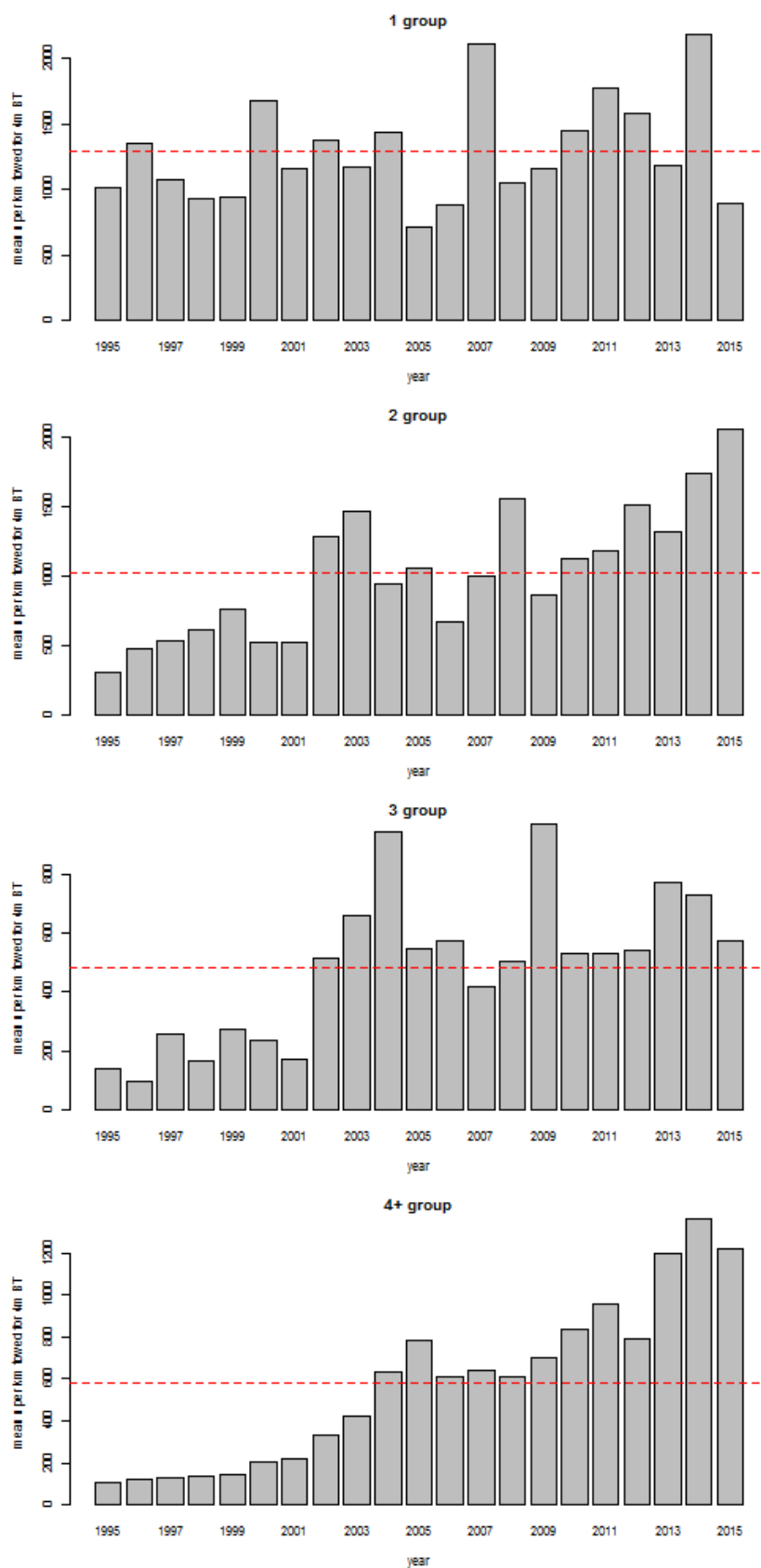
(e) UK: plaice ( $N \cdot h^{-1/8m}$  beam trawl) Eastern English Channel (7d)

Figure 5.1.1.2: continued.



(g) UK: plaice (mean numbers per km towed for 4m beam trawl) Bristol Channel (7f)

Figure 5.1.1.2: continued.



(h) UK: plaice (mean numbers per km towed for 4m beam trawl) Eastern Irish Sea (7a)

Figure 5.1.1.2: continued.

## Annex 6: Population abundance indices for sole and plaice, inshore surveys

### Annex 6.1: Indices from the D(Y)FS inshore beam trawl surveys.

#### a) Plaice abundance indices in numbers per 1000 m<sup>2</sup> (national) or numbers\*10<sup>6</sup> (combined)

	Plaice, age 0				Plaice, age 1		
	nl	be	de	combined	nl	be	combined
Raising	11.007	1.472	1.919		11.007	1.472	
Gear correction	1	1.22	1.22		1	1	
1990	34.515	2.482	23.590	439.593	5.518	1.256	62.588
1991	25.489	1.155	21.240	332.358	4.633	0.170	51.251
1992	15.326	0.315	4.720	180.310	4.066	0.182	45.020
1993	18.860	0.198	3.860	216.990	2.362	0.121	26.178
1994	23.898	1.306	7.710	283.438	0.636	0.292	7.432
1995	10.623	2.623	10.440	146.076	0.789	0.724	9.749
1996	45.345	12.648	41.770	619.615	0.426	0.198	4.985
1997	16.584	4.273	16.670	229.243	3.729	3.448	46.119
1998	*	2.763	8.110	*	*	1.543	*
1999	*	1.136	2.940	*	*	1.624	*
2000	8.953	1.290	10.280	124.926	0.162	0.949	3.185
2001	22.353	1.572	27.470	313.175	0.136	0.630	2.422
2002	10.013	5.609	1.120	122.907	0.088	4.685	7.861
2003	19.197	3.224	9.200	238.626	0.257	1.210	4.607
2004	9.787	4.463	4.700	126.738	0.592	1.999	9.455
2005	6.589	3.942	2.680	85.880	0.155	0.264	2.100
2006	14.230	1.117	3.997	167.988	0.143	0.690	2.585
2007	7.074	4.298	5.410	98.253	0.129	0.236	1.770

	Plaice, age 0				Plaice, age 1		
	nl	be	de	combined	nl	be	combined
2008	10.691	3.796	2.230	129.710	0.067	0.657	1.708
2009	9.757	7.402	9.050	141.870	0.138	0.311	1.981
2010	12.807	1.182	15.600	179.615	0.073	0.501	1.537
2011	6.897	2.182	5.610	92.963	0.329	2.778	7.713
2012	15.191	3.057	3.600	181.122	0.111	1.691	3.713
2013	12.37	5.716	9.423	168.48	0.267	0.745	4.03
2014	8.454	3.822	3.450	107.99	0.207	1.372	4.29
2015	8.124	1.504	3.435	100.162	0.206	1.560	4.559

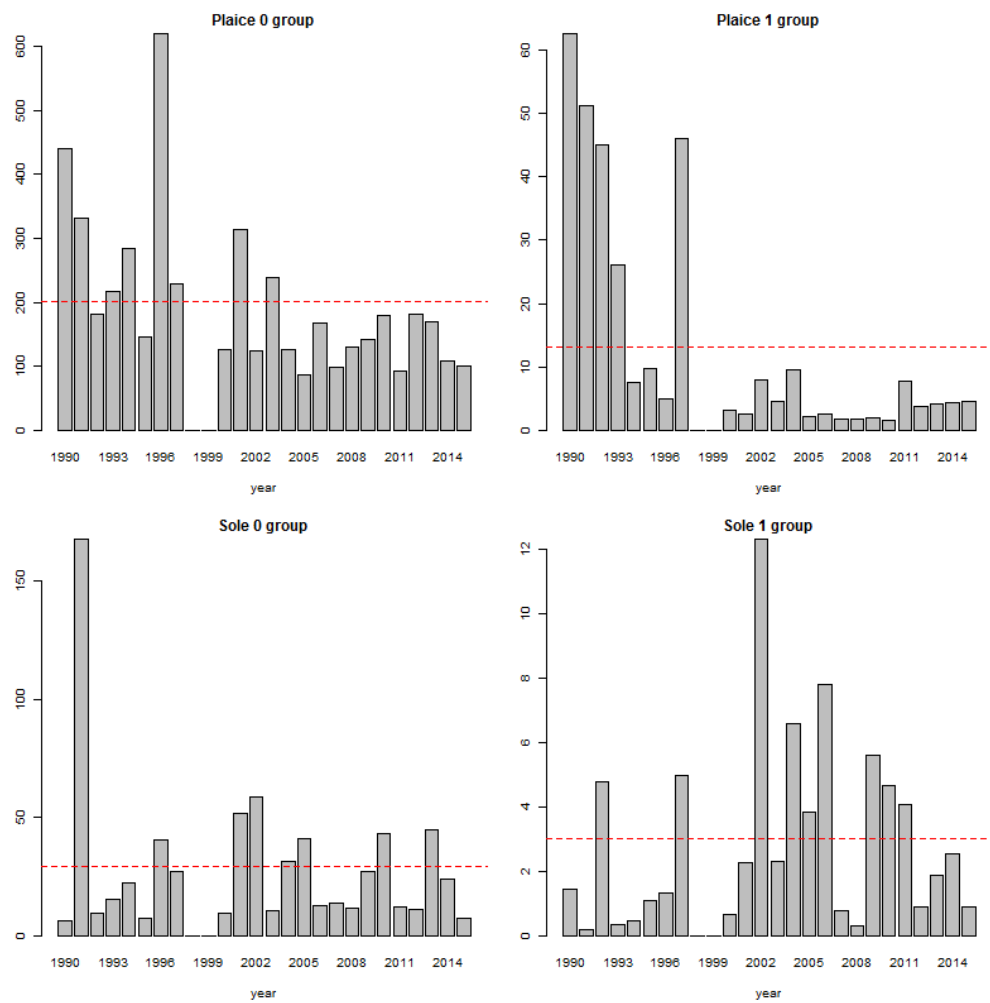
\* No valid survey

**b) Sole abundance indices in numbers per 1000m<sup>2</sup> (national) or numbers\*10<sup>6</sup> (combined)**

	Sole, age 0				Sole, age 1		
	nl	be	de	combined	nl	be	combined
Raising	11.007	1.472	1.919		11.007	1.472	
Gear correction	1	1.59	1.59		1	1.9	
1990	0.440	0.356	0.230	6.381	0.119	0.045	1.435
1991	14.521	2.168	0.870	167.563	0.015	0.005	0.184
1992	0.755	0.160	0.190	9.266	0.344	0.350	4.771
1993	1.263	0.450	0.120	15.324	0.024	0.024	0.335
1994	1.817	0.687	0.150	22.063	0.015	0.106	0.457
1995	0.284	1.568	0.090	7.065	0.075	0.084	1.065
1996	2.454	4.949	0.550	40.272	0.013	0.418	1.306
1997	2.141	1.400	0.030	26.940	0.248	0.804	4.981
1998	*	3.476	0.180	*	*	2.336	*
1999	*	2.310	0.100	*	*	0.506	*
2000	0.716	0.535	0.120	9.504	0.036	0.086	0.636
2001	2.648	9.452	0.050	51.424	0.032	0.687	2.269
2002	2.426	13.386	0.180	58.583	0.087	4.060	12.307
2003	0.618	1.498	0.100	10.609	0.087	0.479	2.298
2004	0.589	10.516	0.050	31.252	0.030	2.235	6.585
2005	2.245	5.665	0.990	40.987	0.032	1.240	3.819
2006	1.037	0.341	0.115	12.567	0.126	2.297	7.813
2007	0.863	1.739	0.050	13.727	0.013	0.226	0.776
2008	0.970	0.434	0.024	11.768	0.011	0.059	0.292
2009	1.224	5.519	0.310	27.332	0.035	1.873	5.620
2010	2.245	7.724	0.024	42.862	0.059	1.439	4.673
2011	0.981	0.477	0.070	12.130	0.143	0.900	4.088

	Sole, age 0				Sole, age 1		
	nl	be	de	combined	nl	be	combined
2012	0.915	0.428	0.050	11.226	0.012	0.269	0.880
2013	3.458	1.944	0.724	44.819	0.036	0.528	1.868
2014	1.980	0.686	0.070	23.616	0.094	0.532	2.522
2015	0.564	0.461	0.054	7.448	0.025	0.222	0.893
*	No				valid		survey





**Figure 5.1.2.1. Combined inshore indices for 0 and 1 group plaice and sole. The horizontal line is the long-term mean for the period presented. The indices were declared to be invalid in 1998 and 1999, due to insufficient coverage of the Dutch survey area and are not displayed.**

## Annex 6.2: Indices from SNS inshore beam trawl survey.

### a) Plaice abundance indices in numbers per 100 hours fished

	Plaice			
	age group			
	1	2	3	4
1970	9311.368	9731.527	3272.977	769.727
1971	13 538.483	28 163.543	1414.688	100.825
1972	13 206.903	10 779.712	4477.829	89.111
1973	65 642.504	5133.332	1578.221	461.359
1974	15 366.398	16 508.939	1128.838	160.004
1975	11 628.230	8168.365	9556.302	65.238
1976	8536.534	2402.627	868.236	236.317
1977	18 536.699	3423.843	1737.311	589.947
1978	14 011.969	12 678.032	345.465	134.778
1979	21 495.430	9828.822	1574.911	161.222
1980	59 174.156	12 882.339	490.655	180.434
1981	24 756.155	18 785.306	834.420	38.321
1982	69 993.328	8642.029	1261.036	87.857
1983	33 974.181	13 908.624	249.374	70.965
1984	44 964.544	10 412.798	2466.902	41.667
1985	28 100.547	13 847.837	1597.696	328.037
1986	93 551.910	7580.403	1152.144	144.873
1987	33 402.438	32 991.107	1226.651	199.582
1988	36 608.576	14 421.140	13 153.247	1350.132
1989	34 276.253	17 810.152	4372.837	7126.431
1990	25 036.611	7496.000	3160.028	816.139
1991	57 221.278	11 247.222	1517.833	1076.833
1992	46 798.224	13 841.786	2267.598	612.976
1993	22 098.315	9685.589	1006.278	97.778
1994	19 188.431	4976.550	855.907	75.944
1995	24 766.964	2796.381	381.327	96.994
1996	23 015.391	10 268.227	1185.155	44.714
1997	95 900.889	4472.700	496.633	31.667
1998	33 665.689	30 242.247	5013.857	49.667
1999	32 951.262	10 272.083	13 783.060	1058.214
2000	22 855.018	2493.389	891.444	982.556
2001	11 510.524	2898.476	370.167	175.833
2002	30 809.227	1102.715	264.641	65.242
2003	*	*	*	*
2004	18 201.602	1349.703	1080.686	50.778
2005	10 118.405	1818.912	141.881	365.524
2006	12 164.222	1570.978	384.722	52.444
2007	14 174.543	2133.911	139.537	51.852

Plaice				
age group				
	1	2	3	4
2008	14 705.767	2700.438	464.129	178.500
2009	14 860.033	2018.683	492.452	38.333
2010	11 946.907	1811.517	529.338	55.476
2011	18 348.596	1142.515	308.193	74.696
2012	5893.440	2928.552	681.524	82.000
2013	15 394.878	3021.319	1638.492	427.603
2014	17 312.696	2258.336	513.847	457.944
2015	16 726.486	5040.444	1881.944	477.611

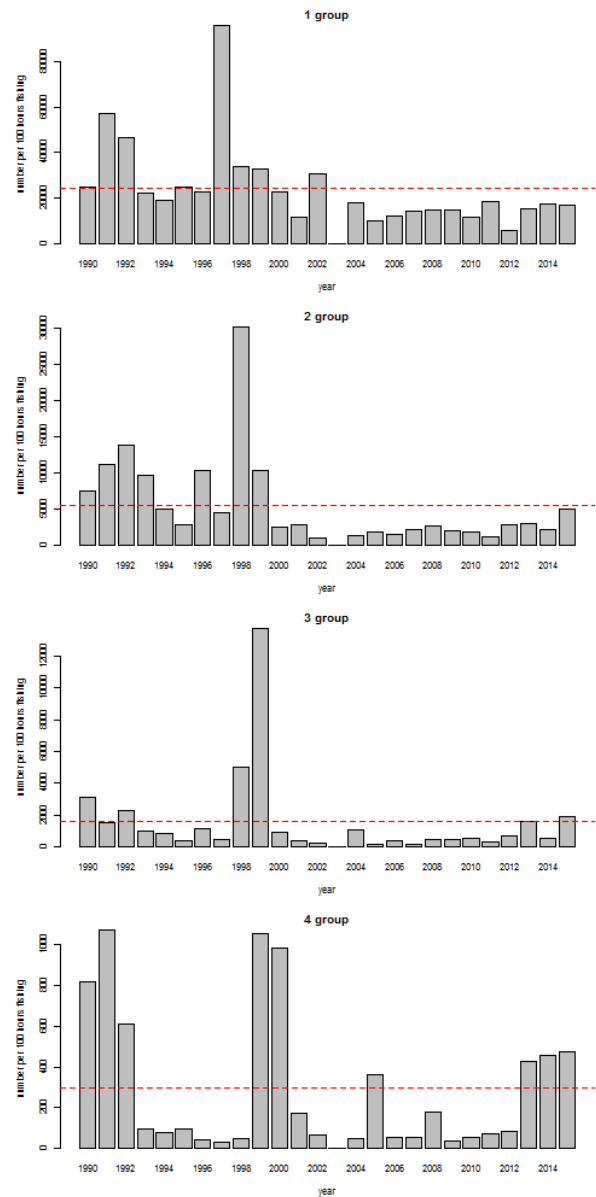
\* No survey

**b) Sole abundance indices in numbers per 100 hour fishing**

Sole				
age group				
	1	2	3	4
1970	5410.280	734.377	237.695	35.444
1971	902.697	1831.076	113.370	2.857
1972	1454.685	272.270	148.553	0.000
1973	5587.152	935.259	83.810	37.303
1974	2347.930	361.429	65.159	0.000
1975	525.425	864.480	176.960	17.500
1976	1399.429	73.556	229.111	26.667
1977	3742.944	776.101	103.838	43.091
1978	1547.714	1354.661	294.069	28.000
1979	93.778	408.273	300.838	76.889
1980	4312.889	88.889	109.333	61.333
1981	3737.200	1413.052	49.970	20.000
1982	5856.463	1146.204	227.778	6.667
1983	2621.143	1123.325	120.579	39.857
1984	2493.111	1099.911	318.322	74.433
1985	3619.435	715.602	167.074	49.333
1986	3705.063	457.607	69.235	31.429
1987	1947.852	943.704	64.815	21.333
1988	11 226.667	593.833	281.611	81.533
1989	2830.744	5004.997	207.558	53.131
1990	2856.167	1119.500	914.250	100.444
1991	1253.620	2529.104	513.839	623.854
1992	11114.014	144.405	360.410	194.857
1993	1290.778	3419.571	153.778	212.778
1994	651.778	498.251	934.097	10.222
1995	1362.100	223.672	142.848	411.134
1996	218.359	349.085	29.600	35.533

	<b>Sole</b>			
	<b>age group</b>			
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1997</b>	10279.333	153.630	189.819	26.470
<b>1998</b>	4094.611	3126.374	141.713	98.730
<b>1999</b>	1648.854	971.782	455.612	10.000
<b>2000</b>	1639.173	125.883	166.278	118.000
<b>2001</b>	970.310	655.357	106.667	35.476
<b>2002</b>	7547.460	379.044	195.300	0.000
<b>2003</b>	*	*	*	*
<b>2004</b>	1369.505	624.376	393.032	68.889
<b>2005</b>	568.083	162.917	124.000	0.000
<b>2006</b>	2726.417	117.083	25.000	30.000
<b>2007</b>	848.642	910.988	33.333	39.506
<b>2008</b>	1259.119	258.548	325.333	0.000
<b>2009</b>	1931.598	344.354	61.667	102.667
<b>2010</b>	2636.933	237.131	67.114	42.202
<b>2011</b>	1247.967	883.867	211.333	111.833
<b>2012</b>	226.576	159.476	54.000	18.000
<b>2013</b>	967.400	426.616	490.472	179.267
<b>2014</b>	2849.000	448.190	44.786	60.000
<b>2015</b>	3192.000	2333.889	137.833	159.944

\* No survey



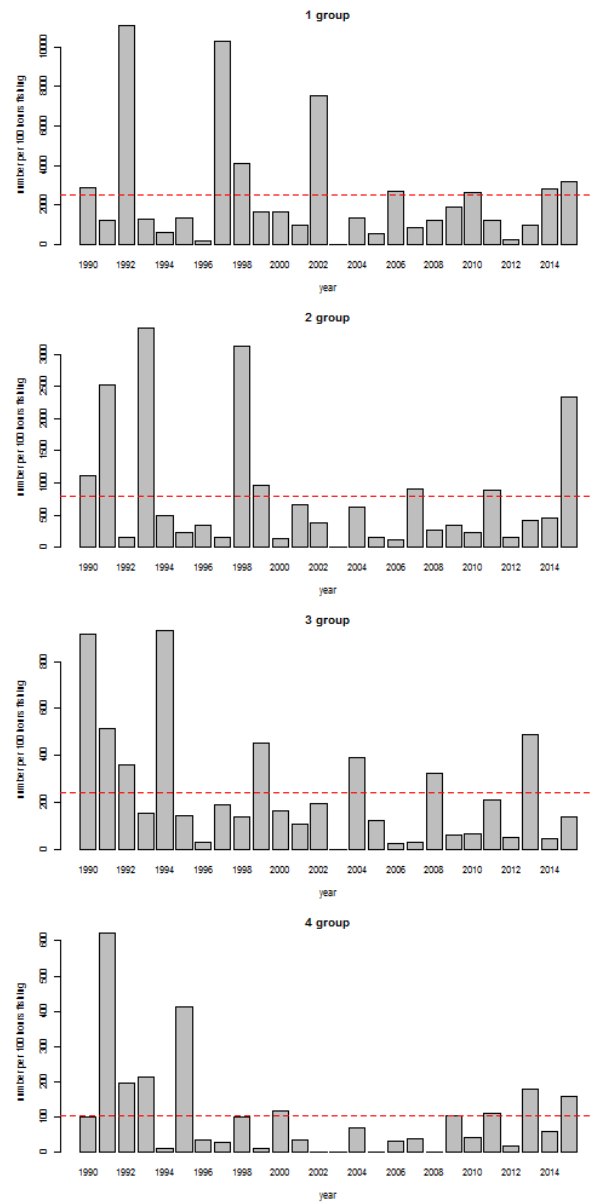


Figure 5.1.2.2. SNS indices for 1 – 4 group plaice (left) and sole (right), in numbers per 100 hours fishing. The horizontal line is the long-term mean for the period presented.

## Annex 7: WGBEAM self-evaluation

---

- 1) **Working Group name:** WGBEAM.
- 2) **Year of appointment:** 2014-2016
- 3) **Current Chair:** Kelle Moreau, Belgium
- 4) **Venues, dates and number of participants per meeting.**  
 Hamburg (Germany), 6-9 May 2014, 10 participants  
 Leuven (Belgium), 14-17 April 2015, 9 participants (+ 1 by correspondence)  
 La Rochelle (France), 12-15 April 2016, 14 participants (+ 1 by correspondence)

### WG Evaluation

- 5) **If applicable, please indicate the research priorities (and sub priorities) of the Science Plan to which the WG make a significant contribution.**

WGBEAM relates directly to the following topics in the ICES Science Plan:  
 25. Identify monitoring requirements for science and advisory needs in collaboration with data product users, including a description of variables and data products, spatial and temporal resolution needs, and the desired quality of data and estimates.

27. Identify knowledge and methodological monitoring gaps, and develop strategies to fill these gaps.

30. Allocate and coordinate observation and monitoring requests to appropriate expert groups on fishery-independent and fishery-dependent surveys and sampling, and monitor the quality and delivery of data products.

31. Ensure the development of best practices through establishment of guidelines and quality standards for: (a) surveys and other sampling and data collection systems; (b) external peer reviews of data collection programmes; and (c) training and capacity-building opportunities for monitoring activities.

- 6) **In bullet form, list the main outcomes and achievements of the WG since their last evaluation. Outcomes including publications, advisory products, modelling outputs, methodological developments, etc.**

- 1) Update and interpretation of abundance index time-series for sole and plaice in offshore and inshore beam trawl surveys:
  - Incorporation of Dutch index calculation for offshore plaice and sole into DATRAS
  - Possibility to calculate North Sea indices for plaice and sole for Belgium and Germany based on the same methodology as used for the Dutch indices.
  - Index calculation for dab via DATRAS for the North Sea based on methodology used for plaice and sole.
  - Revision of the combined inshore indices for sole and plaice (national area-expansions, area-weighting)
  - Update and interpretation of abundance index time-series for sole and plaice in offshore and inshore beam trawl surveys:
- 2) Increase standardization of the surveys:
  - Update of offshore beam trawl manual + sent in for review
  - Progress on inshore beam trawl manual

- 3) Data quality and availability:
  - Creation of data products from DATRAS
  - Improvement regarding data quality in DATRAS
  - Incorporation of inshore beam trawl survey data to DATRAS
  - Incorporation of Belgian offshore data into DATRAS
- 4) Other activities:
  - Analysis of the changes in mean length-at-age for sole and plaice in the North Sea, the English Channel, the Bristol Channel and the Irish Sea (to be continued)
  - Joint session with WGCAN leading to expansion of the dataset of comparative tows of the Dutch and German D(Y)FS (2014)
  - Feedback on MSFD GES assessment matters: Marine Litter reporting format (2014), usefulness of beam trawl surveys for biodiversity studies (2014), species richness and LFI (2016)
  - Feedback on the relevance of beam trawl survey data for the effect of pulse fishing
- 7) **Has the WG contributed to Advisory needs? If so, please list when, to whom, and what was the essence of the advice.**
  - Standard output of the group includes indices for plaice and sole for stock assessment purposes: the offshore data (NLD, ENG) are used as tuning series, the inshore data (combined international index BEL, GER, NLD) provide recruitment indices.
  - Delivery of North Sea dab index to WKNSEA 2016 (benchmark dab)
  - Delivery of German North Sea plaice survey index to WKNSEA 2016 (benchmark plaice)
  - MSFD GES assessment matters:
    - Marine Litter reporting format (2014),
    - usefulness of beam trawl surveys for biodiversity studies (2014),
    - species richness and LFI (2016)
    - Marine litter data upload in DATRAS
  - Joint session with WGCAN
  - Elasmobranch distribution in the beam trawl surveys to WGEF
- 8) **Please list any specific outreach activities of the WG outside the ICES network (unless listed in question 6). For example, EC projects directly emanating from the WG discussions, representation of the WG in meetings of outside organizations, contributions to other agencies' activities.**
  - Feedback on the relevance of beam trawl survey data for the effect of pulse fishing
  - MSFD GES assessment matters:
    - Marine Litter reporting format (2014),
    - usefulness of beam trawl surveys for biodiversity studies (2014),
    - species richness and LFI (2016)
    - Marine litter data upload in DATRAS
- 9) **Please indicate what difficulties, if any, have been encountered in achieving the workplan.**

Results on ToR c (analysis of changes in mean length-at-age) still to be made more consistent methodologically over the different areas + to be expanded



with BEL (sole and plaice) and FRA (sole) data (and ITA?), not fully ready for ASC presentation.

#### Future plans

**10 ) Does the group think that a continuation of the WG beyond its current term is required? (If yes, please list the reasons)**

Yes

The group sees a clear reason for continuation: especially the DCF funded surveys need to be coordinated, and integration of surveys and sample collection will be a topic in the next years. The group has expanded over the last decade: it started off with the Netherlands, Germany, England and Belgium. In 2007 France joined as a beam trawl survey was developed in the Bay of Biscay, followed by Italy (2011) due to the DCF obligation to have a survey internationally coordinated, and Ireland and Iceland (both 2016). Ireland started the beam trawl survey in the Irish/Celtic Sea in March 2016, in line with the English survey in that area. Iceland is developing a beam trawl survey to target younger flatfish yearclasses.

- Continuation of standard reporting on survey results (survey summary sheets)
- Continuation of standard reporting on sole and plaice indices + expansion to other areas and species
- Inclusion of new surveys (UK, Ireland, Iceland) in the WG reporting
- Further assistance in the development of DATRAS products
- Further improvement of data quality in DATRAS, and standardization through publishing the offshore (awaiting review results) and in-shore beam trawl survey manuals
- Feedback from and cooperation with assessment WGs regarding current and future WGBEAM products
- Elaborate on the potential of the surveys for ecosystem monitoring

**11 ) If you are not requesting an extension, does the group consider that a new WG is required to further develop the science previously addressed by the existing WG.**

Not applicable

**12 ) What additional expertise would improve the ability of the new (or in case of renewal, existing) WG to fulfil its ToR?**

WGBEAM feels that the skills that are currently present in the group make answering to the ToRs possible, but the group heavily relies on the expertise of only a few working group members. Therefore, the group feels that it would benefit from skills in working with DATRAS data and general statistical expertise being present in more people, especially when carrying out more analytical tasks in future.

**13 ) Which conclusions/or knowledge acquired of the WG do you think should be used in the Advisory process, if not already used? (please be specific)**

The survey knowledge and the potential of the surveys for the use in any (fish stock and/or ecosystem) assessment should be used, especially in the development phase (i.e. benchmark groups and by IEA groups). The survey experts know the survey from inside out and can add to discussions on the relevance of the survey to an assessment.

## Annex 8: Survey summary sheets offshore surveys per country

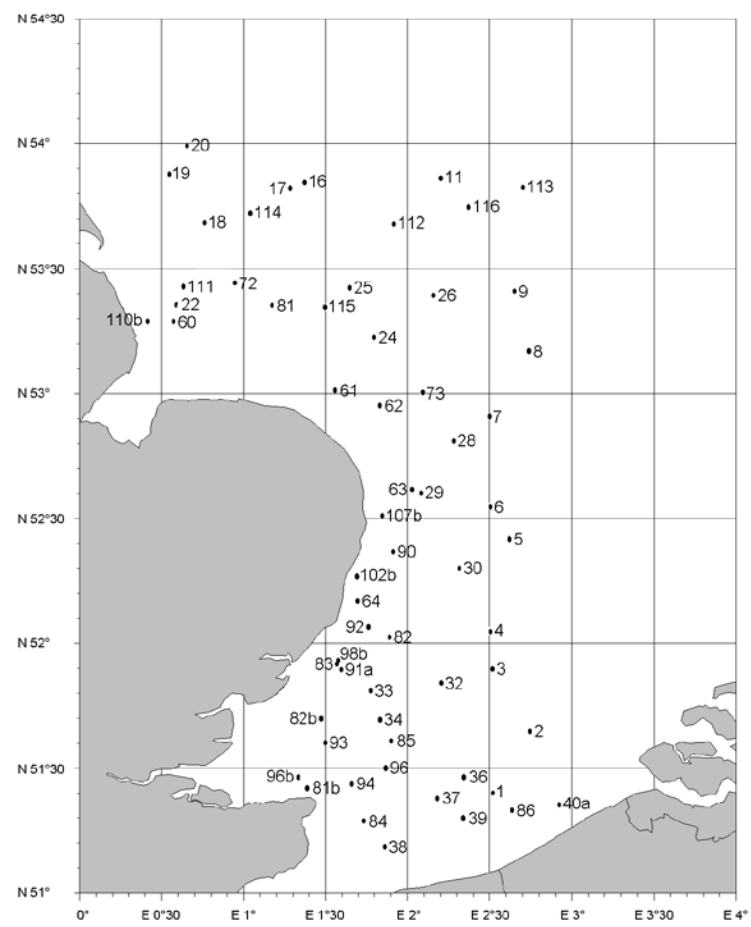
### Annex 8.1: Survey summary Belgium

Nation:	Belgium	Vessel:	FV “Z.279 Ramblers”												
Survey:	Offshore North Sea Beam Trawl Survey	Dates:	13 to 23 September 2015												
Survey description:	An annual North Sea Beam Trawl Survey is carried out in the southwestern part of the North Sea (4b and 4c West) to sample the adult flatfish stocks, primarily targeting plaice <i>Pleuronectes platessa</i> and sole <i>Solea solea</i> . 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.):	<div><div><div>- Due to a severe incident with RV Belgica, the complete shiptime for the Belgian Beam Trawl Survey was lost in 2015, and the survey had to be carried out using a commercial trawler (Z. 279 Ramblers). As new dipclears and permits had to be arranged, the timing also shifted to two weeks later than usual (but still in quarter 3).</div><div>- The meteorological conditions were favorable and no technical issues were encountered.</div><div>- Five stations were missed due to a lack of time.</div><div>- As only two scientists could be embarked on Z.279 Ramblers instead of the usual minimum of 7 scientists, the focus of the survey could only go to the commercial fish species. As a result, no non-commercial fish and no invertebrates were documented, and no marine litter data were recorded.</div></div><div><u>Conclusion:</u> 57 out of the total of 62 planned stations have been fished successfully and were declared valid. This is within the margin of 10% missed stations (would be a maximum of 6 missed stations) superposed by the European Commission (DG Mare).</div><div>Number of otoliths: 5 ind per cm size class per ICES Statistical Rectangle for cod, brill, turbot, plaice and sole. This was the fifth time that the collection of biological samples was geographically organized based on the rectangles instead of the formerly used ALK-areas.</div><div>Indices for plaice and sole are the numbers per hour, averaged by ICES rectangle and averaged over all sampled ICES rectangles.</div></div>														
dTarget species catch rates:	<table><tr><td></td><td>TIME-SERIES</td><td>2015</td></tr><tr><td></td><td>MEAN NR. PER H</td><td>MEAN NR. PER H</td></tr><tr><td>Plaice</td><td>65,7</td><td>120,9</td></tr><tr><td>Sole</td><td>86,2</td><td>95,4</td></tr></table>				TIME-SERIES	2015		MEAN NR. PER H	MEAN NR. PER H	Plaice	65,7	120,9	Sole	86,2	95,4
	TIME-SERIES	2015													
	MEAN NR. PER H	MEAN NR. PER H													
Plaice	65,7	120,9													
Sole	86,2	95,4													
Number of fish species recorded and notes on any rare species or unusual catches:	<div>The NS BTS measures all commercial fish species to the 5 mm below (no sub-sampling), and usually also records all other fish species by length. In 2015 however, only the commercial fish could be documented. 24 different species of commercial fish were caught (as opposed to &gt; 50 species including non-commercial species in usual BTS years).</div> <div>The top 10 by number are (the ones in bold usually appear in the top 10 of all fish species caught, the rest doesn’t):</div> <table><tr><td>SPECIES</td><td>TOTAL NUMBER</td></tr><tr><td>Dab (<i>Limanda limanda</i>)</td><td>4086</td></tr></table>			SPECIES	TOTAL NUMBER	Dab ( <i>Limanda limanda</i> )	4086								
SPECIES	TOTAL NUMBER														
Dab ( <i>Limanda limanda</i> )	4086														

	<b>Sole (<i>Solea solea</i>)</b>	3494
	<b>Plaice (<i>Pleuronectes platessa</i>)</b>	3223
	<b>Whiting (<i>Merlangius merlangus</i>)</b>	1339
	Lesser Spotted Dogfish ( <i>Scyliorhinus canicula</i> )	1030
	<b>Bib (<i>Trisopterus luscus</i>)</b>	460
	Lemon sole ( <i>Microstomus kitt</i> )	333
	Thornback Ray ( <i>Raja clavata</i> )	185
	Grey Gurnard ( <i>Eutrigla gurnardus</i> )	139
	Tub Gurnard ( <i>Chelidonichthys lucerna</i> )	130
Number of epi-fauna species recorded	All individuals of epibenthic/benthic species and occasionally caught pelagic species are usually recorded on the species-level whenever possible (or the most detailed taxonomical level otherwise) based on complete catches (subsampling only for the bigger catches). Due to the limited number of scientists that could be embarked on the commercial vessel, this task could not be carried out in 2015.	
Index revisions:	None	

**Stations fished:**

ICES Divisions	Strata	Gear	Indices stations	Comments
4bc	57 fixed stations	4 m beam trawl	57 (of 62)	
Number of biological samples (maturity and age material, *maturity only):				
5 otoliths per cm size class are collected per ICES Statistical Rectangle for cod, brill, turbot, plaice and sole, and the fish these came from are also sexed.				
No maturity information is recorded (inappropriate period of the year)..				



## Annex 8.2: Survey summary England: 7d and 4c

Nation:	UK (England and Wales)	Vessel:	RV Cefas Endeavour
Survey:	16/15	Dates:	18 – 30 July 2015

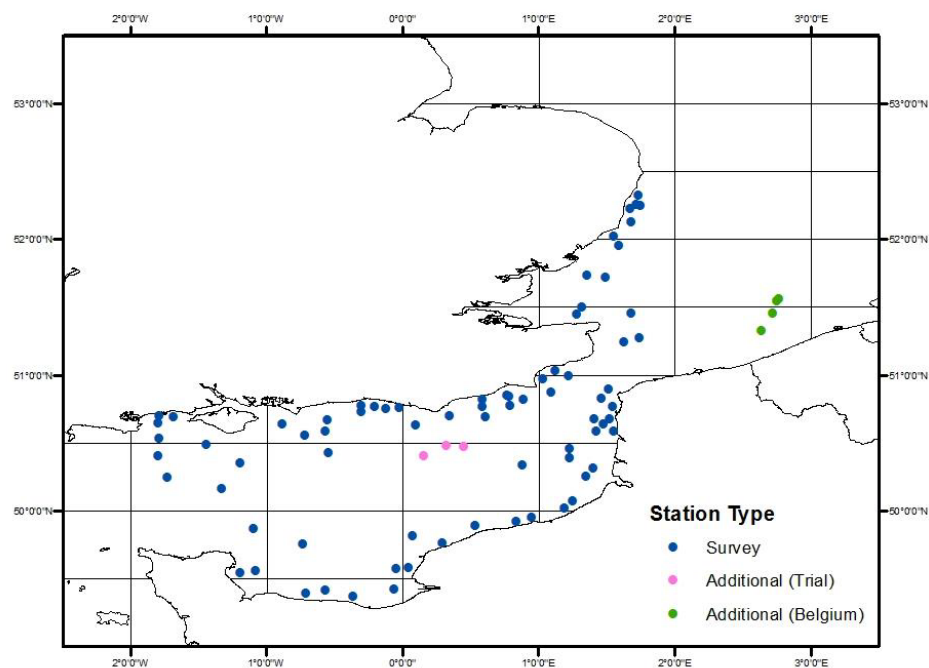
Survey description:	Q3 Eastern English Channel and Southern North Sea survey aims to collect data on distribution and relative abundance, with biological information on commercial fish species in 7d and 4c. The primary target species are sole and plaice, with additional species including lemon sole and cod.				
Gear details:	Steel 4m-beam trawl with chain mat and single flip-up rope, 80mm nylon trawl with 40mm codend liner. Also attached is the SAIV mini CTD.				
Notes from survey (e.g. problems, additional work etc.):	The survey was completed without incident, within the time frame and in good weather. In total 76 valid stations were successfully sampled, although it was necessary to reduce the tow duration to 20 min for 14 of the prime stations to avoid static gear, and reduce the impact of large catches of shell/gravel. All trawl deployments were valid. Time was available to sample additional “trial” stations mid Channel to provide a clearer picture of fish population structure in poorly sampled areas, as well as four stations off the Belgium coast. During the survey new developed EDC measuring software was successfully trialled. Additional survey aims included the collection of: litter data, water samples for nutrient analysis, environmental data; tag and release of species of elasmobranch.				
At Target species catch rates:		Time-series mean no. per h	2014 mean no. per h	Time-series mean catch weight per h (kg)	2014 mean catch weight per h (kg)
	Sole	40.23	58.66	4.44	4.48
	Plaice	56.32	148.29	13.11	27.41
Number of fish species recorded and notes on any rare species or unusual catches:	63 separate species / genera of finfish were caught. The top 10 by number(Standardized to 30-minute tow duration) were:				
	<i>Pleuronectes platessa</i>				5635
	<i>Buglossidium luteum</i>				5048
	<i>Solea solea</i>				2229
	<i>Callionymus lyra</i>				2163
	<i>Merlangius merlangus</i>				1201
	<i>Limanda limanda</i>				1183
	<i>Trisopterus luscus</i>				816
	<i>Trisopterus minutus</i>				488
	<i>Agonus cataphractus</i>				482
<i>Raja clavata</i>				471	
Number of epifauna species recorded:	107 separate infauna species / genera were observed during the 2014 survey across both ICES divisions. At 15 selected fishing stations (12 7d, 3 4c), samples of the epi-benthic bycatches were sorted and 32 ‘core species’ identified and quantified, and at all fishing stations epi-benthic species were observed and the nine sentinel taxa quantified.				
Index revisions:					

**Stations fished:**

ICES Divisions	Strata	Gear	Valid	Invalid	Unable to fish	Comments
7d	English	4m beam trawl	32	0	1	
7d	French	4m beam trawl	30	0	1	
4c		4m beam trawl	14	0	0	

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	1740	<i>Scophthalmus rhombus</i>	34
<i>Solea solea</i>	568	<i>Scophthalmus maximus</i>	25
<i>Merlangius merlangus</i>	193	<i>Eutrigla gurnardus</i>	20
<i>Limanda limanda</i>	109	<i>Mullus surmuletus</i>	16
<i>Microstomus kitt</i>	73	<i>Zeus faber</i>	10
<i>Platichthys flesus</i>	68	<i>Gadus morhua</i>	6
<i>Aspitrigla cuculus</i>	60	<i>Lophius piscatorius</i>	3
<i>Trigla llucerna</i>	53	<i>Dicentrarchus labrax</i>	1
<i>Ttrigloporus lastoviza</i>	50		

#### Station positions for Cefas Endeavour 16/15 Beam Trawl survey



### Annex 8.3: Survey summary England: 7a and 7f

Nation:	UK (England and Wales)	Vessel:	RV Cefas Endeavour
Survey:	20/15	Dates:	10 Sept – 30 Sept 2015

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 7a and 7f. 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 nylon trawl with 40mm codend liner. Also attached is the SAIV mini CTD.				
Notes from survey (e.g. problems, additional work etc.):	The survey was completed in essentially good weather without major incident. At 14 prime stations it was necessary to reduce the tow duration from the standard 30 min to either 20 or 15 min, and further 12 stations were hauled early. These reductions were to either avoid potential large catches of weed, broken shell, small flatfish, or static gear. A few stations were moved slightly to avoid undersea cables (an increasing problem in the area). Five stations were deemed invalid because they either had to be hauled early because of static gear, gear damage or due to loss of catch before processing. These stations were either repeated at the same location or alternative positions identified. Additional survey aims included the collection of: surface and bottom temperature/salinity data; surface water samples for analysis of tritium; water samples to determine alkalinity.				
Target species catch rates:		Time-series mean no. per h (for period 2001-2015)	2015 mean no. per h	Time-series mean catch weight per h (kg)	2015 mean catch weight per h (kg)
	Sole 7a	19.74	26.71	2.84	2.89
	Sole 7f	66.09	69.00	8.19	6.34
	Plaice 7a	264.41	313.72	22.93	28.11
	Plaice 7f	40.27	64.69	7.14	12.71
Number of fish species recorded and notes on any rare species or unusual catches:	71 separate species / genera of finfish were caught. The top 10 by number (Standardized to 30-minute tow duration) were:				
	<i>Limanda limanda</i>				16515
	<i>Pleuronectes platessa</i>				11375
	<i>Buglossidium luteum</i>				3581
	<i>Callionymus lyra</i>				2804
	<i>Trisopterus minutus</i>				2367
	<i>Solea solea</i>				2060
	<i>Merlangius merlangus</i>				2016
	<i>Scyliorhinus canicula</i>				1752
	<i>Arnoglossus laterna</i>				1455
	<i>Eutrigla gurnardus</i>				1267
Number of infauna species recorded	111 separate infauna species / genera were observed during the 2015 survey across both ICES divisions. At 25 selected fishing stations, samples of the epibenthic bycatches were sorted and 32 'core species' identified and quantified, and at all fishing stations epi-benthic species were observed and the nine sentinel				

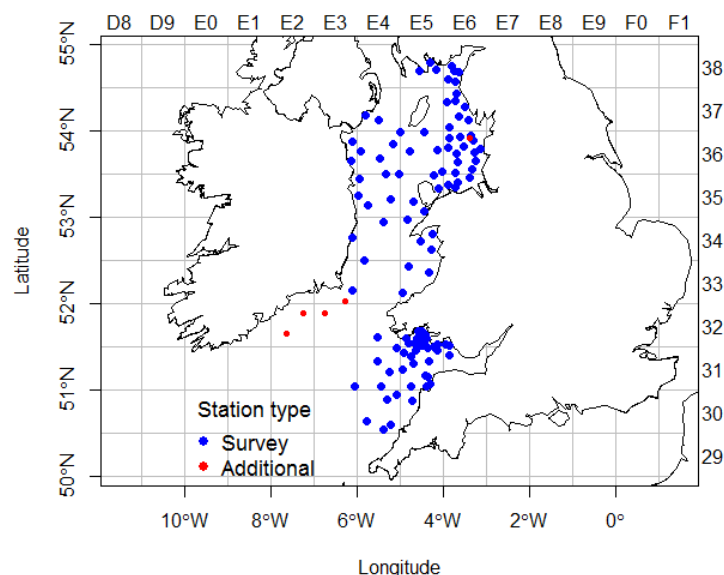
	taxa quantified.
Index revisions:	

### Stations fished:

ICES Divisions	Strata	Gear	Valid	Additional	Invalid	Total	Comments
7a,f	Depth band within stratum 4m beam trawl area		108	6	5	119	

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	2040	<i>Melanogrammus aeglefinus</i>	72
<i>Solea solea</i>	796	<i>Scophthalmus rhombus</i>	65
<i>Limanda limanda</i>	286	<i>Lepidorhombus whiffiagonis</i>	31
<i>Merlangius merlangus</i>	190	<i>Merluccius merluccius</i>	19
<i>Eutrigla gurnardus</i>	143	<i>Mullus surmuletus</i>	19
<i>Microstomus kitt</i>	102	<i>Scophthalmus maximus</i>	18
<i>Lophius piscatorius</i>	82	<i>Zeus faber</i>	16
<i>Trigla lucerna</i>	82	<i>Dicentrarchus labrax</i>	5
<i>Aspitrigla cuculus</i>	74	<i>Trigloporus lastoviza</i>	3
<i>Gadus morhua</i>	74	<i>Lophius budegassa</i>	2

### Station positions for Cefas Endeavour 20/15 Beam Trawl survey





## Annex 8.4: Survey summary England: 7e and Celtic Sea

Nation:	<b>UK (England and Wales)</b>	Vessel:	RV Cefas Endeavour
Survey:	5/16	Dates:	26 Feb – 23 Mar 2016

Survey description	Q1 western English and Celtic Sea ecosystem survey aims to collect data on distribution and relative abundance, with biological information on commercial fish species in 7e and Celtic Sea (7e, 7f, 7g, 7h, 7j). Stations are randomly selected by startum.			
Gear details:	Steel 4m-beam trawl with chain mat and single flip-up rope, 80mm polypropylene trawl with 40mm codend liner. Also attached is the SAIV mini CTD. At a station two beam trawls are deployed, one with and one without a liner.			
Notes from survey (e.g. problems, additional work etc.):	The weather was generally good throughout the survey, although it was necessary to strategically avoid periods of poorer weather whilst the survey was in the English Channel. Generally speaking, the survey was completed without major incident and time was available towards the end of the survey to sample additional stations before the vessel returned to Lowestoft earlier than expected to avoid bad weather that was forecast. Additional survey aims included: the collection of fisheries acoustic data, temperature and conductivity data, water samples for caesium and tritium analysis, water alkalinity and dissolved inorganic carbon (DIC), and opportunistic tagging of species of elasmobranch.			
Target species catch rates:	Species	7e 2015 mean no. per h		Celtic Sea 2015 mean no. per h
	<i>Pleuronectes platessa</i>	27.59		18.93
	<i>Lepidorhombus whiffiagonis</i>	3.93		30.24
	<i>Lophius piscatorius</i>	4.12		8.15
	<i>Solea solea</i>	6.69		5.17
	<i>Microstomus kitt</i>	4.14		10.57
	<i>Lophius budegassa</i>	0.76		6.00
Number of fish species recorded and notes on any rare species or unusual catches:	103 separate species / genera of finfish were caught. The top 10 by number (Standardized to 30-minute tow (for both beam trawls) were:			
		7e	Celtic Sea	Total
	<i>Trisopterus minutus</i>	5742	3434	9176
	<i>Scyliorhinus canicula</i>	916	870	1786
	<i>Pleuronectes platessa</i>	1131	492	1623
	<i>Melanogrammus aeglefinus</i>	244	719	963
	<i>Lepidorhombus whiffiagonis</i>	161	786	947
	<i>Callionymus lyra</i>	582	347	929
	<i>Trisopterus esmarki</i>	51	845	897
	<i>Limanda limanda</i>	140	667	807
	<i>Microchirus variegatus</i>	551	205	757
	<i>Trisopterus luscus</i>	655	95	750
Number of infauna species recorded	165 separate infauna species / genera were observed during the 2016 survey across all areas. The epi-benthic bycatches were either observed or fully sorted at all stations. The nine sentinel taxa were always quantified.			

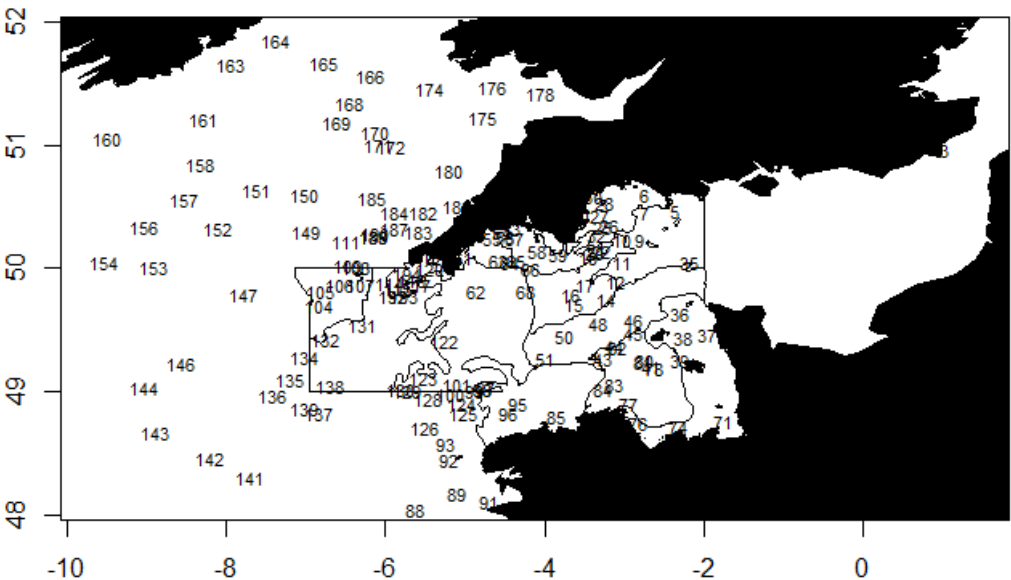
Index revisions:

**Stations fished:**

ICES Divisions	Gear	Valid	Invalid	Additional	Comments
7e	4m Beam Trawl with blinder	82	1	4	
	4m Beam Trawl no blinder	82	3	2	
Celtic Sea	4m Beam Trawl with blinder	52	1	3	
	4m Beam Trawl no blinder	52	3	1	

Number of biological samples (maturity and age material, *maturity only):			
Species	7e	Celtic Sea	Total
<i>Lepidorhombus whiffiagonis</i>	162	775	937
<i>Pleuronectes platessa</i>	585	299	884
<i>Melanogrammus aeglefinus</i>	125	383	508
<i>Merlangius merlangus</i>	171	336	507
<i>Aspitrigla cuculus</i>	222	197	419
<i>Solea solea</i>	272	131	403
<i>Lophius piscatorius</i>	169	213	382
<i>Eutrigla gurnardus</i>	154	226	380
<i>Microstomus kitt</i>	158	221	379
<i>Merluccius merluccius</i>	46	146	192
<i>Lophius budegassa</i>	34	153	187
<i>Glyptocephalus cynoglossus</i>	2	160	162
<i>Trigla lucerna</i>	61	20	81
<i>Trigloporus lastoviza</i>	64	16	80
<i>Mullus surmuletus</i>	53	25	78
<i>Conger conger</i> *	30	8	38
<i>Scophthalmus rhombus</i>	27	8	35
<i>Gadus morhua</i>	8	23	31
<i>Zeus faber</i>	15	16	31
<i>Scophthalmus maximus</i>	15	3	18
<i>Dicentrarchus labrax</i>	12	4	16
<i>Molva molva</i> *	4	2	6
<i>Aspitrigla obscura</i>	3		3

**Station positions for Cefas Endeavour 5/16 Beam Trawl survey**



### Annex 8.5: Survey summary France

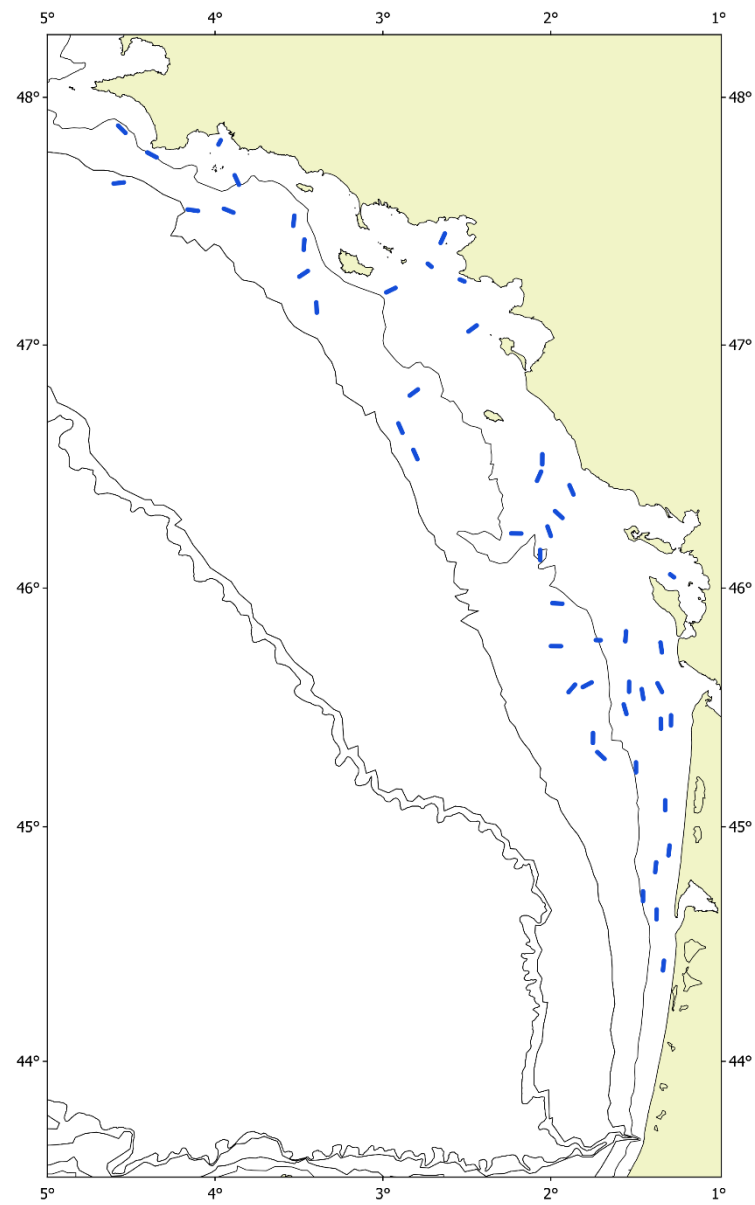
Nation :	FRANCE	Vessel :	NO "Côtes de la Manche"
Survey :	ORHAGO 15	Dates :	25 Nov. – 13 Dec. 2015

Survey description :	The Q4 Bay of Biscay ORHAGO survey aims to collect data on composition, distribution and change in relative abundance of fish fauna on yearly basis. Information is collected on length frequency for all the fish, with biological information (age, maturity) on some species. The main target species is sole, other additional abundant commercial species include (the 10 top number by decreasing numbers/hour in 2015): Norway lobster, hake, brown shrimp, cuttlefish, horse mackerel, common whelk, common spider crab, small-spotted catshark, greater weever and common prawn. From 2013 onwards, the benthos is exhaustively sampled for all the hauls (for determination at the laboratory).														
Gear details :	4m-beam trawl with chain mat, 50mm mesh in the net et 40 mm mesh in the codend.														
Notes from survey (e.g. problems, additional work etc.):	4 hauls slightly displaced or not straight because a fixed gear on the position. 1 haul cancelled because mud and mussels the trawl														
Target species catch rates :	<table><thead><tr><th></th><th>Time-series mean no. per h</th><th>2015 mean no. per h</th><th>Time-series mean catch weight per h</th><th>2014 mean catch weight per h (kg)</th></tr></thead><tbody><tr><td>Sole</td><td>51</td><td>49</td><td>6.8</td><td>7.4</td></tr></tbody></table>						Time-series mean no. per h	2015 mean no. per h	Time-series mean catch weight per h	2014 mean catch weight per h (kg)	Sole	51	49	6.8	7.4
	Time-series mean no. per h	2015 mean no. per h	Time-series mean catch weight per h	2014 mean catch weight per h (kg)											
Sole	51	49	6.8	7.4											
Number of fish recorded and note on any rare species or unusual catches :	61 separate species of fish were caught. The top 10 by number per h are : <table><tbody><tr><td>Arnoglossus laterna</td><td>119</td></tr><tr><td>Trisopterus luscus</td><td>50</td></tr><tr><td>Solea solea</td><td>48</td></tr><tr><td>Callionymus lyra</td><td>45</td></tr></tbody></table>					Arnoglossus laterna	119	Trisopterus luscus	50	Solea solea	48	Callionymus lyra	45		
Arnoglossus laterna	119														
Trisopterus luscus	50														
Solea solea	48														
Callionymus lyra	45														

		Merluccius merluccius	38
		Microchirus variegatus	33
		Buglossidium luteum	27
		Trachurus trachurus	23
		Scyliorhinus canicula	12
		Trachinus draco	10
Number of epifauna species recorded	114 separates epifauna species or group of species sorted by lower taxon to which they can be attributed on board (number, total weight, length distribution of some of them).		

**Stations fished :**

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total valid	comments
8ab	N/A	4m beam trawl	50		3	1	49	none
Number of biological samples ( *age materiel only)								
Species			Number	Species			Number	
Solea vulgaris maturity and age			627	Bass			12	
Solea vulgaris maturity only			474	Lophius piscatorius*			48	
Red mullet			59	Lophius budegasa			55	
Argyrosomus regius			93					

**ORHAGO 2015 tow positions**

## Annex 8.6: Survey summary Germany

Nation:	Germany	Vessel:	RV "Solea"
Survey:	BTS	Dates:	17 – 31 Aug 2015

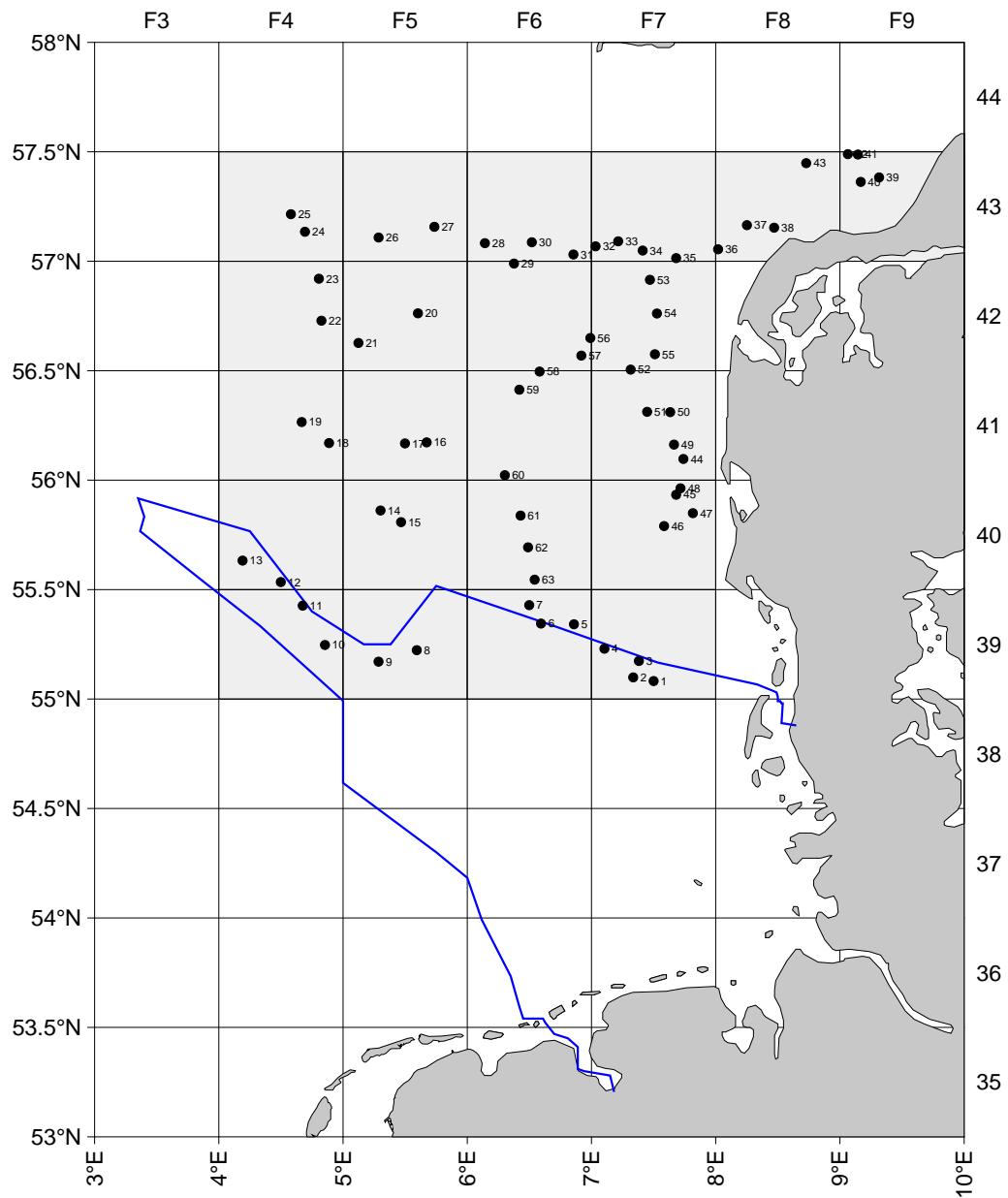
Survey description:	Q3 North Sea survey aims to collect data on distribution and relative abundance, with biological information, on commercial and other fish and invertebrate species in 4b to the west of Denmark. The distribution of young flatfish, particularly plaice, has particular attention (higher sampling density further inshore). In 2013 two rectangles off the north coast of Denmark were added, each with 4 hauls.		
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.):	63 hauls were carried out (approx. 31.5 hours fishing time).		
Target species catch rates:	Time-series mean no. per h	no. per h	2014 mean
	Sole 7.63	8.81	
	Plaice 280.89	323.77	
Number of fish species recorded and notes on any rare species or unusual catches:	34 separate species of finfish were caught. The top 10 by number are: <i>Limanda limanda</i> 28921 <i>Pleuronectes platessa</i> 10199 <i>Eutrigla gurnardus</i> 1743 <i>Buglossidium luteum</i> 966 <i>Hippolossoides platessoides</i> 762 <i>Microstomus kitt</i> 669 <i>Arnoglossus laterna</i> 635 <i>Calionymus lyra</i> 516 <i>Agonus cataphractus</i> 378 <i>Merlangius merlangus</i> 366		
Number of epifauna species recorded:	60 epifauna (attached and free-living) species were observed during the 2015 survey.		
Index revisions:			

### Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Val- id	Comments
North Sea 4b	N/A	7m beam trawl	63	63	0	0	63	

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	882	<i>Limanda limanda</i>	776
<i>Solea vulgaris</i>	134		

Towing positions Germany "Solea" Beam Trawl Survey.





### Annex 8.7: Survey summary Italy/Slovenia: Adriatic Sea–GSA17

<b>Nation:</b>	Italy and Slovenia	<b>Vessel:</b>	N/O G. Dallaporta
<b>Survey:</b>	SoleMon	<b>Dates:</b>	17 Nov – 5 Dec 2015

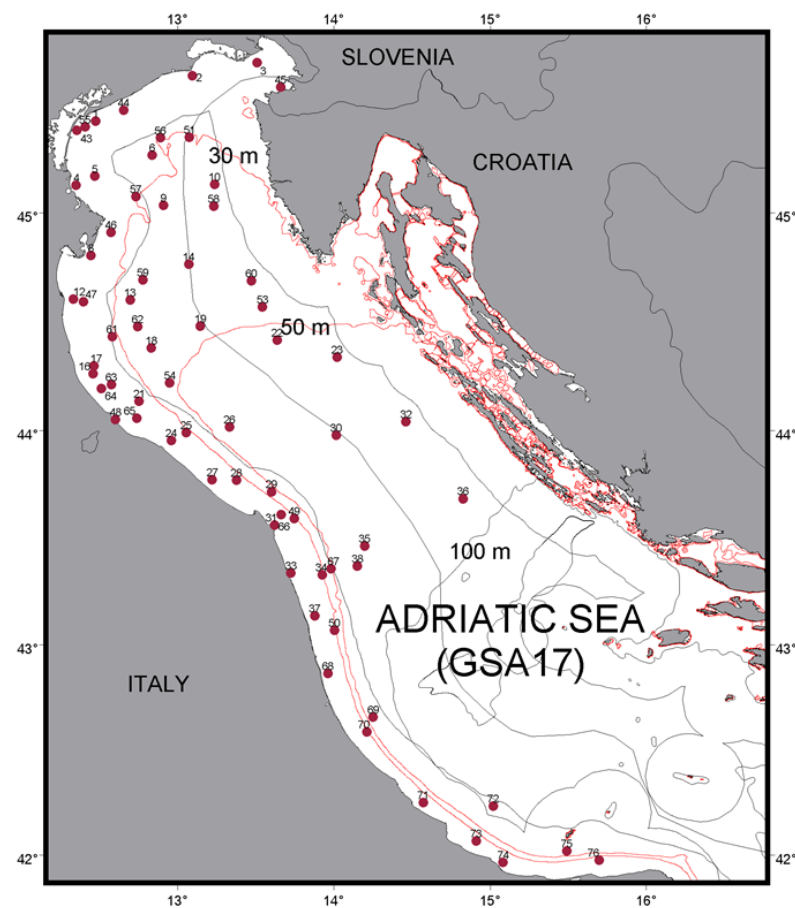
Survey description	SoleMon survey aims to collect data on distribution and relative abundance, with biological information on commercial fish species in FAO-GFCM Geographical Sub-Area 17 (Figure 5.1.3.7.1). The primary target species is sole, with additional species including cuttlefish, scallop, queen scallops, turbot, brill, skates, purple dye murex and caramote prawn.				
Gear details:	Modified beam trawl with a rigid mouth. The frame is rigged with 46 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; 46-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.):	67 hauls were carried out (approx. 30 hours fishing time). The survey was completed without incident. A total of 15 stations had to be fished for less than 30 minutes. This was mainly due to large by catches of benthos and/or as a precaution against gear damage. A significant amount of additional aims were carried out. These included <i>Solea solea</i> , <i>Scophthalmus rhombus</i> and <i>Scophthalmus maximus</i> otolith and finclips for ageing and comparative population genetics structure, collection of samples for Lindane and TBT contaminants analyses, maturity stages of <i>Sepia officinalis</i> , epibenthos analyses, genetic samples of <i>Raja</i> spp. And survivability studies for <i>S. solea</i> and <i>Pecten jacobeus</i> . Vertical CTD measurements were carried out after each haul.				
Target species catch rates:		Time-series mean no. per h	2015 mean no. per h	Time-series mean catch weight per h (kg)	2015 mean catch weight per h (kg)
	Sole GSA17	33.49	44.72	3.14	4.45
Number of fish species recorded and notes on any rare species or unusual catches:	62 separate species of finfish were caught. The top 10 by number per square km are:				
	Solea solea		609.04		
	Arnoglossus laterna		367.82		
	Scorpaena notata		157.91		
	Serranus hepatus		103.78		
	Merluccius merluccius		90.18		
	Gobius niger		82.94		
	Pagellus erythinus		72.3		
	Trisopterus minutus		50.78		
	Uranoscopus scaber		46.08		
	Trachinus draco		45.15		
Number of infauna species recorded	More than 250 separate macro- and megabenthos species were observed during the 2015 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	0	

Number of biological samples (maturity and age material):		
Species	Number	Biological material
<i>Solea solea</i>	1637	(maturity)
<i>Solea solea</i>	520	(otolith)
<i>Scophthalmus rhombus</i>	35	(maturity and otolith)
<i>Scophthalmus maximus</i>	9	(maturity and otolith)

### Towing positions of SoleMon survey



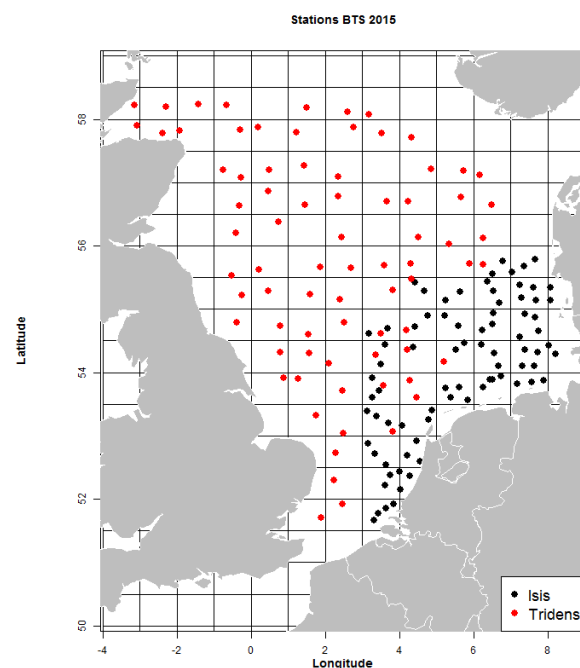
### Annex 8.8: Survey summary Netherlands: Tridens

Nation:	Netherlands	Vessel:	RV “Tridens”																				
Survey:	BTS (Beam Trawl Survey)	Dates:	22 Aug – 16 Sep 2015																				
Survey description	The BTS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age composition of flatfish species, (ii) monitor species composition of epibenthos species by counting and weighing (if possible), (iii) create a fishery-independent estimate of age density for plaice and sole in the North Sea for stock assessment, (iv) monitor sex- and length composition of <i>Cancer pagurus</i> , <i>Nephrops norvegicus</i> and elasmobranch species.																						
Gear details:	8 meter beam trawl with 8 ticklers, 40 mm mesh in the codend, 120 mm mesh in the net and a flip-up rope.																						
Notes from survey:	76 valid hauls were carried out (approx. 35 hours fishing time). The survey was finished without major incidents. Although the weather was rough during large part of the survey, the survey was completed within the time planned. Net damage was repaired within a few hours. Vertical CTD measurements were carried out after each haul.																						
Target species catch rates:	Time-series mean no. per h	no. per h	2015 mean																				
	Sole	no index																					
	Plaice	130.94	303.20																				
Number of fish species recorded and notes on any rare species or unusual catches:	61 separate species of finfish were caught. The top 10 by number are:  <table><tr><td><i>Limanda limanda</i></td><td>43735</td></tr><tr><td><i>Pleuronectes platessa</i></td><td>12631</td></tr><tr><td><i>Buglossidium luteum</i></td><td>7030</td></tr><tr><td><i>Hippoglossoides platessoides</i></td><td>5449</td></tr><tr><td><i>Merlangius merlangus</i></td><td>4610</td></tr><tr><td><i>Arnoglossus laterna</i></td><td>4267</td></tr><tr><td><i>Eutrigla gurnardus</i></td><td>4195</td></tr><tr><td><i>Microstomus kitt</i></td><td>2983</td></tr><tr><td><i>Echiichthys vipera</i></td><td>2911</td></tr><tr><td><i>Callionymus lyra</i></td><td>2778</td></tr></table>			<i>Limanda limanda</i>	43735	<i>Pleuronectes platessa</i>	12631	<i>Buglossidium luteum</i>	7030	<i>Hippoglossoides platessoides</i>	5449	<i>Merlangius merlangus</i>	4610	<i>Arnoglossus laterna</i>	4267	<i>Eutrigla gurnardus</i>	4195	<i>Microstomus kitt</i>	2983	<i>Echiichthys vipera</i>	2911	<i>Callionymus lyra</i>	2778
<i>Limanda limanda</i>	43735																						
<i>Pleuronectes platessa</i>	12631																						
<i>Buglossidium luteum</i>	7030																						
<i>Hippoglossoides platessoides</i>	5449																						
<i>Merlangius merlangus</i>	4610																						
<i>Arnoglossus laterna</i>	4267																						
<i>Eutrigla gurnardus</i>	4195																						
<i>Microstomus kitt</i>	2983																						
<i>Echiichthys vipera</i>	2911																						
<i>Callionymus lyra</i>	2778																						
Number of epifauna species recorded:	157 epifauna (attached and free-living) species were observed during the 2015 survey.																						
Index revisions:	None																						

**Stations fished:**

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
North Sea	N/A	8m beam trawl	52	24	0	1	77	

Number of biological samples (age material), including hauls with Isis gear:			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	1435	<i>Scophthalmus maximus</i>	35
<i>Limanda limanda</i>	587	<i>Microchirus variegatus</i>	32
<i>Microstomus kitt</i>	496	<i>Buglossidium luteum</i>	28
<i>Solea solea</i>	270	<i>Scophthalmus rhombus</i>	21
<i>Hippoglossoides platessoides</i>	201	<i>Platichthys flesus</i>	7
<i>Gadus morhua</i>	153	<i>Zeugopterus norvegicus</i>	6
<i>Merluccius merluccius</i>	67	<i>Lepidorhombus whiffiagonis</i>	5
<i>Arnoglossus laterna</i>	62		



**Towing positions Dutch Beam Trawl survey: red=Tridens, black=Isis (in Isis summary sheet)**

### Annex 8.9: Survey summary Netherlands: Isis

Nation:	Netherlands	Vessel:	RV "Isis"
Survey:	BTS (Beam Trawl Survey)	Dates:	8 Aug - 9 Sep 2015

Survey description	The BTS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age composition of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent estimate of age density for plaice and sole in the North Sea for stock assessment, (iv) monitor sex- and length composition of <i>Cancer pagurus</i> , <i>Nephrops norvegicus</i> and elasmobranch species.		
Gear details:	8 meter beam trawl with 8 ticklers, 40 mm mesh in the codend, 120 mm mesh in the net.		
Notes from survey:	79 valid hauls were carried out (approx. 30 hours fishing time) by Isis. The survey covered most of the planned stations. A few stations were taken over by Tridens.		
Target species catch rates:	Time-series mean no. per h	2015 mean no. per h	
	Sole	49.75	64.71
	Plaice	817.15	813.12
Number of fish species recorded and notes on any rare species or unusual catches:	49 separate species of finfish were caught. The top 10 by number are:  <i>Limanda limanda</i> 106029 <i>Pleuronectes platessa</i> 27560 <i>Buglossidium luteum</i> 17402 <i>Arnoglossus laterna</i> 8085 <i>Callionymus lyra</i> 4443 <i>Agonus cataphractus</i> 3791 <i>Merlangius merlangus</i> 2579 <i>Solea solea</i> 2478 <i>Eutrigla gurnardus</i> 2110 <i>Echiichthys vipera</i> 1353		
Number of epifauna species recorded:	57 epifauna (attached and free-living) species were observed during the 2015 survey		
Index revisions:	None		

#### Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
North Sea	N/A	8m beam trawl	79	0	1		80	

Number of biological samples (age material):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	626	<i>Microstomus kitt</i>	86
<i>Solea solea</i>	446	<i>Scophthalmus rhombus</i>	73

<i>Limanda limanda</i>	204	<i>Gadus morhua</i>	2
<i>Scophthalmus maximus</i>	123		

## Annex 9: Survey summary sheets inshore surveys per country

### Annex 9.1: Survey summary Belgium

Nation:	<b>Belgium</b>	Vessel:	RV 'Simon Stevin'
Survey:	Inshore Demersal Young Fish and Brown shrimp Survey	Dates:	7-15 September 2015

Survey description	As part of the international Demersal Young Fish and Brown Shrimp Survey, an annual autumn sampling survey is carried out in the Belgian coastal waters, to collect data on the abundance of juvenile flatfish (primarily plaice <i>Pleuronectes platessa</i> , and sole <i>Solea solea</i> ) and brown shrimp ( <i>Crangon crangon</i> ). Since 1973, 33 fixed sampling stations are fished. Until 1982, the research vessel Hinder was used, from 1983 onwards the survey was carried out with the training and research vessel O.29 'Broodwinner'. In 2013 a switch was made to the new RV 'Simon Stevin', that was used for the Belgian DYFS for the third time in 2015.  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.):	The weather did not interfere with the sea-going operations in 2015, and no technical problems were encountered. This allowed for all 33 sampling stations to be fished succesfully. None of the fished stations were declared invalid.		
Target species catch rates:	TIME-SERIES	2015	
	mean nr. per 1000 m <sup>2</sup>	mean nr. per 1000 m <sup>2</sup>	
2015 data	Plaice	5.80	4.63
	Sole	3.28	0.93
Number of fish species recorded and notes on any rare species or unusual catches:	The DYFS focuses on measuring the most important commercial fish species (value and/or volume) to the cm below being cod, whiting, plaice, flounder, dab, sole, brill and turbot. From 2009 on, the species list was extended to cover all commercial fish species caught (e.g. including lesser spotted dogfish, gurnards, lemon sole, ...). In this way, 12 species were documented in 2015. Ordered by number, these are:		
	Species	Total number	
	Dab ( <i>Limanda limanda</i> )	5268	
	Plaice ( <i>Pleuronectes platessa</i> )	2826	
	Whiting ( <i>Merlangius merlangus</i> )	2638	
	Sole ( <i>Solea solea</i> )	550	
	Flounder ( <i>Platichthys flesus</i> )	122	
	Tub Gurnard ( <i>Chelidonichthys lucerna</i> )	53	
	Turbot ( <i>Scophthalmus maximus</i> )	51	
	Horse Mackerel ( <i>Trachurus trachurus</i> )	8	
	Cod ( <i>Gadus morhua</i> )	5	

	Mackerel ( <i>Scomber scombrus</i> )	3
	Striped Red Mullet ( <i>Mullus surmuletus</i> )	2
	Lemon Sole ( <i>Microstomus kitt</i> )	2
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	

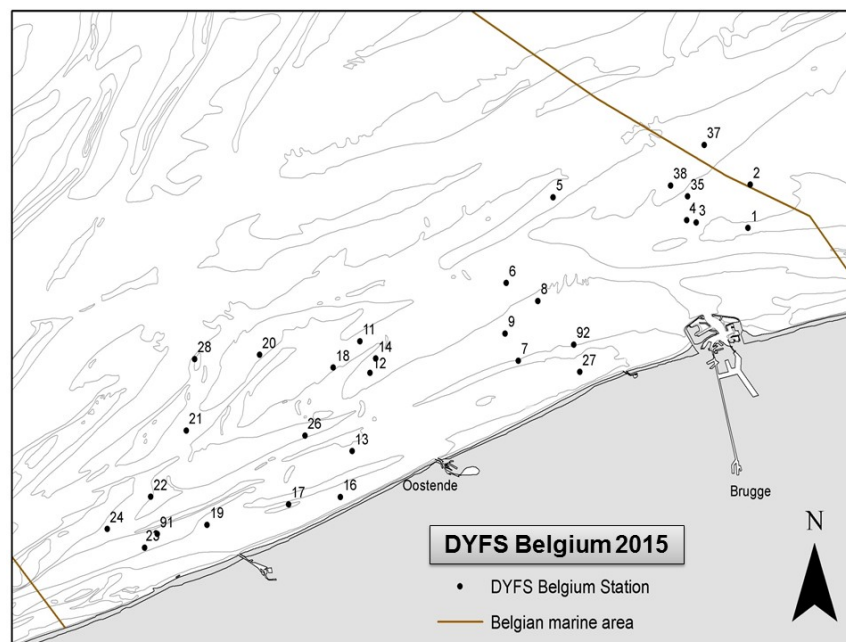
#### Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Inva-lid	Total Valid	Comments
4c	N/A	6m beam trawl	133	33	0	0	33	none

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

None

#### DYFS sampling stations in the Belgian coastal waters

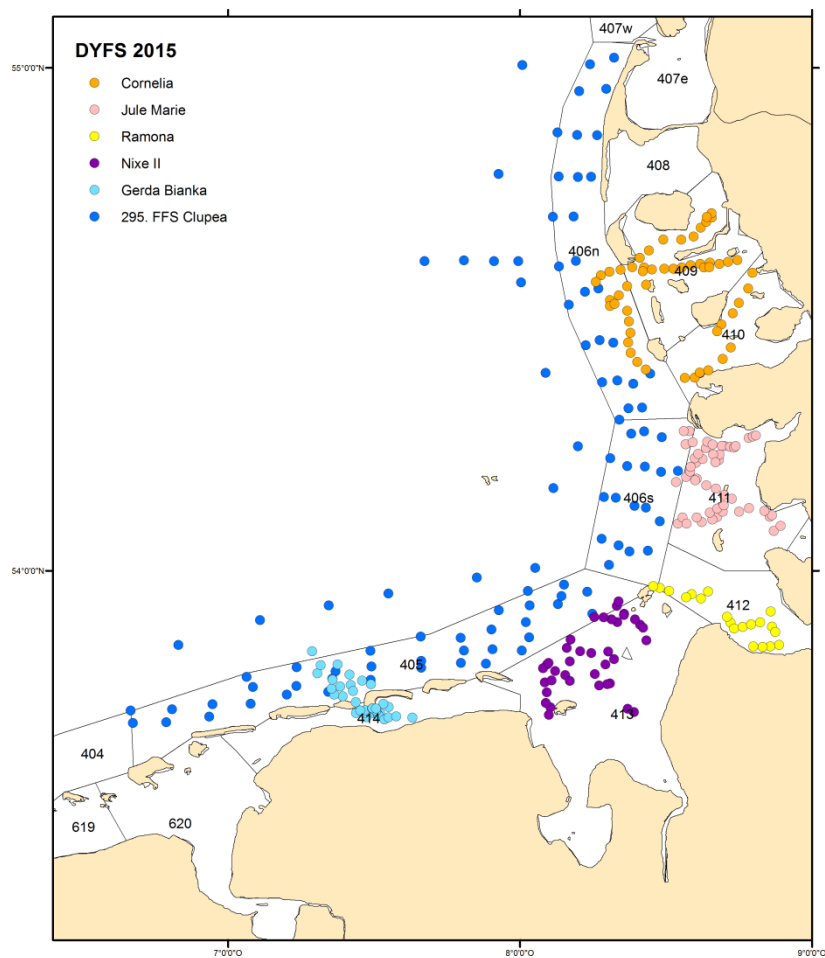




## Annex 9.2: Survey summary Germany

Nation:	Germany	Vessel:	RV “Clupea” and Chartered Cutters
Survey:	DYFS	Dates:	28 Aug – 01 Oct 2015

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 (turbidity optional) is attached.				
Notes from survey (e.g. problems, additional work etc.):	TI-SF operates the survey since 1974. Weser estuary and Jade were included from 2005 onwards. Spring series were terminated in 2004. 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. 20m water depth are sampled on a yearly basis. The deeper gullies are taken into account, too. Since 2012 the survey area outside the island chain was intensified by using RV Clupea in addition to chartered cutters. Single station data are available for the entire dataset. At present, time-series indices are available from 1976 onwards, the earlier survey data are in a validation process. Data of only a limited number of “standard” invertebrates are stored in the TI-SF database. (Species list has changed also over years) In total 294 valid hauls were carried out in 2015.				
Target species catch rates:		Time-series mean (Schleswig-Holstein only 2005 - 2015) n/1000m²	2015 mean (Schleswig-Holstein only) n/1000m²	Time-series mean (coastal Zone all along Germany, 2005 - 2015) n/1000m²	2015 mean (coastal Zone all along Germany) n/1000m²
	Plaice	5.80	3.43	9.65	7.33
	Sole	0.16	0.05	0.20	0.10
	Cod	0.32	0.01	0.26	0.01
	Whiting	0.67	0.75	0.66	1.82
	Brown shrimp	1674.87	1390.77	1669.02	1539.74
Number of fish species recorded and notes on any rare species or unusual catches:	59 taxa of finfish were caught from 2001 to 2015. The top 10 by number in 2015 out of taxa:				
	OSMERUS EPERLANUS			7408	
	PLEURONECTES PLATESSA			6535	
	POMATOSCHISTUS MINUTUS			6147	
	LIMANDA LIMANDA			5185	
	SYNGNATHUS ROSELLATUS			3774	
	MERLANGIUS MERLANGUS			3662	
	CLUPEA HARENGUS			2515	
	AGONUS CATAPHRACTUS			1317	
	PLATICHTHYS FLESUS			557	
CALLIONYMUS LYRA			538		
Number of epifauna species recorded:	All epifauna found are recorded and available in the SF database. For 2015 they were				
	CRANGON CRANGON			1512415	
	LIOCARCINUS HOLSATUS			63597	
	OPHIURIDA			21538	
	ASTERIAS RUBENS			18910	
	CARCINUS MAENAS			7044	
	ABRA ALBA			829	
	LOLIGINIDAE			616	
	PALAEMON SERRATUS			507	
	NUCULA NITIDOSA			389	
PAGURIDAE			351		
Index revisions:	Inclusion of RV Clupea data since 2012 in the time-series means and top ten species for the whole German coastline.				



Stations sampled in the German DYFS 2015.

### Annex 9.3: Survey summary Netherlands: Schollebaar

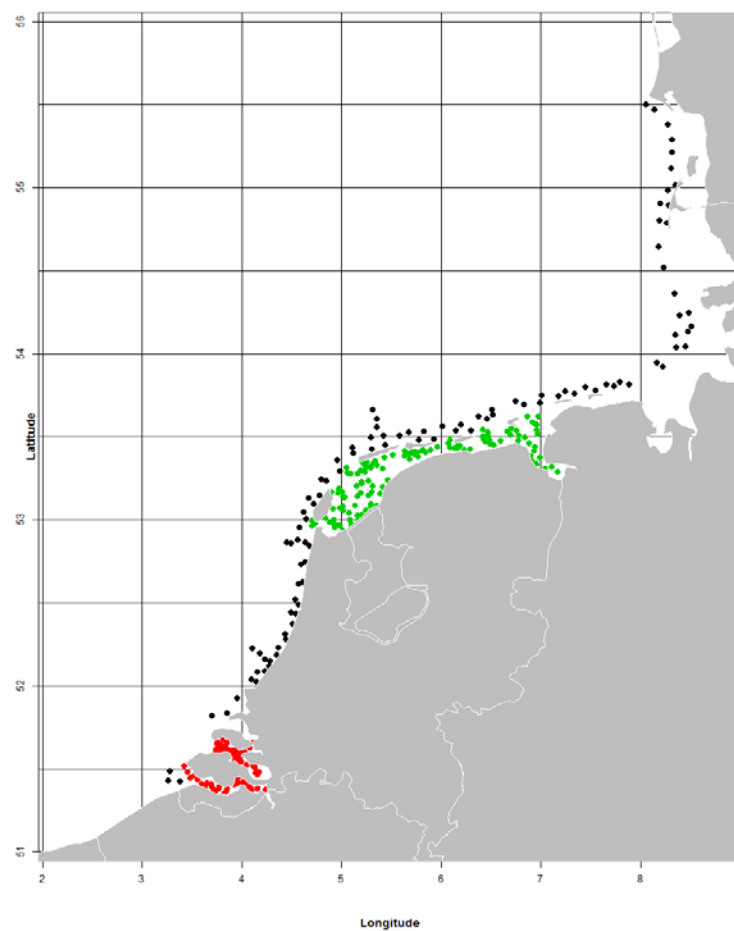
Nation:	<b>Netherlands</b>	Vessel:	RV “Schollebaar”
Survey:	DYFS (Demersal Young Fish Survey)	Dates:	5-23 Sep 2015

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 ( <i>Crangon crangon</i> ).																						
Gear details:	3 meter beam trawl with 1 tickler chain and a bobbin rope (“shrimp net”).																						
Notes from survey (e.g. problems, additional work etc.):	76 valid hauls were carried out. A CTD was attached to the net. A new rigging was used. During the survey, the old and the new rigging were compared.																						
Target species catch rates:	Time-series mean no./1000m <sup>2</sup>	2015 mean no. per 1000m <sup>2</sup>																					
	Sole	3.22	0.94																				
	Plaice	9.93	4.38																				
	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:	33 separate species of finfish were caught. The top 10 by number are:  <table><tr><td><i>Pomatoschistus lozanoi/minutus</i></td><td>4829</td></tr><tr><td><i>Clupea harengus</i></td><td>1679</td></tr><tr><td><i>Pleuronectes platessa</i></td><td>1308</td></tr><tr><td><i>Platichthys flesus</i></td><td>854</td></tr><tr><td><i>Osmerus eperlanus</i></td><td>740</td></tr><tr><td><i>Pomatoschistus sp.</i></td><td>547</td></tr><tr><td><i>Solea solea</i></td><td>302</td></tr><tr><td><i>Dicentrarchus labrax</i></td><td>246</td></tr><tr><td><i>Neogobius melanostomus</i></td><td>201</td></tr><tr><td><i>Syngnathus rostellatus</i></td><td>181</td></tr></table>			<i>Pomatoschistus lozanoi/minutus</i>	4829	<i>Clupea harengus</i>	1679	<i>Pleuronectes platessa</i>	1308	<i>Platichthys flesus</i>	854	<i>Osmerus eperlanus</i>	740	<i>Pomatoschistus sp.</i>	547	<i>Solea solea</i>	302	<i>Dicentrarchus labrax</i>	246	<i>Neogobius melanostomus</i>	201	<i>Syngnathus rostellatus</i>	181
<i>Pomatoschistus lozanoi/minutus</i>	4829																						
<i>Clupea harengus</i>	1679																						
<i>Pleuronectes platessa</i>	1308																						
<i>Platichthys flesus</i>	854																						
<i>Osmerus eperlanus</i>	740																						
<i>Pomatoschistus sp.</i>	547																						
<i>Solea solea</i>	302																						
<i>Dicentrarchus labrax</i>	246																						
<i>Neogobius melanostomus</i>	201																						
<i>Syngnathus rostellatus</i>	181																						
Number of epifauna species recorded:	56 epifauna (attached and free-living) species were observed during the 2015 survey.																						
Index revisions:	No																						

**Stations fished:**

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
4c: Scheldt estuary	area and depth class	3m beam trawl	176		0	1	77	

Number of biological samples (maturity and age material):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	88	<i>Limanda limanda</i>	13
<i>Solea solea</i>	113	<i>Scophthalmus rhombus</i>	1
<i>Platichthys flesus</i>	99	<i>Scophthalmus maximus</i>	1



**Positions DYFS 2015: red=Scholle; black=Isis, green=Stern**

### Annex 9.4: Survey summary Netherlands: Stern (DYFS)

Nation:	Netherlands	Vessel:	RV “Stern”
Survey:	DYFS (Demersal Young Fish Survey)	Dates:	29 Aug- 30 Sep 2015

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 ( <i>Crangon crangon</i> ).		
Gear details:	3 meter beam trawl with 1 tickler chain and a bobbin rope (“shrimp net”).		
Notes from survey (e.g. problems, additional work etc.):	121 valid hauls were carried out. A CTD was attached to the net.		
Target species catch rates:	Time-series mean no/1000m <sup>2</sup>	2015 mean no/1000m <sup>2</sup>	
	Sole	4.95	1.63
	Plaice	30.68	14.62
	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:	38 separate species of finfish were caught. The top 10 by number are:  <i>Pleuronectes platessa</i> 7373 <i>Pomatoschistus lozanoi/minutus</i> 5582 <i>Clupea harengus</i> 2997 <i>Ciliata mustela</i> 1317 <i>Solea solea</i> 826 <i>Syngnathus rostellatus</i> 749 <i>Myoxocephalus scorpius</i> 566 <i>Ammodytes sp.</i> 561 <i>Agonus cataphractus</i> 493 <i>Liparis liparis liparis</i> 429		
Number of epifauna species recorded:	28 epifauna (attached and free-living) species were observed during the 2015 survey.		
Index revisions:	No		

**Stations fished:**

ICES Divisions	Strata	Gear	Indices sta- tions	Priority sta- tions	Addition- al	Inva- lid	Total Valid	Com- ments
4c: Wadden Sea	area and depth class	3m beam trawl	121		0	2	123	

Number of biological samples (maturity and age material):			
Species	Number	Species	Number
<i>Pleuronectes platessa</i>	227	<i>Scophthalmus rhombus</i>	6
<i>Platichthys flesus</i>	185	<i>Limanda limanda</i>	10
<i>Solea solea</i>	203	<i>Scophthalmus maximus</i>	8

**Positions DYFS Stern 2015: see map above**

### Annex 9.5: Survey summary Netherlands: Isis (DYFS)

Nation:	Netherlands	Vessel:	RV “Isis”
Survey:	DYFS (Demersal Young Fish Survey)	Dates:	25 Sep – 4 Nov 2015 (5 weeks in this period)

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 ( <i>Crangon crangon</i> ).																						
Gear details:	6 meter beam trawl with 1 tickler chain and a bobbin rope (“shrimp net”).																						
Notes from survey (e.g. problems, additional work etc.):	111 valid hauls were carried out. A CTD was attached to the net.																						
Target species catch rates:	Time-series mean no/1000m <sup>2</sup>	2015 mean no/1000m <sup>2</sup>																					
	Sole	5.59	0.37																				
	Plaice	20.32	3.92																				
	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:	50 separate species of finfish were caught. The top 10 by number are:  <table><tr><td><i>Pomatoschistus lozanoi/minutus</i></td><td>23813</td></tr><tr><td><i>Limanda limanda</i></td><td>6458</td></tr><tr><td><i>Pomatoschistus minutus</i></td><td>3302</td></tr><tr><td><i>Pleuronectes platessa</i></td><td>3291</td></tr><tr><td><i>Clupea harengus</i></td><td>2739</td></tr><tr><td><i>Merlangius merlangus</i></td><td>2485</td></tr><tr><td><i>Buglossidium luteum</i></td><td>2101</td></tr><tr><td><i>Callionymus lyra</i></td><td>1702</td></tr><tr><td><i>Pomatoschistus sp.</i></td><td>1352</td></tr><tr><td><i>Syngnathus rostellatus</i></td><td>1029</td></tr></table>			<i>Pomatoschistus lozanoi/minutus</i>	23813	<i>Limanda limanda</i>	6458	<i>Pomatoschistus minutus</i>	3302	<i>Pleuronectes platessa</i>	3291	<i>Clupea harengus</i>	2739	<i>Merlangius merlangus</i>	2485	<i>Buglossidium luteum</i>	2101	<i>Callionymus lyra</i>	1702	<i>Pomatoschistus sp.</i>	1352	<i>Syngnathus rostellatus</i>	1029
<i>Pomatoschistus lozanoi/minutus</i>	23813																						
<i>Limanda limanda</i>	6458																						
<i>Pomatoschistus minutus</i>	3302																						
<i>Pleuronectes platessa</i>	3291																						
<i>Clupea harengus</i>	2739																						
<i>Merlangius merlangus</i>	2485																						
<i>Buglossidium luteum</i>	2101																						
<i>Callionymus lyra</i>	1702																						
<i>Pomatoschistus sp.</i>	1352																						
<i>Syngnathus rostellatus</i>	1029																						
Number of epifauna species recorded:	52 epifauna (attached and free-living) species were observed during the 2015 survey.																						
Index revisions:	No																						

**Stations fished:**

ICES Divisions	Strata	Gear	Indices sta- tions	Priority sta- tions	Additional	Invalid	Total Valid	Comments
4c: Dutch coast	area and depth class	6m beam trawl	111	0	0	2	113	

Number of biological samples (maturity and age material):			
Species	Number	Species	Number
<i>Limanda limanda</i>	511	<i>Platichthys flesus</i>	86
<i>Pleuronectes platessa</i>	300	<i>Scophthalmus rhombus</i>	11
<i>Solea solea</i>	118	<i>Scophthalmus maximus</i>	33

**Positions DYFS Isis 2015: see map above**



## Annex 9.6: Survey summary Netherlands: Isis (SNS)

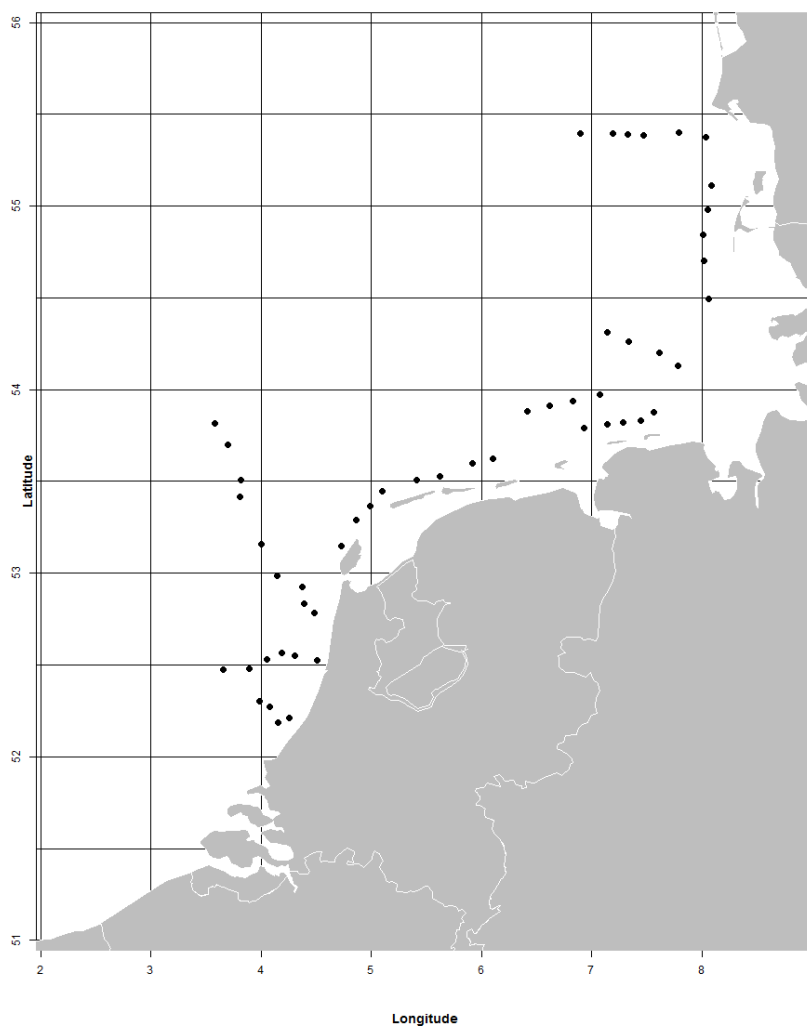
Nation:	Netherlands	Vessel:	RV "Isis"
Survey:	SNS (Sole Net Survey)	Dates:	12-23 Sep 2015

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 A Valeport CTD is attached to the gear																						
Notes from survey (e.g. problems, additional work etc.):	51 hauls were carried out (approx. 13 hours fishing time). A CTD was mounted to the net, collecting a profile throughout the haul. All transects were covered.																						
Target species catch rates:		Time-series mean no/100 h	2015 mean no/100 h																				
	Sole	6238	6246																				
	Plaice	65517	55045																				
Number of fish species recorded and notes on any rare species or unusual catches:	31 separate species of finfish+elasmobranchs were caught. The top 10 by number are:  <table><tr><td><i>Limanda limanda</i></td><td>15889</td></tr><tr><td><i>Pleuronectes platessa</i></td><td>6526</td></tr><tr><td><i>Buglossidium luteum</i></td><td>2095</td></tr><tr><td><i>Merlangius merlangus</i></td><td>1504</td></tr><tr><td><i>Arnoglossus laterna</i></td><td>1024</td></tr><tr><td><i>Echiichthys vipera</i></td><td>888</td></tr><tr><td><i>Callionymus lyra</i></td><td>874</td></tr><tr><td><i>Pomatoschistus lozanoi/minutus</i></td><td>855</td></tr><tr><td><i>Solea solea</i></td><td>646</td></tr><tr><td><i>Agonus cataphractus</i></td><td>643</td></tr></table>			<i>Limanda limanda</i>	15889	<i>Pleuronectes platessa</i>	6526	<i>Buglossidium luteum</i>	2095	<i>Merlangius merlangus</i>	1504	<i>Arnoglossus laterna</i>	1024	<i>Echiichthys vipera</i>	888	<i>Callionymus lyra</i>	874	<i>Pomatoschistus lozanoi/minutus</i>	855	<i>Solea solea</i>	646	<i>Agonus cataphractus</i>	643
<i>Limanda limanda</i>	15889																						
<i>Pleuronectes platessa</i>	6526																						
<i>Buglossidium luteum</i>	2095																						
<i>Merlangius merlangus</i>	1504																						
<i>Arnoglossus laterna</i>	1024																						
<i>Echiichthys vipera</i>	888																						
<i>Callionymus lyra</i>	874																						
<i>Pomatoschistus lozanoi/minutus</i>	855																						
<i>Solea solea</i>	646																						
<i>Agonus cataphractus</i>	643																						
Number of epifauna species recorded:	42 epifauna (attached and free-living) species were observed during the 2015 survey.																						
Index revisions:																							

**Stations fished:**

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total	Comments
4c: North Sea	area and depth class	6m beam trawl	151	0	0	0	51	

Number of biological samples (maturity and age material):			
Species	Number	Species	Number
<i>Limanda limanda</i>	614	<i>Platichthys flesus</i>	11
<i>Pleuronectes platessa</i>	588	<i>Scophthalmus rhombus</i>	3
<i>Solea solea</i>	161	<i>Microstomus kitt</i>	2
<i>Scophthalmus maximus</i>	38		

**Station positions for SNS 2015**

## Annex 10: Number of hauls by area and year for the Dutch DFS, German DYFS and Belgian DYFS

### Annex 10.1: Dutch DFS

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	3	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		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	28	15	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	16	12	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		
2011	15	12	19	28	15	14	6		49	25	32	6	22	14	9	7	28		
2012	17	28	18	28	14	16	3		43	37	26	7	27	15	8	22	28		
2013	16	12	16	21	15	16	6		42	37	31	6	26	15	9	10	28		
2014	17	14	17	28	15	16	6		42	39	28	6	29	15	9	11	27		
2015	17	13	18	28	15	16	6		41	36	28	6	29	14	9	11	26		

## Annex 10.2: German DYFS

region	German Bight				German/DK Wadden Sea						
area code	405	406N	406S	Outside	408	409	410	411	412	413	414
1978		3	3		4	10	7	22	18		
1979	4	3	3		4	10	7	23	15		30
1980	4	1	3		4	9	7	23	17		21
1981	1	3	6		4	10	7	20	25	2	29
1982	13	3	3		4	10	7	23	29		25
1983	12		1					9	23		34
1984	6		7		4	8	6	16	24		35
1985	7	7	2				37		23	1	39
1986	11	10	9			8	7	23	25		34
1987	11	9	2				31	15	23		38
1988	2	4	10			5	23	16	23		42
1989	10		3				24	21	23		42
1990	19	6	8			6	29	21	27	1	36
1991	12		5			12	27	14	24		34
1992	1	3	7		3	13	12	22	24		45
1993	13	11	6			12	14	17	23		21
1994	23	5	7			8	23	20	22		10
1995	17	9	9		7	18	14	20	21		27
1996	12		9	1		25	8	25	21	1	21
1997	8	9	14			16	14	39	23		26
1998	1	29	2			19	11	33	21		29
1999	1	16	7			13	13	36	23		35
2000	11	11	5			16	14	29	21		29
2001	14	14	2			12	11	30	19		21
2002	8	11	4			15	10	29	23		19
2003		10	1			10	18	35	18		25
2004			7			11	14	24	24		19
2005	17	13	8		6	19	12	22	21	23	25
2006	12	11	5		5	14	11	23	28	21	23
2007	4	10	1	1		13	14	34	40	29	24
2008	12	17	6	7		15	14	21	19	25	22
2009	13	6	13	6		22	9	18	20	29	16
2010	8	10	8			23	9	30	16	21	21
2011	13	1	1	2		15	17	32	15	28	17
2012	32	18	14	16		20	12	29	17	38	17
2013	57	48	23	13		14	13	26	15	33	21
2014	61	43	28	10		19	16	32	21	34	21
2015	54	44	23	16		25	12	46	19	34	21

### Annex 10.3: 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
2010	28
2011	31
2012	32
2013	33
2014	33
2015	33

## Annex 11: Check DATRAS vs. frisbe BTS indices NED

ship	species	year	ok	ICES_action	IMARES_action
ISI	Plaice	1987	n		
ISI	Sole	1987	n		
ISI	Plaice	1988	n		
ISI	Sole	1988	n		
ISI	Plaice	1989	n		
ISI	Sole	1989	n		
ISI	Sole	1990	n		
ISI	Plaice	1991	n		Check proportional alk frisbe-DATRAS
ISI	Sole	1991	n		
ISI	Plaice	1992	n		Resubmit; first check CA info in DATRAS before resubmitting
ISI	Sole	1992	n		
ISI	Plaice	1993	n		Check proportional alk frisbe-DATRAS
ISI	Sole	1993	n		
ISI	Sole	1994	n		
ISI	Sole	1995	n		
ISI	Plaice	1996	n		Check proportional alk frisbe-DATRAS
ISI	Sole	1996	n		
TRI2	Sole	1996	n		
ISI	Plaice	1997	n	X	Resubmit; major age corrections in 2009, last submission June 2008
TRI2	Plaice	1997	n		
ISI	Sole	1997	n		
ISI	Sole	2000	n		
TRI2	Sole	2000	n		
ISI	Plaice	2001	n		Check why DATRAS alk is almost? 2x as high as frisbe –probably because of delivering info for 2 gears at once, but this should not affect alk.
TRI2	Plaice	2001	n		Check proportional alk frisbe-DATRAS
ISI	Sole	2001	n		
TRI2	Sole	2001	n		
TRI2	Plaice	2004	n	X	Check index alk file (2009) with most recent frisbe data (2016)

ship	species	year	ok	ICES_action	IMARES_action
					(rerun code for 2004 as a testrun and compare alk files) differences in alkarea 706; not only totals but also age by length
TRI2	Sole	2004	n		
TRI2	Plaice	2005	n	X	Check index alk file (2009) with most recent frisbe data (2016)  (rerun code for 2005 as a testrun and compare alk files)  Differences in alkarea 705 age7 (1, 36 cm), age8 (1, 41 cm), age9 (12, 42 cm), age10 (1, 45 cm)
TRI2	Sole	2005	n		Check proportional alk frisbe-DATRAS
ISI	Plaice	2008	n		?Ingtclass 10 in alkarea 702 in alk?
TRI2	Plaice	2008	n		check alk for areas 702 and 703
ISI	Sole	2008	n		
TRI2	Plaice	2009	n	X	Check index alk file (2009) with most recent frisbe data (2016)  (rerun code for 2009 as a testrun and compare alk files)
ISI	Plaice	2010	n		X
ISI	Sole	2010	n		X
TRI2	Plaice	2010	n		Resubmit: make file consistent with the NED data selection for indices
ISI	Plaice	2011	n	check why statrec 37F4 (TRI2--> ISI, hauls 271 and 272 are not taken into consideration in the calculation.	
TRI2	Plaice	2011	n		
ISI	Sole	2011	n		
TRI2	Sole	2011	n		
ISI	Plaice	2014	n	X	?
TRI2	Plaice	2014	n		Resubmit: CA ,3 ,NED ,TRI2 ,BT8 ,-9 ,-9 ,-9 ,40F635 ,035 ,2014 ,W ,127150 ,0 ,40F6 ,1 ,33.1 ,M ,-9 ,-9 ,2 ,-9 ,518.000  CA ,3 ,NED ,TRI2 ,BT8 ,-9 ,-9 ,-9 ,41F447 ,047 ,2014 ,W ,127143 ,0 ,41F4 ,. ,28.2 ,M ,-9 ,-9 ,4 ,1 ,214.000