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

23–26 April 2013

Ancona, Italy

ICES International Council for the Exploration of the Sea

CIEM Conseil International pour l'Exploration de la Mer

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Executive summary

The Working Group on Beam Trawl Surveys (WGBEAM), chaired by Brian Harley, UK, met in Ancona, Italy, 23–26 April 2013.

The core of the working groups work revolved around producing the summaries and indices for the surveys that it coordinates.

Almost all the indices for sole from all northern areas show a decline in the youngest ages. However, the relatively strong 2010 year-class is still clearly visible in the older ages in all areas. Sole in the Adriatic at the youngest ages are yielding high index values, however the oldest age in the index (age 4) is at its lowest value over the time-series.

Plaice indices in the northern areas still show signs of strength with the strong year classes in 2007-2011, however the incoming (2012) year class is below the time-series mean for all but the Irish Sea areas.

During the meeting WGBEAM agreed to coordinate a new offshore survey in the western English Channel run by Cefas, this survey is the first random stratified survey that WGBEAM has coordinated. Germany now uses a new research vessel '*Clupea*' to carry out its inshore survey, replacing the previous '*Clupea*' survey vessel which was decommissioned last year.

A significant amount of work has been carried out both during WGBEAM and intersessionally on issues that affect WGBEAM data and the DATRAS data warehouse. These include the production of indices for plaice and sole used by North Sea, Skagerrak and Kattegat Working Group (WGNSSK) by DATRAS using the protocols and procedures defined by the IMARES index calculation routines. This work will streamline the process by which all WGBEAM indices will be created. The next steps are for the all countries to provide data to the ICES Data Centre to facilitate this work within the next year. There are still some underlying data quality issues within the WGBEAM data in DATRAS and further work to identify and correct these is taking place.

In addition to the coordination work there were a number of other terms of reference that the working group addressed.

Work continues on the analysis of possible changes in sole length-at-age in the North Sea, English Channel, Bristol Channel and Irish Sea. This year data were analysed from areas outside the North Sea and the results show similar trends to that of the Southern North Sea. As two different methods for analysis have been used, the most appropriate method to remove the biasing of the biological sampling regimes is to be investigated intersessionally.

The multi-annual ToRs for WGBEAM 2014 have been devised, using the templates agreed by ICES. Other than the ongoing coordination and index calculation ToRs, the following have been suggested.

1) Analyse the changes in mean length-at-age for sole in the North Sea, English Channel, Bristol Channel and Irish Sea.

2) Provide index calculations based on DATRAS for plaice and sole for the North Sea.

3) Assess the opportunities for providing plaice and sole index calculations based on DATRAS for all other areas.

Using the template from the International Bottom Trawl Surveys Working Group (IBTSWG), WGBEAM responded to the OSPAR request to identify ways of maximizing the use of available sources of data for monitoring biodiversity. WGBEAM feels beam trawl surveys have an important role to play in the MSFD but there seems to be little guidance available. It is recommended that SCICOM provide opportunities for cooperation between survey coordinating groups, the Working Group on Integrating Surveys for the ecosystem Approach (WGISUR) and the integrated assessment groups in the development of Marine Strategy Framework Directive (MSFD) related issues.

The offshore survey manual will be sent to ICES for review once complete, and after the workshop at the Annual Science Conference in 2013, will be sent for publication as a "Series of ICES Survey Protocols".

1 Opening of the meeting

The Chair opened the meeting at 09:20 on 23 April 2013.

2 Adoption of the agenda

The adopted agenda is published in Annex 2.

3 Introduction

3.1 Terms of reference

The **Working Group on Beam Trawl Surveys** (WGBEAM), chaired by Brian Harley, UK, met in Ancona, Italy, 23–26 April 2013.

Prepare a progress report summarizing the results of the 2012 offshore and inshore beam trawl surveys;

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

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

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

d) Using the work carried out in 2012, continue to analyse the changes in mean length-at-age for sole in the North Sea, English Channel, Bristol Channel and Irish Sea;

e) Review and finalize the multi-annual TOR for 2014-2016;

f) Provide a response in terms of a joint annex in the reports from IBTSWG and WGBEAM, on maximizing the use of available sources of data for monitoring of biodiversity. The WGBIODIV should be consulted in the process.

"The purpose of this request is to seek ICES advice on the potential sources of data and information that may be available to support the monitoring and assessment of biodiversity in relation to commitments under MSFD so as to maximize efficiencies in the use of available resources, for example where efficiencies could be made to identify where there are monitoring programmes or data sources that can deliver multiple indicators, which may relate to different Descriptors, (e.g. The Data Collection Framework could be used to implement D3 and D1 indicators), or where with a small additional effort existing monitoring could be amplified to deliver a broader set of data. Advice would be sought as to 1) the quality of these potential data sources and how they could be used, including but not limited to the relevance of outcomes identified in chapter 8 of the ICES MSFD D3+ report to Descriptors 1, 4 and 6. **OSPAR request 2013-4 (report by 15 May 2013).**

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

g) Ensure that the most recent version of the survey manual is submitted to the Series of ICES Survey Protocols (SISP).

There were 10 participants from six countries. In addition, one member of the ICES Data Centre joined for the duration of the meeting. A complete list of participants at the WGBEAM meeting is given in Annex 1 of the report.

4 Review of WGBEAM 2012 recommendations and other requests to WGBEAM

4.1 WGBEAM 2012 recommendations

1. WGBEAM recommends that a power analysis to identify the number of hauls needed to carry out a sound statistical analysis and costs for the differences between the German and Dutch inshore surveys should be carried out .This power analysis will be carried out inter-sessionally in collaboration with WGCRAN and presented at WGBEAM in 2013.

Unfortunately this was not possible and it is suggested that WGBEAM meets in Hamburg, Germany in 2014 to allow key members of WGCRAN, that use the inshore data, to attend and concentrate on this issue as a matter of priority.

2. WGBEAM recommends that the maturity subgroup of PGCCDBS, investigate other sources of data for the calculation of mean size at first maturity.

This recommendation was originally put forward by WGNSSK to WGBEAM in 2011, to ask if they have maturity data for various species. WGBEAM indicated that the surveys they coordinate are in the wrong time of the year for this purpose (Q3) so no maturity data are collected for plaice and sole. PGCCDBS 2013 responded that PGCCDBS can - on request - provide an overview of available data for the required species, and the optimum time for collecting such data based on existing knowledge of spawning seasons, and added that details of the link to the Interactive Maturity Long Term Planning Table can be sent to the WGNSSK and WGBEAM chairs for information on future quality assurance exercises for maturity identification, when this is online on the ICES website.

Although it becomes clear from this reaction that PGCCDBS can compile information on other data that are already available on maturity for several species/stocks, no action was taken to collate this information nor to investigate other sources of data that should be collected to fill data gaps for species/stocks for which this information is not yet available.

3. WGBEAM recommends that WGISDAA carry out analysis of data from WGBEAM surveys to calculate estimates of survey sampling variance at their working group in 2013.

WGISDAA did not attempt this as WGBEAM did not send a working document to them for discussion. As the analysis is not possible without guidance on the format of the variance, it is recommended that the Method Working Group (WGMG) decides on the format and produces the calculation methodology based on this format. WGBEAM will then use this method and produce the estimate annually.

4. WGBEAM recommends that once the offshore surveys are up-loaded to the DATRAS Database, ICES Data Centre provides precision estimates based on the outcome of the work to be carried out by WGISDAA in 2013.

Precision estimates for the beam trawl surveys have yet to be produced. There is no standard way to do this and until the indices are created within the DATRAS portal no further work will be carried out on this recommendation.

5. WGBEAM recommends that as the Adriatic survey has met the full set of criteria to be coordinated by our group, it be included in the list of coordinated surveys.

RCM MED&BS and PGMED were both contacted and informed that the Adriatic survey was now coordinated by WGBEAM.

6. WGBEAM recommends that Belgium and France upload the 2011 offshore survey data to DATRAS before 1 August 2012.

See chapter 9.6 for update.

7. WGBEAM recommends that when DATRAS is ready for the inshore data, ICES Data Centre requests members of WGBEAM to test the import facility and the checks.

See chapter 9.7 for update.

8. WGBEAM recommends that ICES Data Centre and IMARES agree on the way forward, to ensure that indices for plaice and sole in the North Sea can be calculated from DATRAS before 1 December 2012.

See chapter 7.1 for update

9. WGBEAM recommends that the ICES secretariat sets up multi-annul SharePoint sites, in order to facilitate the work of the multi-annual TORs.

The template for the multi-annual ToRs was sent to WGBEAM and is being used to produce the ToRs for WGBEAM 2014. As yet no decision on the multi-annual SharePoint sites has been made.

4.2 Actions for WGBEAM during 2012

1. The UK and Netherlands beam trawl surveys responsible persons will provide the ICES Data Centre with information regarding those surveys affected by the reassignment of the Quarter field in the HH record, in order to ensure that the calculation of data products is not affected by the change in its function.

ICES Data Centre implemented this change and it has been tested by Cefas (the only institute that has a survey that is impacted by this) and the new change has no effect on data loading or product calculation.

2. WGBEAM needs to ensure that WGISDAA have the necessary data made available to them through the DATRAS portal, to carry out the calculation of estimates of survey sampling variance at their working group in 2013.

Not carried out. See comments above in recommendation point 3 for response.

3. Intersessionally Germany shall produce indices from their offshore data and present to WGBEAM in 2013. This can be done in conjunction with ICES Data Centre, Cefas and IMARES.

Not carried out, see also Section 7.1.2 for new proposal.

4. Intersessionally Cefas will produce an index from the Belgium offshore data, provided by from the WGBEAM dataset, using age data derived from the southern North Sea part of the UK quarter 3 North Sea Beam Trawl survey. This will be carried out for plaice and sole and will be presented at WGBEAM 2013.

Unfortunately this was not possible as the Belgium data are still not available in DATRAS, however, if the data becomes available during the coming year, this work will be carried out before WGBEAM 2014 and will therefore be added to the actions for Cefas for next year.

5. Comparisons of the day and night indices from the ORHAGO survey, by their assessment outputs, needs to be carries out. This comparison should include investigations on the effect of missing values for some stations in some years (0 to 20%, depending on the year and the day fishing period).

See chapter 6.3 for update.

6. Intersessionally an estimate of surface areas by depth class and total surface area for the Belgian DYFS using GIS. Revise the area-based weighting for the Belgian indices accordingly. Include the 0-5m depth class in the index as it has been sampled adequately since 1983 (Annex 13), by 1 July 2012.

Surface areas by depth class (0-5m, 5-10m, 10-20m, >20m) were re-estimated for the Belgian inshore survey area intersessionally between the 2012 and 2013 WGBEAM meetings by ILVO. The area-based weighting for calculation of the raising factors for the combined inshore indices were revised accordingly for all contributing countries by IMARES. For the calculation of the Belgian index, several methods were tested using the new surface area values. Ultimately it was decided to stick to the method that was used previously, and the combined index was constructed using the updated Belgian index and the new raising factors (see Section 6.2.2).

7. Intersessionally Germany should reconsider not applying area-based weighting for the German DYFS indices. Also, consideration should be given to which areas are included in the German DYFS indices, before 1 October 2012.

This is ongoing but due to time constraints this has not been updated during WGBEAM 2013. It shall be added to the actions for WGBEAM 2014.

8. IMARES will revise the combined inshore indices using the revised Belgian and German data and the new raising factor for the Belgian survey for WGBEAM 2013.

See chapter 6.2.2 for update.

9. The Chair of WGBEAM shall contact the Chairs of RCM MED&BS and the Chair of the PGMED about the Adriatic survey coordination.

See recommendation 5 for response.

10. The Chair of WGBEAM will send the most up-to-date offshore manual to ICES to enable them to give it a suitable reference, along with the completed WGBEAM 2012 report.

The outgoing Chair will send ICES the offshore survey manual directly after the end of WGBEAM 2013 and request it be externally reviewed and with feedback from the workshop at the ASC in 2013, then update and send for publication in "Series of ICES Survey Protocols" (SISP).

11. It is recommended that the corrected English beam trawl survey data are re-uploaded as soon as possible by Cefas.

This was started and is ongoing. There are a number of years still to upload from 1993 to 2006 but this will be continued intersessionally and attempted to be completed before WGBEAM 2014.

12. It is recommended that England, Germany and Belgium check if their CTD data are publically available elsewhere, and if not, upload the CTD data to ICES.

UK – data are available in national databases and within some HH records within DATRAS. Other data not available will be uploaded when resources become available.

Belgium – data from surface (ship CTD) available but not yet from other sources (bottom data from ILVO CTD attached to beam).

Germany – CTD data from all hauls uploaded to ICES and available from national databases.

13. It is recommended that WGBEAM in 2013 reviews the list of multi-annual TORs suggested during WGBEAM 2012 and makes amendments when required.

The multi-annual ToRs were discussed at length and have been produced in line with current ICES recommendations. See annex 3 for full list for 2014-2016.

14. As there is now enough data for the creation of a time-series for the ORHAGO survey in the Bay of Biscay, it is recommended that from 2013, Ifremer provides an index to WGBEAM for this survey.

See chapter 6.4 for update.

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

No overlapping hauls were carried out during the 2012 survey period.

5 Coordinate offshore and coastal beam trawl surveys in the North Sea and Divisions VIIa, VIId–g and VIIIa–b; (ToR b)

5.1 Results of 2012 surveys

5.1.1 Offshore surveys

5.1.1.1 Participation and coverage of the area

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

The coverage of the area by each of the participating countries' surveys and the number of stations sampled in 2012 are shown in Annex 6.

Annex 9 gives the abundance results (by area fished) from the offshore beam trawl surveys, using data from the UK for areas VIIa and VIId and from all countries, except Belgium for 2011 and 2012, for the North Sea.

Table 5.1.1.1. Overview of surveys during 2012.

Country	Vessel	Area	Dates	Gear
Belgium	Belgica	southern North Sea	27 Aug – 7 Sep	4m beam
England	Endeavour	VIId, IVc	18 – 31 July	4m beam
England	Endeavour	VIIa, VIIf	13 Sept – 4 Oct	4m beam
England	Carhelmar	VIIe	10 – 16 Oct	4m beam
France	Gwen Drez	VIIIa, VIIIb	3 Nov – 9 Dec	4m beam
Germany	Solea	German Bight	17 – 26 Aug	7m beam
Italy/Slovenia	G. Dallaporta	northern Adriatic Sea	22 Nov – 17 Dec	3.5m beam
Netherlands	Tridens	central North Sea	20 Aug – 14 Sep	8m beam + flip-up rope
Netherlands	Isis	southern North Sea	6 Aug – 4 Sep	8m beam

5.1.1.2 Survey results

A summary of each of the surveys is to be found in Section 5.1.2.

The Belgian offshore survey successfully carried out 57 of the 62 planned stations. Three stations could not be fished because of technical issues that affected the cruise plan. Two of the fished stations were declared invalid as the catches were very different from the time-series norm and were considered to be unreliable.

The English eastern English Channel and southern North Sea (VIId, IVc) survey was completed, although it was not possible to attempt two stations and two of the three invalid stations were not repeated. Both of the other two English offshore surveys, the Irish Sea and Bristol Channel (VIIa, VIIf) and western English Channel (VIIe) surveys, were successfully completed, although there was significant gear damage at one station for the former survey, which was successfully sampled after repair of the gear.

For the French survey some hauls were either displaced or cancelled because of the presence of fixed nets, and work was not possible for an eight day period because of bad weather.

For the German offshore survey bad weather prevented two of the planned 55 stations from being completed.

Sixty-three hauls were successfully completed for the Adriatic Sea survey but because of bad weather, which compromised the availability of the vessel, it was necessary to drop four stations. The duration for 20 stations had to be reduced from the standard 30 minutes because of large catches of benthos and/or as a precaution against gear damage.

The Dutch offshore surveys, usually carried out by two vessels ("Tridens" and "Isis"), were completed without incident, although it was not possible to sample one of the "Tridens" stations because of time constraints.

5.1.1.3 Catch results

Distribution plots for the offshore survey fish species are presented in Annex 6.2, and numbers per hour, by ICES Division and roundfish area (RFA), in Annexes 7 and 8.

5.1.2 Survey summary sheets offshore surveys per country

5.1.2.1 Surveys summary Belgium

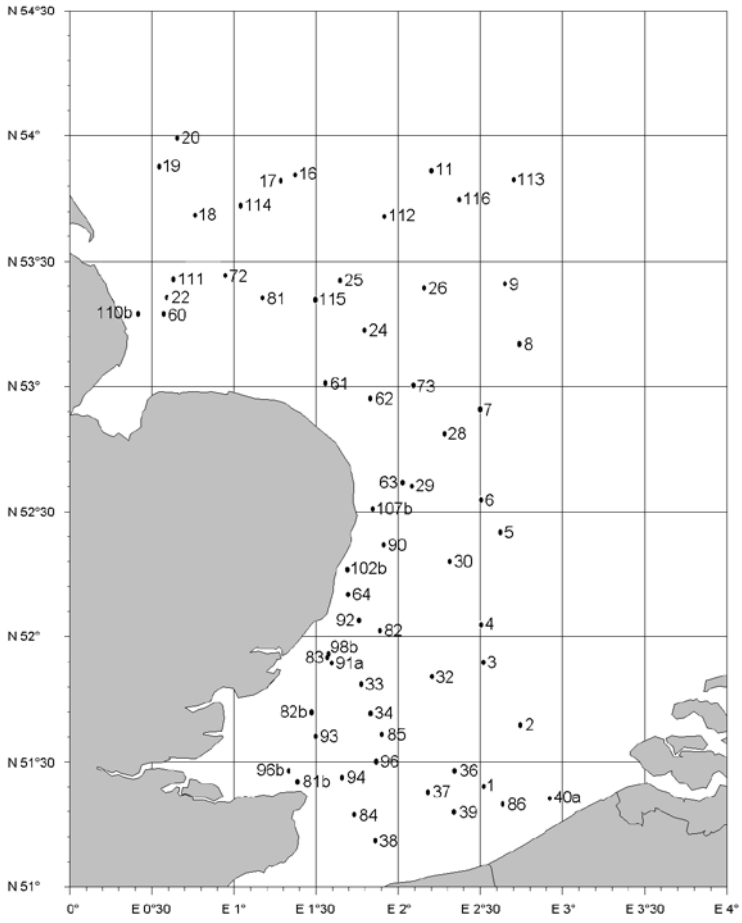
Nation:	Belgium	Vessel:	RV "Belgica"
Survey:	Offshore North Sea Beam Trawl Survey	Dates:	27 August to 7 September 2012
Survey description:	An annual North Sea Beam Trawl Survey is carried out in the southwestern part of the North Sea (IVb and IVc West) to sample the adult flatfish stocks, primarily targeting plaice Pleuronectes platessa and sole Solea solea. Starting in 1992, the RV "Belgica" samples 62 fixed sampling stations in BTS Areas 2, 3 and 4.		
Gear details:	All NSBTS sampling stations are fished for approx. 30 min, with a 4 m beam trawl, fitted with a 40 mm codend and chain mat.		
Notes from survey (e.g. problems, additional work etc.):	In 2012, the weather did not interfere with the fishing activities. However, only 57 of the 62 planned survey stations were fished successfully. Two stations in the northwestern part (60 and 111) were fished but declared invalid as the catch sizes were too different from the time-series of these stations to be considered reliable. The other three stations (81, 96 and 96b) were missed because of delays caused by technical issues that affected the cruise plan and/or scientific operations (hydraulic, engine and electricity problems). These were geographically well spread so the spatial resolution in the results was not compromised. Problems with the depth meter forced us to fish two stations a second time, creating additional delay. Number of otoliths: 4 per cm size class per ICES Statistical Rectangle for cod, brill, turbot, plaice and sole. This was the second time that the collection of biological samples was geographically organized based on the rectangles instead of the formerly used ALK-areas. Indices for plaice and sole are the numbers per hour, averaged by ICES rectangle and averaged over all sampled ICES rectangles.		
Target species catch rates:		Time-series mean nr. per hr	2012 mean nr. per hr
	Plaice	60.8	105.8
	Sole	88.7	70.2
Number of fish species recorded and notes on any rare species or unusual catches:	The NS BTS measures all commercial fish species to the 5 mm below (no subsampling), and also records all other fish species by length (mostly all individuals, but sometimes based on subsamples). 53 different species of fish were caught. The top 10 by number are:		

Species	Total number
Dab (*Limanda limanda*)	4938
Lesser Weever (*Echiichthys vipera*)	2981
Plaice (*Pleuronectes platessa*)	2972
Sole (*Solea solea*)	2432
Common Dragonet (*Callionymus lyra)*	1732
Pogge (*Agonus cataphractus*)	1555
Solenette (*Buglossidium luteum*)	919
Whiting (*Merlangius merlangus*)	913
Scaldfish (*Arnoglossus laterna*)	625
Lemon Sole (*Microstomus kitt)*	603

Number of epifauna species recorded	All individuals of epibenthic/benthic species and occasionally caught pelagic species are recorded on the species-level whenever possible (or the most detailed taxonomical level otherwise) based on complete catches (subsampling only for the bigger catches). A selected list, decided upon by WGBEAM, is presented to the WGBEAM.
Index revisions:	None

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	comments
IVb, c	62 fixed stations	4 m beam trawl	57	
Number of biological samples (maturity and age material, *maturity only):				
4 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).				



5.1.2.2 Survey summary England: VIId and IVc

Nation:	UK (England and Wales)	**Vessel:**	**RV Cefas Endeavour**
Survey:	**13/12**	**Dates:**	**18 – 31 July 2012**

Survey description:	**Q3 Eastern English Channel and Southern North Sea survey aims to collect data on distribution and relative abundance, with biological information on commercial fish species in VIId and IVc. The primary target species are sole and plaice, with additional species including lemon sole and cod.**
Gear details:	**Steel 4m-beam trawl with chain mat and single flip-up rope, 80mm trawl with 40mm codend liner. Also attached is the SAIV mini CTD.**
Notes from survey (e.g. problems, additional work etc.):	A total of 82 valid stations were successfully sampled, although it was necessary to reduce the tow duration to 20 minutes for 13 stations, primarily to avoid the presence of static gear or to reduce the impact of large catches of shell/gravel. The position of prime station 12 (French side) had to be moved slightly to a new position because of the presence of a cable, and two stations were deemed to be invalid. Three of the stations were invalid: at prime station 4 there was an unusually small catch of fish/benthos, which was later repeated in the other direction as it was suspected that strong tides had kept the trawl off the bottom on the first attempt; at prime 2 the tow yielded a large catch of shell and gravel and was not repeated; at prime 83 the gear was not on the bottom on the first attempt and was repeated immediately. Additional survey aims included the collection of: litter data; live crab and starfish for a local Sea Life centre; water samples for nutrient analysis; dissolved CO_2 data.
At Target species catch rates:	

	Time-series mean no. per hr	2012 mean no. per hr	Time-series mean catch weight per hr (kg)	2012 mean catch weight per hr (kg)
Sole	37.32	35.32	4.26	3.77
Plaice	45.29	74.48	11.23	14.25

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

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

Pleuronectes platessa	2949
Buglossidium luteum	1934
Solea solea	1379
Limanda limanda	1320
Callionymus lyra	1169
Trisopterus luscus	449
Trisopterus minutus	426
Echiichthys vipera	408
Agonus cataphractus	332
Scyliorhinus canicula	262

Number of epifauna species recorded:	**95 separate infauna species / genera were observed during the 2012 survey across both ICES divisions. At 15 selected fishing stations (12 VIId, 3 IVc), samples of the epibenthic bycatches were sorted and 32 'core species' identified and quantified, and at all fishing stations epibenthic species were observed and the nine sentinel**

	taxa quantified.
Index revisions:	

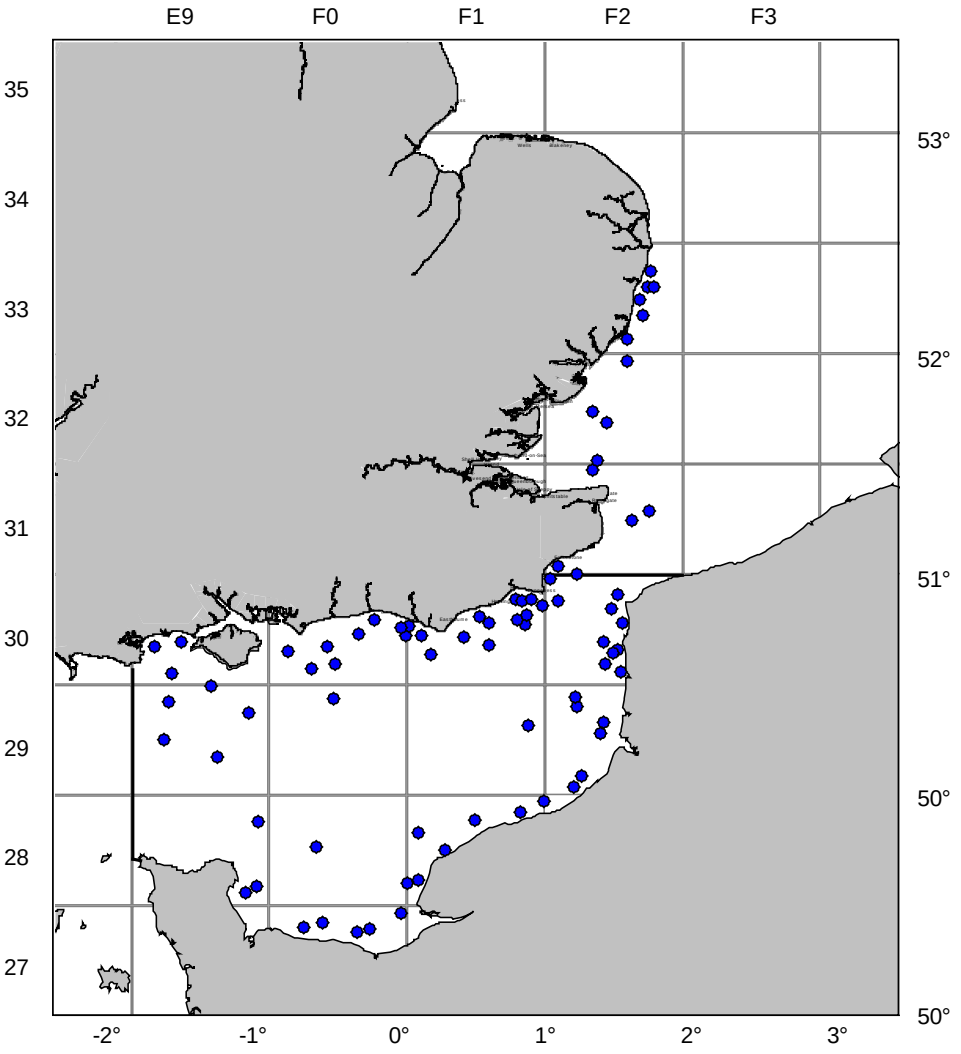
Stations fished:

ICES Divisions	Strata	Gear	Valid	Invalid	Unable to fish	Comments
VIId	English	4m beam trawl	36	2 (1 repeated)	2	
VIId	French	4m beam trawl	31	1 (not repeated)	1	
IVc		4m beam trawl	15		0	

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

Species	Number	Species	Number
Pleuronectes platessa	971	*Platichthys flesus*	109
Solea solea	752	*Chelidonichthys cuculus*	68
Limanda limanda	270	*Chelidonichthys lucerna*	45
Microstomus kitt	220	*Scophthalmus maximus*	17
Merlangius merlangus	114	Other	32

Positions of stations sampled in 2012 on 7d BTS



5.1.2.3 Survey summary England: VIIa and VIIf

Nation:	UK (England and Wales)	Vessel:	RV Cefas Endeavour
Survey:	15/12	Dates:	13 Sept – 4 Oct 2012

Survey description	**Q3 Irish Sea and Bristol Channel survey aims to collect data on distribution and relative abundance, with biological information on commercial fish species in VIIa and VIIf. The primary target species are sole and plaice, with additional species including whiting, lemon sole and cod.**
Gear details:	**Steel 4m-beam trawl with chain mat and single flip-up rope, 80mm trawl with 40mm codend cover. Also attached is the SAIV mini CTD.**
Notes from survey (e.g. problems, additional work etc.):	The survey was completed, although the trawl received major net damage at prime station 137 after it had picked up a very heavy weight. There had been no previous history of damage at this station, and was successfully repeated the following day. The tow duration at nine prime stations (27, 53, 54, 313, 425, 203, 220, 233, 501) was reduced from the standard 30-minute to 15-minute tow, and for a further four stations, durations were reduced to 20-minutes (28, 49, 137, 512). All tow reductions were due to expected large catches of weed, broken shell, or large numbers of small flatfish species. For this year, an alternative tow was located for prime station 54 as in 2011 over 3 tonnes of broken shell was caught. The beam trawl was towed for a duration of 15-minutes as a precaution, given the results from seabed mapping. In addition, two stations were hauled a few minutes early due to either the presence of cables or static gear at the end of the tow, and several other stations were moved short distances to avoid snagging undersea cables (an increasing problem in area) or to avoid static gear. Additional survey aims included the collection of: surface and bottom temperature/salinity data; length/weight and maturity information using individual fish measurements, in support of the EU Data Collection Framework; surface water samples for analysis of tritium; water samples to determine alkalinity.

Target species catch rates:

	Time-series mean no. per hr (for period 2001-2012)	2012 mean no. per hr	Time-series mean catch weight per hr (kg)	2012 mean catch weight per hr (kg)
Sole VIIa	**19.37**	**8.18**	**2.83**	**1.45**
Sole VIIf	**67.15**	**65.81**	**7.82**	**7.58**
Plaice VIIa	**254.45**	**273.63**	**21.67**	**22.27**
Plaice VIIf	**35.28**	**56.25**	**6.13**	**10.93**

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

76 separate species / genera of finfish were caught. The top 10 by number (Standardized to 30-minute tow duration) were:

Limanda limanda	19517
Pleuronectes platessa	9899
Buglossidium luteum	6653
Trisopterus minutus	5509
Callionymus lyra	2989
Scyliorhinus canicula	2158
Merlangius merlangus	1951
Arnoglossus laterna	1503
Solea solea	1384

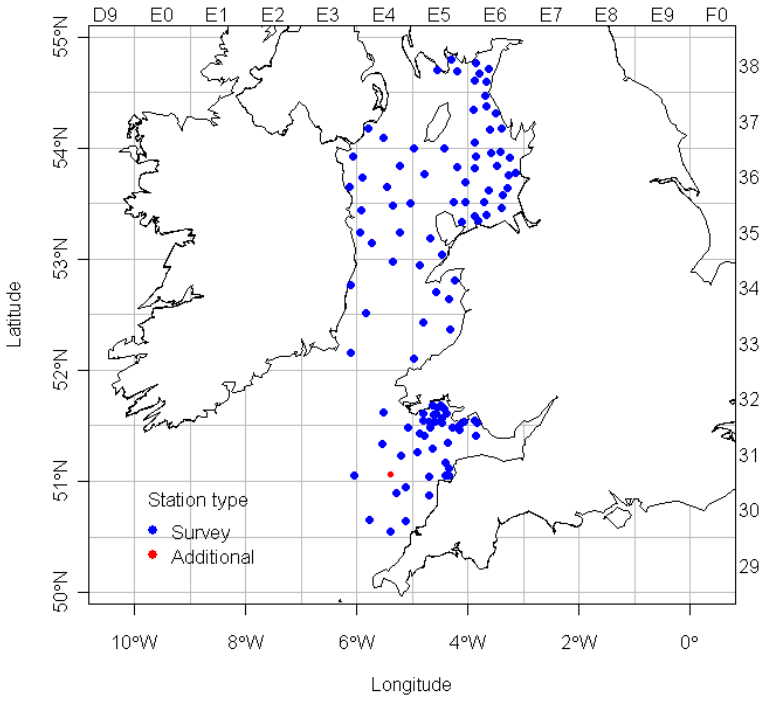
	Eutrigla gurnardus	920	
Number of infauna species recorded	115 separate infauna species / genera were observed during the 2012 survey across both ICES divisions. At 25 selected fishing stations, samples of the epi-benthic bycatches were sorted and 32 'core species' identified and quantified, and at all fishing stations epibenthic species were observed and the nine sentinel taxa quantified.		
Index revisions:			

Stations fished:

ICES Divisions	Strata	Gear	Valid	Addit ional	In-valid	Total	Comments
VIIa,f	Depth band within stratum area	4m beam trawl	107 (of which 65/65 were priority index stns)	2	1	110	

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
Pleuronectes platessa	1848	*Lepidorhombus whiffiagonis*	37
Solea solea	631	*Gadus morhua*	35
Limanda limanda	568	*Scophthalmus rhombus*	29
Merlangius merlangus	227	*Zeus faber*	25
Microstomus kitt	155	*Merluccius merluccius*	22
Lophius piscatorius	84	*Scophthalmus maximus*	18
Melanogrammus aeglefinus	42	*Dicentrarchus labrax*	10
Buglossidium luteum	40	Other	15

Station positions for Cefas Endeavour 15/12 Beam Trawl survey



5.1.2.4 Survey summary England: VIIe

Nation:	UK (England and Wales)	**Vessel:**	**FV Carhelmar**
Survey:	**2/12**	**Dates:**	**10 – 16 October 2012**

Survey description	**Q4 Western English Channel beam trawl survey. The primary target species are sole and plaice, with additional species including lemon sole and monkfish.**
Gear details:	**Twin steel 4m-beam trawls with chain mat and single flip-up rope, 80mm trawl with 40mm codend cover. From 2006, a SAIV mini CTD has been attached to one beam.**
Notes from survey (e.g. problems, additional work etc.):	**Cefas has carried out the survey since 1984, firstly on the FV Bogey1, then from 1989 onwards the FV Carhelmar. In 2002 the survey was switched to the RV Corystes for three years, although both vessels were used in 2003. Since 2005 the survey returned to using the FV Carhelmar. For 2011 a number of changes were implemented. The principal ones were to stop collecting length measurements for non-commercial fish species at a randomly selected station each day, to collect length frequency data for all commercial cephalopods (*Sepia* and *Loligo* spp.), and to restrict the collection of biological samples to *Pleuronectes platessa*, *Solea solea* and *Microstomus kitt* as well as reducing slightly some of the length group targets. Weights are only recorded for individual biological samples.** **For the 2012 survey, all 58 stations were successfully sampled without the need to repeat any tows to obtain a valid sample, and on all occasions both port and starboard trawls were brought aboard and processed. However, it was necessary to reduce the duration of the tow at two stations (H3 and P2) and at a number of stations (six) to reduce the warp-out to depth ratio slightly to avoid potential large catches of substrate.**
Target species catch rates:	**No catch weights recorded**

	Time-series mean no. per hr	2012 mean no. per hr
Sole	**15.4**	**17.05**
Plaice	**21.50**	**48.01**

Number of fish species recorded and notes on any rare species or unusual catches:	**51 separate species / genera of finfish were caught in 2012. The top 10 by number were:**

Pleuronectes platessa	**1391**
Aspitrigla (Chelidonichthys) cuculus	**1023**
Scyliorhinus canicula	**496**
Solea solea	**492**
Trisopterus luscus	**344**
Limanda limanda	**337**
Eutrigla (Chelidonicthys) gurnardus	**287**
Merlangius merlangus	**130**
Microstomus kitt	**82**
Lophius piscatorius	**79**

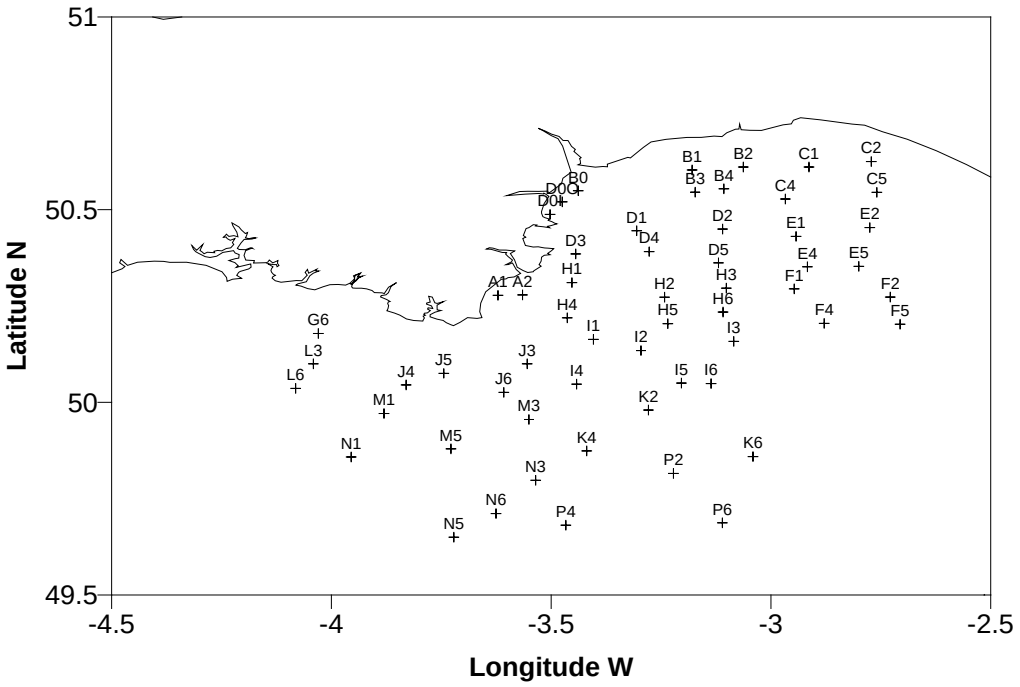
Number of infauna species recorded	**Five species of commercial shell-fish (mollusca and crustacea) and cephalopod species were measured at each station, of which *Sepia officinalis* was the most abundant. *Asterias rubens* occurred at 91% of the stations and were the most commonly encountered of the 52 other epibenthic species / genera observed during the survey.**

Stations fished:

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

Number of biological samples (maturity and age material, *maturity only):			
Species	**Number**	**Species**	**Number**
Pleuronectes platessa	**450**	*Solea solea*	**228**
Microstomus kitt	**76**		

Station positions for Carhelmar 2/12 Beam Trawl survey



5.1.2.5 Survey summary France

Nation:	France	Vessel:	NO "Gwen Drez"
Survey:	ORHAGO 12	Dates:	16 October 2012

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 *Nephrops norvegicus*, cuttlefish, wedge sole, red mullet, meagre, monks. The benthos is exhaustively sampled for two hauls by day (for determination at the laboratory). For the other hauls, the exploited benthic species are sampled and other species are sorted, weighted and counted by group (lower taxon to which they can be determinate on board).**
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.):	Some hauls displaced or cancelled because the presence of fixed net on the position. Work was impossible during eight days because bad weather.

Target species catch rates:

	Time-series mean no. per hr	2012 mean no. per hr	Time-series mean catch weight per hr (kg)	2012 mean catch weight per hr (kg)
Sole (day)	43.1	33.7	5.5	6.0
Sole (night)	49.9	46.6	6.6	6.3

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

58 separate species of fish were caught at day and 65 at night. The top 10 by number per hr are:

Day		Night	
Merluccius merluccius	91.3	*Trisopterus luscus*	68.6
Trisopterus luscus	56.2	*Arnoglossus laterna*	61.1
Arnoglossus laterna	52.7	*Solea solea*	46.6
Solea solea	33.7	*Merluccius merluccius*	44.0
Callionymus lyra	19.0	*Trisopterus minutus*	34.1
Buglossidium luteum	15.2	*Callionymus lyra*	27.6
Trisopterus minutus	14.6	*Microchirus variegatus*	21.0
Microchirus variegatus	12.2	*Buglossidium luteum*	20.7
Dicologlossa cuneata	7.1	*Dicologlossa cuneata*	6.8
Eutrigla gurnardus	5.6	*Pomatoschistus minutus*	5.7

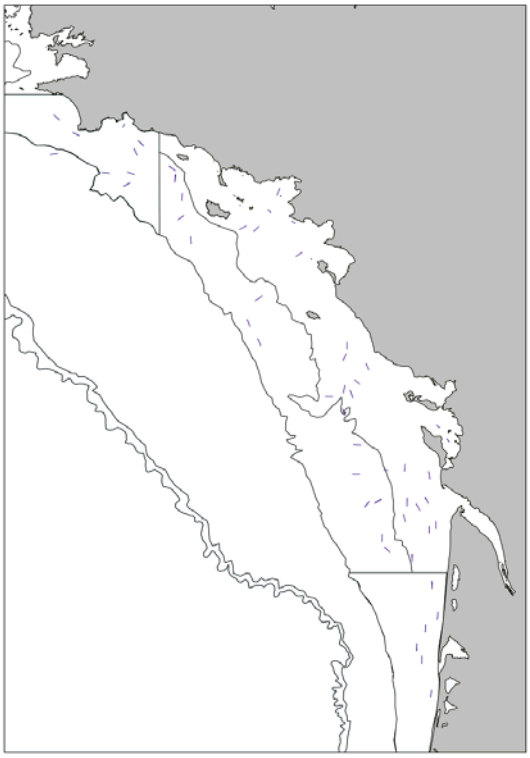
Number of infauna species recorded	**34 separates epifauna species or group of species sorted by lower taxon to which they can be attributed on board (number, total weight, length distribution of some of them).**

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total valid	comments
VIIIa,b	N/A	4m beam trawl	48		5	0	109	52 replicate tows for day-night studies.

Number of biological samples (*age material only)			
Species	Number	Species	Number
Solea vulgaris maturity and age	1031	Bass*	15
Solea vulgaris maturity only	2071	*Lophius piscatorius**	69
Red mullet	90	*Lophius budegassa**	14
Argyrosomus regius	96		

ORHAGO 2012 tow positions and strata limits



5.1.2.6 Survey summary Germany

Nation:	Germany	Vessel:	RV "Solea"
Survey:	BTS	Dates:	17 – 26 Aug 2012

Survey description:	**Q3 North Sea survey aims to collect data on distribution and relative abundance, with biological information, on commercial and other fish and invertebrate species in IVb to the west of Denmark. The distribution of young flatfish, particularly plaice, has particular attention (higher sampling density further inshore.)**
Gear details:	**7 meter beam trawl with 5 ticklers, 40 mm mesh in the codend, 80 mm mesh in the net.**
Notes from survey (e.g. problems, additional work etc.):	**53 hauls were carried out (approx. 26.5 hours fishing time). Due to bad weather conditions 2 hauls were missed.**
Target species catch rates:	

	Time-series mean no. per hr	2012 mean no. per hr	2012 mean catch weight per hr (kg)
Sole	4.01		11.31
Plaice	265.29	500.56	

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:

Limanda limanda	*30053*
Pleuronectes platessa	**12714**
Buglossidium luteum	**1940**
Callionymus lyra	**1529**
Eutrigla gurnardus	**1164**
Microstomus kitt	**767**
Arnoglossus laterna	**707**
Hippoglossoides platessoides	**642**
Agonus cataphractus	**573**
Pomatoschistus minutus	**393**

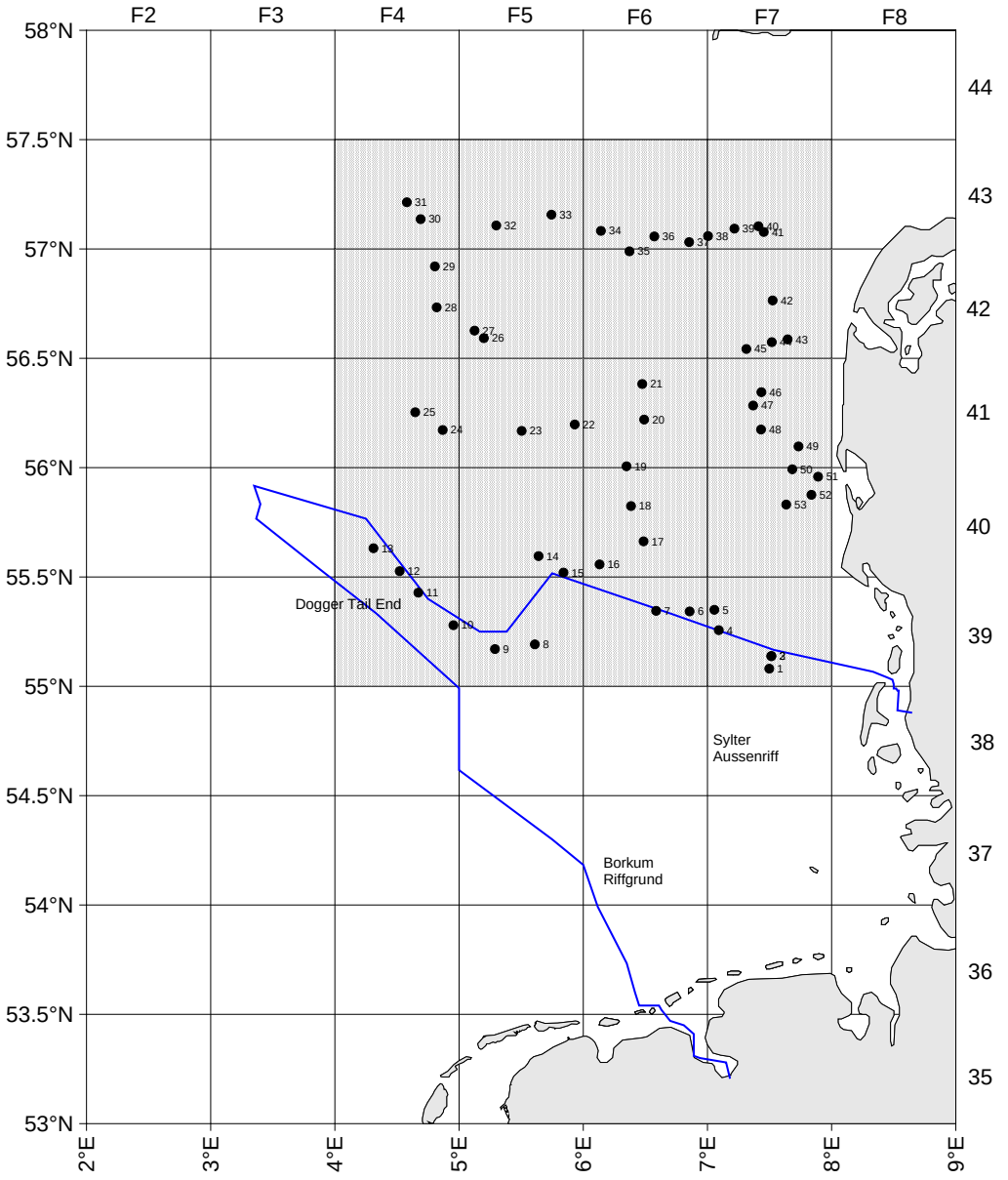
Number of epifauna species recorded:	**65 epifauna (attached and free-living) species were observed during the 2012 survey.**
Index revisions:	

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
North Sea IVb	N/A	7m beam trawl	53	53	**	0	53	

Number of biological samples (maturity and age material, *maturity only):			
Species	Number	Species	Number
Pleuronectes platessa	2023	*Limanda limanda*	1761
Solea vulgaris	140		

Towing positions Germany "Solea" Beam Trawl Survey



5.1.2.7 Survey summary Adriatic Sea: GSA17

Nation:	Italy and Slovenia	**Vessel:**	**N/O G. Dallaporta**
Survey:	**SoleMon**	**Dates:**	**22 Nov – 17 Dec 2012**

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; 40-mm codend mesh size). The beam trawl is provided with DST Logic Temperature and Depth Recorders.**
Notes from survey (e.g. problems, additional work etc.):	**63 hauls were carried out (approx. 28 hours fishing time). Due delay caused by adverse sea conditions and time constraint in availability of vessels, 4 station were not carried out. The survey was completed without incident. A total of 20 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 *Solea solea*, *Scophthalmus rhombus* and *Scophthalmus maximus* otolith and finclips for ageing and comparative population genetics structure, collection of samples for Lindane and TBT contaminants analyses, maturity stages of *Sepia officinalis*, epibenthos analises. Vertical CTD measurements were carried out after each haul.**
Target species catch rates:	

	Time-series mean no. per hr	2012 mean no. per hr	Time-series mean catch weight per hr (kg)	2011 mean catch weight per hr (kg)
Sole GSA17	**29.9**	**32.4**	**2.90**	**3.19**

Number of fish species recorded and notes on any rare species or unusual catches:	**59 separate species of finfish were caught. The top 10 by number per square km are:**

Arnoglossus laterna	553.53
Solea solea	438.01
Gobius niger	249.27
Serranus hepatus	218.67
Merluccius merluccius	155.34
Buglossidium luteum	134.02
Eutrigla gurnargus	93.14
Chelidonichthys lucernus	90.01
Scorpaena notata	66.47
Trisopterus minutus capelanus	46.47

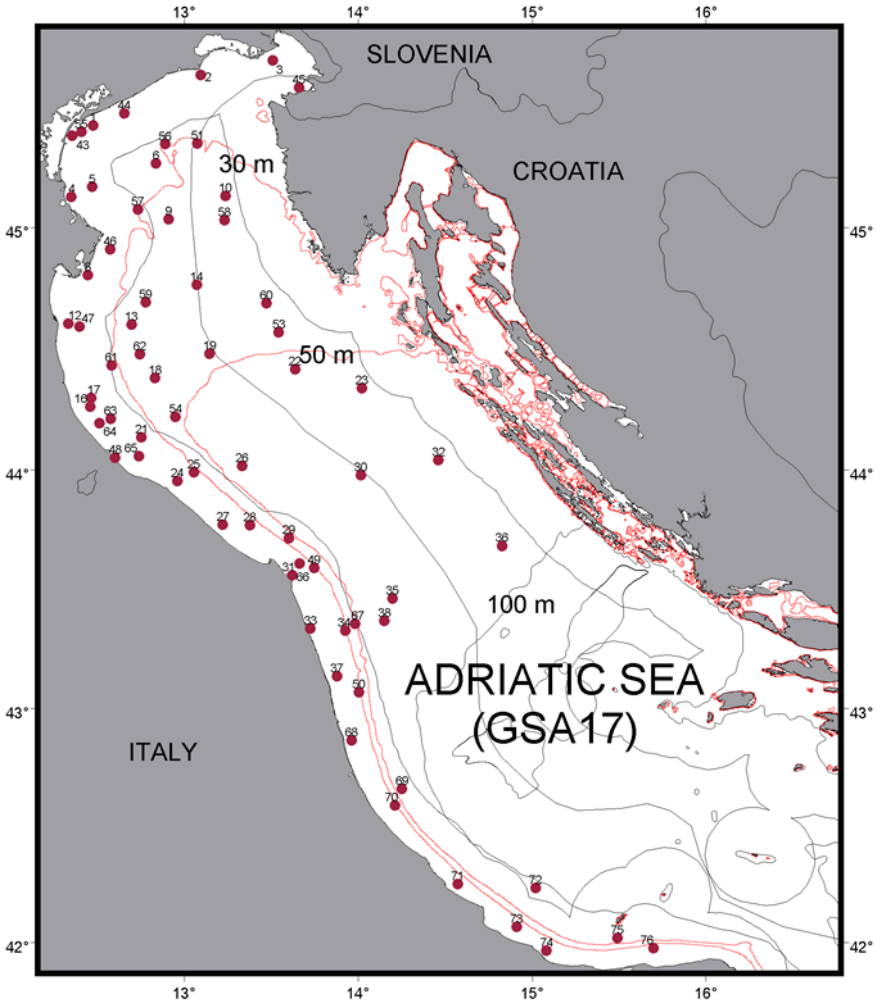
Number of infauna species recorded	**245 separate macro- and megabenthos species were observed during the 2012 survey.**
Index revisions:	

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	63	0	0			

Number of biological samples (maturity and age material):		
Species	**Number**	**Biological material**
Solea solea	**1666**	**(maturity)**
Solea solea	**267**	**(otolith)**
Scophthalmus rhombus	**42**	**(maturity and otolith)**
Scophthalmus maximus	**9**	**(maturity and otolith)**
Platichthys flesus	**53**	**(maturity and otolith)**

Towing positions of SoleMon survey



5.1.2.8 Survey summary Netherlands: Tridens

Nation:	Netherlands	**Vessel:**	**RV "Tridens"**
Survey:	**BTS (Beam Trawl Survey)**	**Dates:**	**20 Aug – 13 Sep 2012**

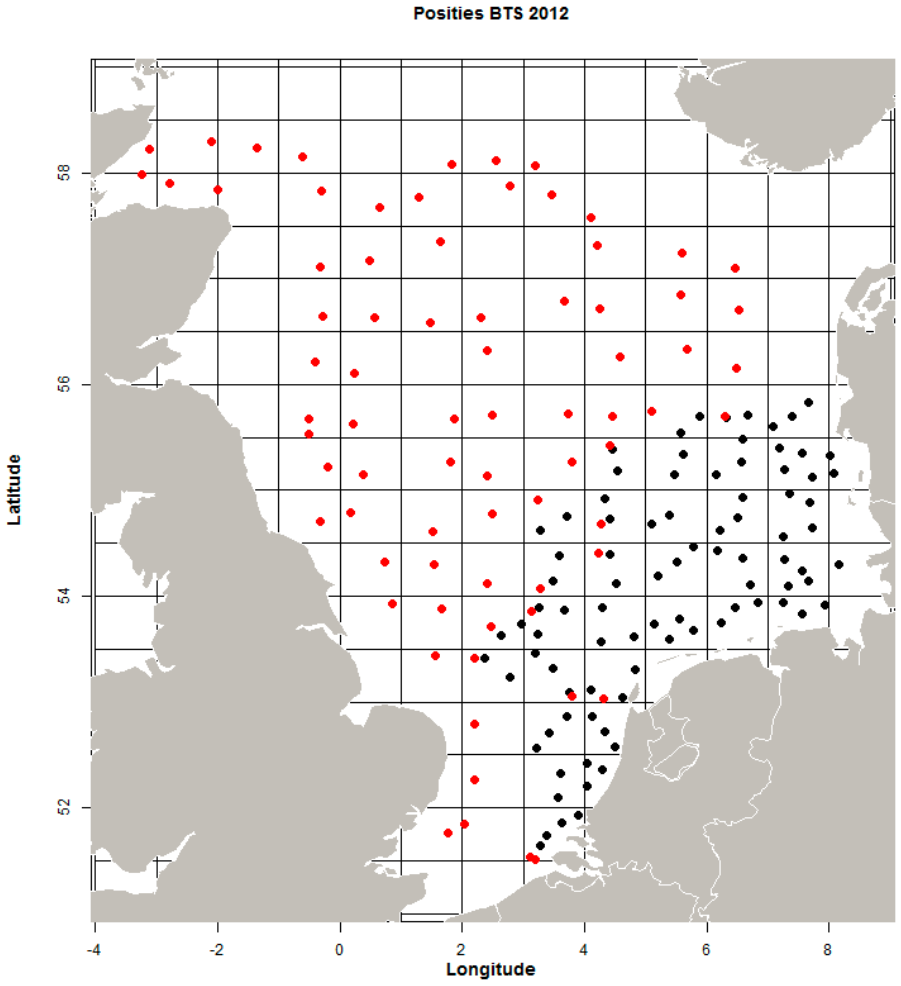
Survey description	**The BTS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age composition of flatfish species, (ii) monitor species composition of epibenthos species by counting and weighing (if possible), (iii) create a fishery-independent estimate of age density for plaice and sole in the North Sea for stock assessment, (iv) monitor sex- and length composition of *Cancer pagurus*, *Nephrops norvegicus* and elasmobranch species.**
Gear details:	**8 meter beam trawl with 8 ticklers, 40 mm mesh in the codend, 120 mm mesh in the net and a flip-up rope.**
Notes from survey:	**76 hauls were carried out (approx. 38 hours fishing time. The survey was finished without major incidents. One station could not be fished as it could not be reached within the survey period.** **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 hr / 2012 mean no. per hr** **Sole** no index **Plaice** 104.41 / 262.54
Number of fish species recorded and notes on any rare species or unusual catches:	**52 separate species of finfish were caught.** **The top 10 by number are:** *Limanda limanda* **27212** *Pleuronectes platessa* **10715** *Hippoglossoides platessoides* **4847** *Agonus cataphractus* **3561** *Arnoglossus laterna* **2647** *Eutrigla gurnardus* **2450** *Microstomus kitt* **2422** *Callionymus lyra* **2123** *Buglossidium luteum* **1731** *Merlangius merlangus* **1091**
Number of epifauna species recorded:	**144 epifauna (attached and free-living) species were observed during the 2012 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	47	25	4	0	76	

Number of biological samples (age material), including hauls with Isis gear:			
Species	Number	Species	Number
Pleuronectes platessa	1444	*Arnoglossus laterna*	77
Limanda limanda	572	*Scophthalmus maximus*	73
Microstomus kitt	429	*Microchirus variegatus*	51
Solea solea	292	*Scophthalmus rhombus*	29
Hippoglossoides platessoides	240	*Buglossidium luteum*	6
Gadus morhua	160	*Molva molva*	4
Merluccius merluccius	97	*Zeugopterus norvegicus*	4

Towing positions Dutch Beam Trawl Survey. Red = Tridens; Black = Isis



5.1.2.9 Survey summary Netherlands: Isis

Nation:	Netherlands	**Vessel:**	**RV "Isis"**
Survey:	**BTS (Beam Trawl Survey)**	**Dates:**	**6 Aug - 7 Sep 2012**

Survey description	**The BTS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age composition of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent estimate of age density for plaice and sole in the North Sea for stock assessment, (iv) monitor sex- and length composition of *Cancer pagurus*, *Nephrops norvegicus* and elasmobranch species.**
Gear details:	**8 meter beam trawl with 8 ticklers, 40 mm mesh in the codend, 120 mm mesh in the net.**
Notes from survey:	**89 hauls were carried out (approx. 45 hours fishing time) by Isis, meaning that the full sampling programme has been carried out in 2012**
Target species catch rates:	**Time-series mean no. per hr** / **2012 mean no. per hr** **Sole** 49.96 / 36.34 **Plaice** 809.80 / 989.93
Number of fish species recorded and notes on any rare species or unusual catches:	47 separate species of finfish were caught. The top 10 by number are: *Limanda limanda* 81015 *Pleuronectes platessa* 41899 *Arnoglossus laterna* 10952 *Buglossidium luteum* 5633 *Callionymus lyra* 5269 *Agonus cataphractus* 2676 *Solea solea* 1777 *Eutrigla gurnardus* 1475 *Echiichthys vipera* 1283 *Merlangius merlangus* 966
Number of epifauna species recorded:	**55 epifauna (attached and free-living) species were observed during the 2012 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	75	4	4	3	86	

Number of biological samples (age material):			
Species	Number	Species	Number
Pleuronectes platessa	753	Scophthalmus maximus	139

Limanda limanda	373	Scophthalmus rhombus	63
Solea solea	478	Microstomus kitt	93

5.2 Inshore surveys

5.2.1 Participation and coverage of the area

The inshore surveys in the North Sea are carried out by Belgium (Demersal Young Fish Survey-DYFS), Germany (DYFS) and the Netherlands (Demersal Fish Survey-DFS). UK (Young Fish Survey-YFS) ceased the survey due to 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 surveys are listed in Table 5.2.1.1. Details on areas covered by country are given in Annex 5, and details on depth strata fished are presented in Annex 10.

Table 5.2.1.1. Overview of surveys during 2012.

Country	Vessel	Area	Dates	Gear
Belgium	Broodwinner	Belgian coastal zone	10 – 21 Sep	6 m shrimp trawl
Germany	Chartered Vessels & RV Clupea	German Bight and German Wadden Sea	04 Sep –10 Oct	3 m shrimp trawl
Netherlands (SNS)	Tridens	Dutch coastal zone	1 – 7 Oct	6 m beam trawl
Netherlands	Schollevaar	Scheldt estuary	8 – 20 Sep	3 m shrimp trawl
Netherlands	Stern	Dutch Wadden Sea	27 Aug – 27 Sep	3 m shrimp trawl
Netherlands	Isis	Dutch coastal zone and German Bight	26 Sep – 30 Oct	6 m shrimp trawl

5.2.2 Survey results

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

For the Belgium inshore survey, it was not possible to sample one of the planned 33 stations because of bad weather and none of the stations were deemed to be invalid.

The German survey was completed without incident and a total of 217 hauls were conducted of which four were classified as invalid. For 2012 the sampling of the survey area outside the island chain was intensified using the same gear deployed by RV Clupea (a newly commissioned replacement research vessel for the "old" Clupea).

The Dutch inshore DFS surveys were completed without incident. For the SNS the survey was delayed because of technical problems with "Isis", and the survey had to be completed using "Tridens".

5.2.3 Catch results

The species composition per country per area for the continental surveys (Coastal, Wadden Sea, and Scheldt Estuary) is listed in Annex 13. From 2012, Annex 13 only shows the data from the most recent years. The catch for the UK inshore surveys is no longer given in the reports as the surveys ceased in 2010 and no new data are available. For historic data on these surveys please refer to the reports of the meeting in 2011.

5.2.4 Survey summary sheets inshore surveys per country

5.2.4.1 Survey summary Belgium

Nation:	Belgium	Vessel:	O.29 'Broodwinner'
Survey:	Inshore Demersal Young Fish & Brown shrimp Survey	Dates:	10–21 September 2012

Survey description	As part of the international Demersal Young Fish and Brown Shrimp Survey, an annual autumn sampling survey is carried out in the Belgian coastal waters, to collect data on the abundance of juvenile flatfish (primarily plaice *Pleuronectes platessa*, and sole *Solea solea*) and brown shrimp (*Crangon crangon*). Since 1973, 33 fixed sampling stations are fished. Until 1982, the research vessel Hinders was used, from 1983 onwards the survey was carried out with the training and research vessel O.29 'Broodwinner' (LOA 27.2 m; engine power 221 kW). The location of the sampling area matches the main flatfish nursery grounds along the Belgian coast.
Gear details:	All DYFS sampling stations are fished for approx. 30 min, with a standard shrimp beam trawl (beam length 6 m; codend mesh size 11 mm, no tickler chains), at 3 knots against tide.
Notes from survey (e.g. problems, additional work etc.):	Although the weather interfered with the sea-going operations in 2012 on several days of the survey, the ten days of ship time still allowed 32 of the 33 sampling stations to be fished successfully. None of the fished stations were declared invalid.

Target species catch rates:

2012 data

	Time Series mean nr. per 1000 m²	2012 mean nr. per 1000 m²
Plaice	5.67	5.50
Sole	4.19	1.75

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, 11 species were documented in 2012. Ordered by number, these are:

SPECIES	TOTAL NUMBER
Dab (*Limanda limanda*)	**6109**
Plaice (*Pleuronectes platessa*)	**2944**
Whiting (*Merlangius merlangus*)	**2176**
Sole (*Solea solea*)	**891**
Flounder (*Platichthys flesus*)	**97**
Horse Mackerel (*Trachurus trachurus*)	**26**
Lemon Sole (*Microstomus kitt*)	**19**
Turbot (*Scophthalmus maximus*)	**17**
Cod (*Gadus morhua*)	**15**
Tub Gurnard (*Chelidonichthys lucerna*)	**8**

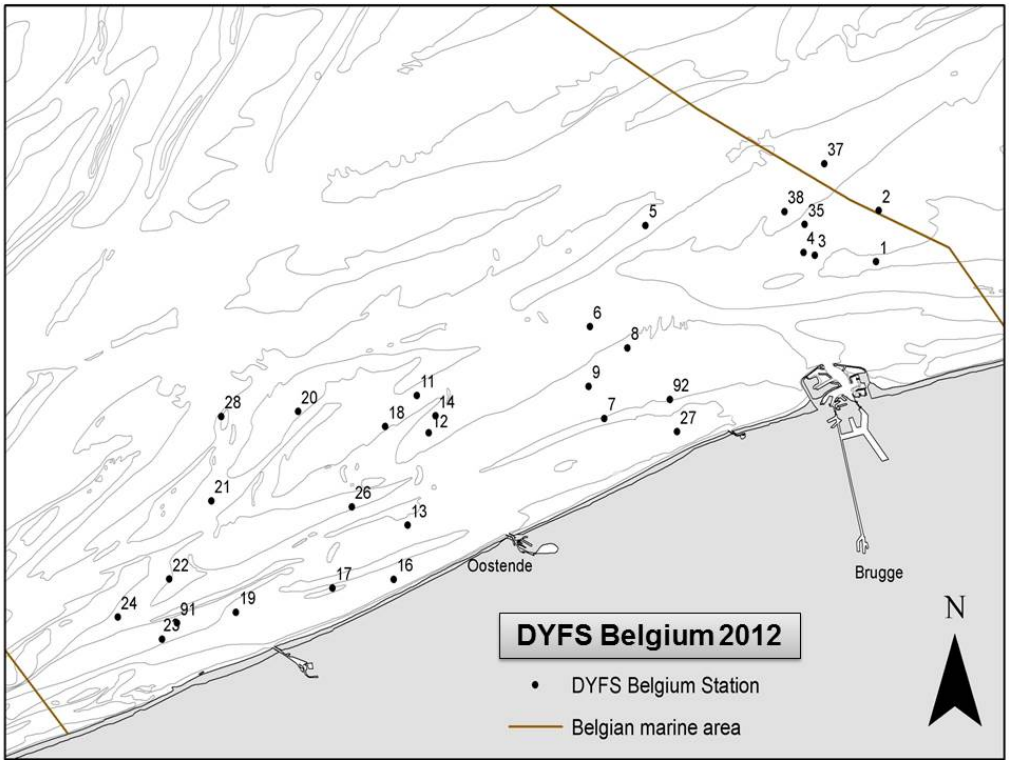
	Grey Gurnard (*Eutrigla gurnardus*) 3
Number of epifauna species recorded:	Appr. 500 brown shrimp per station are measured in 5 mm size classes. No other epifauna species are recorded.
Index revisions:	No

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc	N/A	6m beam trawl	33	33	0	0	32	1 station not fished (see above)

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

DYFS sampling stations in the Belgian coastal waters



5.2.4.2 Survey summary Germany

Nation:	Germany	Vessel:	RV "Clupea" and Chartered Cutters
Survey:	DYFS	Dates:	04 Sep – 10 Oct 2012

Survey description

The DYFS (Demersal Young Fish and Brown Shrimp Survey) aims to collect data on distribution and relative abundance, with biological information on fish and crustacean species in the Wadden Sea region. The primary target species are plaice and sole, with additional species including whiting, cod and brown shrimp.

Gear details:

Steel 3m- shrimp-beam trawl without tickler chain, 20mm codend. An electronic mini sensor for time, temperature and pressure (light optional) is attached.

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

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. 12m 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 1980 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 213 valid hauls of 217 total hauls were carried out in 2012.

Target species catch rates:

	Time-series mean (Schleswig-Holstein only) n/1000m²	2012 mean (Schleswig-Holstein only) n/1000m²	Time-series mean	2012 mean (coastal Zone all along Germany) n/1000m²
Plaice	14.40	3.69		12.40
Sole	0.97	0.41		0.64
Cod	0.98	0.47		0.41
Whiting	2.23	0.58		0.70
Brown shrimp	1899	1869.82		1751.53

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

The top 10 by number are:

54 taxa of finfish were caught from 2001 to 2012. The top 10 by number in 2012 out of 42 taxa:

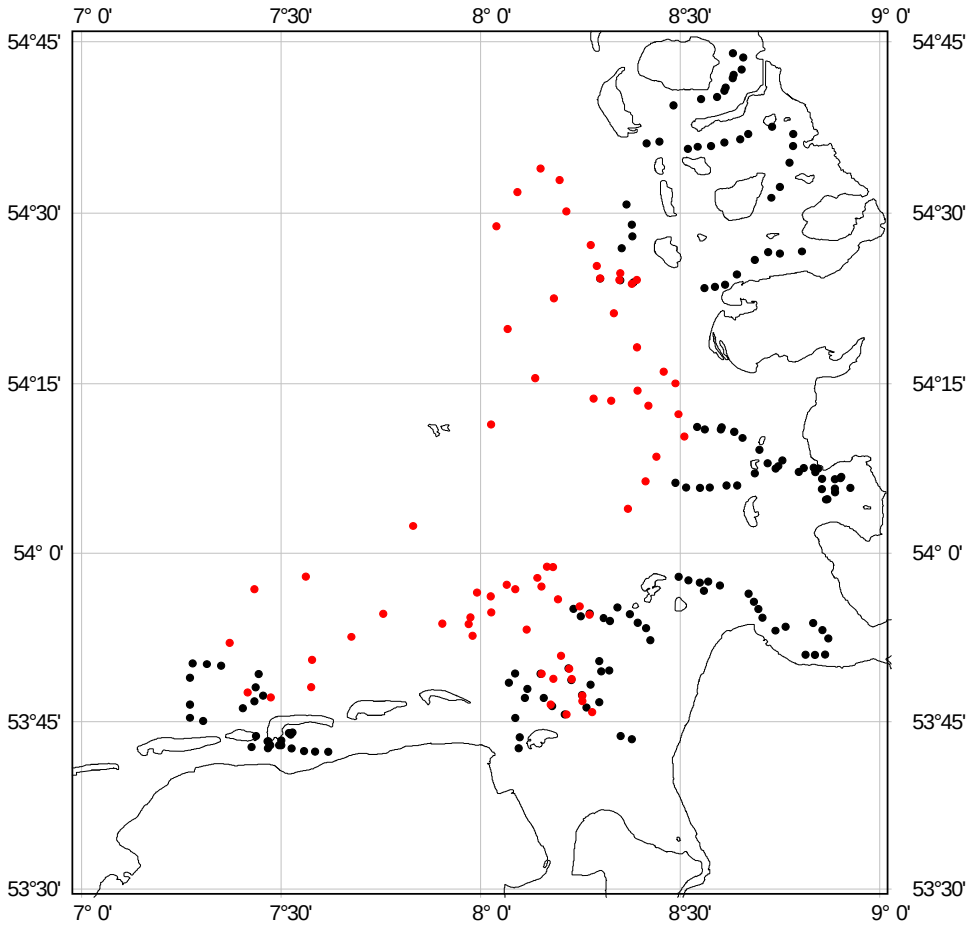
Pomatoschistus minutus	19084
Pleuronectes platessa	10060
Limanda limanda	5770
Agonus cataphractus	5446
Syngnathus rostellatus	4128
Osmerus eperlanus	4124
Ciliata mustela	731
Liparis liparis	682
Platichthys flesus	575
Pomatoschistus microps	570
Callionymus lyra	388
Clupea harengus	263

Number of epifauna

All epifauna found are recorded and available in the SF database. For 2012 they were

species recorded:	*Crangon crangon*	**1592401**
	Liocarcinus holsatus	**25838**
	Pandalus montagui	**8600**
	Carcinus maenas	**4282**
	Crangon allmanni	**3904**
	Ophiurida	**1798**
	Asterias rubens	**795**
	Loliginidae	**707**
	Actinaria	**621**
	Pleurobrachia pileus	**548**
Index revisions:		

Stations sampled in the German DYFS 2012. Black circles: chartered vessels, red circles: RV Clupea



5.2.4.3 Survey summary Netherlands: Schollevaar (DYFS)

Nation:	Netherlands	**Vessel:**	**RV "Schollevaar"**
Survey:	**DYFS (Demersal Young Fish Survey)**	**Dates:**	**8-20 Sep 2012**

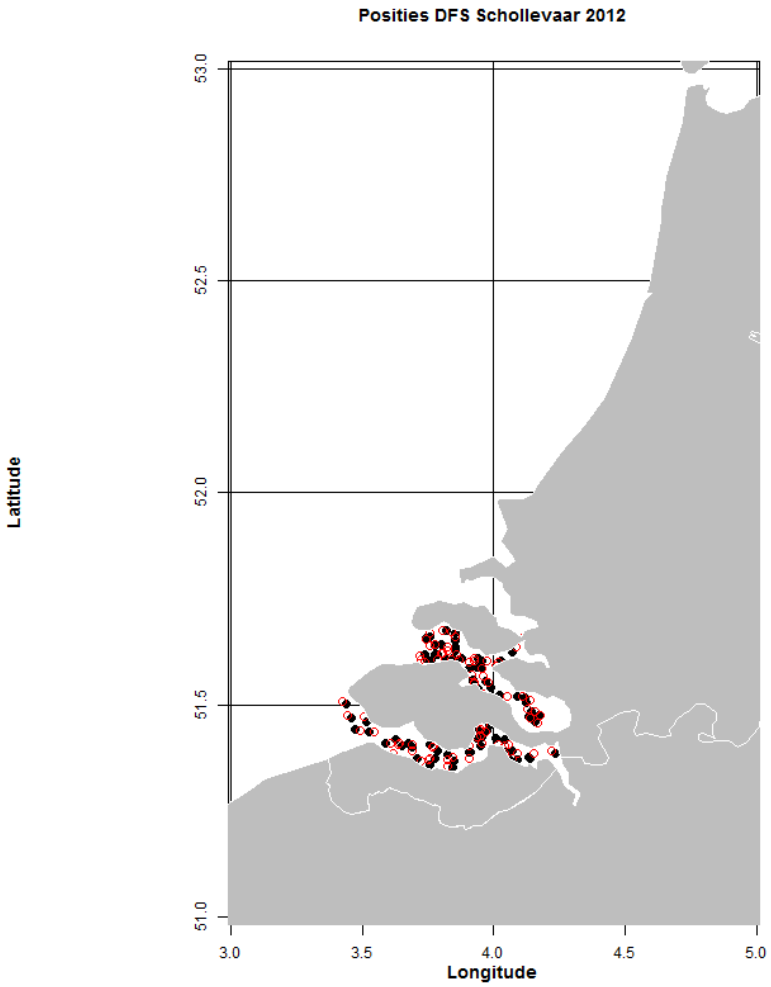
Survey description	**The DYFS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age compositions of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent index of abundance by age group (0- and 1-group) for plaice and sole in the North Sea for stock assessment, (iv) collect data on length frequency distribution of brown shrimp (*Crangon crangon*).**
Gear details:	**3 meter beam trawl with 1 tickler chain and a bobbin rope ("shrimp net").**
Notes from survey (e.g. problems, additional work etc.):	**80 hauls were carried out. A CTD was attached to the net.**
Target species catch rates:	**Time-series mean no./1000m^2 / 2012 mean no. per 1000m^2** **Sole 3.49 2.20** **Plaice 10.08 6.46** **Note: without area based weighting as used in the index calculations**
Number of fish species recorded and notes on any rare species or unusual catches:	**39 separate species of finfish were caught.** **The top 10 by number are:** ***Pomatoschistus sp.* 3520** ***Pleuronectes platessa* 2041** ***Clupea harengus* 1583** ***Osmerus eperlanus* 758** ***Solea solea* 611** ***Platichthys flesus* 446** ***Syngnathus rostellatus* 234** ***Limanda limanda* 133** ***Agonus cataphractus* 131** ***Trisopterus luscus* 121** ****Pomatoschistus* species (*P. minutus, P. lozanoi, P. microps*) have been identified to the species but were added for this report**
Number of epifauna species recorded:	**41 epifauna (attached and free-living) species were observed during the 2011 survey.**
Index revisions:	**No**

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: Scheldt estuary	area & depth class	3m beam trawl	76		0	4	76	

Number of biological samples (maturity and age material):			
Species	**Number**	**Species**	**Number**
Pleuronectes platessa	**117**	*Limanda limanda*	**26**
Solea solea	**121**	*Scophthalmus rhombus*	**8**
Platichthys flesus	**59**	*Scophthalmus maximus*	**1**

Positions DYFS Schollevaar 2012 (black=shooting positions, open red=hauling positions)



5.2.4.4 Survey summary Netherlands: Stern (DYFS)

Nation:	Netherlands	**Vessel:**	**RV "Stern"**
Survey:	**DYFS (Demersal Young Fish Survey)**	**Dates:**	**27 Aug- 27 Sep 2012**

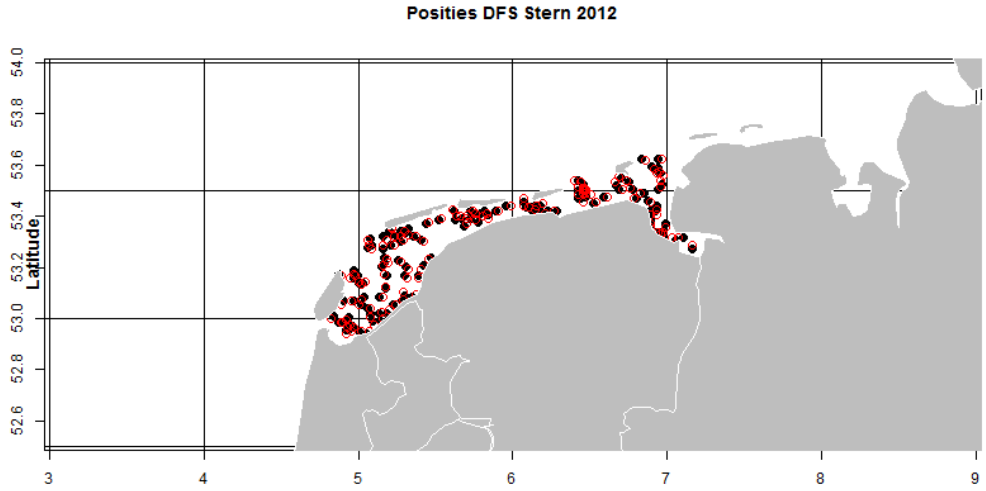
Survey description	**The DYFS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age compositions of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent index of abundance by age group (0- and 1-group) for plaice and sole in the North Sea for stock assessment, (iv) collect data on length frequency distribution of brown shrimp (*Crangon crangon*).**
Gear details:	**3 meter beam trawl with 1 tickler chain and a bobbin rope ("shrimp net").**
Notes from survey (e.g. problems, additional work etc.):	**121 hauls were carried out. A CTD was attached to the net.**
Target species catch rates:	**Time-series mean no/1000m²** / **2012 mean no/1000m²** **Sole** 5.22 / 0.85 **Plaice** 32.27 / 13.51 **Note: without area based weighting as used in the index calculations**
Number of fish species recorded and notes on any rare species or unusual catches:	**39 separate species of finfish were caught.** **The top 10 by number are:** *Pomatoschistus sp.** 9407 *Pleuronectes platessa* 6663 *Syngnathus rostellatus* 1572 *Ciliata mustela* 824 *Clupea harengus* 818 *Liparis liparis* 515 *Platichthys flesus* 492 *Zoarces viviparus* 431 *Myoxocephalus scorpius* 352 *Solea solea* 319 ***Pomatoschistus* species (*P. minutus, P. lozanoi, P. microps*) have been identified to the species but were added for this report**
Number of epifauna species recorded:	**33 epifauna (attached and free-living) species were observed during the 2012 survey.**
Index revisions:	**No**

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: Wadden Sea	area & depth class	3m beam trawl	118		12	3	130	

Number of biological samples (maturity and age material):			
Species	**Number**	**Species**	**Number**
Platichthys flesus	172	*Scophthalmus rhombus*	6
Pleuronectes platessa	203	*Limanda limanda*	6
Solea solea	124	*Scophthalmus maximus*	2

Positions DYFS Stern 2012 (black=shooting positions, open red=hauling positions)



5.2.4.5 Survey summary Netherlands: Isis (DYFS)

Nation:	Netherlands	**Vessel:**	**RV "Isis"**
Survey:	**DYFS (Demersal Young Fish Survey)**	**Dates:**	**26 Sep –30 Oct 2012**

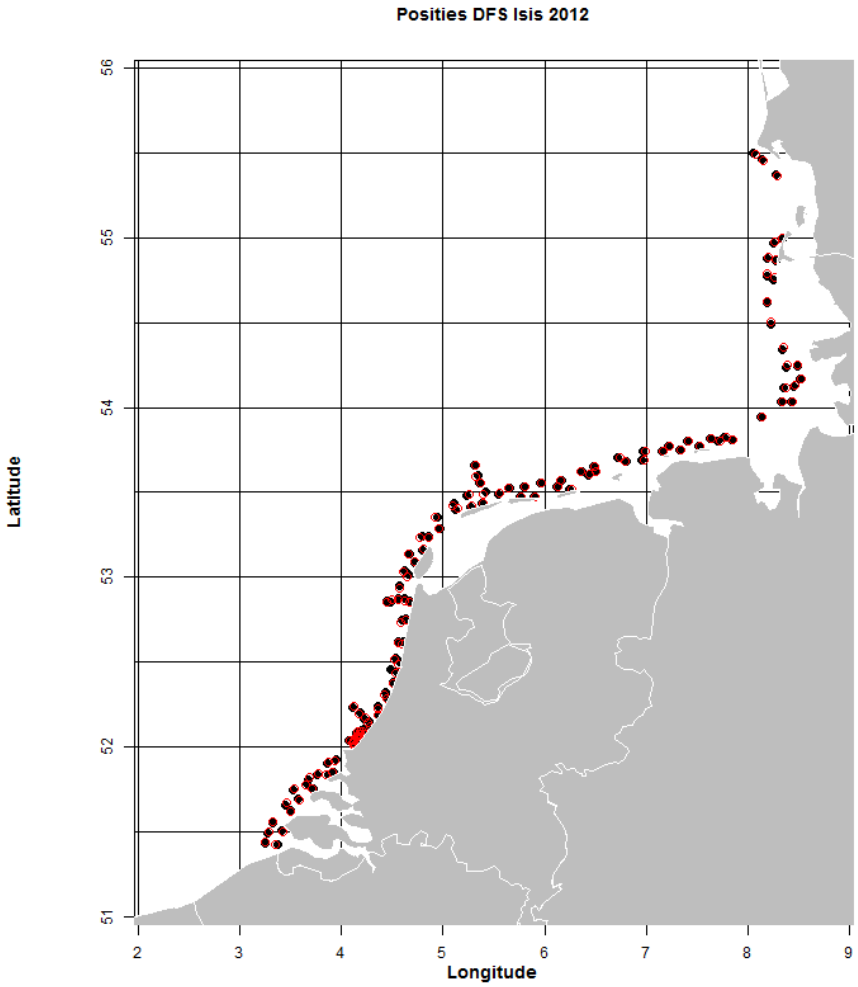
Survey description	**The DYFS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age compositions of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent index of abundance by age group (0- and 1-group) for plaice and sole in the North Sea for stock assessment, (iv) collect data on length frequency distribution of brown shrimp (*Crangon crangon*).**
Gear details:	**6 meter beam trawl with 1 tickler chain and a bobbin rope ("shrimp net").**
Notes from survey (e.g. problems, additional work etc.):	**124 hauls were carried out. A CTD was attached to the net.**
Target species catch rates:	**Time-series mean no/1000m²** / **2012 mean no/1000m²** **Sole 6.04 1.25** **Plaice 21.83 9.56** **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:** ***Pomatoschistus sp.* 91118** ***Limanda limanda* 13715** ***Pleuronectes platessa* 7953** ***Buglossidium luteum* 3944** ***Callionymus lyra* 3680** ***Agonus cataphractus* 1931** ***Merlangius merlangus* 1585** ***Ammodytes sp.* 1424** ***Syngnathus rostellatus* 1142** ***Arnoglossus laterna* 1057**
Number of epifauna species recorded:	**50 epifauna (attached and free-living) species were observed during the 2012 survey.**
Index revisions:	**No**

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: Dutch coast	area & depth class	6m beam trawl	115	0	9	0	124	

Number of biological samples (maturity and age material):			
Species	**Number**	**Species**	**Number**
Limanda limanda	**554**	*Platichthys flesus*	**61**
Pleuronectes platessa	**342**	*Scophthalmus rhombus*	**16**
Solea solea	**189**	*Scophthalmus maximus*	**11**

Positions DYFS Isis 2012 (black=shooting positions, open red=hauling positions)



5.2.4.6 Survey summary Netherlands: Tridens (SNS)

Nation:	Netherlands	**Vessel:**	**RV "Tridens"**
Survey:	**SNS (Sole Net Survey)**	**Dates:**	**1–7 Oct 2012**

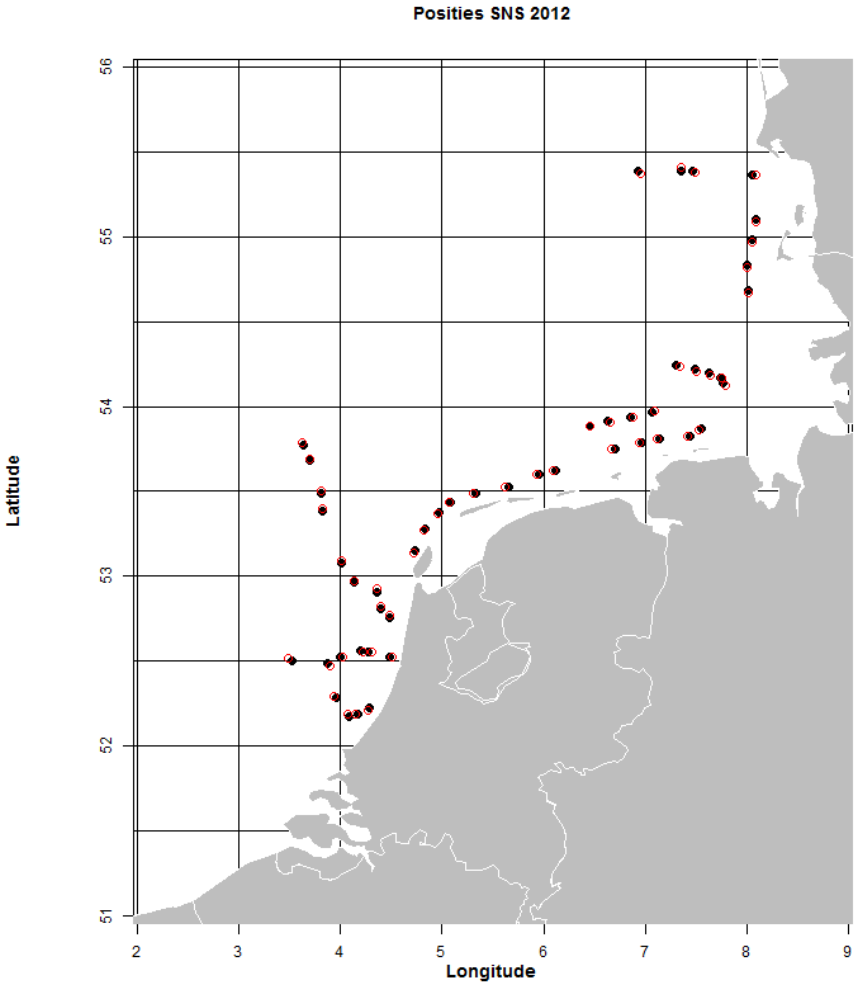
Survey description	**The SNS aims to (i) monitor fish fauna by sampling length frequency distributions of all fish species and age compositions of flatfish species, (ii) monitor species composition of epibenthos species by counting, (iii) create a fishery-independent index of abundance by age group (1-, 2-, 3- and 4-group) for plaice and sole in the North Sea for stock assessment.**
Gear details:	**6 meter beam trawl with 4 tickler chains, mesh size 40 mm in the codend.**
Notes from survey (e.g. problems, additional work etc.):	**49 hauls were carried out (approx. 13 hours fishing time). A vertical CTD sample was taken at the first station of each transect. All transects were covered. Due to technical problems the survey was carried out by RV Tridens. The survey started two weeks later than normal**
Target species catch rates:	**Time-series mean no/100 hr / 2012 mean no/100 hr** **Sole 6393 / 619** **Plaice 66569 / 54658**
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:** ***Limanda limanda* 10762** ***Pleuronectes platessa* 6254** ***Pomatoschistus sp.* 1810** ***Arnoglossus laterna* 1692** ***Callionymus lyra* 1465** ***Agonus cataphractus* 1313** ***Buglossidium luteum* 1273** ***Merlangius merlangus* 559** ***Echiichthys vipera* 371** ***Myoxocephalus scorpius* 136**
Number of epifauna species recorded:	**27 epifauna (attached and free-living) species were observed during the 2012 survey.**
Index revisions:	

Stations fished:

ICES Divisions	Strata	Gear	Indices stations	Priority stations	Additional	Invalid	Total Valid	Comments
IVc: North Sea	area & depth class	6m beam trawl	49	0	0	0	49	

Number of biological samples (maturity and age material):			
Species	**Number**	**Species**	**Number**
Limanda limanda	**704**	*Platichthys flesus*	**47**
Pleuronectes platessa	**538**	*Scophthalmus maximus*	**18**
Solea solea	**122**	*Scophthalmus rhombus*	**16**

Station positions for SNS Tridens (black=shooting positions, open red=hauling positions)



5.3 Coordination and standardization of beam trawl surveys in 2013

5.3.1 Offshore beam trawl surveys

5.3.1.1 Timing and area coverage

Annex 5.1 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 2012, no overlapping hauls were carried out due to time constraints, other priorities and budgetary constraints.

Table 5.3.1.1. Timing of the surveys in 2013.

Country	Vessel	Area	Dates	Gear	Contact
Belgium	Belgica	southern North Sea	26 Aug – 6 Sep	4m beam	kelle.moreau@ilvo.vlaanderen.be
UK	Cefas Endeavour	VIId, IVc	14 Jul – 24 Jul	4m beam	sally.songer@cefas.co.uk Cc: brian.harley@cefas.co.uk
UK	Cefas Endeavour	VIIfg, VIIa	12 Sep – 3 Oct	4m beam	ian.holmes@cefas.co.uk Cc: brian.harley@cefas.co.uk
UK	Carhelmar	VIIe	9 – 16 Oct	4m beam	gary.burt@cefas.co.uk Cc: brian.harley@cefas.co.uk
UK	Cefas Endeavour	English Channel	15 Feb – 14 Mar	2x 4m beam	Sven.Kupschus@cefas.co.uk Cc: brian.harley@cefas.co.uk
France	Gwen Drez	VIIIa, VIIIb	3 Nov – 9 Dec	4m beam	yann.coupeau@ifremer.fr Cc: Gerard.Biais@ifremer.fr
Germany	Solea	German Bight	17 Aug – 2 Sep	7m beam	kay.panten@ti.bund.de
Adriatic (Italy-Slovenia)	G. Dallaporta	North Adriatic Sea (GSA 17)	29 Nov – 14 Dec	2x 3.5m modified beam	giuseppe.scarcella@an.ismar.cnr.it
Netherlands	Tridens	central North Sea	19 Aug – 13 Sep	2x 8m beam + flip-up rope	Lorna.teal@wur.nl Cc: ingeborg.deboois@wur.nl
Netherlands	Isis	southern North Sea	5 Aug – 6 Sep	2x 8m beam	Ronald.bol@wur.nl Cc:ingeborg.deboois@wur.nl

5.3.1.2 Other issues

All of the offshore surveys that have the staff and resources to collect information on litter in the catch are now doing so. The appropriate form is available in Annex 15.

5.3.2 Inshore beam trawl surveys

5.3.2.1 Timing and area coverage

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

Table 5.3.2.1. Timing of the surveys in 2013.

Country	Vessel	Area	Dates	Gear	contact
Belgium	Simon Stevin	Belgian coastal zone	9 – 18 Sep	6 m shrimp trawl	Jurgen.Bossaert@ilvo.vlaanderen.be Cc: kelle.moreau@ilvo.vlaanderen.be
Germany	Chartered vessels + RV Clupea	German Bight and German Wadden Sea	26 Aug – 30 Sep	3 m shrimp trawl	Holger.haslob@ti.bund.de Cc: Volker.siegel@ti.bund.de
Netherlands (SNS)	Isis	Dutch coastal zone	9 – 20 Sep	6 m beam trawl	Hanz.wiegerinck@wur.nl Cc: Loes.bolle@wur.nl
Netherlands	Schollevaar	Scheldt estuary	2 – 20 Sep	3 m shrimp trawl	Andre.dijkman@wur.nl Cc: Loes.bolle@wur.nl
Netherlands	Stern	Dutch Wadden Sea	26 Aug – 27 Sep	3 m shrimp trawl	Marcel.devries@wur.nl Cc: Loes.bolle@wur.nl
Netherlands	Isis	Dutch coastal zone and German Bight	23 Sep – 1 Nov	6 m shrimp trawl	Thomas.pasterkamp@wur.nl Cc: Loes.bolle@wur.nl

The UK survey ceased in 2010.

6 Population abundance indices (ToR a)

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

Annex 9 and Figures 6.1.1.1–6.1.1.2 present the abundance indices by age for sole and plaice from each of the offshore survey areas separately, updated with the indices for 2012.

The revision history until 2011 can be found in the WGBEAM 2012 report (ICES, 2012;3) and preceding WGBEAM reports.

6.1.1 Sole

North Sea sole

Time-series trends for sole in the North Sea, based on the Netherlands Isis offshore survey, are shown in Figure 6.1.1.1a. This survey indicates that recent year-classes have been mainly poor with seven of the year-classes in the latest decade (2002-2011) below the long-term arithmetic mean at all ages (even below this mean for nine of these year-classes at age 4+, and for eight at ages 1 and 3). The relatively good 2005 year-class, that was already becoming less abundant in the population in 2010-2011, is still visible in 2012 and around the same level as 2011. The 2009 year-class, with an above average number of 1-year olds in 2010 for the first time since 1997, appears clearly at age 3 in 2012 with above average numbers at this age only for the second time since 2000. Also the year class 2010, characterized by numbers-at-age 1 slightly above average in 2011, lives on in the population and becomes visible at age 2 in 2012 (above average for the third time since 2000). However, the number of 1-year olds in 2012 was far below the long-term average and among the lowest values ever recorded. The spatial coverage of the Netherlands Tridens survey makes it unsuitable for monitoring sole abundance.

Time-series trends for sole in the southern North Sea, based on the UK offshore survey, are depicted in Figure 6.1.1.1b. Also here, the number of 1-year olds was far below the long-term mean in 2012 (second lowest value of the series after 1998). The 2009 and 2010 year classes seem less strong in this part of the North Sea compared to the Dutch Isis survey area, both being around average at age 1 but below average at age 2. The 2009 year class however does appear above average at age 3 in 2012. The disappearing of the good year class 2005 is confirmed by this UK survey.

Area VII sole

The indices for sole from area VII stocks are summarized in Figure 6.1.1.1c-f.

Division VIId

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. The numbers of 1 and 2 year olds were far below the long-term averages in this year, with the number of 1 year olds (the incoming year class 2011) being the third lowest of the time-series. The 3 year olds have decreased significantly in abundance in 2012 to a value around the average, creating the perception that the relatively good 2009 year class is already slowly disappearing from the population. The very good 2008 year class (second highest of the

time-series) now appears in the 4+ group, extending the relatively constant pattern of the relative abundance of this age group since 1999. In contrast 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 VIIe

In the western English Channel, sole shows basically the same trends as observed in the Eastern English Channel. In this Division, relative abundances for 2012 are below the time-series averages for ages 1 and 2, with the number of 1-year olds (incoming year class 2011) being the lowest of the series in this case. The 3-year olds have decreased in abundance in 2012 compared to the exceptionally large number of 2011, but are still above the long-term average (and around the values of 2007-2010) so the 2009 is still noticeably present in the population in this area. The large numbers in the 4+ group in 2012 (around the highest value ever observed), and the preceding large numbers of 3-year olds in 2011 and 2-year olds in 2010, can be less easily explained as the recruitment-at-age one (2008 year class) was not higher than in the surrounding years in 2009. The phenomenon of 1-group peaks not following through at older ages in the subsequent years has been noticed before in this area, namely with respect to the good incoming year classes 1995 and 2002 (visible at age 1 in 1996 and 2003 respectively).

Division VIIf

The relative abundances for most of the age groups of sole in the Bristol Channel are at or above time-series averages in 2012. However, the abundance of the 3 group is very low, which reflects the low 1 group abundance recorded in 2010 that was also visible at age 2 in 2011 (the very poor year class 2009, lowest of the time-series at all of the ages 1-3). The abundance of the 4+ group in 2012 was around the same level of the value recorded in 2011 (being the third highest value of the time-series), although this 2008 year class was not picked up as exceptionally strong at age 1 in 2009. The incoming recruitment-at-age 1 was around the long-term average in 2012.

Division VIIa

Of all VII sole stocks, sole in the Irish Sea is clearly in the worst shape according to the beam trawl survey carried out in this Division. This is especially so for the ages 1-3, although the abundances have been below the time-series means for all age groups since 2005. The small increase documented for the 1 group in 2011 meant a small increase at age 2 in 2012, but all cited values are far below the long-term averages. The abundance at age 3 (year class 2009) in 2012 is the lowest of the time-series for this age. The numbers for the 4+ group however remain more or less stable at the low 2005-2011 level. As for most other sole stocks, peaks in the abundance of 1 groups can generally be tracked through to following years.

Northern Adriatic Sea sole

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

This survey indicates that the 2012 0 age-group of sole in the northern Adriatic has been at the level of the long-term arithmetic mean (the abundances at this age have only been substantially below the mean in 2006 and 2010). At age 1, the 2012 cruise yielded the highest index value of the time-series and the abundance was also above the long-term arithmetic mean for age 2 in this year. Age-groups 3–4+ showed lower values than the averages for these ages in 2012, what has been consistently so since 2009. The abundance of the 4+ group now dropped to the lowest value of the time-series.

6.1.2 Plaice

North Sea plaice

Figures 6.1.1.2a and 6.1.1.2b 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 1-year olds in 2002, and this was also the case in 2012. Only in 2009 and 2011, the observed number of 1-year olds was higher than the long-term mean. The Tridens survey confirmed the strong 2001 year class, but also documented a series of six consecutive incoming year classes that were above average from 2007 onwards (including 2012), although the value of 2012 is only marginally above the average and represents a serious drop after the all-time high of 2011. This pattern is visible at all ages in this survey, and the cohorts can be tracked over time really well. In the more inshore Isis survey this was only the case to a lesser extent, with above average abundances since 2007 only for age 4+. The combined Isis-Tridens index (Figure 6.1.1.2c) shows above average numbers-at-ages 2-4+ in 2012, with an increasing trend since the beginning of the 21st century, but the new incoming year class 2011 appeared as below average in 2012. It is not clear where the larger numbers of 4-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 6.1.1.2d), tells a different story for the southern North Sea. Here, the high incoming year classes 2006 and 2007 are apparent as the biggest in recent years. Consistent with the Dutch surveys is that also the above average incoming year class 2010 (one year olds in 2011) was picked up, and that the number of incoming recruits at age 1 (year class 2011) dropped below the long-term average (second lowest value of the time-series).

Area VII plaice

The indices for plaice from area VII stocks are summarized in Figure 6.1.1.2e-h

Division VIId

After a period in which the relative abundances have steadily increased for all age groups over 4-5 consecutive years, this trend was only continued for age 3 in 2012. The abundance at age 1 dropped substantially to a value just below the long-term arithmetic mean (year class 2011) in this year, while the abundances at ages 2 and 3 still remain the second highest value and the time-series peak respectively as a result of the good year classes 2009 and 2010. Also the numbers-at-age 4+ (year class 2008)

are still well above average but lower than in the previous year. Cohorts can be generally well tracked into all or some of the following years in this survey.

Division VIIe

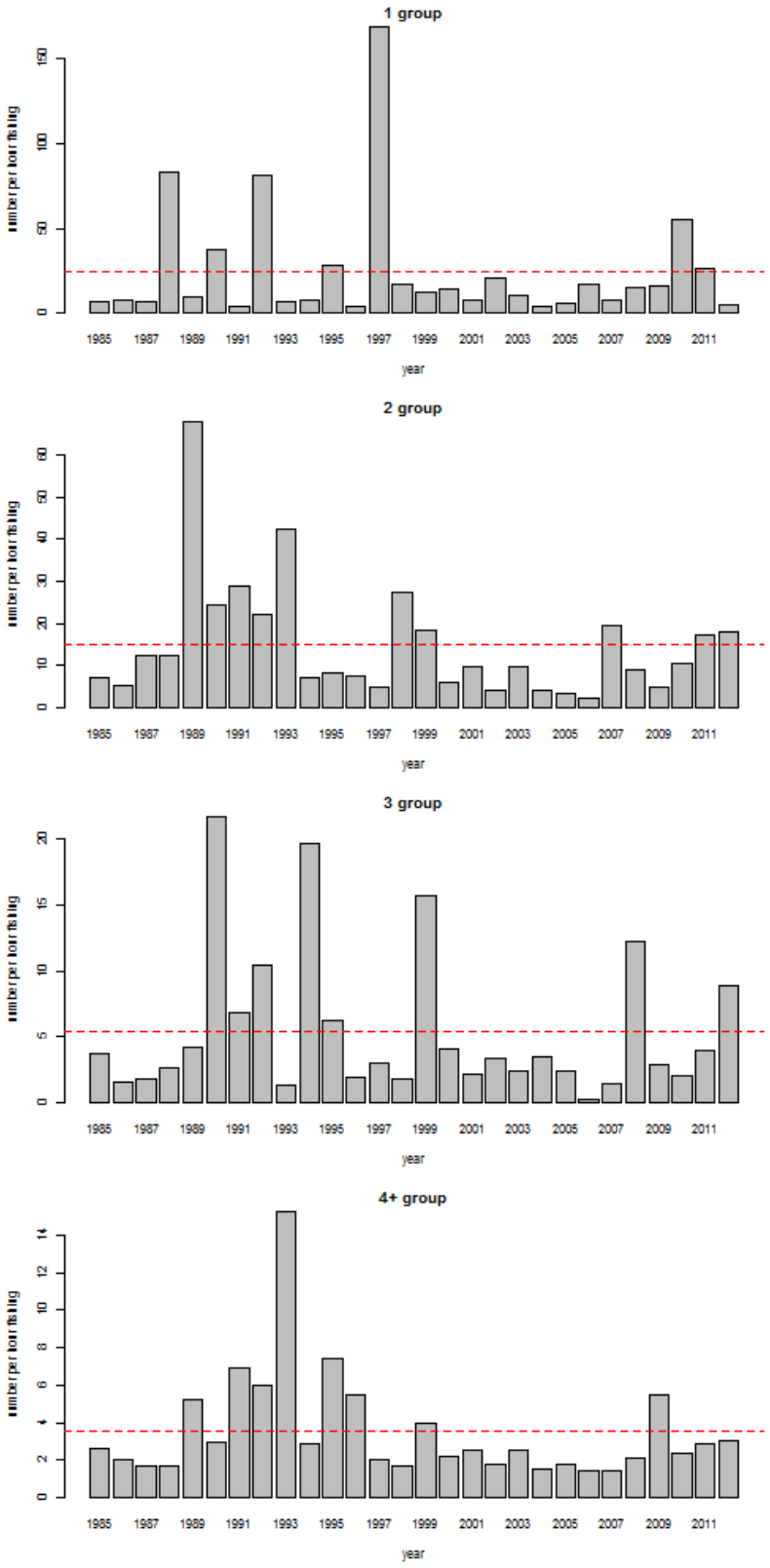
As for the VIId plaice stock, the relative abundance in VIIe for all age groups has increased in the last few years (2008-2011), but stopped doing so for ages 1 and 2 in 2012. The number of 1-year olds was the third lowest of the time-series in this year, and the drop in numbers of 2 year olds compared to 2011 is unexpected given the absolute peak of 1-year olds observed in 2011. On the other hand, the abundances at ages 3 and 4+ were the highest of the time-series in 2012. This can be easily understood as a continuation of the good year classes 2008 and 2009, although the year class 2008 was only picked up at ages 2 and 3 (in 2010 and 2011) and completely not so at age 1 (in 2009). Before these recent years the correlation of year groups from one year to the next was poor in this survey.

Division VIIf

As in all the above mentioned plaice stocks (with 2-4 years of high recruitments at age 1), the relative abundance at age 1 dropped considerably for plaice in the Bristol Channel, reaching a below average value in this case. The good year classes 2009 and 2010 can be tracked over the years, and produce time-series peaks of two and three year olds in 2012. The numbers in the 4+ group remain at the same level as in 2010-2011, and are well above average for four consecutive years now. Before that, this age group consistently numbered around the mean average abundance of the time-series. 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.

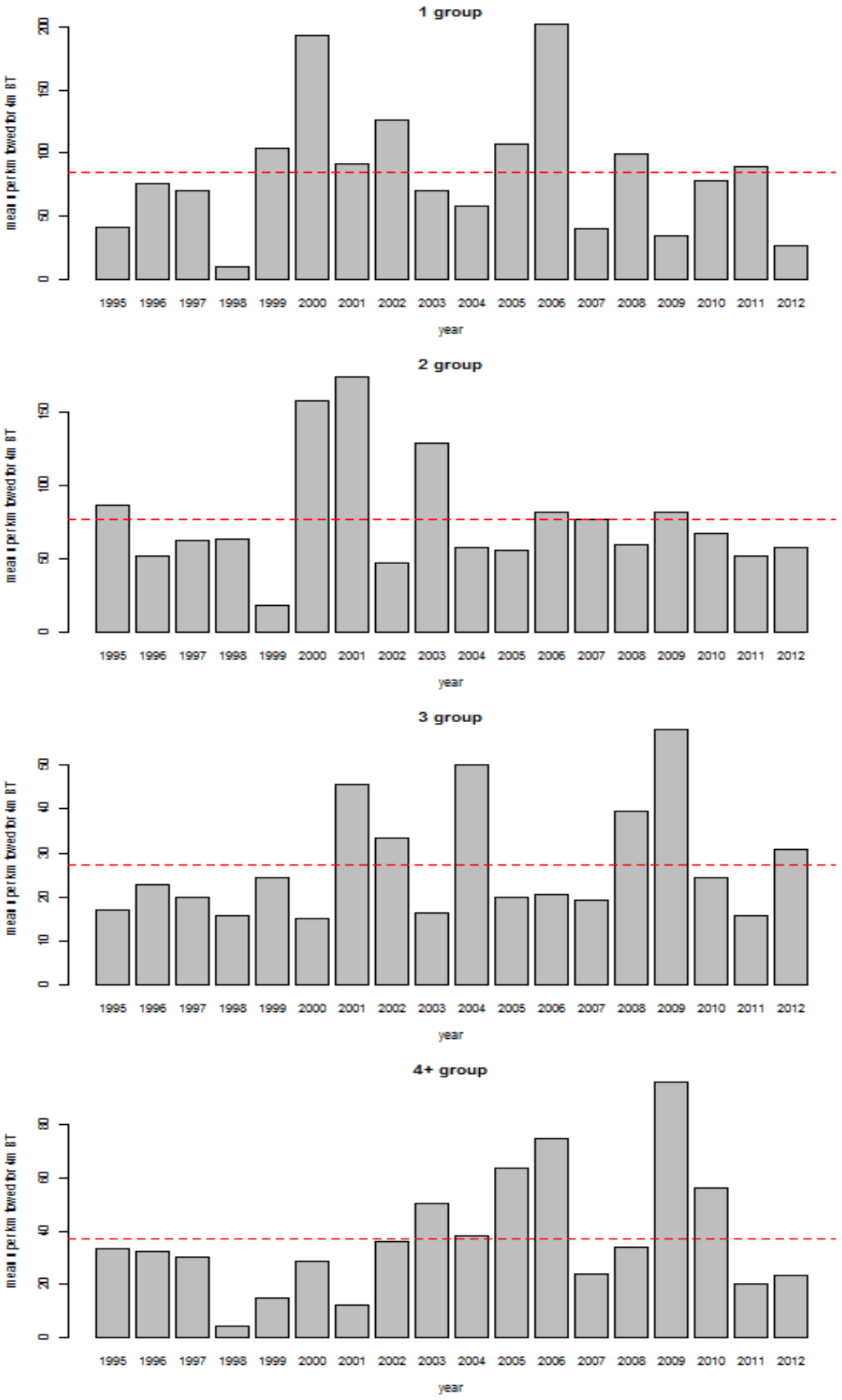
Division VIIa

Plaice in the Irish Sea is the only of the covered plaice stocks for which the abundance at age 1 did not drop significantly in 2012 compared to the preceding years. In this case, this abundance remained at the level of 2010-2011 and among the highest values 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. As opposed to sole in this area, place in VIIa seems to be characterized by a healthy stock status, with numbers for the 4+ group in 2010-2012 being the highest of the time-series. Cohorts can be tracked relatively well over consecutive years in this survey.



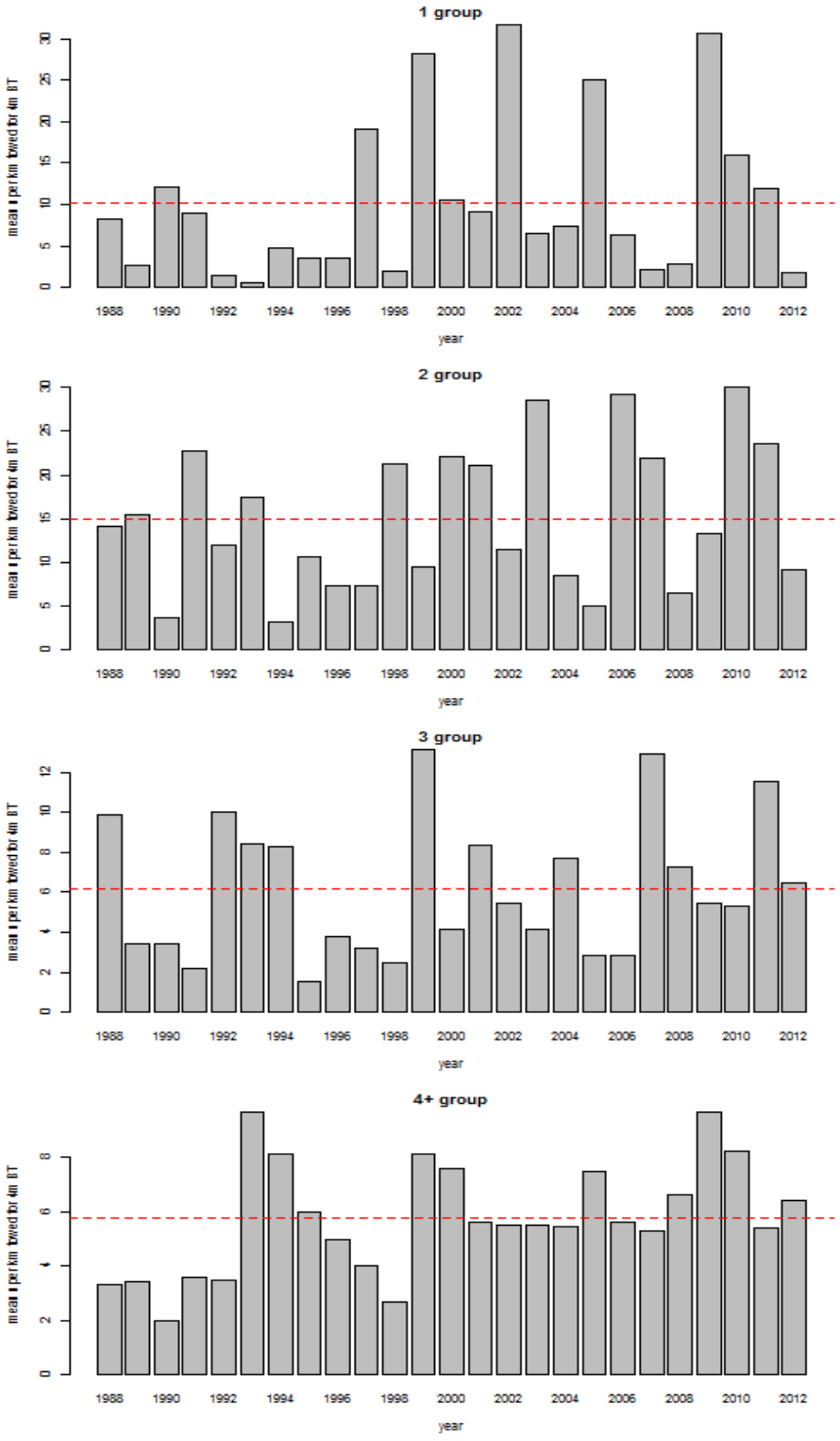
a) Netherlands: sole (N.hr^-1/8m trawl) North Sea (IV) RV "Isis"

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



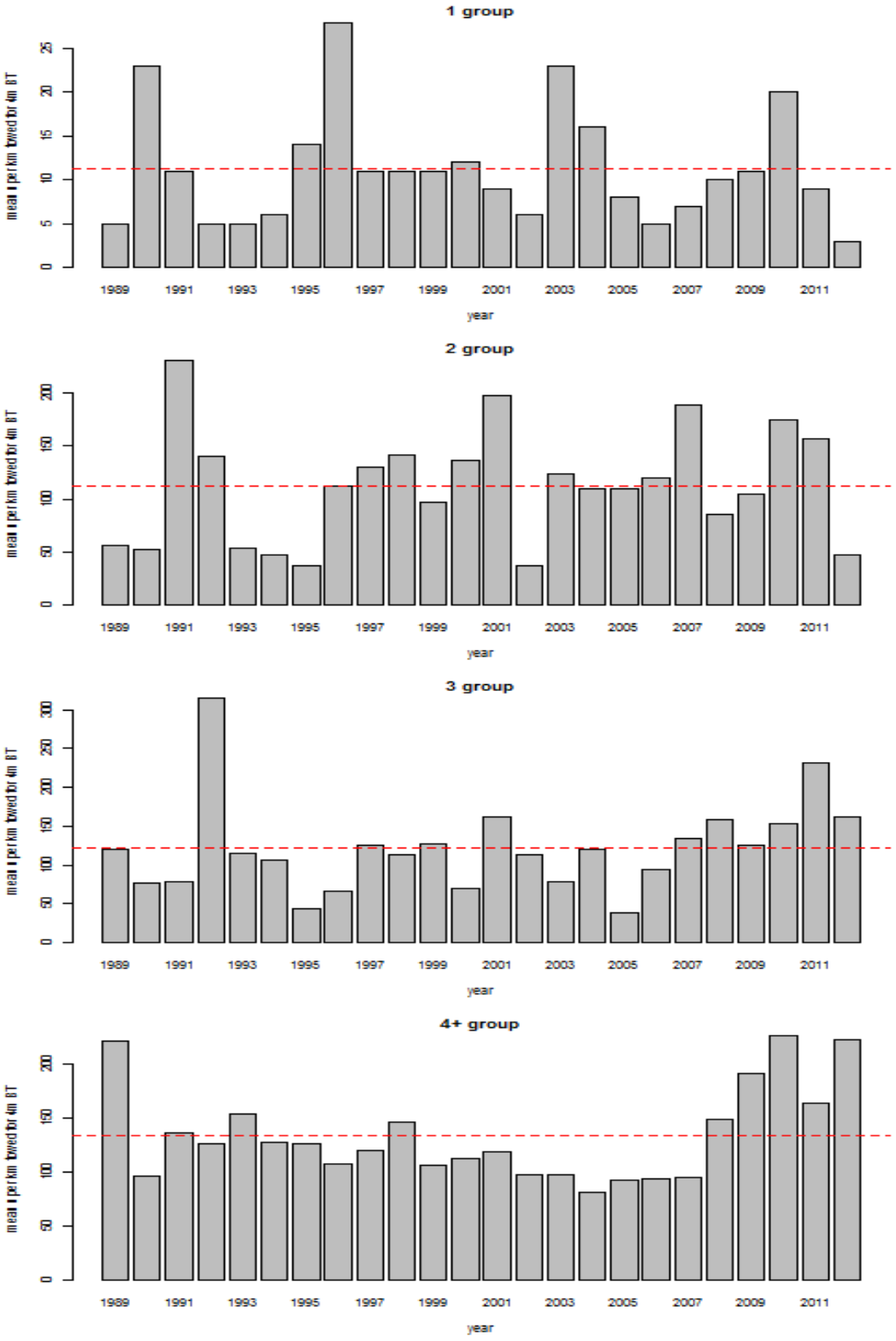
b) UK: sole (mean numbers per km towed for 4m beam trawl) southern North Sea (IVc)

Figure 6.1.1.1. Continued.



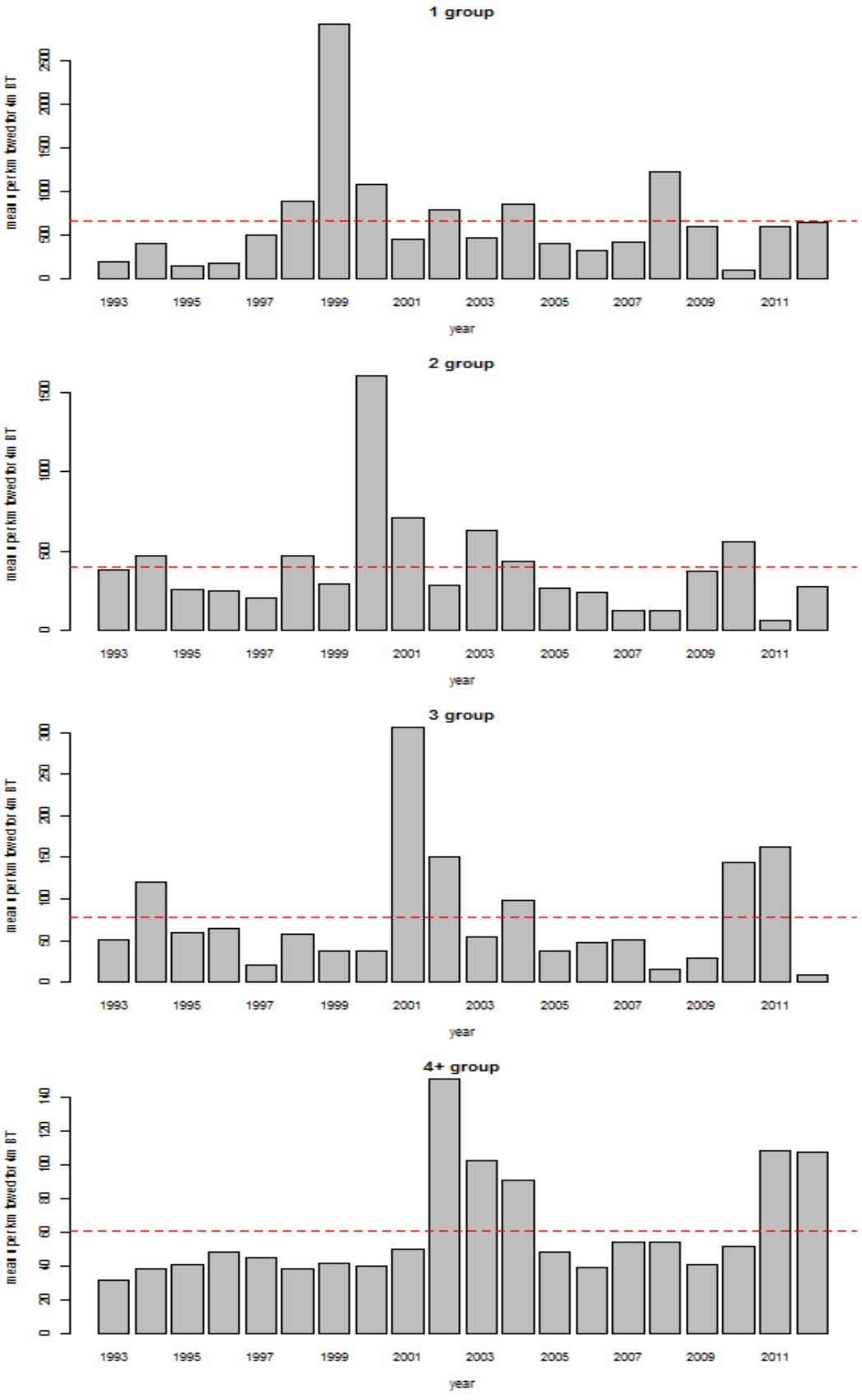
c) UK: sole (N.hr^-1/8m beam) eastern English Channel (VIId)

Figure 6.1.1.1. Continued.



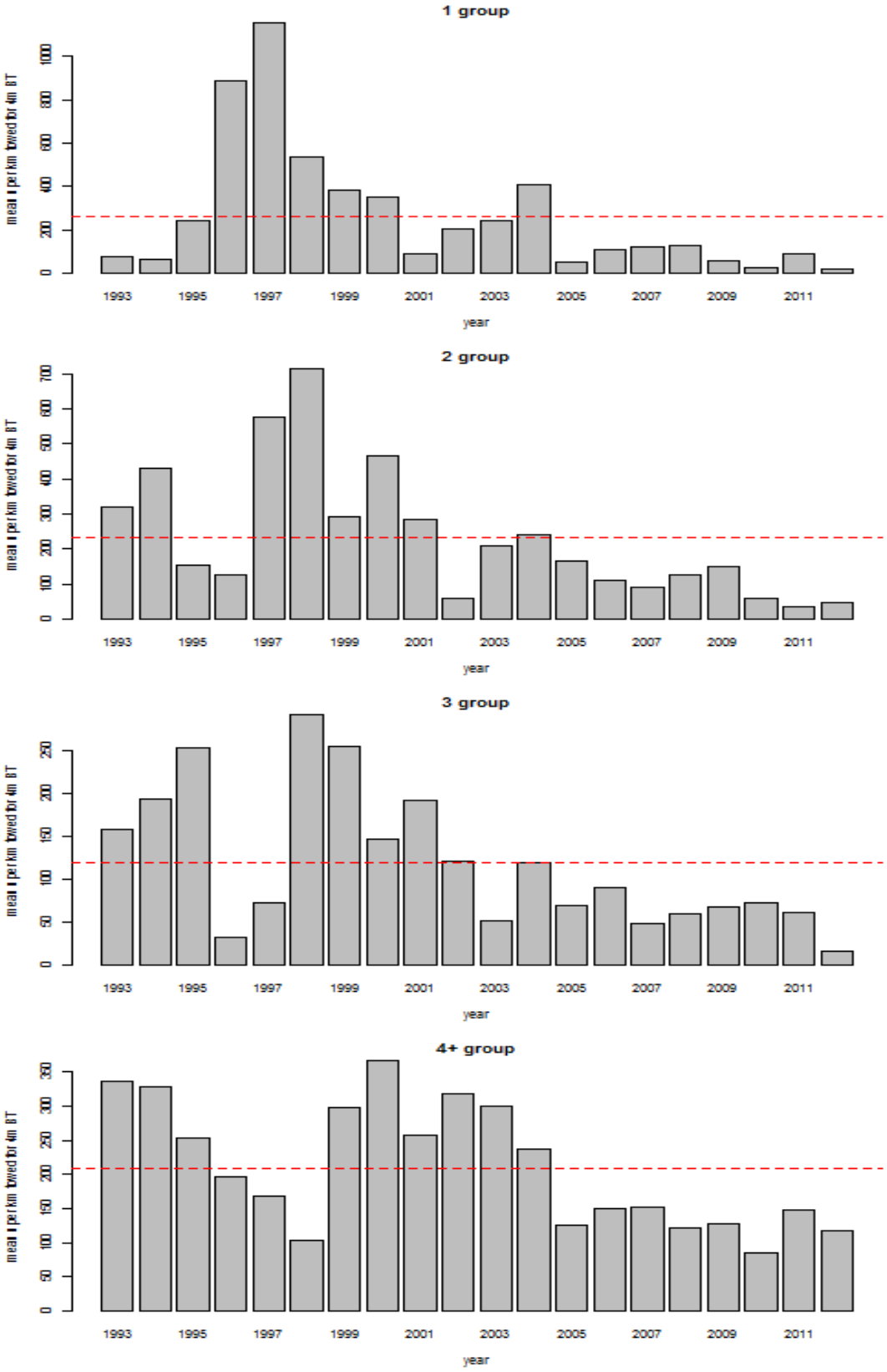
d) UK: sole (mean numbers per km towed for 2*4m beam trawl) western English Channel (VIIe)

Figure 6.1.1.1. Continued.



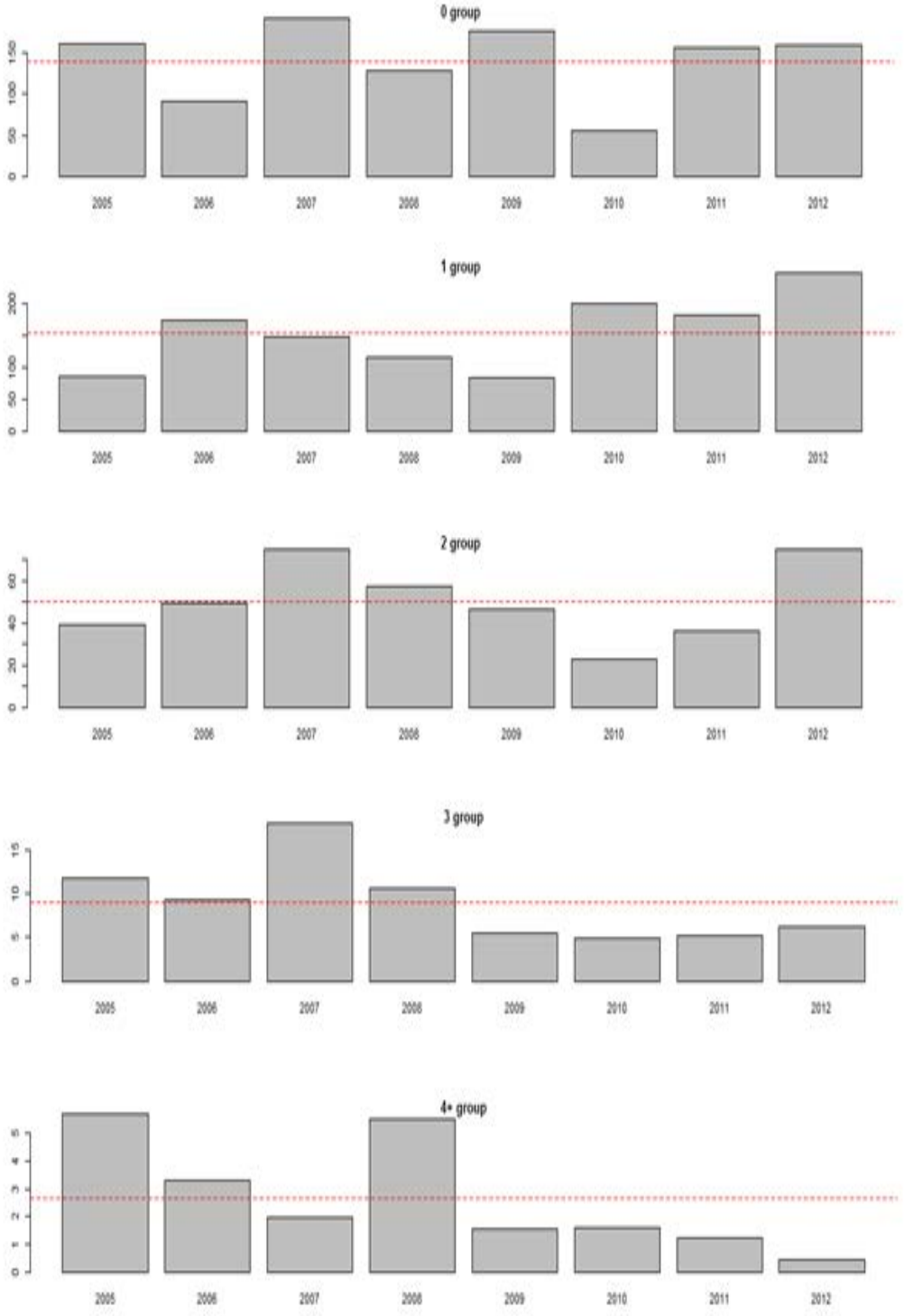
e) UK: sole (mean numbers per km towed for 4m beam trawl) Bristol Channel (VIIf)

Figure 6.1.1.1. Continued.



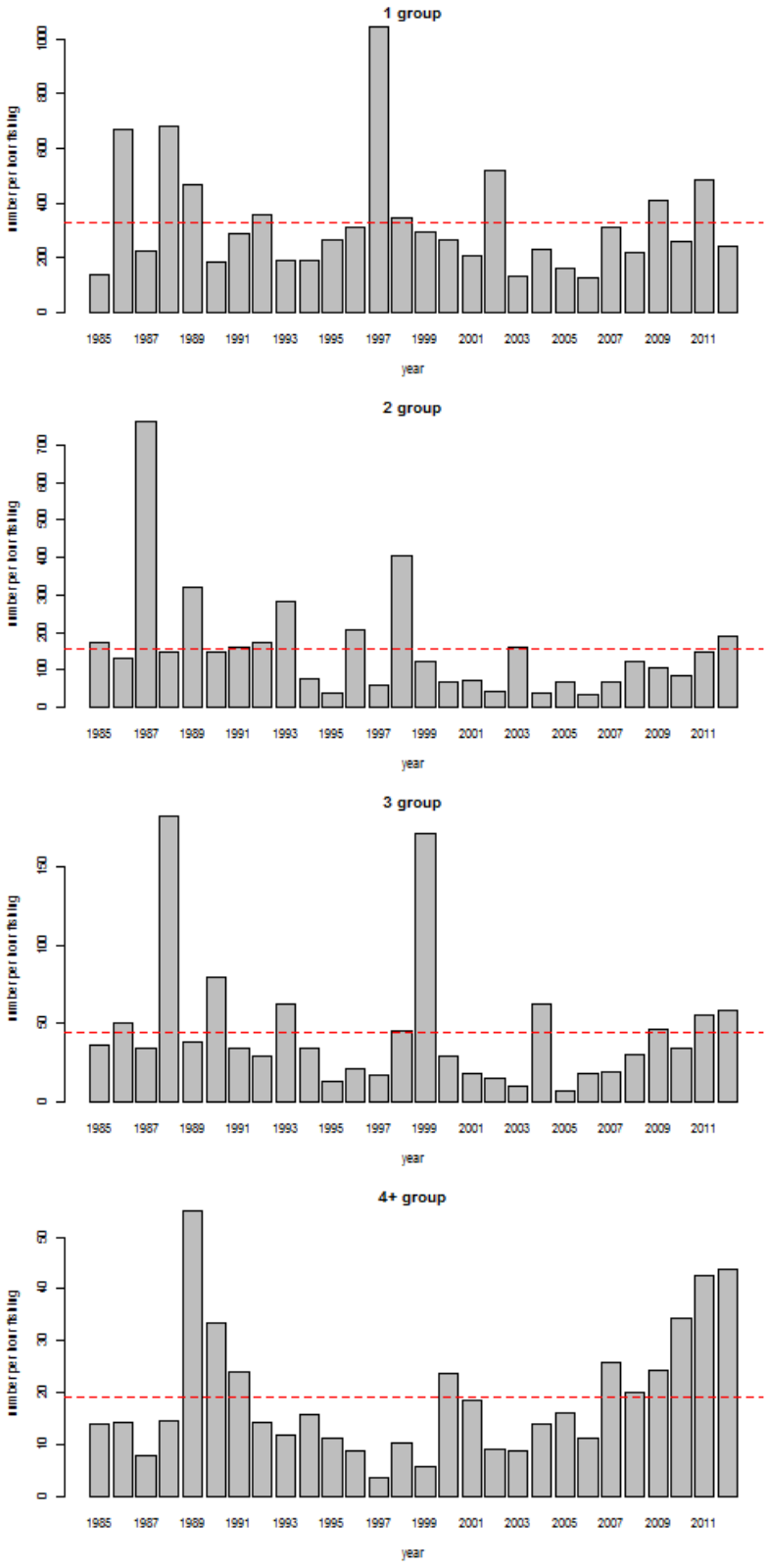
f) UK: sole (mean numbers per km towed for 4m beam trawl) eastern Irish Sea (VIIa)

Figure 6.1.1.1. Continued.



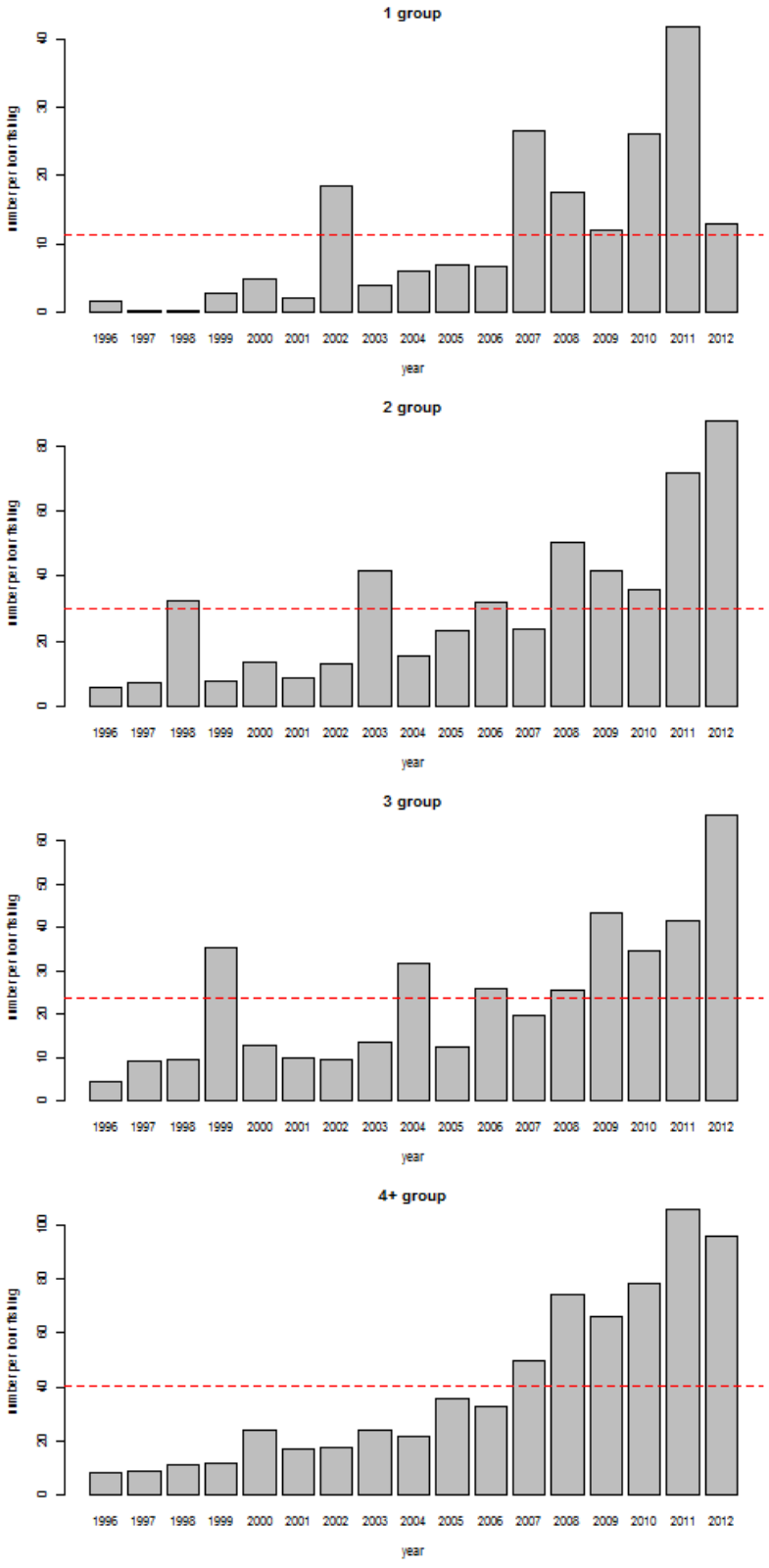
g) Italy: Catch rate of sole from the Adriatic beam trawl survey. (horizontal line = long-term mean for the period presented).

Figure 6.1.1.1. Continued.



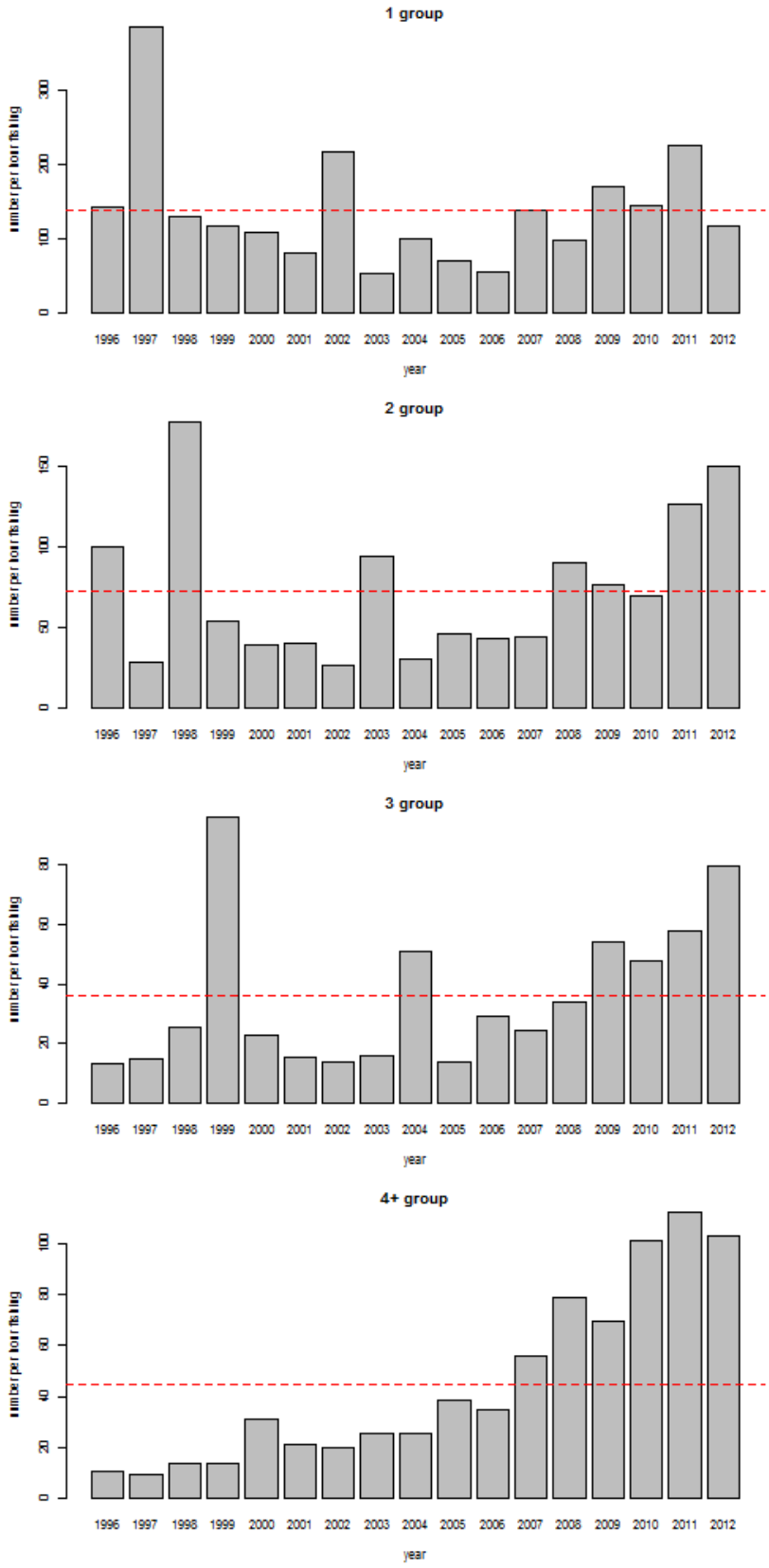
a) Netherlands: plaice (N.hr^-1/8m trawl) North Sea (IV) RV "Isis"

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



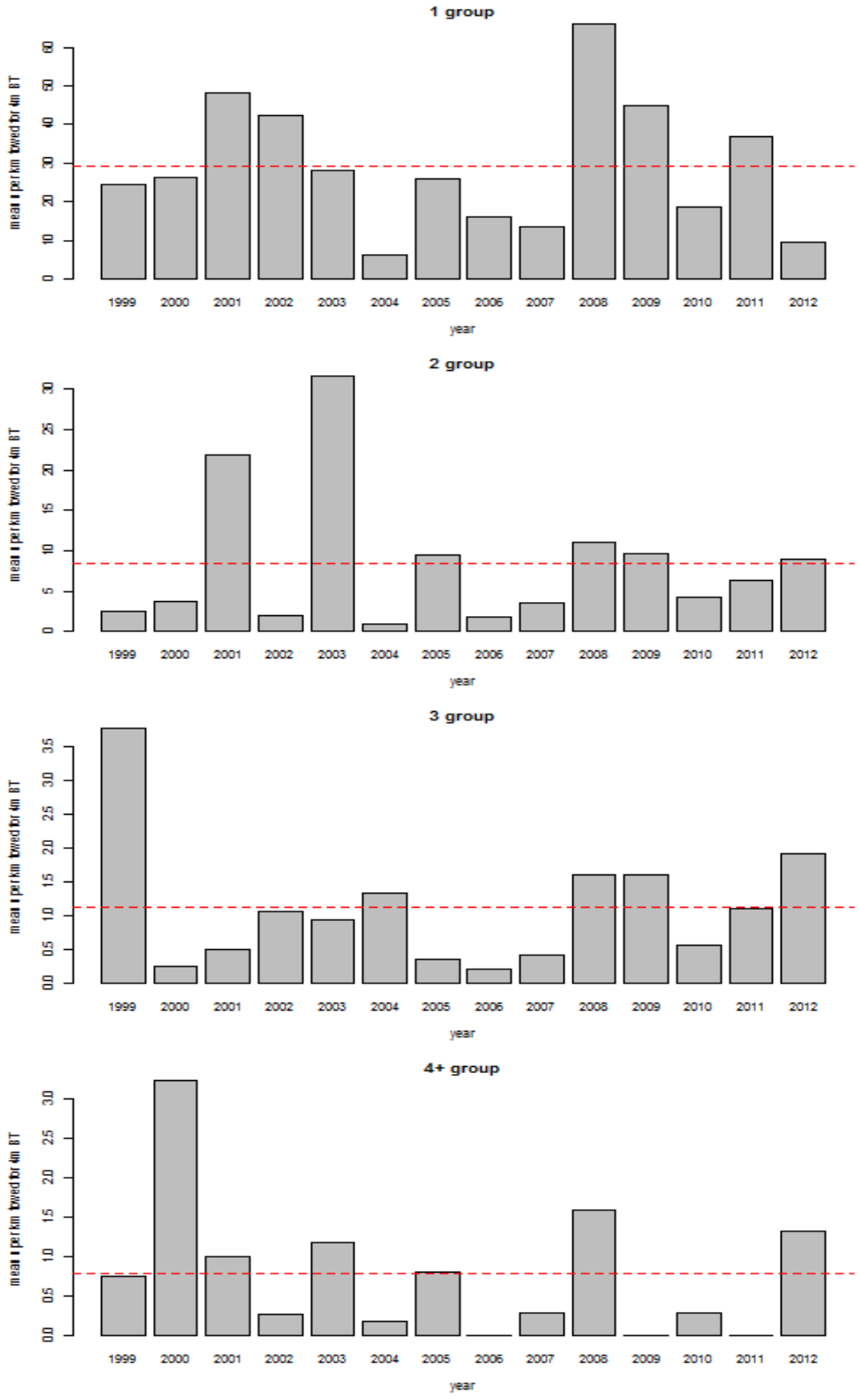
b) Netherlands: plaice (N.hr^-1/8m trawl) North Sea (IV) RV “Tridens”

Figure 6.1.1.2: continued.



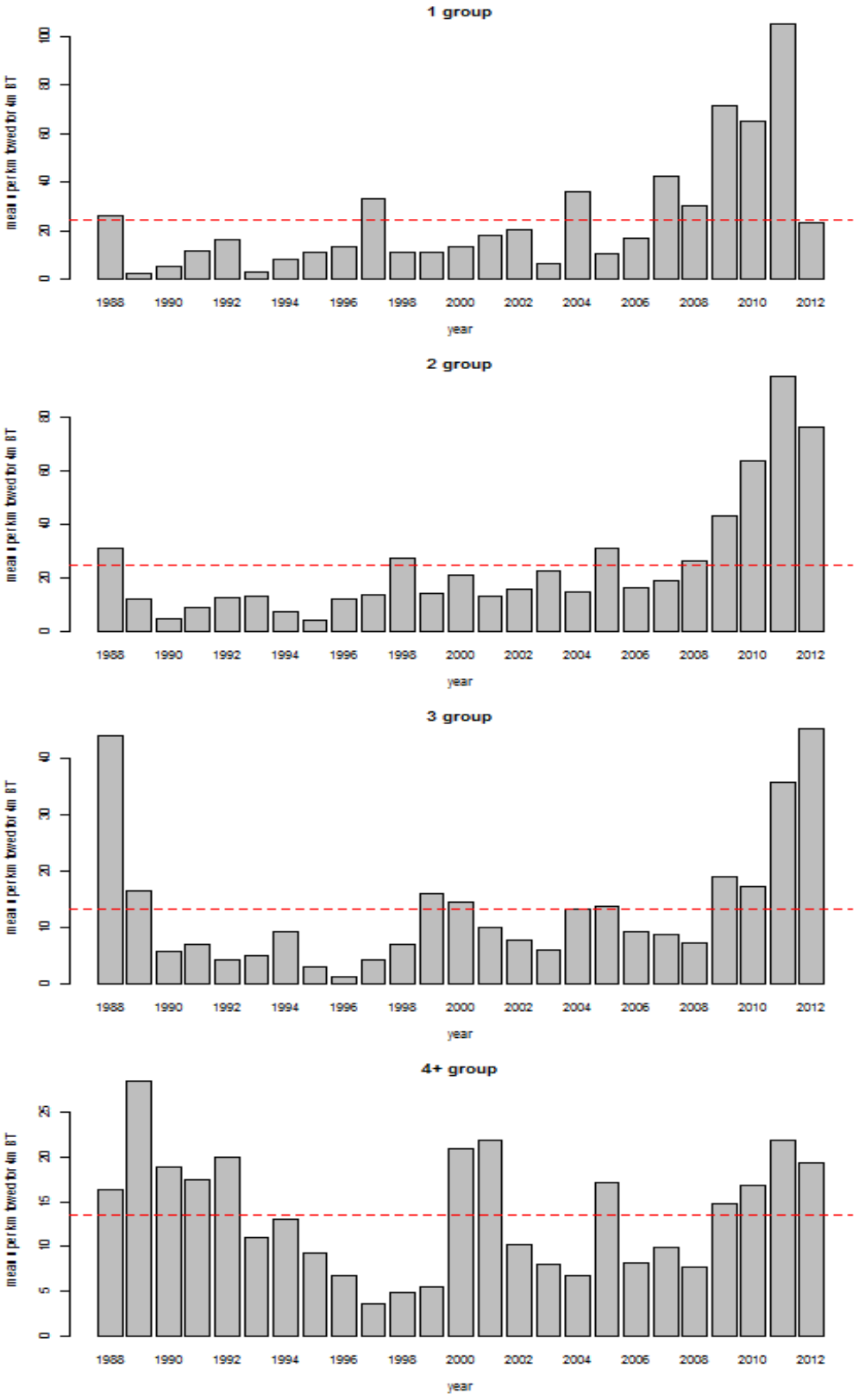
c) Netherlands: plaice (N.hr^-1/8m trawl) North Sea (IV) RV “Isis” and RV “Tridens”

Figure 6.1.1.2: continued.



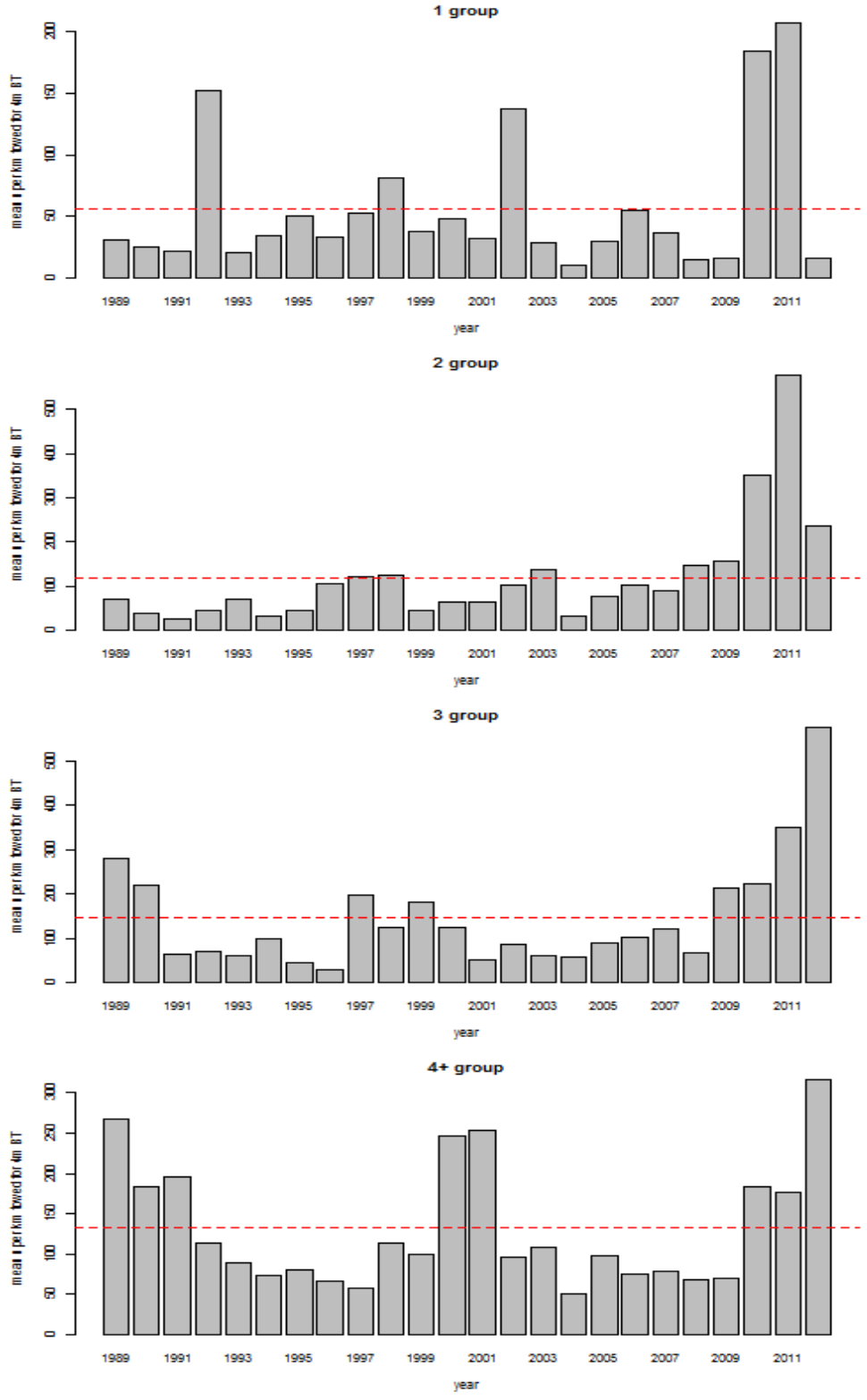
d) UK: plaice (mean numbers per km towed for 4m beam trawl) southern North Sea (IVc)

Figure 6.1.1.2: continued.



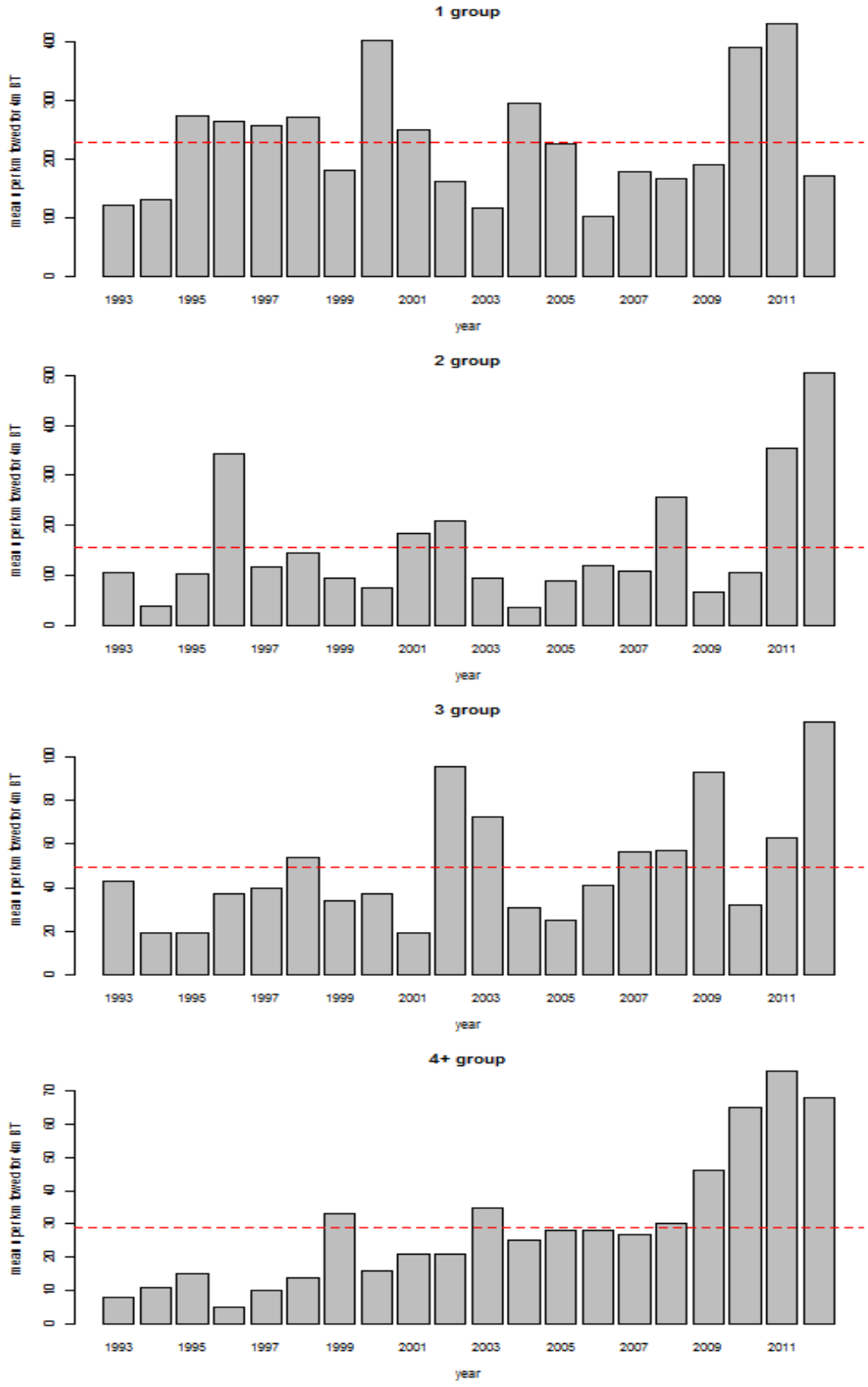
e) UK: plaice (N.hr^-1/8m beam trawl) eastern English Channel (VIId)

Figure 6.1.1.2: continued.



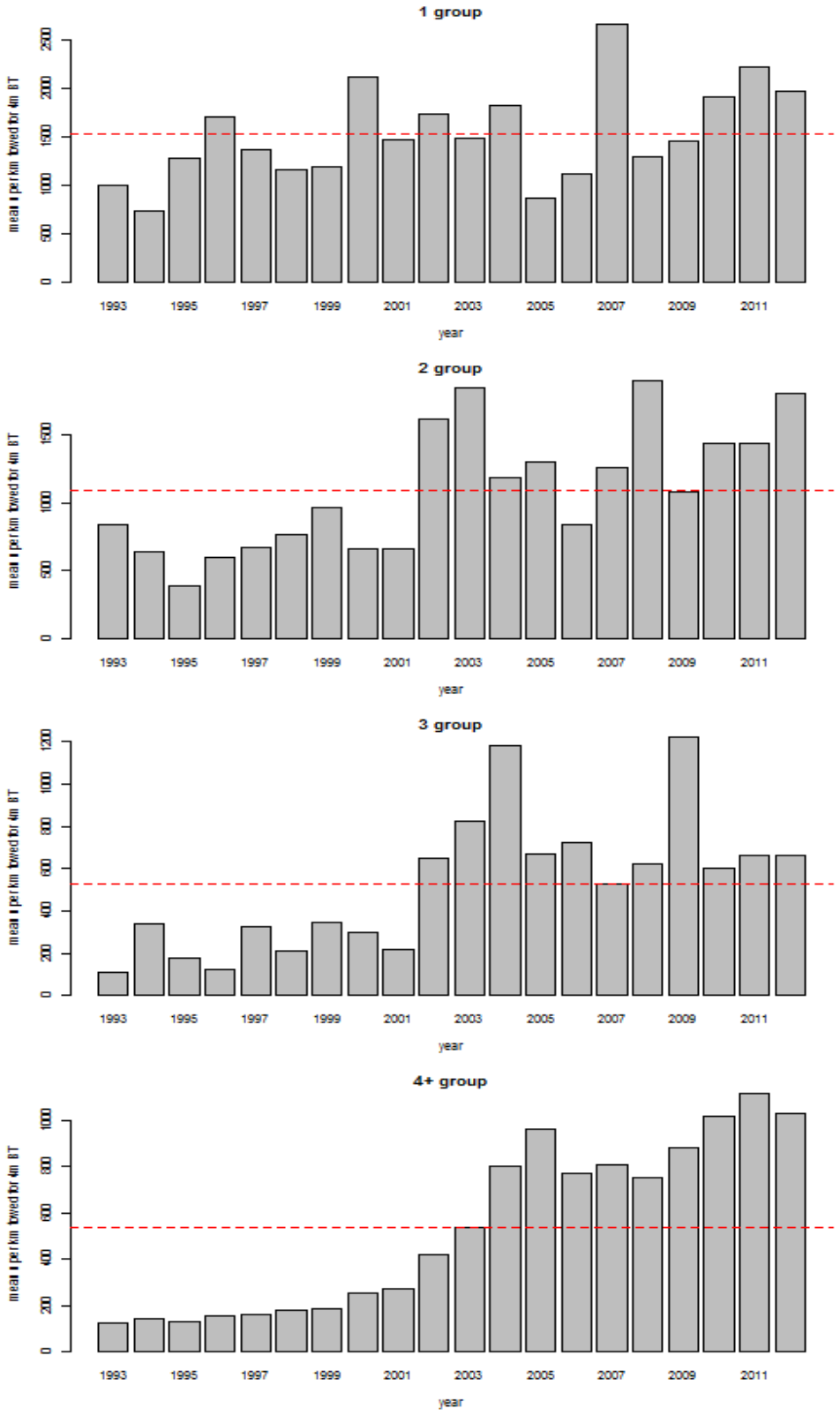
f) UK: plaice (mean numbers per km towed for 2*4m beam trawl) western English Channel (VIIe)

Figure 6.1.1.2: continued.



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

Figure 6.1.1.2: continued.



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

Figure 6.1.1.2: continued.

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

6.2.1 Population abundance indices

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 abundance indices are presented in Annex 12. The SNS indices and the combined inshore indices are plotted for 1990 to 2012 in Figures 6.2.1.1 and 6.2.1.2.

The combined inshore indices for 0 and 1 group, plaice and sole in 2012 were below average. Compared to 2011, the abundance indices have increased for 0 group plaice, decreased slightly for 0 group sole, decreased for 1 group plaice and strongly decreased for 1 group sole.

The SNS indices also showed a decrease in abundance of 1 group plaice and 1 group sole. A slight increase in abundance was observed for plaice age groups 2 to 4, whereas a decrease was observed for sole age groups 2 to 4. The results for plaice correspond to the BTS-Isis indices, but the results for sole do not; the BTS-Isis indices indicate an increase in abundance of 2-4 group sole. In 2012, the SNS was carried out on the RV Tridens instead of the RV Isis due to technical problems with the Isis. This change in vessel may have caused a bias in the SNS abundance indices.

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 XSA models. 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.

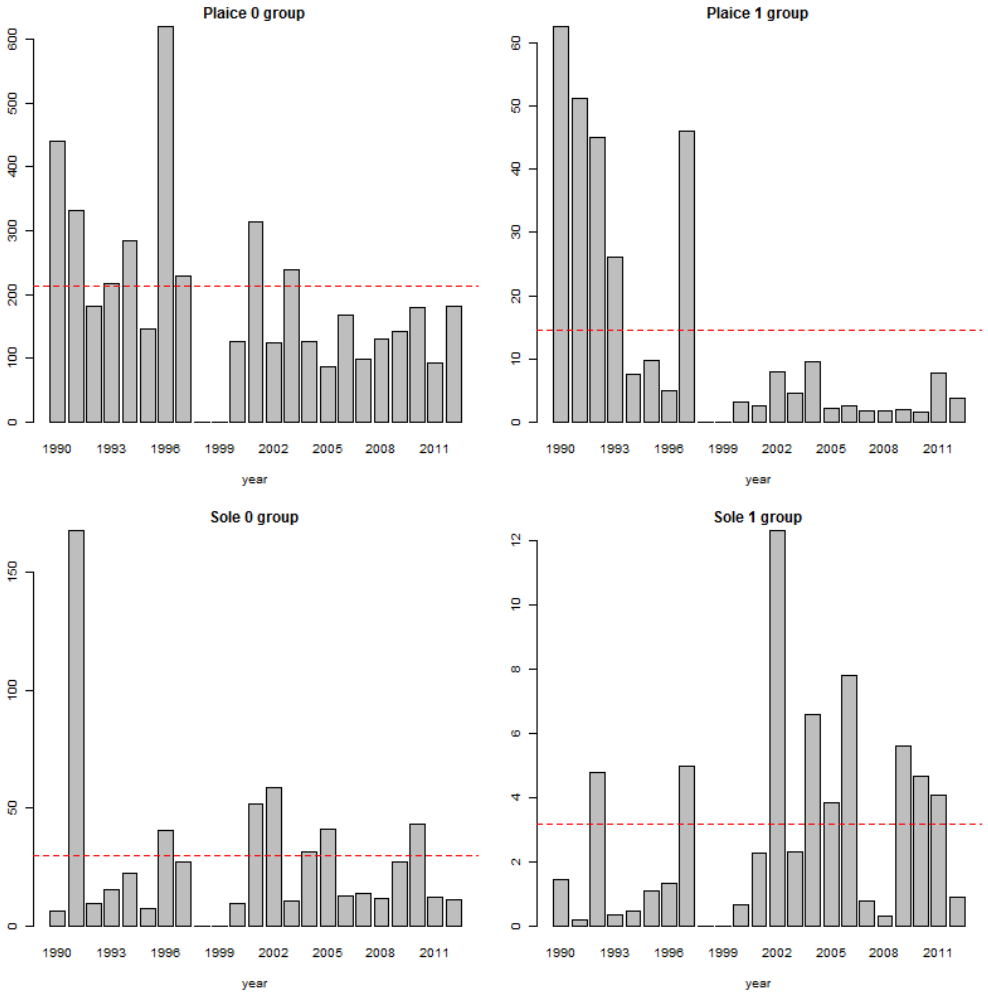


Figure 6.2.1.1. Combined inshore indices for 0 and 1 group plaice and sole. The horizontal line is the long-term mean for the period presented. The indices were declared to be in invalid in 1997 and 1998, due to insufficient coverage of the Dutch survey.

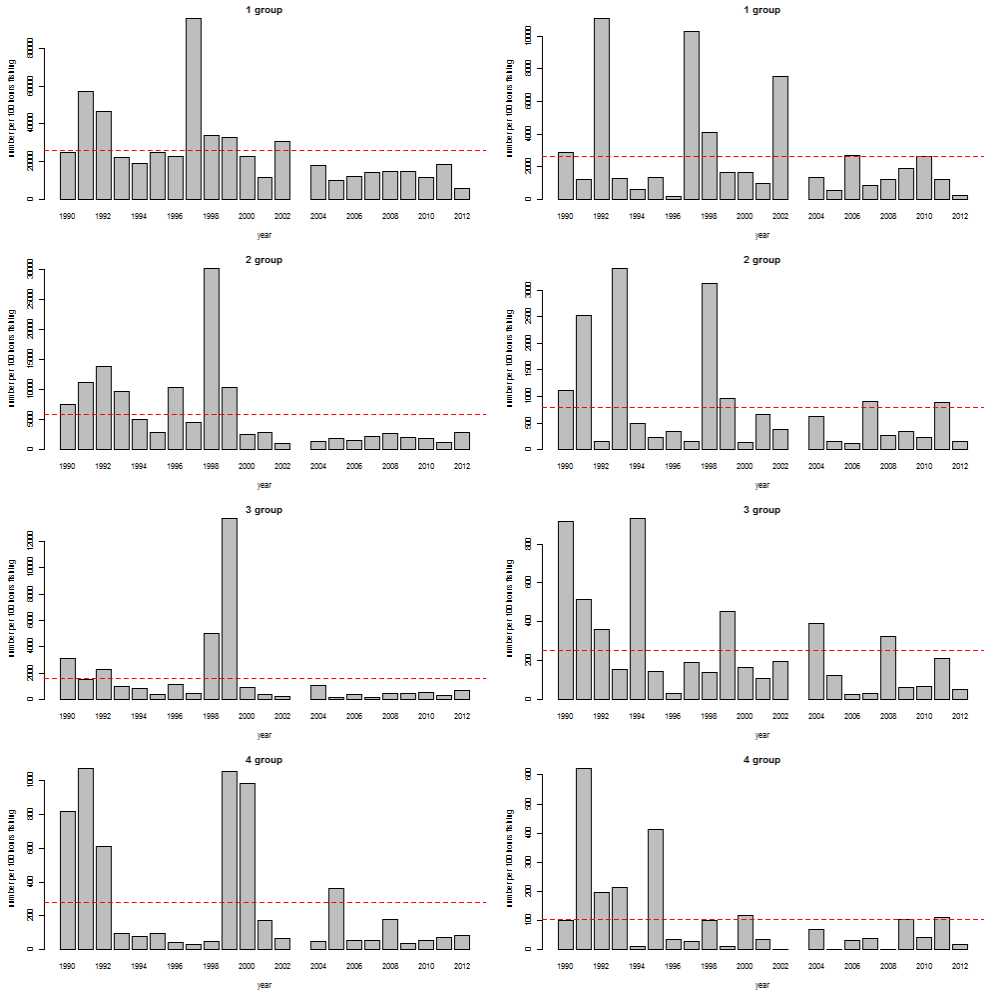


Figure 6.2.1.2. SNS indices for 1 - 4 group plaice (left) and sole (right), in numbers per 100 hours fishing. The horizontal line is the long-term mean for the period presented.

6.2.2 Revision of the inshore indices

The termination of the UK YFS necessitated revision of the combined inshore indices. Furthermore, the combined 1 group indices had not been calculated since 2005 because of the termination of the German DYFS spring survey. Other issues have been (and will be) addressed in the revision process.

The following issues were addressed during the 2012 revision:

1) Dutch DFS indices: Correction of age data, specifically for plaice in survey years 1996 and 1997 (i.e. year class 1996).

2) Dutch DFS indices: Revision of the area-based weighting factors using new surface area estimates. This included reconsideration of setting the weighting factor to zero for depth strata which were sampled insufficiently or inconsistently, and reconsideration of the areas included in the indices.

3) Combined inshore indices: Reduce the surveys included in the combined indices, due to termination of surveys. Revision of the area-based raising factors using new surface area estimates.

The effects of the above mentioned changes were examined in the 2012 report of WGBEAM (ICES, 2012).

Since the 2012 WGBEAM meeting, surface areas by depth class were re-estimated for the Belgian survey area (Annex 10). The area-based weighting for calculation of the Belgian (Table 6.2.2.1) and the raising factors for the combined inshore indices were revised accordingly (Table 6.2.2.2). Previously, the 0-5 m depth class was excluded in the calculation (weight = 0), due to insufficient sampling. This depth class has now been included, as it has been sampled adequately since 1983 (Annex 12). Consequently, the Belgian time-series is now calculated from 1983 onwards. The >20m depth class was and still is excluded from the Belgian index calculation. The new time-series is considered to be an improvement compared to the old time-series, due to better spatial coverage (i.e. 0-5m depth class) and better surface area estimates. The differences between the new and old time-series are small (Figure 6.2.2.1).

Table 6.2.2.1. Weighting factors by depth class for the Belgian DYFS.

Region	area code	Country	0-5m	5-10m	10-20m	>20 m	**Total**
Belgian Coast	400	BE	0.108	0.459	0.434	0*	1.000

* surface area > 0 km^2, but no weight (due to insufficient sampling)

Table 6.2.2.2. Previous and current raising factors (surface area estimates in km^2) for calculation of the combined inshore indices.

Country	ICES 1985	present
Belgian DYFS	1661	1472
German DYFS	1559	1919
Dutch DFS	16484	11007
UK YFS	6994	-

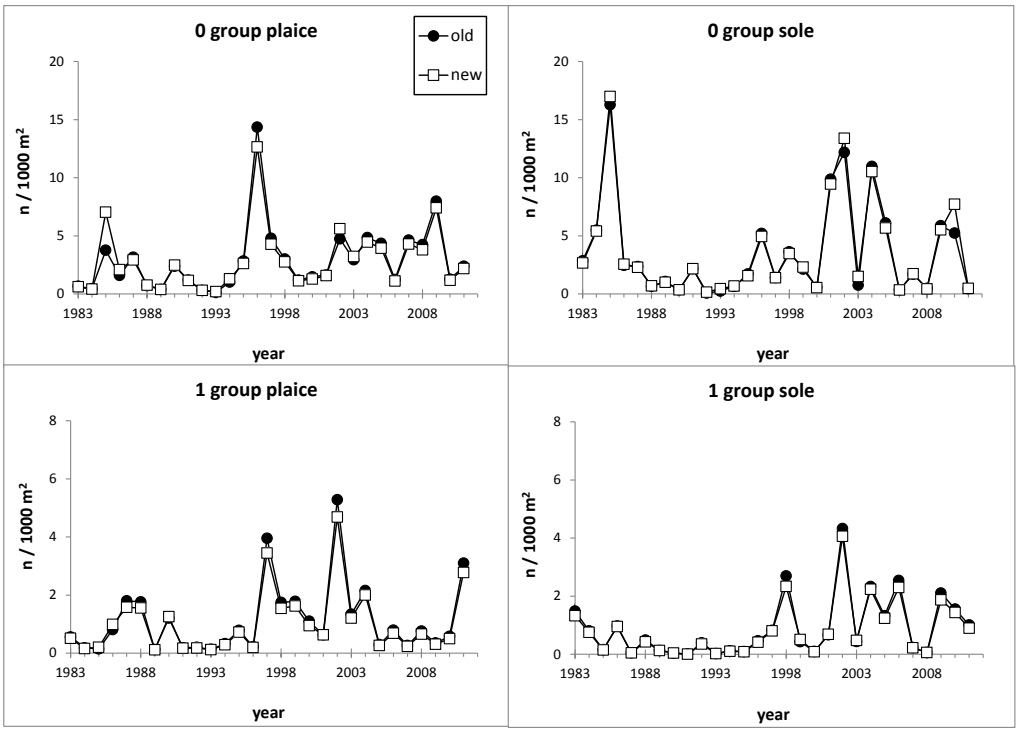


Figure 6.2.2.1. Belgian DYFS indices for 0 and 1 group plaice and sole, before and after revision.

6.2.3 Evaluation of the (combined) inshore indices

The Dutch DFS and Belgian DYFS are calculated using area-based weighting factors, whereas no weighting is applied for the calculation of the German DYFS indices. Updated surface area estimates are available for all 3 surveys (Annex 10).

The German DYFS areas 412-414 are not included in the index calculation, while these areas appear to have a good coverage since 1979 (Annex 12).

WGBEAM recommends the following actions:

1) Before WGBEAM 2014, Germany reconsider which areas are included in the German DYFS indices and update appropriately.

2) Reconsider not applying area-based weighting for the German DYFS indices.

3) Revise the combined inshore indices using the revised German indices.

6.3 Investigations on the Bay of Biscay sole abundance index

6.3.1 Creation of time-series for the ORHAGO survey in the Bay of Biscay sole

The ORHAGO time-series is now long enough (6 years in 2012) to show the trends in sole for the Bay of Biscay by age group (Figure 6.4.1). For each age, two time-series are available, one carried out during daylight and one during night. They are based on a set of reference stations (6.3). Both series show close age group strengths in every year, except at age 0 which is an age for which the ORHAGO survey results must be considered as imprecise. At other ages, the large 2007 year class can be followed from 2008 at age 1 to 2012 at age 5. However, this year class is lower at age 4 (in 2011) than the following 2008 year class (that has lower index values at the youngest ages than the 2007 one) at the same age in 2012. It is not clear what causes this surprising observation and the strength of age groups 6 to 8+ in 2012.

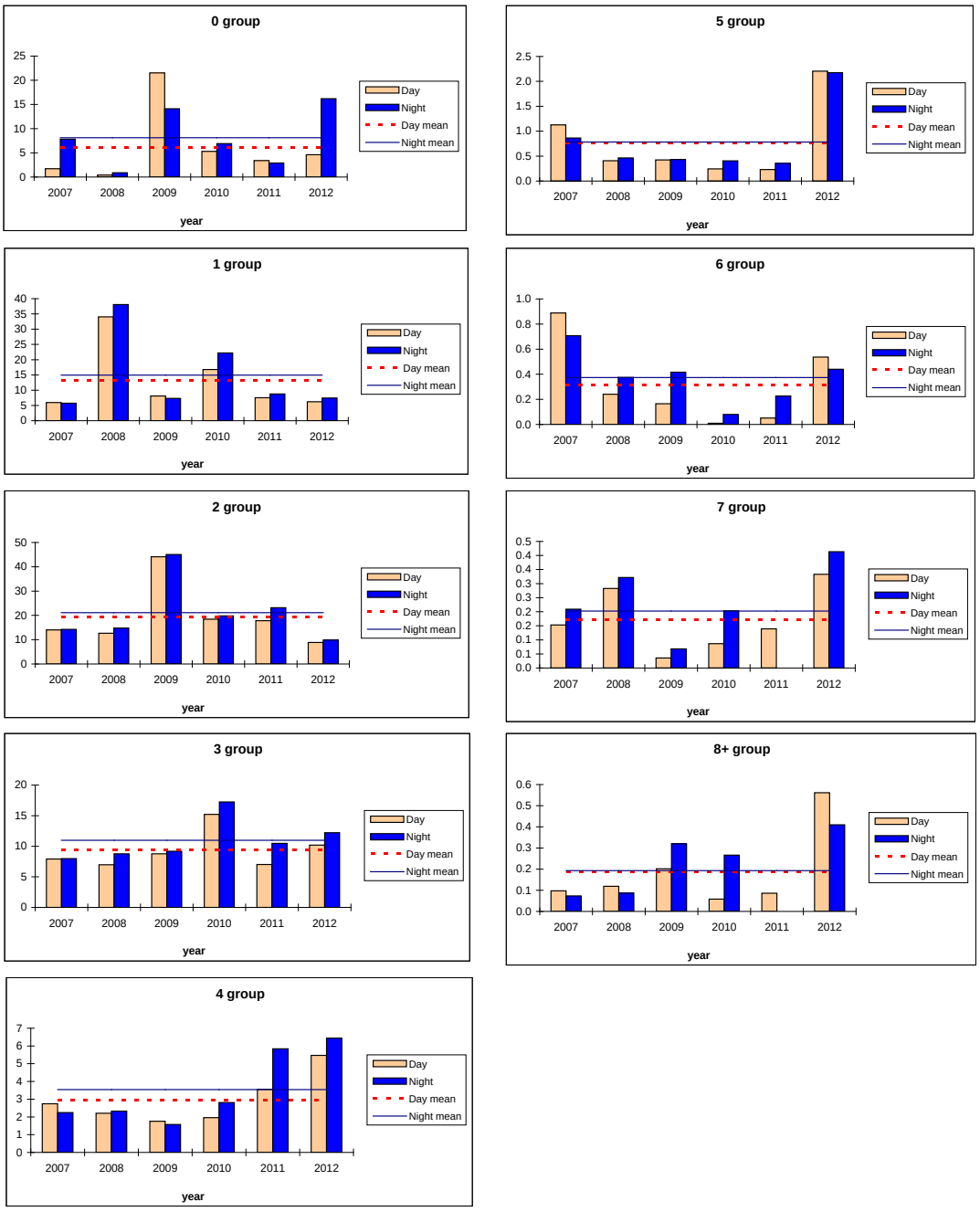


Figure 6.4.1. Catch rate of sole (number/10 km) from the ORHAGO survey in the Bay of Biscay (horizontal line = long-term means for the period presented).

6.3.2 Patterns in day vs. night hauls

The ORHAGO survey provides two cpue series, one during daylight and the other at night. The decision to get a night series was due to the knowledge that the sole catches are generally higher at night. Consequently, cpue during that period might provide a better abundance index than during daylight. However, because of the working time constraints at night, it was decided to investigate the effect of the night darkness on cpue before deciding to work only at night by carrying out hauls on the same position and the same day during daylight and at night. An analysis of the results obtained after five years was presented at the 2012 WGBEAM. It shows that the cpue are greater at night by about 10% but with large year-to-year variations of

the night/day cpue ratio from 1.0 to 1.4. The improvement in accuracy of the stock assessment due to the use of a night cpue tuning series appeared to be confirmed by comparative assessments which were planned for 2013. This comparison should include investigations on the effect of missing values for some stations in some years (0 to 20%, depending on the year and the day fishing period).

6.3.3 Variance

A variance analysis was first carried out, which confirmed that daylight has a significant effect on cpue ($p<0.01$). Its results lead to exclusion of the hauls which are not strictly carried out by daylight or at night, according to civil and astronomical twilights, and to retain only the 49 reference stations of the survey to calculate the abundance index. To investigate the effect of missing values, the cpue series with all the reference stations, which were all sampled for more than three years between 2007 and 2012, was compared to the three cpue series which can be built using the reference stations which were sampled in all six years since 2007 (23 stations), in five years (38 stations by daylight and 37 at night) and in four years (48 stations by daylight and 45 at night) respectively. The quality of these four cpue series are similar according to the trends of the log mean standardized cpue at the different ages of each cohort, by daylight as well as at night (Figure 6.3.1).

6.3.4 Behaviour in XSA

The two sets of 4 cpue series were also used to run XSAs, each cpue series being added alone to the 4 tuning series already used by the WGHMM in the 2012 XSA. Outputs were very close to each other for each set (Figures 6.3.2 a and 6.3.2b), except for the recruitment in the last year. They were also close to the 2012 WGHMM XSA outputs (Figure 6.3.3). According to these results, it appears justified to retain the cpue series including all the reference stations and carried out by daylight as an abundance index for the Bay of Biscay sole. WGBEAM feels confident in only carrying out day hauls in the ORHAGO survey from 2013 onwards.

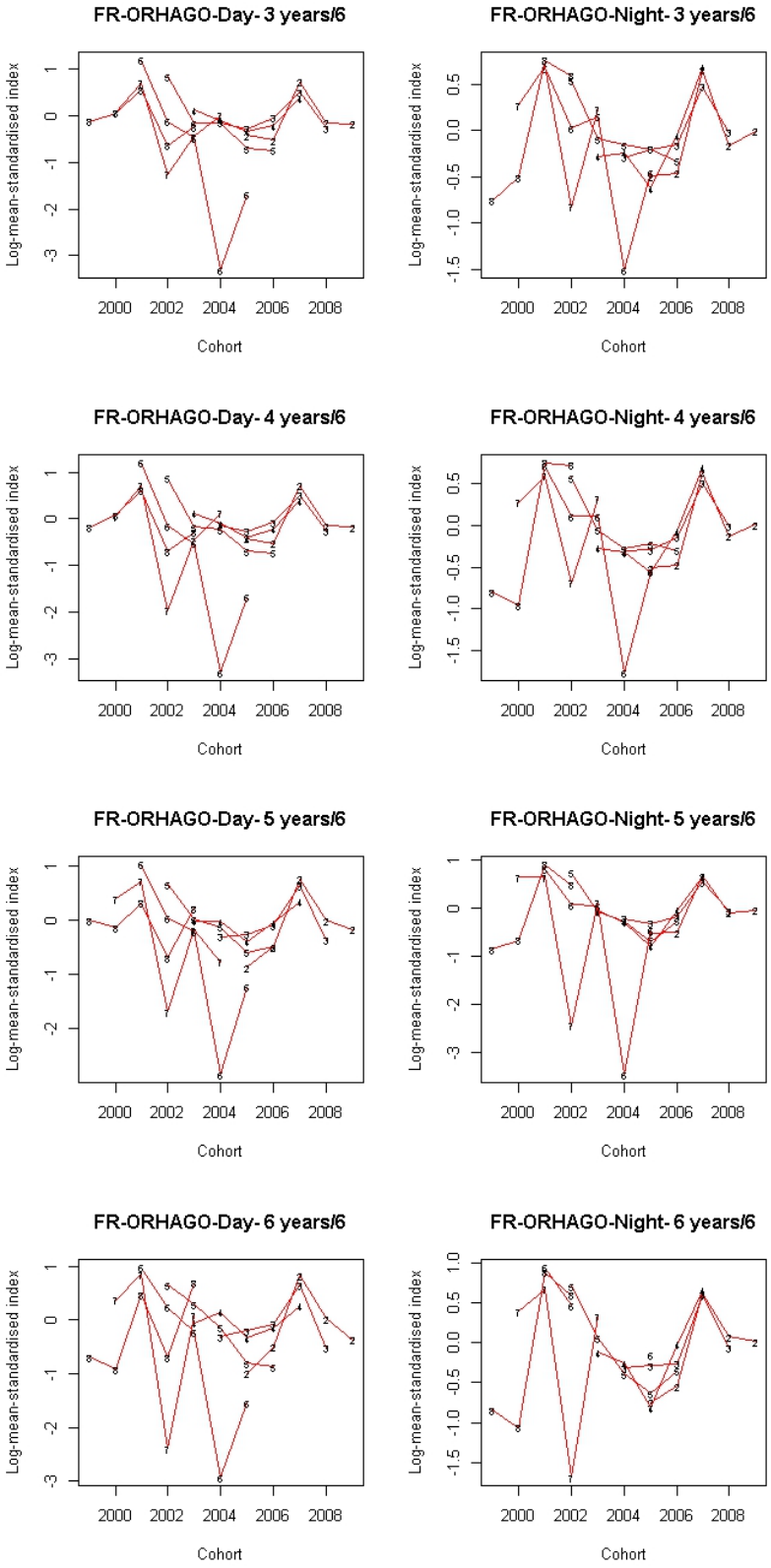


Figure 6.3.1. Log mean standardized cpue at ages by cohort of the ORHAGO survey. Daylight and at night series for the stations sampled from three to six years from 2007 onwards.

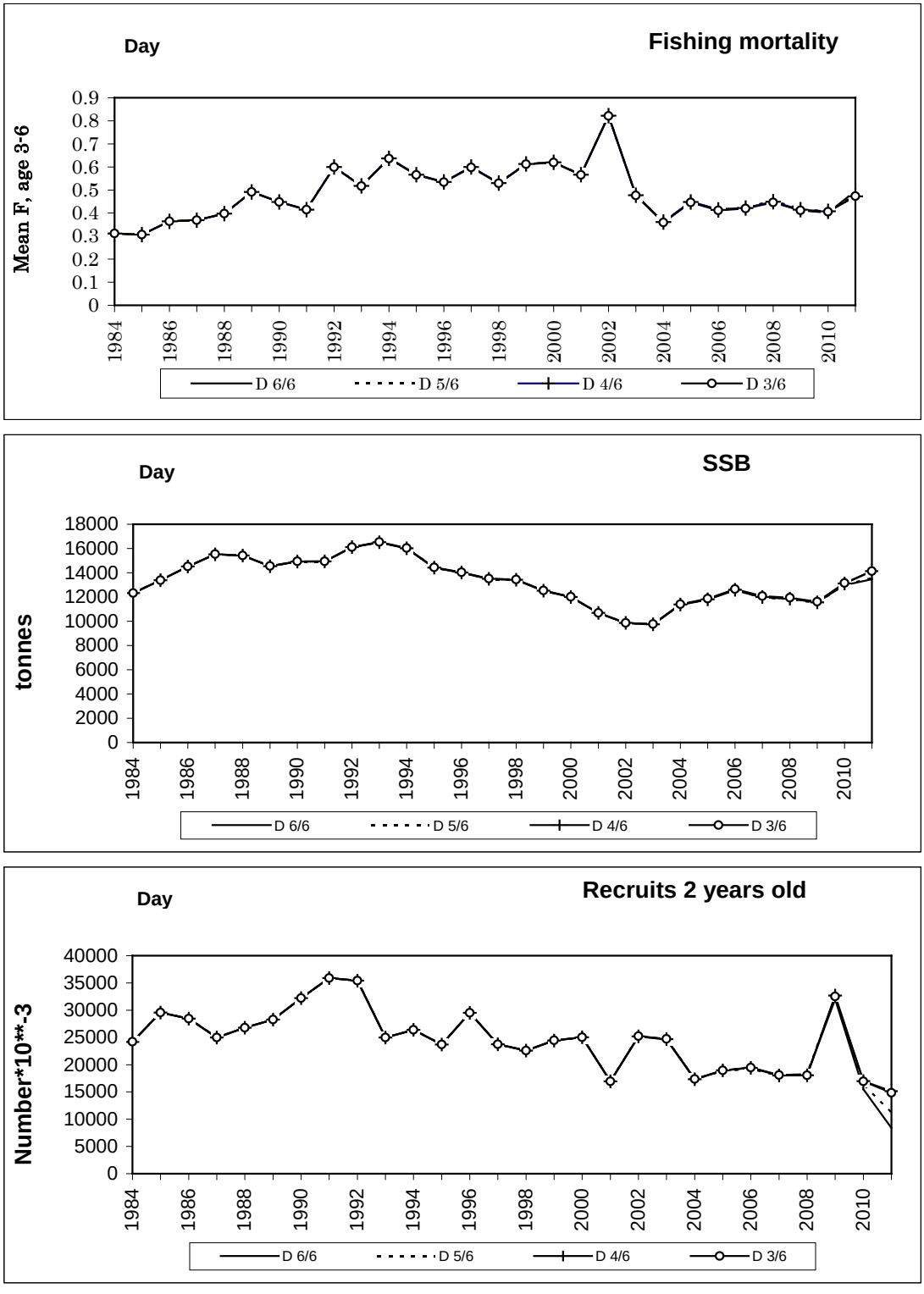


Figure 6.3.2a. Comparison of XSA outputs of the ORHAGO series carried out during daylight (legend: x/6 i. the set of station sampled the same x number of years from 2007 to 2012, i.e. in six years).

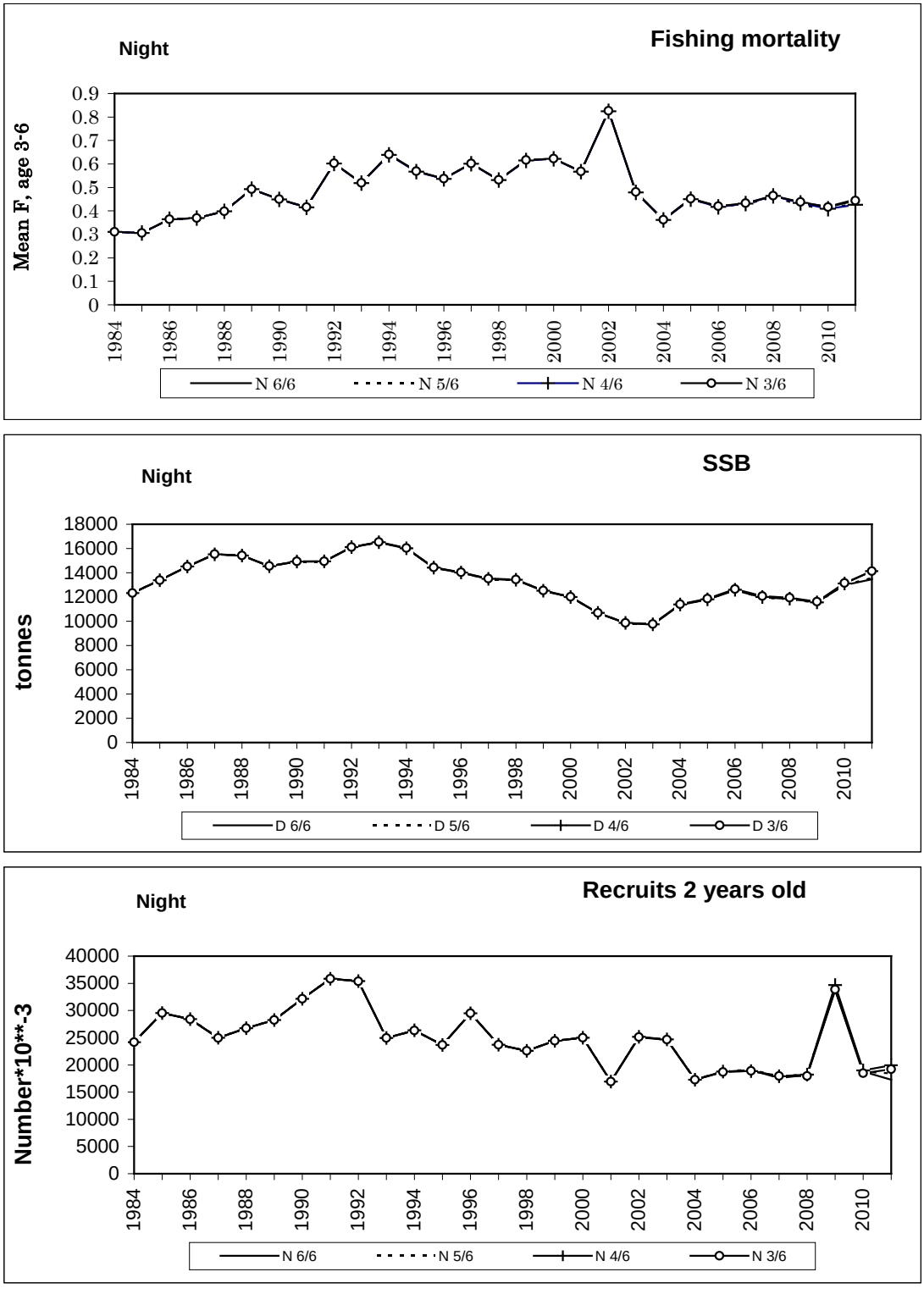


Figure 6.3.2b. Comparison of XSA outputs of the ORHAGO series carried out at night (legend: x/6 is the set of station sampled the same x number of years from 2007 to 2012, i.e. in six years).

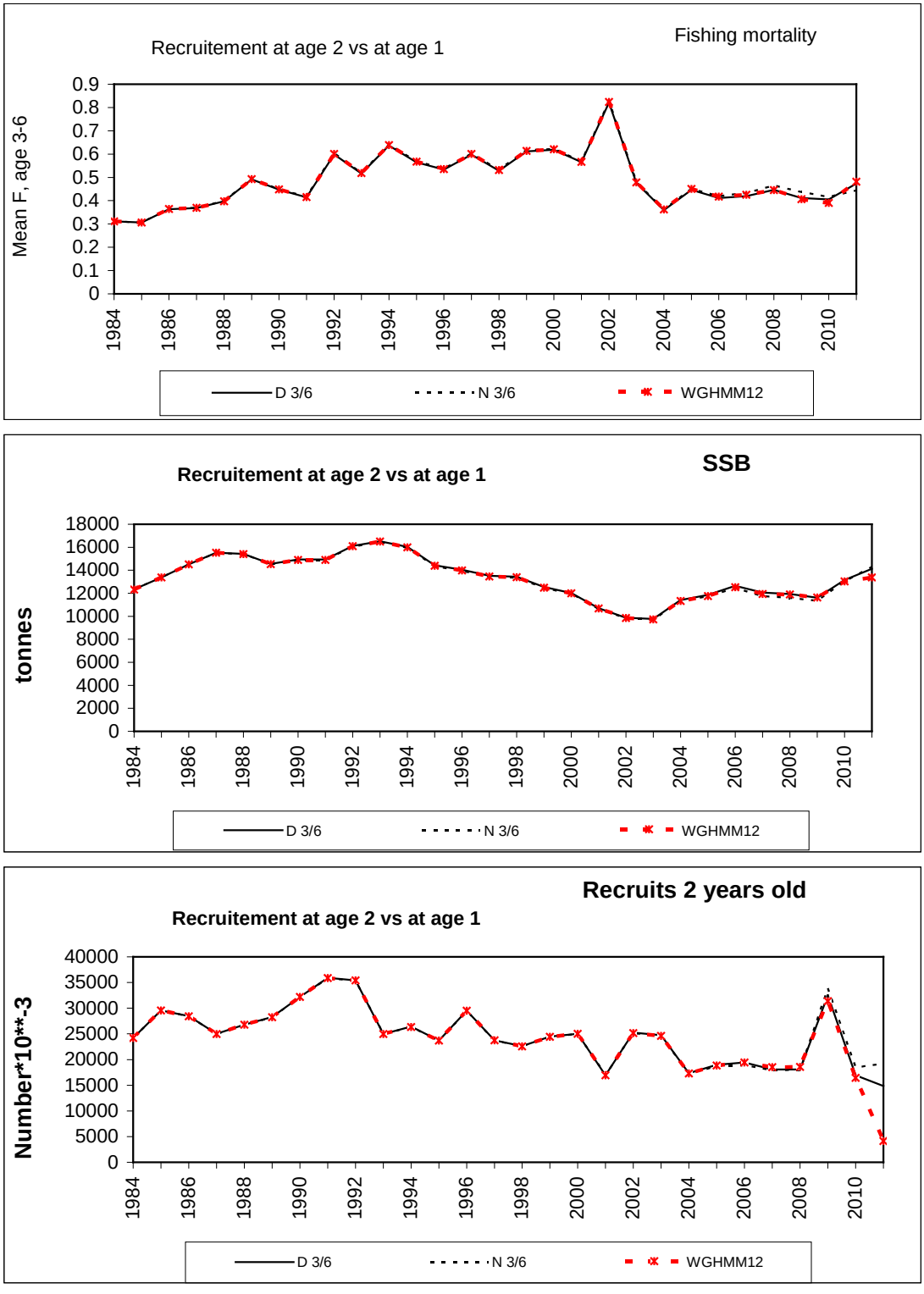


Figure 6.2.3. Comparison of XSA outputs of the ORHAGO series carried out during daylight and at night to the 2012 WGHMM XSA outputs (legend: x/6 is the set of station sampled the same x number of years from 2007 to 2012, i.e. in six years).

7 DATRAS related topics

7.1 Index calculation for plaice and sole based on DATRAS data

WGBEAM aims to calculate the offshore indices for plaice and sole as used by WGNSSK directly from DATRAS. During 2012 and 2013, ICES Data Centre and IMARES have worked intersessionally to reproduce the indices as calculated by the Netherlands.

7.1.1 Methodology

First of all, IMARES sent a flow diagram containing the steps followed in the index calculation to ICES Data Centre, including the outcomes by step in .csv format. SAS code as used by IMARES was also sent to ICES Data Centre.

ICES Data Centre worked on reproducing the outcomes of all steps and provided feedback to IMARES. The milestone was reached during WGBEAM 2013, when the index for 2012 plaice could be reproduced.

7.1.2 Next steps

Next steps for WGBEAM and ICES Data Centre are:

1) Send the selection of rectangles for which an index has to be created to ICES Data Centre (action Brian).

2) Provide allocation of statistical rectangles to ALK areas of Dutch index calculation to England, Germany and Belgium (action Ingeborg).

3) Apply the current calculation to:

   a. The Dutch BTS data for plaice and sole for the full time-series and compare with Dutch index series (action Vaishav/Ingeborg). Differences due to data should be solved by resubmitting data and differences due to different data selection might be solved by fine-tuning the current code.
   b. The English BTS data for plaice and sole and compare with the English index series (action Vaishav/Brian). Differences due to data should be solved by resubmitting data. Differences not caused by differences in data should be discussed during WGBEAM 2014, to see the impact of the differences.
   c. The German BTS data and send the data to TI for review (action Vaishav/Kay).
   d. The Belgian BTS data if uploaded in DATRAS and send the data to ILVO for review (action Vaishav/Kelle).

4) WGBEAM 2014 plan sufficient time for a subgroup to:

   a. Discuss the allocation of statistical rectangles to ALK areas in relation to the Belgian, English and German data.
   b. Discuss the results of all index series in the North Sea, for plaice and sole.
   c. Decide on final index calculations for sole in the North Sea, by country as well as combined (probably benchmarked in 2015).
   d. Decide on final index calculations for plaice in the North Sea, by country. Discuss need and possibility of a combined plaice index in the North Sea (no benchmark planned yet).

5) WGBEAM 2014 to decide on action plan for index calculations BTS-VIIa (ENG, plaice and sole), BTS-VIII (FRA, sole) and Adriatic (IT/CRO, sole).

7.2 Checks on offshore beam trawl survey data in DATRAS

7.2.1 Checking distance against duration, speed and calculated distance

WKDATR (ICES, 2013) asked WGBEAM to review the distance towed against haul duration and ground speed respectively as currently stored in DATRAS. HH Exchange files were downloaded from datras.ices.dk and the variables were plotted using an R script. Additionally, based on shooting and hauling positions, the distance towed was calculated and compared with the observed distance towed. Only data from England, Germany and Netherlands are currently available via the DATRAS webpage so only for those countries the analyses have been carried out.

7.2.1.1 Distance against duration

Figure 7.2.1a shows the results for distance against duration by survey. The upper blue line is the line when fishing 5 knots, the black line 4 knots, the lower blue line reflects fishing speed 3 knots.

There are some outliers. The English data do not contain information on distance towed.

7.2.1.2 Distance against speed over ground

In line with the comparison above, distance towed was plotted against speed over ground (Figure 7.2.1b). The lower black line represents the distance when fishing for 30 minutes with 4 knots ground speed, the upper black line fishing for 60 minutes with 4 knots ground speed.

The figures show that all countries probably submit a standard speed over ground, as the actual speed over ground is not recorded on board. WGBEAM decided that -9 should not be allowed for speed and so, if speed is not observed, the default for the survey should be entered. England does not report speed over ground at all. This should be changed by resubmitting the data.

7.2.1.3 Distance against calculated distance

The distance towed was calculated based on the shooting and hauling positions as recorded in DATRAS. If hauling position was not available, calculated distance was set to -9. It is to be expected that there are some differences between the observed and calculated distance, as fishing tracks might not be straight lines, as the calculated distance assumes.

Figure 7.2.1c shows the plots of observed distance against calculated distance for all beam trawl surveys stored in DATRAS. From the figures it becomes clear that there are some very large values in the calculated distance. This might be due to either wrongly recorded distance or to errors in shooting or hauling position.

As only observed data should be uploaded into DATRAS, but calculated distance might be useful for the calculation of swept-area based figures, it is recommended that a column 'calculated distance' be added to the so-called new DATRAS product 'flat file' (see ICES, 2013).

a

b

c

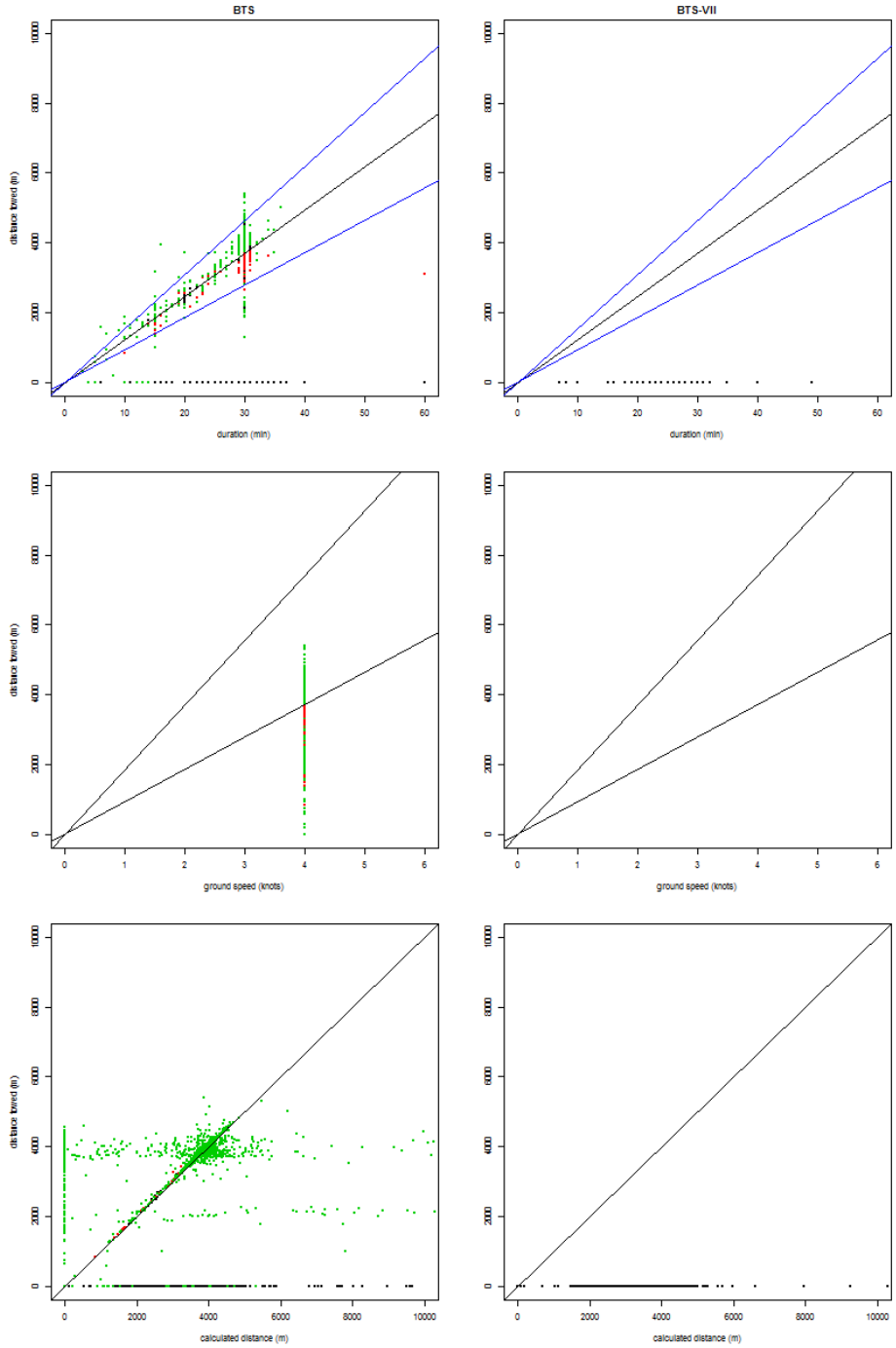


Figure 7.2.1a. (upper; left BTS, right BTS-VII) Distance towed against duration, by survey, all years. In BTS the different colours reflect different countries. Upper blue line: fishing speed 5 knots, black line fishing speed 4 knots, lower black line fishing speed 3 knots.

Figure 7.2.1b. (middle; left BTS, right BTS-VII) Distance towed against speed over ground, by survey, all years. Different colours reflect different countries. Upper black line: distance when fishing for 30 minutes with 4 knots ground speed, the upper black line fishing for 60 minutes with 4 knots ground speed.

Figure 7.2.1c. (lower; left BTS, right BTS-VII) Observed distance towed against calculated distance, by survey, all years. The different colours reflect different countries. Black line: observed distance=calculated distance.

Actions:

- All countries to cross-check the distance and duration information for the complete dataset, and resubmit data where appropriate.
- All countries reporting -9 for GroundSpeed resubmit files with the standard survey speed following the manual.

7.2.2 Checking combination of datatype and subfactor

WKDATR asked WGBEAM to review the datatype as entered in the HH records against the subfactors recorded in the HL records.

7.2.2.1 DataType and SubFactor: definitions

DataType contains information on the way the catch was processed and documented. The following values are allowed (http://vocab.ices.dk/?ref=9):

-9	Invalid hauls
C	Data calculated as cpue (number per hour)
R	Data by haul
S	Sub sampled data

SubFactor is the subsampling factor used for length measurements. When half of the catch of a specific species is measured, SubFactor is 2. If a quarter of the species is measured, SubFactor is 4. Subsampling can be done by fraction, volume, weight or numbers, and so, all values larger than or equal to 1 are allowed in this field. SubFactor less than 1 should not occur, as it is not possible to measure more fish than caught. SubFactor -9 occurs for (a) invalid hauls where no length measurements are available but individual fish information has been collected (CA records) or (b) so-called dummy hauls containing CA records from multiple hauls.

7.2.2.2 DataType and SubFactor: allowed combinations

When DataType is C then the subsampling factor should always be 1, as data are raised to numbers per hour and no information on numbers caught in the haul is available. This mainly applies to historical data. DataType C does not occur in the BTS and BTS-VIIa dataseries.

DataType R reflects the fully sorted catches. The subsampling factor might vary by species, but should always be larger than or equal to 1 as it is not possible to (a) not record a subsampling factor (resulting in SubFactor -9), (b) measure more fish than caught (SubFactor < 1).

DataType S reflects catches which were partly sorted. This only happens in case of very large catches as it is then not possible to (a) get all the catch on board or (b) get the whole catch processed in a decent way. The SubFactor in such cases should always be larger than 1, as SubFactor=1 means that the full catch is sorted.

DataType -9 should be used for invalid hauls, or for so-called dummy hauls.

7.2.2.3 DataType and SubFactor: wrong combinations in WGBEAM data

Table 7.2.2a shows the occurrences of combinations that should not be allowed in DATRAS. For most cases, the solution is straightforward.

1) If **DataType=S and SubFactor=1** and species information is available, then DataType should be changed into DataType=R. However, the DataType of the other hauls within that survey-year-country combination should also be checked if the DataType is correct as there is a possibility that the wrong DataType is reported for the complete time-series.

2) If **DataType=S or DataType=R and SubFactor=-9** and no species information is available, then DataType should be changed in -9.

3) If **DataType=S or DataType=R and SubFactor=-9** and species information is available, then SubFactor should be checked. If there is no information on SubFactor available, then either DataType should be changed to C (numbers per hour) or to -9 (invalid).

The BTS and BTS-VIIa data only contain DataType R and S.

Table 7.2.2a. DataType-SubFactor: number of occurrences of combinations that should not be allowed in DATRAS.

			BTS					BTS-VIIa	
			ENG			NED		ENG	
Year	DataType	subfact	CAR	COR	END	ISI	TRI2	COR	END
1987	R	-9				1			
1990	R	-9				1			
1993	R	-9				1			
1995	R	-9				1			
2000	R	-9		1					
2003	S	1						57	
2004	R	-9				2	1		
	S	1		1847				5741	
2005	R	-9					1		
	S	1		770				2720	
2006	R	-9				2			
	S	1		1312				3387	
2007	R	-9		1				15	
	S	-9		1				8	
		1		1195				3091	
2008	R	-9			2			12	
	S	-9			1			2	
		1			1083			3283	
2009	R	-9			4	2			473
	S	-9			2				
		1			941				
2010	R	-9	8		8	238	595		443
	S	1			779				
2011	R	-9			74	396	598		435

			BTS					BTS-VIIa	
			ENG			NED		ENG	
Year	DataType	subfact	CAR	COR	END	ISI	TRI2	COR	END
2012	R	-9			95	4	1		455

Action: all information listed above should be checked by the country responsible and changed as soon as possible in DATRAS, by resubmitting the data. Observed species should have subfactor 1.

7.2.3 Species inconsistencies

In 2012, DATRAS shifted from TSN (ITIS, itis.gov) coding to Aphia (WoRMS, marinespecies.org) coding for species in the database. WKDATR asked WGBEAM to investigate the effects of the change on the output. The results of the analyses are in the sections below.

WGBEAM considers two things very important:

- When institutes submit data they have to be able to upload data using the most up-to-date version of the species codes.
- Data users should not have to think about the coding system or the validity of species codes. When a data user wants to do an analysis for a specific species, he should be able to select only one species name or code and then receive all available data of this species.

As the differences in coding (TSN vs. WoRMS, accepted codes vs. unaccepted codes) might not only influence DATRAS but also other databases hosted by ICES, it is recommended that ICES Data Centre and DIG define the most suitable way for ICES Data Centre, data-submitters and data-users to cope with the frequent updates of WoRMS.

7.2.3.1 Differences between WoRMS and DATRAS

Errors may occur due to different reasons. First of all, the scientific names or the species codes in the species list used might vary between the original (marinespecies.org) and the used species list. The difference between the species names as used by WoRMS (marinespecies.org) and DATRAS are in Table 7.2.3a and Table 7.2.3b.

Table 7.2.3a. Inconsistencies between last version WoRMS database and ICES species list, comparison by joining AphiaID codes from DATRAS species list and marinespecies.org species list.

ERROR_NR	APHIAID	WORMS (SCIENTIFIC NAME)	DATRAS (SCIENTIFIC NAME)
1	125158	*Leptasterias (Leptasterias) muelleri*	*Leptasterias muelleri*
2	125475	*Phycidae*	*Phycidae˜*
3	416668	*Loligo forbesii*	*Loligo forbesiij*

Table 7.2.3b. Inconsistencies between last version WoRMS database and ICES species list, comparison by joining scientific names from DATRAS species list and marinespecies.org species list.

Error nr	scientific name	WoRMS(AphiaID)	DATRAS (AphiaID)
4	Crossaster	123336	123386

It is recommended that ICES Data Centre changes the AphiaID for *Crossaster* into 123336 and changes the scientific names of *Leptasterias muelleri*, *Phycidae˜* and *Loligo forbesiiÿ* in the correct names.

7.2.3.2 Differences between WoRMS and TSN

The second source of inconsistency can be found in differences between the old (TSN, itis.gov) and the new (WoRMS, marinespecies.org) coding system. For end-users this is the most visible inconsistency. This problem can only exist when not all data are stored using the same species coding system. Currently, data uploaded in DATRAS before 2012 are coded by the TSN system and data from 2012 onwards by the WoRMS system. As this complicates searching for data of a specific species and so, directly influences the end-users, it should be solved as soon as possible. Table 7.2.3c shows the differences in scientific species names between the old and the new system.

Table 7.2.3c. Differences in species names in Beam Trawl Survey dataset, by survey, full time-series.

Survey	ITIS (scientific name)	WoRMS (scientific name)
BTS	*Anapagurus levis*	*Anapagurus laevis*
BTS	*Apletodon microcephalus*	*Apletodon dentatus*
BTS	*Aporrhais pespelicanis*	*Aporrhais pespelecani*
BTS	*Aspitrigla cuculus*	*Chelidonichthys cuculus*
BTS	*Aspitrigla obscura*	*Chelidonichthys obscurus*
BTS	*Blennius gattorugine*	*Parablennius gattorugine*
BTS	*Buenia jeffreysi*	*Buenia jeffreysii*
BTS	*Cardium echinatum*	*Acanthocardia echinata*
BTS	*Ciliata mustella*	*Ciliata mustela*
BTS	*Corystes cassivelanus*	*Corystes cassivelaunus*
BTS	*Culicoides˜sordidellus (insect)*	*Microchirus (Microchirus) variegatus*
BTS	*Entelurus aequerius*	*Entelurus aequoreus*
BTS	*Epinephelus acanthistius*	*Liparis*
BTS	*Loligo forbesii*	*Loligo forbesi*
BTS	*Loligo forbesii*	*Loligo forbesiiÿ*
BTS	*Lumpenus lumpretaeformis*	*Lumpenus lampretaeformis*
BTS	*Macropipus dupurator*	*Liocarcinus depurator*
BTS	*Macropipus holsatus*	*Liocarcinus holsatus*
BTS	*Macropipus marmoreus*	*Liocarcinus marmoreus*
BTS	*Macropipus puber*	*Necora puber*
BTS	*Maia squinado*	*Maja brachydactyla*
BTS	*NULL*	*Echinidea*

Survey	ITIS (scientific name)	WoRMS (scientific name)
BTS	*NULL*	*Gracilechinus elegans*
BTS	*NULL*	*Liocarcinus navigator*
BTS	*Pagurus prideauxi*	*Pagurus prideaux*
BTS	*Polinices polianus*	*Euspira pulchella*
BTS	*Raja batis*	*Dipturus batis*
BTS	*Raja naevus*	*Leucoraja naevus*
BTS	*Raja radiate*	*Amblyraja radiata*
BTS	*Scophthalmus maximus*	*Psetta maxima*
BTS	*Solea vulgaris*	*Solea solea*
BTS	*Torpedo marmorata*	*Torpedo (Torpedo) marmorata*
BTS	*Torpedo nobiliana*	*Torpedo (Tetronarce) nobiliana*
BTS	*Trachinus vipera*	*Echiichthys vipera*
BTS	*Trigla lucerna*	*Chelidonichthys lucerna*
BTS	*Venus gallina*	*Chamelea gallina*
BTS	*Zeugopterus norvegicus*	*Phrynorhombus norvegicus*
BTS	*Urochordata*	*Tunicata*
BTS-VIIa	*Artediellus atlanticus europaeus*	*Artediellus atlanticus*
BTS-VIIa	*Aspitrigla cuculus*	*Chelidonichthys cuculus*
BTS-VIIa	*Balistes carolinensis*	*Balistes capriscus*
BTS-VIIa	*Buenia jeffreysi*	*Buenia jeffreysii*
BTS-VIIa	*Cepola rubescens*	*Cepola macrophthalma*
BTS-VIIa	*Ciliata mustella*	*Ciliata mustela*
BTS-VIIa	*Culicoides˜sordidellus (insect)*	*Microchirus (Microchirus) variegatus*
BTS-VIIa	*Echinus acutus*	*Gracilechinus acutus*
BTS-VIIa	*Entelurus aequerius*	*Entelurus aequoreus*
BTS-VIIa	*Epinephelus acanthistius*	*Liparis*
BTS-VIIa	*Labrus bimaculatus*	*Labrus mixtus*
BTS-VIIa	*Liza ramado*	*Liza ramada*
BTS-VIIa	*Loligo forbesii*	*Loligo forbesiiÿ*
BTS-VIIa	*Macropipus holsatus*	*Liocarcinus holsatus*
BTS-VIIa	*Macropipus marmoreus*	*Liocarcinus marmoreus*
BTS-VIIa	*Macropipus puber*	*Necora puber*
BTS-VIIa	*Maia squinado*	*Maja brachydactyla*
BTS-VIIa	*Pycnogonum littorale*	*Pycnogonum litorale*
BTS-VIIa	*Raja naevus*	*Leucoraja naevus*
BTS-VIIa	*Solea vulgaris*	*Solea solea*
BTS-VIIa	*Stichopus tremulus*	*Parastichopus tremulus*
BTS-VIIa	*Torpedo nobiliana*	*Torpedo (Tetronarce) nobiliana*
BTS-VIIa	*Trachinus vipera*	*Echiichthys vipera*
BTS-VIIa	*Trigla lucerna*	*Chelidonichthys lucerna*
BTS-VIIa	*Zeugopterus norvegicus*	*Phrynorhombus norvegicus*

It is recommended that ICES Data Centre adds an extra column to the Exchange file containing the accepted WoRMS coding or the accepted scientific name for all data stored in DATRAS so data downloaders do not have to work with two different tax-

onomic coding systems. Additionally, it is recommended to create the "flat file" proposed by WKDATR (see section 4.2.4 of ICES 2013) as soon as possible.

7.2.3.3 Use of unaccepted species codes or species names having alternate representation

Finally, errors might occur when invalid species names are used in the database. As long as only the invalid code is being used for a species this does not lead to any problems for end-users, but when old unaccepted codes occur in the database next to the valid species codes, this will lead to errors. Table 7.2.3d shows the species for which currently an invalid WoRMS species code is being used.

Table 7.2.3d. Species for which unaccepted WoRMS codes are used in DATRAS.

Survey	Scientific name	Aphiaid	Status
BTS	*Chelidonichthys lucernus*	274877	Unaccepted
BTS	*Liparis liparis*	127219	Unaccepted
BTS	*Loligo forbesi*	140270	Unaccepted
BTS	*Loligo subulata*	341892	Unaccepted
BTS	*Luidia sarsi*	178639	Unaccepted
BTS	*Psetta maxima*	154473	Unaccepted
BTS	*Microchirus (Microchirus) variegatus*	127472	alternate representation
BTS-VIIa	*Diplecogaster bimaculata*	126513	Unaccepted
BTS-VIIa	*Liparis liparis*	127219	Unaccepted
BTS-VIIa	*Luidia sarsi*	178639	Unaccepted
BTS-VIIa	*Microchirus (Microchirus) variegatus*	127472	alternate representation

It is recommended that ICES Data Centre changes the codes for the unaccepted names to the accepted name codes for the species in Table 7.2.3d.

In general, it is recommended that ICES Data Centre finds a way forward to incorporate WoRMS updates in the submission checking procedures. WoRMS is being updated on a regular basis and so, the DATRAS reference tables should be updated more frequently.

7.2.4 Reporting on benthos species

WGBEAM normally reports on a closed benthos species list for the offshore surveys. However, on board all countries fully sort the catch, including all benthic species. WGBEAM therefore decided that all benthos species should be uploaded by all countries.

Currently, the upload of benthos data are not consistent between the countries and over the years. Table 7.2.4 shows the benthos species reported by country and survey, only meant for illustration. When the list was checked by the experts, it was confirmed that not all species have been submitted to DATRAS. Action: all countries to upload all species caught during the beam trawl surveys, if necessary by resubmitting files from earlier years.

Table 7.2.4. Benthos species submitted for BTS and BTS-VIIa in DATRAS, by country.

	BTS			BTS–VIIa
SCIENTIFIC NAME	ENG	GFR	NED	ENG
Actiniaria				X
Aequipecten opercularis	X			X
Alloteuthis		X		
Alloteuthis subulata	X	X		X
Anapagurus laevis			X	
Anseropoda placenta	X			X
Antedon bifida				X
Aphrodita aculeate	X		X	X
Arctica islandica				X
Astartidae				X
Asterias rubens	X		X	X
Astropecten irregularis			X	X
Buccinum undatum	X		X	X
Cancer pagurus	X	X	X	X
Carcinus maenas	X			X
Corystes cassivelaunus			X	
Crangon allmanni				X
Crangon crangon	X			X
Crangon sp.	X			X
Echinocardium cordatum			X	X
Echinocardium flavescens			X	
Echinocardium sp.	X		X	
Echinus esculentus				X
Eledone cirrhosa		X		X
Glycymeris glycymeris	X			X
Goneplax rhomboids				X
Gracilechinus acutus				X
Homarus gammarus	X			X
Hyas araneus	X			X
Inachus dorsettensis	X			X
Leander serratus	X			X
Liocarcinus depurator			X	
Liocarcinus holsatus	X		X	X
Liocarcinus marmoreus	X		X	X
Lithodes maja		X		
Loliginidae	X			
Loligo forbesi	X	X		X
Loligo sp.				X
Loligo vulgaris		X		X
Luidia sarsii				X
Macropipus tuberculatus				X
Maja				X

	BTS			BTS–VIIa
SCIENTIFIC NAME	ENG	GFR	NED	ENG
Maja brachydactyla	X			X
Marthasterias glacialis				X
Mytilus edulis	X			X
Necora puber	X			X
Nephrops norvegicus		X	X	X
Neptunea antiqua				X
Ophiothrix fragilis	X		X	X
Ophiura albida	X		X	
Ophiura ophiura	X		X	X
Ophiuridae	X			
Ostrea edulis	X			
Paguridae	X			X
Pagurus bernhardus			X	
Pagurus prideauxi			X	
Pagurus pubescens			X	
Pandalus sp.	X			X
Parastichopus tremulus				X
Pasiphaeidae				X
Pecten maximus	X			X
Pycnogonum littorale				X
Rossia macrosoma	X			X
Scaphander lignarius				X
Sepia elegans				X
Sepia officinalis	X			X
Sepietta oweniana		X		X
Sepiola atlantica	X			X
Spatangus purpureus	X			X
Todaropsis eblanae		X		

7.2.5 Submitting species of higher taxonomic groups than species level

For some fish species, information on a higher taxonomic level than the species level is stored in DATRAS. Table 7.2.5 lists the groups as well as the recommended species name and in some cases the rationale to make the choice between one name and the other.

Table 7.2.5. Fish species for which a higher taxonomic level than the species level has been submitted to BTS and BTS-VIIa in DATRAS.

	BTS			BTS-VIIa		
SCIENTIFIC NAME	ENG	GFR	NED	ENG	RECOMMENDED SPECIES NAME	RATIONALE
Ammodytes	X		X	x	1.*Ammodytes* sp. (2.Ammodytidae)	If *A. marinus*/*A. tobianus:* (1); if no distinction with e.g. *Hyperoplus*: (2)
Ammodytidae	X		X	x		
Anguillidae	X				*Anguilla anguilla*	No other options
Argentinidae				X	Argentinidae	
Callionymidae			X	X	1.Callionymidae (2.*Callionymus*)	If other than *Callionymus*: (1); if only *Callionymus* species: (2)
Dicentrarchus	X				*Dicentrarchus*	
Gobiesocidae	X			X	Gobiesocidae	
Gobiidae	X		X	X	1.*Gobius* 2.*Pomatoschistus* 3.Gobiidae	If *Gobius* species: (1); if *Pomatischistus* species: (2); else (3)
Gobius		X				
Pomatoschistus	X		X	X		
Labridae	X			X	Labridae	
Mugilidae			X		Mugilidae	
Mustelus			X		*Mustelus*	NB: it is only possible to distinguish *M. asterias* and *M. mustelus* by genetics. In the North Sea it is most likely M. asterias (Farrell *et al.,* 2009)
Raja			X		1.Rajidae (2.*Raja*)	If other than *Raja:* (1); if only *Raja* species: (2)
Rajidae				X		
Syngnathidae			X		1. *Syngnathus* (2. Syngnathidae)	If Syngnathus species: (1); if no distinction with e.g. *Hippocampus*/*Entelurus:* (2)
Syngnathus			X			

7.3 New DATRAS products

The current products for the BTS and BTS-VIIa at datras.ices.dk have not been validated by WGBEAM, and are in some cases incorrect. WGBEAM recommend that the current products should be removed from the DATRAS webpage and be replaced by new products as proposed below. Data product request forms have been filled in (http://www.ices.dk/marine-data/guidelines-and-policy/_layouts/15/xlviewer.aspx?id=/marine-data/guidelines-and-policy/Documents/Input-output%20request%20form.xlsx).

7.3.1 Calculation of cpue per haul for BTS data in DATRAS

CPUE for beam trawl surveys is calculated by surface fished (swept-area). Table 7.3.1 shows the steps to be taken. DATRAS products are requested for the results of step 1 (CPUE per length per haul), step 3 (cpue per haul, including 0 values for species not

caught in the haul), step 4 (cpue per statrec), step 5 (cpue per year). Calculation procedures as well as output files from the different steps have been provided to the ICES Data Centre.

Data selection from HH and HL Exchange files (BTS and BTS-VIIa):

a) Only valid hauls

b) All species

It is advised that this calculation is carried out by species name, and not by code, as long as the same species names are used throughout all years.

Table 7.3.1. Steps required to calculate cpue per hail for BTS in DATRAS.

	Variable	Information needed	Alternative information 1	Alternative information 2	Calculations	
1	CPUE per haul per species per length (numbers per ha)	Distance (D)	Calculated distance from GroundSpeed (SOG) and HaulDur (DUR): D=SOG*1852*(60/DUR)	Calculated distance from shooting and hauling position (using fun_Distance)	S=D*W	By year survey period country ship station haul daynight species sex and length: CPUE_l=∑(N)*(10000/S)
		Beam width: W=SUBSTR (Gear,3,1)				
		SubFactor (SUB)	When SubFact=-9 and HLNoLngt=-9 and Lngt=-9: TotalNo (T)		N=SUB*NO or N=TotalNo	
		HLNoAtLngt (NO)				
2	CPUE per haul per species	CPUE_l				year survey period country ship station haul daynight species sex: CPUE_h=∑(CPUE_l)
3	Add 0 values to CPUE per haul per species (→ a file containing all species for all hauls, some with a positive CPUE_h value, some with 0 for CPUE_h)	CPUE_h				
4	CPUE per year per statrec per species	CPUE_h				By year survey period statrec daynight species sex: CPUE_s=∑(CPUE_h)/Hs
		By year survey period statrec species: Hs=COUNT(Haul)				

	Variable	Information needed	Alternative information 1	Alternative information 2	Calculations	
5	CPUE per year	CPUE_s By year: Hy=COUNT(StatRec)				By year daynight species sex: CPUE_y=∑(CPUE_s)/Hy

7.3.2 Calculation of ALK, SMALK and indices for BTS data in DATRAS

The ALK, SMALK and indices products are part of the index calculation process from DATRAS (see section 7.1) and can be released when the index calculation procedure is ready. The documentation for those products (algorithms, data selection as well as schematic text) is available at ICES Data Centre. A data product request form is filled in for both products.

8 Sole trends (ToR d)

8.1 Sole

Plaice and sole are both commercially important flatfish species and both are target species of the beam trawl surveys. Plaice has received much attention in the past, therefore sole was now selected to examine in more detail.

At the previous WG, changes in length-at-age were examined based on data collected during Dutch BTS-Isis survey. As sole is a sexual dimorphic species, length-at-age was examined separately for males and females. This year, the same analysis was carried out for the Dutch SNS survey. Changes in length-at-age were also crudely examined using DATRAS exchange data. This was done for UK BTS surveys (all areas combined) and for the Dutch BTS-Isis (to enable comparison with the previous results). Finally, spatial distribution by sex, age and year was examined, based on data from the Dutch BTS-Isis survey.

8.1.1 Methods

Two approaches were used to calculate mean length. The first method, which is considered to be the best approach, has until now only been applied to the Dutch survey data. In this approach, length distributions by haul were converted into age distributions by haul and sex using sex-differentiated age–length-keys. At the same time the mean length by sex and age group was calculated for each haul. Weighted averages for fish length were calculated by ICES rectangle then for all ICES rectangles within the index area. The number of fish by sex, age group and haul was used as weighting factor. Only hauls within the index area were included, following the approach taken for the index calculations, to ensure that observed changes over time were not related to geographical shifts in the survey.

For the second method, DATRAS exchange data were used. Only the biological sampling data (record type CA) were used. Consequently, the mean length estimations may be biased due to stratification of the biological sampling. This approach was taken to quick scan if the trends observed in the Dutch data are also observed in the UK data (for all areas combined). This approach was also applied to the Dutch data to examine differences between the two approaches. Age groups for which < 10 fish were sampled, were eliminated from this analysis.

Potential changes in distribution by sex and age group were examined for the BTS-Isis data. The mean abundance (catch numbers per 1000m^2) by ICES rectangle was plotted for each sex, age group and year.

8.1.2 Results

Mean length by sex and year is plotted for each age group separately in Figures 8.1 and 8.2. Figure 8.1 presents the results based on the first approach for mean length calculation and Figure 8.2 for the second approach.

Results for the two Dutch surveys (SNS and BTS-Isis) show a decrease in mean length over time in the 3+ age groups (Figure 8.1). Comparison of the two methods for mean length calculation shows some differences in means and standard deviations, but the overall trend is very similar (compare BTS-Isis results in Figures 8.1 and 8.2). The UK BTS surveys show a decrease in mean length for all age groups included in the analyses (Figure 8.2).

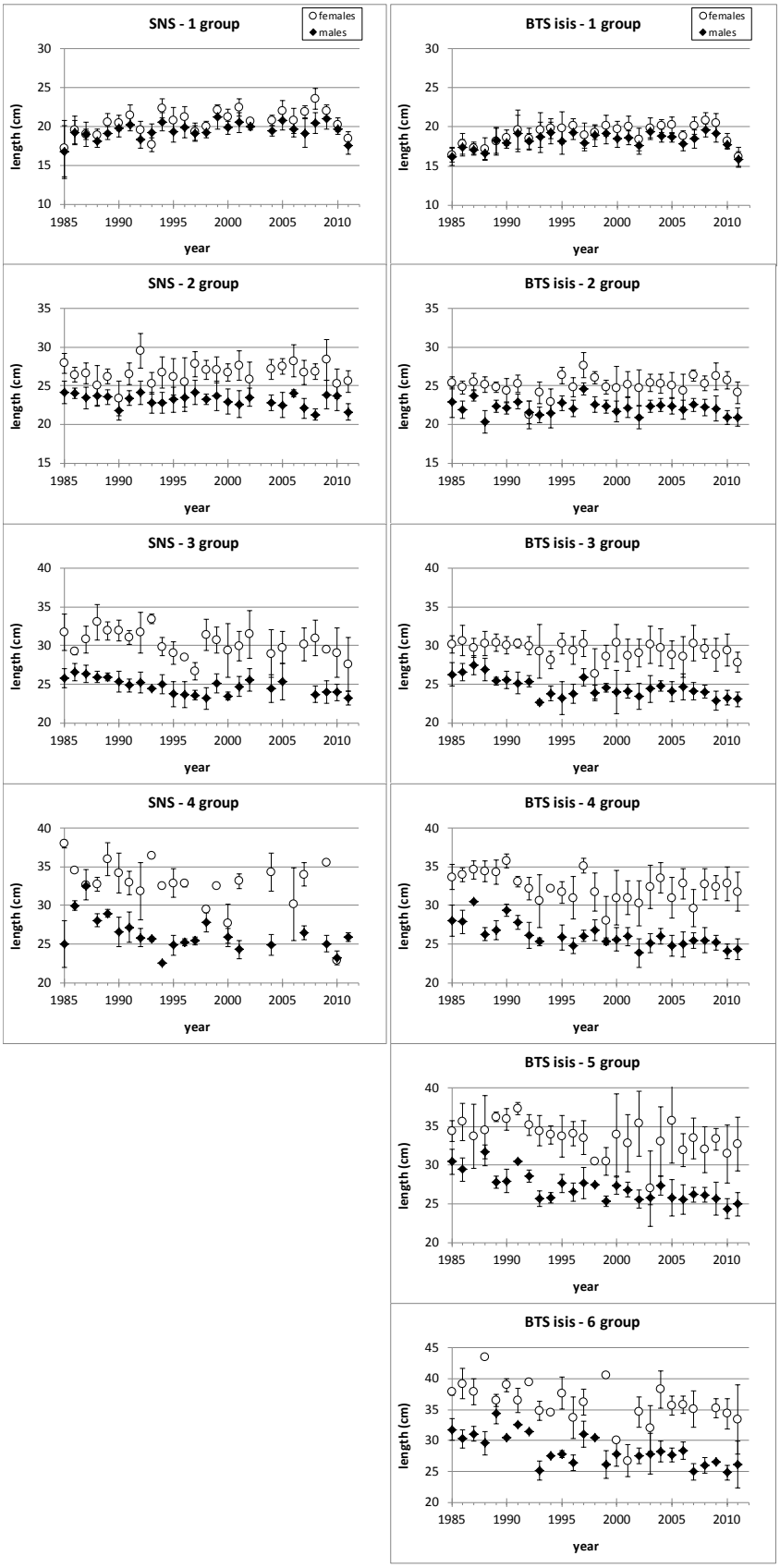


Figure 8.1. Sole mean length (± standard deviation) by age, sex and year for age groups 1 to 6 in the BTS Isis survey and for age groups 1 to 4 in the SNS survey. Mean length was calculated based on catch data and biological sampling data.

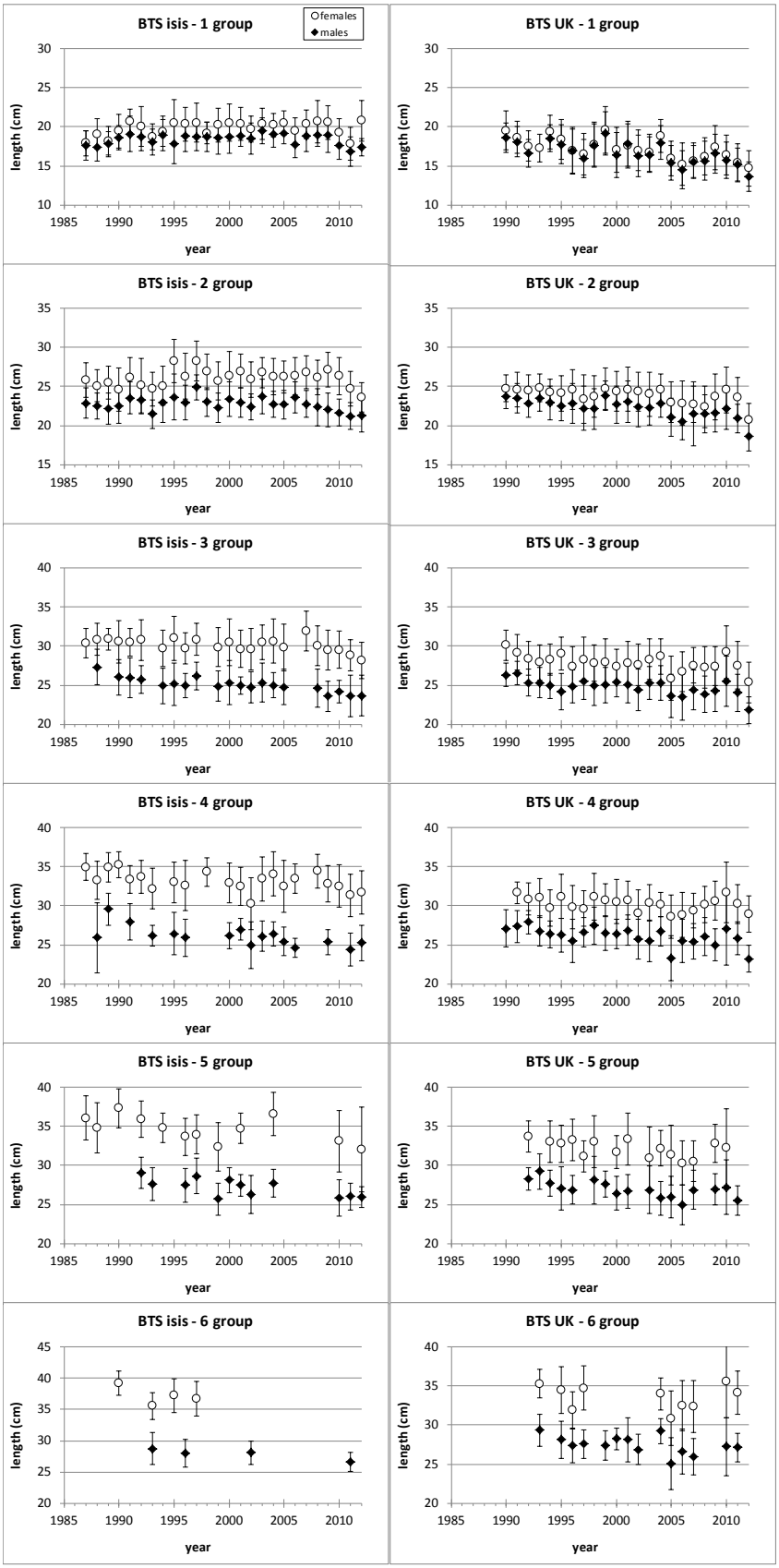


Figure 8.2. Sole mean length (± standard deviation) by age, sex and year for age groups 1 to 6 in the BTS Isis survey and the UK BTS surveys combined. Mean length was calculated based on biological sampling data only.

The maps showing the distribution of sole by sex, age and year are presented in Annex 14. No clear differences between sexes of the same age group are observed. Differences are observed between age groups, with the older age groups distributed further offshore. The main goal for producing these maps was to examine trends over time in spatial distribution. Although notable differences are observed between years there are no clear trends over time.

Discussion

The trends in sole mean length-at-age that were observed for the BTS-Isis last year were corroborated by the analyses done this year for the SNS and the UK BTS surveys. Despite the fact that the method applied for the UK BTS data are suboptimal, the trends are clear and are not expected to disappear if a more appropriate method is applied.

A potential cause for trends in mean length-at-age might be a bias in age reading. However, the fact that a decrease in mean length is observed in both the Dutch and the UK surveys refutes this explanation, as the age readings for these 2 series were done by different institutes and different readers.

No clear trends in spatial distribution at age were observed in the BTS-Isis. This indicates that the observed trends in mean length-at-age are not related to changes in spatial distribution.

Work on this topic will be continued as part of a multi-annual ToR. Future work will consist of closer examination of the trends by area, improvement of the analyses and discussion of the results taking into account the available literature on growth (changes) in sole. WGBEAM is aware that some research has been done addressing this topic in sole, but has not yet been able to collate and review the relevant literature.

9 Continue work on standardizing the offshore and inshore surveys such as, the reviewing the manuals, updating database and staff exchanges (ToR c and g)

9.1 Offshore beam trawl survey manual

No updates to the offshore manual were required.

The Chair of WGBEAM will send the offshore WGBEAM manual to ICES and request it is reviewed. Once this has been carried out the response from the review and the workshop at the ASC in September 2013 will be implemented and the offshore and inshore manuals will be updated and re-submitted as soon as possible.

9.2 Inshore beam trawl survey manual

No updates of the inshore manual occurred during the 2013 working group and any further development will await the outcome of the offshore manual review and the ASC workshop.

9.3 SISP progress

The outgoing chair will send the offshore survey manual directly after the end of WGBEAM 2013 to ICES and request it be externally reviewed and with feedback from the workshop at the ASC in 2013, then update and send for publication as a SISP.

9.4 Offshore staff exchange

No ICES WGBEAM offshore beam trawl survey (BTS) staff exchanges were conducted during 2012. During 2013, the Adriatic survey can host a member of staff from one of the WGBEAM participating institutes; however, no definite exchange has been organized at this time. Cefas, Germany and the Netherlands have also offered a place on their Research Vessel offshore surveys.

9.5 Inshore staff exchange

No inshore staff exchanges were conducted during 2012. The organization of staff exchange on inshore surveys is more complicated than for the offshore surveys since the inshore surveys take place on smaller vessels with less staff on board and so, it is more complicated to exchange experienced staff without causing problems on the own survey.

Table 8.5.1 shows information on the logistics of the inshore trips that are relevant to staff exchange.

Table 8.5.1. Information ion inshore trips.

Country	Ship	Sleep ashore	Extra sleeping facilities on board	Trip length
Belgium	Simon Stevin	yes	-	Day
Germany	Commercial	yes	-	Day
Netherlands	Stern, Schollevaar	no	No	Day
	Isis	no	No	Week

The Netherlands have once again offered a place on one of their inshore day trip surveys however, at this time no definite exchange has been organized.

9.6 Submission status of BTS offshore data

9.6.1 Belgium

The survey has been setup into the DATRAS database, and all checks and relations are in place. During WGBEAM 2013, a subgroup meeting was arranged between the Belgium data submitter and a DATRAS system analyst. The outcome of this meeting was that the Belgium file was successfully screened through DATRAS screening procedure. Given the success of this exercise during 2013, Belgium will screen and upload all remaining files to DATRAS.

9.6.2 France

The survey has been setup into the DATRAS database, and all checks and relations are in place. During WGBEAM 2013, a subgroup meeting was arranged between the French data submitter and a DATRAS system analyst. The outcome of this meeting was that the following additional fields and acceptable values would be required for the French ORHAGO survey in Bay of Biscay;

Strata (DN: < 120 m, DCC: 0-50 m, DCL: 50-120 m, NS: < 120 m)

Area code (BB or BoB)

Tickler (allow 10)

BycSpecRecCode: allow 6 (= Open ended fish species list and limited benthos list)

9.6.3 Italy/Croatia

A formal request has been made to ICES to host the northern Adriatic Sole survey. There are some issues to resolve intersessionally before this can be agreed.

9.7 Submission status of BTS inshore data

All ranges and checks have been set up and submitters from The Netherlands and Germany received guidelines for further changes, which are the requirements to correct their files according to the DATRAS format. The DYFS set up document was presented in WGBEAM 2013 which shows all relevant information regarding survey setup.

10 Other subjects

10.1 Coordination of the Q1SWBeam (UK) survey:

The UK requested that WGBEAM examine the new beam trawl survey time-series started in 2006 in the western channel with the view of having the series internationally coordinated by the group and the data be made available on DATRAS. The sampling protocols, gear, recording catches and species coding implemented are already in accordance to the procedure required to provide data through WGBEAM. What is different from other beam trawl surveys currently coordinated under this group is the survey design. The short discussion and presentation of some results focus largely on the design aspect of the survey as most other aspects of the series follow very closely the other UK surveys.

10.1.1 Timing and area coverage

The Q1SWBeam survey is carried out at the end of the third quarter in the western English Channel covering the entire ICES Division VIIe in order to provide abundance information for plaice and sole in the area and two rectangles in VIIh considered important fishing and nursery grounds for a number of demersal species in the Celtic Sea such as monkfish and megrim. As the timing of the survey coincides with the spawning time for a number of important flatfish species the survey is also important in providing information on maturity-at-age which in terms of macroscopic examination is now considered unreliable from other times of the year.

10.1.2 Stratification design

The survey follows a complex stratification design, the complexity being deemed necessary less so for the production of indices for plaice and sole, but more so because it is hoped that the survey represents a novel opportunity for combining fisheries with ecosystem monitoring where aspect of variability and sampling scale differ from those historically considered important in fisheries only monitoring. In accordance with these principles the design of the strata is based on the consideration of a range of available environmental information on habitat, oceanography and bathymetry, which were all used in the development of the design in conjunction with anecdotal fisheries information and more recently available discard data. The information from fishers was used not to determine sampling areas for specific species, but rather integrated over all species as it was felt that the elicited demersal community structure would be highly informative on habitats. It is expected that these habitats are on a scale consistent with the scales on which ecosystem processes are important to the marine strategy framework directive (MSFD), so that this survey could provide an important platform for ecosystem monitoring as well as provide information on a variety of MSFD descriptors in its current form.

10.1.3 Survey design

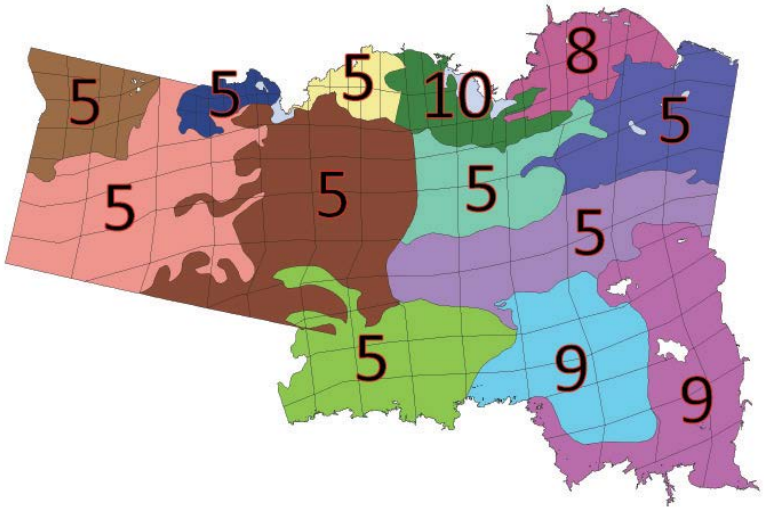


Figure 10.1 strata layout of the Q1SW-BTS.

The western channel is stratified into 13 strata (Figure 10.1). Five of these are located along the English coast with 3 slightly larger strata covering the French coastal zone. The remaining four (are considered offshore on the basis of the oceanographic conditions with the Hurd deep containing the deepest part of the survey area of around 200m although this depth is limited to a very small part of the stratum. Each stratum is subdivided into roughly 15 polygons from which samples are picked randomly without replacement proportional to the area of each polygon. A minimum of five samples is collected from each stratum per year. Strata 4,5,10 and 11 are sampled more intensely at a minimum of 10, 8, 9, and 9 samples per year respectively in order to improve the precision of indices especially for the longer lived species, as these areas are important both for the fishery and the stocks of interest. This results in a minimum of 76 stations sampled in a year and additional samples from the draw list can be added (in order of draw) time permitting or as required by additional objectives without the risk of biasing the abundance estimator.

Each polygon is further subdivided into 2 mile by 2 mile grids from which 1 grid is chosen randomly from each polygon with a probability of selection proportional to its area in order to account for the facts that grids at the edge of the polygon intersected by the polygon have a smaller area. The two stage selection approach ensures that in any given year the stations are not too clustered to retain spatial coverage, yet retain equal probability of any sample site within a stratum. The entire sample selection procedure is fully automated in R to avoid errors or omissions in the development of the cruise plan which is also completed by the script to the point of providing charts, checking lists and Transas format files for the crew to plan the daily station allocation. Simulation testing of the code confirmed the unbiased sample selection and its ability to avoid overly clustered sampling within a year as desired by the survey specification.

The centre of the grid is taken as the sampling position, and additional sample selections are made. The latter are important in the practical application of the design. The

aim is to sample within the 2 mile grid, but this is often not practically possible, because of the 2 mile tow which is conducted at 4 knots. Therefore a sample whose track passes through the grid is considered sufficient. If it is not possible to find a suitable sampling site due to habitat, interactions with commercial fishing gears or tidal conditions, then one of the additional survey stations is used to replace the untrawlable site. This may involve considerable additional travel, because the next alternate in the sequence could be anywhere in the stratum. However, in practical terms use of alternate grids occurs rarely enough not to be a large concern either with regards to maintaining randomness or extended search times.

10.1.4 Dataseries and results

The time-series commenced in 2006 and currently eight years of data are available. Results of an ordination for this period indicate that species communities are persistent across the time varying much more between strata than between years, despite sizeable fluctuations in the population trends of some species. Cluster analysis of the same data displayed spatially also demonstrates a consistent pattern of special distribution of clusters with the major gradients of change being consistent with the stratification scheme. In several areas a number of communities / strata can be encountered within a single ICES rectangle. The environmental gradients in the area are of sufficient magnitude that the use of data at the scale of rectangle information in the western channel is inappropriate, justifying the use of strata rather than rectangles in this case. The desire to sample randomly is driven by the realization that rarely do spatial distributions of fish remain constant over long periods in time. Especially in transition zones between ecosystems such as the English Channel have these influences been of concern. At this time few if any such shifts have been observed, but having a design that is robust to such changes is highly desirable when developing a new monitoring dataset especially if they are to serve more than one purpose.

Fisheries information from the Q1SWBeam survey has been used in the VIIe sole assessment since the benchmark assessment at WKFLAT 2012 where a detailed analysis of the utility of the survey is presented and plots are shown. For the purposes of this group it suffices to mention that the index information provided on sole is highly consistent with the other available data sources in terms of the identification of strong and weak year classes. It provides a significantly wider range of age information (age 2-15, used as 1-14 offset by a year in the assessment) than the other surveys despite lower sample numbers, while maintaining comparable levels of precision with other surveys despite its random approach to sampling. In addition the index poses far fewer concerns with respect to potential bias than any of the other data sources used in the assessment due to its area wide coverage and random sampling approach. Figure 10.2 shows the same information for plaice and aside from a reduction of the age range of 1-10 compared to the sole index the conclusions are very similar. The reason for presenting the plaice information here is that it provides new and previously unseen confirmation of the utility of the survey in providing fisheries abundance information at a high level of precision without concerns over bias. It is planned to include this information in the VIIe plaice assessment in the near future.

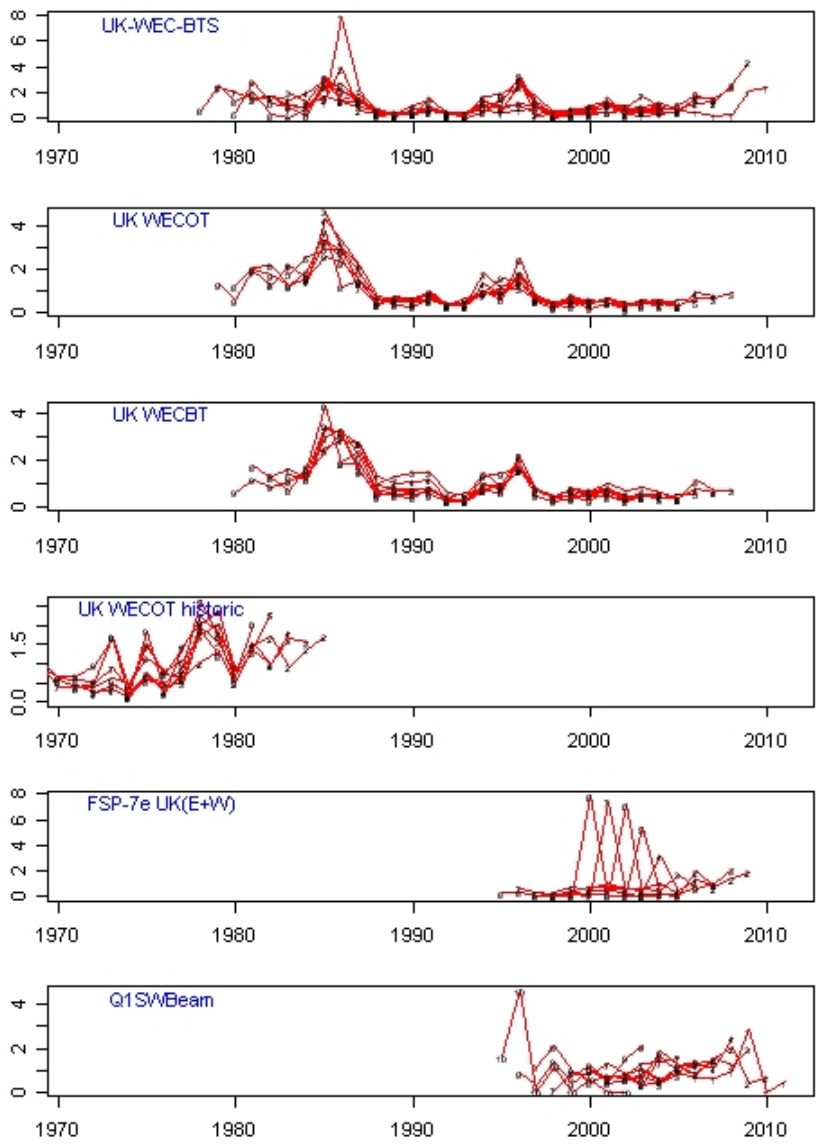


Figure 10.2. Comparison of plaice indices used in assessment with new survey.

The consistency of the community information of fish suggests that the survey is also suitable to provide unbiased ecosystem information as expected. It is hoped that this information will be investigated in more detail to show how the species community information can be seen as integrating over a significant number of ecosystem process. It is hoped that inclusion of further sampling disciplines in the survey in future will further enhance the contribution of this survey to the ecosystem monitoring process while maintaining its fisheries utility.

WGBEAM feels that the difference in survey design and the move towards a more ecosystem based monitoring approach is not a hindrance to either the coordination of the series nor the provision of data products from DATRAS, so agreed to coordinate the survey.

10.2 OSPAR Request (ToR f)

Several ICES Expert Groups - including WGBEAM - have been asked to respond to the OSPAR Request (2013-4):

"Maximize the use of available sources of data for monitoring of biodiversity: The purpose of this request is to seek ICES advice on the potential sources of data and information that may be available to support the monitoring and assessment of biodiversity in relation to commitments under MSFD so as to maximize efficiencies in the use of available resources, for example where efficiencies could be made to identify where there are monitoring programmes or data sources that can deliver multiple indicators, which may relate to different Descriptors, (e.g. The Data Collection Framework could be used to implement D3 and D1 indicators), or where with a small additional effort existing monitoring could be amplified to deliver a broader set of data. Advice would be sought as to 1) the quality of these potential data sources and how they could be used, including but not limited to the relevance of outcomes identified in chapter 8 of the ICES MSFD D3+ report to Descriptors 1, 4 and 6."

WGBEAM 2013 used the template agreed at IBTSWG 2013 which used the following assumptions.

i) Selecting MSFD indicators defined in the EU COM Decision 477/2010, which are related to biodiversity issues. These are primarily, but not exclusively, the indicators listed under Descriptor 1.

ii) Identifying as far as possible analogous indicators in the OSPAR terminology in OSPAR document BDC 13/4/2-E from February, 2013.

iii) Determining data availability through the IBTS surveys in their present form.

iv) Identifying opportunities for additional data collection or analyses, which would lead to improved data availability for MSFD reporting, but would require additional effort during the IBTS surveys themselves or after the surveys for sample and data analyses ashore.

WGBEAM data has important contributions to make to the MSFD descriptors (especially 1,2,3,4 and 10). Currently MSFD focuses on survey data from IBTSWG, and appears to disregard data from WGBEAM surveys. The work necessary to integrate the two sources of information effectively should be undertaken as soon as possible. WGBEAM is willing to contribute to this work.

WGBEAM feels beam trawl surveys have an important role to play in the MSFD but there seems to be little guidance available. It is recommended that SCICOM provide opportunities for cooperation between survey coordinating groups, WGISUR and the integrated assessment groups in the development of MSFD related issues.

The results of the stepwise process described above are summarized in Table 10.1.

Table 10.1. Possible contributions of the ICES Beam Trawl Surveys to reporting under the MSFD, specifically with regard to biodiversity-related indicators. Indicators selected, based on nomenclature in EU-COM 477/2010 (left-hand column); matching OPSAR indicator ID (2nd column); distinction of core and candidate indicators as identified by OSPAR; WGBEAM data availability from surveys in the North Sea, Western Waters of the UK, Bay of Biscay, Adriatic Sea and inshore waters of the North Sea respectively; possible improvement of data availability in each of the survey areas if extra effort was allocated to these surveys. Were 'NO' is recorded this means that without extensive redesigning of the survey, no improvement to the data availability is possible.

MSFD (EU-COM 477/2010)	OSPAR terminology			WGBEAM data availability				
Indicator ID	**Indicator ID**	**Indicator name**	**Core/ Candidate**	**North Sea**	**Western UK Waters**	**France/Biscay**	**Adriatic**	**Inshore**
1.2.1	FC-1	Population abundance/ biomass of a suite of selected species	Core	No population estimates (see assessments for those). Abundance (per square km) estimates for various fish species can be supplied. Accuracy is species-dependent.	No population estimates (see assessments for those). Abundance (per square km) estimates for various fish species can be supplied. Accuracy is species-dependent.	No population estimates (see assessments for those). Abundance (per square km) estimates for various fish species can be supplied. Accuracy is species-dependent.	No population estimates (see assessments for those). Abundance (per square km) estimates for various fish species can be supplied. Accuracy is species-dependent.	The area covered is spatially restricted but will give additional information not available from other survey sources. Abundance (per square km) estimates for various fish species can be supplied. Accuracy is species-dependent.
4.2.1	FC-2; FW-3	OSPAR EcoQO for proportion of large fish (LFI)	Core	Yes - cut-off point and reference limit needs to be defined by survey	Yes - cut-off point and reference limit needs to be defined by survey	Yes - cut-off point and reference limit needs to be defined by survey	Yes	Yes - cut-off point and reference limit needs to be defined by survey

MSFD (EU-COM 477/2010)	**OSPAR terminology**			**WGBEAM data availability**				
Indicator ID	**Indicator ID**	**Indicator name**	**Core/ Candidate**	**North Sea**	**Western UK Waters**	**France/Biscay**	**Adriatic**	**Inshore**
3.3.2	FC-3	Mean maximum length of demersal fish and elasmobranchs	Core	Yes	Yes	Yes	Yes	Yes
N.A. (related to 4.3.1)	FC-4	Bycatch rates of Chondrichthyes	Candidate	Not relevant to research surveys	Not relevant to research surveys	Not relevant to research surveys	Not relevant to research surveys	Not relevant to research surveys
N.A. (related to 4.3.1)	FC-5	Conservation status of elasmobranch and demersal bony-fish species (IUCN)	Candidate	No population estimates (see assessments for those). Abundance (per square km) estimates for various fish species can be supplied. Accuracy is species-dependent.	No population estimates (see assessments for those). Abundance (per square km) estimates for various fish species can be supplied. Accuracy is species-dependent.	No population estimates (see assessments for those). Abundance (per square km) estimates for various fish species can be supplied. Accuracy is species-dependent.	No population estimates (see assessments for those). Abundance (per square km) estimates for various fish species can be supplied. Accuracy is species-dependent.	The area covered is spatially restricted but will give additional information not available from other survey sources. Abundance (per square km) estimates for various fish species can be supplied. Accuracy is species-dependent.
1.3.1; 3.3.1	FC-6	Proportion of mature fish in the populations of all species sampled adequately in international and national fish surveys	Candidate	No - surveys outside the spawning period and gear selectivity issues	No - surveys outside the spawning period and gear selectivity issues	Relative proportion for target species (sole) data are collected	Relative proportion for target species data are collected	No - surveys outside the spawning period and gear selectivity issues

MSFD (EU-COM 477/2010)	OSPAR terminology			WGBEAM data availability				
Indicator ID	**Indicator ID**	**Indicator name**	**Core/ Candidate**	**North Sea**	**Western UK Waters**	**France/Biscay**	**Adriatic**	**Inshore**
1.1.1	FC-7	Distributional range of a suite of selected species	Candidate	Yes	Yes	Yes	Yes	Yes
1.1.2	FC-8	Distributional pattern within range of a suite of selected species	Candidate	Yes, according to spatial resolution and extent of the survey	Yes, according to spatial resolution and extent of the survey	Yes, according to spatial resolution and extent of the survey	Yes, according to spatial resolution and extent of the survey	Yes, according to spatial resolution of the survey
possibly related to 1.7.1 or 4.3.1	FW-4	Changes in average trophic level of marine predators (cf MTI)	Core	calculation of relative abundance is possible	calculation of relative abundance is possible	calculation of relative abundance is possible	calculation of relative abundance is possible	calculation of relative abundance is possible
1.7.1; 4.3.1	FW-7	Fish biomass and abundance of dietary functional groups	Candidate	Biomass and abundance estimates per square km of various fish species dependent on definition of dietary functional groups.	Biomass and abundance estimates per square km of various fish species dependent on definition of dietary functional groups.	Biomass and abundance estimates per square km of various fish species dependent on definition of dietary functional groups.	Biomass and abundance estimates per square km of various fish species dependent on definition of dietary functional groups.	Biomass and abundance estimates per square km of various fish species dependent on definition of dietary functional groups.
could be related to 4.2.1; 4.3.1	FW-8	Changes in average faunal biomass per trophic level (Biomass Trophic Spectrum)	Candidate	Data on biomass per haul for fish species and benthic organisms available for some surveys and some years	Data on biomass per haul for fish species and benthic organisms available for some surveys and some years		Data on biomass per haul for fish species and mega-benthic organisms available for some surveys and some years	Data on biomass per haul for fish species available. Epibenthic biomass available for some surveys

MSFD (EU-COM 477/2010)	OSPAR terminology			WGBEAM data availability				
Indicator ID	**Indicator ID**	**Indicator name**	**Core/ Candi-date**	**North Sea**	**Western UK Waters**	**France/Biscay**	**Adriatic**	**Inshore**
1.2.1	B-1	Species-specific trends in relative abundance of non-breeding and breeding marine bird species	Core					
1.1.2	B-6	Distributional pattern of breeding and non-breeding marine birds	Core					

MSFD (EU-COM 477/2010)	OSPAR terminology			Possible improvement with extra effort				
Indicator ID	**Indicator ID**	**Indicator name**	**Core/ Candidate**	**North Sea**	**Western UK Waters**	**France/Biscay**	**Adriatic**	**Inshore**
1.2.1	FC-1	Population abundance/ biomass of a suite of selected species	Core	improve precision of relative abundance estimate by use of covariates	improve precision of relative abundance estimate by use of covariates	improve precision of relative abundance estimate by use of covariates	improve precision of relative abundance estimate by use of covariates	improve precision of relative abundance estimate by use of covariates
4.2.1	FC-2; FW-3	OSPAR EcoQO for proportion of large fish (LFI)	Core	No	No	No	No	No
3.3.2	FC-3	Mean maximum length of demersal fish and elasmobranchs	Core	No	No	No		No
N.A. (related to 4.3.1)	FC-4	Bycatch rates of Chondrichthyes	Candidate	No	No	No	No	No
N.A. (related to 4.3.1)	FC-5	Conservation status of elasmobranch and demersal bony-fish species (IUCN)	Candidate	No	No	No	No	No

MSFD (EU-COM 477/2010)	OSPAR terminology			Possible improvement with extra effort				
Indicator ID	**Indicator ID**	**Indicator name**	**Core/ Candidate**	**North Sea**	**Western UK Waters**	**France/Biscay**	**Adriatic**	**Inshore**
1.3.1; 3.3.1	FC-6	Proportion of mature fish in the populations of all species sampled adequately in international and national fish surveys	Candidate	Histological analysis at sea (ICES, 2012;1 and 2012;2) during sampling of macroscopic maturity sampling. And/or back calculating size at maturity from data collected during spawning season. For summer spawning species a validated maturity key	Histological analysis at sea (ICES 2012;1 and 2012;2) during sampling of macroscopic maturity sampling. And/or back calculating size at maturity from data collected during spawning season. For summer spawning species a validated maturity key	Histological analysis at sea (ICES, 2012;1 and 2012;2) during sampling of macroscopic maturity sampling. And/or back calculating size at maturity from data collected during spawning season. For summer spawning species a validated maturity key	Histological analysis at sea (ICES, 2012;1 and 2012;2) during sampling of macroscopic maturity sampling. And/or back calculating size at maturity from data collected during spawning season. For summer spawning species a validated maturity key	
1.1.1	FC-7	Distributional range of a suite of selected species	Candidate	No	No	No	No	No
1.1.2	FC-8	Distributional pattern within range of a suite of selected species	Candidate	No	No	No	No	No

MSFD (EU-COM 477/2010)	OSPAR terminology			Possible improvement with extra effort				
Indicator ID	**Indicator ID**	**Indicator name**	**Core/ Candidate**	**North Sea**	**Western UK Waters**	**France/Biscay**	**Adriatic**	**Inshore**
possibly related to 1.7.1 or 4.3.1	FW-4	Changes in average trophic level of marine predators (cf MTI)	Core	Samples for fish predators can be provided (for stomach analyses or tissue samples for stable isotope analysis); sample processing requires extra analytical effort.	Samples for fish predators can be provided (for stomach analyses or tissue samples for stable isotope analysis); sample processing requires extra analytical effort.	Samples for fish predators can be provided (for stomach analyses or tissue samples for stable isotope analysis); sample processing requires extra analytical effort.	Samples for fish predators can be provided (for stomach analyses or tissue samples for stable isotope analysis); sample processing requires extra analytical effort.	Samples for fish predators can be provided (for stomach analyses or tissue samples for stable isotope analysis); sample processing requires extra analytical effort.
1.7.1; 4.3.1	FW-7	Fish biomass and abundance of dietary functional groups	Candidate	Extra effort if individual fish weights of non-target species are needed.	Extra effort if individual fish weights of non-target species are needed.	Extra effort if individual fish weights of non-target species are needed.	Extra effort if individual fish weights of non-target species are needed.	Extra effort if individual fish weights of non-target species are needed.
could be related to 4.2.1; 4.3.1	FW-8	Changes in average faunal biomass per trophic level (Biomass Trophic Spectrum)	Candidate	full benthic sort and sampling possible with extra resource	full benthic sort and sampling possible with extra resource	full benthic sort and sampling possible with extra resource	full benthic sort and sampling possible with extra resource	full benthic sort and sampling possible with extra resource

MSFD (EU-COM 477/2010)	OSPAR terminology			Possible improvement with extra effort				
Indicator ID	**Indicator ID**	**Indicator name**	**Core/ Candidate**	**North Sea**	**Western UK Waters**	**France/Biscay**	**Adriatic**	**Inshore**
1.2.1	B-1	Species-specific trends in relative abundance of non-breeding and breeding marine bird species	Core	Yes, some surveys in WGBEAM may be able to take bird observers aboard (however, acoustic surveys or ichthyoplankon surveys may be advantageous for seabird observations).	No	No	No	No
1.1.2	B-6	Distributional pattern of breeding and non-breeding marine birds	Core					

Comment for all entries: Limited (all survey data) by the catchability of the gear for the species in question.

11 References

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ICES. 2012b. Report of the Workshop on Sexual Maturity Staging of Turbot and Brill (WKM-STB 2012), 5–9 March 2012, IJmuiden, Netherlands. ICES 2012/ACOM:56. 48 pp.

ICES. 1985. Report of the 0-group North Sea flatfish working group. ICES CM 1985/G:2

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Annex 1: List of WGBEAM participants

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Annex 2: Agenda

Agenda WGBEAM 2013, 23–26 April 2013

Tuesday 23 April, start 9.30

Welcome and Logistics

am

General issues:

1) Terms of Reference and main aims
2) Working documents
3) Chapter responsibilities:

Then ICES Datacentre issues

- ICES Datacenter – Vaishav
- Issues arising

4) Review of recommendations
5) Reports from:
   - IBTS WG – Brian
   - WKDATR – Ingeborg
   - WGISUR – Brian

Presentations:

- New Cefas Q1 Western English Channel BT survey (presentation on Thursday pm)

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

- as last year: similar plots and text as in 2012 report
- changes in population distribution
- discuss the index calculation methods

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

Short feedback on the 2012 by all countries: did people face problems during the survey, how were they solved? Involvement of fishers in the beam trawl surveys: experiences, nice things to know, etc.

Prepare standard output:

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

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

- survey timing and gear
- staff exchange – any for 2013
- overlapping of survey days for gear inter-calibration to be discussed
- QA issues, list of fish species in offshore and inshore beam trawl surveys
- Update on benthic species list for DATRAS –

pm

ToR d) Using the work carried out in 2012, continue to analyse the changes in mean length-at-age for sole in the North Sea, English Channel, Bristol Channel and Irish Sea;

- Update on were Loes has got to on this work
- Input from others to this ToR
- Continue with Chapter work

Wednesday 24th

am

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

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

Inshore surveys:

- update database inshore surveys

Discussion and arrangement of staff exchanges on 2012 beam trawl surveys

Tor g) Ensure that the most recent version of the survey manual is submitted to the Series of ICES Survey Protocols (SISP).

pm

- continue chapter work

Thursday 25th

am

Tor f) Provide a response in terms of a joint annex in the reports from IBTSWG and WGBEAM, on maximizing the use of available sources of data for monitoring of biodiversity. The WGBIODIV should be consulted in the process.

The purpose of this request is to seek ICES advice on the potential sources of data and information that may be available to support the monitoring and assessment of biodiversity in relation to commitments under MSFD so as to maximize efficiencies in the use of available resources, for example where efficiencies could be made to identify where there are monitoring programmes or data sources that can deliver multiple indicators, which may relate to different Descriptors, (e.g. The Data Collection Framework could be used to implement D3 and D1 indicators), or where with a small additional effort existing monitoring could be amplified to deliver a broader set of data. Advice would be

sought as to 1) the quality of these potential data sources and how they could be used, including but not limited to the relevance of outcomes identified in chapter 8 of the ICES MSFD D3+ report to Descriptors 1, 4 and 6. **OSPAR request 2013-4 (report by 15 May).**

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

pm

- Presentation on new Cefas Q1 Western English Channel BT survey
- Analysis and text writing

Friday 26th

am

Date and time of next meeting. 6–9 May 2014 Hamburg

New Chair – Kelle!

ToR e) Review and finalize the multi-annual TOR for 2014-2016;

Recommendations

Text checking

1300 finish

Annex 3: WGBEAM terms of reference for next meeting

The **Working Group on Beam Trawl Surveys** (WGBEAM), chaired by Kelle Moreau*, Belgium, will meet in Hamburg, Germany, 6–9 May 2014, to work on ToRs and generate deliverables as listed in the Table below.

WGBEAM will report on the activities of 2014 by 10 July 2014 to 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 and plaice and other species if required in the North Sea, Division VIIa and Divisions VIId-g, taking into account the key issues involved in the index calculation.	Required to support indices for assessements	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 VIIa, VIId-g, VIIIa-b and the Adraitic.	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 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.	a). The large WGBEAM dataset has the potential to elucidate temporal and spatial changes in population parameters. b). Indices are being used by assesements working groups and any changes to age structure of species of interest need to be investigated.	145	Expected output in 2015	WGBEAM 2014 update and ultimatley ASC presentation
d	Provide index calculations based on DATRAS for plaice and sole for the North Sea.	Required to support indices for assessements	141, 143, 144	2 years for sole 3 years for plaice	Provision of new indice 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 assessements	141, 143, 144	3 years	Provision of new index series to relevant WGs

Summary of the Work Plan

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

Supporting information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem affects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority.
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 10-12 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages.
Linkages to other committees or groups	There is a very close working relationship with all the groups of the SSGESST. It is also very relevant to the Working Group on Ecosystem Effects of Fisheries.
Linkages to other organizations	The work of this group is closely aligned with similar work in FAO.

Annex 4: Recommendations

nr	Recommendation	Adressed to
1	To change the AphiaID for Crossaster into 123336 and to change the scientific names of *Leptasterias muelleri*, Phycidae˜ and *Loligo forbesiiÿ* in the correct names (section 7.2.3).	ICES Data Centre
2	It is recommended that ICES Data Centre adds an extra column to the Exchange file containing the accepted WoRMS coding or the accepted scientific name for all data stored in DATRAS so data downloaders do not have to work with two different taxonomic coding systems. Additionally, it is recommended to create the "flat file" proposed by WKDATR (see section 4.2.4 of ICES 2013) as soon as possible .	ICES Data Centre
3	To create the "flat file" proposed by WKDATR (see section 4.2.4 of WKDATR report) as soon as possible.	ICES Data Centre
4	To changes the codes for the unaccepted names to the accepted name codes for the species in the BTS and BTS-VII dataset (Section 7.2.3).	ICES Data Centre
5	As the differences in coding (TSN vs. WoRMS, accepted codes vs. unaccepted codes) might not only influence DATRAS but also other databases hosted by ICES, it is recommended that ICES Data Centre and DIG define the most suitable way for ICES Data Centre, data-submitters and data-users to cope with the frequent updates of WoRMS.	ICES Data Centre, DIG
6	WGBEAM feels we have an important role to play in the MSFD but there seems to be little guidance available. It is recommended that SCICOM provide opportunities for cooperation in the development of MSFD related issues (section 9.1)	SCICOM
7	WGBEAM recommends that if time and weather allows, overlapping hauls should be carried out by countries operating in the same area.	All WGBEAM countries
8	The current products for the BTS and BTS-VIIa at datras.ices.dk have not been validated by WGBEAM, and are in some cases incorrect. WGBEAM recommend that the current products should be removed from the DATRAS webpage and be replaced by new products as proposed below.	ICES Data Centre
9	WGBEAM recommends that the Methods Working Group (WGMG) decides on the format of survey sampling variance required for use at assessment working groups. If possible the methodology to calculate this variance should also be produced.	WGMG

	Actions	Adressed to
1	Cross-check the distance and duration information for the complete offshore dataset in DATRAS, and resubmit data where appropriate	ENG (Brian Harley), GFR (Kay Panten), NED (Ingeborg de Boois)
2	Resubmit files containing -9 for GroundSpeed with the standard survey speed following the manual	ENG (Brian Harley)
3	Mismatching information on datatype and subfactor should be checked by the country responsible and changed as soon as possible in DATRAS, by resubmitting the data	ENG (Brian Harley), NED (Ingeborg de Boois)
4	all countries to upload all species caught during the beam trawl surveys, if necessary by resubmitting files from earlier years.	Resubmission: ENG (Brian Harley), GFR (Kay Panten), NED (Ingeborg de Boois) Submission: BEL (Kelle Moreau), FRA (Gerard Biais)
5	During WGBEAM 2014, Germany reconsider which areas are included in the German DYFS indices and update appropriately	GFR(Kay Panten)
6	Reconsider not applying area-based weighting for the German DYFS indices	GFR(Kay Panten)
7	Revise the combined inshore indices using the revised German indices.	GFR(Kay Panten)

	Actions related to index calculation BTS from DATRAS, carry out before 1/2/2014	Adressed to
1	Send the selection of rectangles for which an index has to be created to ICES Data Centre	Brian Harley
2	Provide allocation of statistical rectangles to ALK areas of Dutch index calculation to England, Germany and Belgium	Ingeborg de Boois
3	Apply the current calculation to:	
	a. the Dutch BTS data for plaice and sole for the full time-series and compare with Dutch index series. Differences due to data should be solved by resubmitting data and differences due to different data selection might be solved by fine-tuning the current code.	Vaishav Soni/Ingeborg de Boois
	b. the English BTS data for plaice and sole and compare with the English index series. Differences due to data should be solved by resubmitting data. Differences not caused by differences in data should be discussed during WGBEAM 2014, to see the impact of the differences.	Vaishav Soni/Brian Harley
	c. to the German BTS data and send the data to TI for review	Vaishav Soni/Kay Panten
	d. to the Belgian BTS data if uploaded in DATRAS and send the data to ILVO for review	Vaishav Soni/Kelle Moreau

Annex 5: Details on offshore and inshore beam trawl surveys

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

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

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

Annex 5.2: Inventory of the inshore beam trawl surveys.

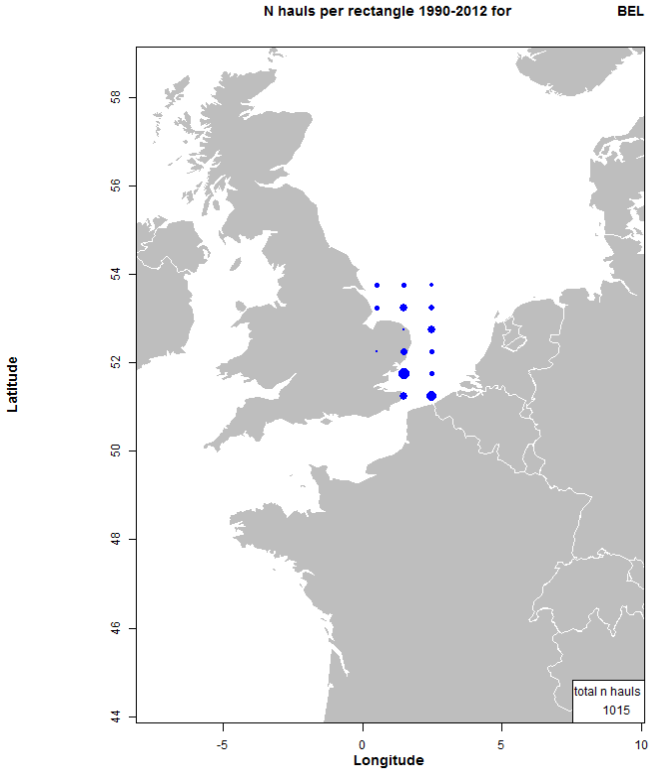
Country	Netherlands (SNS)	Netherlands (DYFS)			UK (YFS)	Belgium (DYFS)	Germany (DYFS)	
Geographical Area	Scheveningen (NL) to Esbjerg (DK)	Wadden Sea	Scheldt Estuary	Dutch coast to Danish coast	Eastern/South-Eastern English Coast	Belgian Coast	NiedersachsenWadden Sea +Elbe Estuary	Schlesweig-Holstein Wadden Sea
Ship	Tridens / Isis	Stern / Waddenzee	Schollevaar	Isis / Beukels / WR17 / GO29	Chartered vessels	Broodwinner	Chartered vessels	Chartered vessels
ship size (m)	73m / 28m	21m / 21m	21m	± 28m	8–10m	27m	12–16m	12–18m
Date started	1969	1970	1970	1970	1973-2007 Ceased 2011	1970	1972	1974
Sampling Period	Apr/May ('69–'89) Sept/Oct	Apr/May ('70–'86) Sept/Oct	Apr/May ('70–'86) Sept/Oct	Apr/May ('70–'86) Sept/Oct	Sept/Oct	Sept/Oct	Apr/May ('74–'04) Sept/Oct	Apr/May ('74–'04) Sept/Oct
Usual Start date	12 Sept	29 Aug	5 Sept	26 Sept	1 Sept	1–14 Sept	15 Sept	5 Sept
Number of days per period	8–9 within 2 weeks	20 within 5 weeks	12 within 3 weeks	16 within 5 weeks	3 surveys x 8 days	7 within 2 weeks	5	5 – 7
Beam trawl type	6m beam trawl	3m shrimp trawl	3m shrimp trawl	6m shrimp trawl	2m shrimp trawl	6m shrimp trawl	3m shrimp trawl	3m shrimp trawl
Tickler Chains	4	1	1	1	3	0	0	0
Mesh size net	80mm	35mm	35mm	35mm	10mm	40mm	32mm	32mm
Mesh size codend	40mm	20mm	20mm	20mm	4mm	22mm	18mm	18mm
Speed fished	3.5–4 knots	3 knots	3 knots	3 knots	1 knot	3 knots	3 knots	3 knots
Time Fished	15 min	15 min	15 min	15 min	10 min	15 min	15 min	15 min
Approx. number of stations per year	55	120	80	100	82	33		
Target species	0– 4 group sole and plaice	0–1 group sole and plaice	0–1 group sole and plaice	0–1 group sole and plaice	0–1 group sole and plaice	0–2 group sole and plaice	0–1 group sole and plaice	0–1 group sole and plaice
Catch rate and LF distribution	All fish species	All fish species *Crangon*	All fish species *Crangon*	All fish species *Crangon*	All fish species	Commercial fish species *Crangon* (1973–92, 2004–05)	All fish species *Crangon*	All fish species *Crangon*
Catch rate	Epibenthos (quantity)	Epibenthos (quantity)	Epibenthos (quantity)	Epibenthos (quantity)	*Crangon* (volume)	*Crangon* (weight)	Epibenthos (quantity)	Epibenthos (quantity)
Age data for plaice and sole	All years	All years	All years	All years	Since 2003	None	None	None

Annex 6: Spatial distribution of sampling and fish species for the offshore surveys

Annex 6.1: Spatial sampling coverage per country

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

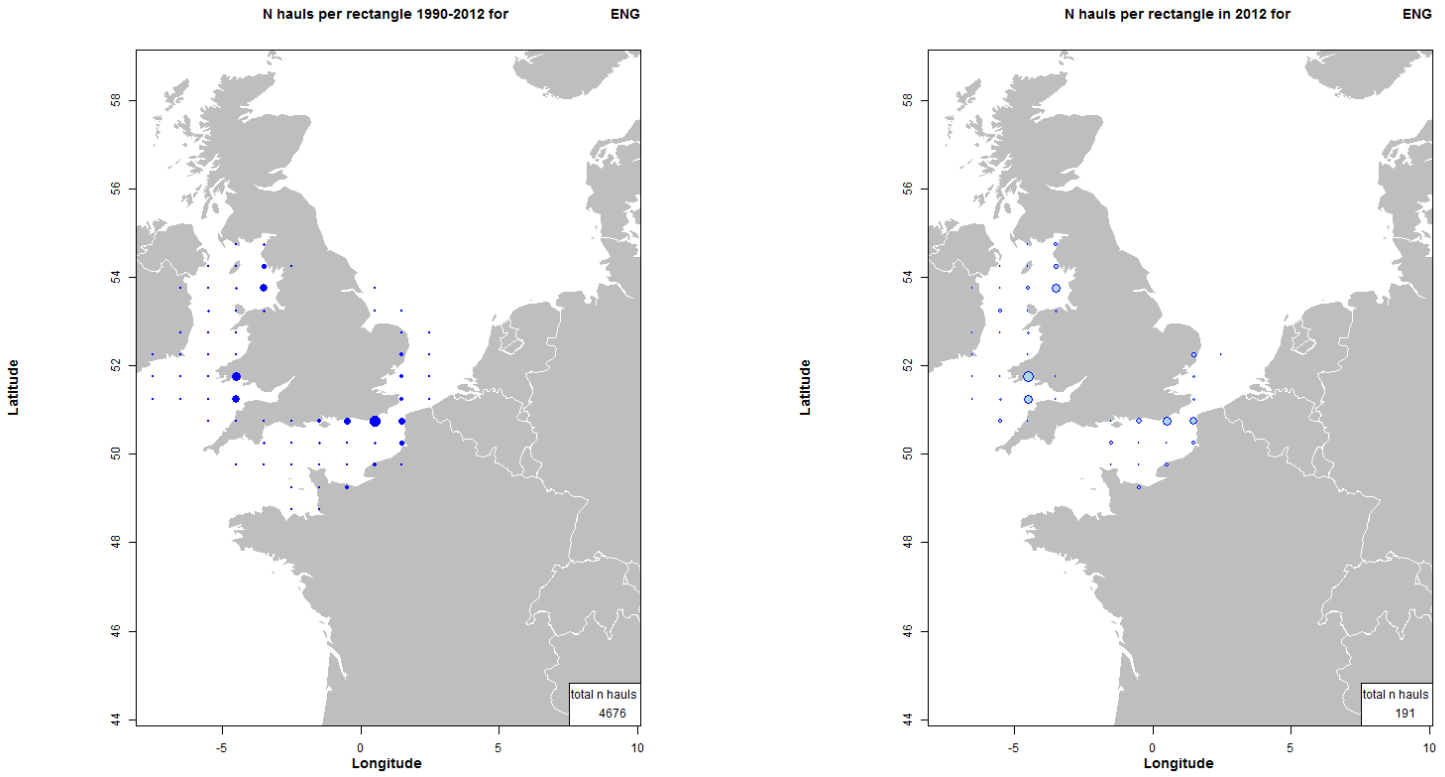
Left plot time-series, right plot current year



No data availabe at time of Working Group to produce 2012 plot

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

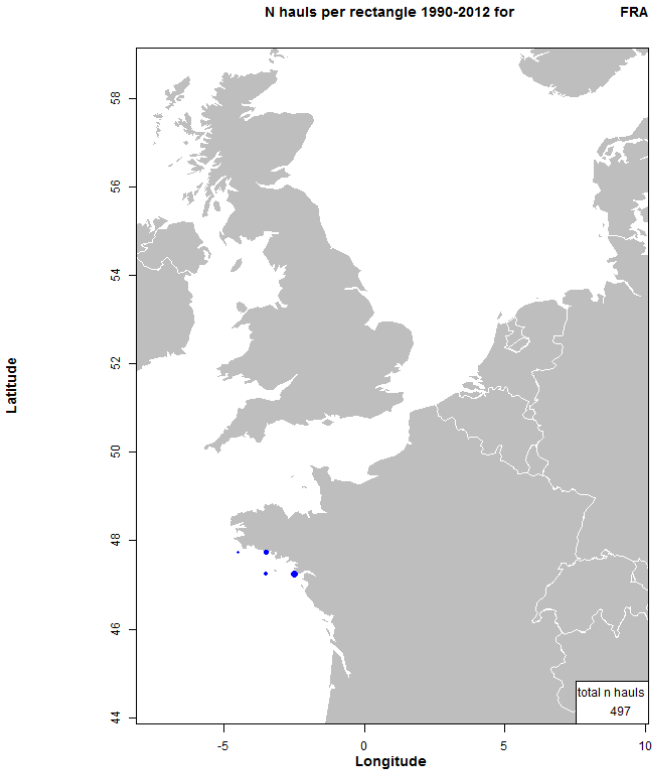
Left plot time-series, right plot current year



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

Left plot time-series, right plot current year

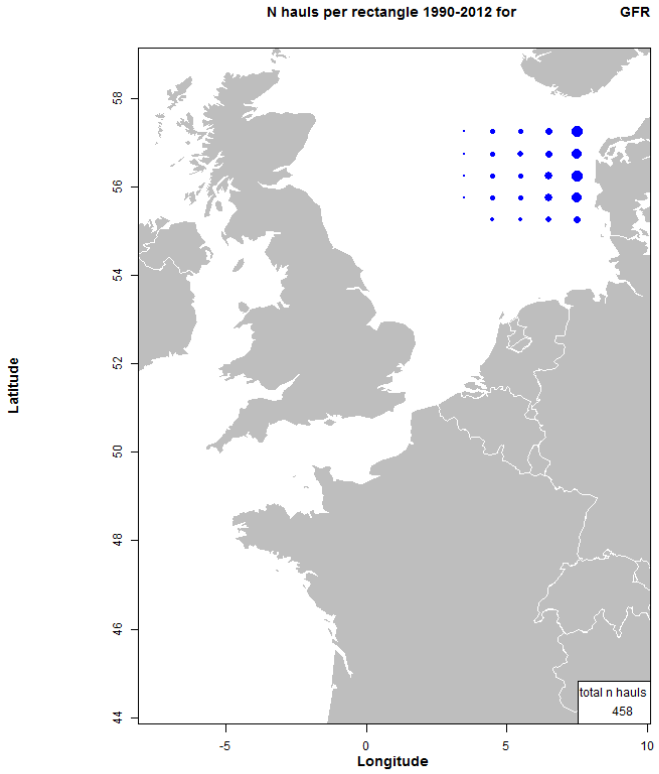
Station plot for 2011 survey not avialabe at time of Working Group

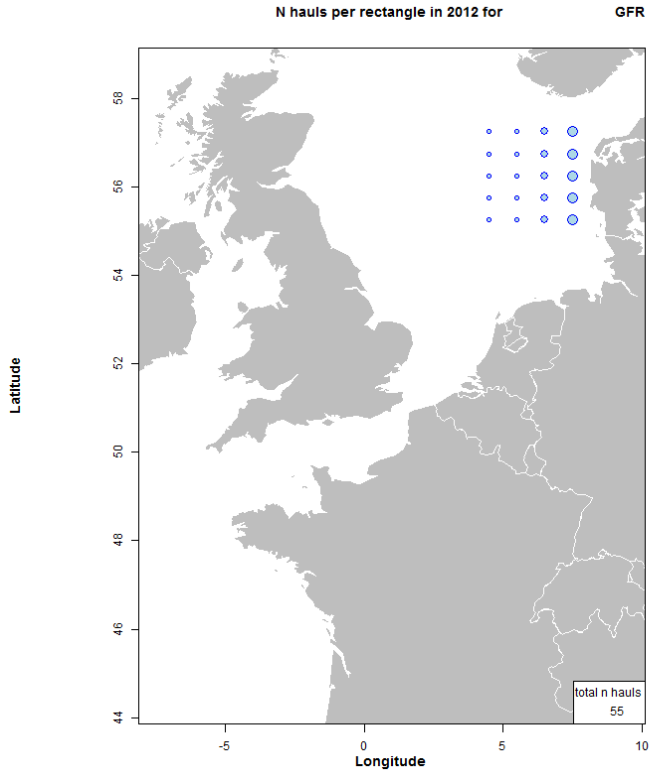


No data availabe at time of Working Group to produce 2012 plot

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

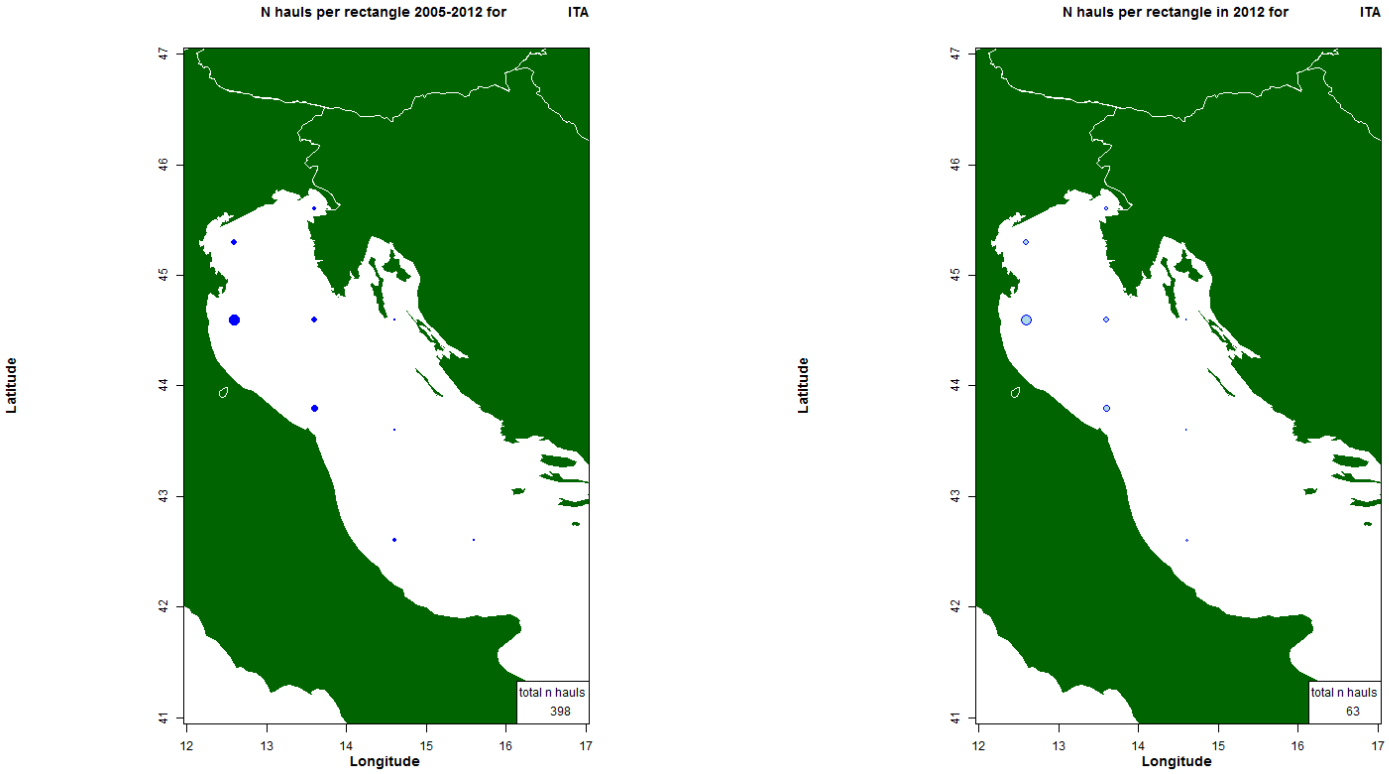
Left plot time-series, right plot current year





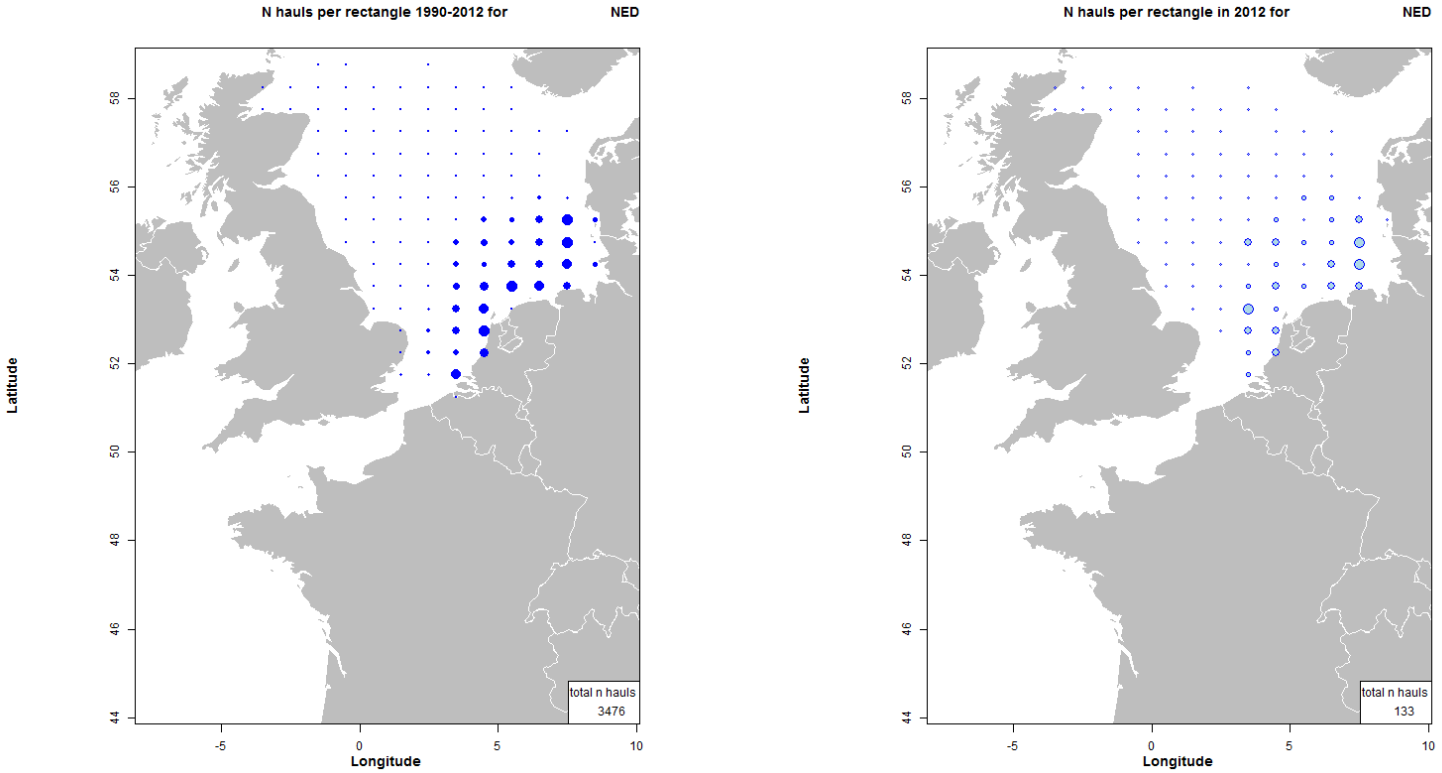
Annex 6.1.5: Total number of offshore beam trawl hauls per rectangle for Italy-Slovenia-Croatia

Left plot time-series, right plot current year



Annex 6.1.6: Total number of offshore beam trawl hauls per rectangle for Netherlands

Left plot time-series, right plot current year



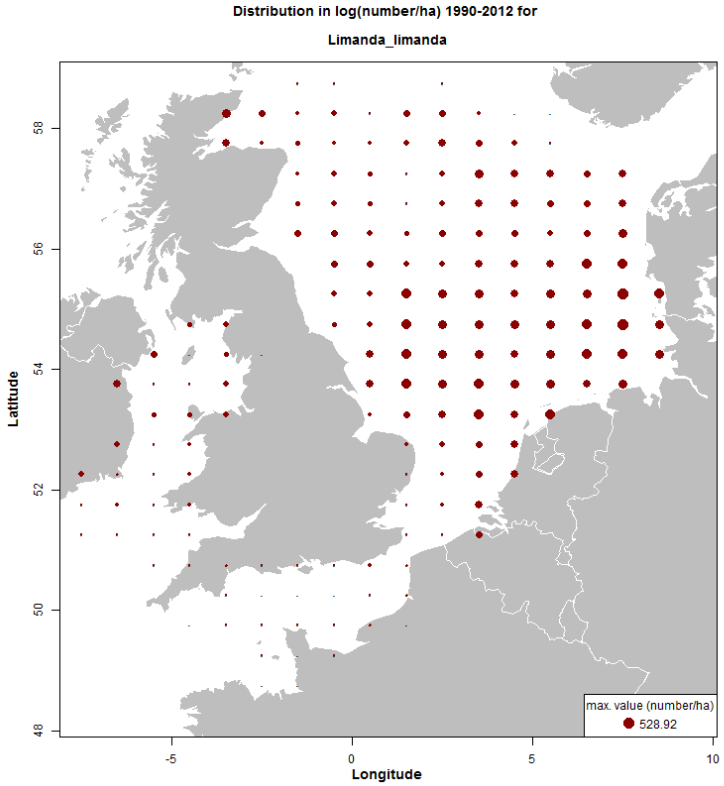
Annex 6.2: Spatial distribution per species

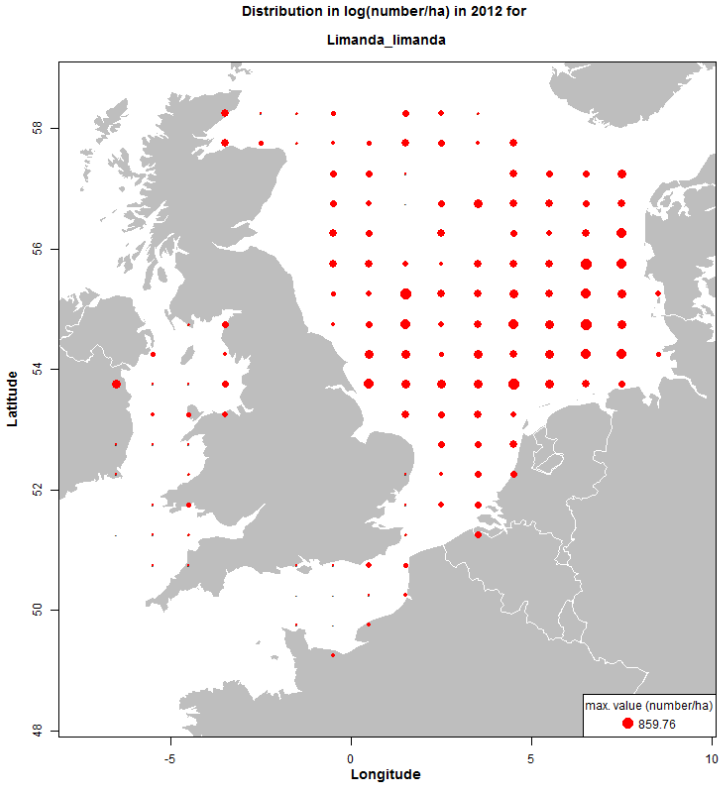
This annex shows distribution bubble plots of the main species caught throughout the beam trawl surveys by rectangle for all surveys combined. The left hand plot shows the mean catch in numbers per swept-area (hectares), for the time-series. The right hand plot shows the data for the current year.

Annex 6.2.1: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Dab

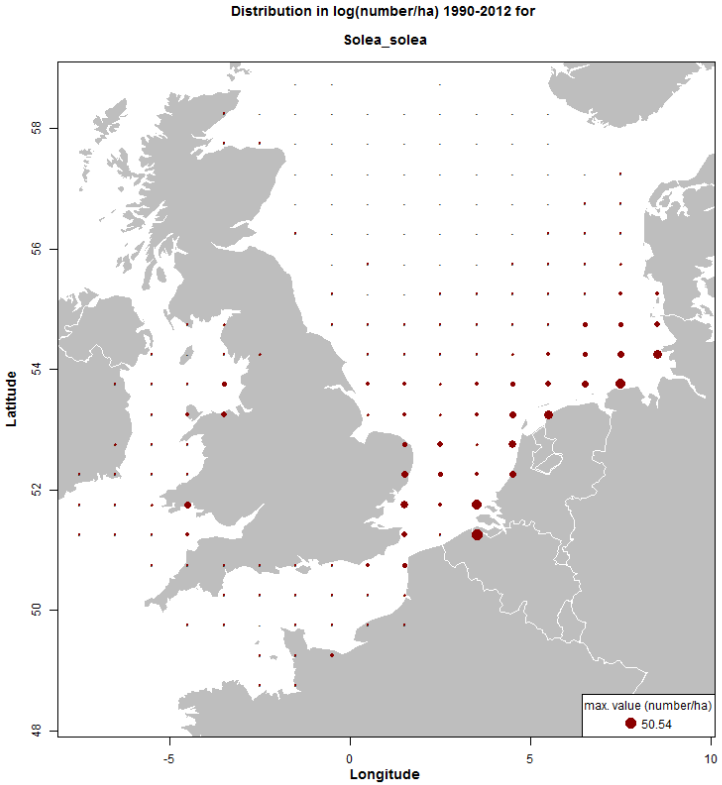


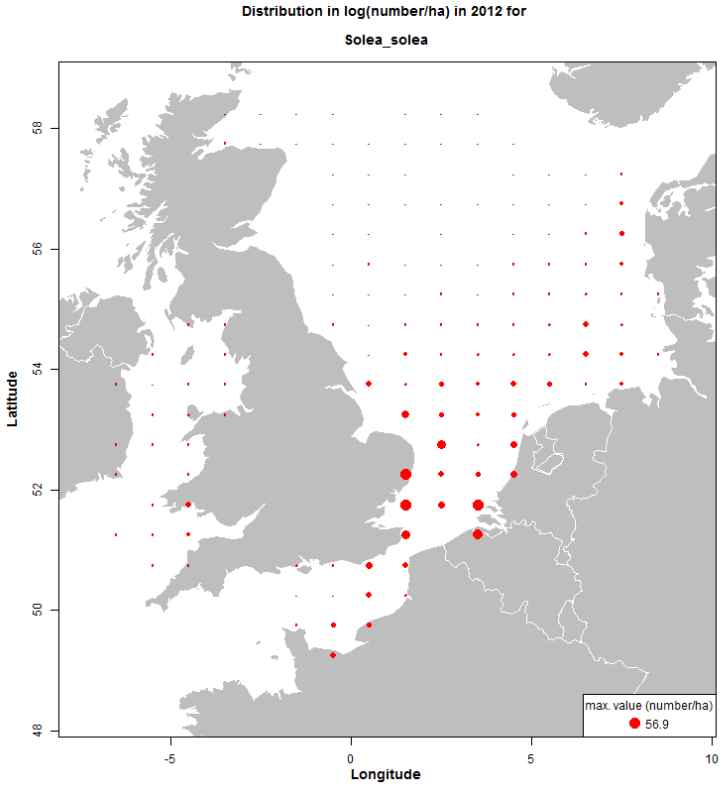


Annex 6.2.2: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Sole

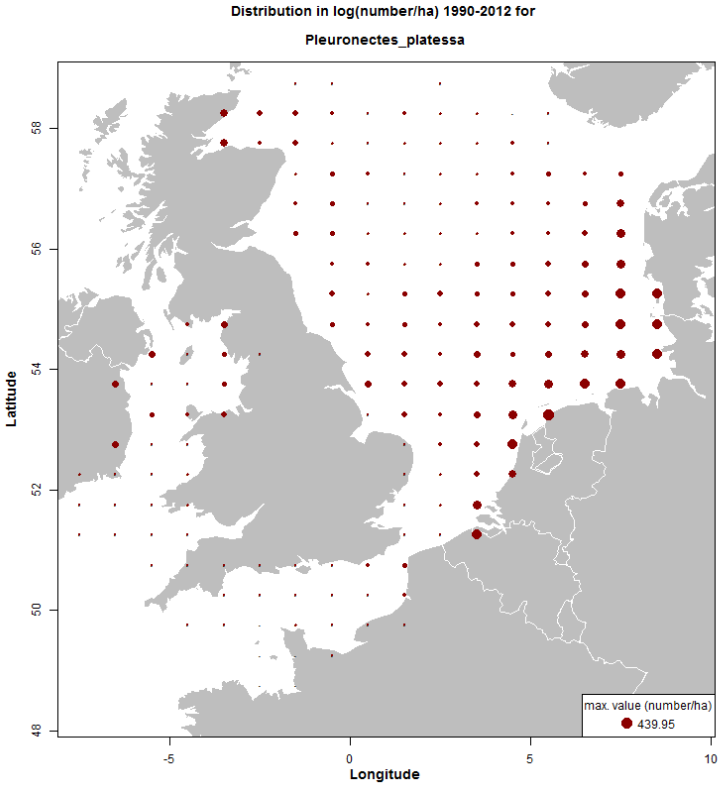


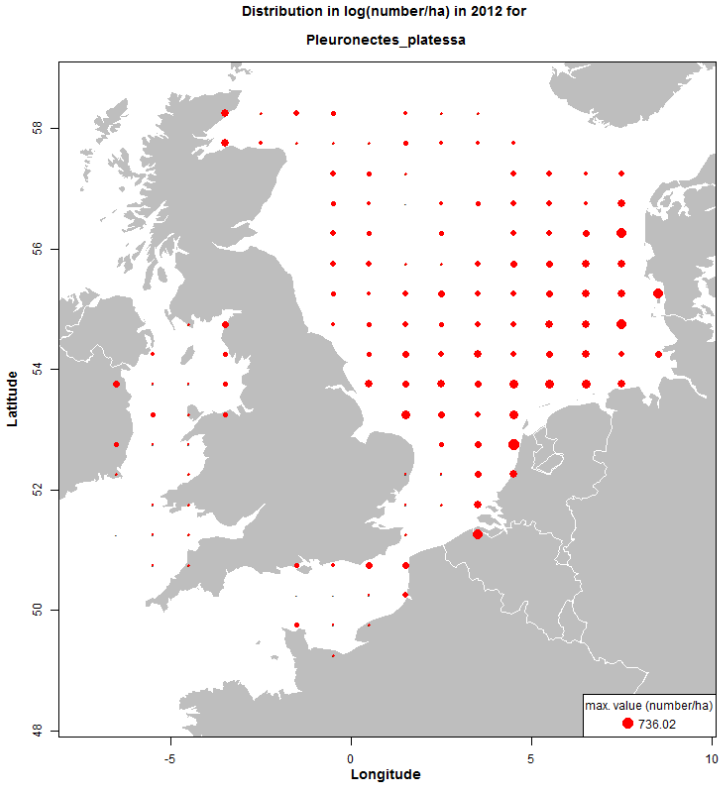


Annex 6.2.3: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Plaice

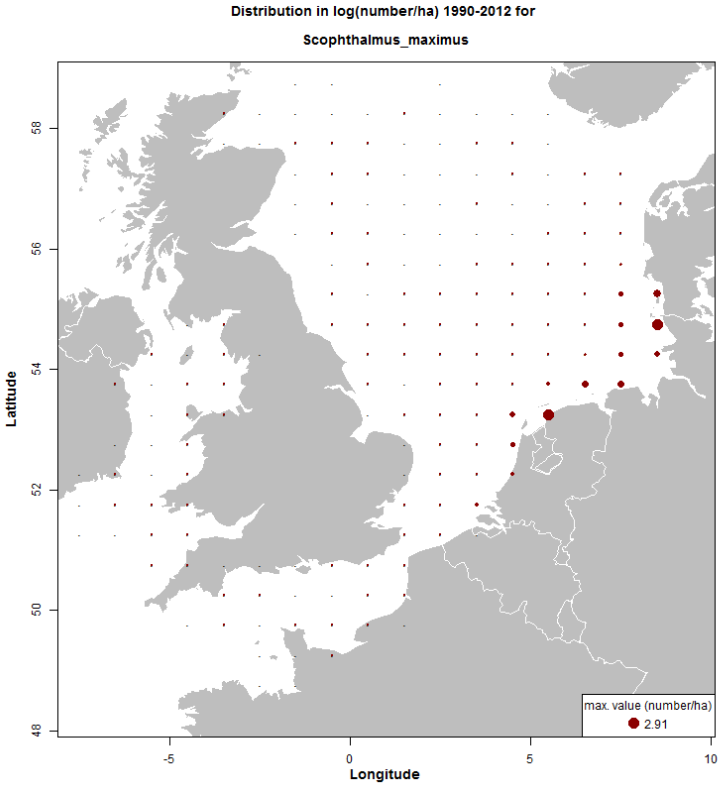


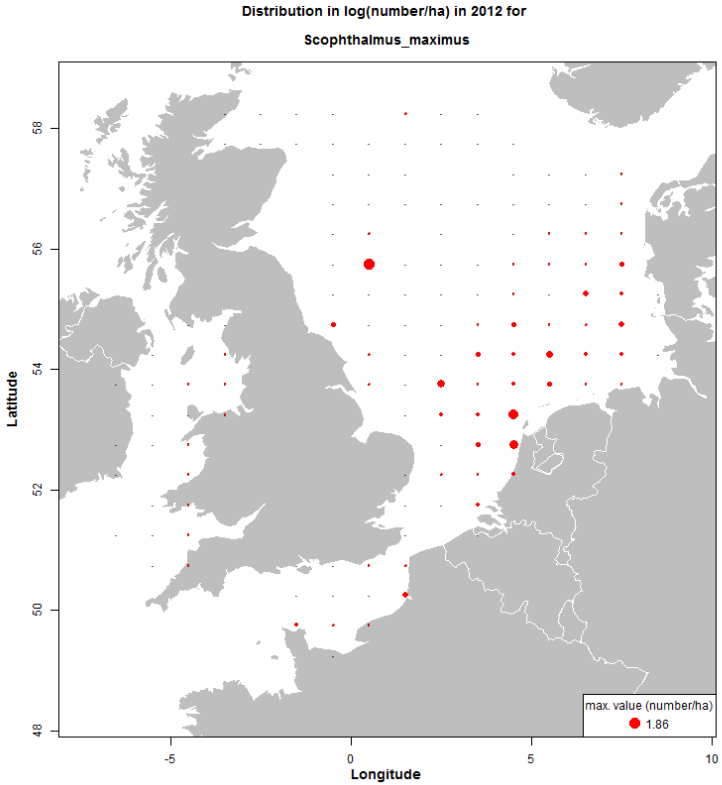


Annex 6.2.4: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Turbot

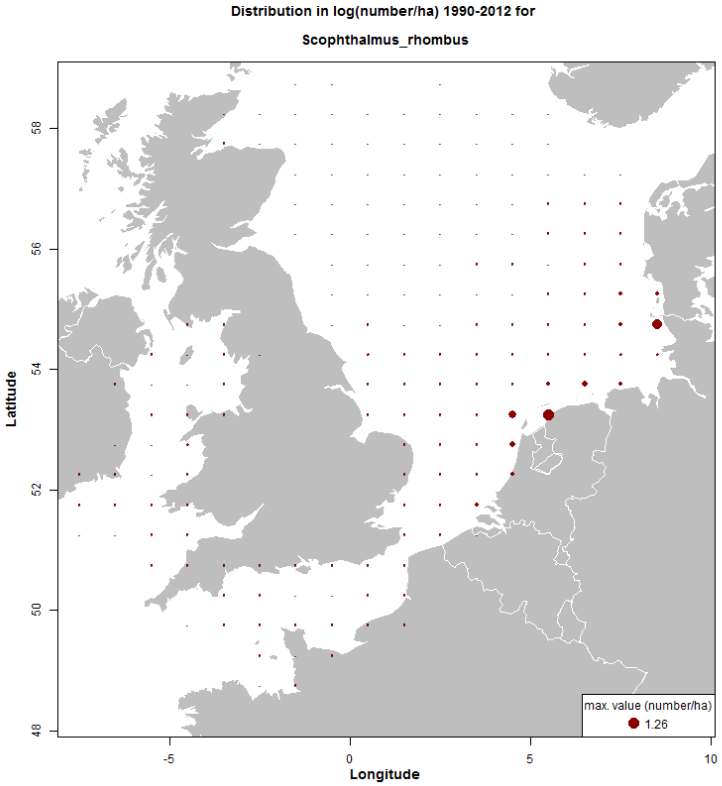


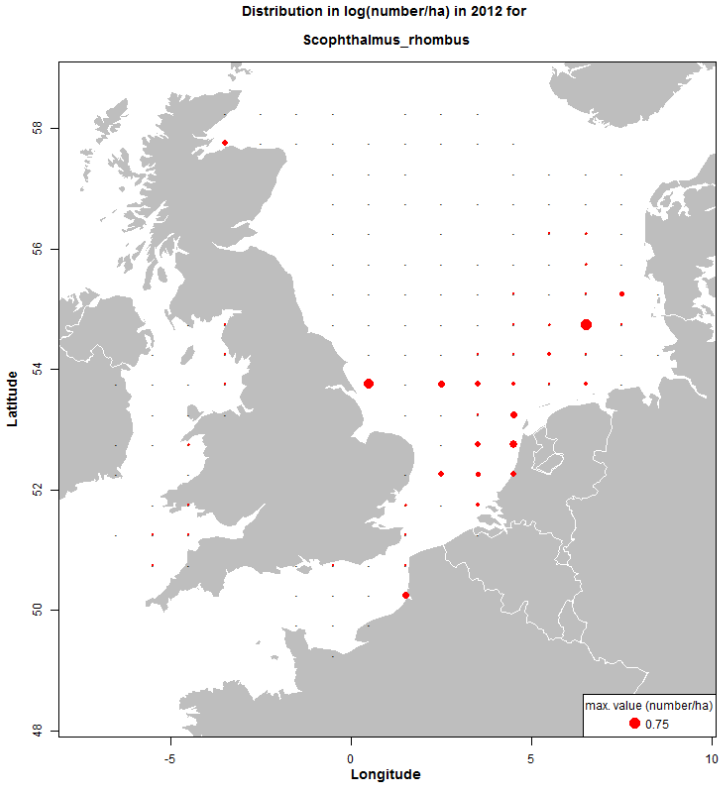


Annex 6.2.5: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Brill

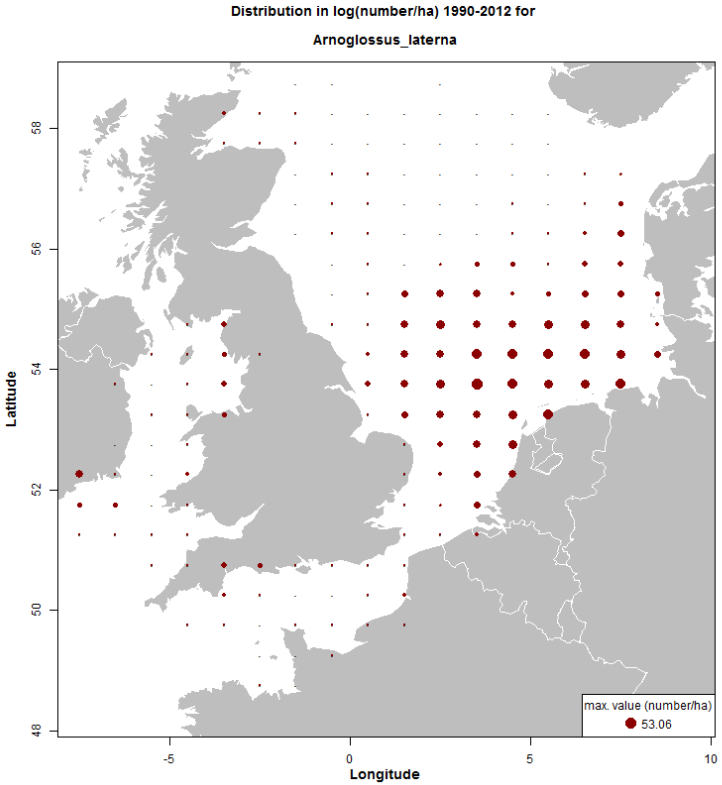


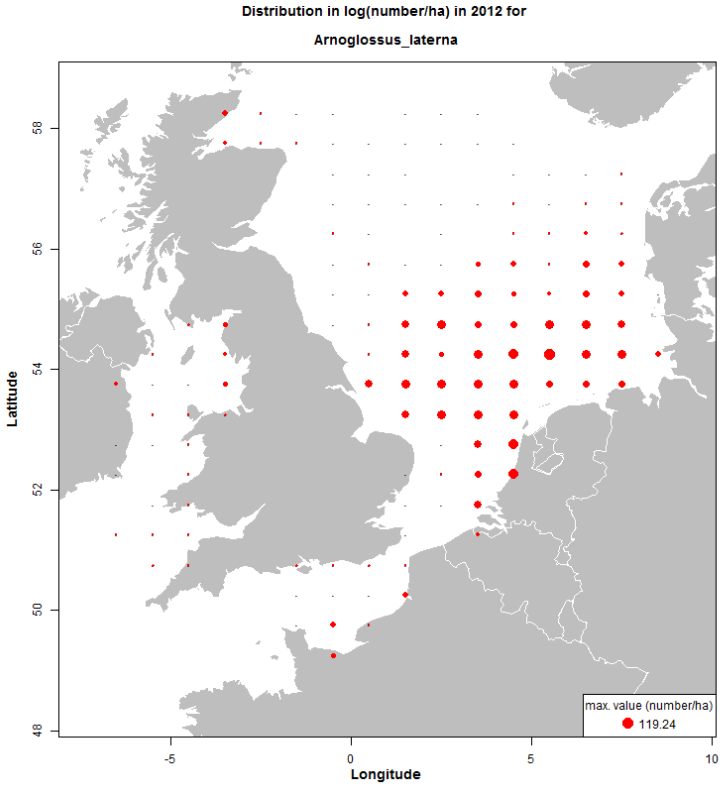


Annex 6.2.6: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Scaldfish

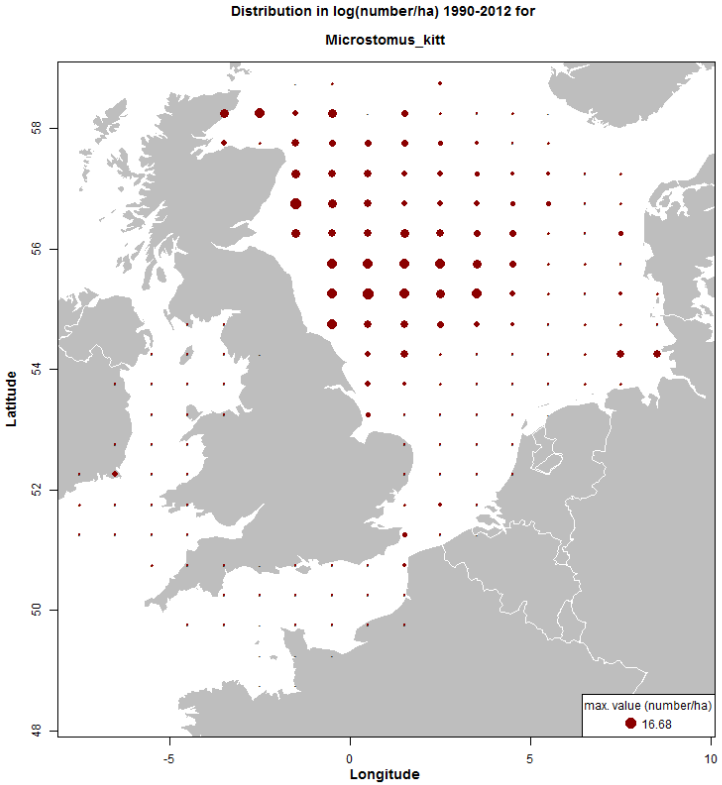


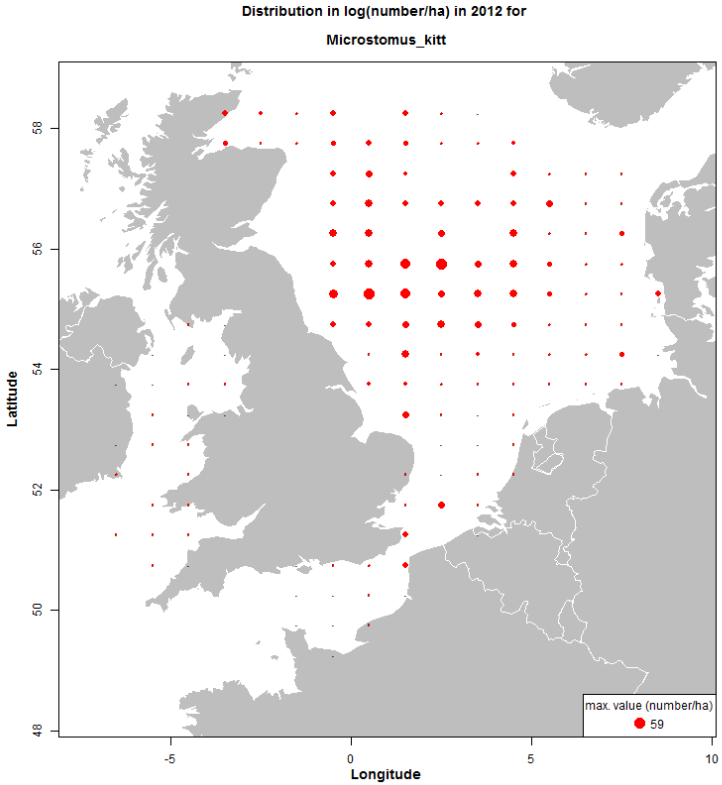


Annex 6.2.7: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Lemon sole

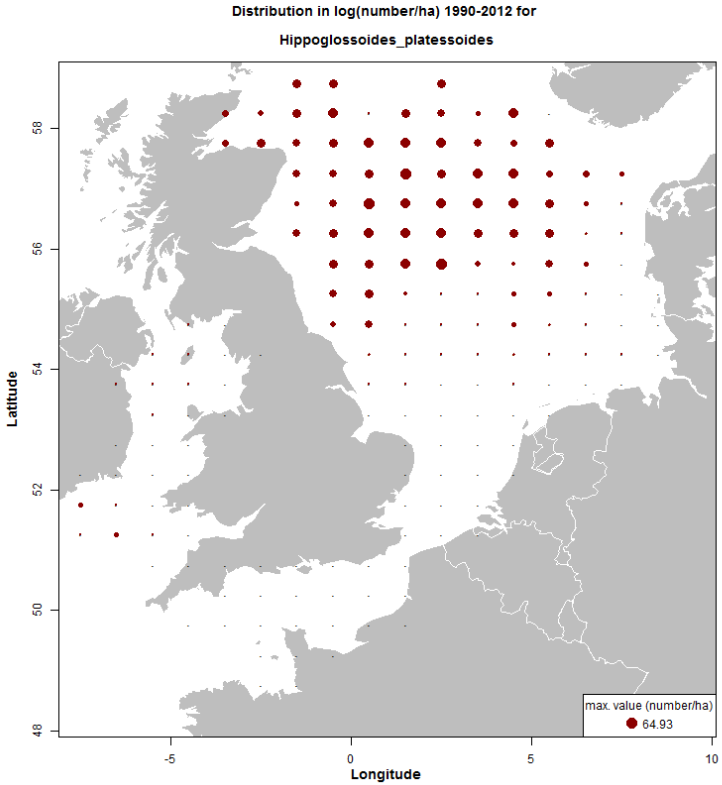


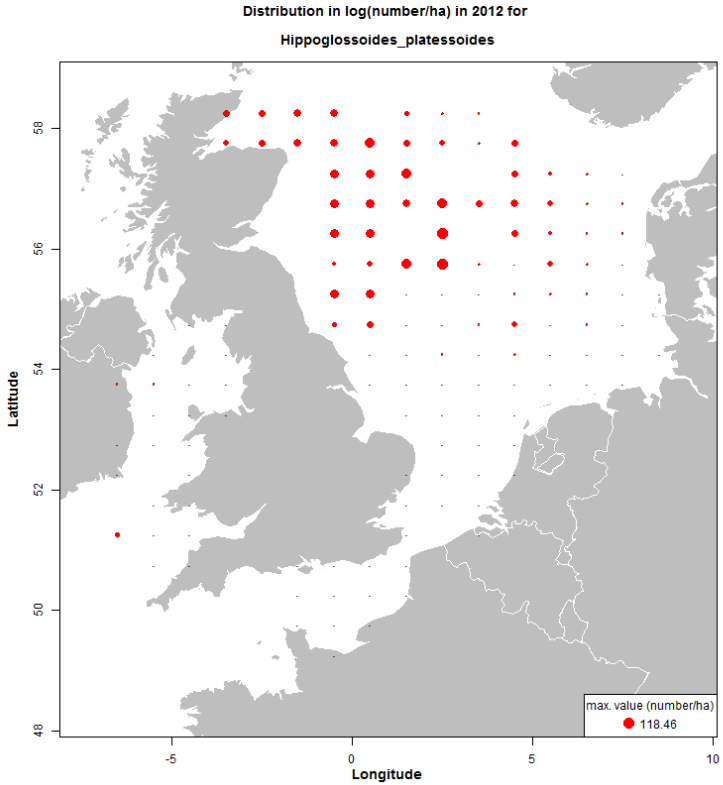


Annex 6.2.8: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

American plaice (long rough dab)

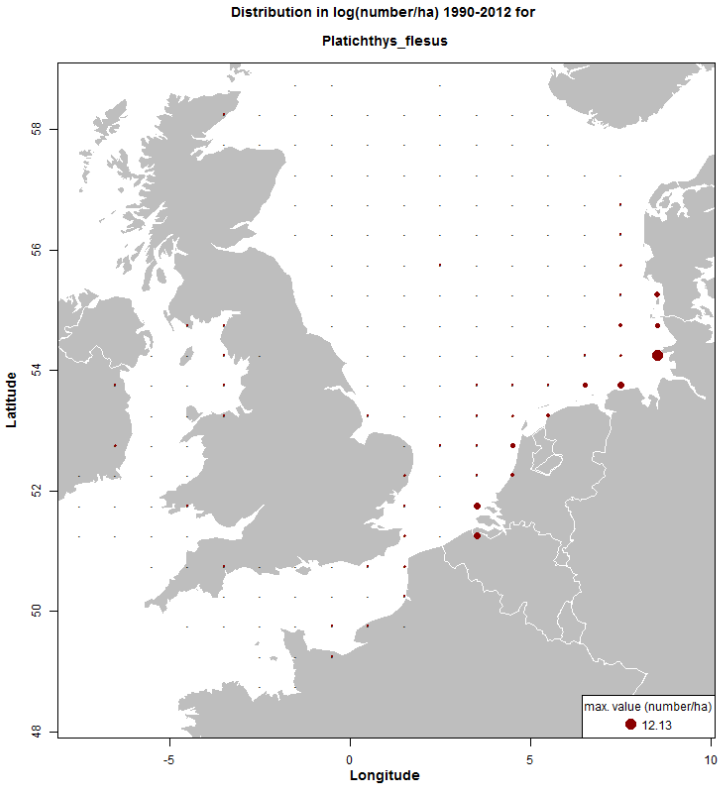


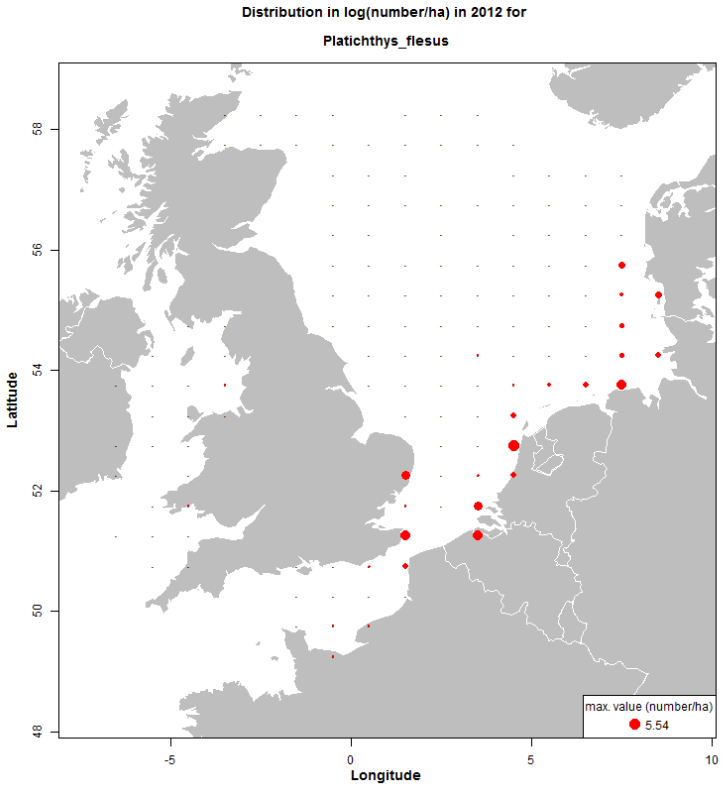


Annex 6.2.9: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Flounder

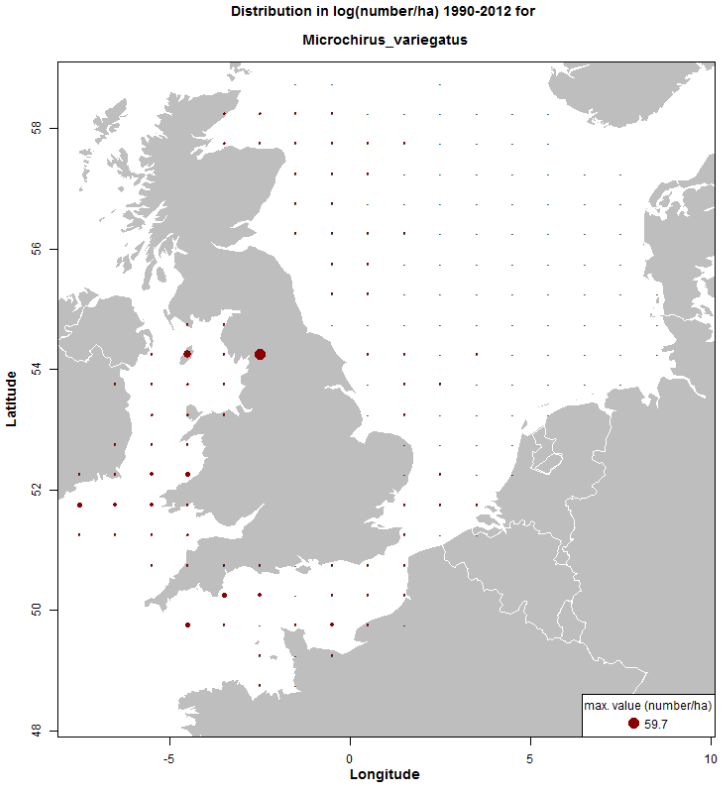


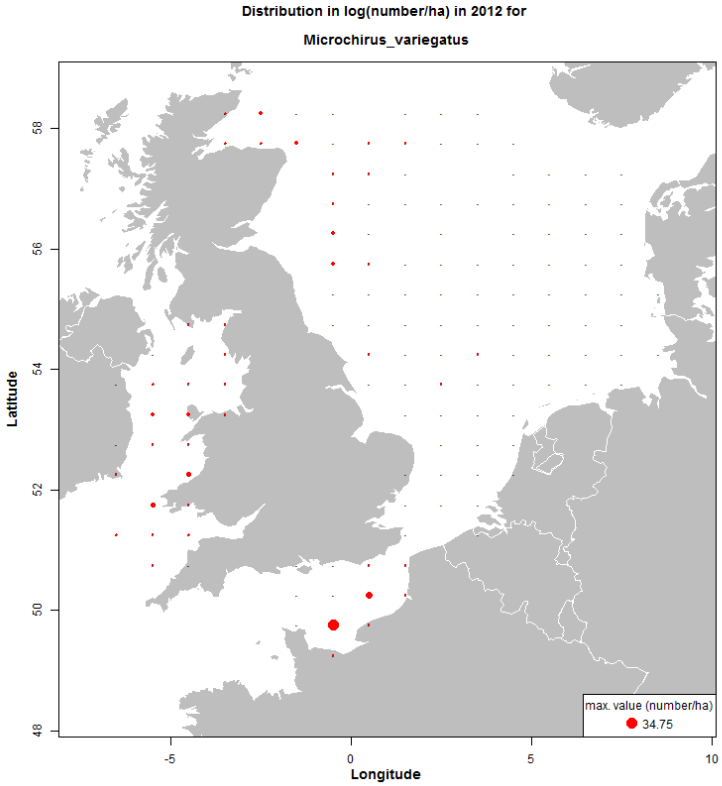


Annex 6.2.10: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Solenette

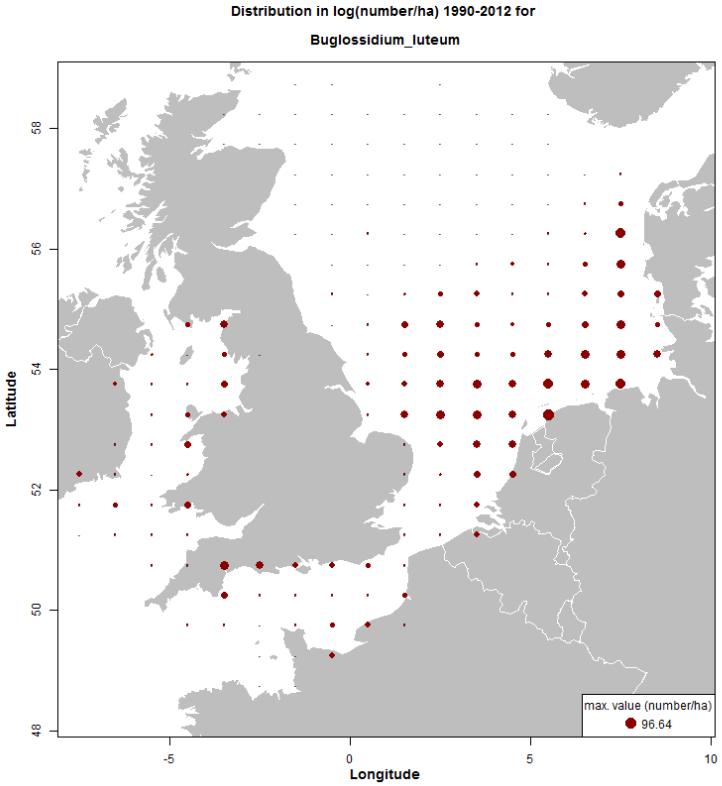


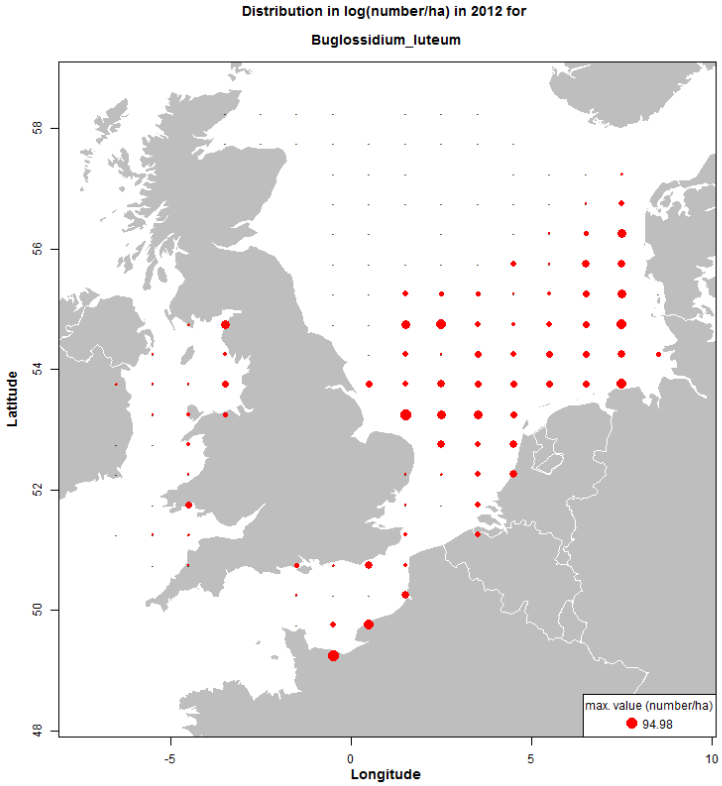


Annex 6.2.11: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Thickback sole

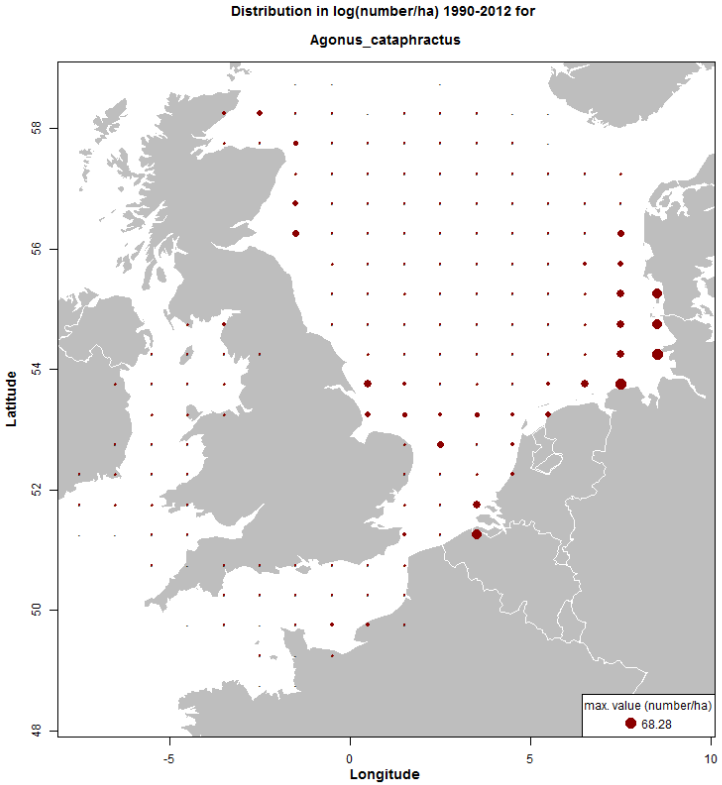


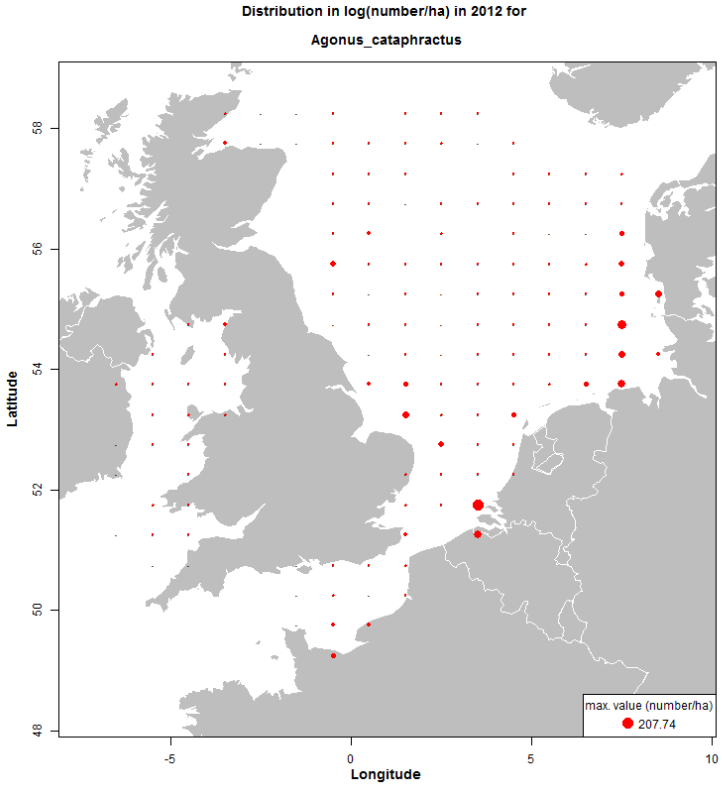


Annex 6.2.12: International offshore beam trawl survey 1990-2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Pogge

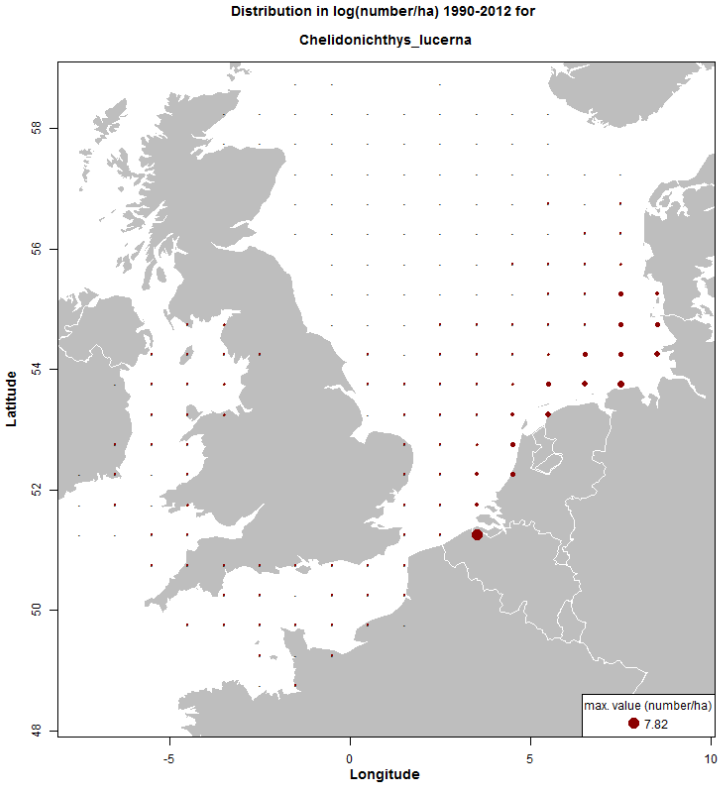


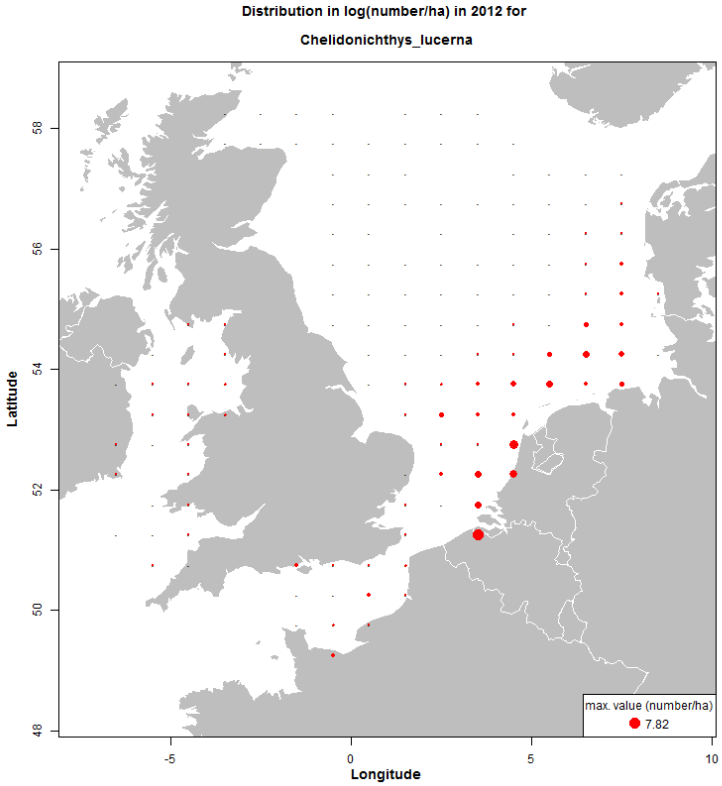


Annex 6.2.13: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Tub gurnard

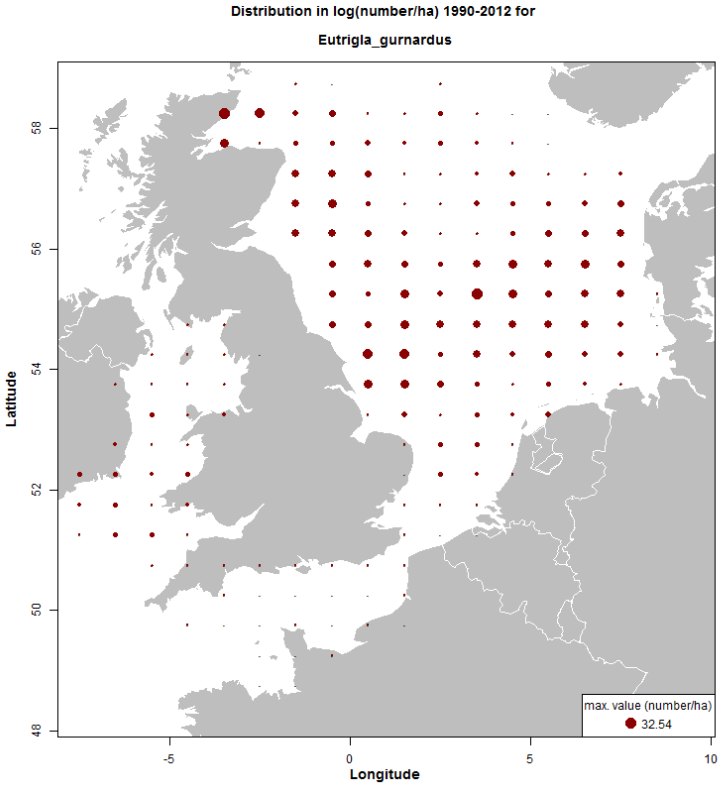


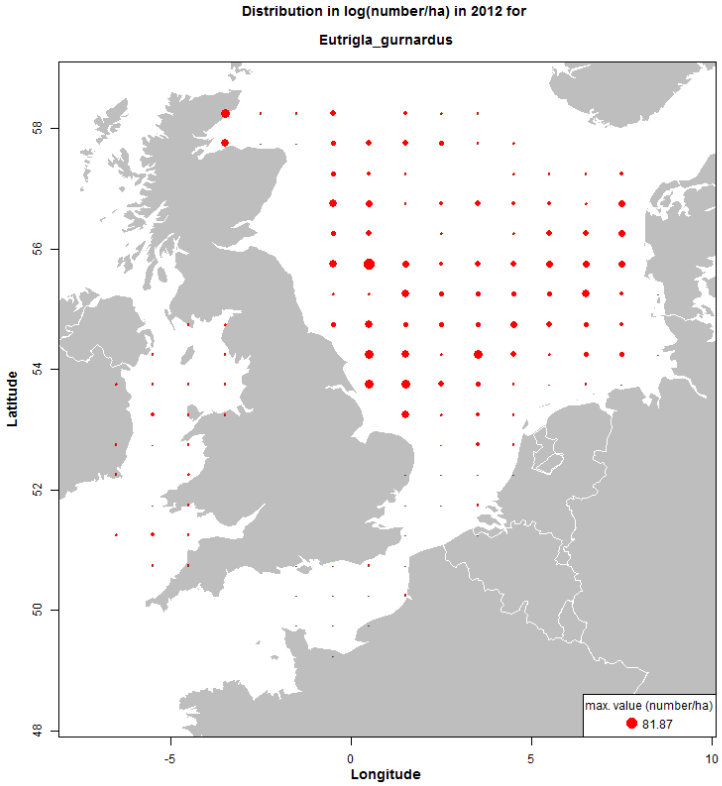


Annex 6.2.14: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Grey gurnard

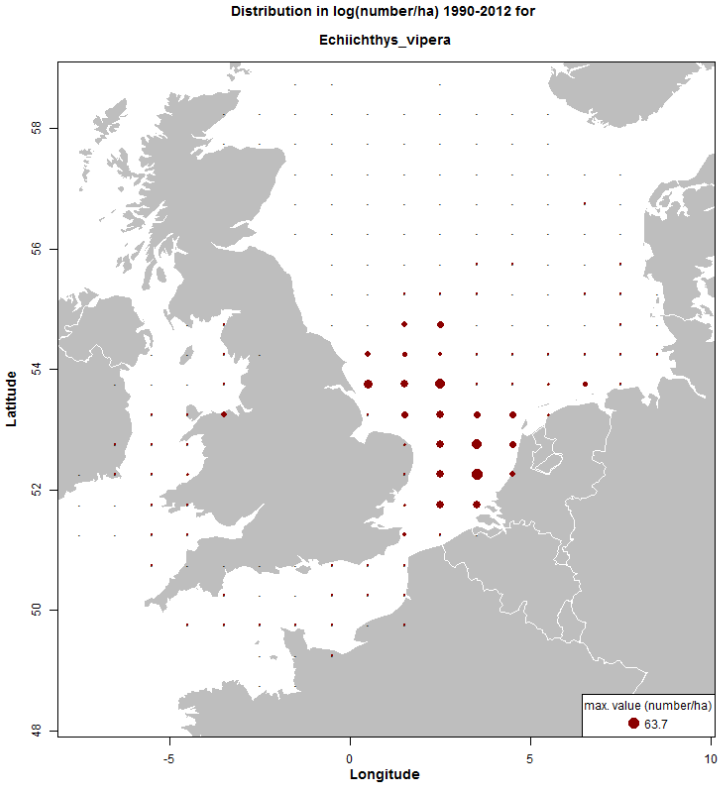


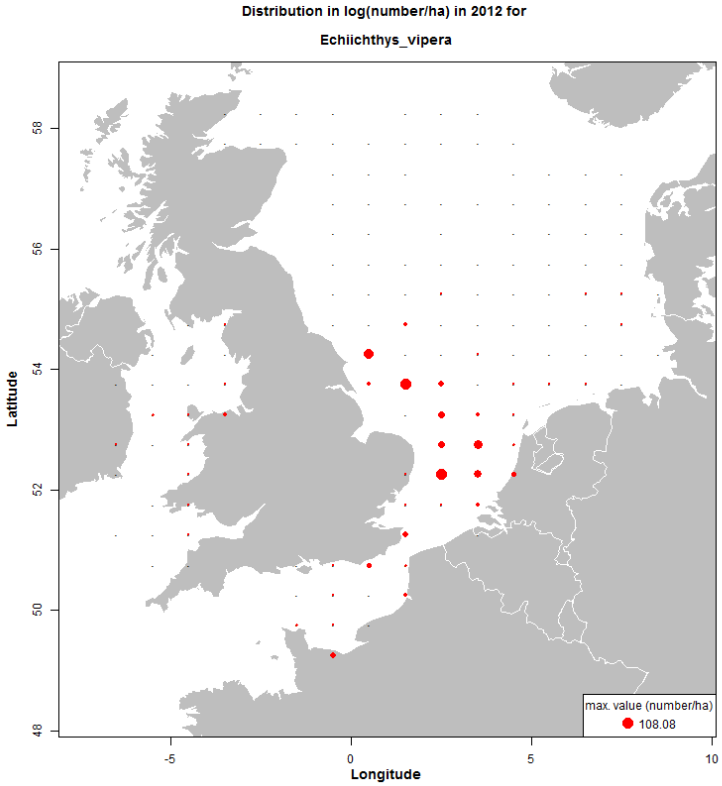


Annex 6.2.15: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Lesser weever

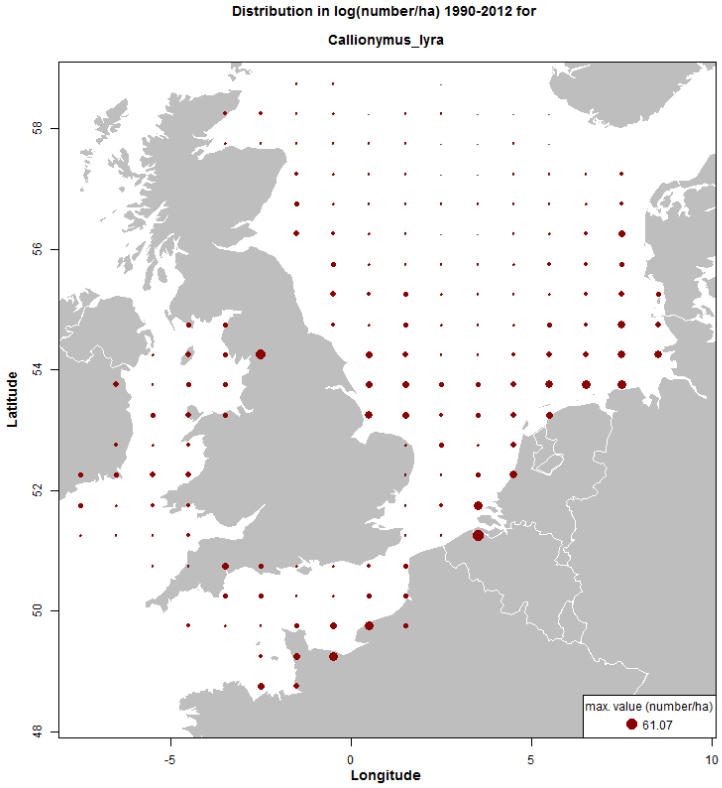


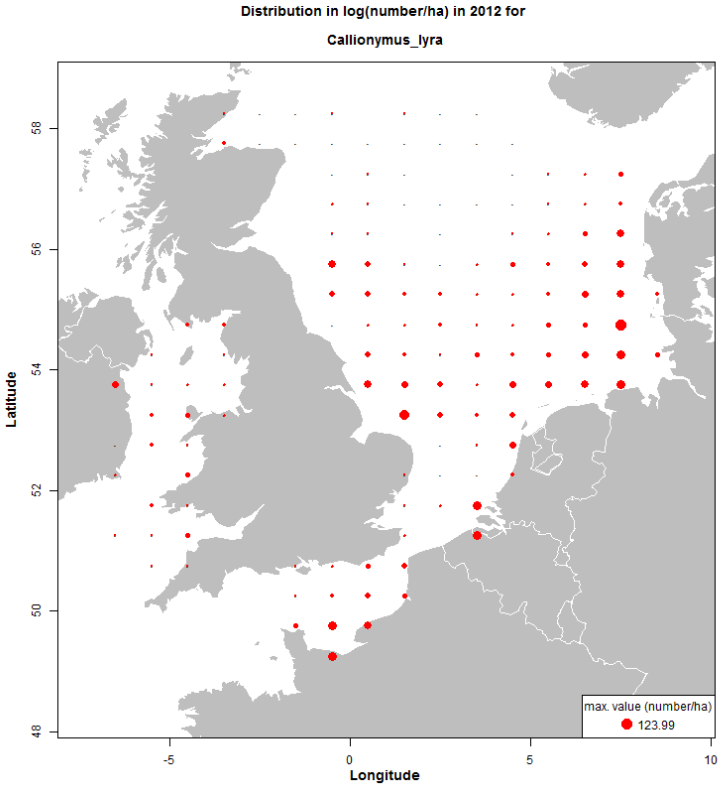


Annex 6.2.16: International offshore beam trawl survey 1990-2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Common dragonet

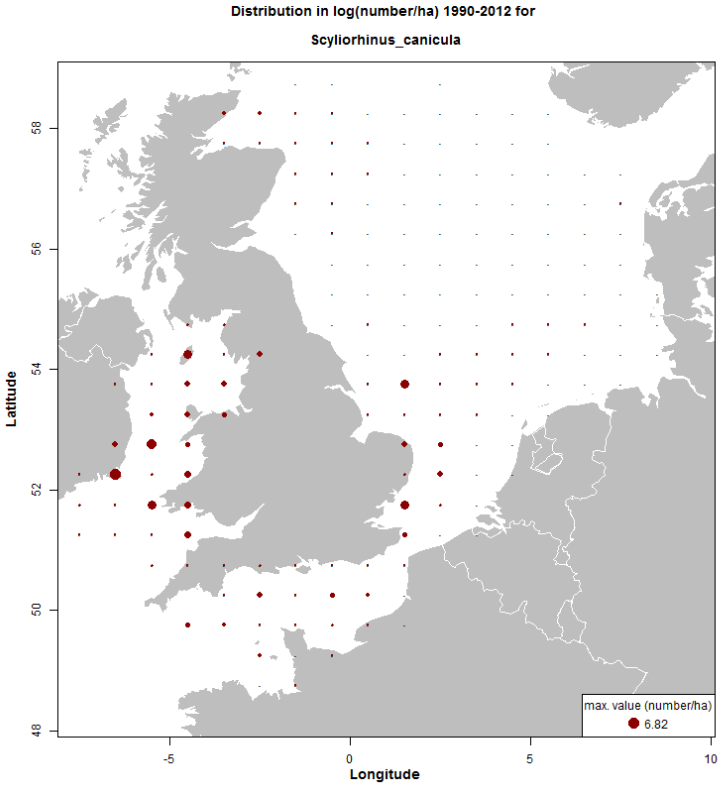


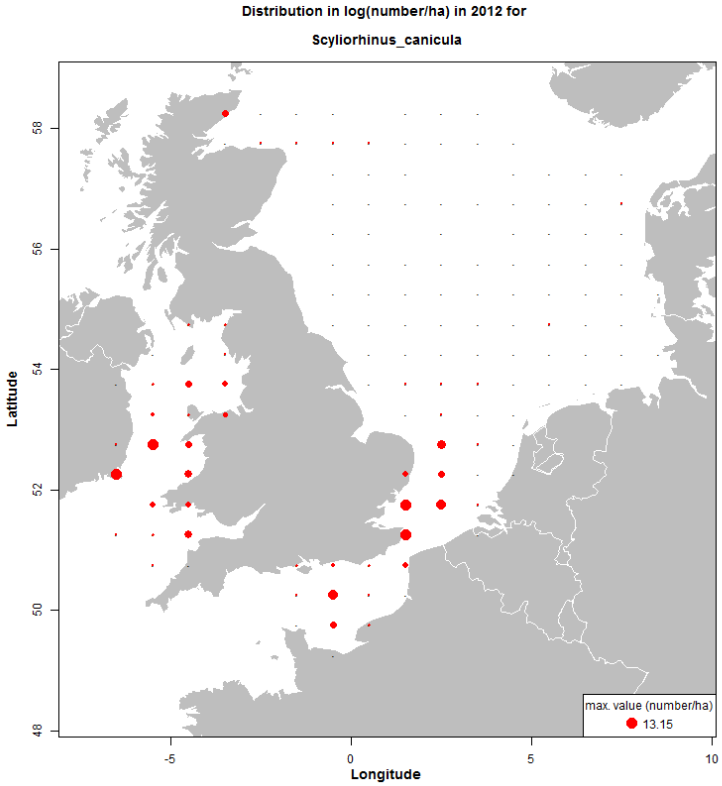


Annex 6.2.17: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Lesser spotted dogfish

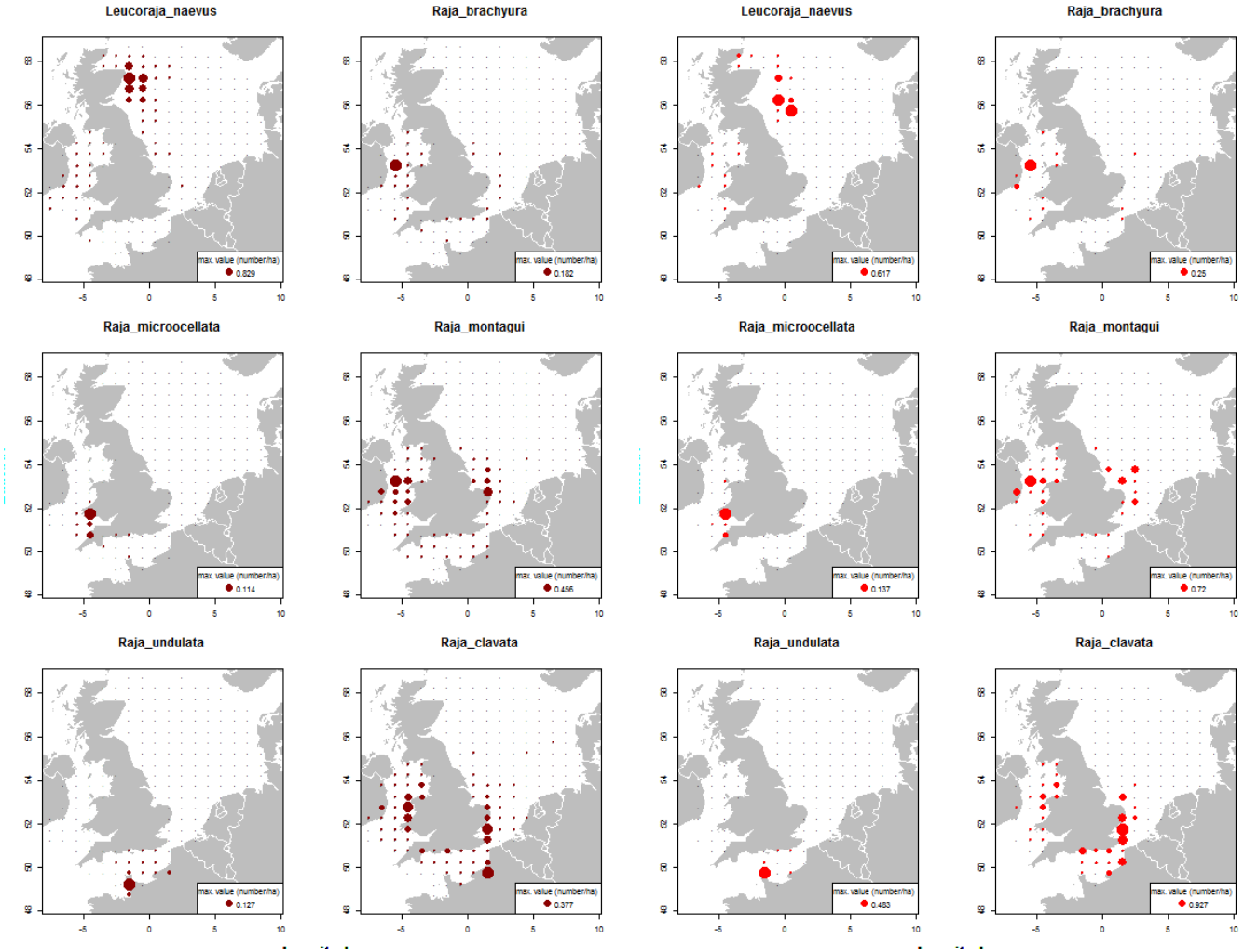




Annex 6.2.18: International offshore beam trawl survey 1990-2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

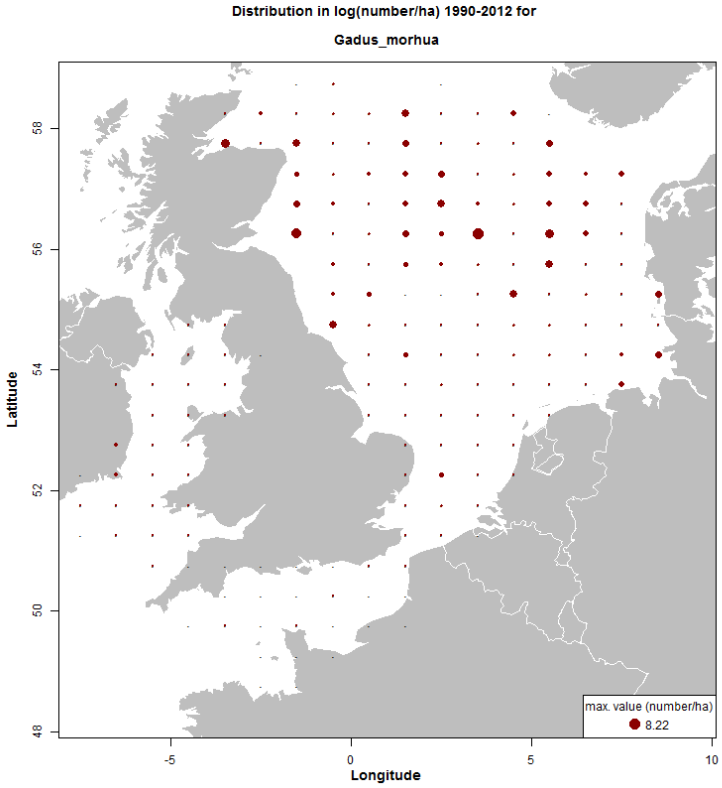
Rays

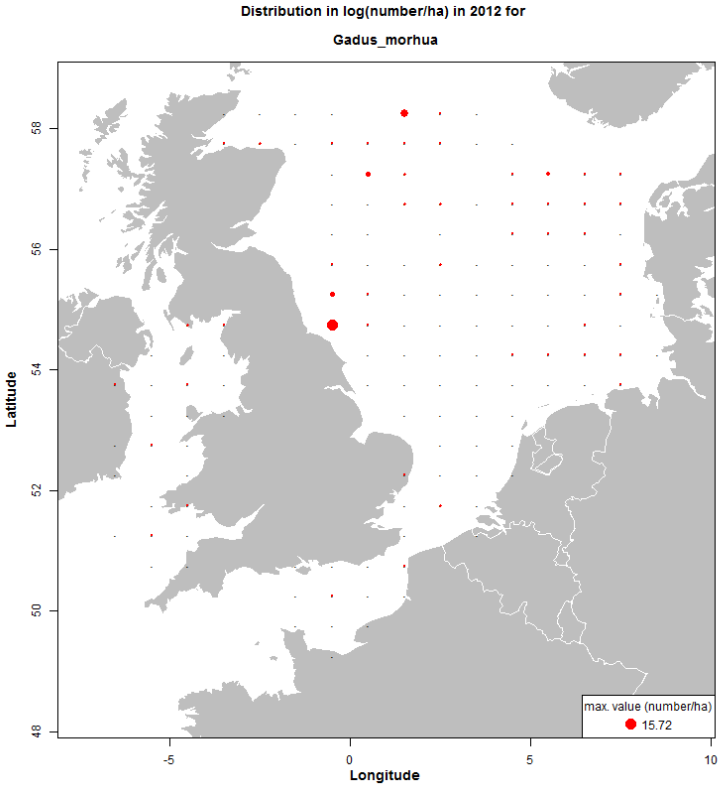


Annex 6.2.19: International offshore beam trawl survey 1990-2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Cod

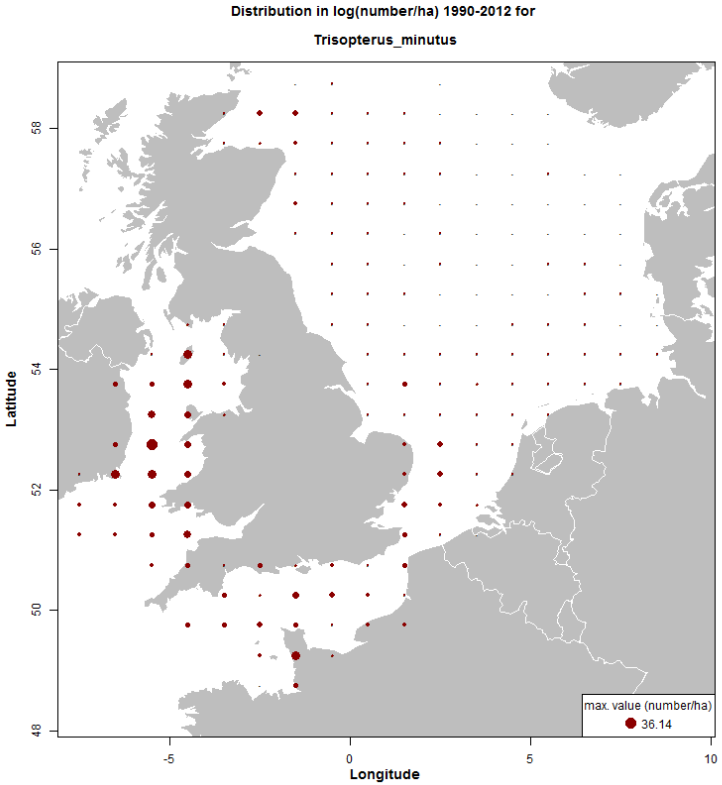


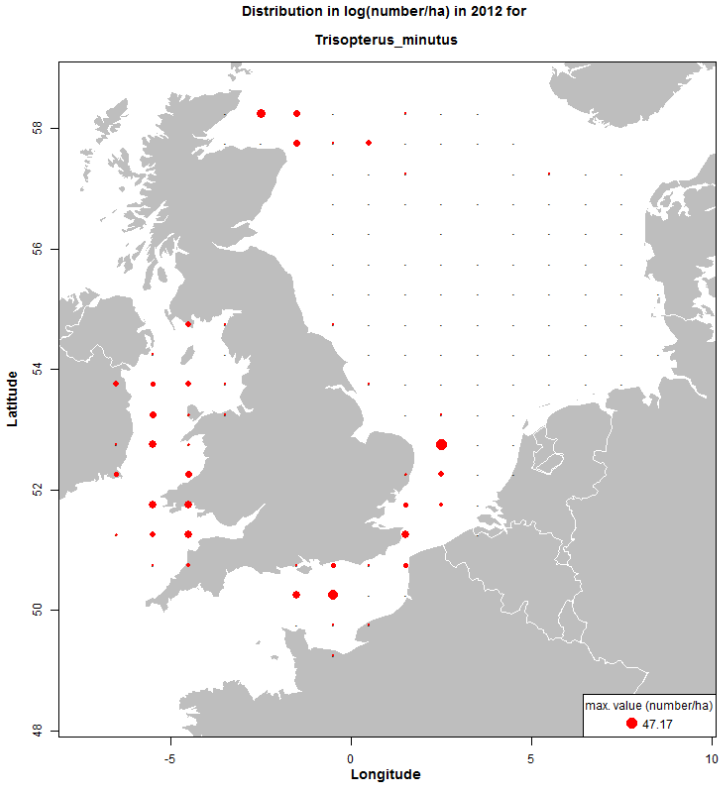


Annex 6.2.20: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Poor cod

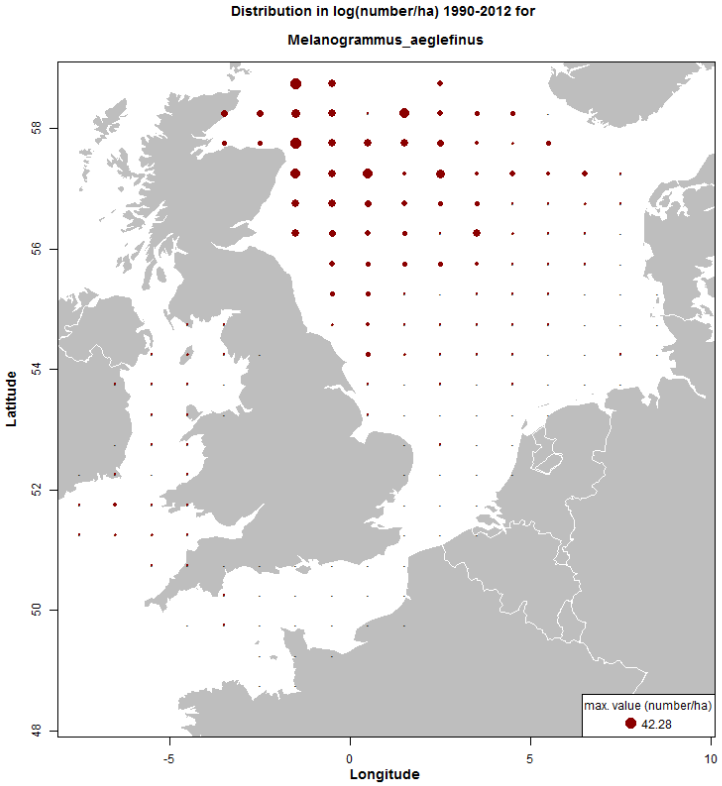


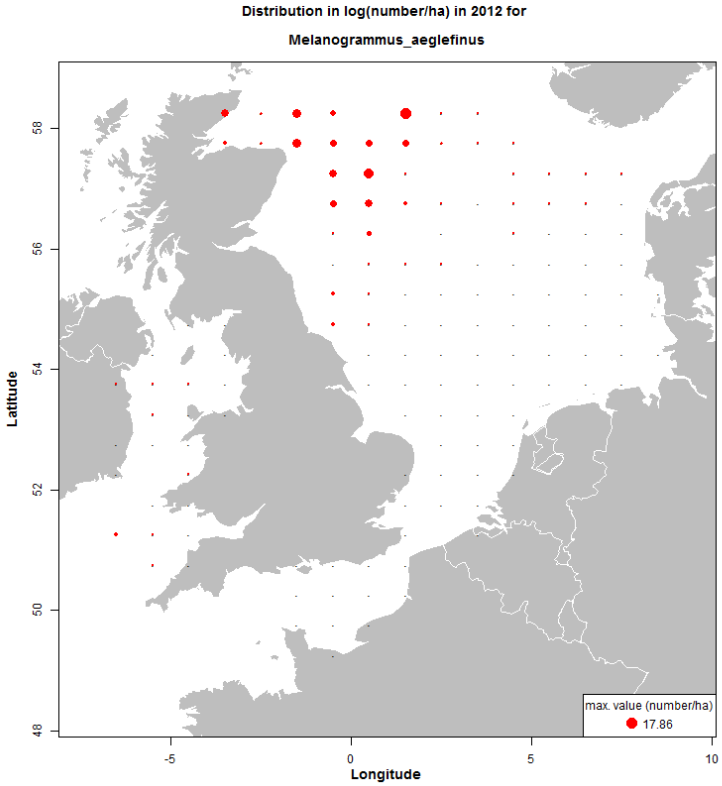


Annex 6.2.21: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Haddock

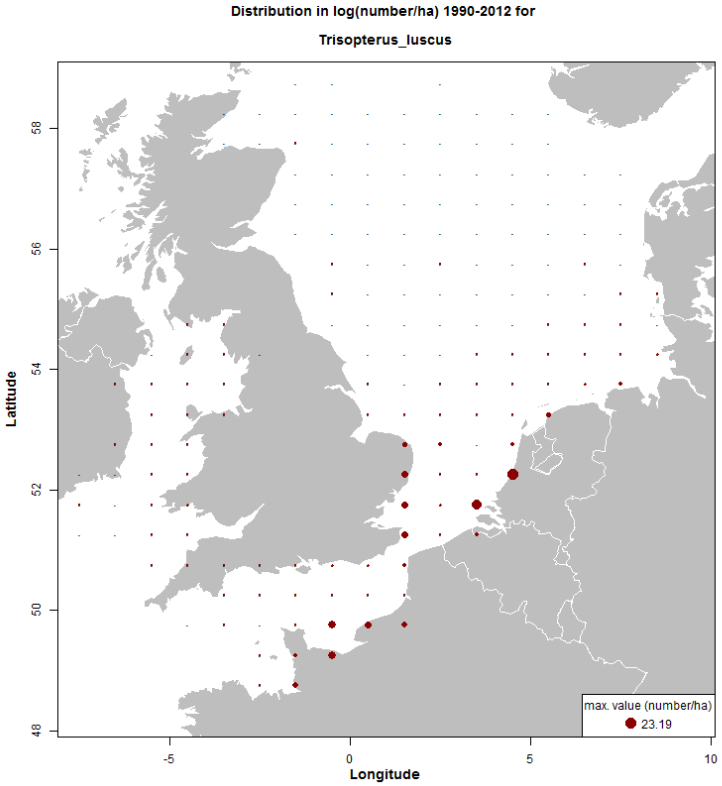


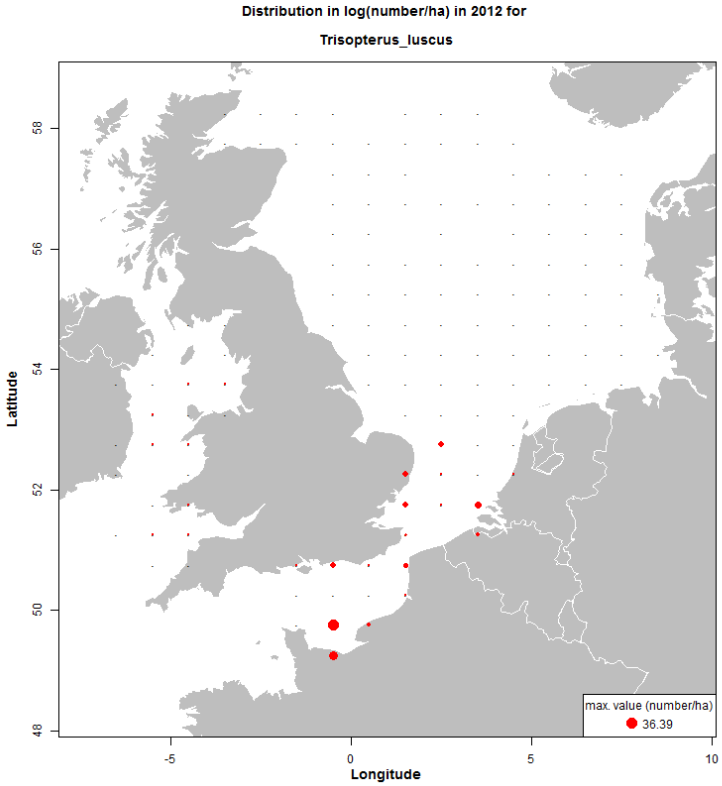


Annex 6.2.22: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Pout whiting

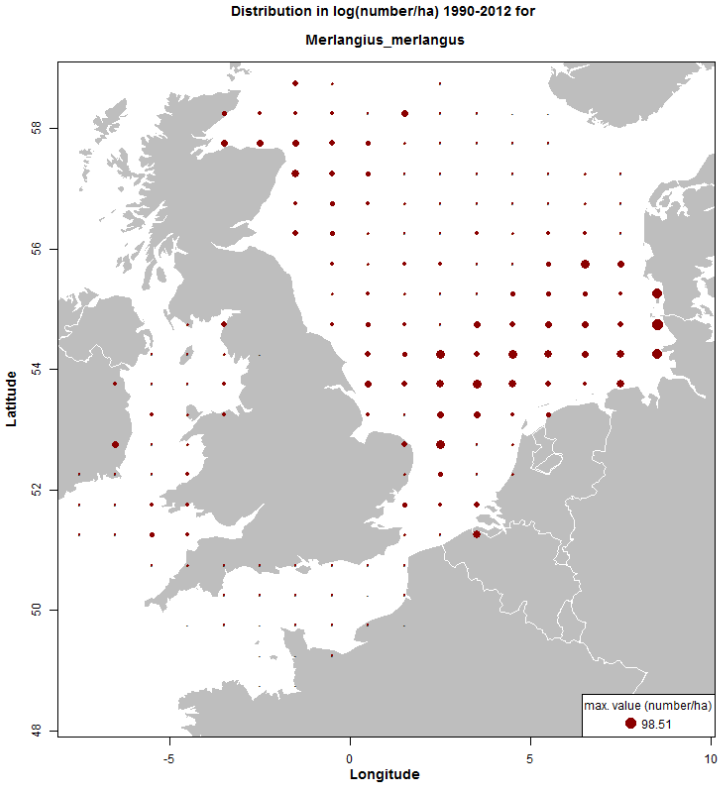


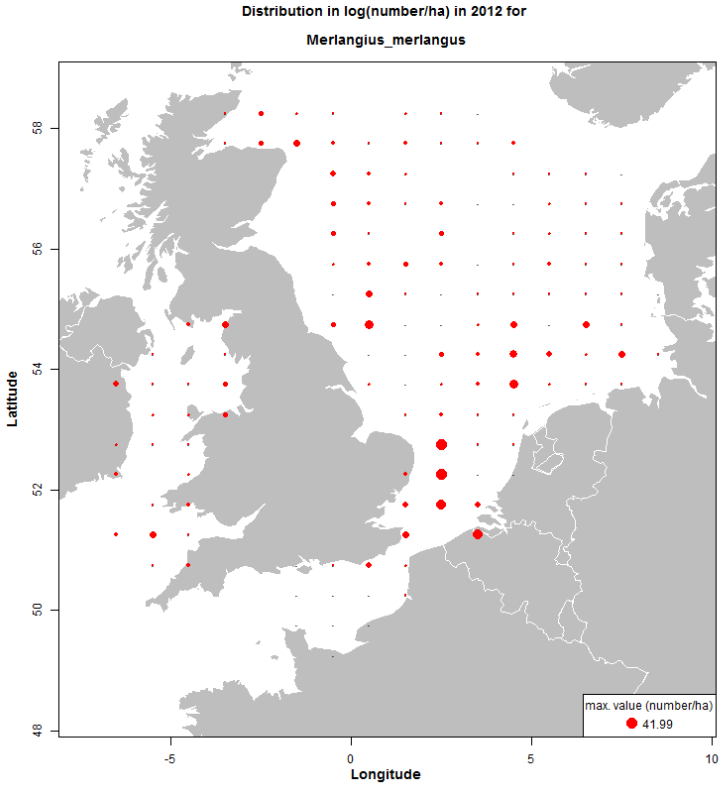


Annex 6.2.23: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Whiting

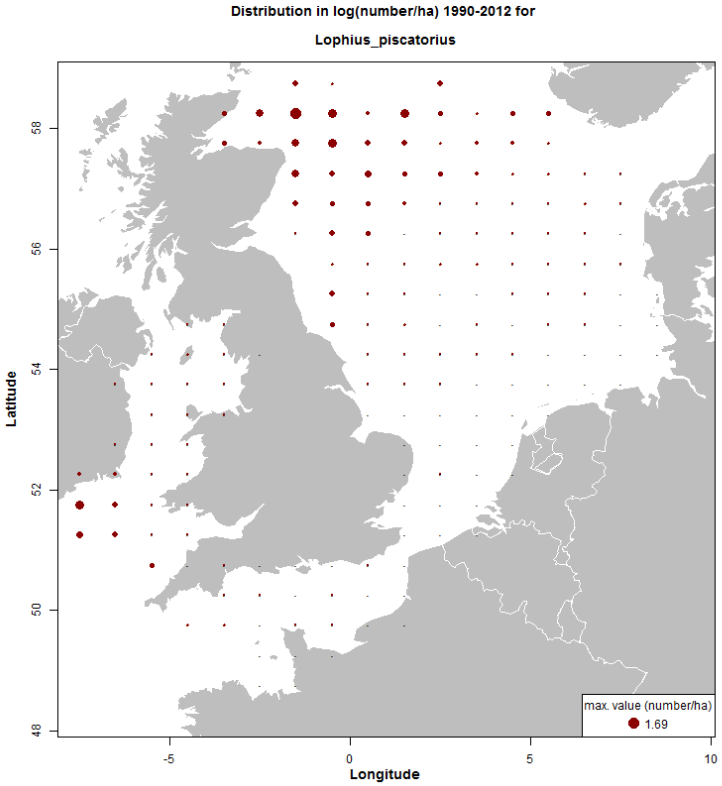


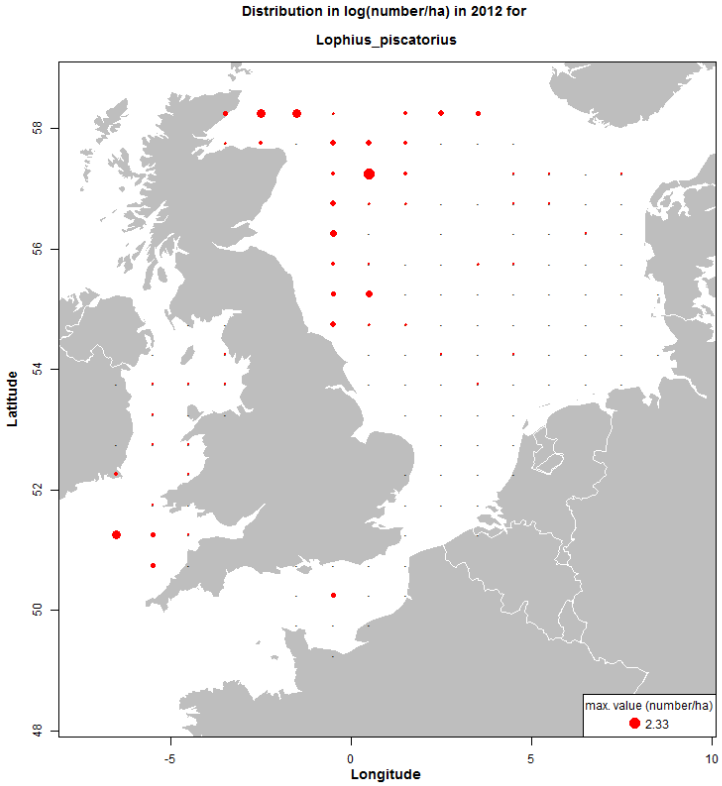


Annex 6.2.24: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Monkfish

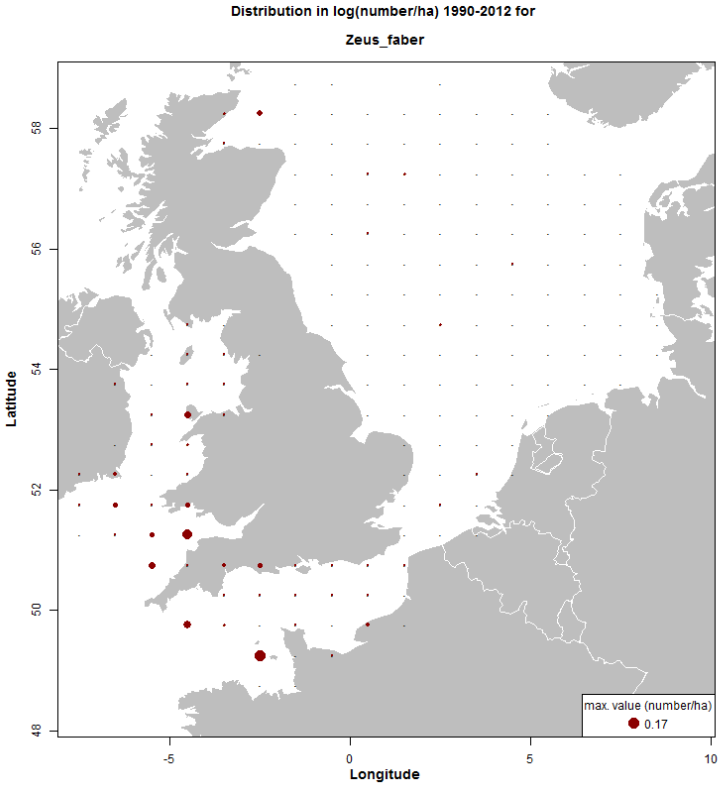


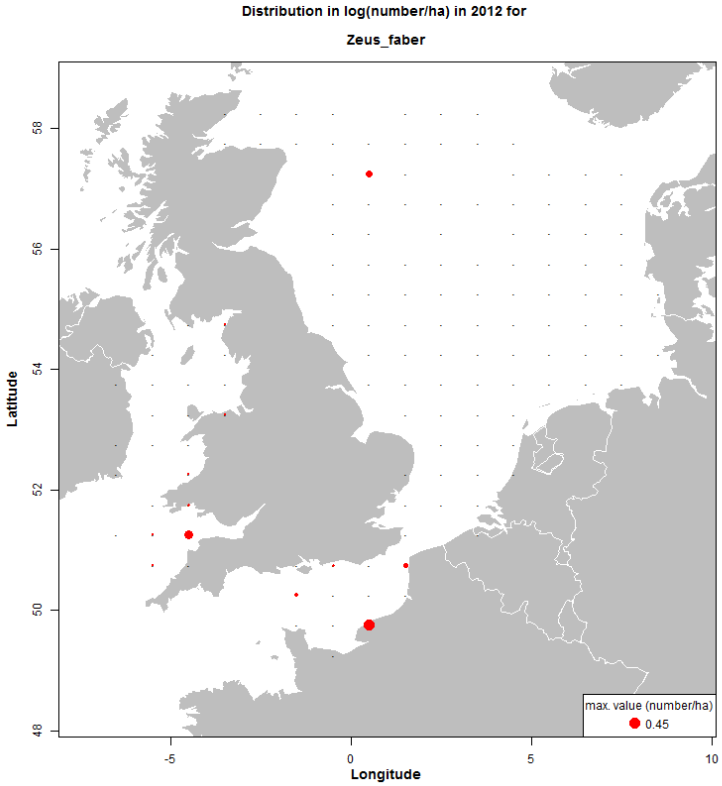


Annex 6.2.25: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

John Dory

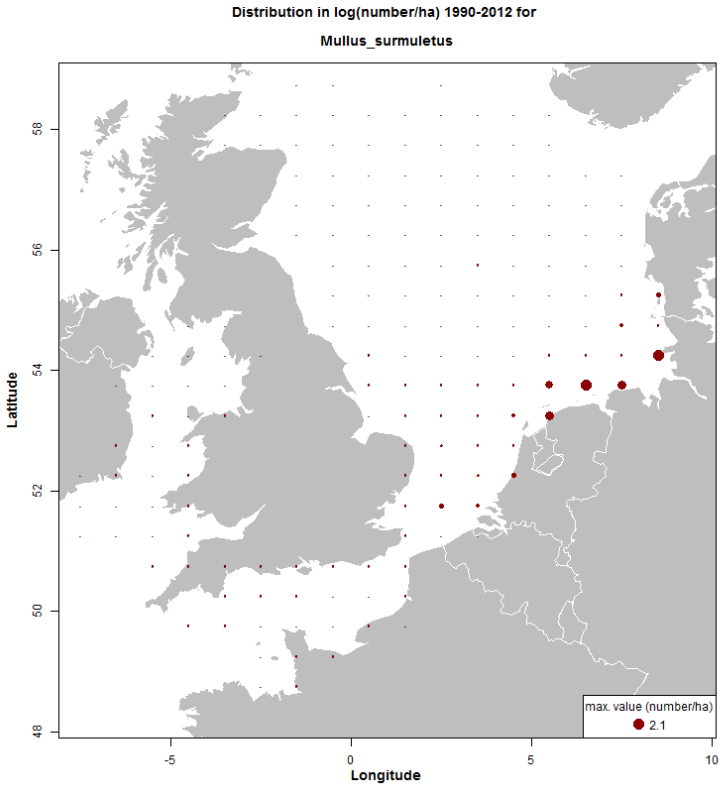


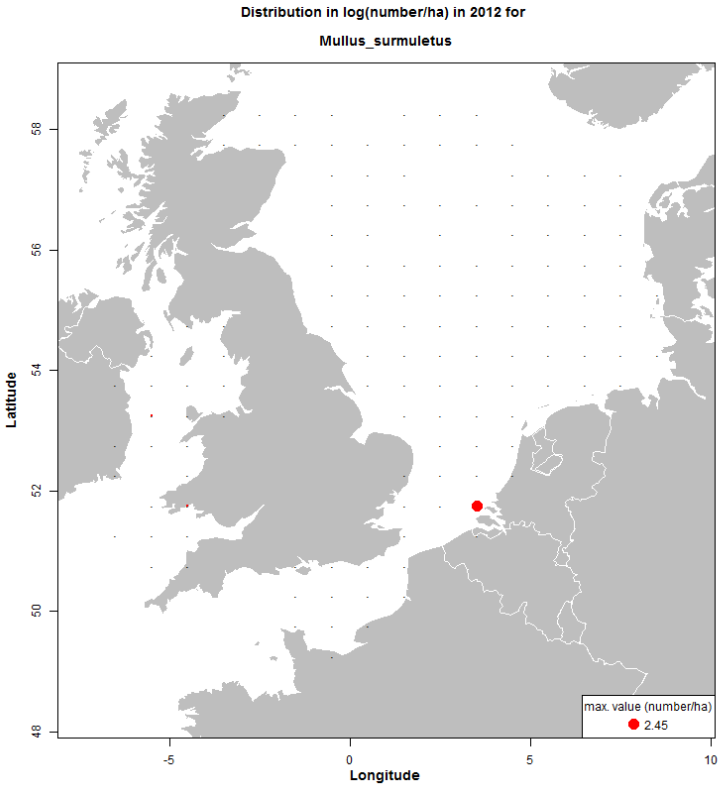


Annex 6.2.26: International offshore beam trawl survey 1990–2012

Catches are number/hectare swept-area; left plot mean of time-series, right plot current year

Red mullet

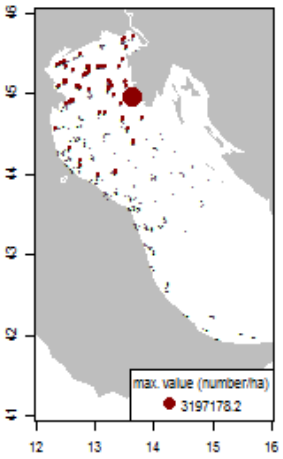




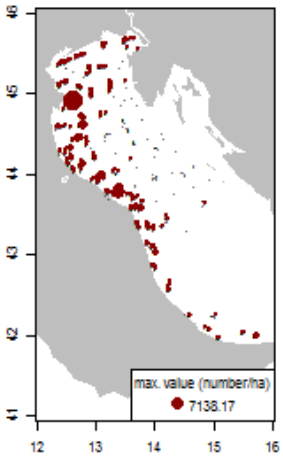
Annex 6.2.27: Northern Adriatic survey main target species distribution maps (mean 2005–2012)

Catches are number/hectare swept-area

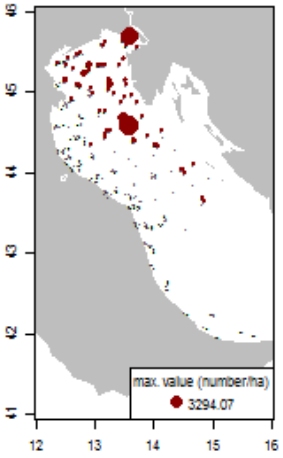
Aequipecten.opercularis



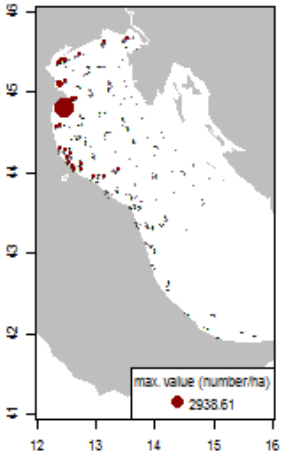
Melicertus.kerathurus



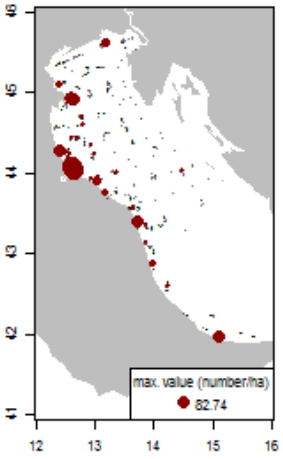
Pecten.jacobeus



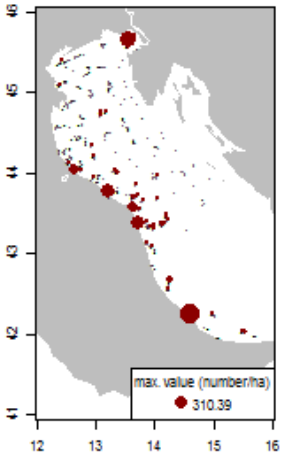
Platicthys.flesus



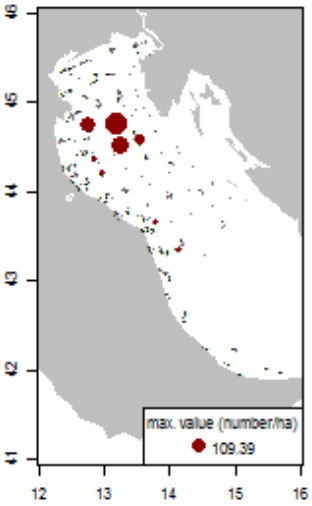
Scophtalmus.maximus



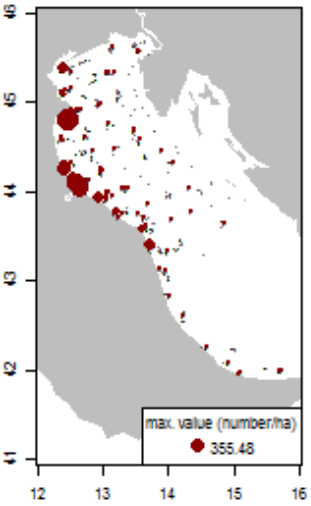
Raja.asterias



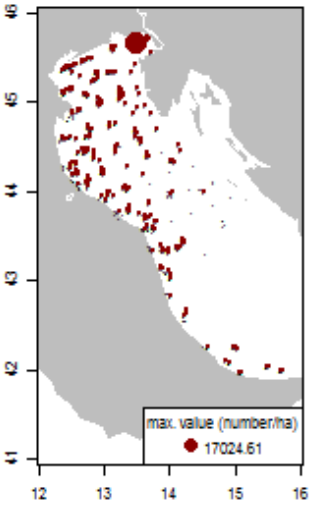
Raja.clavata



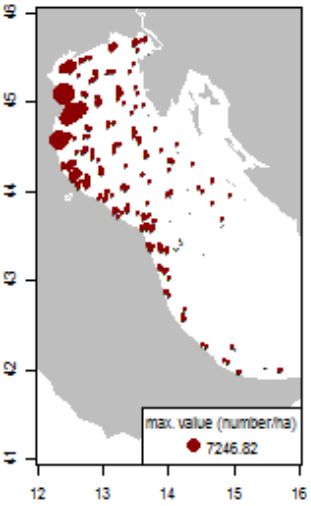
Scophtalmus.rhombus



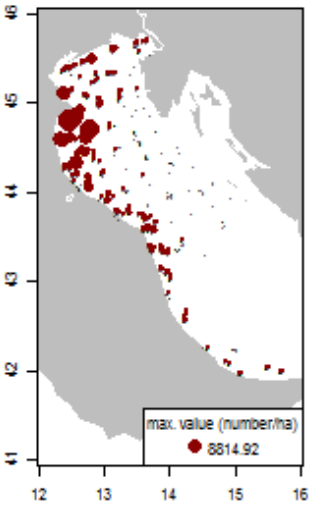
Sepia.officinalis



Solea.solea



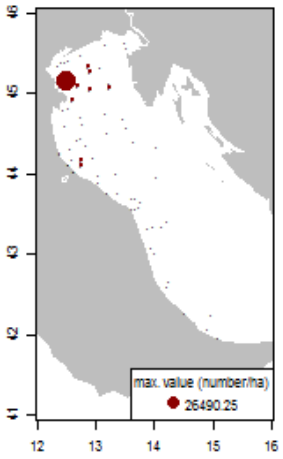
Squilla.mantis



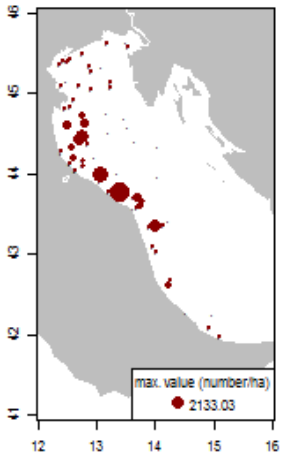
Annex 6.2.28: Northern Adriatic survey main target species distribution maps 2012 data

Catches are number/hectare swept-area

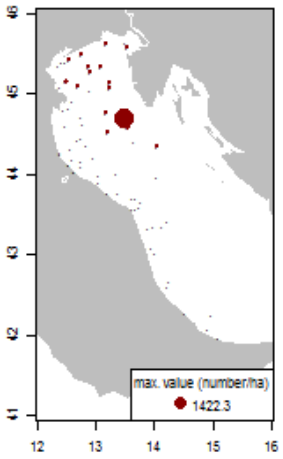
Aequipecten.opercularis



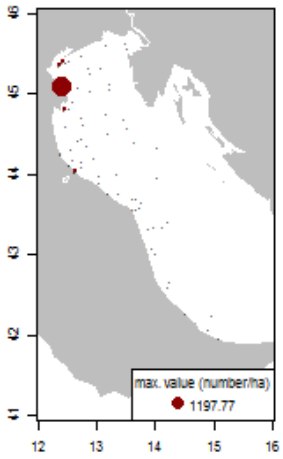
Melicertus.kerathurus



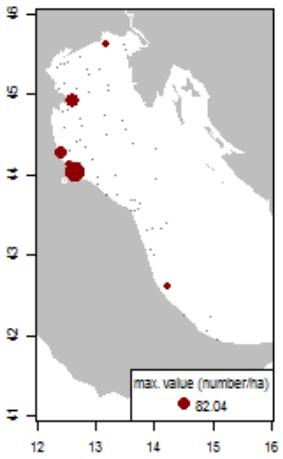
Pecten.jacobeus



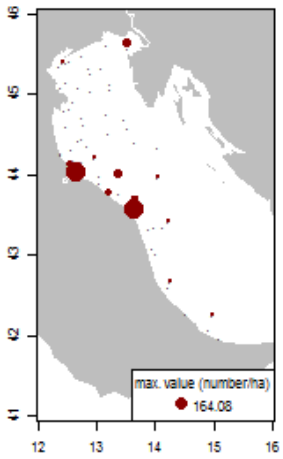
Platicthys.flesus



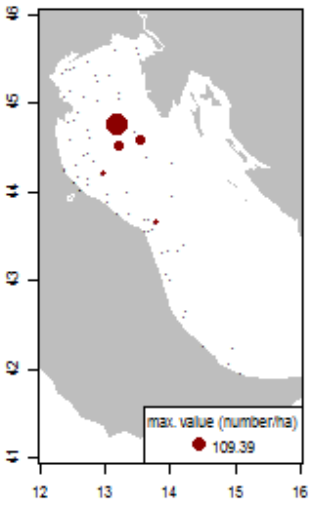
Scophtalmus.maximus



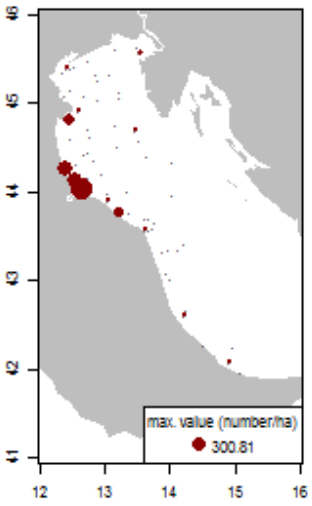
Raja.asterias



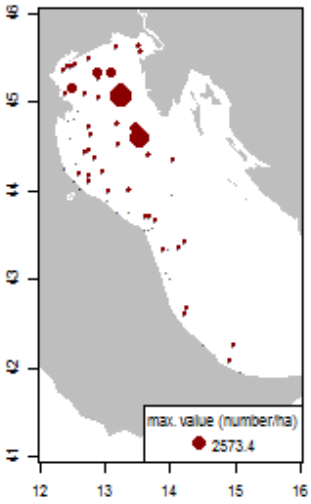
Raja.clavata



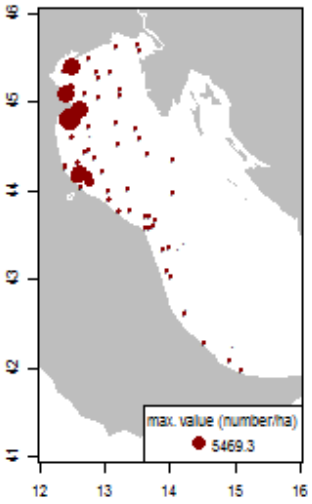
Scophtalmus.rhombus



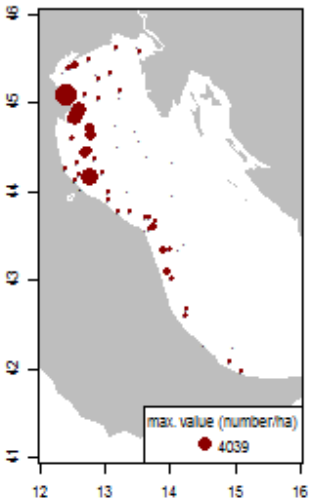
Sepia.officinalis



Solea.solea



Squilla.mantis



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

Annex 7 a) Abundance of fish species (per hectare swept-area) in subarea VIIa per year.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	1.3	1.2	1.9	1.1	0.7	1.1	0.7	1.1	1.5	1.6	1.2
Ammodytes tobianus	0.2	0.3	0.8	0.5	0.3	0.0	0.0	0.1	0.1	0.0	0.0
Arnoglossus laterna	2.6	2.9	2.5	2.4	2.7	2.7	4.6	3.1	2.1	2.3	2.2
Blennius ocellaris	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0
Buglossidium luteum	8.9	5.1	7.6	4.3	6.6	5.4	6.5	6.6	4.5	5.3	5.5
Callionymus lyra	6.0	5.0	4.8	3.2	3.9	4.9	4.6	4.2	4.1	4.0	4.8
Callionymus maculatus	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0
Callionymus reticulatus	0.0	0.1	0.0	0.0	0.3	0.0	0.0	0.2	0.1	0.0	0.0
Chelidonichthys cuculus	0.4	0.5	0.7	0.5	0.4	0.8	0.4	0.8	0.8	1.3	0.7
Chelidonichthys lucerna	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2
Echiichthys vipera	1.0	0.9	1.1	0.8	1.0	0.8	1.1	0.9	0.5	0.8	0.5
Eutrigla gurnardus	1.0	1.7	1.6	1.2	2.0	2.1	1.8	1.3	1.1	1.1	1.3
Gadus morhua	0.1	0.1	0.3	0.3	0.2	0.1	0.1	0.2	0.4	0.1	0.1
Glyptocephalus cynoglossus	0.2	0.5	0.6	0.5	0.3	1.2	0.7	0.4	0.5	0.2	0.4
Hippoglossoides platessoides	0.0	0.0	0.3	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1
Leucoraja naevus	0.1	0.1	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Limanda limanda	14.6	31.2	23.2	18.1	18.1	14.4	16.7	24.7	18.9	16.5	32.4
Lophius piscatorius	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1
Melanogrammus aeglefinus	0.0	0.4	0.5	0.4	0.8	0.1	0.0	0.3	0.2	0.1	0.1
Merlangius merlangus	2.0	2.1	5.6	3.3	4.0	1.8	3.2	2.6	1.8	3.1	2.8
Merluccius merluccius	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.0
Microchirus variegatus	4.7	1.9	2.3	0.7	2.3	1.8	1.1	2.0	1.1	1.7	1.0
Microstomus kitt	0.6	0.8	1.0	0.5	0.3	0.4	0.2	0.4	0.5	0.3	0.2
Mustelus asterias	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1
Myoxocephalus scorpioides	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1
Myoxocephalus scorpius	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Pleuronectes platessa	12.7	15.4	12.6	11.9	13.2	13.7	11.1	14.1	15.0	15.1	16.2
Pomatoschistus sp.	0.0	0.0	0.0	0.0	0.0	1.4	0.8	0.2	0.5	0.6	0.3
Raja brachyura	0.0	0.1	0.2	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1
Raja clavata	0.2	0.2	0.4	0.2	0.3	0.4	0.3	0.3	0.4	0.4	0.6
Raja montagui	0.3	0.5	0.7	0.4	0.4	0.4	0.3	0.6	0.5	0.6	0.7
Scyliorhinus canicula	1.3	1.3	3.1	2.0	2.0	2.3	1.6	2.6	2.9	4.8	3.3
Solea solea	1.6	1.4	1.6	0.8	0.9	0.9	0.8	0.9	0.6	0.7	0.4
Syngnathus acus	0.2	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0
Trisopterus esmarkii	0.1	0.2	0.3	0.4	1.1	0.3	0.1	0.7	0.2	0.3	0.1
Trisopterus luscus	0.2	0.3	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.2	0.0
Trisopterus minutus	4.0	11.4	18.5	11.8	15.8	14.3	8.7	9.6	5.1	5.8	4.9
Zeugopterus norvegicus	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.3	0.1	0.1	0.0

Annex 7 b) Abundance of fish species (per hectare swept-area) in subarea VIId per year.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	2.2	1.7	1.6	0.4	2.5	0.5	0.5	0.7	0.9	1.2	2.7
Arnoglossus laterna	0.2	0.3	0.6	0.4	0.6	0.8	1.0	0.9	1.0	1.5	3.2
Blennius ocellaris	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Buglossidium luteum	3.4	4.8	5.1	5.0	9.1	5.1	4.3	4.0	5.3	4.9	21.1
Callionymus lyra	8.4	9.0	6.8	4.5	9.2	5.7	6.5	7.1	5.9	6.1	16.3
Chelidonichthys cuculus	0.6	0.9	0.9	0.3	0.4	0.6	1.0	1.0	0.5	0.4	2.3
Chelidonichthys lucerna	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.3	0.2	0.2	0.6
Diplecogaster bimaculata	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Echiichthys vipera	0.2	0.3	0.6	0.5	0.6	0.3	0.4	0.5	0.4	0.4	2.6
Gobius niger	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	1.4
Gobius paganellus	0.0	0.1	0.0	0.0	0.2	0.1	0.2	0.0	0.1	0.1	0.7
Limanda limanda	1.6	3.0	2.3	0.7	5.3	1.0	0.9	3.3	1.5	2.4	8.1
Merlangius merlangus	0.3	0.0	0.2	0.1	0.0	0.0	0.3	0.3	0.4	0.5	0.7
Microchirus variegatus	0.6	0.9	0.7	0.4	0.5	0.4	0.5	0.7	0.8	0.5	3.8
Microstomus kitt	0.3	0.3	0.2	0.1	0.1	0.1	0.3	0.2	0.2	0.5	1.1
Pegusa lascaris	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.2
Platichthys flesus	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.3	0.1	0.1	0.3
Pleuronectes platessa	1.8	1.8	3.0	1.7	2.5	2.4	2.5	3.6	4.1	7.2	21.1
Pomatoschistus minutus	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.3	0.0	0.0
Pomatoschistus sp.	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	1.4	1.1
Raja clavata	0.1	0.2	0.3	0.1	0.2	0.1	0.1	0.2	0.3	0.5	1.1
Scophthalmus maximus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
Scophthalmus rhombus	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1
Scyliorhinus canicula	0.6	0.3	0.4	0.5	0.2	0.4	0.3	0.2	0.3	0.3	2.0
Solea solea	1.9	1.7	1.2	1.4	1.6	1.2	0.7	2.1	1.5	1.5	4.5
Spondyliosoma cantharus	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.2
Syngnathus acus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Trachinus draco	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.3
Trigloporus lastoviza	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.7
Trisopterus luscus	0.6	7.8	3.2	2.2	3.7	2.0	1.3	0.7	0.3	0.9	5.8
Trisopterus minutus	2.5	4.9	3.4	1.2	1.0	2.2	1.7	0.9	0.7	0.6	5.6
Zeugopterus regius	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1

Annex 7 c) Abundance of fish species (per hour fishing) in subarea VIIe per year (no data available in 2012).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Agonus cataphractus	1	1	18	1	19	2	1	1		1		
Arnoglossus laterna	1	6	82		85	4	2	6	5	6	1	
Aspitrigla cuculus	28	10	30	21	38	30	32	13	33	37	30	34
Buglossidium luteum	1	20	415	43	449	8	1	9	9	14	1	
Callionymus lyra	3	15	158	13	182	9	12	4	9	6	5	
Echiichthys vipera	1	1	6	1	6	1	1	1	1	1		
Eutrigla gurnardus	8	1	9	5	6	10	7	10	7	9	10	7
Gadus morhua	1	1	1				1	1	1	1	1	1
Limanda limanda	10	43	68	8	19	19	32	11	12	16	23	31
Lophius piscatorius	1	1	1	2	1	3	1	1	4	8	8	5
Melanogrammus aeglefinus							1		1	1	1	1
Merlangius merlangus	1	5	6	6	2	13	2	6	7	6	18	6
Microchirus variegatus	5	4	116	6	101	8	9	2	10	2	1	
Microstomus kitt	1	1	1	1	1	1	1	1	2	3	2	2
Mullus surmuletus	2	4	1	7	2	3	7	2	1	1	2	1
Platichthys flesus	1	1		1			1	1		1	1	1
Pleuronectes platessa	22	28	18	15	13	13	14	13	14	26	45	56
Psetta maxima	1	1	1	1	1	1	1	1	1	1	1	1
Scophthalmus rhombus	1	1	1	1	1	1	1	1	1	1	1	1
Scyliorhinus canicula	14	26	16	21	19	24	25	18	30	20	33	23
Solea solea	14	19	10	14	13	10	12	16	18	18	22	22
Trigla lucerna	1	1	1	2	1	1	2	2	3	2	3	2
Trisopterus luscus	1	1	6	10	4	3	6	3	11	7	13	5
Trisopterus minutus	5	6	56	16	75	27	9	5	13	6		
Zeus faber	1	2	1	1	1	1	1	1	2	1	1	1

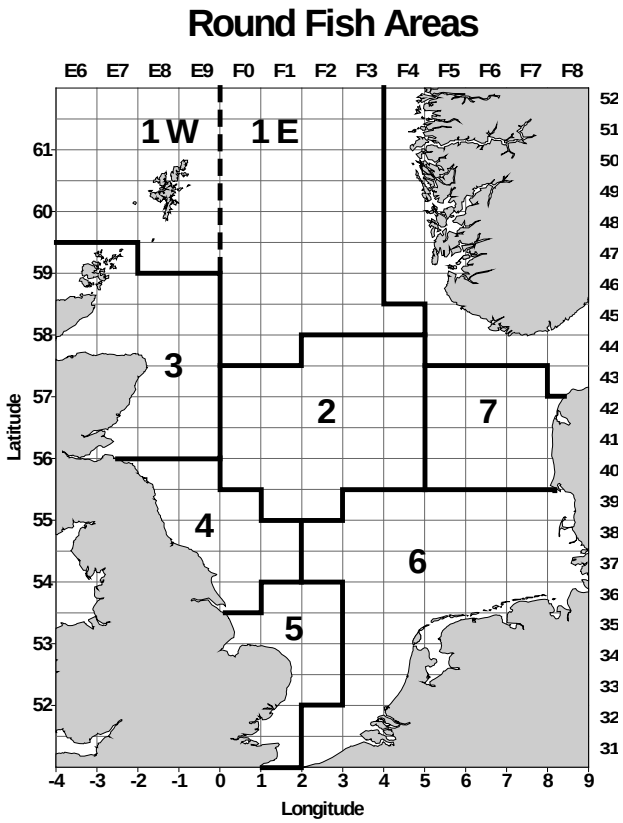
Annex 7 d) Abundance of fish species (per hectare swept-area) in subarea VIIf per year.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	0.2	0.4	0.3	0.3	0.4	0.9	1.4	0.4	0.3	0.2	0.4
Arnoglossus imperialis	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0
Arnoglossus laterna	0.3	0.5	0.8	0.4	0.4	1.1	0.6	0.8	1.0	1.0	0.8
Buglossidium luteum	3.1	5.3	11.9	8.8	4.2	11.7	13.1	5.8	6.4	5.9	6.1
Callionymus lyra	1.2	1.5	2.2	2.0	2.3	3.8	5.1	2.0	2.4	2.0	3.0
Chelidonichthys cuculus	0.6	0.7	1.1	0.6	0.5	0.8	0.1	0.6	0.3	0.2	0.5
Chelidonichthys lucerna	0.3	0.5	0.4	0.2	0.3	0.4	0.3	0.3	0.5	0.7	0.1
Dicentrarchus labrax	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.3	0.0	0.0
Echiichthys vipera	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.3	0.1	0.1	0.1
Eutrigla gurnardus	1.1	1.3	1.2	1.4	1.1	3.6	3.0	1.9	0.9	0.7	0.8
Lepidorhombus whiffiagonis	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.2	0.3	0.1
Limanda limanda	2.5	3.1	3.2	3.6	2.8	3.8	6.3	3.1	5.0	5.2	6.3
Lophius piscatorius	0.3	0.2	0.2	0.3	0.1	0.1	0.0	0.2	0.2	0.2	0.2
Melanogrammus aeglefinus	0.0	0.1	0.1	0.1	0.1	0.5	0.0	1.5	0.4	0.2	0.0
Merlangius merlangus	1.7	1.2	2.9	5.7	2.4	2.8	17.8	5.0	2.4	1.9	1.8
Merluccius merluccius	0.2	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Microchirus variegatus	0.6	0.4	0.6	0.5	0.5	1.0	1.3	0.6	0.6	0.6	0.7
Microstomus kitt	0.7	0.8	0.6	0.6	0.8	1.1	0.6	0.4	0.5	0.5	0.4
Mullus surmuletus	0.0	0.3	0.1	0.3	0.2	0.1	0.0	0.1	0.0	0.0	0.0
Mustelus asterias	0.1	0.0	0.2	0.2	0.1	0.4	0.5	0.1	0.2	0.4	0.3
Pegusa lascaris	0.2	0.2	0.2	0.3	0.2	0.4	0.8	0.2	0.3	0.4	0.3
Pleuronectes platessa	2.0	1.3	1.6	2.0	1.9	2.3	3.0	2.5	3.0	3.4	4.0
Pomatoschistus sp.	0.0	0.0	0.0	0.0	0.0	1.2	0.4	0.2	0.6	0.2	0.1
Raja brachyura	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Raja clavata	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.2	0.3	0.3	0.1
Raja microocellata	0.3	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.1	0.1	0.2
Raja montagui	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.3	0.1	0.2	0.2
Scophthalmus maximus	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1
Scophthalmus rhombus	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0
Scyliorhinus canicula	1.3	0.7	2.7	1.0	1.7	2.2	4.6	1.8	1.8	2.5	2.5
Solea solea	3.6	3.5	4.4	2.4	2.3	2.8	8.5	3.4	3.1	2.8	3.1
Trachurus trachurus	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trisopterus luscus	1.0	0.6	0.6	0.0	0.2	1.4	2.1	0.1	0.2	1.2	0.4
Trisopterus minutus	4.2	9.9	7.4	14.8	13.6	9.7	19.9	2.2	2.9	7.4	9.8
Zeus faber	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Annex 7 e) Abundance of fish species (per hectare swept-area) in subarea VIIg per year.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	2.4	0.3	0.5	0.1	1.1	1.5	0.9	1.2	0.2	0.7	0.9
Argentinidae	0.3	0.0	0.2	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0
Arnoglossus laterna	0.3	0.4	0.4	0.7	2.1	0.6	1.0	0.2	0.5	0.4	0.2
Buglossidium luteum	0.0	0.0	0.0	0.0	3.0	0.1	0.5	0.2	0.3	0.0	0.0
Callionymus lyra	0.8	0.6	4.2	2.7	1.7	1.9	1.8	1.1	1.1	1.0	2.5
Echiichthys vipera	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	0.0	0.0	0.0
Eutrigla gurnardus	2.3	2.5	0.6	1.8	4.1	4.7	5.5	3.9	1.9	3.9	2.2
Glyptocephalus cynoglossus	0.3	0.5	0.4	1.2	0.0	0.0	1.3	0.6	0.7	1.3	0.3
Hippoglossoides platessoides	1.0	1.3	1.8	2.7	0.0	0.0	1.8	3.3	1.9	1.9	2.8
Lepidorhombus whiffiagonis	0.1	0.2	0.3	0.4	0.0	0.1	0.9	1.1	1.4	1.5	0.7
Limanda limanda	1.1	0.9	0.4	1.5	4.0	3.3	3.9	3.7	1.9	1.0	1.5
Lophius piscatorius	0.2	0.4	0.2	0.3	0.3	0.1	0.3	0.4	0.5	0.3	0.9
Melanogrammus aeglefinus	1.0	0.1	0.3	4.2	2.4	6.5	0.9	3.5	2.9	4.1	0.6
Merlangius merlangus	1.8	1.3	3.2	2.8	0.8	8.2	8.4	1.2	0.4	2.7	5.2
Merluccius merluccius	0.5	0.3	0.3	0.7	0.1	0.2	0.6	0.4	0.2	0.1	0.7
Microchirus variegatus	3.6	1.2	3.3	1.7	1.2	0.7	1.5	0.5	0.5	2.0	2.2
Micromesistius poutassou	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Microstomus kitt	0.0	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.4	0.5	0.3
Pleuronectes platessa	0.1	0.1	0.1	0.2	1.4	0.5	0.5	0.2	0.3	0.3	0.7
Raja clavata	0.0	0.3	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
Scyliorhinus canicula	5.3	0.5	1.1	1.6	0.6	1.9	1.3	1.8	1.3	2.2	1.8
Solea solea	0.5	0.7	0.9	1.0	1.1	1.0	0.5	1.1	0.9	0.7	0.8
Sprattus sprattus	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4
Trisopterus esmarkii	0.5	0.1	0.4	0.5	0.2	0.8	0.4	0.6	0.7	2.1	1.6
Trisopterus minutus	3.7	2.5	7.8	8.4	4.3	8.0	7.6	1.9	2.1	6.7	9.9
Zeus faber	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0

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



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

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	0.0	0.2	0.6	0.1	0.0	0.7	0.4	0.6	0.3	0.7	1.1
Amblyraja radiata	7.3	4.6	5.3	2.2	1.3	3.0	1.9	2.9	2.8	2.2	1.5
Anarhichas lupus	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1
Argentina sphyraena	0.4	2.3	0.5	0.2	0.3	1.1	0.1	0.1	0.9	0.8	0.7
Brosme brosme	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Callionymus lyra	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.2
Callionymus maculatus	0.1	0.6	0.6	0.1	4.0	0.6	0.2	0.2	1.9	0.4	0.5
Enchelyopus cimbrius	0.4	1.5	0.3	0.1	1.3	0.0	0.0	0.1	0.0	0.0	0.0
Entelurus aequoraeus	0.0	0.0	0.0	0.0	0.5	0.1	0.1	0.0	0.0	0.0	0.0
Eutrigla gurnardus	2.5	2.8	2.3	3.4	1.5	10.6	3.2	2.7	4.2	2.5	6.0
Gadiculus argenteus	0.0	3.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Gadus morhua	1.2	0.2	1.4	0.8	1.7	1.3	3.1	1.4	1.5	1.8	1.7
Glyptocephalus cynoglossus	0.9	5.1	3.1	2.5	1.7	3.5	2.9	1.8	3.1	1.2	0.6
Hippoglossoides platessoides	18.5	21.7	34.1	28.2	30.8	34.7	28.4	33.6	56.3	26.5	21.9
Lepidorhombus whiffiagonis	0.0	0.9	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Leucoraja naevus	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0
Limanda limanda	8.4	14.0	17.1	12.9	4.7	6.0	15.2	21.7	10.4	58.0	56.1
Lophius piscatorius	1.2	1.9	0.6	0.4	0.5	0.4	0.9	0.7	1.1	0.3	0.7
Melanogrammus aeglefinus	9.2	3.6	7.5	6.2	15.0	13.3	12.5	12.6	12.8	6.6	6.1
Merlangius merlangus	5.4	1.7	5.6	0.6	1.3	1.8	0.9	1.7	2.3	1.9	1.4
Merluccius merluccius	0.1	0.1	2.6	0.1	0.3	0.3	0.1	0.1	0.6	0.2	0.8
Microstomus kitt	3.2	1.2	2.0	3.8	0.6	4.3	3.2	5.1	8.0	4.7	5.7
Molva molva	0.1	0.5	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Myxine glutinosa	0.3	0.2	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0
Pleuronectes platessa	0.8	1.6	0.6	2.7	0.5	1.0	3.1	4.5	3.4	5.3	9.7
Pollachius virens	0.5	0.0	0.0	0.0	0.1	0.4	0.0	0.2	0.0	0.0	0.1
Scyliorhinus canicula	0.0	0.1	0.0	0.2	0.0	0.5	0.5	0.3	0.3	0.1	0.1
Trisopterus esmarkii	4.3	10.6	4.8	0.2	2.4	0.9	0.0	0.8	0.8	0.1	0.2
Trisopterus minutus	0.1	3.2	0.2	0.1	1.0	0.2	0.2	1.2	0.0	0.0	1.7

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

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	1.2	1.0	0.8	0.6	1.6	1.0	0.8	0.8	0.9	1.0	1.8
Amblyraja radiata	4.7	2.9	4.9	4.1	3.5	3.7	3.6	4.0	4.5	3.0	4.0
Ammodytes marinus	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammodytidae	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0
Argentina sphyraena	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.1	0.1
Arnoglossus laterna	0.7	0.3	0.4	1.3	1.1	2.6	1.3	3.2	1.8	1.3	2.8
Buglossidium luteum	1.3	2.1	2.0	1.9	3.2	1.3	0.7	1.6	2.2	2.3	8.4
Callionymus lyra	3.3	4.1	3.6	2.8	4.0	3.2	2.9	3.2	2.7	2.6	7.1
Callionymus maculatus	0.1	0.1	0.1	0.1	0.3	0.2	0.4	0.3	0.7	0.8	0.3
Chelidonichthys cuculus	0.4	0.6	0.7	0.1	0.2	0.3	0.4	0.4	0.4	0.1	0.9
Chelidonichthys lucerna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2
Echiichthys vipera	0.1	0.1	0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1	0.7
Eutrigla gurnardus	2.7	2.5	2.6	4.6	3.3	5.8	4.9	4.8	6.0	5.0	7.8
Gadus morhua	0.5	0.5	0.2	0.8	0.8	0.5	0.4	0.3	0.8	0.3	0.3
Glyptocephalus cynoglossus	0.5	0.6	0.4	1.0	0.9	0.7	1.1	0.7	1.1	1.8	1.6
Gobius niger	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Gobius paganellus	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.3
Hippoglossoides platessoides	20.2	26.9	14.1	18.8	29.4	22.1	26.2	23.5	25.6	31.7	28.8
Leucoraja naevus	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.2
Limanda limanda	29.6	39.9	33.6	30.8	53.1	66.8	47.0	75.9	47.6	76.4	93.2
Lophius piscatorius	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.2	0.3	0.3	0.2
Melanogrammus aeglefinus	2.8	2.8	1.4	1.7	5.2	1.4	1.4	0.7	1.9	2.1	1.1
Merlangius merlangus	1.3	2.0	0.9	1.0	1.1	0.7	1.1	0.9	1.4	1.6	1.2
Merluccius merluccius	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2
Microchirus variegatus	0.6	1.0	1.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	1.6
Microstomus kitt	2.3	2.5	2.5	3.8	5.8	6.3	5.7	5.6	6.9	9.4	12.0
Pleuronectes platessa	2.6	2.6	2.7	3.4	2.6	5.9	8.1	7.1	6.5	10.6	21.8
Pomatoschistus minutus	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0
Pomatoschistus sp.	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	0.0	0.5	0.4
Raja clavata	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.2
Scyliorhinus canicula	0.3	0.3	0.3	0.2	0.0	0.1	0.1	0.0	0.3	0.1	0.6
Solea solea	0.2	0.3	0.3	0.1	0.3	0.3	0.1	0.3	0.4	0.2	1.1
Trigloporus lastoviza	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
Trisopterus esmarkii	0.1	0.2	0.0	0.1	0.0	0.3	0.1	0.0	0.2	0.0	0.5
Trisopterus luscus	0.3	3.0	1.3	0.8	1.5	0.7	0.2	0.2	0.1	0.3	2.0
Trisopterus minutus	1.0	2.5	1.0	0.7	0.6	0.8	0.5	0.3	0.3	0.2	1.9

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

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	1.8	1.4	1.9	1.9	1.4	1.3	1.0	1.6	1.6	1.3	1.1
Amblyraja radiata	0.2	0.2	0.5	0.3	0.1	0.1	0.1	0.2	0.1	0.2	0.1
Ammodytes tobianus	0.1	0.1	0.3	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Argentina sphyraena	0.1	0.3	0.1	0.1	0.2	0.3	0.1	0.2	0.4	0.6	0.3
Arnoglossus laterna	2.1	2.1	2.3	1.7	1.9	2.0	3.7	2.7	2.6	2.8	3.1
Buglossidium luteum	7.5	6.0	8.7	3.3	4.5	4.5	5.3	5.4	4.3	4.0	5.0
Callionymus lyra	4.2	4.0	4.7	2.6	3.1	4.1	4.1	3.2	3.4	2.9	3.5
Callionymus maculatus	0.3	0.2	0.4	0.3	0.4	0.2	0.2	0.5	0.3	0.1	0.3
Chelidonichthys cuculus	0.2	0.3	0.4	0.3	0.3	0.5	0.3	0.4	0.4	0.6	0.4
Chelidonichthys lucerna	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2
Echiichthys vipera	0.6	0.8	0.8	0.6	0.6	0.5	0.6	0.6	0.3	0.6	0.6
Enchelyopus cimbrius	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.3
Entelurus aequoraeus	0.0	0.0	0.0	0.2	0.6	0.2	0.2	0.0	0.0	0.0	0.0
Eutrigla gurnardus	3.7	5.6	4.4	3.5	4.2	4.9	4.3	5.7	4.7	4.4	4.0
Gadus morhua	0.4	0.9	1.4	2.8	1.0	0.2	0.3	0.4	0.3	0.1	0.1
Glyptocephalus cynoglossus	0.2	1.1	0.7	0.6	0.5	1.0	0.7	0.6	0.7	1.0	1.0
Hippoglossoides platessoides	3.5	5.7	5.8	7.3	8.0	7.1	4.0	10.1	9.0	8.8	9.6
Lepidorhombus whiffiagonis	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.1
Leucoraja naevus	0.7	0.8	0.3	0.5	0.4	0.6	1.2	0.5	0.2	0.2	0.2
Limanda limanda	19.0	26.4	31.8	22.2	41.5	24.7	58.4	44.8	36.7	35.7	35.7
Lophius piscatorius	0.3	0.6	0.4	0.4	0.2	0.3	0.2	0.4	0.3	0.2	0.4
Melanogrammus aeglefinus	3.8	3.7	2.6	4.4	4.8	2.2	1.7	4.2	4.1	3.0	1.6
Merlangius merlangus	6.3	6.5	5.6	5.3	3.6	3.2	4.1	4.2	3.2	5.0	3.0
Merluccius merluccius	0.1	0.1	0.1	0.2	0.1	0.1	0.4	0.1	0.1	0.1	0.3
Microchirus variegatus	2.3	1.1	1.3	0.8	1.6	1.4	1.1	1.2	0.9	1.2	1.1
Microstomus kitt	2.6	4.2	3.3	3.3	2.7	3.0	2.9	2.4	1.6	2.5	2.4
Mustelus asterias	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1
Myoxocephalus scorpius	0.2	0.8	0.2	0.2	0.1	0.4	0.2	0.0	0.0	0.0	0.0
Pegusa lascaris	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1
Platichthys flesus	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1
Pleuronectes platessa	10.9	12.6	12.9	12.0	20.7	15.9	16.2	21.5	21.8	26.9	25.5
Pomatoschistus sp.	0.0	0.2	0.0	0.0	0.0	0.8	0.4	0.3	0.3	0.3	0.2
Raja clavata	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.4
Raja montagui	0.1	0.2	0.3	0.2	0.2	0.2	0.1	0.3	0.2	0.3	0.3
Scyliorhinus canicula	1.1	0.7	1.7	1.2	1.1	1.4	1.3	1.6	1.7	2.6	2.1
Solea solea	1.4	1.3	1.5	1.0	1.0	1.0	1.2	1.4	1.0	1.1	1.2
Trisopterus esmarkii	1.8	1.6	1.7	3.4	1.6	2.8	0.2	3.1	10.3	4.2	4.1
Trisopterus luscus	0.3	0.2	0.2	0.1	0.1	0.4	0.4	0.1	0.1	0.3	0.4
Trisopterus minutus	2.6	7.3	9.4	7.2	8.7	8.4	7.2	5.6	3.4	3.9	5.3
Zeugopterus norvegicus	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.0	0.0

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

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	19.4	1.6	3.5	3.7	9.5	2.6	1.6	1.7	1.4	3.6	3.2
Amblyraja radiata	4.8	3.1	3.7	2.6	1.6	2.4	1.3	1.2	0.8	1.9	1.4
Ammodytidae	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.6	0.2	0.4
Anarhichas lupus	0.1	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arnoglossus laterna	1.9	4.1	1.6	11.2	5.2	8.4	10.5	9.5	14.1	6.7	9.9
Buglossidium luteum	0.6	5.6	0.3	5.9	0.7	1.7	7.9	1.6	9.5	3.5	8.2
Callionymus lyra	4.7	4.9	4.6	16.7	11.8	13.4	6.9	6.3	11.2	10.8	13.0
Callionymus maculatus	0.0	0.0	0.2	0.3	0.0	0.2	0.2	0.4	0.0	0.1	0.3
Callionymus reticulatus	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clupea harengus	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0
Echiichthys vipera	3.7	12.1	12.7	1.2	2.9	1.6	2.4	59.5	11.1	3.9	10.8
Enchelyopus cimbrius	0.3	0.2	0.1	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.1
Entelurus aequoraeus	0.0	0.0	0.0	0.2	0.4	0.3	0.0	0.0	0.0	0.0	0.0
Eutrigla gurnardus	5.7	5.7	10.3	21.5	22.2	14.4	17.9	7.9	24.0	16.8	19.1
Gadus morhua	1.7	0.5	0.9	2.2	0.3	0.6	0.3	1.6	0.1	0.3	2.1
Glyptocephalus cynoglossus	0.3	0.4	0.7	0.2	0.3	0.2	0.0	0.1	0.3	0.2	1.0
Hippoglossoides platessoides	16.3	18.6	13.4	11.9	12.0	15.1	10.5	9.1	8.5	6.6	15.8
Leucoraja naevus	0.0	0.2	0.1	0.3	0.2	0.3	0.2	0.1	0.0	0.3	0.1
Limanda limanda	50.6	53.4	46.6	86.2	305.0	154.6	172.3	120.3	99.8	152.8	211.0
Lophius piscatorius	0.3	0.1	0.3	0.2	0.3	0.4	0.2	0.6	0.1	0.3	0.5
Melanogrammus aeglefinus	3.6	2.4	1.5	1.6	2.5	0.9	0.4	0.4	0.9	1.0	0.5
Merlangius merlangus	6.1	11.0	3.5	4.8	8.2	1.9	4.8	2.4	9.0	8.1	4.3
Merluccius merluccius	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.3	0.0
Microchirus variegatus	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.4
Microstomus kitt	9.9	8.9	8.3	9.0	7.6	10.8	9.9	7.6	13.1	19.3	16.7
Myoxocephalus scorpius	1.9	0.0	0.2	0.6	0.1	1.0	0.3	0.3	0.2	4.1	0.8
Myxine glutinosa	0.5	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1
Pleuronectes platessa	7.4	14.9	23.0	18.1	31.3	17.4	26.4	32.1	30.8	55.8	35.7
Pomatoschistus sp.	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.3	0.0	0.0	0.0
Raja montagui	0.0	0.0	0.3	0.2	0.0	0.1	0.0	0.1	0.0	0.4	0.2
Scophthalmus maximus	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.0	0.2	0.1
Scophthalmus rhombus	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.1	0.0	0.1	0.1
Solea solea	0.2	0.7	0.5	1.2	0.7	1.3	0.4	1.2	0.6	1.9	1.5
Taurulus bubalis	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.2
Trisopterus esmarkii	2.6	0.3	0.4	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.1
Trisopterus minutus	0.6	0.0	0.0	0.6	0.0	1.1	0.0	0.9	0.0	0.2	0.1

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

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	4.5	2.6	3.2	4.3	3.4	5.2	1.2	2.9	2.6	27.7	9.7
Ammodytidae	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.3	0.1	0.1
Arnoglossus laterna	4.0	6.9	1.9	22.7	19.3	10.5	17.4	21.8	20.1	17.1	21.9
Buglossidium luteum	7.2	8.2	1.9	9.0	7.7	34.4	7.1	19.3	29.7	22.3	24.1
Callionymus lyra	5.1	2.2	2.9	12.6	7.5	13.7	4.0	3.5	5.3	2.6	14.6
Callionymus reticulatus	0.0	0.0	0.0	0.1	1.9	0.1	0.0	0.0	0.1	0.0	0.2
Chelidonichthys lucerna	0.1	0.2	0.4	0.7	0.6	0.2	0.2	1.0	0.6	0.5	0.6
Echiichthys vipera	14.1	17.4	9.7	17.4	5.6	33.9	10.4	10.8	13.6	10.5	30.1
Enchelyopus cimbrius	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Eutrigla gurnardus	3.4	2.4	2.4	7.4	6.0	3.2	4.4	2.6	8.2	9.2	7.5
Gadus morhua	0.6	0.1	0.1	0.7	4.7	0.2	0.0	0.0	0.0	0.0	0.0
Hyperoplus lanceolatus	0.5	0.1	0.1	0.0	0.7	0.1	0.0	0.1	0.1	0.1	0.2
Limanda limanda	31.4	48.6	33.7	62.6	80.4	205.0	88.8	65.0	86.5	216.8	116.9
Merlangius merlangus	52.4	8.3	12.9	11.2	11.8	12.7	2.8	7.4	24.2	12.2	11.7
Microstomus kitt	1.9	0.5	0.4	0.3	0.6	0.9	0.6	0.5	0.6	0.8	3.3
Mullus surmuletus	0.1	0.1	0.1	0.0	0.3	0.2	0.0	0.6	0.0	0.0	0.0
Mustelus asterias	0.0	0.0	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1
Mustelus sp.	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.1
Myoxocephalus scorpius	3.9	0.2	2.2	0.2	1.9	0.3	0.0	0.0	0.0	0.0	0.5
Platichthys flesus	1.1	0.2	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.4	1.0
Pleuronectes platessa	13.0	9.9	8.7	13.0	12.2	14.0	37.6	14.0	26.7	33.7	58.5
Pomatoschistus sp.	0.3	0.8	0.2	1.5	0.6	2.0	0.1	2.4	0.2	0.1	0.1
Raja clavata	1.2	0.4	0.2	0.5	0.4	0.5	0.6	0.4	0.6	0.3	2.4
Raja montagui	0.4	0.3	0.1	0.0	0.7	0.2	0.2	0.1	0.3	0.9	0.8
Scophthalmus maximus	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.2
Scophthalmus rhombus	0.1	0.2	0.0	0.1	0.1	0.1	0.0	0.0	0.2	0.1	0.1
Scyliorhinus canicula	10.9	1.4	1.1	0.7	4.7	2.6	1.3	0.9	0.8	0.9	4.8
Solea solea	12.4	10.6	4.5	8.2	9.0	4.7	6.0	5.7	4.8	8.2	22.9
Taurulus bubalis	0.0	0.0	0.4	0.0	0.2	0.4	0.0	0.0	0.0	0.0	0.3
Trachurus trachurus	0.0	0.2	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0
Trisopterus luscus	2.3	4.4	4.8	2.5	1.3	6.8	4.2	1.4	0.2	0.5	2.4
Trisopterus minutus	10.5	4.0	3.7	2.7	0.7	3.4	1.7	1.1	0.2	0.3	8.5

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

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	18.5	9.6	8.7	4.4	4.1	6.2	13.6	6.3	8.3	8.7	16.4
Ammodytes marinus	0.0	0.0	0.3	0.1	0.1	0.1	0.2	0.0	0.1	0.0	0.0
Ammodytidae	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0
Arnoglossus laterna	32.3	38.9	43.6	30.2	13.9	29.9	35.5	43.3	32.9	32.7	36.8
Belone belone	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	0.0
Buglossidium luteum	48.2	25.0	34.7	23.1	10.7	19.2	25.8	34.4	30.9	20.4	19.1
Callionymus lyra	22.2	15.0	10.6	6.6	11.6	14.7	17.8	11.0	9.9	11.8	20.0
Callionymus reticulatus	0.1	0.4	0.5	0.0	0.2	0.1	0.1	0.0	0.2	0.1	0.2
Chelidonichthys lucerna	0.9	1.2	1.1	1.2	1.2	1.2	1.0	1.0	0.9	1.0	1.5
Clupea harengus	0.1	0.4	0.4	0.0	0.1	0.2	0.0	0.0	0.3	0.0	0.1
Echiichthys vipera	10.0	12.3	8.2	9.2	4.5	7.5	5.1	5.1	3.6	4.1	3.6
Enchelyopus cimbrius	0.5	2.7	1.4	1.5	1.5	0.5	0.4	0.7	0.2	0.8	0.5
Eutrigla gurnardus	5.2	6.6	5.6	8.2	5.4	5.7	5.0	3.3	6.4	9.8	5.4
Gadus morhua	0.1	0.1	0.2	0.6	0.7	1.1	0.2	0.1	0.5	0.4	0.1
Hippoglossoides platessoides	0.7	0.9	1.0	1.2	1.6	0.3	0.6	0.4	0.3	0.8	0.6
Hyperoplus lanceolatus	0.5	0.7	0.5	0.2	0.3	0.2	0.3	0.3	0.2	0.3	0.3
Limanda limanda	140.7	142.7	100.8	108.7	85.9	152.2	202.1	157.0	173.8	227.7	235.5
Liparis liparis	0.2	0.0	0.4	0.1	0.0	0.1	1.0	0.4	0.4	0.1	0.1
Merlangius merlangus	21.9	18.2	9.8	7.7	4.4	22.2	14.5	9.9	7.3	11.1	5.2
Microstomus kitt	1.7	3.0	1.8	0.6	1.1	3.0	3.3	1.5	2.7	5.3	4.0
Mullus surmuletus	0.6	1.4	0.4	0.0	0.3	0.2	0.0	0.6	0.8	0.0	0.1
Myoxocephalus scorpius	1.2	0.3	1.4	1.4	0.5	1.3	0.5	0.4	1.8	2.6	0.8
Platichthys flesus	0.8	0.7	0.7	1.2	0.4	0.9	1.0	0.9	2.6	3.3	1.1
Pleuronectes platessa	131.6	79.7	77.1	80.3	70.0	105.9	111.0	156.7	184.3	149.1	153.8
Pomatoschistus minutus	1.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.6	0.1	0.0
Pomatoschistus sp.	23.2	12.5	0.1	0.1	0.0	0.0	0.0	0.2	1.8	14.8	6.8
Scophthalmus maximus	0.5	0.7	0.5	0.5	0.4	0.5	0.4	0.3	0.3	0.4	0.4
Scophthalmus rhombus	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.2
Scyliorhinus canicula	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3
Solea solea	5.8	4.0	2.1	2.2	3.6	4.5	4.9	4.9	11.5	7.0	6.9
Sprattus sprattus	0.1	0.5	0.4	0.2	0.2	0.0	0.1	0.1	0.1	0.6	0.1
Syngnathus acus	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Syngnathus rostellatus	0.1	0.1	0.0	0.3	0.1	0.1	0.1	0.1	0.2	0.0	0.0
Trachurus trachurus	2.7	6.0	0.8	0.8	1.1	0.1	0.4	0.3	0.3	0.0	0.0
Trisopterus luscus	0.7	1.1	0.6	0.1	0.1	2.1	2.3	0.1	0.0	0.5	0.4
Trisopterus minutus	0.7	0.6	0.8	0.5	0.1	0.2	0.5	0.0	0.0	0.0	0.1

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

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	0.4	1.8	0.1	0.8	0.4	1.9	2.2	1.5	2.9	5.3	3.7
Amblyraja radiata	2.0	0.7	2.4	1.4	3.2	1.6	1.8	1.2	1.5	1.4	2.3
Ammodytes marinus	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0
Arnoglossus laterna	2.6	6.3	0.9	5.7	1.1	6.8	7.1	6.3	4.9	3.0	3.9
Buglossidium luteum	0.9	31.5	0.0	7.9	0.3	14.2	31.3	15.8	11.7	11.9	11.1
Callionymus lyra	2.6	5.6	0.6	3.8	3.0	7.3	5.4	2.6	3.0	4.3	9.6
Callionymus maculatus	0.0	0.5	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Chelidonichthys lucerna	0.0	0.1	0.0	0.3	0.2	0.2	0.1	0.1	0.2	0.1	0.2
Enchelyopus cimbrius	0.3	0.3	0.2	0.5	0.4	0.0	0.1	0.0	0.4	0.3	0.2
Eutrigla gurnardus	8.1	4.3	0.8	14.8	6.5	12.4	7.5	5.2	7.6	8.3	9.5
Gadus morhua	2.9	2.4	0.4	0.8	0.3	0.9	0.2	0.1	0.9	0.5	0.3
Glyptocephalus cynoglossus	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Gobiidae	0.0	12.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hippoglossoides platessoides	18.2	12.9	4.5	10.0	7.8	8.8	5.6	6.9	6.3	6.9	3.7
Hyperoplus lanceolatus	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Limanda limanda	56.6	120.7	125.2	109.6	56.1	105.0	96.4	100.4	111.9	132.0	239.2
Lophius piscatorius	0.1	0.0	0.0	0.1	0.1	0.0	0.2	0.0	0.1	0.1	0.1
Melanogrammus aeglefinus	0.3	0.7	0.2	1.7	0.4	0.5	0.0	0.6	1.3	0.2	0.1
Merlangius merlangus	3.3	2.0	1.0	1.1	0.6	1.2	2.7	1.0	1.4	1.9	0.9
Merluccius merluccius	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.1	0.1
Microstomus kitt	0.5	1.6	0.1	1.1	0.4	2.3	1.5	1.4	2.0	2.2	3.4
Myoxocephalus scorpius	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.6	0.7	0.5
Platichthys flesus	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.1	0.2
Pleuronectes platessa	10.6	25.3	23.6	42.9	16.3	44.0	49.4	33.0	76.4	55.2	98.5
Pomatoschistus minutus	0.0	0.1	0.0	0.1	0.0	1.5	1.7	0.1	10.4	5.2	0.5
Scophthalmus maximus	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2
Solea solea	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.7	1.2
Zeugopterus norvegicus	0.2	0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1

Annex 9: Population abundance indices for sole and plaice, offshore surveys

Annex 9.1: Catch rate of sole from Netherlands and UK surveys in the North Sea and VII a, d, e and f.

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1985	0.000	7.031	7.121	3.695	1.654	0.688	0.276	0.000	0.000	0.000	0.000
1986	0.000	7.168	5.183	1.596	0.987	0.623	0.171	0.158	0.000	0.018	0.052
1987	0.041	6.973	12.548	1.834	0.563	0.583	0.222	0.228	0.058	0.000	0.022
1988	0.000	83.111	12.512	2.684	1.032	0.123	0.149	0.132	0.103	0.014	0.126
1989	0.490	9.015	68.084	4.191	4.096	0.677	0.128	0.242	0.000	0.051	0.034
1990	0.019	37.839	24.487	21.789	0.778	1.081	0.770	0.120	0.115	0.025	0.048
1991	0.815	4.035	28.841	6.872	6.453	0.136	0.135	0.063	0.045	0.013	0.059
1992	0.024	81.625	22.284	10.449	2.529	3.018	0.090	0.162	0.078	0.020	0.077
1993	0.018	6.350	42.345	1.338	5.516	3.371	6.199	0.023	0.084	0.053	0.061
1994	2.172	7.660	7.121	19.743	0.124	1.636	0.088	0.983	0.009	0.000	0.008
1995	0.429	28.125	8.458	6.268	5.129	0.363	0.805	0.316	0.734	0.039	0.036
1996	0.161	3.975	7.634	1.955	1.785	2.586	0.326	0.393	0.052	0.264	0.055
1997	0.542	169.343	4.919	2.985	0.739	0.710	0.380	0.096	0.035	0.042	0.055
1998	0.371	17.108	27.422	1.862	1.242	0.073	0.015	0.391	0.000	0.000	0.000
1999	6.338	11.960	18.363	15.783	0.584	1.920	0.310	0.218	0.604	0.003	0.310
2000	0.190	14.594	6.144	4.045	1.483	0.263	0.141	0.060	0.007	0.150	0.069
2001	9.200	7.998	9.963	2.156	1.564	0.684	0.074	0.037	0.028	0.000	0.163
2002	5.908	20.989	4.182	3.428	0.886	0.363	0.361	0.032	0.069	0.000	0.052
2003	0.321	10.507	9.947	2.459	1.670	0.360	0.187	0.319	0.000	0.020	0.000
2004	0.685	4.192	4.354	3.553	0.644	0.626	0.118	0.070	0.073	0.000	0.012
2005	0.083	5.534	3.395	2.377	1.303	0.167	0.171	0.077	0.047	0.000	0.018
2006	0.060	17.089	2.332	0.278	0.709	0.479	0.151	0.088	0.000	0.007	0.030
2007	0.714	7.498	19.504	1.464	0.565	0.315	0.537	0.031	0.009	0.000	0.024
2008	3.092	15.247	9.062	12.298	1.313	0.222	0.279	0.202	0.028	0.047	0.000
2009	4.911	15.950	4.999	2.858	4.791	0.252	0.124	0.272	0.079	0.000	0.000
2010	2.462	54.811	10.707	2.027	0.774	1.252	0.143	0.122	0.005	0.027	0.089
2011	2.228	26.166	17.387	4.006	1.094	0.778	0.828	0.013	0.000	0.141	0.027
2012	1.089	5.149	18.212	8.863	1.692	0.764	0.257	0.229	0.046	0.000	0.043

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1995	0.53	41.6	86.43	17.13	16.1	9.81	5.19	0.86	0.78	0	0.43
1996	3.33	75.48	52.47	22.89	8.98	8.33	8.77	1.3	1.81	0.73	2.22
1997	4.49	70.49	63.17	19.81	9.34	5.56	3.52	7.1	1.77	1.77	0.97
1998	7.91	10.59	63.34	15.71	1.77	0.89	0.86	0	0.44	0	0.22
1999	8.96	103.75	18.49	24.53	9.36	0.86	0.3	1.09	0.59	1.56	0.99
2000	3.22	192.51	157.89	15.03	14.08	7	2.6	0.67	0.37	0.91	3.01
2001	5.87	91.45	174.9	45.7	2.99	4.57	1.83	0.82	0.63	0.24	1
2002	2.22	125.78	47.31	33.28	21.97	3.61	4.39	1.79	0.9	1.15	2.38
2003	0.91	69.91	129.31	16.26	23.56	14.71	0.77	6.43	1.52	0.86	2.5
2004	24.63	58.65	57.77	50.15	12.46	10.14	8.58	0.65	2.15	1.15	3
2005	37.64	107.01	55.54	19.82	37.68	3.29	10.42	5.63	0.56	1.2	4.64
2006	7.02	202.5	82.19	20.64	14.03	35.2	6.72	9.17	5.34	0.36	3.83
2007	9.41	40.71	77.34	19.25	4.4	2.78	11.41	0.94	2.19	1.08	0.96
2008	1	98.84	59.97	39.34	13.45	0.63	3.41	10.73	2.55	1.79	1.32
2009	1.01	35.21	82.39	58.21	56.85	12.23	1.99	3.39	10.18	6.27	5.23
2010	1.43	77.97	67.96	24.52	22.62	17.47	7.01	2.16	3.34	1.36	1.97
2011	5.43	89.66	51.75	15.66	4.40	7.94	4.01	1.13	0.77	0.43	1.60
2012	0	26.85	58.22	30.93	9.05	3.47	3.85	5.61	1.07	0.27	0

c) United Kingdom: sole (N.hr^-1/8m trawl) Eastern Channel (VIId).

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1988		8.2	14.2	9.9	0.8	1.3	0.6	0.1	0.1	0.2	0.2
1989		2.6	15.4	3.4	1.7	0.6	0.2	0.2	0	0	0.7
1990		12.1	3.7	3.4	0.7	0.8	0.2	0.1	0.2	0	0
1991		8.9	22.8	2.2	2.3	0.3	0.5	0.1	0.2	0.1	0.1
1992		1.4	12	10	0.7	1.1	0.3	0.5	0.1	0.2	0.6
1993		0.5	17.5	8.4	7	0.8	1	0.3	0.2	0	0.4
1994		4.8	3.2	8.3	3.3	3.3	0.2	0.6	0.1	0.3	0.3
1995		3.5	10.6	1.5	2.3	1.2	1.5	0.2	0.3	0.2	0.3
1996		3.5	7.3	3.8	0.7	1.3	0.9	1.1	0.1	0.5	0.4
1997		19	7.3	3.2	1.3	0.2	0.5	0.4	0.9	0	0.7
1998		2	21.2	2.5	1	0.9	0.1	0.3	0	0.1	0.3
1999		28.14	9.44	13.17	2.51	1.73	1.28	0.16	0.93	1.07	0.47
2000		10.49	22.03	4.15	4.24	1.03	0.58	0.28	0.03	0.24	1.2
2001		9.09	21.01	8.36	1.2	1.91	0.54	0.57	0.35	0.04	1.01
2002		31.76	11.42	5.42	3.45	0.27	0.71	0.44	0.09	0	0.56
2003		6.47	28.48	4.13	2.46	1.58	0.3	0.39	0.2	0.07	0.52
2004		7.35	8.49	7.71	1.57	1.45	0.99	0.2	0.44	0.21	0.57
2005		25	5.04	2.86	3.47	1.63	1.02	0.66	0.06	0.31	0.35
2006		6.3	29.18	2.83	1.99	1.95	0.34	0.44	0.57	0	0.34
2007		2.14	21.86	12.9	1.22	0.8	1.2	0.32	0.17	0.59	1.02
2008		2.86	6.46	7.24	4.82	0.25	0.49	0.38	0.27	0.24	0.2
2009		30.54	13.33	5.44	4.34	3.76	0.37	0.2	0.31	0.23	0.48
2010		15.9	30.12	5.32	1.66	2.82	2.38	0.35	0.16	0.55	0.31
2011		11.92	23.54	11.56	1.25	0.57	2.56	0.60	0.16	0.21	0.06
2012		1.75	9.14	6.47	3.36	0.87	0.39	0.65	0.52	0.00	0.65

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1989	0	5	56	120	107	34	40	17	5	7	12
1990	0	23	52	76	31	24	7	15	3	6	11
1991	0	11	231	79	51	23	21	5	17	4	15
1992	0	5	140	316	44	36	12	7	5	11	11
1993	0	5	54	115	105	14	10	9	3	3	10
1994	0	6	47	106	62	44	5	5	2	3	7
1995	0	14	37	44	42	26	31	4	5	5	13
1996	0	28	112	67	25	32	20	17	3	2	9
1997	0	11	130	126	43	14	16	13	14	5	15
1998	0	11	141	114	76	22	10	14	6	8	11
1999	0	11	97	128	47	23	8	4	4	4	17
2000	0	12	136	70	52	23	16	5	3	5	9
2001	0	9	197	162	52	31	12	12	4	1	7
2002	0	6	37	113	48	27	6	3	2	0	12
2003	0	23	124	78	56	28	6	1	1	2	4
2004	0	16	110	120	24	15	10	16	9	4	4
2005	0	8	110	39	53	12	12	6	2	4	4
2006	0	5	120	95	26	37	10	7	9	0	5
2007	0	7	188	135	50	11	23	3	3	1	4
2008	0	10	85	158	77	40	2	14	3	6	7
2009	0	11	104	126	96	49	13	13	12	1	8
2010	0	20	175	154	84	59	31	20	7	12	14
2011	0	9	156	231	62	39	25	24	8	2	4
2012	0	3	47	162	125	40	27	13	3	6	9

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1993	3	201	379	51	23	1	2	2	1	1	2
1994	1	407	473	121	17	9	8	0	0	2	2
1995	31	142	255	60	13	7	14	1	1	1	4
1996	3	178	251	64	27	7	3	4	1	3	3
1997	37	498	207	21	13	14	5	3	6	0	4
1998	104	885	472	57	11	9	5	2	1	5	5
1999	29	2922	297	38	16	7	4	5	1	0	9
2000	16	1086	1608	37	26	6	0	2	1	1	4
2001	26	449	711	307	23	9	6	2	0	2	8
2002	9	786	283	151	121	14	7	2	3	0	4
2003	14	465	628	55	30	56	9	3	3	0	1
2004	64	860	434	99	15	22	42	4	3	0	5
2005	44	407	267	38	16	7	5	17	1	2	0
2006	13	324	238	47	16	8	0	2	12	0	1
2007	108	424	128	51	16	8	7	3	4	13	3
2008	6	1232	124	15	18	7	9	4	3	5	8
2009	1	604	377	29	8	10	4	3	3	2	11
2010	19	101	558	144	20	2	7	9	4	2	8
2011	22	596	62	163	82	8	2	7	3	0	6
2012	16	643	274	9	63	28	1	1	1	3	10

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1993	0	78	320	158	208	28	16	5	14	39	27
1994	0	62	431	193	95	128	43	10	11	6	36
1995	24	246	154	253	110	30	67	12	5	5	24
1996	4	886	126	32	76	46	23	31	8	2	11
1997	5	1158	577	72	24	55	27	16	30	7	10
1998	2	539	716	292	18	6	24	23	5	18	9
1999	3	385	293	255	203	29	8	26	5	6	21
2000	0	354	464	147	219	91	13	2	13	6	24
2001	1	91	284	192	65	96	64	6	3	12	11
2002	0	205	61	121	126	42	79	49	2	1	19
2003	0	242	210	51	97	81	40	43	26	1	13
2004	0	406	240	119	27	77	45	41	17	19	11
2005	0	53	165	69	25	13	35	25	4	6	17
2006	0	107	110	90	45	36	9	16	15	10	20
2007	0	125	93	49	57	41	11	4	6	12	22
2008	0	126	125	60	21	43	23	6	2	9	17
2009	0	57	150	68	39	23	30	12	7	1	16
2010	0	25	59	73	37	16	5	10	9	3	6
2011	0	89	35	62	68	35	12	4	13	6	11
2012	0	21	49	17	46	29	12	9	2	6	13

Annex 9.2: Catch rate of plaice from Netherlands and UK surveys in the North Sea and VII

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1985	595.271	136.759	173.893	36.059	10.997	1.273	0.973	0.336	0.155	0.091	0.229
1986	9.303	667.441	131.704	50.173	9.208	3.780	0.400	0.418	0.147	0.070	0.188
1987	44.126	225.822	764.186	33.841	4.880	1.842	0.607	0.252	0.134	0.078	0.186
1988	29.623	680.173	146.993	182.312	9.991	2.810	0.814	0.458	0.036	0.112	0.254
1989	31.862	467.877	319.272	38.660	47.305	5.850	0.833	0.311	0.661	0.132	0.075
1990	27.000	185.344	146.071	79.339	26.351	5.469	0.758	0.189	0.383	0.239	0.198
1991	152.176	291.378	159.424	33.955	13.569	4.313	5.659	0.239	0.204	0.092	0.107
1992	26.814	360.890	174.526	29.253	5.961	3.748	2.871	1.186	0.346	0.050	0.089
1993	74.272	188.988	283.400	62.783	8.272	1.128	1.130	0.584	0.464	0.155	0.071
1994	284.479	193.260	77.139	34.458	10.586	2.667	0.600	0.800	0.895	0.373	0.030
1995	108.101	265.634	40.618	13.218	7.527	1.110	0.806	0.330	1.051	0.202	0.119
1996	222.510	310.287	206.883	21.469	4.470	3.134	0.838	0.044	0.161	0.122	0.110
1997	65.515	1046.845	59.241	17.180	2.670	0.257	0.358	0.157	0.111	0.000	0.031
1998	255.654	347.575	402.657	44.960	8.294	1.224	0.339	0.149	0.213	0.072	0.081
1999	257.559	293.253	121.551	171.254	3.391	1.956	0.127	0.130	0.027	0.030	0.079
2000	209.293	267.473	69.252	29.349	22.359	0.570	0.162	0.502	0.027	0.012	0.052
2001	807.932	206.531	72.236	17.840	9.174	8.716	0.270	0.131	0.038	0.040	0.170
2002	248.356	519.224	44.475	14.901	4.991	2.539	1.321	0.085	0.128	0.000	0.092
2003	225.619	132.754	159.120	10.057	5.550	1.426	1.133	0.638	0.111	0.096	0.018
2004	197.940	233.707	39.623	61.912	6.152	2.464	1.492	0.952	2.842	0.000	0.012
2005	270.775	163.046	66.176	6.759	12.790	1.084	1.164	0.290	0.152	0.492	0.041
2006	250.800	128.615	36.385	18.115	2.982	5.890	0.867	0.757	0.040	0.269	0.387
2007	298.086	311.997	67.169	19.707	14.416	2.942	6.085	0.684	0.831	0.156	0.651
2008	387.592	221.567	120.728	30.108	9.075	7.205	0.618	1.715	0.292	0.229	1.046
2009	555.472	408.995	105.222	45.975	13.013	4.029	3.474	0.574	2.128	0.278	0.929
2010	814.363	261.097	84.254	34.244	20.178	4.662	2.162	3.464	0.207	2.547	1.232
2011	323.428	486.157	148.217	55.305	20.065	12.903	3.945	2.243	2.263	0.232	0.906
2012	454.620	241.840	191.502	58.067	20.904	12.638	5.594	1.787	0.494	1.695	0.789

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1996	-	1.643	6.021	4.451	2.903	2.039	1.566	0.721	0.415	0.190	0.468
1997	-	0.221	7.119	9.127	3.252	2.105	1.523	0.401	0.819	0.354	0.429
1998	-	0.228	32.249	9.572	4.874	2.202	1.274	0.929	0.762	0.304	0.540
1999	0.054	2.692	7.711	35.228	5.558	2.498	1.928	0.633	0.761	0.309	0.331
2000	0.043	4.795	13.445	12.910	16.957	2.882	1.716	0.933	0.805	0.218	0.530
2001	0.178	2.154	8.612	9.901	6.681	7.360	1.055	0.592	0.418	0.505	0.543
2002	-	18.553	12.912	9.541	6.411	4.181	4.420	0.743	0.741	0.394	0.933
2003	0.338	3.975	41.692	13.378	9.059	5.077	2.806	3.920	0.703	0.740	1.562
2004	0.014	5.985	15.784	31.488	9.430	4.316	2.439	1.242	2.500	0.409	1.405
2005	0.043	6.876	23.366	12.234	17.672	2.824	6.871	1.565	0.567	3.574	2.482
2006	0.236	6.725	32.192	25.727	11.367	10.918	1.985	3.897	0.864	0.723	3.262
2007	-	26.571	23.735	19.551	23.175	4.900	10.147	1.974	3.786	0.323	5.471
2008	-	17.467	50.462	25.585	18.392	18.974	6.243	12.747	2.657	6.749	8.411
2009	0.116	12.110	41.685	43.331	19.126	12.052	11.768	3.081	10.119	1.567	8.025
2010	0.644	26.180	35.716	34.561	30.093	13.412	5.695	12.234	2.744	6.362	7.706
2011	0.174	41.881	71.478	41.593	28.462	31.670	14.284	5.501	11.881	1.172	12.890
2012	0.000	12.898	87.806	65.988	32.006	19.318	16.038	7.147	3.630	8.635	8.989

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

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

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1999	1.5	24.45	2.51	3.79	0.50	0	0	0	0	0.25	0
2000	13.25	26.33	3.68	0.25	2.92	0.33	0	0	0	0	0
2001	23.00	48.10	21.90	0.50	0.50	0.25	0	0	0.25	0	0
2002	1.07	42.40	1.87	1.07	0	0	0.27	0	0	0	0
2003	11.29	28.08	31.69	0.94	0.24	0.24	0	0.47	0	0.24	0
2004	0.95	6.29	0.95	1.33	0	0	0	0	0.19	0	0
2005	1.31	25.85	9.49	0.36	0.44	0	0	0	0	0.36	0
2006	2.49	16.02	1.72	0.22	0	0	0	0	0	0	0
2007	0.35	13.46	3.6	0.42	0.05	0	0.24	0	0	0	0
2008	0.80	66.24	11.07	1.60	0	0.80	0.80	0	0	0	0
2009	7.87	44.73	9.6	1.6	0	0	0	0	0	0	0
2010	4.86	18.72	4.27	0.57	0.29	0	0	0	0	0	0
2011	9.14	36.76	6.27	1.10	0	0	0	0	0	0	0
2012	0.53	9.54	8.94	1.93	0.80	0	0.53	0	0	0	0

e) United Kingdom: plaice (N.hr^-1/8m trawl) Eastern Channel (VIId).

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1988		26.5	31.3	43.8	7	4.6	1.5	0.8	0.7	0.6	1.2
1989		2.3	12.1	16.6	19.9	3.3	1.5	1.3	0.5	0.3	1.7
1990		5.2	4.9	5.8	6.7	7.5	1.8	0.7	1	0.8	0.4
1991		11.8	9.1	7	5.3	5.4	3.2	1.2	1	0.1	1.2
1992		16.5	12.5	4.2	4.2	5.6	4.9	3.4	0.7	0.5	0.7
1993		3.2	13.4	5	1.7	1.9	1.6	2	2.8	0.4	0.6
1994		8.3	7.5	9.2	5.6	1.9	0.8	0.9	1.8	1.2	0.8
1995		11.3	4.1	3	3.7	1.5	0.6	0.6	1.3	0.8	0.8
1996		13.2	11.9	1.3	0.7	1.3	0.9	0.4	0.3	0.4	2.8
1997		33.1	13.5	4.2	0.6	0.3	0.3	0.2	0.2	0.2	1.9
1998		11.4	27.3	7	3.1	0.3	0.2	0.2	0.1	0	1
1999		11.3	14.1	15.9	2.9	1	0.2	0.1	0.3	0.1	0.9
2000		13.2	21	14.4	13.8	3.5	0.9	0.6	0.2	0.4	1.5
2001		17.9	13	10	7.1	10.9	1.9	0.5	0.3	0.2	1
2002		20.7	15.9	7.7	3.5	1.8	3.5	0.7	0.1	0.1	0.6
2003		6.2	22.8	6	2.9	1.6	0.8	1.8	0.6	0.1	0.3
2004		36.2	15	13.2	3.4	0.9	0.2	0.7	1.2	0.2	0.2
2005		10.8	31.2	13.8	10.3	2.9	1.2	0.8	0.4	0.9	0.7
2006		17.2	16.1	9.2	3.3	2.6	0.8	0.6	0.3	0.1	0.5
2007		42.6	18.8	8.7	3.9	1.7	2	0.8	0.3	0.1	1.1
2008		30.3	26.5	7.2	3	2.3	1.1	0.5	0.4	0.1	0.3
2009		71.6	42.9	19.1	5.7	3.2	2.2	0.8	1.2	0.4	1.3
2010		65.25	63.83	17.27	8.9	3.04	1.9	1.38	0.3	0.36	0.89
2011		105.55	95.31	35.70	9.25	6.68	2.82	1.40	0.19	0.57	0.95
2012		23.23	76.07	45.26	12.73	3.53	1.61	0.42	0.41	0.43	0.12

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1989	0	31	70	281	188	23	11	14	8	6	18
1990	0	25	38	220	87	75	2	6	1	6	7
1991	2	22	27	63	79	62	41	9	0	1	3
1992	0	152	44	72	24	40	20	17	3	5	4
1993	0	21	70	60	24	13	25	13	11	2	2
1994	0	34	32	98	30	10	2	9	13	8	2
1995	0	50	46	45	48	12	4	5	6	1	4
1996	1	33	106	30	17	25	5	1	3	7	8
1997	0	53	122	197	24	6	12	7	1	1	7
1998	0	81	125	125	85	9	6	7	4	0	3
1999	1	38	44	182	53	30	3	2	6	4	2
2000	0	47.93	62.76	125.38	178.56	38.11	22.18	1.08	2.00	0	5.00
2001	20.50	31.88	63.69	50.99	111.35	97.44	24.54	12.61	0	3.00	5.00
2002	0	138.00	101.55	86.58	23.20	23.47	39.87	5.33	2.00	0	2.00
2003	0	28.83	137.32	59.84	50.14	4.50	18.06	27.08	7.22	0	2.00
2004	0	11.00	32.50	59.84	23.00	10.00	3.00	1.00	10.00	0	4.00
2005	1.50	30.43	75.41	90.88	69.82	12.88	3.20	2.67	5.25	2.20	2.75
2006	0.00	55.00	102.40	103.05	30.39	31.19	2.67	3.80	0.00	4.50	2.00
2007	0.00	37.00	91.15	120.53	33.79	27.03	6.00	5.50	0.50	2.50	4.00
2008	0.00	14.92	145.77	67.61	30.87	12.00	7.83	9.50	3.50	1.00	4.00
2009	3.00	16.17	156.37	213.65	29.13	14.63	10.94	8.00	4.61	1.00	2.50
2010	14.00	184.25	350.81	224.27	112.75	31.05	15.05	16.50	1.00	3.33	4.00
2011	0	207.99	578.76	351.47	94.41	54.86	8.75	8.27	3.00	1.00	6.50
2012	0	16.24	235.46	577.44	188.21	47.22	44.14	19.35	6.07	5.00	6.88

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1993	4	121	107	43	2	5	0	1	0	0	0
1994	150	131	39	19	10	1	0	0	0	0	0
1995	1	275	103	19	3	8	2	0	0	2	0
1996	10	265	342	37	1	3	1	0	0	0	0
1997	8	259	117	40	5	2	2	1	0	0	0
1998	6	273	145	54	10	2	1	0	0	0	1
1999	192	181	94	34	23	8	0	0	2	0	0
2000	100	403	75	37	8	7	0	1	0	0	0
2001	42	251	185	19	10	5	4	2	0	0	0
2002	1	162	208	95	7	7	2	4	1	0	0
2003	72	117	95	72	26	3	2	1	1	2	0
2004	188	297	38	31	15	3	1	1	3	0	2
2005	3	228	89	25	10	13	3	1	0	0	1
2006	96	102	121	41	11	2	11	0	3	1	0
2007	41	178	109	56	18	2	3	1	2	1	0
2008	7	167	257	57	19	6	1	3	0	0	1
2009	222	192	66	93	25	13	5	2	0	1	0
2010	170	393	105	31	47	8	5	1	0	1	2
2011	10	433	353	63	24	27	18	3	3	1	0
2012	19	173	506	116	29	12	18	7	2	0	0

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

Year/Age	0	1	2	3	4	5	6	7	8	9	10+
1993	7	1007	836	111	90	11	5	9	2	1	6
1994	100	736	642	339	63	29	12	16	9	2	9
1995	281	1283	387	179	84	16	18	0	1	3	8
1996	105	1701	601	124	74	49	9	11	1	2	8
1997	31	1363	668	322	65	50	23	8	7	0	7
1998	169	1167	767	212	95	34	23	14	3	1	7
1999	180	1189	965	344	113	38	17	7	7	4	0
2000	132	2112	659	298	141	73	22	7	3	3	5
2001	249	1468	663	218	130	89	28	10	7	6	4
2002	16	1734	1615	647	243	79	51	16	17	5	7
2003	258	1480	1842	827	296	122	62	39	10	4	4
2004	218	1816	1187	1184	404	261	57	57	14	4	3
2005	288	869	1295	666	499	297	111	17	17	9	11
2006	485	1120	840	722	411	178	83	59	16	15	6
2007	186	2667	1255	525	417	196	95	45	37	6	10
2008	439	1293	1900	619	339	244	76	55	33	5	0
2009	150	1460	1083	1225	310	189	251	65	31	20	13
2010	499	1912	1431	600	460	187	142	98	61	35	35
2011	232	2213	1432	663	315	347	122	101	87	71	74
2012	320	1964	1796	660	319	156	148	137	84	100	84

Annex 10: Area definitions and surface area data for the German, Dutch and Belgian inshore surveys

The area definitions for the German DYFS and Dutch DFS are presented in the Figure 10.1. These definitions are an approximation of the old figure (see WGBEAM 2006 report) and were used to estimate surface areas using GIS techniques (see WGBEAM 2007 report). The surface area estimates, by area and depth class, are presented in Table 11.1. Not all areas listed in Table 10.1 are surveyed (consistently). The weighting and raising factors are therefore based on the reduced areas presented in Table 10.2.

The Belgian survey covers one area (area code 400). The surface area estimates by depth class are presented in Figure 10.2 and Table 10.2.

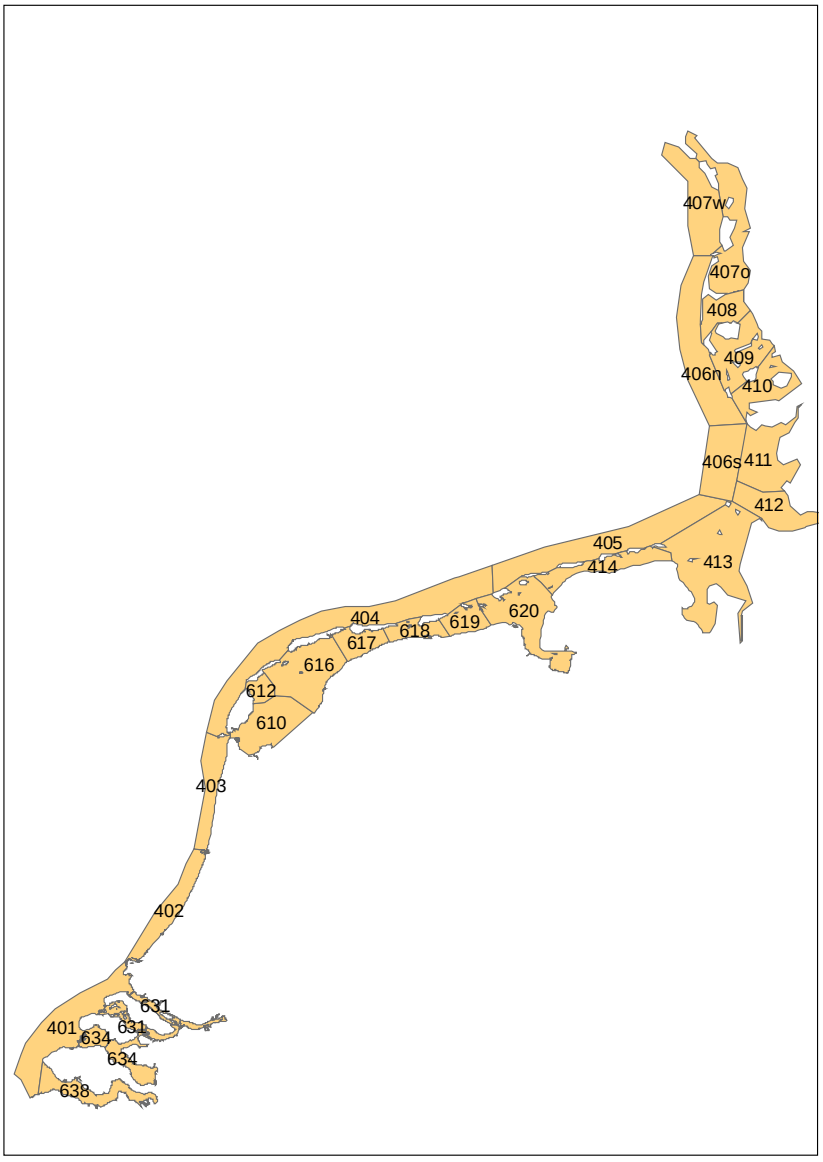


Figure 10.1. Area definitions for the Dutch DFS and German DYFS.

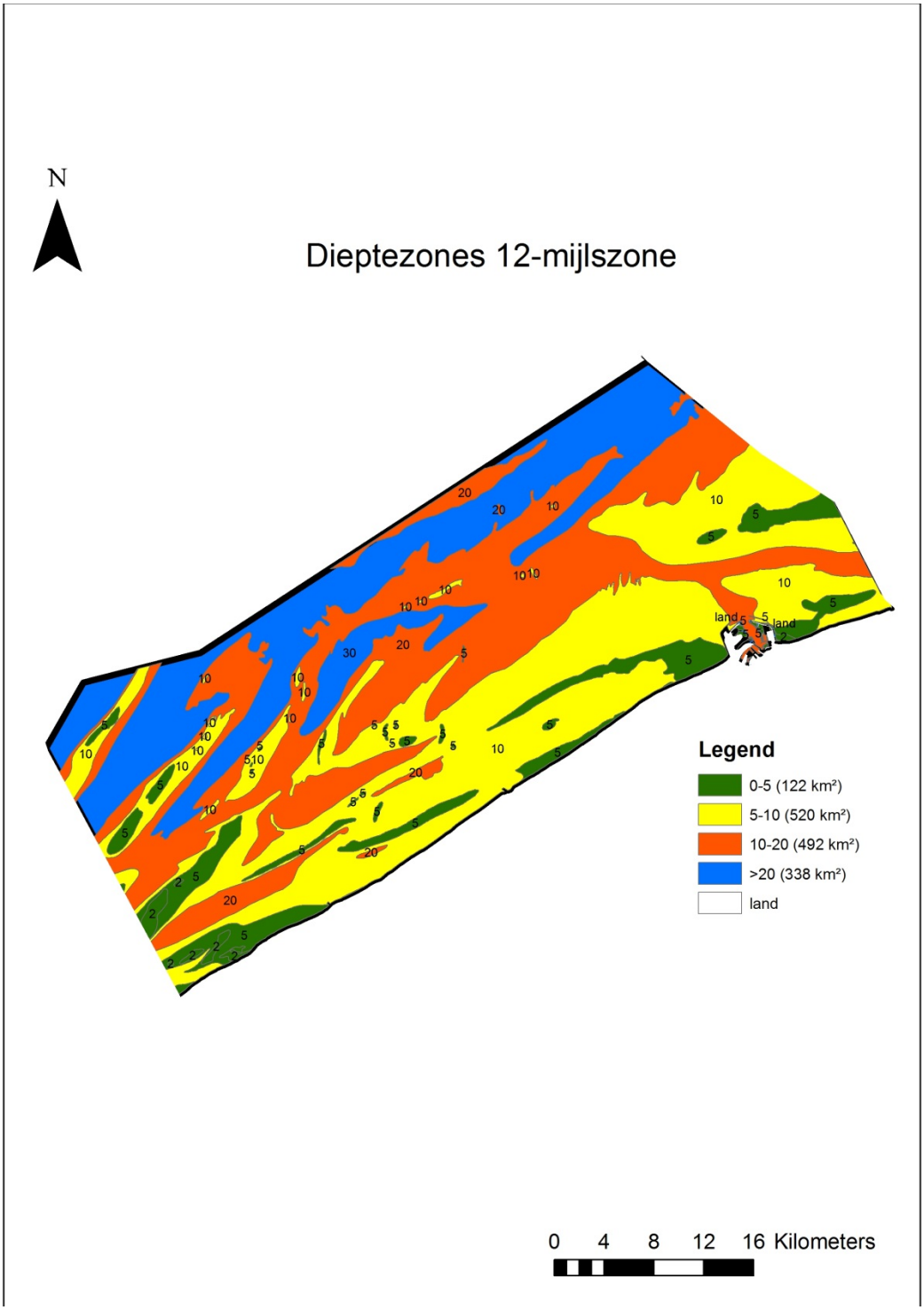


Figure 10.2. Surface area (km²) by depth class for the Belgian DYFS.

Table 10.1. Surface area (km²) by area and depth class for the Dutch DFS and German DYFS.

Area & Region	Depth class							Total	Total
	<0m (>LW)	0-5m	5-10m	10-15m	15-20m	20-25m	>25m	<LW	
401	0.3	329.7	370.2	192.1	58.1	28.0	7.1	985	986
402	0.0	44.0	78.3	174.2	199.4	3.1	0.3	499	499
403	0.9	50.8	92.5	176.3	121.7	18.9	4.6	465	466
404	6.4	275.6	420.1	393.8	484.9	132.4	0.4	1707	1714
Dutch coast	8	700	961	936	864	182	12	3656	3664
405	47.2	256.3	271.9	295.5	337.5	104.2	9.2	1275	1322
406n	4.3	246.4	322.4	489.0	14.3	1.0	0.0	1073	1077
406s	3.2	92.9	214.2	257.6	39.2	20.8	0.1	625	628
407w	0.0	193.1	323.5	214.3	5.5	0.2	0.1	737	737
German Bight	55	789	1132	1256	396	126	9	3709	3764
407o	0.0	767.4	26.9	15.4	3.7	2.2	0.8	816	816
408	158.5	118.3	19.5	7.6	1.8	0.3	0.1	148	306
409	323.0	184.8	47.2	18.2	10.8	4.6	0.2	266	589
410	233.2	83.3	39.4	32.6	8.9	2.0	0.2	166	400
411	324.3	220.3	56.8	21.3	1.3	0.0	0.0	300	624
412	198.3	126.2	93.9	46.0	24.5	5.1	0.6	296	495
413	740.1	325.8	161.2	106.6	50.7	12.0	1.6	658	1398
414	295.7	83.8	9.4	3.6	0.6	0.0	0.0	97	393
German & Danish WS	2273	1910	454	251	102	26	4	2748	5021
610	13.6	434.6	71.1	40.9	22.0	12.7	5.4	587	600
612	20.7	102.3	10.7	1.5	0.1	0.0	0.0	115	135
616	42.5	686.0	52.8	27.7	9.6	2.6	3.1	782	824
617	35.5	207.1	15.7	4.5	3.8	1.2	0.5	233	268
618	40.5	159.0	16.5	5.6	1.0	0.0	0.0	182	223
619	67.4	169.7	17.4	2.4	0.7	0.0	0.0	190	258
620	281.0	304.9	89.7	78.6	33.5	4.5	1.6	513	794
Dutch WS	501	2064	274	161	71	21	11	2601	3102
634	1.4	39.4	11.4	12.6	10.1	6.2	7.1	87	88
638	49.8	76.8	92.2	60.6	63.4	29.5	17.0	340	389
Scheldt estuary	51	116	104	73	74	36	24	426	478
Total	2888	5578	2925	2678	1507	392	60	13140	16028

Table 10.2. Surface area (km²) by region and depth class for the Dutch DFS, German DYFS and Belgian DYFS.

Region	area codes	Country	0-5m	5-10m	10-20m	>20 m	Total
Scheldt estuary	634, 638	NL	167	104	147	60	478
Dutch Coast	401-404	NL	708	961	1801	195	3664
German Bight	405-407w	NL	843	1132	1653	136	3764
Dutch Wadden Sea	610-620	NL	2565	274	232	32	3102
German Wadden Sea*	408-411	DE	1646	163	103	7	1919
Belgian Coast	400	BE	122	520	492	338	1472

* excluding areas 407o, 412-414 (no, insufficient or inconsitent sampling)

Annex 11: Number of hauls by area and year for the Dutch DFS, German DYFS and Belgian DYFS

Annex 11.1. 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		6	11	11	22				13	31	26	23		24	16	10	12	20
1971		9	9	13	19				4	29	30	25		28	14	8	12	22
1972		8	15	11	20				5	29	28	18		25	11	10	10	20
1973		8	9	8	19				5	30	31	18	2	24	11	9	9	22
1974		8	16	11	19				6	32	32	19	7	24	12	10	11	21
1975		8	11	10	19				4	31	26	21	7	25	14	9	10	21
1976									6	30	26	21	7	25	13	10	10	21
1977		10	16	9	23				8	28	27	21	7	26	13	10	11	21
1978		1	15	10	23	8	16	18	5	30	28	21	7	26	13	10	10	21
1979			15	8	13	7	18	19	6	28	28	21		26	13	10	10	21
1980		9	7	10	26	7	16	23	6	27	29	21	7	26	13	10	10	21
1981		10	9	9	25	10	10		6	28	27	19	6	28	13	10	10	21
1982	3	18	8	9	28	14	21	6	6	28	27	21	7	26	13	10	10	21
1983		18	13	6	15	8	21	6	7	27	27	21	7	26	13	10	9	21
1984		23	13	8	31	15	22	4	6	27	27	22	7	25	12	10	10	21
1985		17	12	9	28	15	20	7	6	26	27	21	7	26	12	10	8	20
1986		17	13	9	28	15	21	5	6	26	27	21	7	26	13	10	9	21
1987		18	13	9	28	15	21	6		30	28	17	7	30	13	10	8	23
1988		18	14	8	29	14	22	5		24	27	21		26	13	9	8	22
1989		26	13	9	28	10	23	6		40	30	21		26	13	10	8	23
1990		25	13	9	28	15	21	6		39	29	21		25	13	11	8	23
1991		16	13	9	28	15	21	6		31	31	23	5	25	13	10	10	24
1992		26	16	13	28	15	21	6		36	28	23	6	26	12	6		28
1993		22	20	9	28	15	21	5		31	27	23		27	14	11	8	29
1994		21	16	13	28	15	19	6		35	33	24		26	12	10	7	25
1995		17	13	9	25	14	22	6		41	33	31		23	15	10	9	26
1996		17	12	10	29	14	21	6		43	33	28	6	28	15	10	9	27
1997		17	13	9	28	13				43	34	27		28	15	11	9	27
1998		9	10	8						43	34	27	6	29	15	10	10	27
1999		17	14	8	14	1				43	35	28		31	14	13	10	22
2000		15	7	2	17	10	19	6		45	43	42		26	15	11	10	26
2001			13	5	28	15	19	3		45	49	28		27	14	11	10	26
2002		21	13	8	26	14				44	41	27		26	13	11	9	26
2003		16	14	9	28	15	18	6		42	36	29		27	13	9	9	26
2004		17	13	4	19	15	17	6		41	31	28	6	27	14	10	8	27
2005		17	14	14	30	15	15	8		43	36	29	6	25	13	11	9	34
2006		15	14	10	28	15	17	6		41	36	28	7	28	16	8	9	29
2007		17	16	13	30	15	17	6		41	36	30	9	25	13	11	8	25
2008		16	11	8	19	11	4	6		41	37	30	7	24	12	9	9	30
2009		16	13	16	28	15	16	6		44	37	32	6	26	12	10	8	28
2010		17	13	15	26	15	16	6		41	36	31	6	24	13	10	6	28
2011		15	12	18	29	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	7	22	27

Annex 11.2. German DYFS

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

Annex 11.3. 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

Annex 12: Population abundance indices for sole and plaice, inshore surveys

Annex 12.1. Indices from the D(Y)FS inshore beam trawl surveys.

a) Plaice abundance indices in numbers per 1000m² (national) or numbers*10⁶ (combined)

	Plaice, age 0				Plaice, age 1		
	nl	be	de	combined	nl	be	combined
Raising	11.007	1.661	1.919		11.007	1.661	
Gear correction	1	1.22	1.22		1	1	
1970	8.843				5.809		
1971	20.313				1.558		
1972	7.089				4.004		
1973	6.764				7.668		
1974	6.121		14.380		2.215		
1975	9.701		9.020		2.866		
1976	15.046		37.090		3.919		
1977	7.652		39.120		4.156		
1978	21.015		26.370		3.608		
1979	21.784		22.210		5.651		
1980	13.076		21.480		12.346		
1981	46.391		34.300		9.633		
1982	25.790		6.370		15.210		
1983	35.123	0.615	26.410		21.881	0.513	
1984	30.685	0.415	6.010		5.672	0.163	
1985	53.906	7.037	5.510		4.354	0.201	
1986	17.824	2.098	3.380		14.316	0.990	
1987	35.897	2.932	13.460		11.427	1.580	
1988	33.658	0.758	14.930		6.339	1.556	
1989	26.621	0.391	19.090		4.269	0.117	
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
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

b) Sole abundance indices in numbers per 1000m² (national) or numbers*10⁶ (combined)

	Sole, age 0				Sole, age 1		
	nl	**be**	**de**	**combined**	**nl**	**be**	**combined**
Raising	11.007	1.661	1.919		11.007	1.661	
Gear correction	1	1.59	1.59		1	1.9	
1970	21.555				1.708		
1971	20.348				1.077		
1972	0.762				0.169		
1973	6.516				0.197		
1974	1.061		0.210		0.417		
1975	9.647		3.790		0.363		
1976	4.228		0.550		0.171		
1977	1.122		2.800		0.130		
1978	5.803		3.100		0.018		
1979	12.763		1.330		0.034		
1980	26.172		3.560		0.974		
1981	15.606		2.100		1.442		
1982	12.752		1.110		4.912		
1983	4.312	2.667	2.140		0.744	1.329	
1984	7.272	5.402	1.140		0.186	0.753	
1985	12.026	16.981	0.030		0.059	0.150	
1986	4.415	2.557	0.310		0.279	0.955	
1987	30.820	2.293	1.270		0.160	0.052	
1988	1.674	0.703	3.170		0.546	0.429	
1989	3.023	1.003	0.430		0.132	0.130	
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
2012	0.915	0.428	0.050	11.226	0.012	0.269	0.880

*** No valid survey.**

Annex 12.2. 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	13538.483	28163.543	1414.688	100.825
1972	13206.903	10779.712	4477.829	89.111
1973	65642.504	5133.332	1578.221	461.359
1974	15366.398	16508.939	1128.838	160.004
1975	11628.230	8168.365	9556.302	65.238
1976	8536.534	2402.627	868.236	236.317
1977	18536.699	3423.843	1737.311	589.947
1978	14011.969	12678.032	345.465	134.778
1979	21495.430	9828.822	1574.911	161.222
1980	59174.156	12882.339	490.655	180.434
1981	24756.155	18785.306	834.420	38.321
1982	69993.328	8642.029	1261.036	87.857
1983	33974.181	13908.624	249.374	70.965
1984	44964.544	10412.798	2466.902	41.667
1985	28100.547	13847.837	1597.696	328.037
1986	93551.910	7580.403	1152.144	144.873
1987	33402.438	32991.107	1226.651	199.582
1988	36608.576	14421.140	13153.247	1350.132
1989	34276.253	17810.152	4372.837	7126.431
1990	25036.611	7496.000	3160.028	816.139
1991	57221.278	11247.222	1517.833	1076.833
1992	46798.224	13841.786	2267.598	612.976
1993	22098.315	9685.589	1006.278	97.778
1994	19188.431	4976.550	855.907	75.944
1995	24766.964	2796.381	381.327	96.994
1996	23015.391	10268.227	1185.155	44.714
1997	95900.889	4472.700	496.633	31.667
1998	33665.689	30242.247	5013.857	49.667
1999	32951.262	10272.083	13783.060	1058.214
2000	22855.018	2493.389	891.444	982.556
2001	11510.524	2898.476	370.167	175.833
2002	30809.227	1102.715	264.641	65.242
2003	*	*	*	*
2004	18201.602	1349.703	1080.686	50.778
2005	10118.405	1818.912	141.881	365.524
2006	12164.222	1570.978	384.722	52.444
2007	14174.543	2133.911	139.537	51.852
2008	14705.767	2700.438	464.129	178.500
2009	14860.033	2018.683	492.452	38.333
2010	11946.907	1811.517	529.338	55.476
2011	18348.596	1142.515	308.193	74.696
2012	5893.440	2928.552	681.524	82.000

*** 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	11226.667	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
1997	10279.333	153.630	189.819	26.470
1998	4094.611	3126.374	141.713	98.730
1999	1648.854	971.782	455.612	10.000
2000	1639.173	125.883	166.278	118.000
2001	970.310	655.357	106.667	35.476
2002	7547.460	379.044	195.300	0.000
2003	*	*	*	*
2004	1369.505	624.376	393.032	68.889
2005	568.083	162.917	124.000	0.000
2006	2726.417	117.083	25.000	30.000
2007	848.642	910.988	33.333	39.506
2008	1259.119	258.548	325.333	0.000
2009	1931.598	344.354	61.667	102.667
2010	2636.933	237.131	67.114	42.202
2011	1247.967	883.867	211.333	111.833
2012	226.576	159.476	54.000	18.000

*** No survey.**

Annex 13: Abundance of fish species and *Crangon* sp. in the inshore surveys

Annex 13 a) Abundance of fish species and *Crangon* sp. for the continental coastal areas.

Dutch coast

Dutch Coast (Dutch data)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	19	5.7	15	4.6	6.3	13	77	110	26	67	17
Alosa fallax	0.05	0.39		1.2	0.25					0.52	0.04
Ammodytes sp.	11	7.2	3.5	23	27	58	32	23	38	32	56
Buglossidium luteum	32	166	160	134	144	170	126	192	43	116	90
Callionymus lyra	151	202	101	351	217	85	69	85	43	30	114
Clupea harengus	121	154	45	108	1237	122	45	14	45	41	27
Gadus morhua	2.8	1.7	6.4	2.5	13	5.9	2.1	2.4	1.2	1.8	2.9
Gobiidae	2436	7073	2511	3068	4303	2232	1389	4524	3072	2886	1282
Hyperoplus lanceolatus	3.2	9.6	4.8	4.3	1.5	3.6	5.5	3.5	2.5	3.3	8.8
Limanda limanda	223	1320	417	523	199	713	437	1697	188	188	251
Merlangius merlangus	241	75	130	36	40	273	97	133	105	87	54
Osmerus eperlanus	1.2	1.6	0.14	1.1	2.1	4.7		1.5	9.9	6.6	2.6
Platichthys flesus	16	3.1	2.5	1	1.5	4.6	5	4.2	4.2	3.4	2.0
Pleuronectes platessa	339	573	398	191	666	193	366	324	676	229	169
Solea solea	23	62	10	72	23	14	52	45	158	32	31
Syngnathus sp.	68	14	2.4	4.9	76	11	22	8.5	70	40	18
Crangon sp.	28942	47496	21036	30097	46472	13105	35317	57722	48729	32310	22390

German Bight

German Bight (Dutch data)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	31	9.5	20	5.2	2	37	67	66	15	39	310
Alosa fallax		1.3		0.07	1.2					0.07	
Ammodytes sp.	0.57	0.47	6.2	12	142	12	15	7	20	7.6	10.9
Buglossidium luteum	1.3	26	4	11	3	35	5.6	13	1.5	2.7	7.3
Callionymus lyra	4	36	59	16	37	53	36	15	11	13	44
Clupea harengus	0.43	4.4	13	0.39	35	6	42	8.7	46	14	10
Gadus morhua	0.21	1.8	12	4.8	5.2	21	3	11	3.4	1.4	5.4
Gobiidae	581	1022	3007	1781	1476	552	390	1234	1012	5077	5967
Hyperoplus lanceolatus	0.43	4.1	3.4	1.6	0.83	3	5	1.6	3.1	0.5	1.1
Limanda limanda	80	24	393	92	26	325	247	401	15	437	1324
Merlangius merlangus	201	16	55	4.3	11	94	77	96	14	13	16
Osmerus eperlanus	0.93	7.6	42	39	43	24		28	176	144	28
Platichthys flesus	1.1	4.3	2.6	1.7	10	4.7	4	2.2	3.6	3.9	2.1
Pleuronectes platessa	78	284	163	103	127	130	176	456	121	267	355
Solea solea	11	4.7	2	11	4.1	1.8	14	4	3.3	0.77	14

Syngnathus sp.	163	47	12	28	18	2.2	13	14	11	244	51
Crangon sp.	12105	27057	25414	40865	84103	14800	24763	28275	38611	60802	41572

German Bight (German data)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	19	58	16	0	381	608	840	319	231	954
Alosa fallax			3	1						
Ammodytes sp.	4									
Buglossidium luteum				5		13	3		4	1
Callionymus lyra	42	3	24	72	138	261	103	2	76	52
Clupea harengus	7	2766	72	20	2104	16615	298	399	115	48
Gadus morhua	1	4	2	2	104	4	27	120	3	45
Gobiidae	421	239	459	449	216	375	339	473	470	1105
Hyperoplus lanceolatus	2		1	1	1	1	8			
Limanda limanda	4	53	223	19	1557	684	410	22	64	568
Merlangius merlangus	200	24	12	1	948	1985	2788	30	101	79
Osmerus eperlanus	236	1027	734	103	404	565	269	1028	2363	1253
Platichthys flesus	8	24	3	3	11	18	199	191	70	4
Pleuronectes platessa	557	2232	2185	1416	1184	945	1396	3254	5889	1237
Solea solea	1	24	29	3		12	66	13	2	5
Syngnathus sp.										
Crangon sp.	370992	488531	728688	679139	710147	552826	557731	628794	686390	758471

Belgian Coast

Belgian Coast (Belgian Data)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus											
Alosa fallax											
Ammodytes sp.											
Buglossidium luteum											
Callionymus lyra											
Clupea harengus											
Gadus morhua		0.12			4	10	0.58	0.43	0.39	1.5	
Gobiidae											
Hyperoplus lanceolatus											
Limanda limanda	29	83	93	30	11	343	404	167	143	157	
Merlangius merlangus		74			53	1	223	133	203	135	
Osmerus eperlanus											
Platichthys flesus								4.7	4.5	7.5	
Pleuronectes platessa	165	74	115	82	33	85	76	121	43	120	
Solea solea	320	43	234	142	38	39	9.2	111	155	29	
Syngnathus sp.											
Crangon sp.											

No data available for Belgium in 2012.

Annex 13 b) Abundance of fish species and *Crangon* sp. for the Wadden Sea.

Dutch Wadden Sea (Dutch data)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	5.4	11	3.4	1.5	1.5	16	4.4	24	105	34	13
Alosa fallax		1.9	0.04	0.26	6		0.11			2.4	0.9
Ammodytes sp.	15	8.9	24	2.7	0.34	1.6	12	0.94	7	13	0.7
Buglossidium luteum		0.04									
Callionymus lyra	0.37		0.7	0.03	0.07	0.13	0.08	0.08		0.06	
Clupea harengus	22	78	260	31	44	433	377	19	30	19	37
Gadus morhua	0.45	0.59	3.4	0.95	2.4	13	1.2	1.6	1.1	0.71	0.45
Gobiidae	272	252	1299	1236	111	346	256	415	481	478	300
Hyperoplus lanceolatus	0.95	0.66	0.26	0.15	0.25	0.62	0.57	0.67	0.67	0.39	0.18
Limanda limanda	2.6	5.3	76	20	0.27	89	2.6	3	2.5	19	1.5
Merlangius merlangus	6.4	1.7	4.9	5.3	2	40	13	12	12	17	5.5
Osmerus eperlanus	55	16	14	132	82	82	103	21	205	62	13
Platichthys flesus	18	38	23	27	38	48	81	47	43	16	23
Pleuronectes platessa	131	546	237	176	396	214	333	124	363	76	305
Solea solea	105	21	34	183	60	56	48	72	71	80	15
Syngnathus sp.	306	295	114	260	19	11	81	24	151	16	
Crangon sp.	37291	55285	97350	72659	41510	42081	91125	70272	128306	59367	52073

German Danish Wadden Sea (German data)

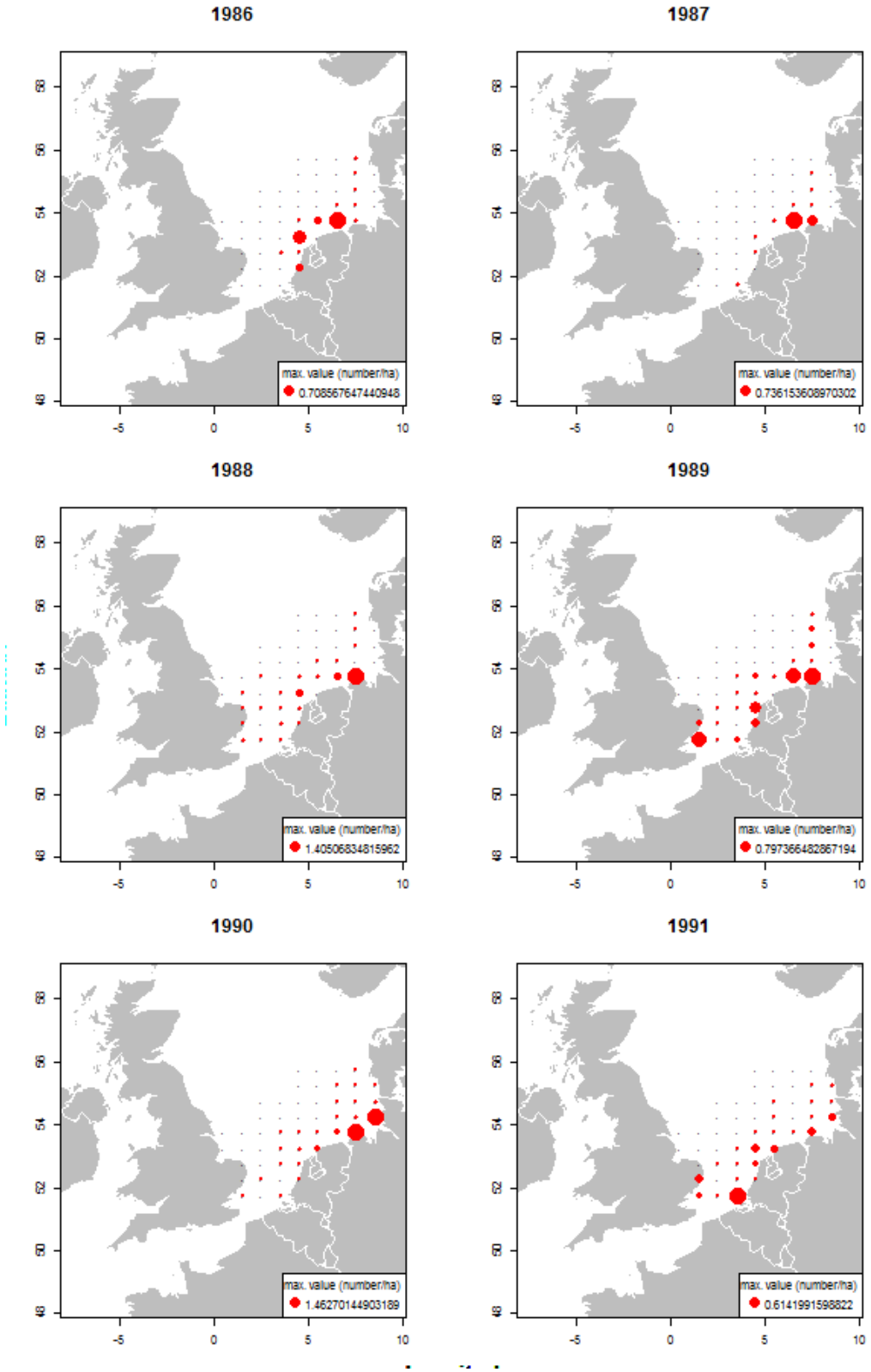
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	1142	196	50	157	2128	589	1701	2800	1732	4201
Alosa fallax	34	5	6	97	1	1		1	10	4
Ammodytes sp.	40									
Buglossidium luteum									1	2
Callionymus lyra	2	8	4	9	3	42	9	3	5	2
Clupea harengus	250	9856	908	764	15126	60270	5553	9885	4151	4646
Gadus morhua	12	192	68	451	5525	54	161	81	147	90
Gobiidae	3067	1791	1880	1452	1011	1445	1877	2669	2794	4396
Hyperoplus lanceolatus	3		29	7	14	2	4	4	6	3
Limanda limanda	66	912	453	11	1348	549	551	36	59	724
Merlangius merlangus	238	818	42	37	9295	999	2415	732	574	373
Osmerus eperlanus	2637	5031	6166	4522	7251	8742	9659	11547	12255	11910
Platichthys flesus	757	755	589	1395	1835	1309	1480	3248	2943	1309
Pleuronectes platessa	8327	8830	4110	9111	9281	7549	9972	11199	8364	7676
Solea solea	40	92	220	200	226	203	323	143	38	68
Syngnathus sp.	3625	2042	708	1444	1317	2788	2259	2876	2429	2121
Crangon sp.	2279438	2018953	2191826	2232824	1832111	2039141	2289664	1970372	2420063	2683168

Annex 13 c) Abundance of fish species and *Crangon* sp. for the Scheldt estuary.

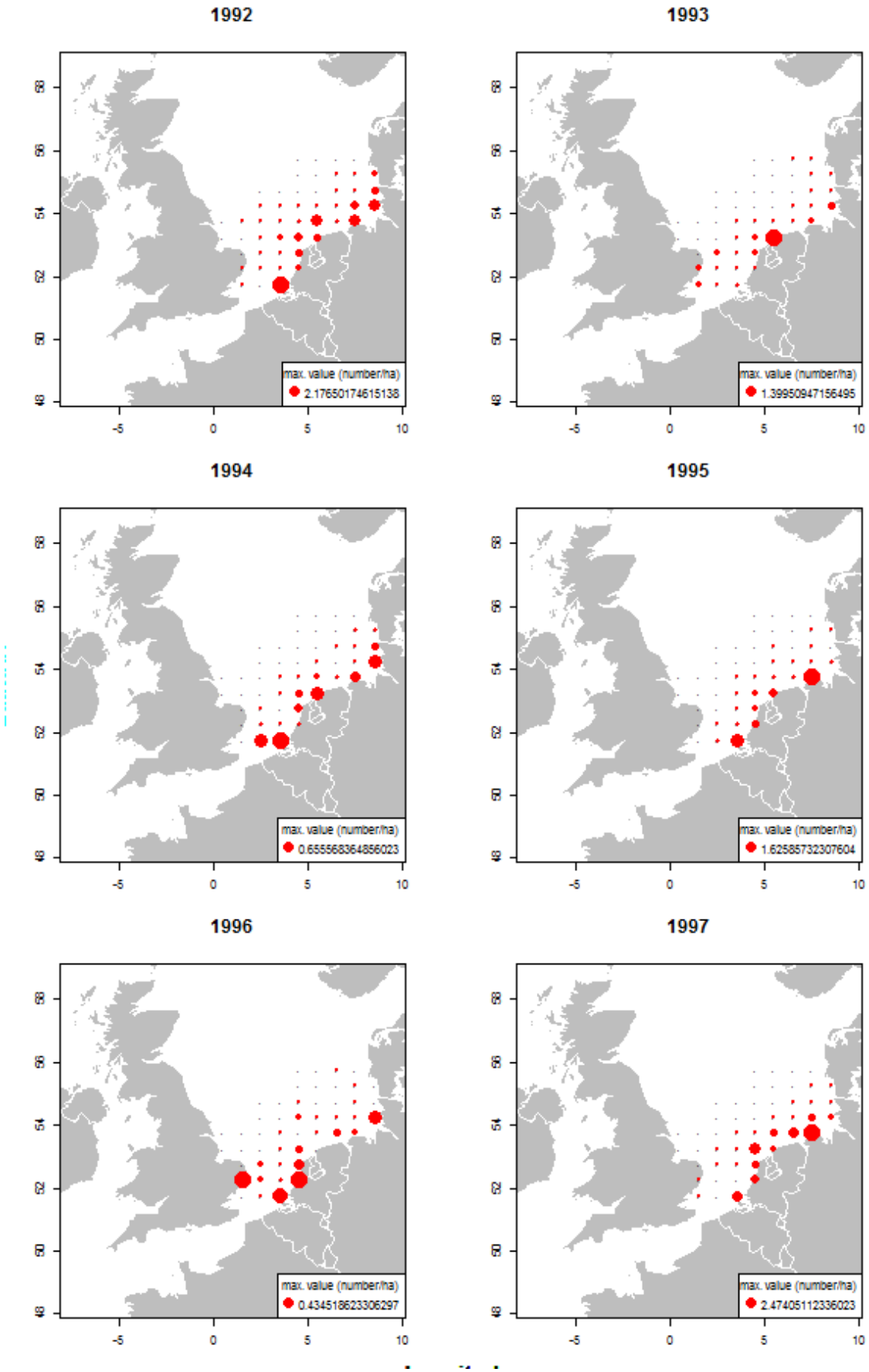
Scheldt estuary (Dutch data)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Agonus cataphractus	1.7	1.2	0.83	1.4	0.26	0.32	0.21	0.34	4	2.1	3.3
Alosa fallax									0.06		0.7
Ammodytes sp.	0.47	0.38	2.5	1.2	1	0.39	0.7	0.33	3.1	0.2	
Buglossidium luteum				0.51							
Callionymus lyra	12	3.7	3.9	4.5	6	1.5	0.29	0.35	0.28	0.1	.22
Clupea harengus	80	116	26	10	40	39	77	40	26	3.8	42
Gadus morhua	0.51	0.06	0.05	2.1	0.58	0.71	0.34	0.14	0.1	0.14	0.08
Gobiidae	212	78	251	167	200	188	71	86	107	138	88
Hyperoplus lanceolatus	0.05	0.15	0.17	0.29	0.37	0.35	0.35	0.47	0.46	0.26	0.5
Limanda limanda	19	2.4	10	13	0.07	28	5.2	18	1.4	1.7	3.1
Merlangius merlangus	0.14	1.5	1.8	4.4	0.77	5.6	3.8	1.7	2.7	4	2
Osmerus eperlanus	0.05	0.17	0.2	0.06	0.14	0.17	0.3	1.3	4.1	7	20
Platichthys flesus	5.7	3.1	3.7	1.1	1.4	15	33	24	20	9.6	12
Pleuronectes platessa	45	122	79	92	64	95	104	62	80	65	51
Solea solea	27	16	12	48	12	47	38	28	16	14	16
Syngnathus sp.	0.64	1.7	0.79	2.9	2.5	0.39	0.3	0.6	5.6	2.9	6.4
Crangon sp.	2003	1796	1203	3957	2086	1485	1562	3574	6762	4398	2794

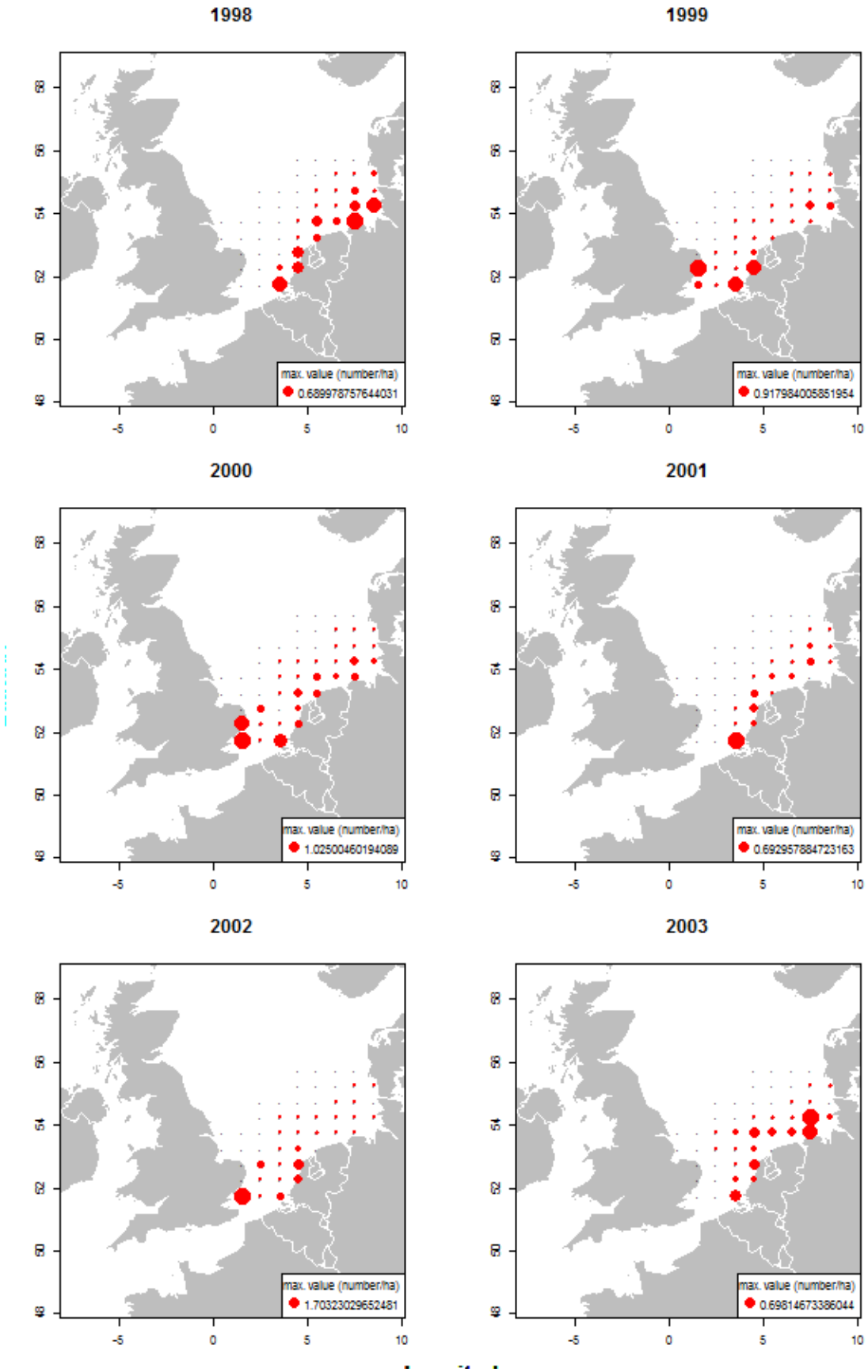
Annex 14: Spatial distribution of sole by sex, age and year based on the BTS Isis survey



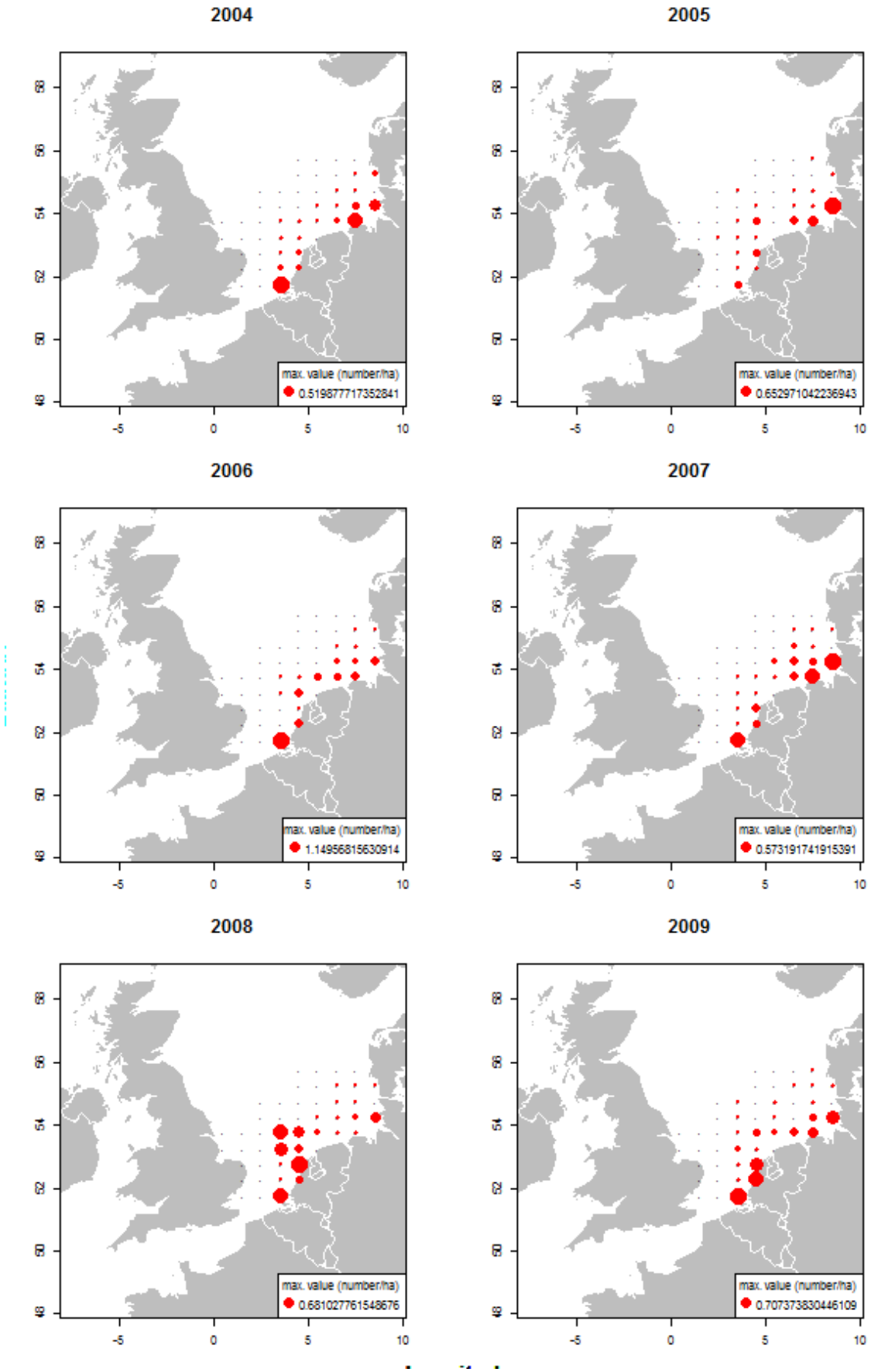
Females age group 1



Females age group 1



Females age group 1



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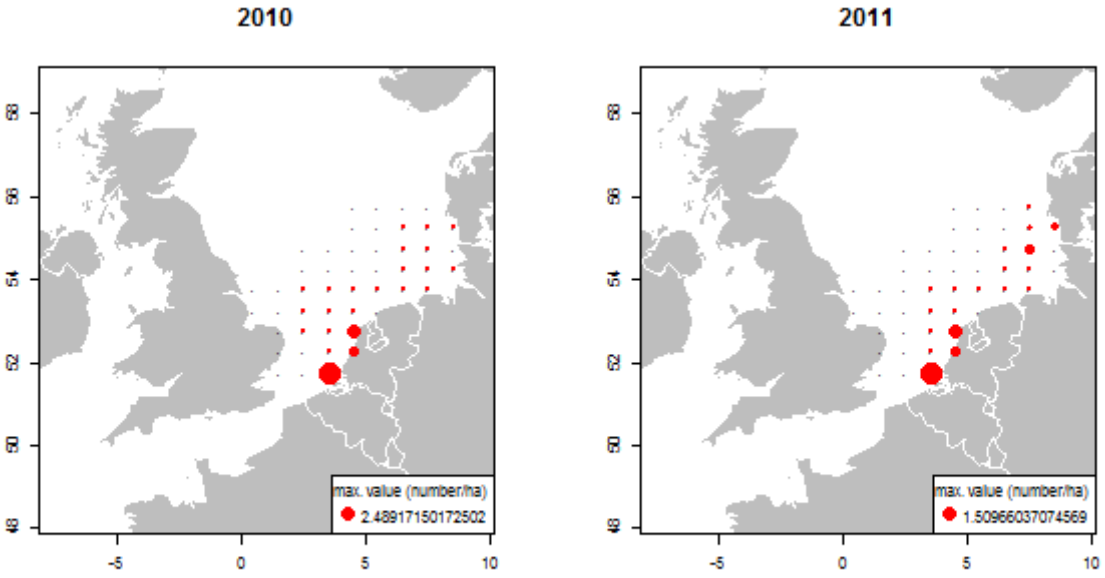

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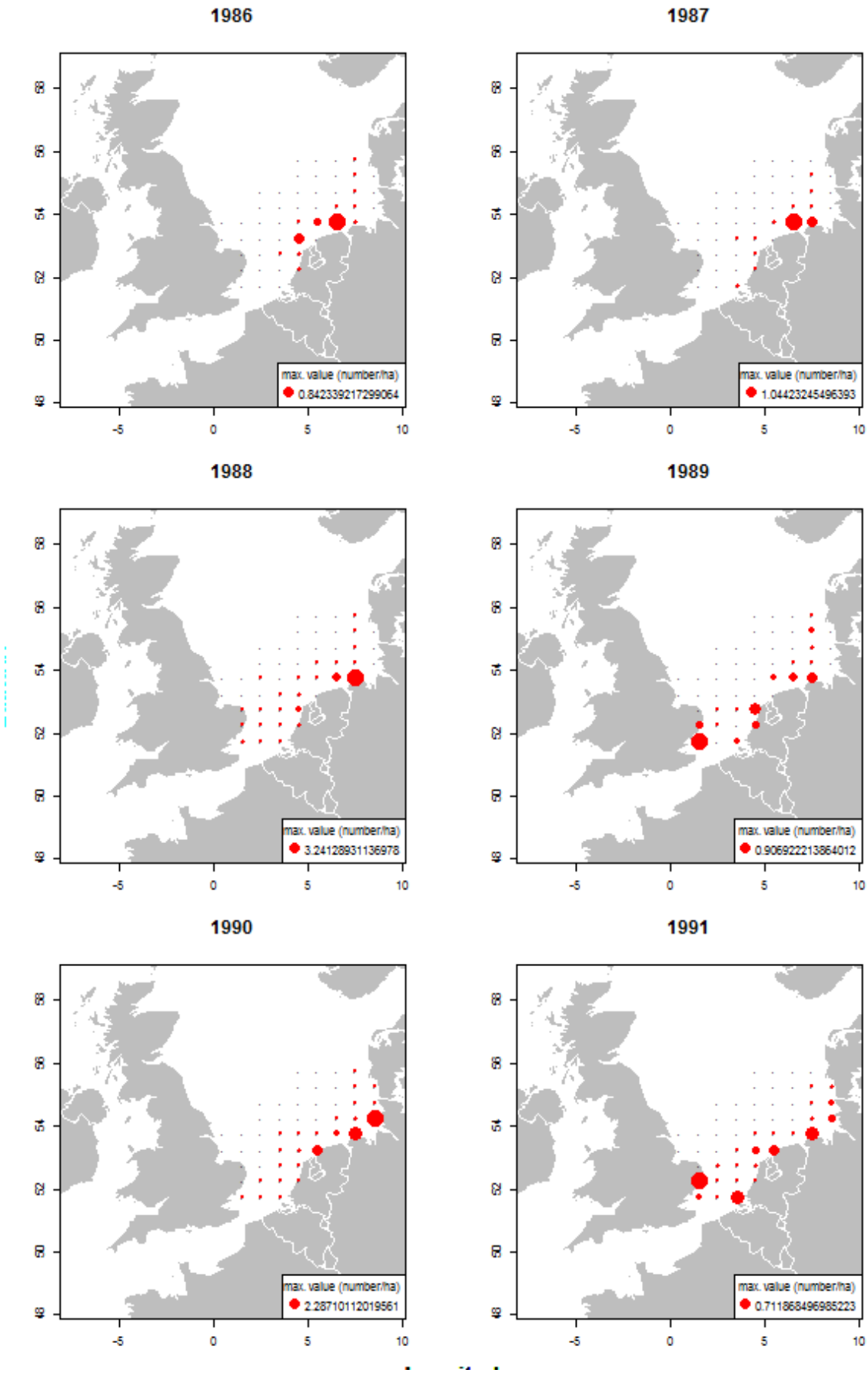
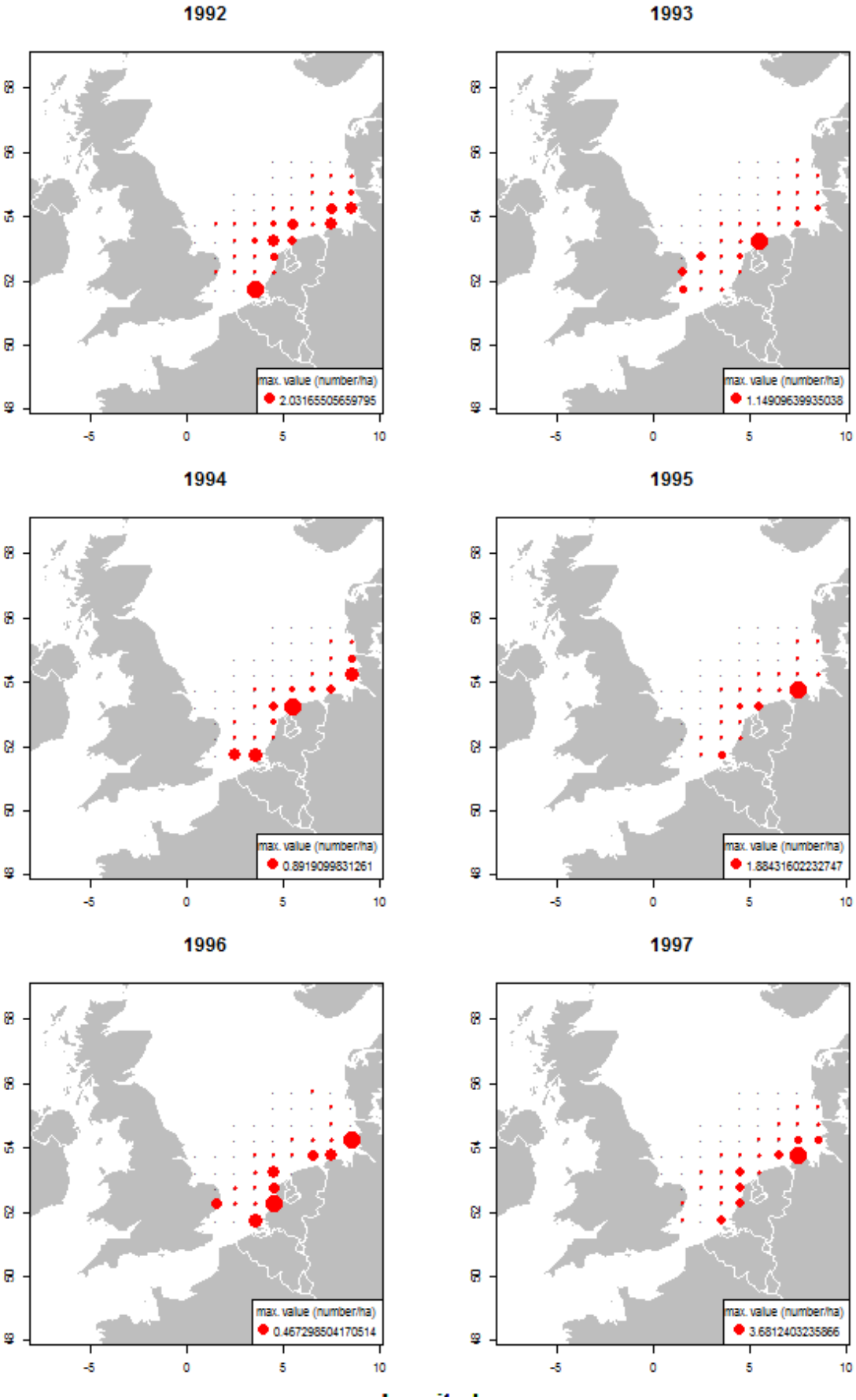
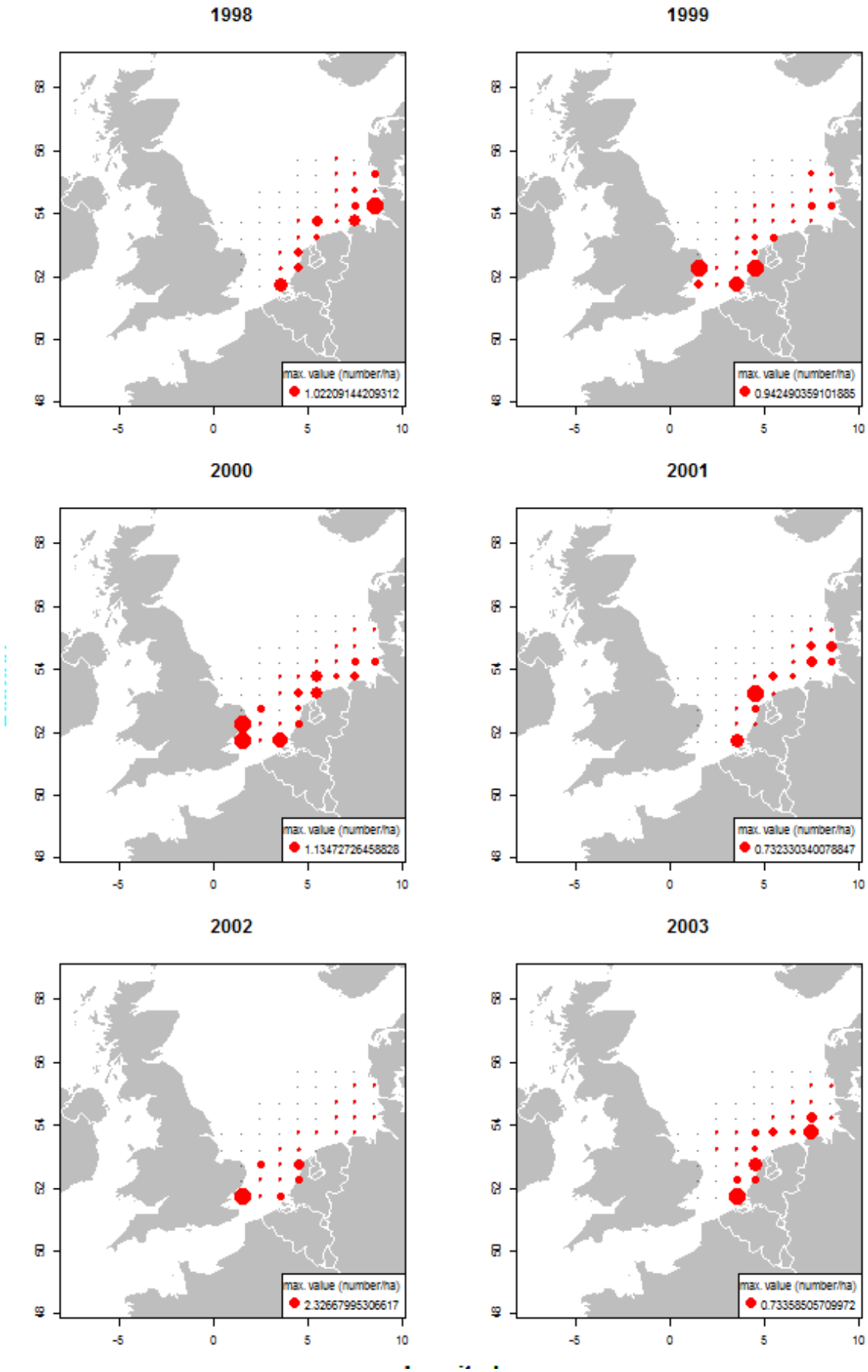


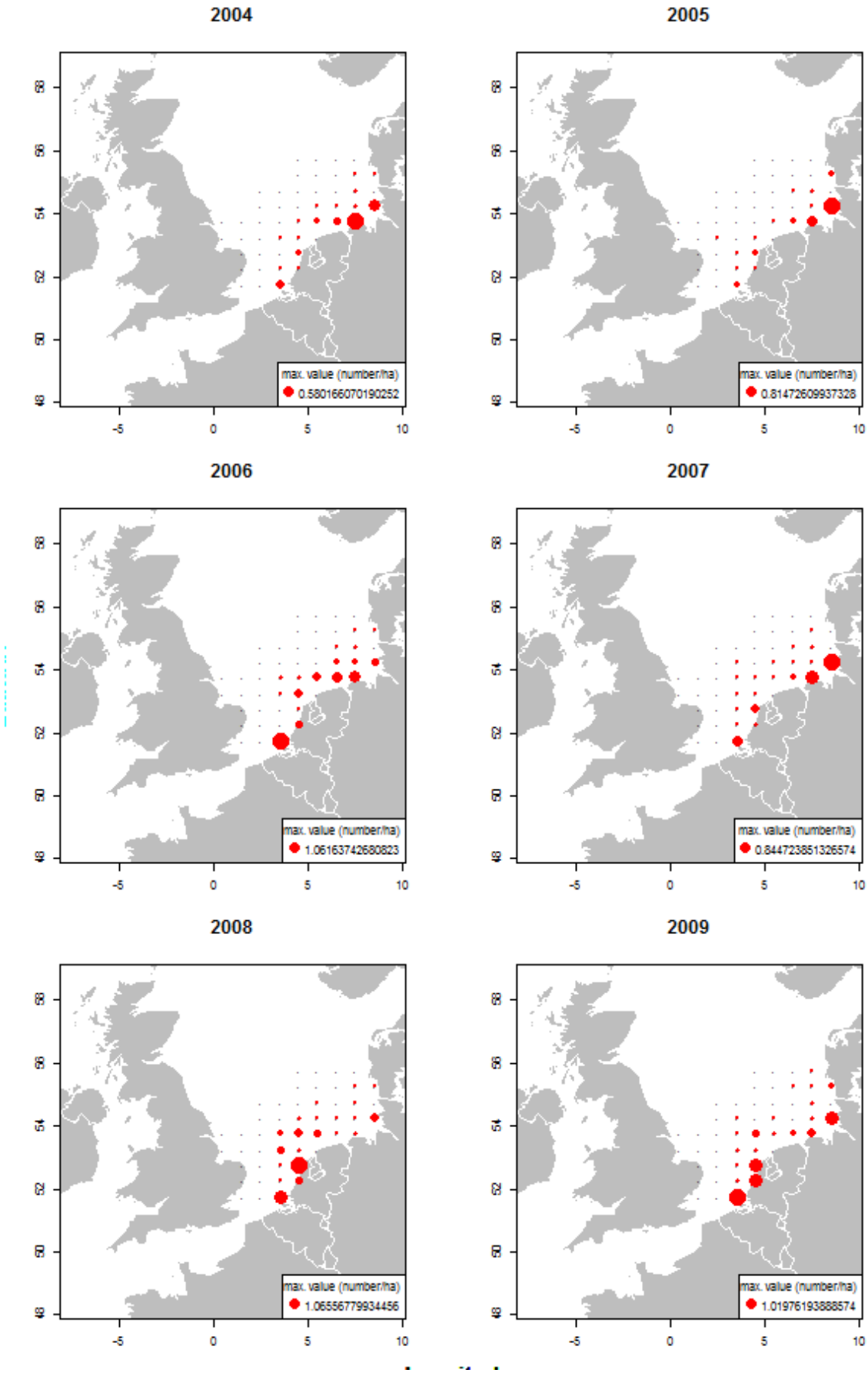
Males age group 1



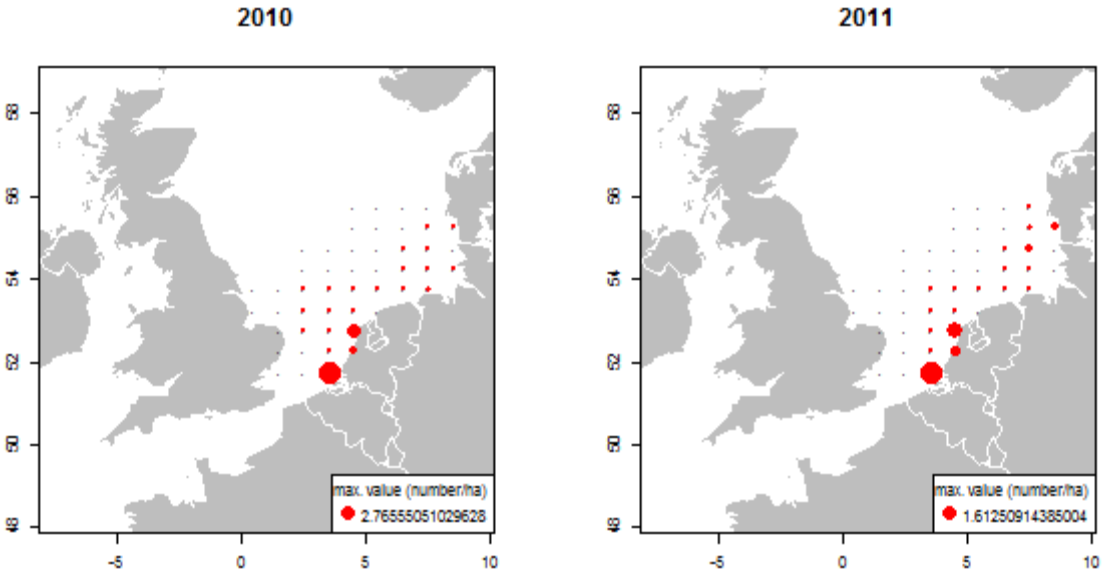
Males age group 1



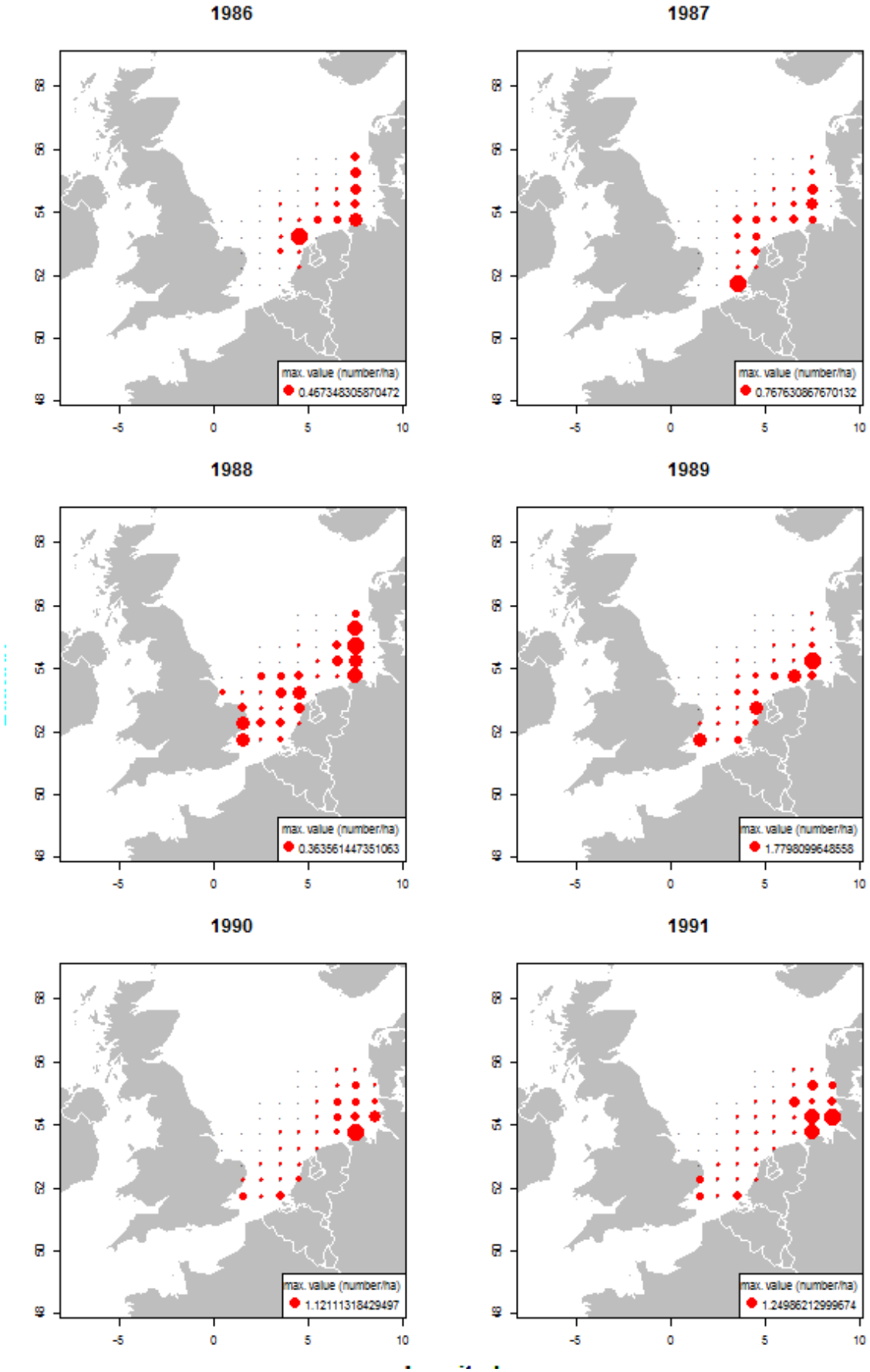
Males age group 1



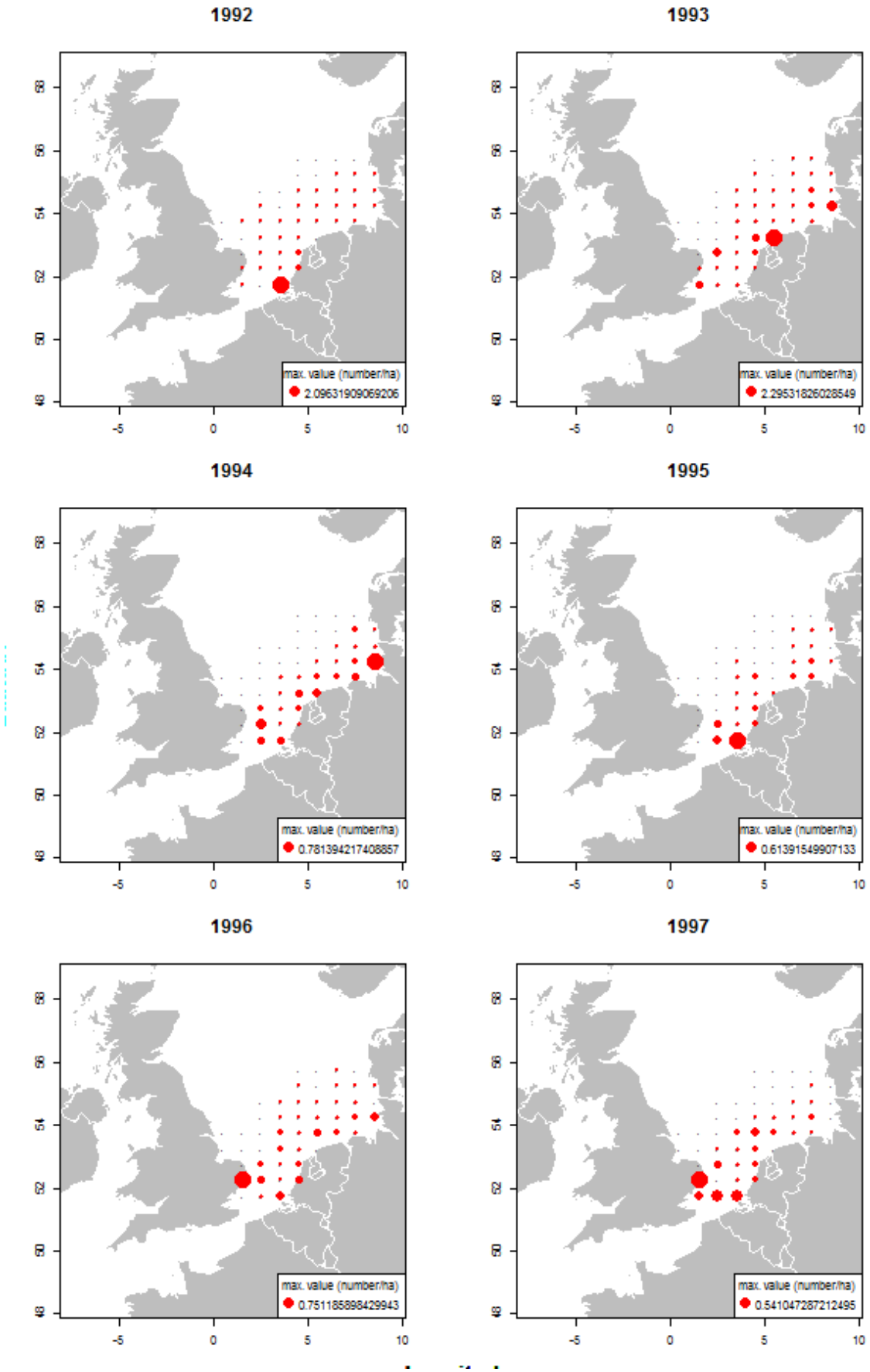
Males age group 1



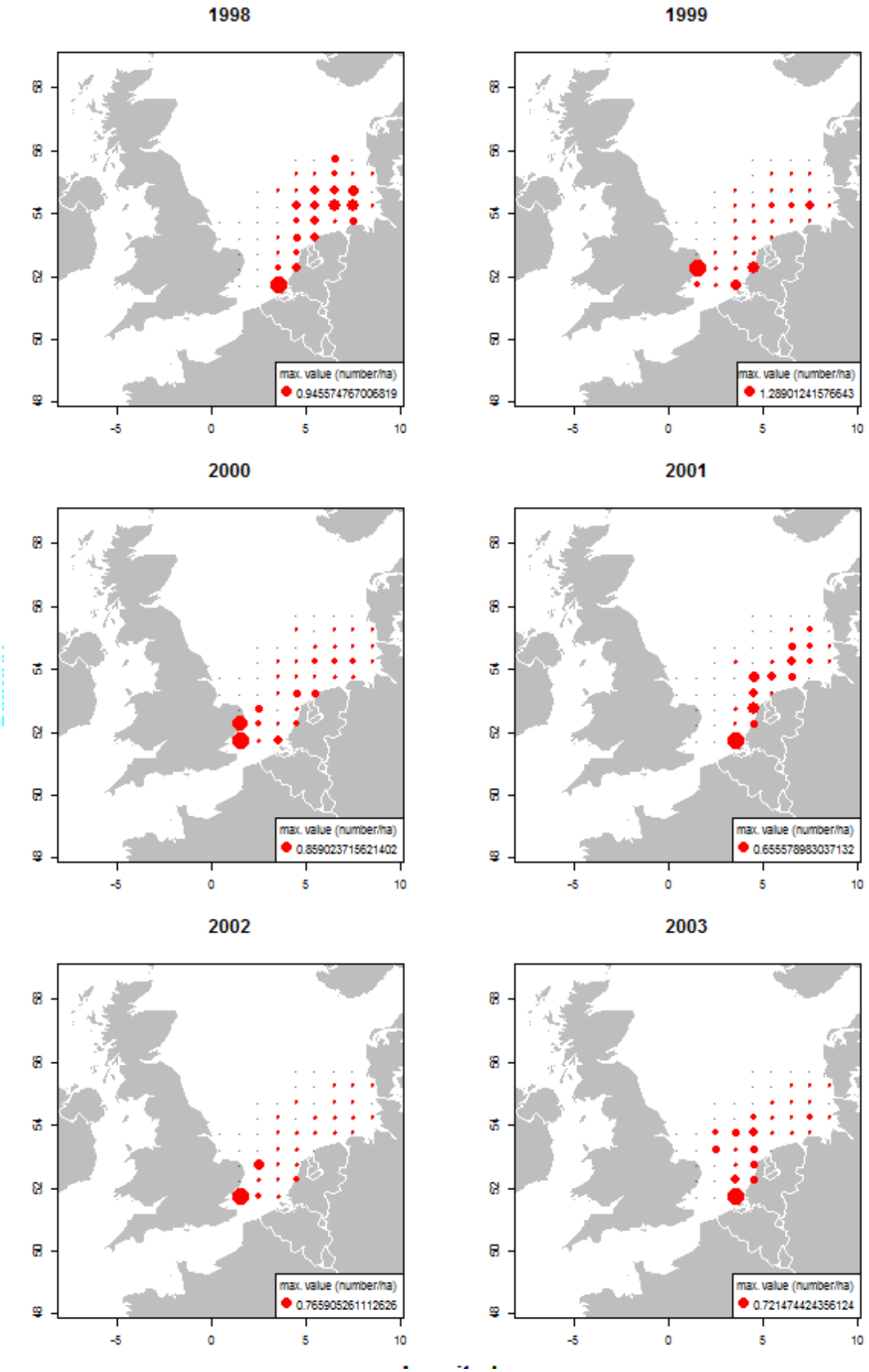
Males age group 1



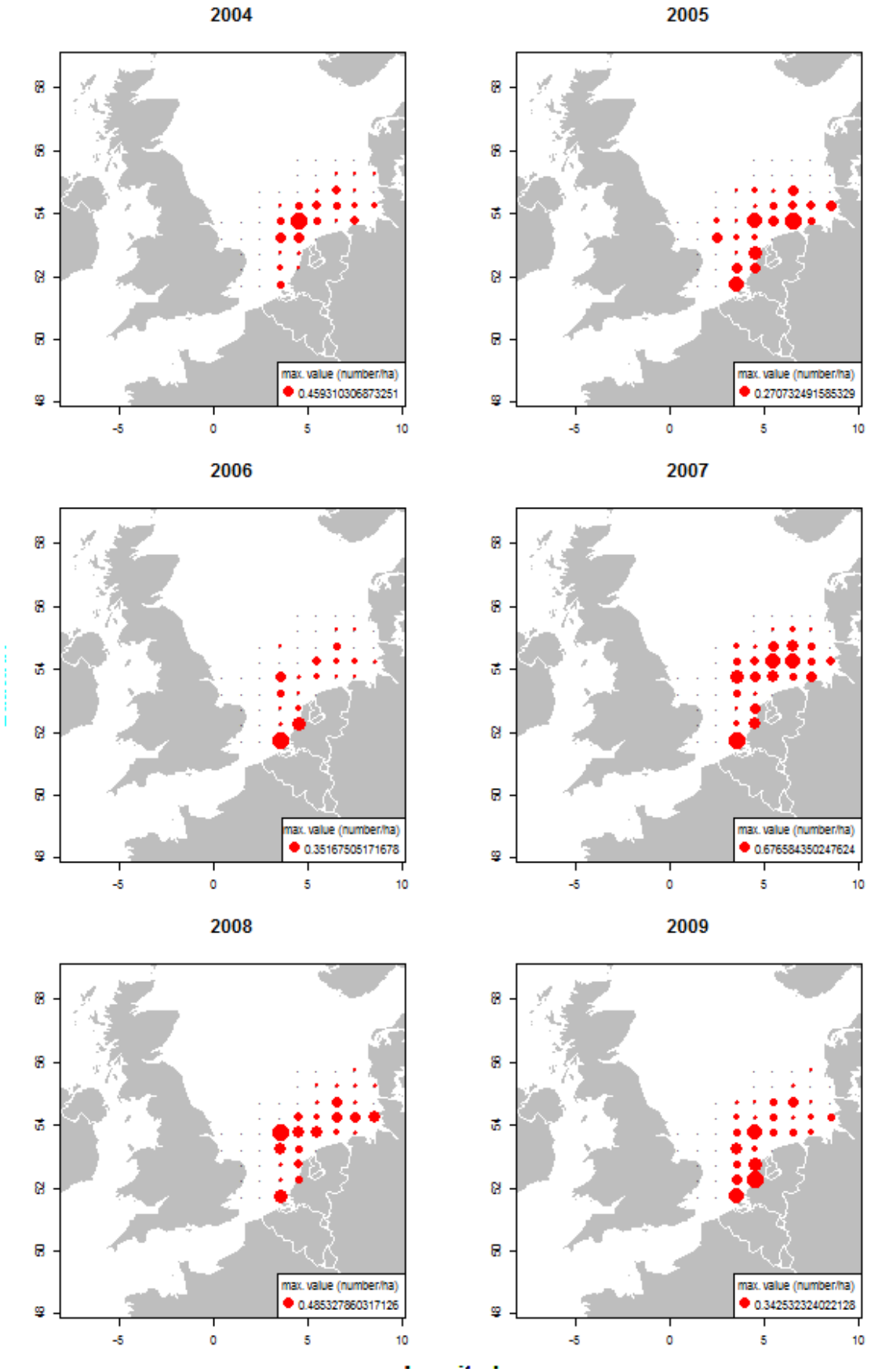
Females age group 2



Females age group 2



Females age group 2



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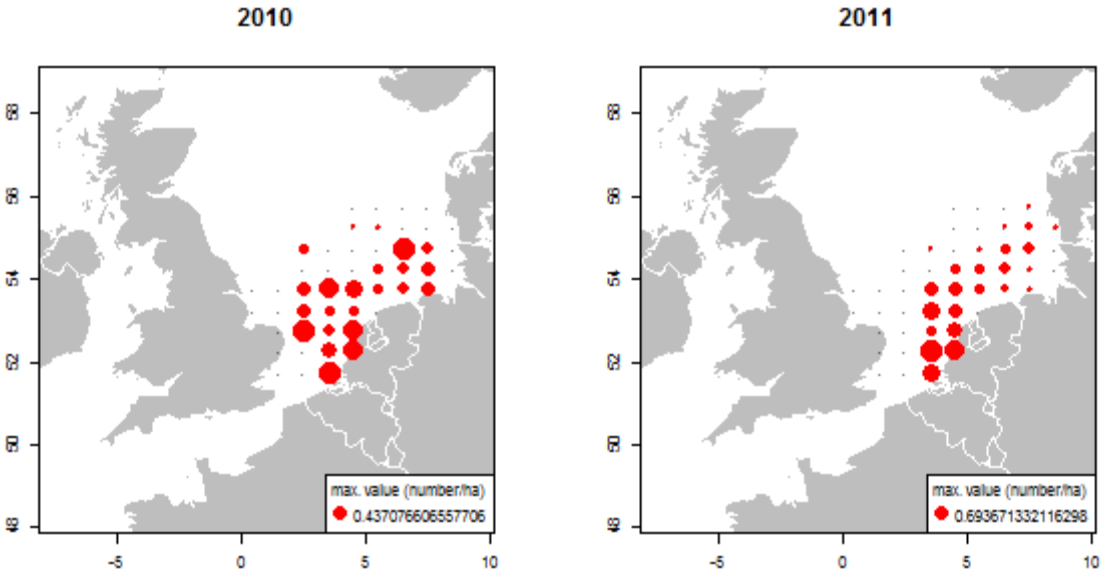

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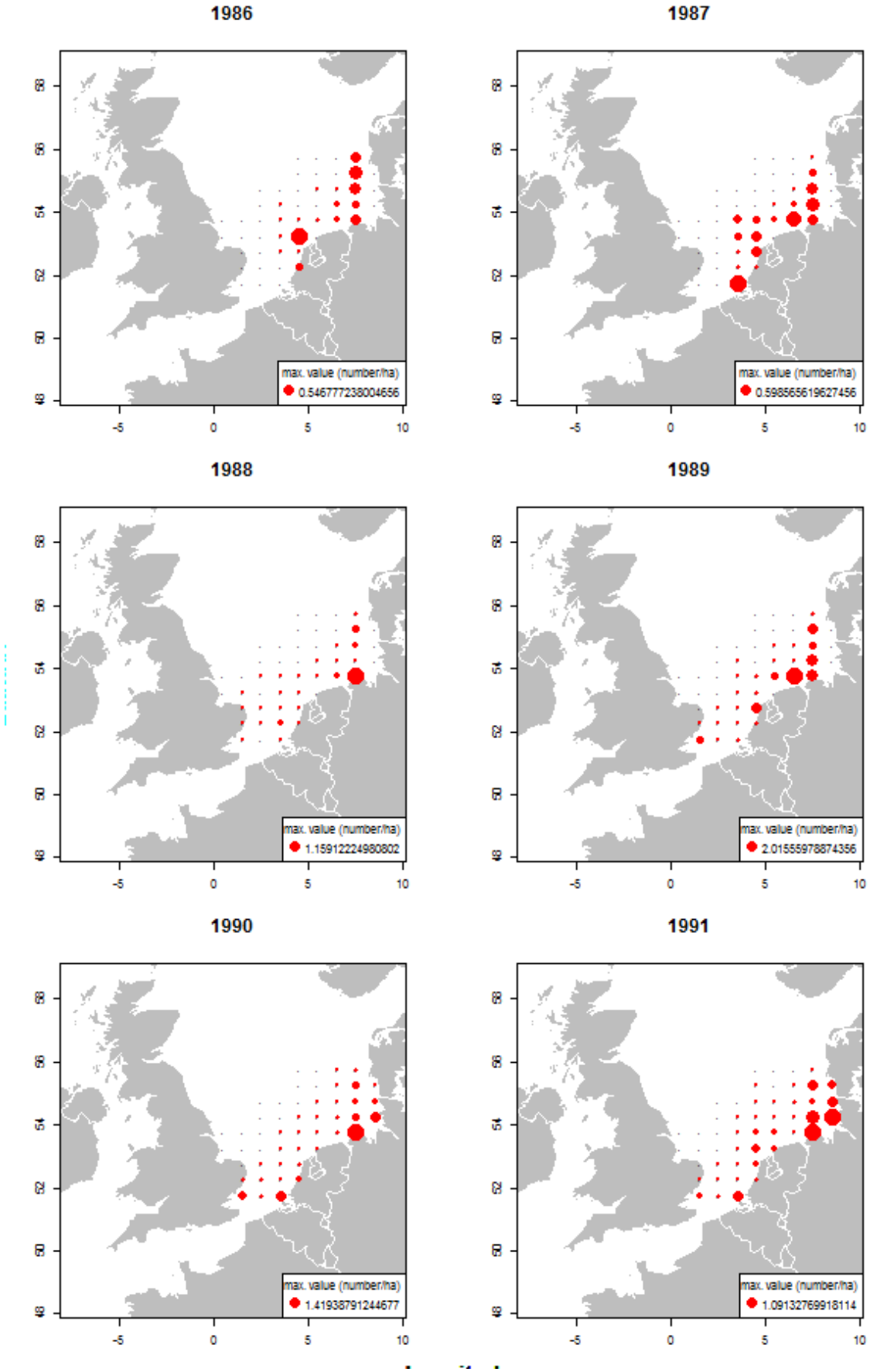
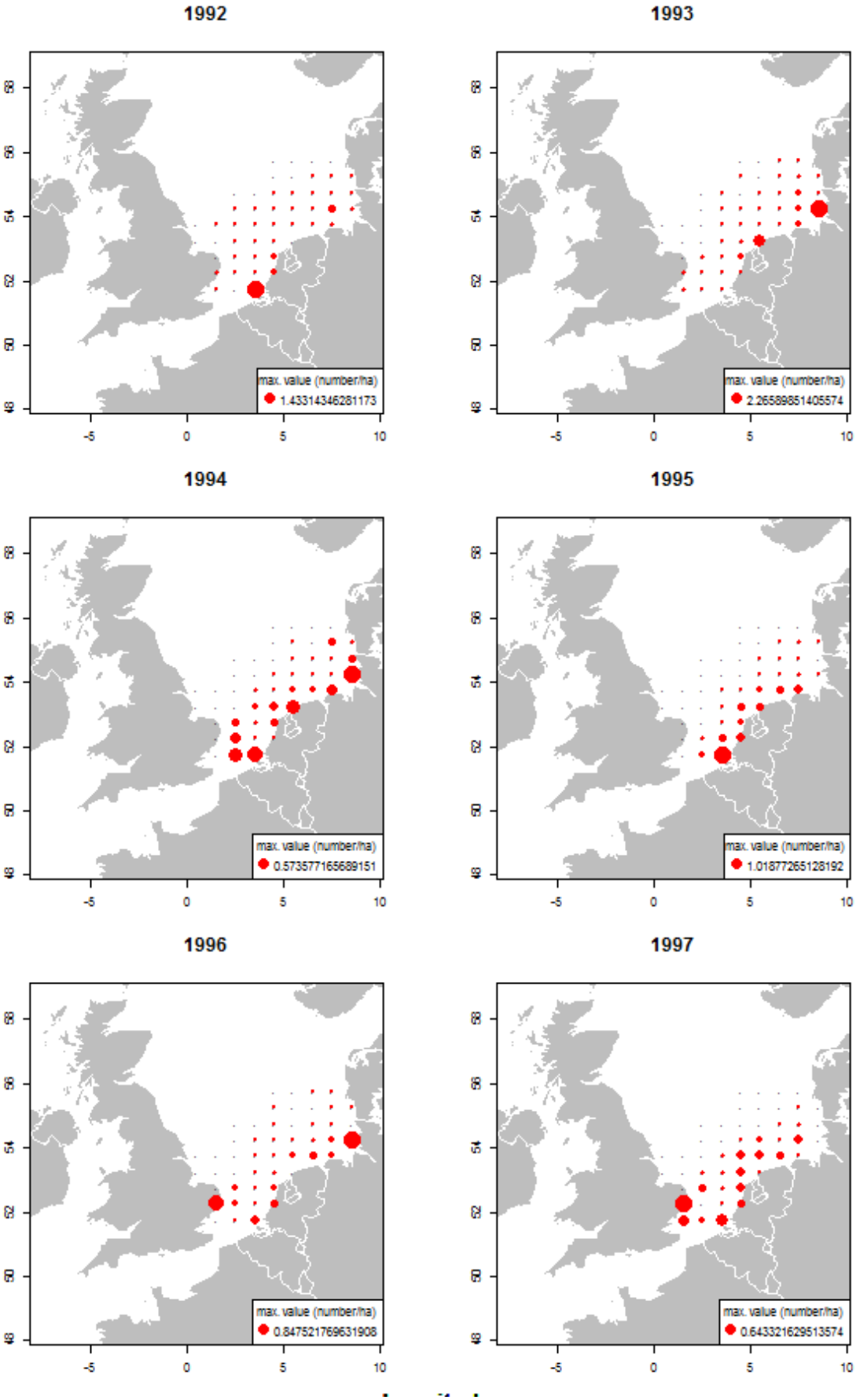
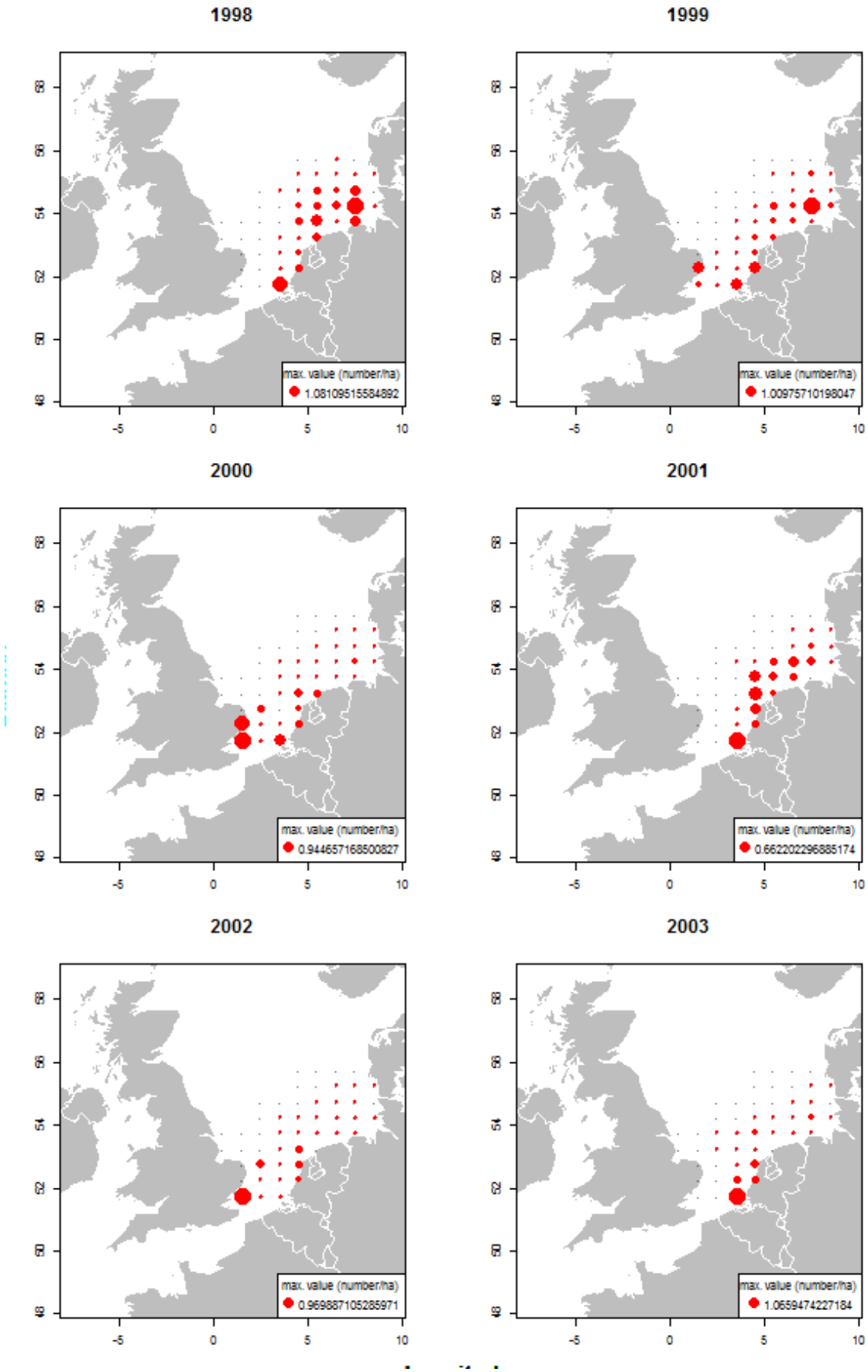


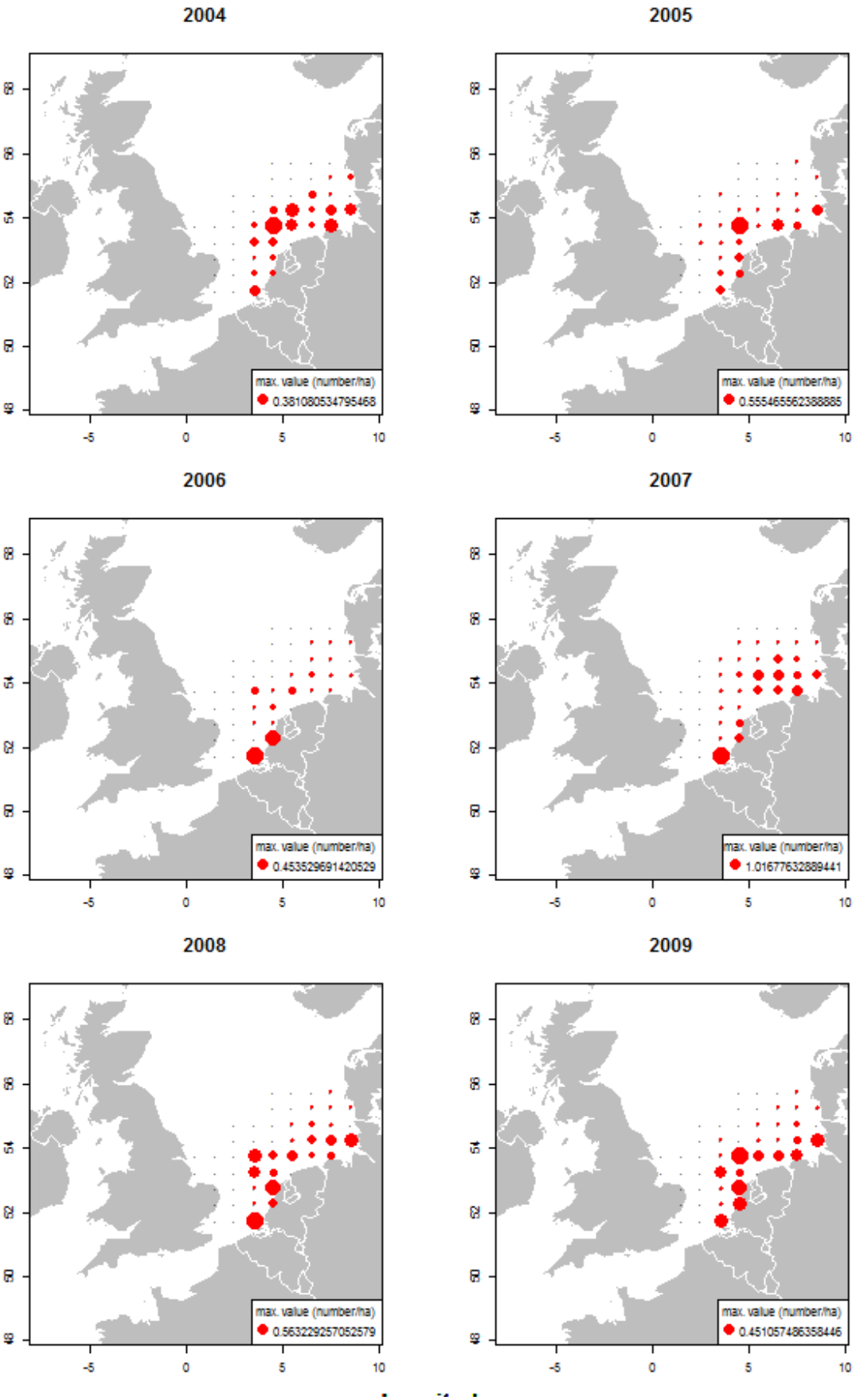
Males age group 2



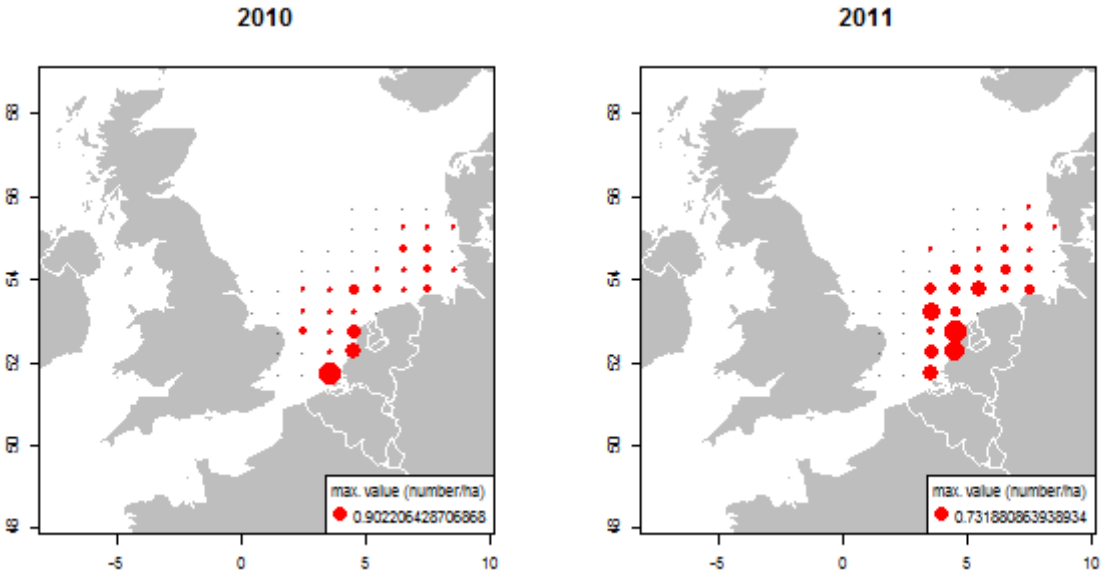
Males age group 2



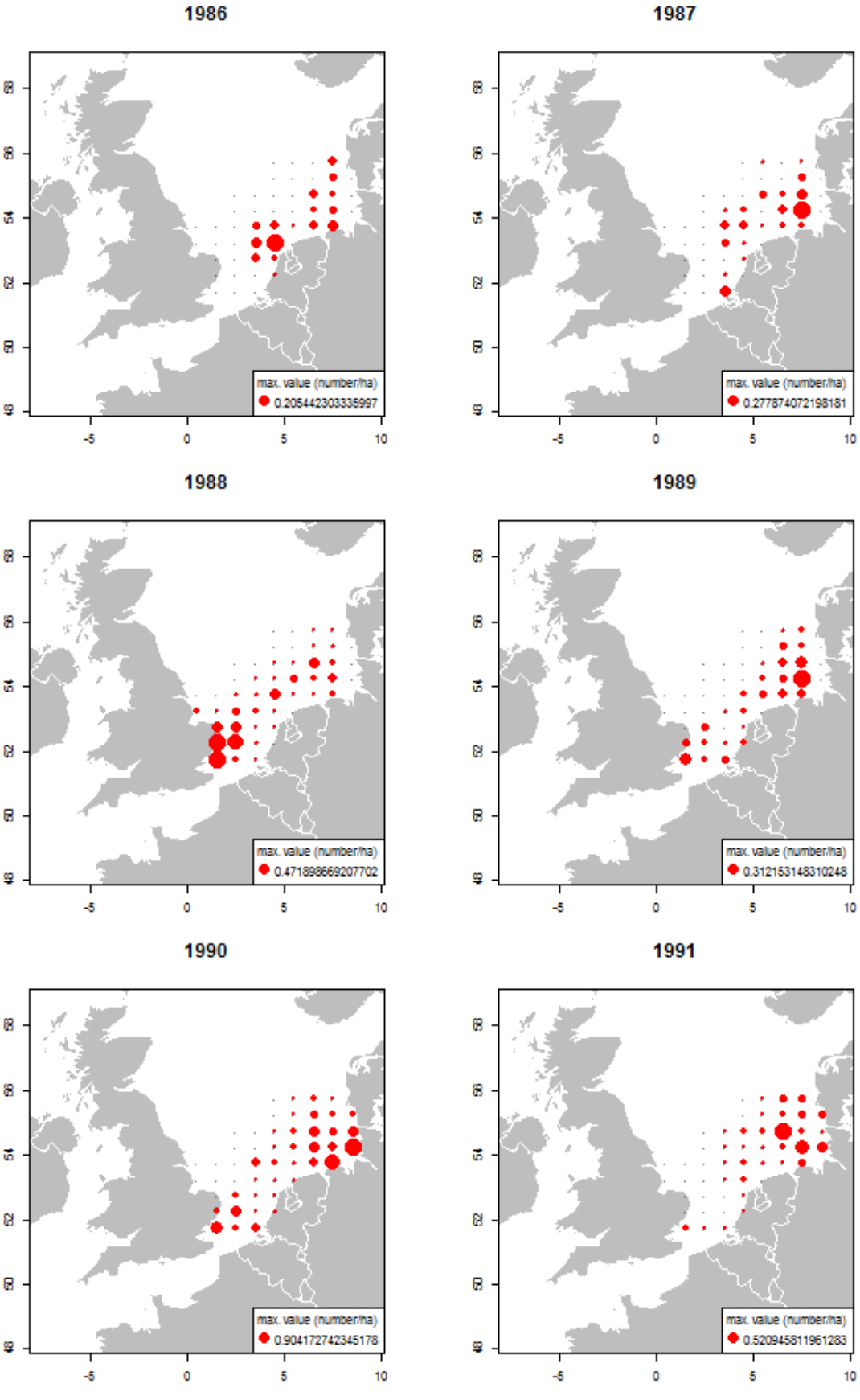
Males age group 2



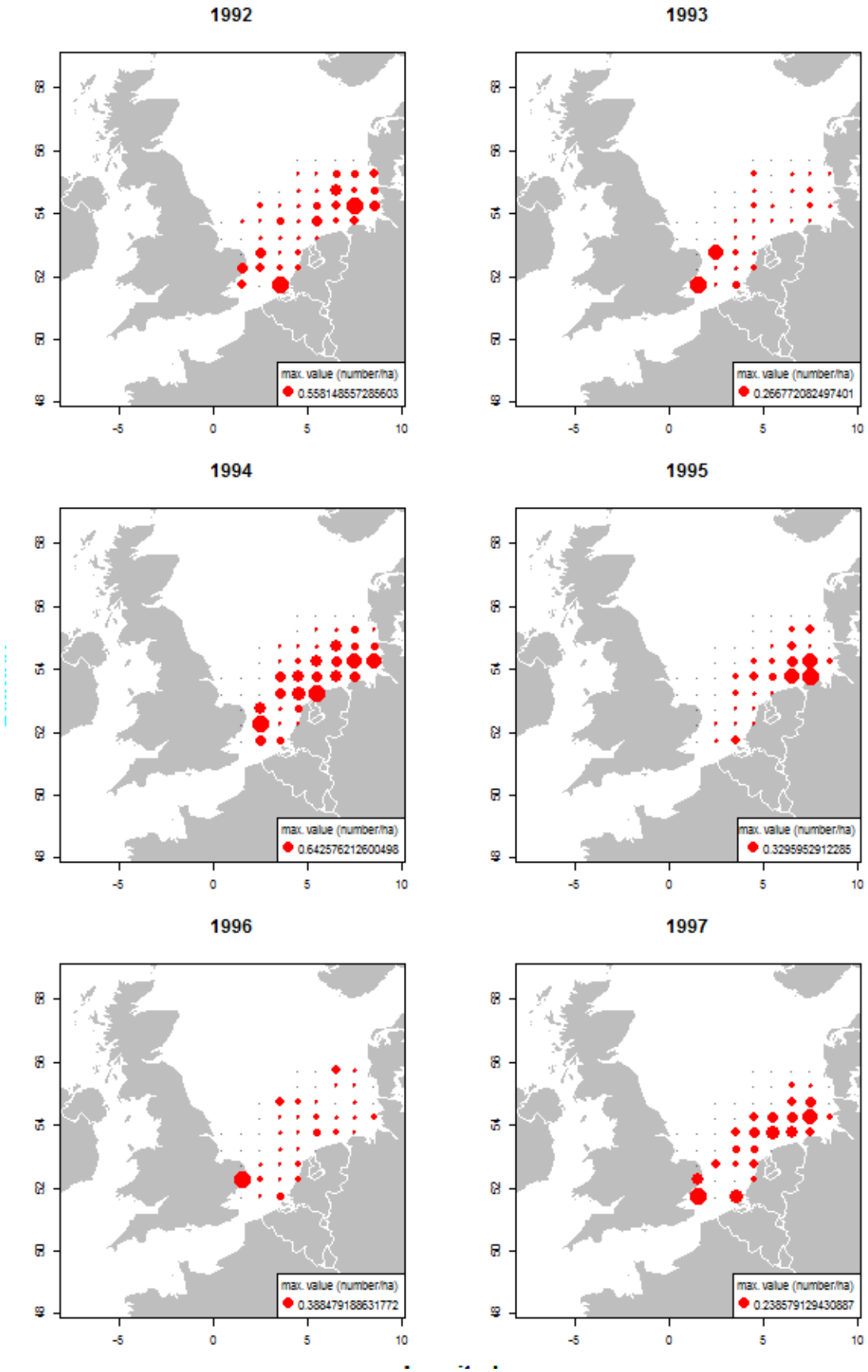
Males age group 2



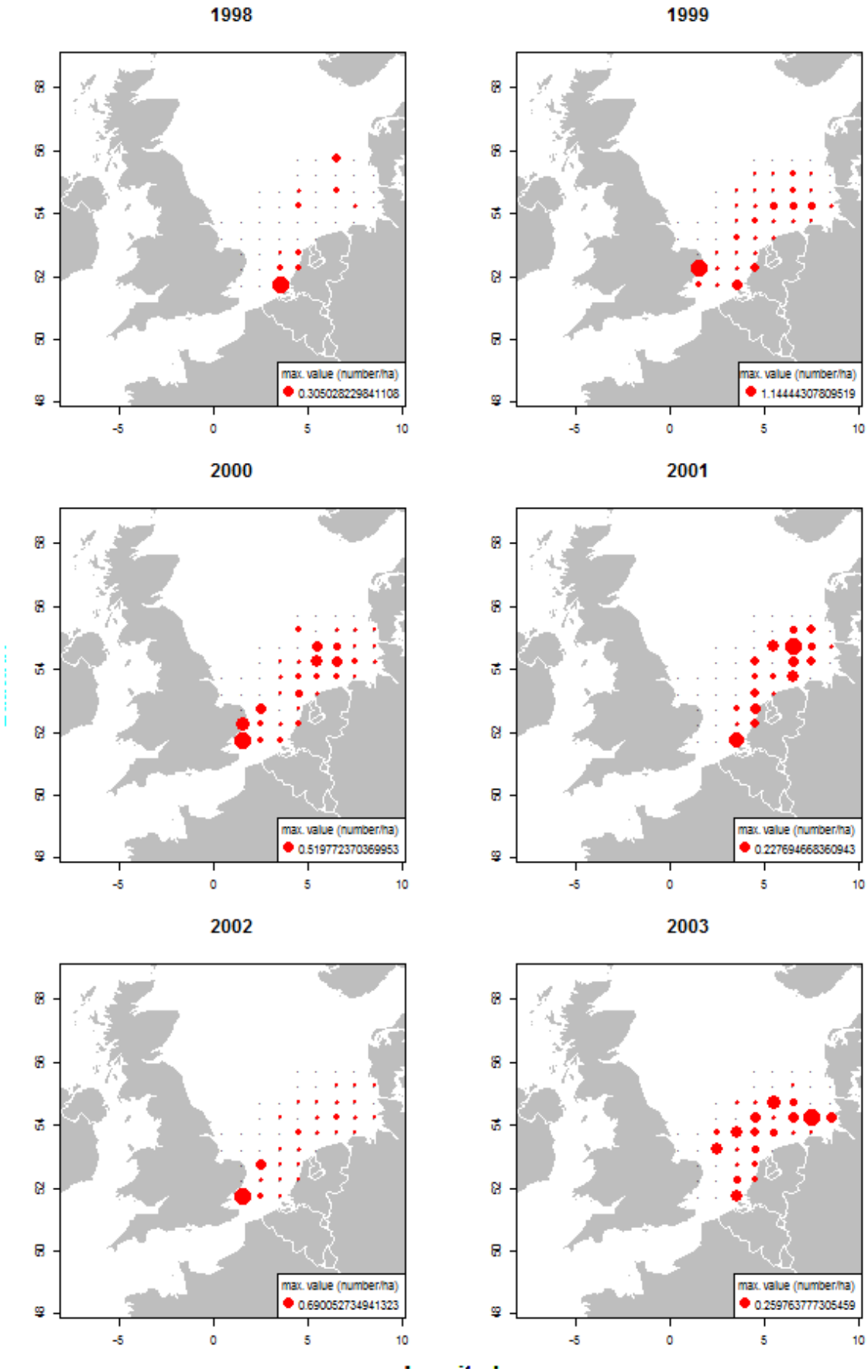
Males age group 2



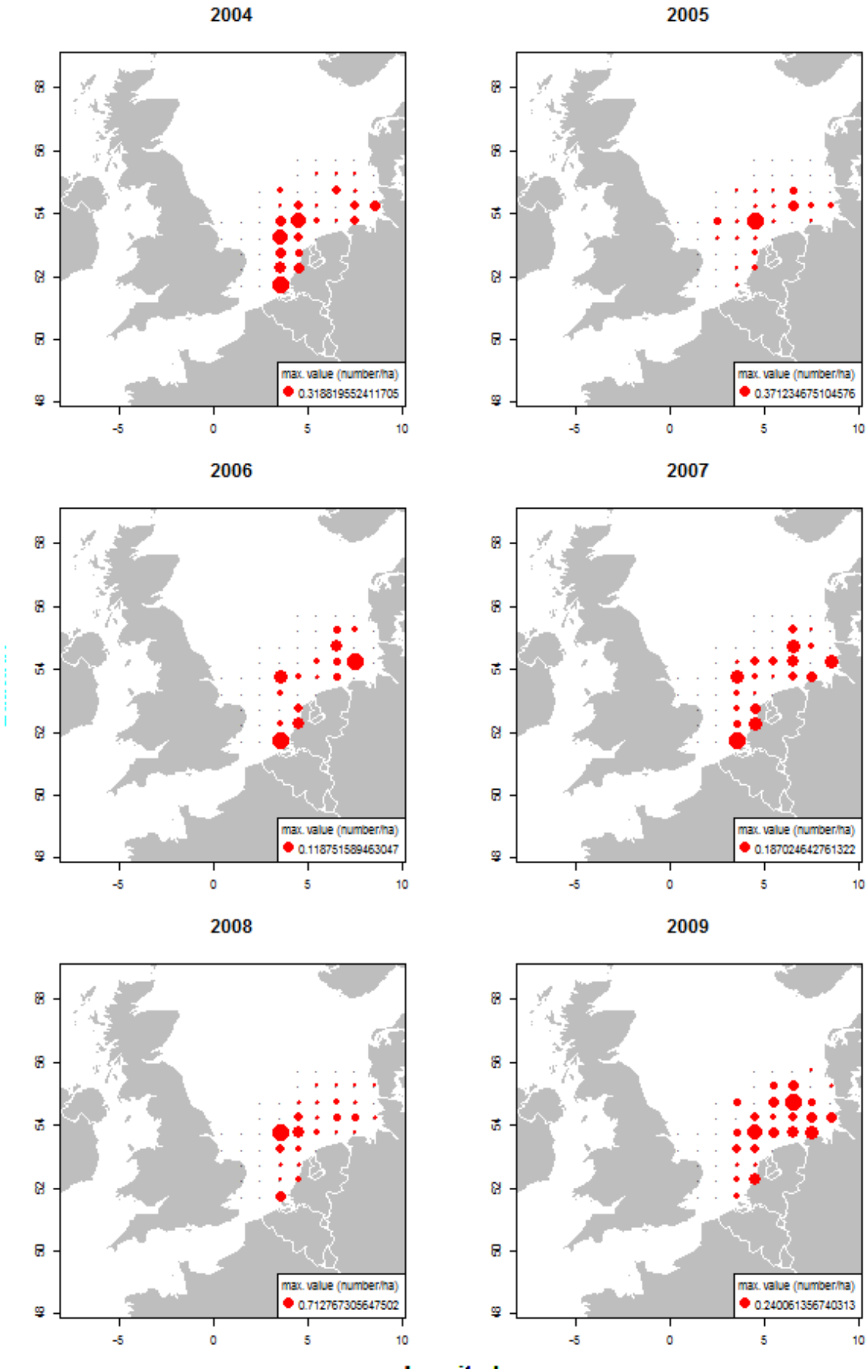
Females age group 3



Females age group 3



Females age group 3



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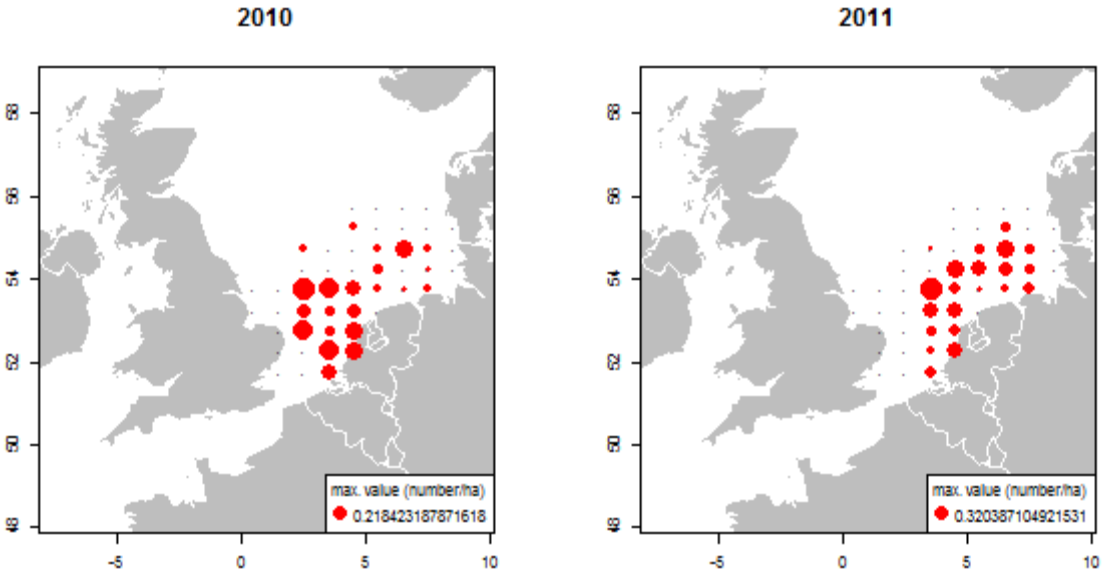

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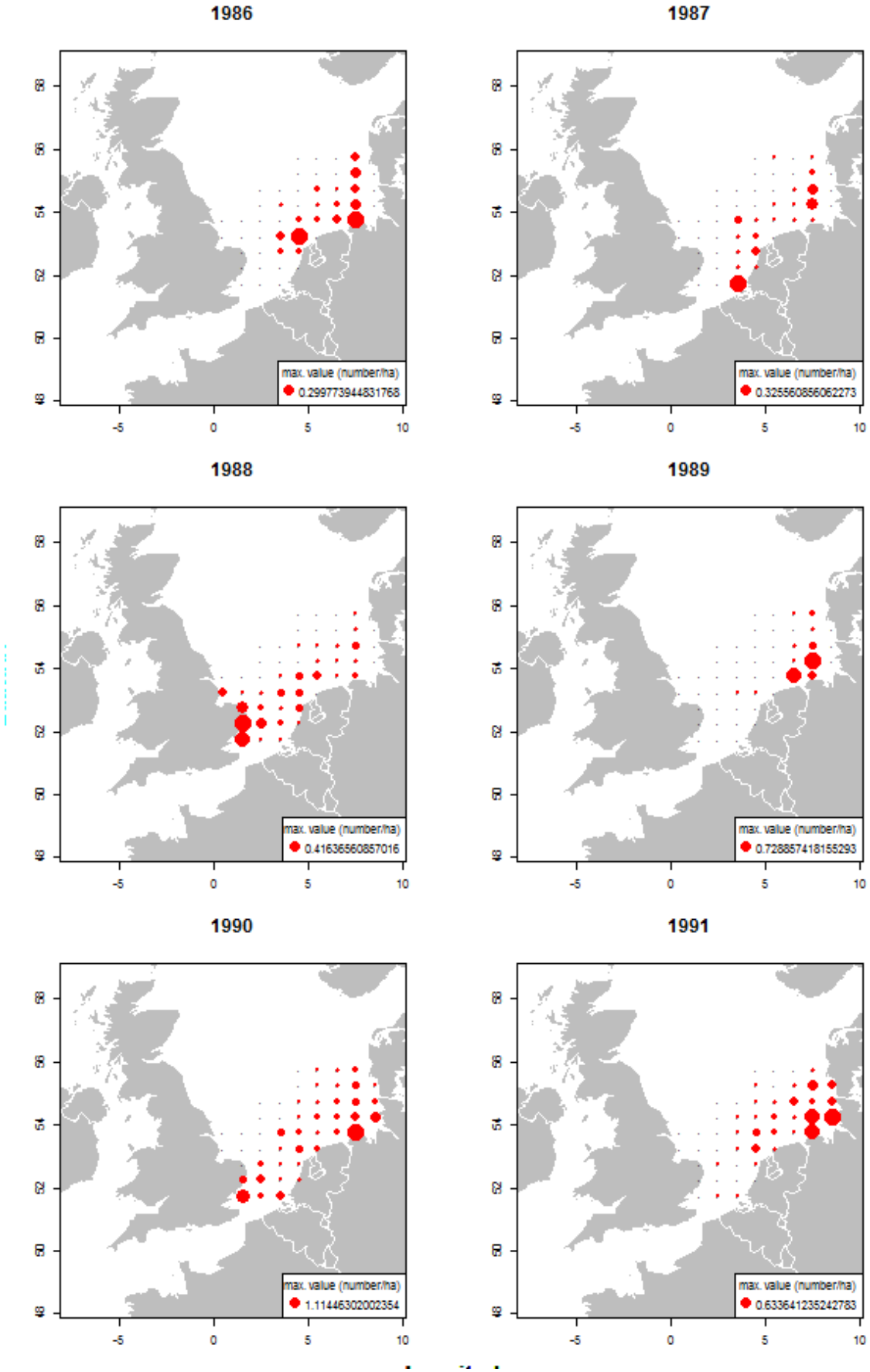
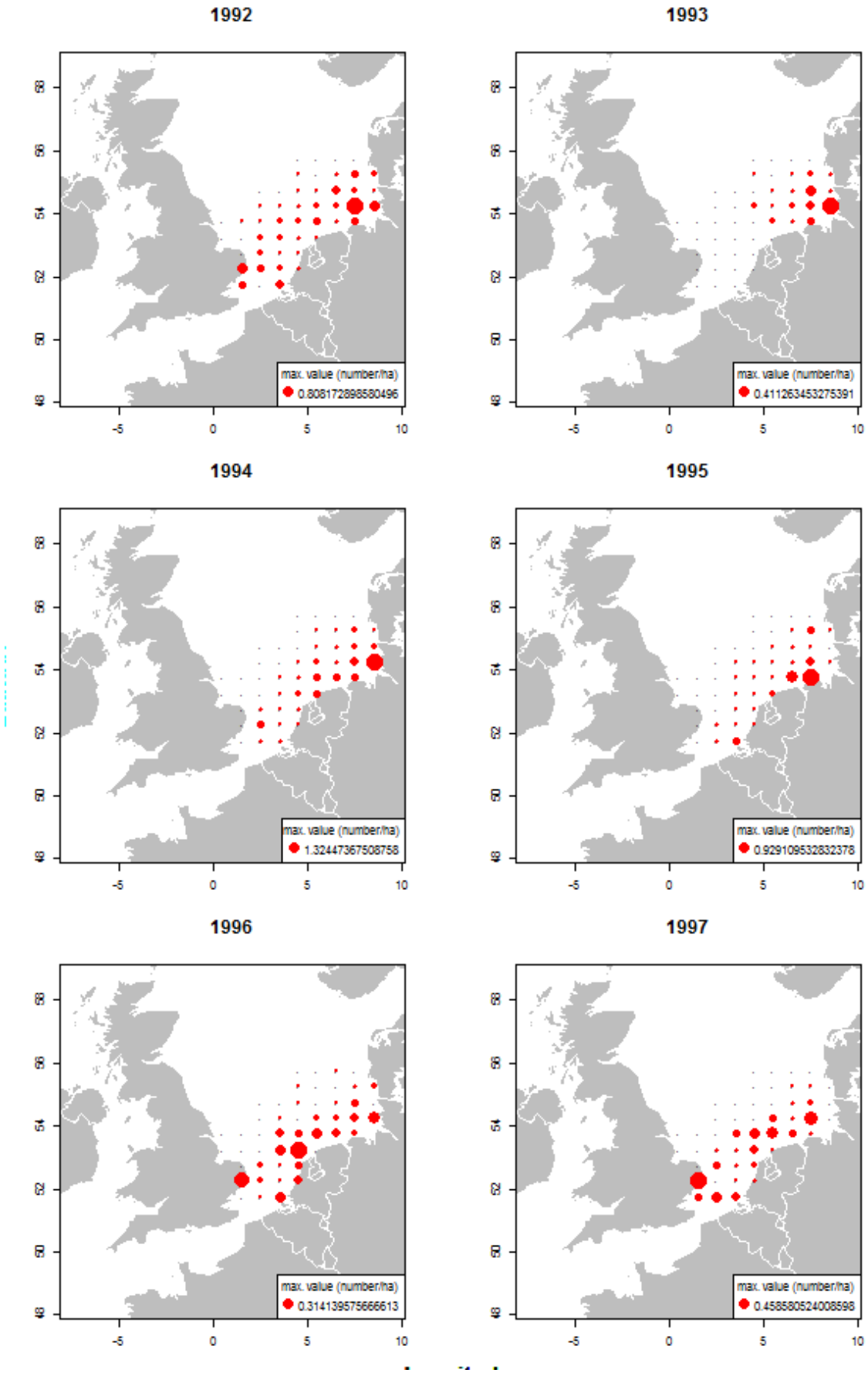
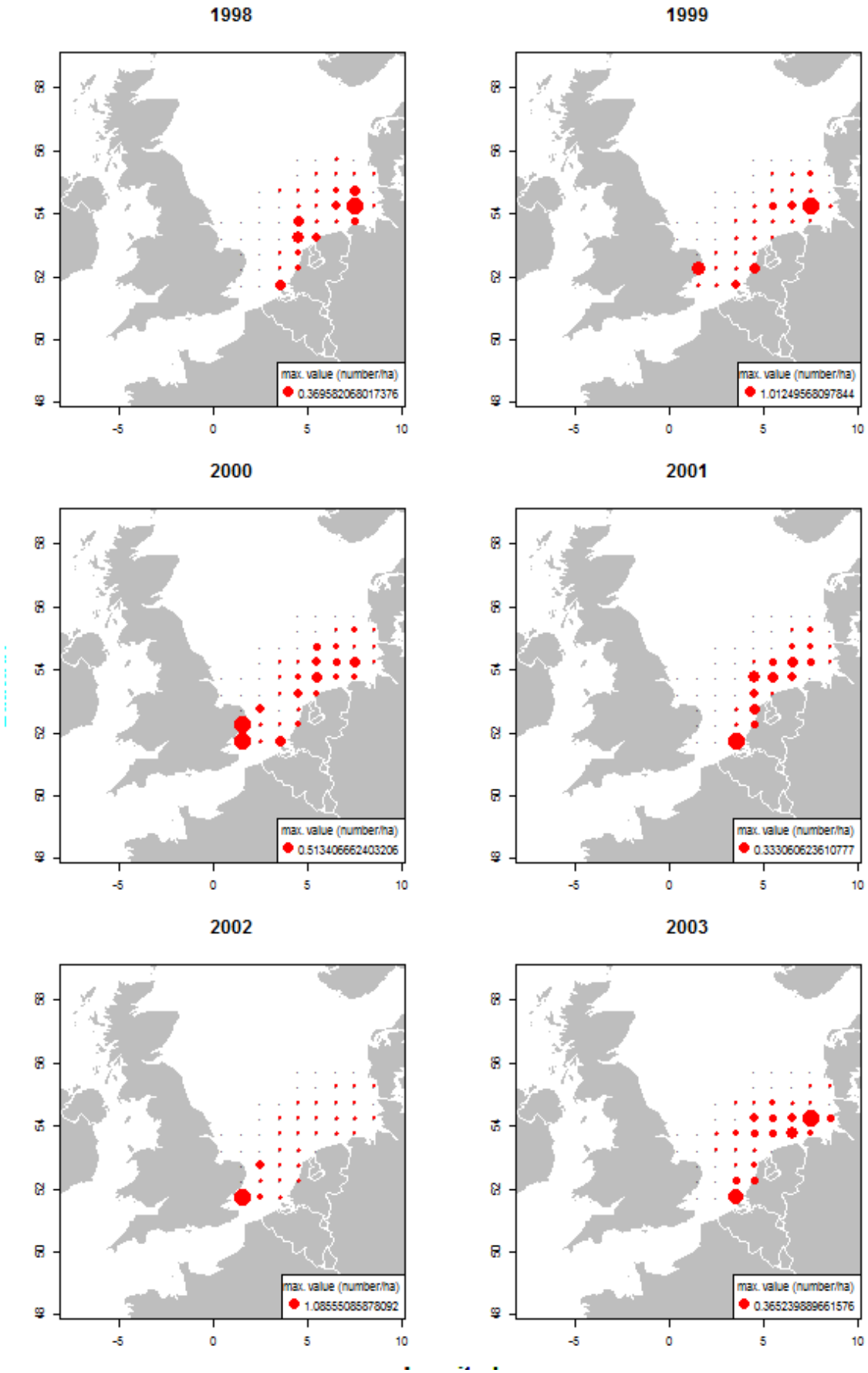


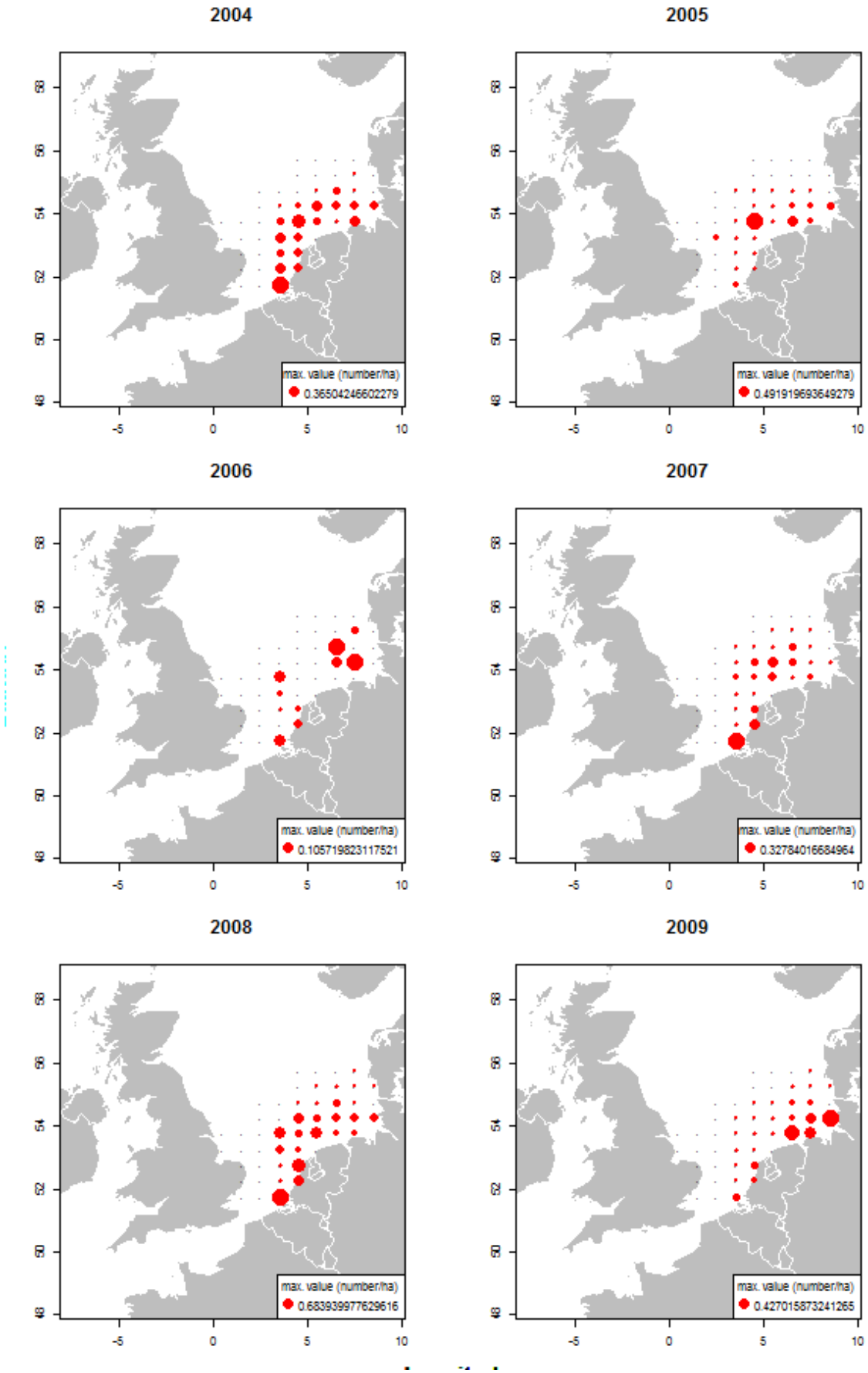
Males age group 3



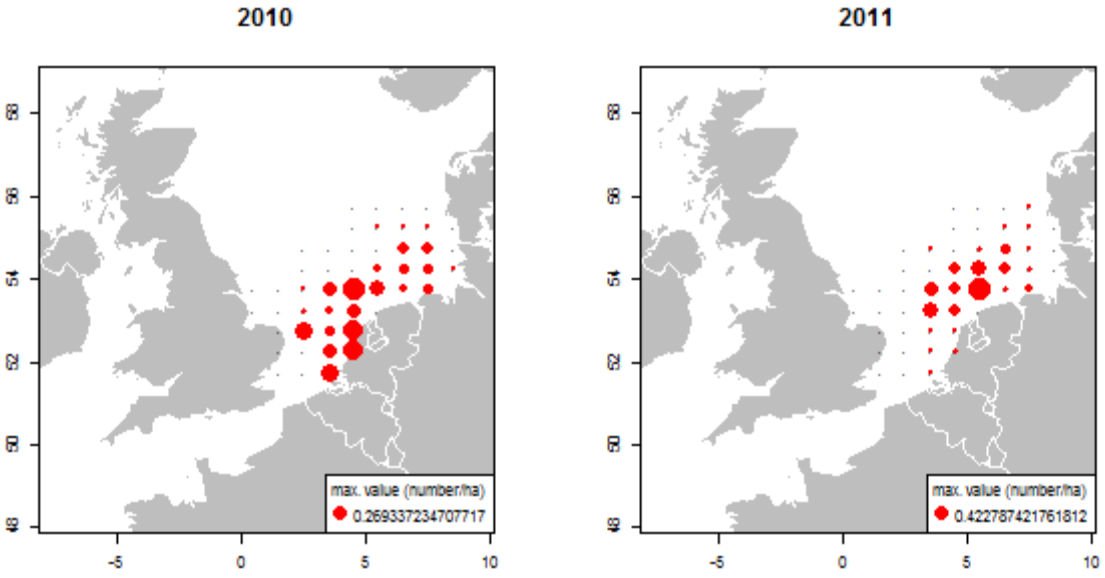
Males age group 3



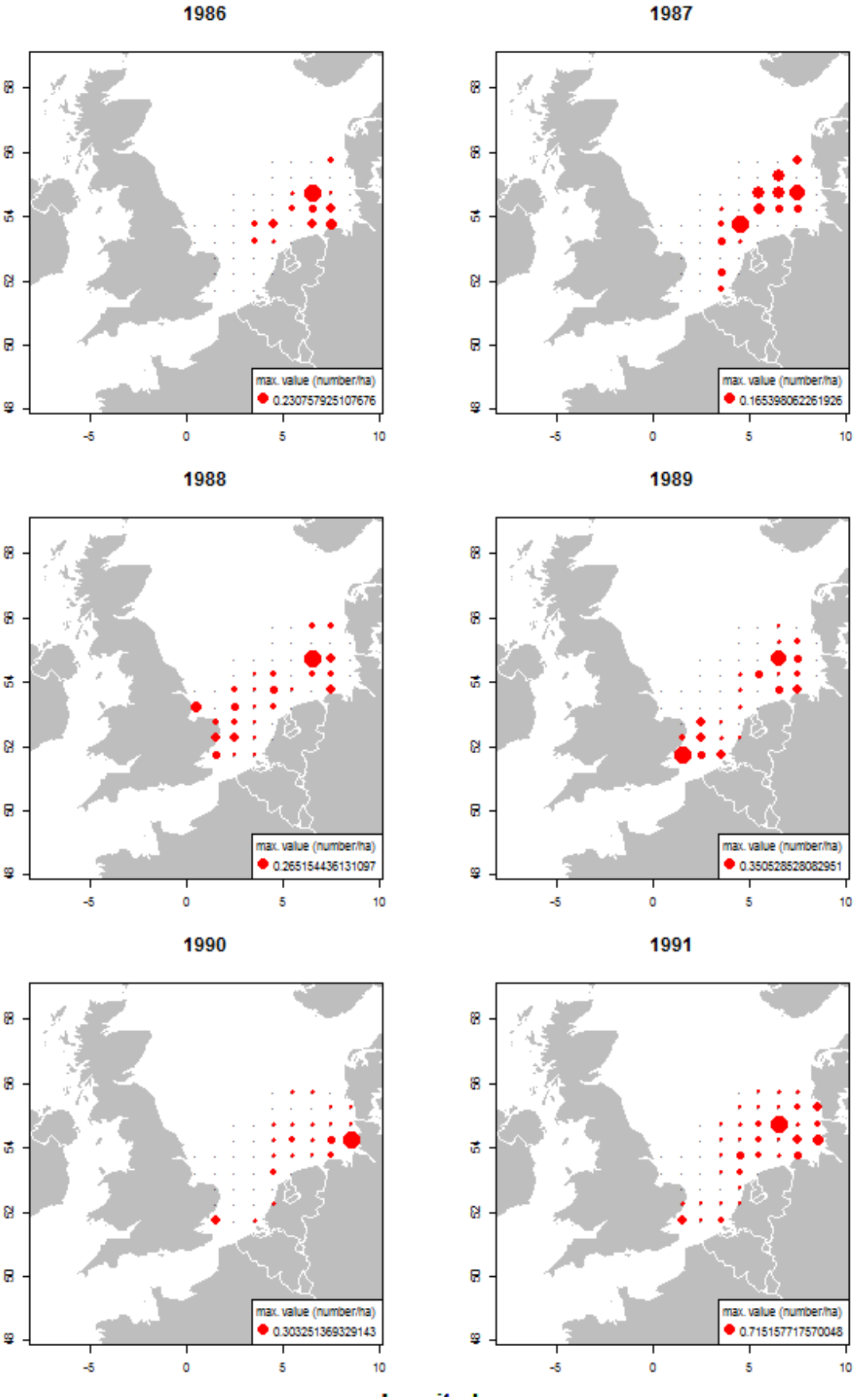
Males age group 3



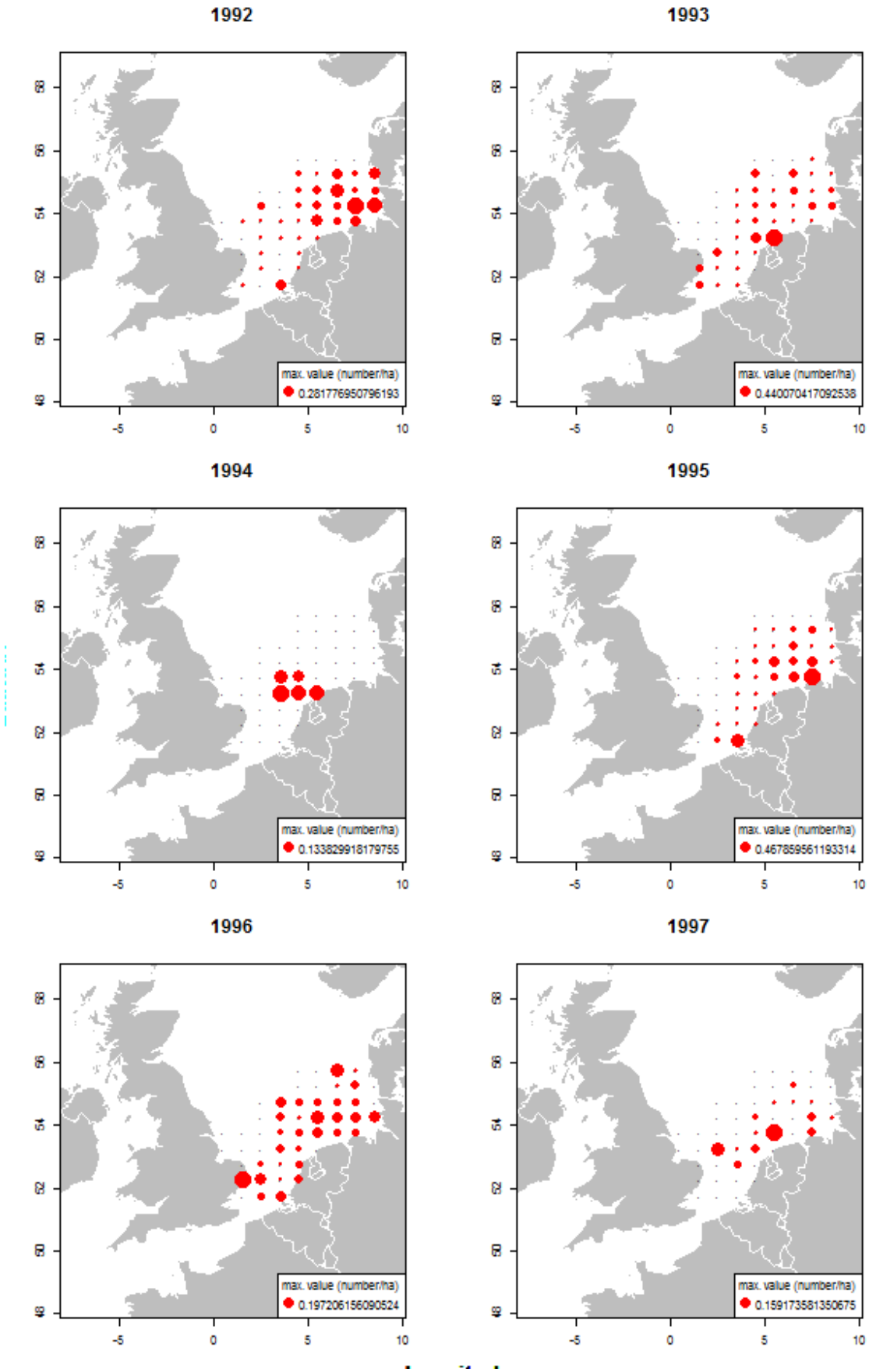
Males age group 3



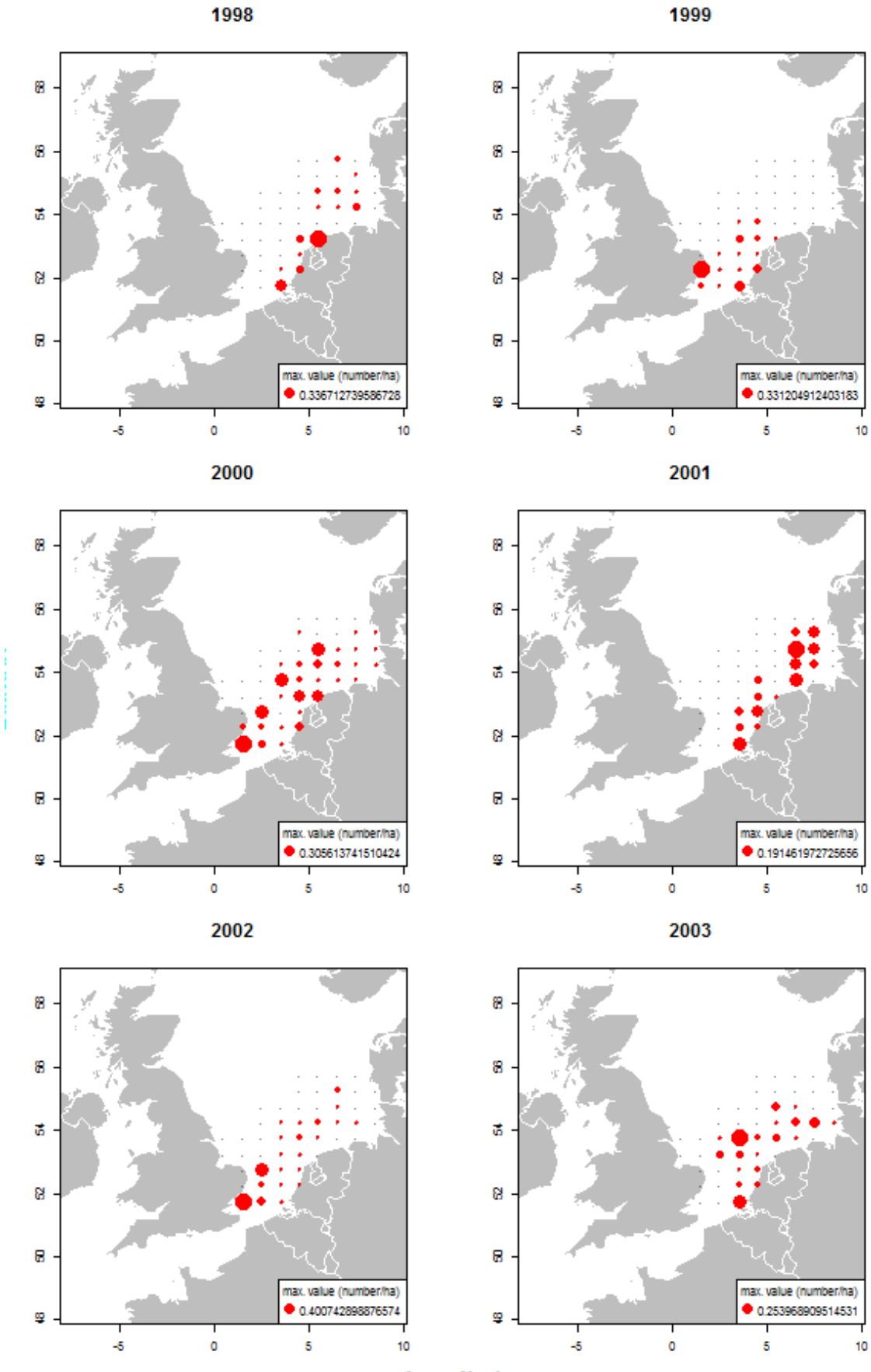
Males age group 3



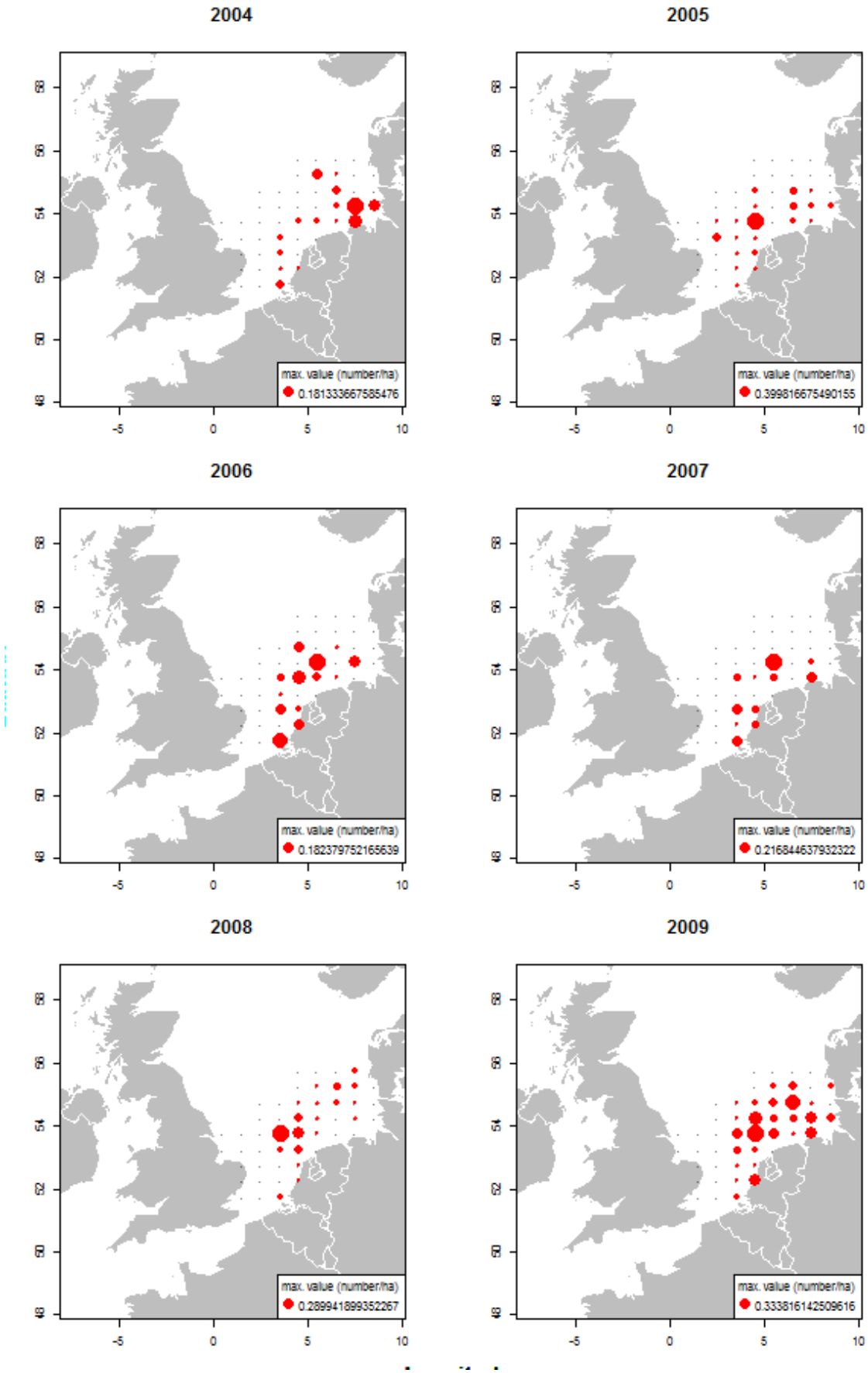
Females age group 4



Females age group 4



Females age group 4



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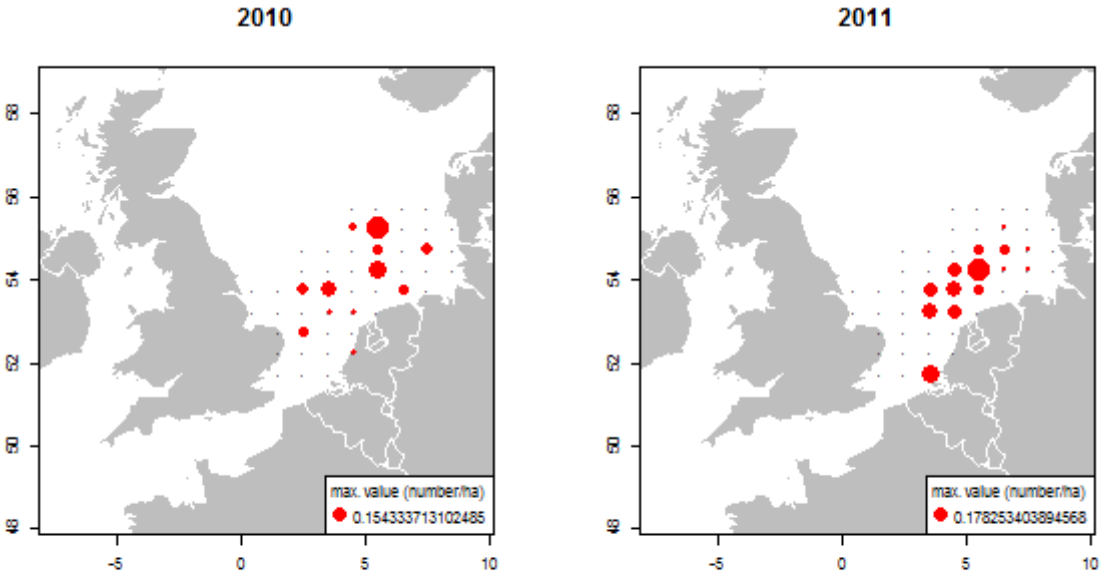
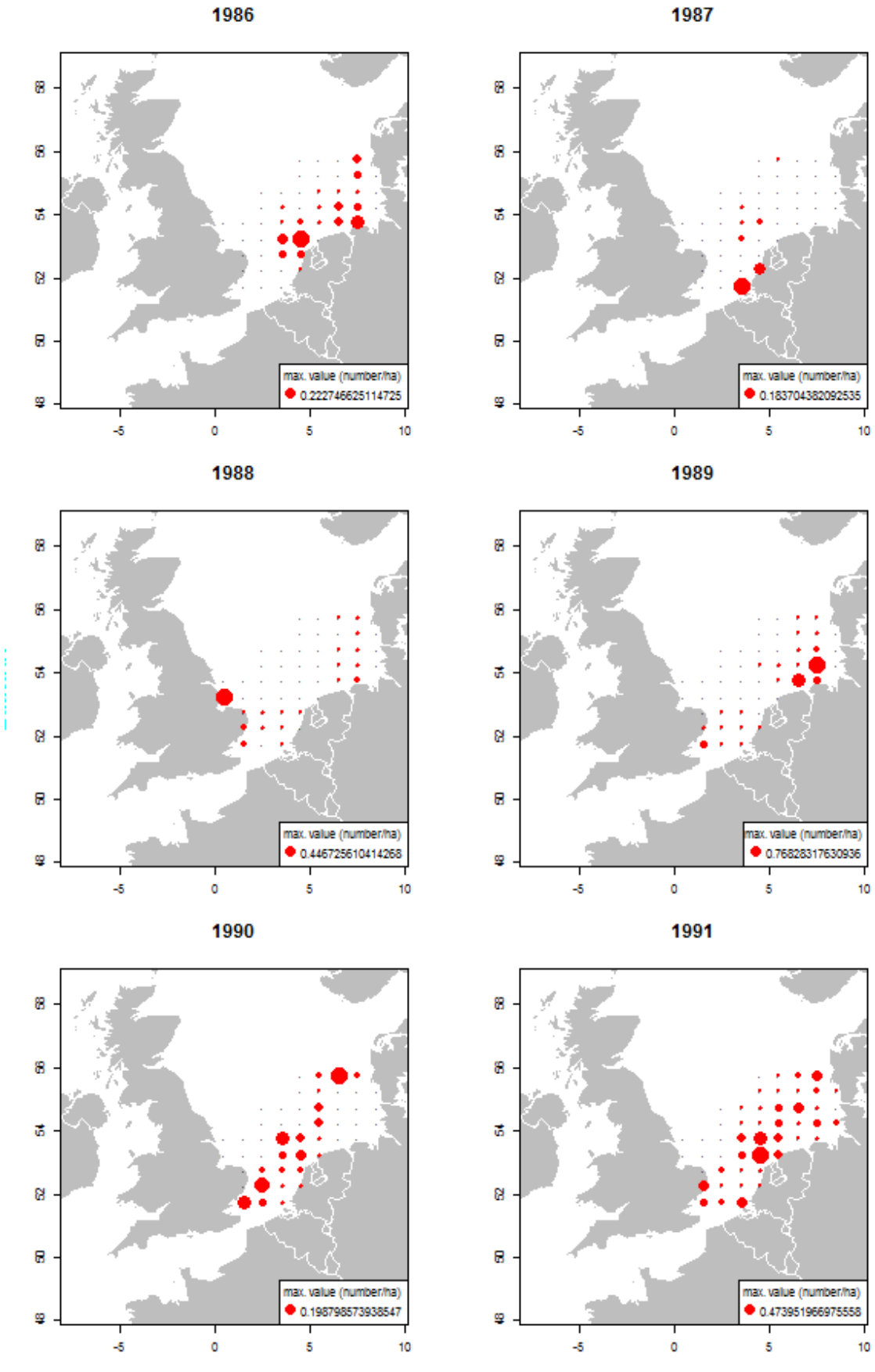
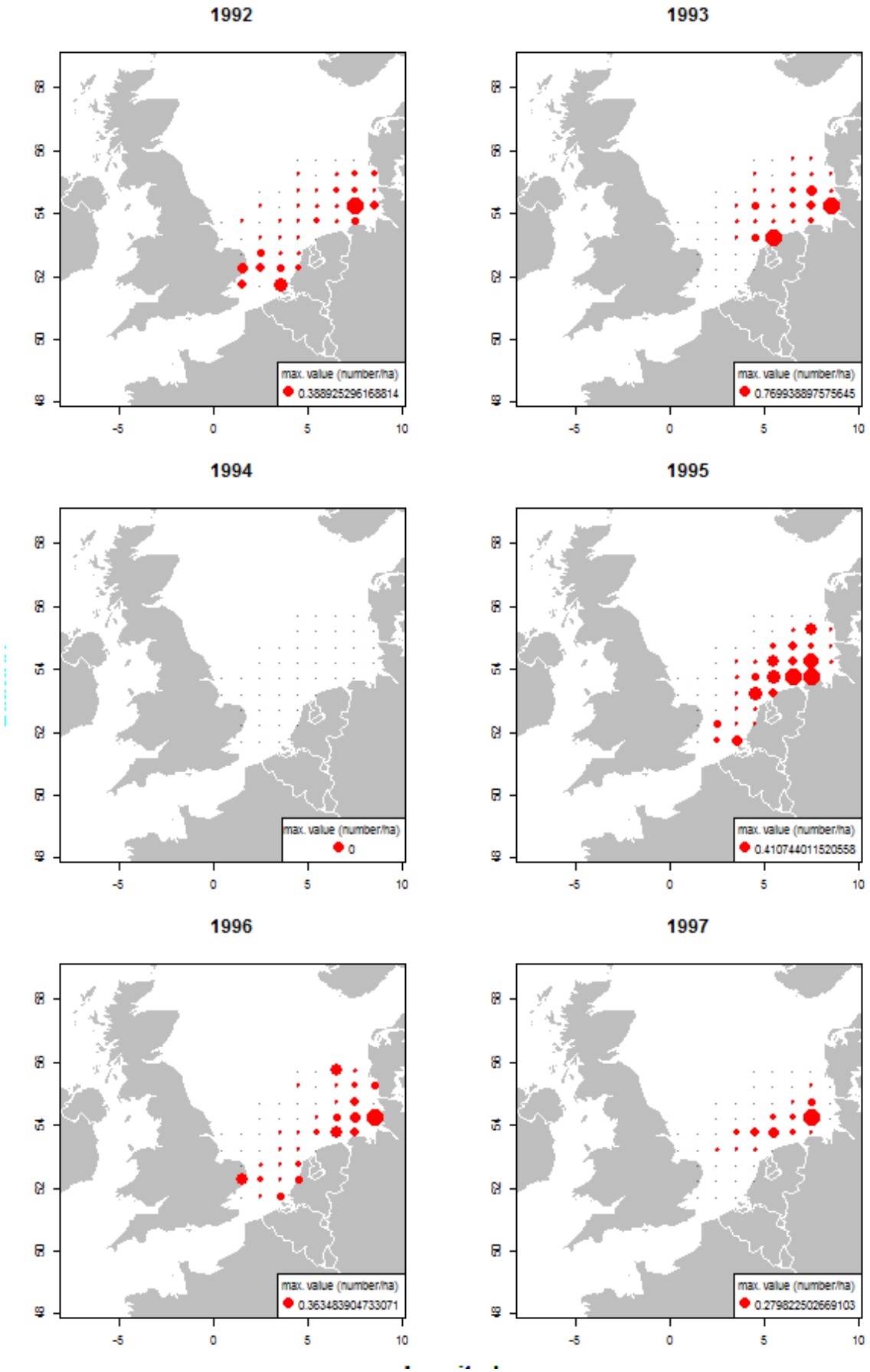


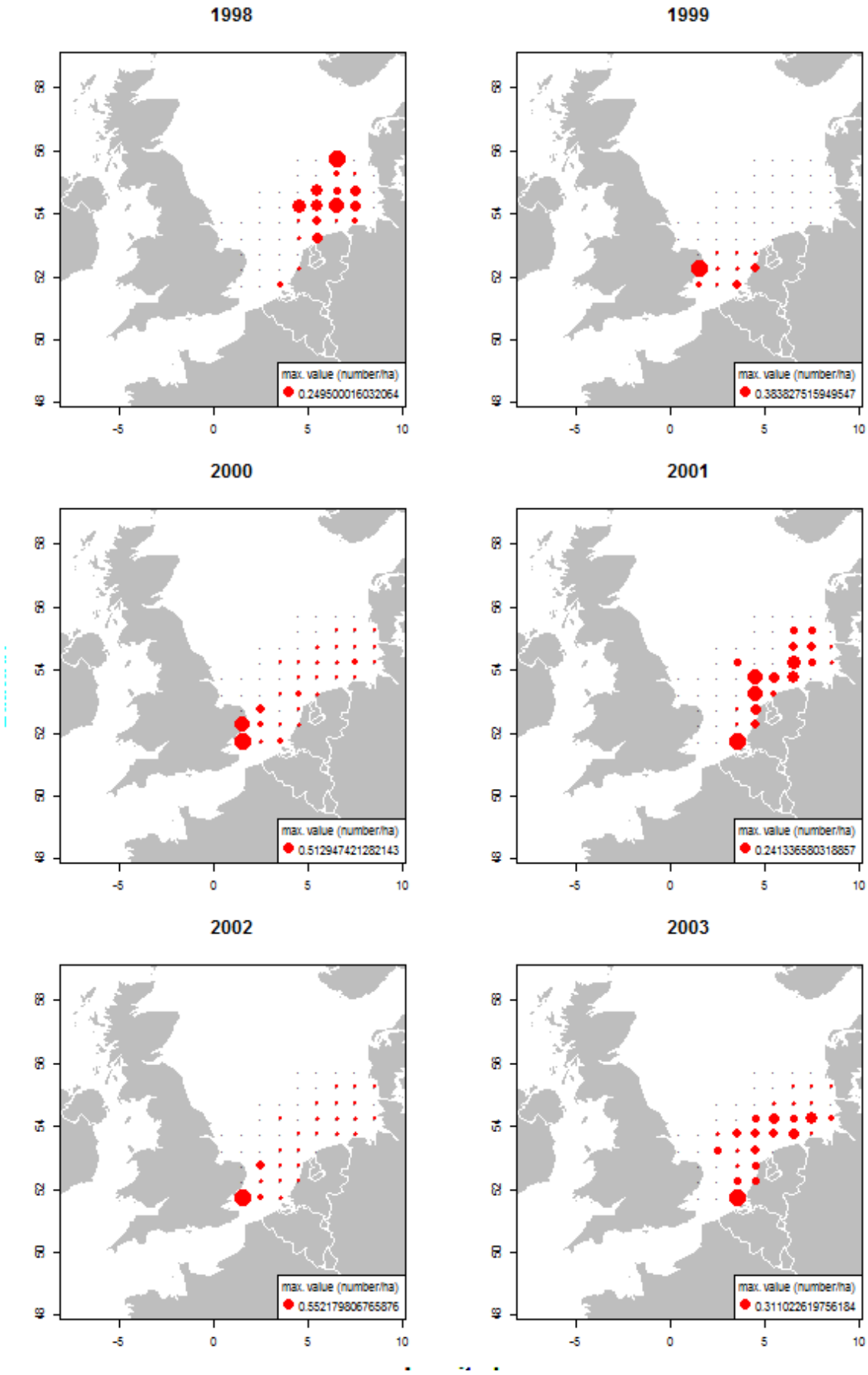
Females age group 4



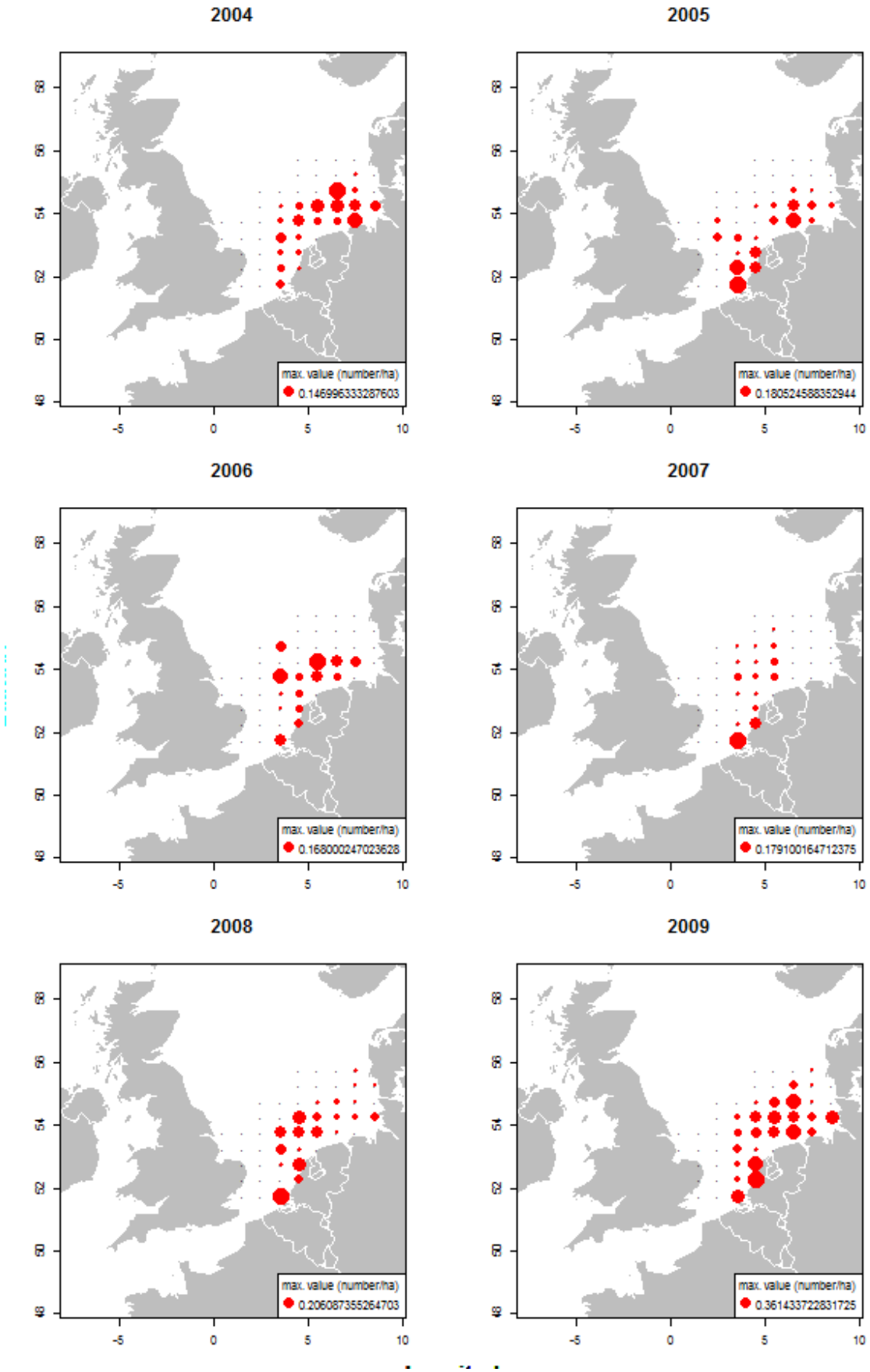
Males age group 4



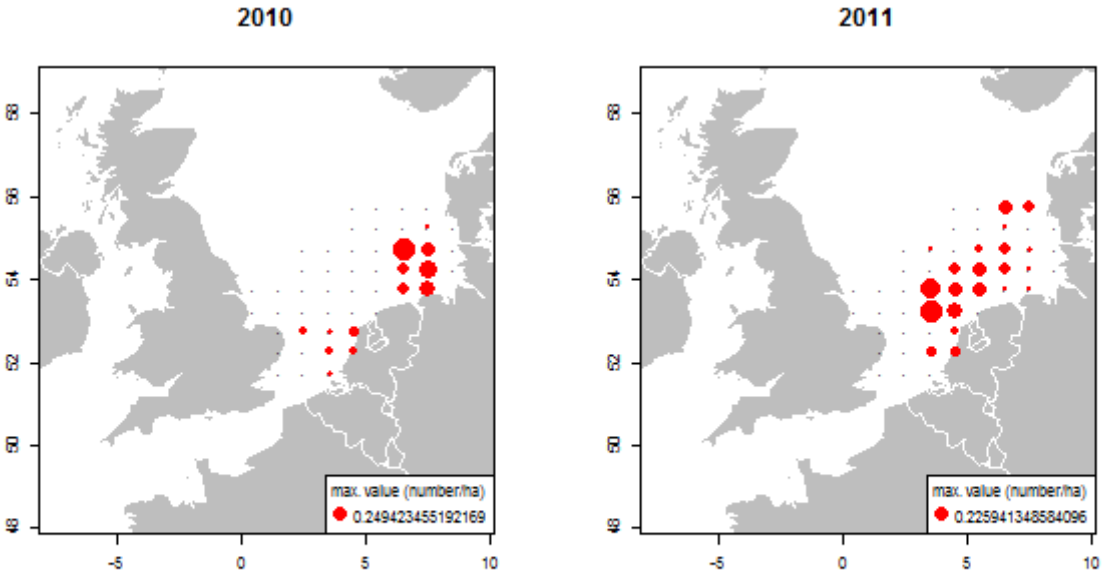
Males age group 4



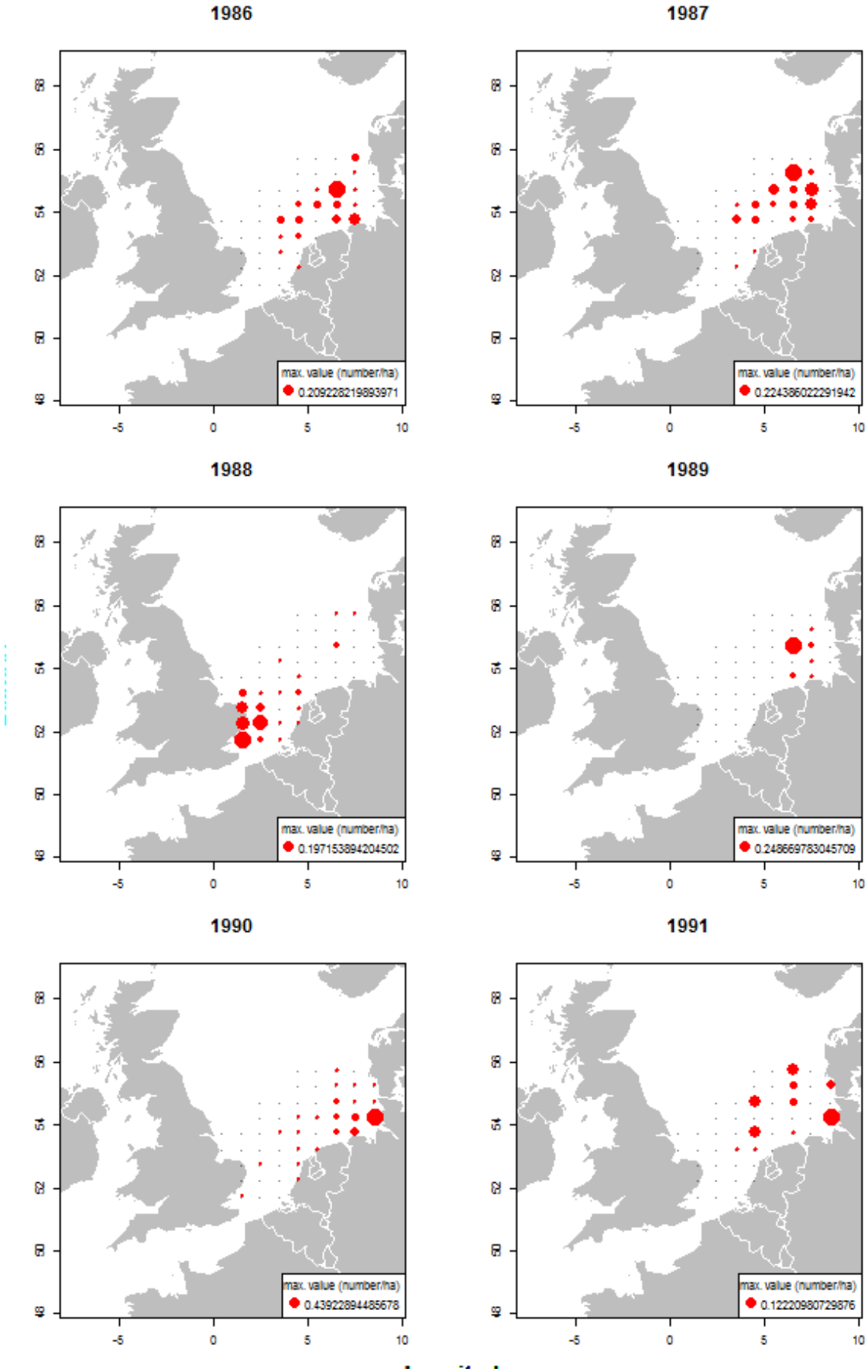
Males age group 4



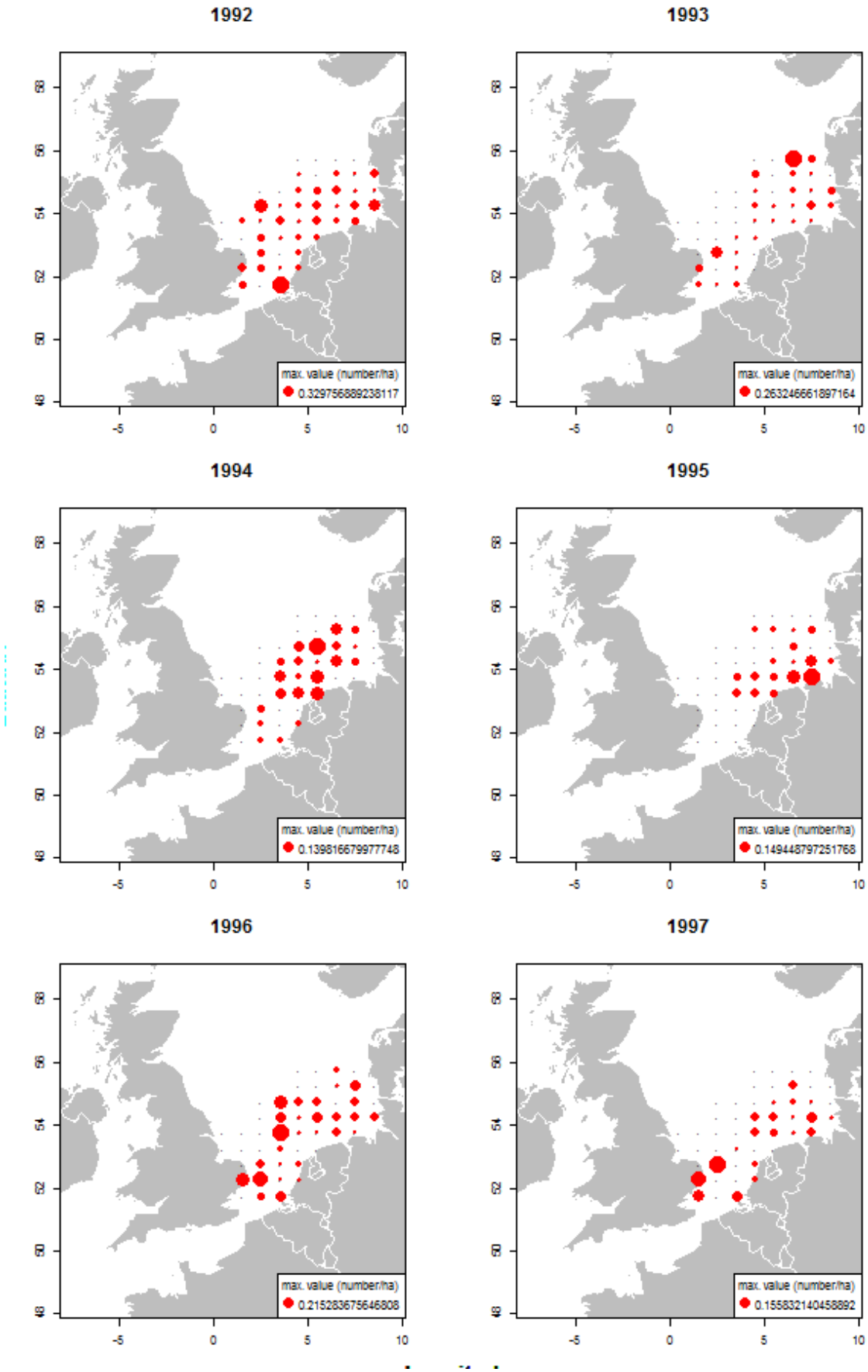
Males age group 4



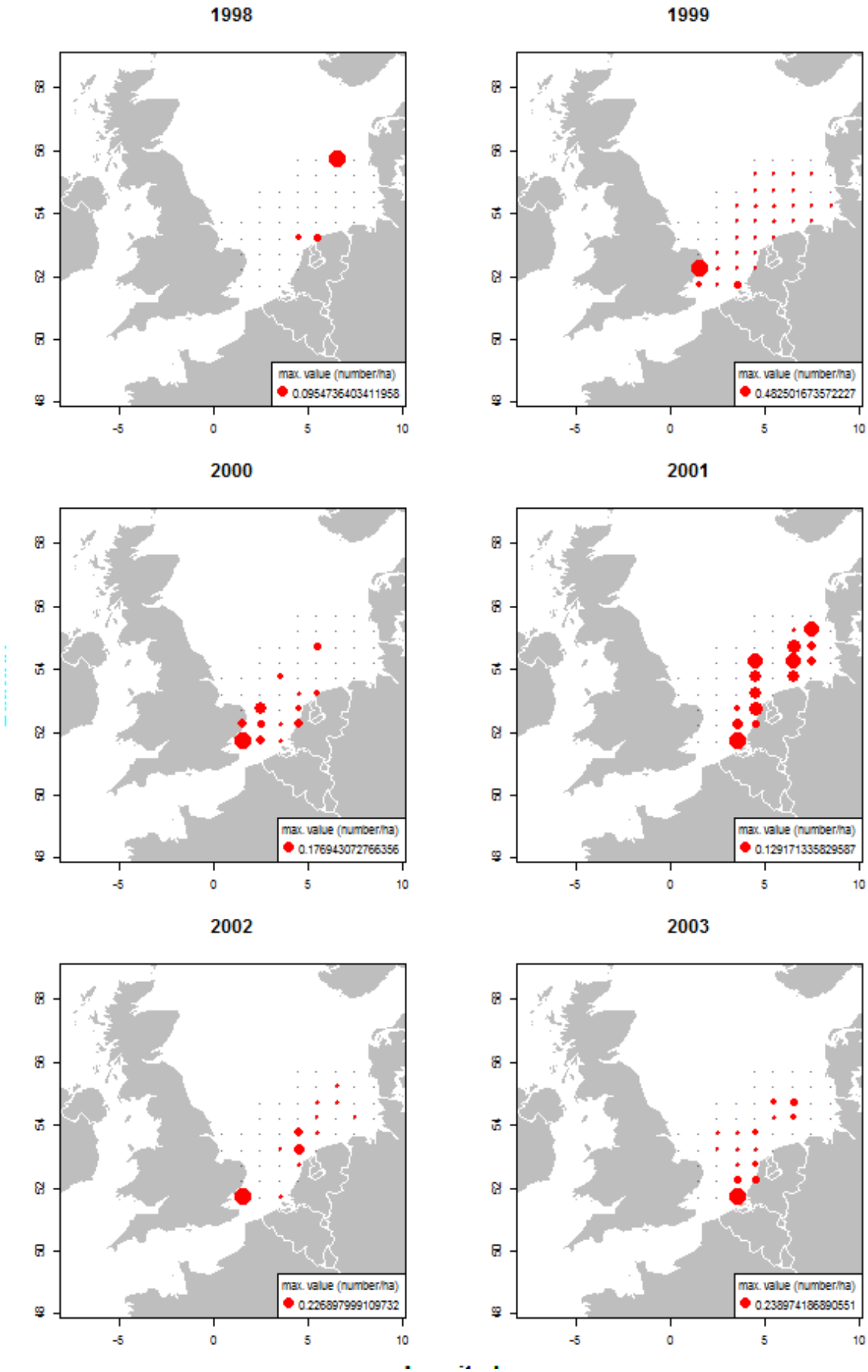
Males age group 4



Females age group 5



Females age group 5



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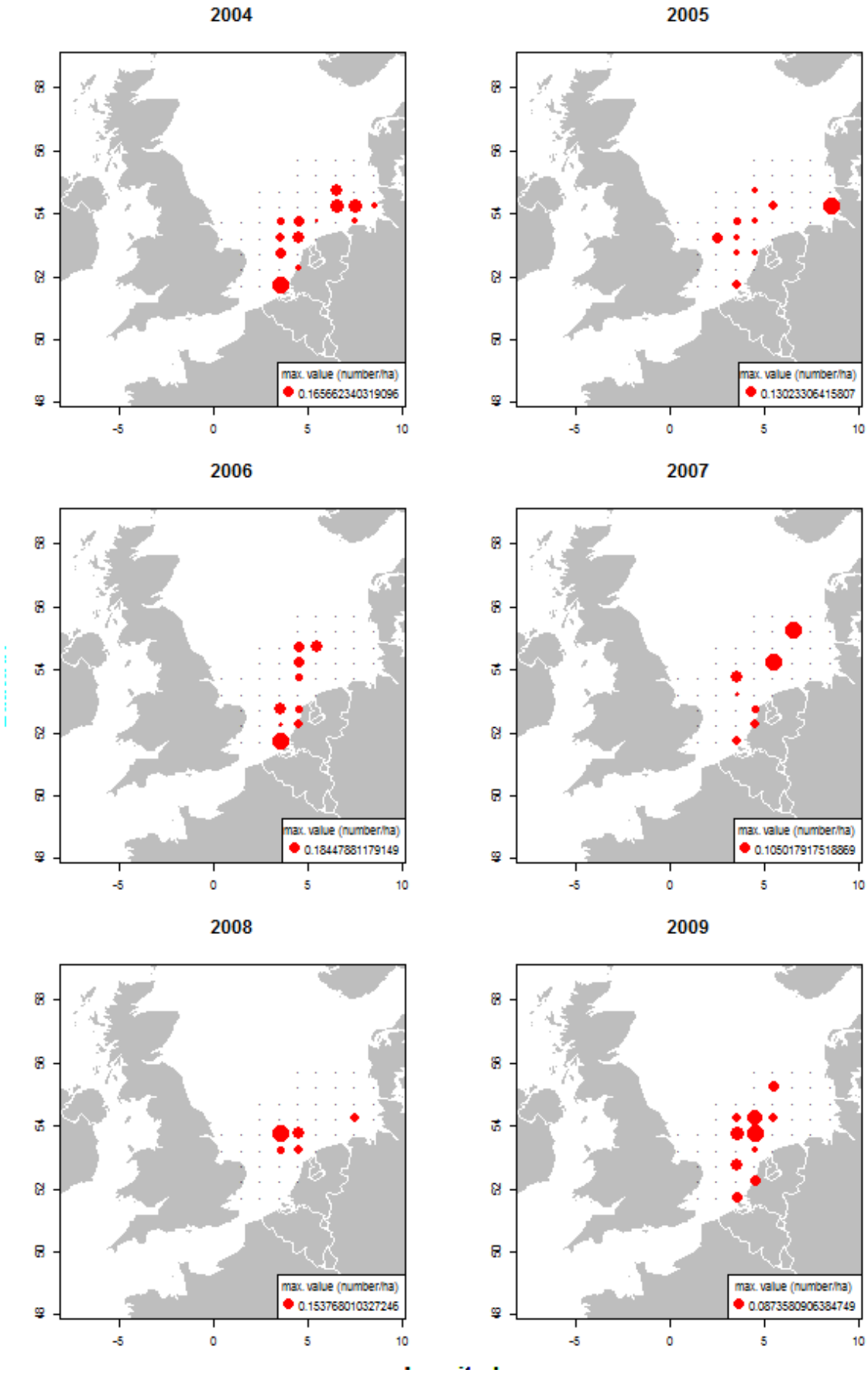

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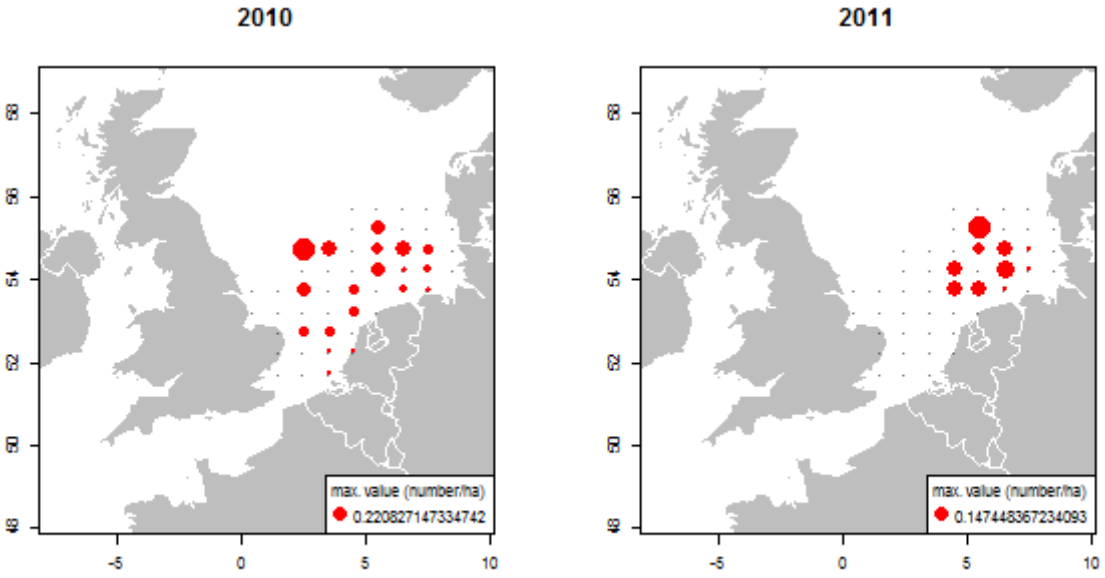
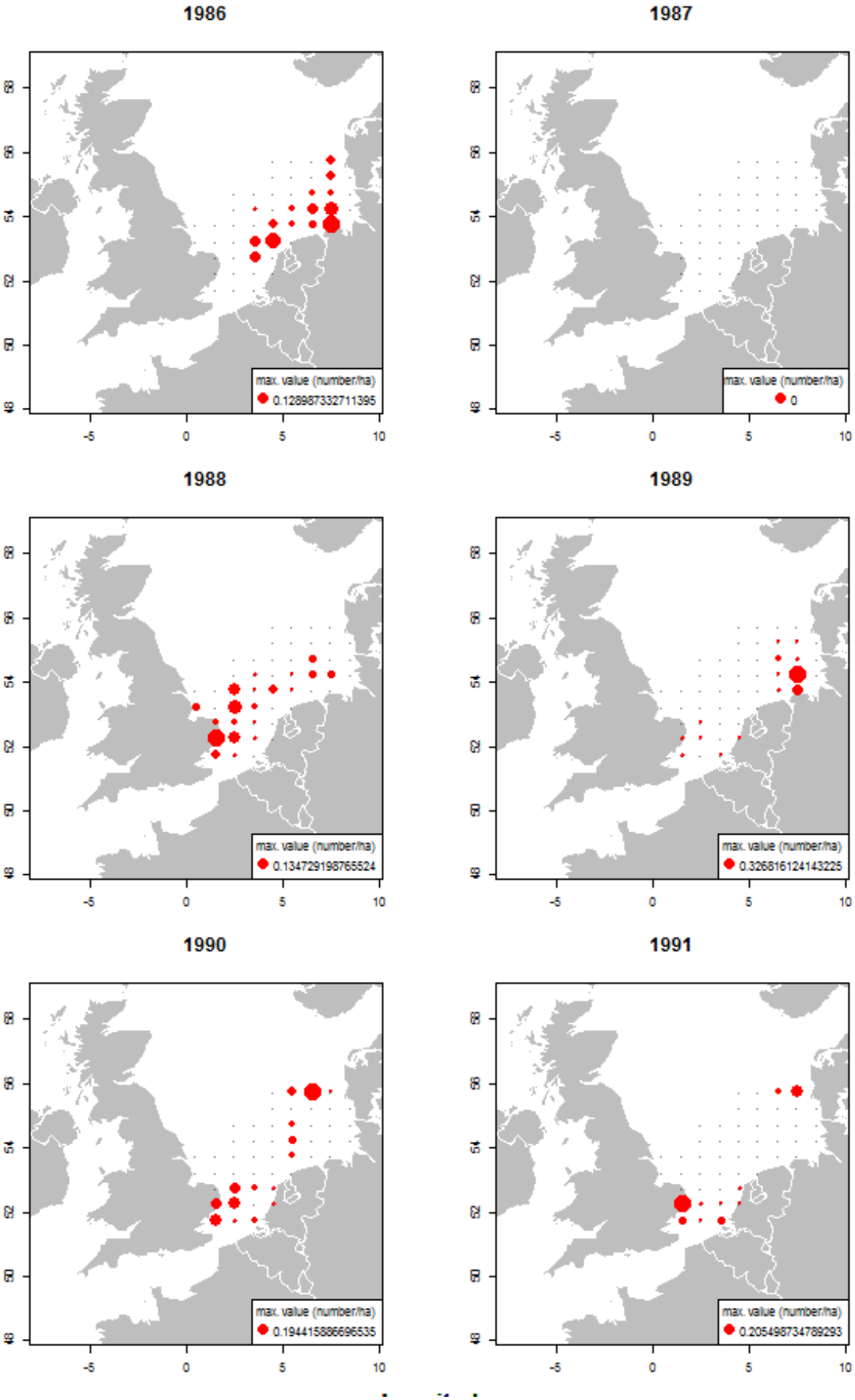
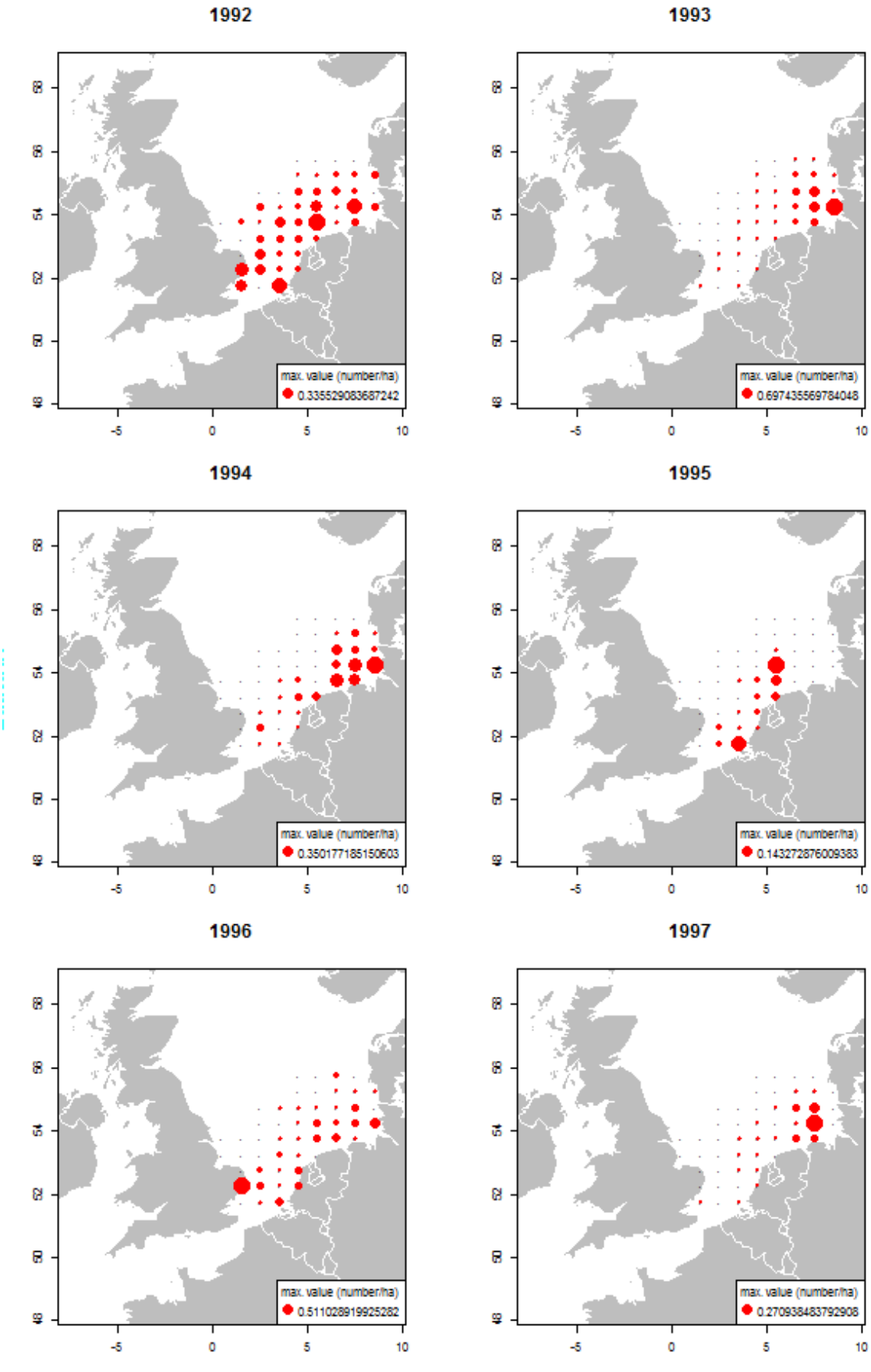


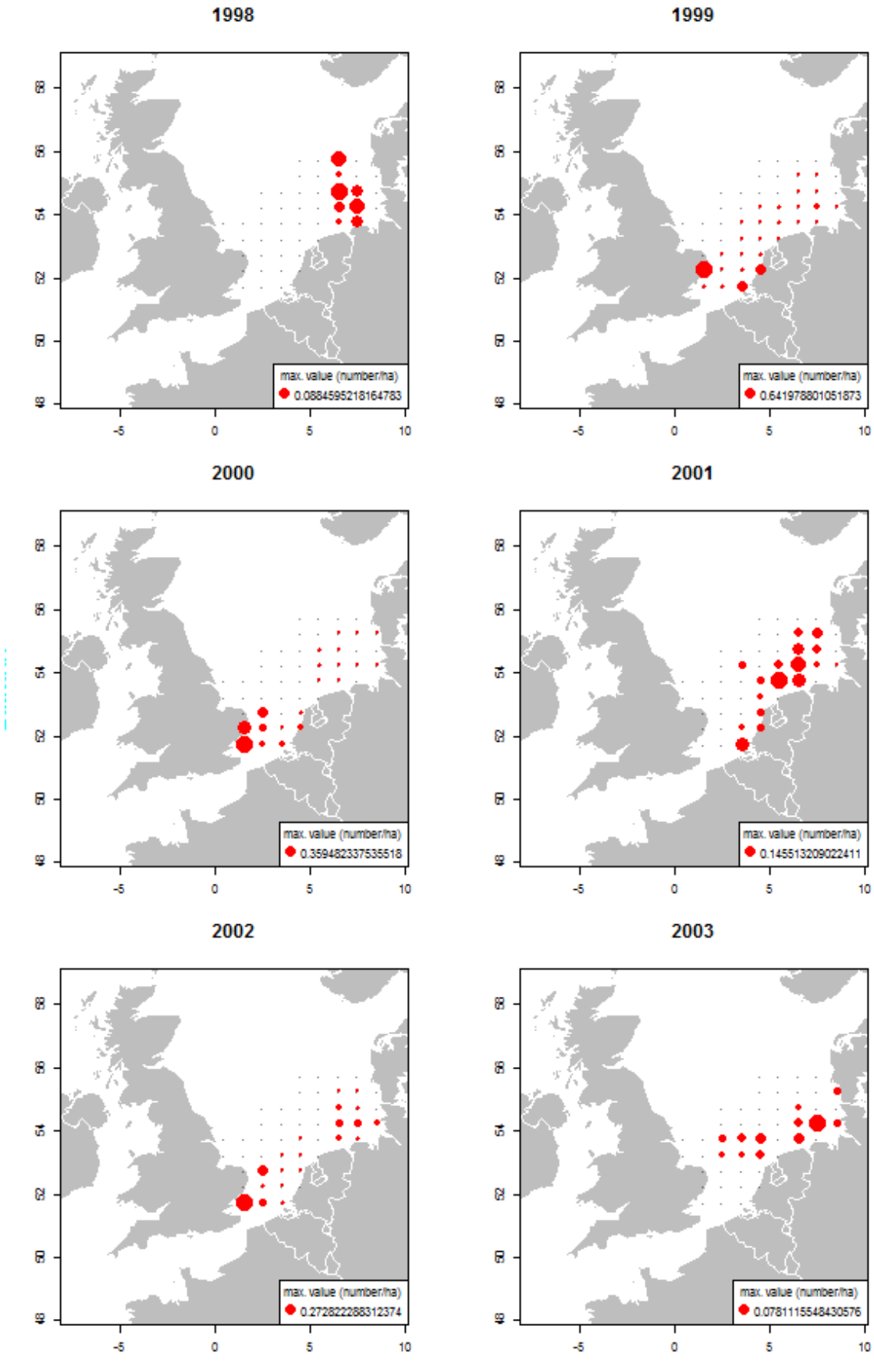
Females age group 5



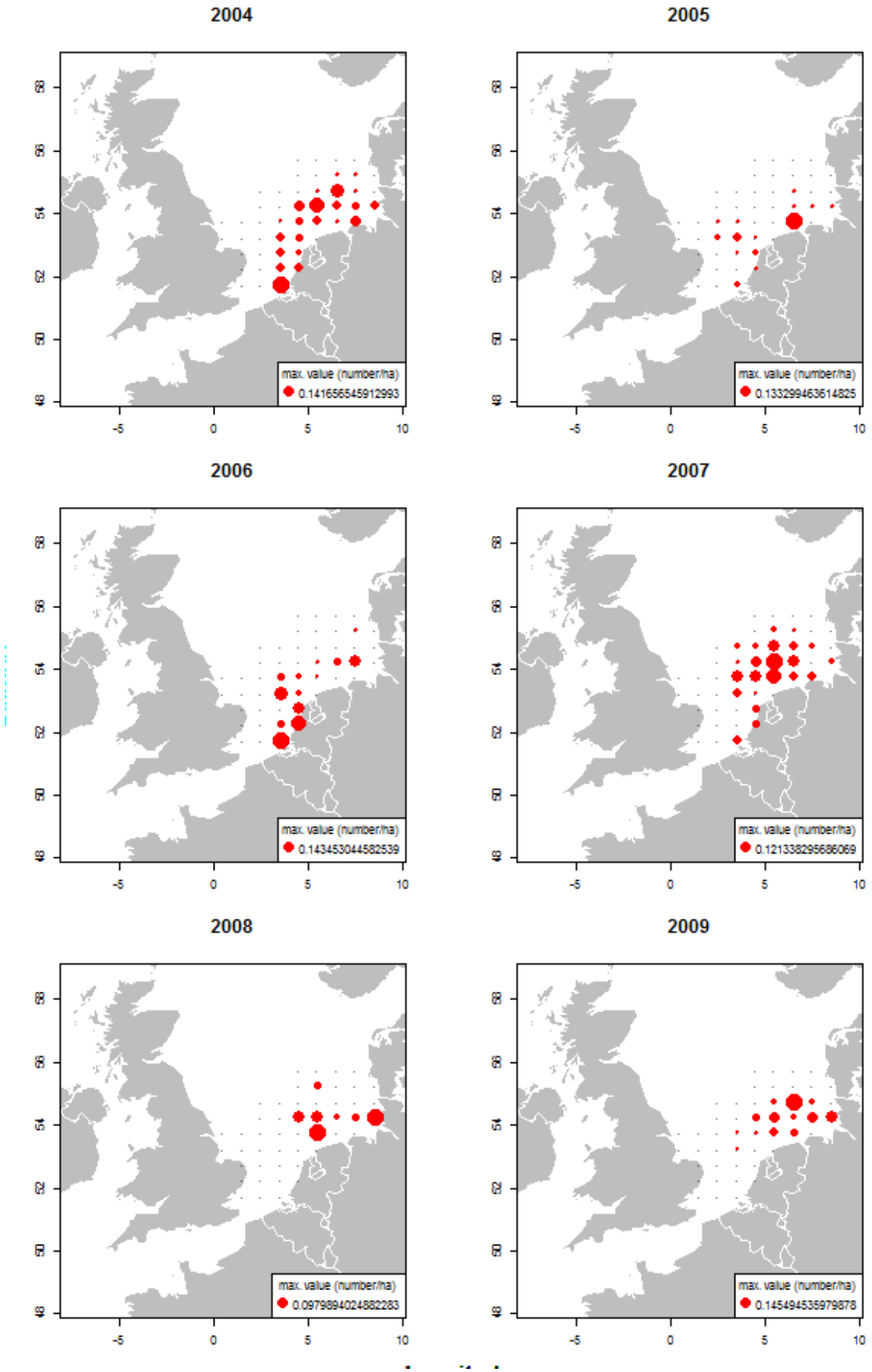
Males age group 5



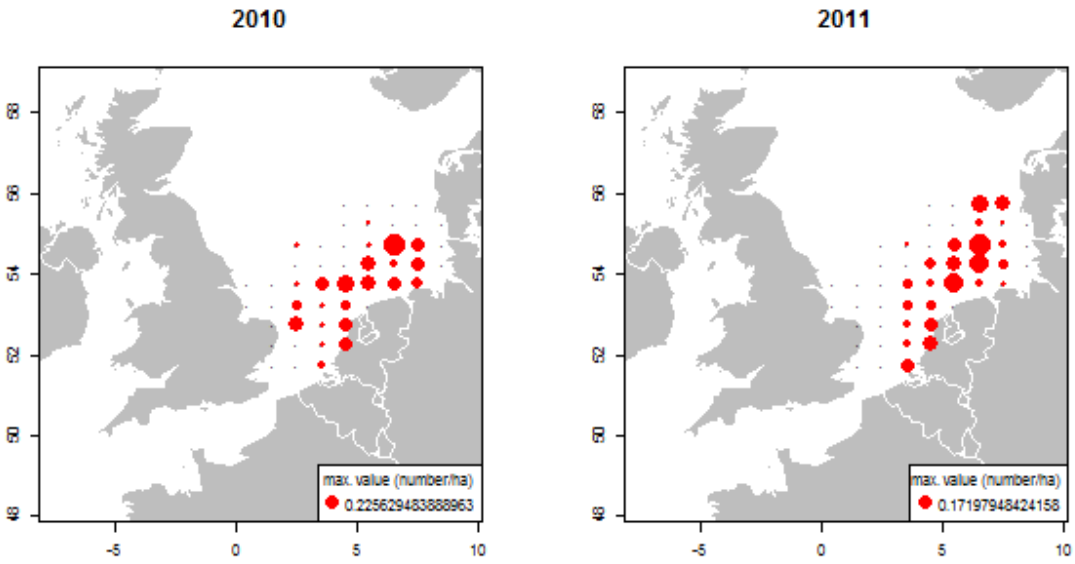
Males age group 5



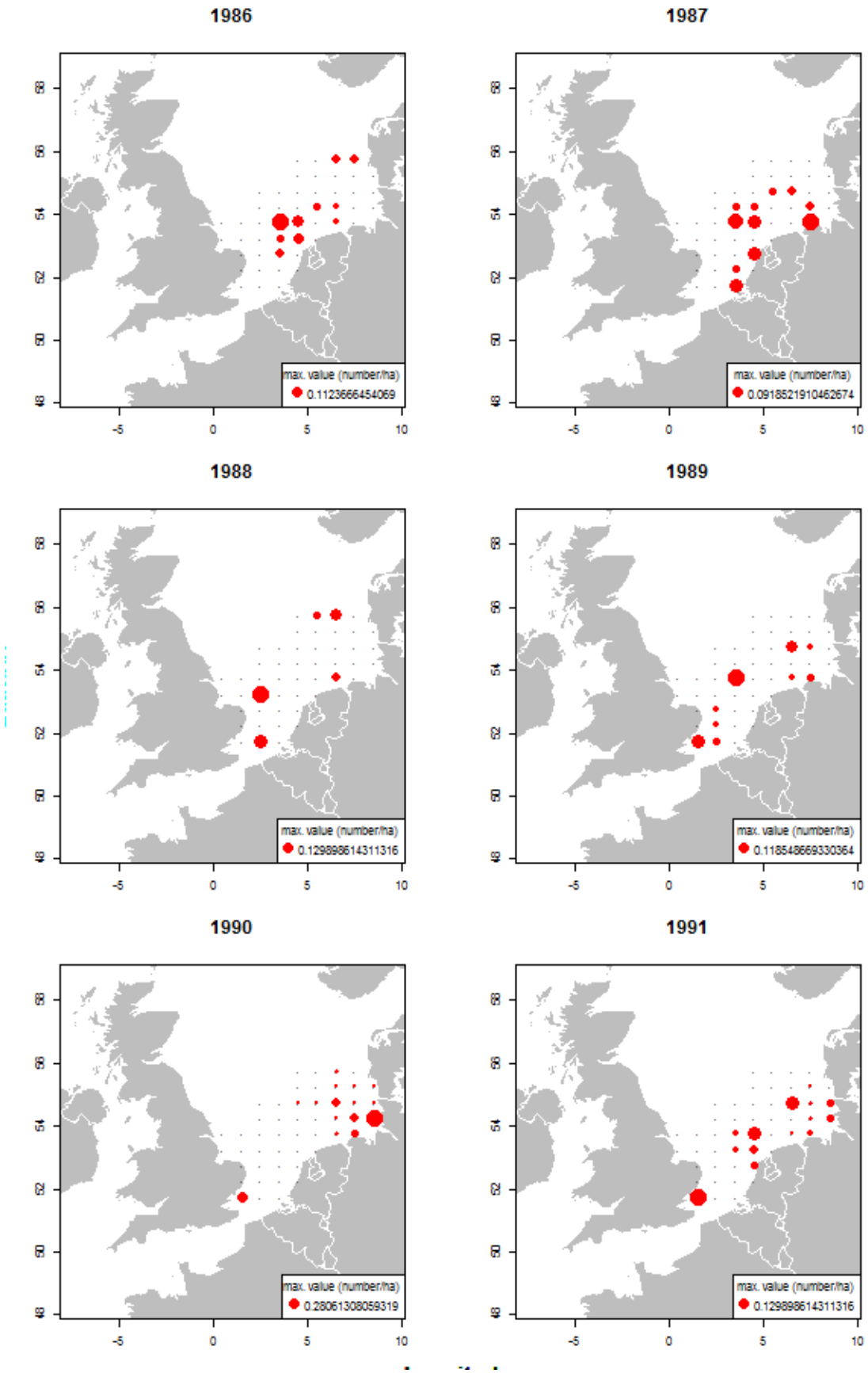
Males age group 5



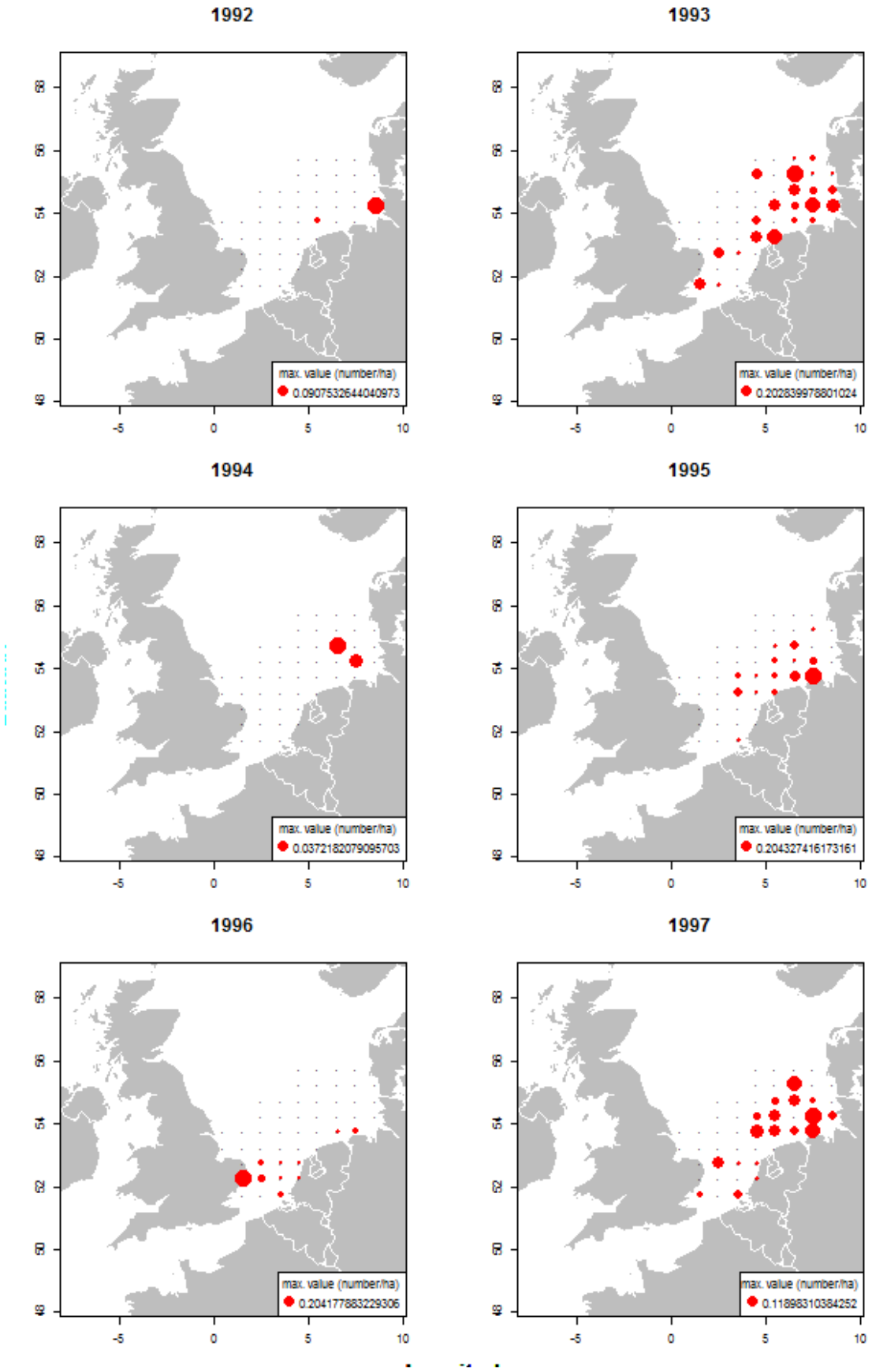
Males age group 5



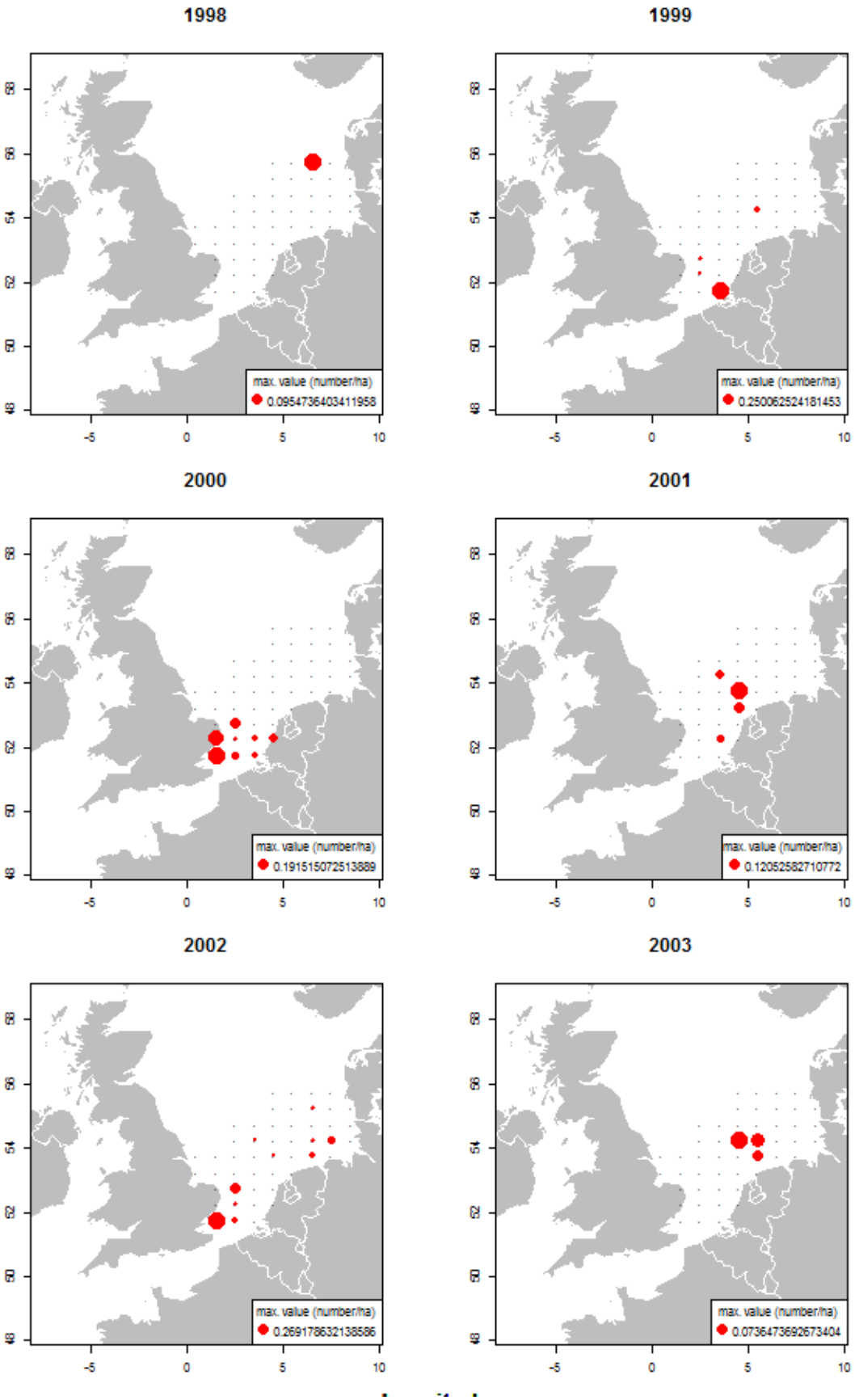
Males age group 5



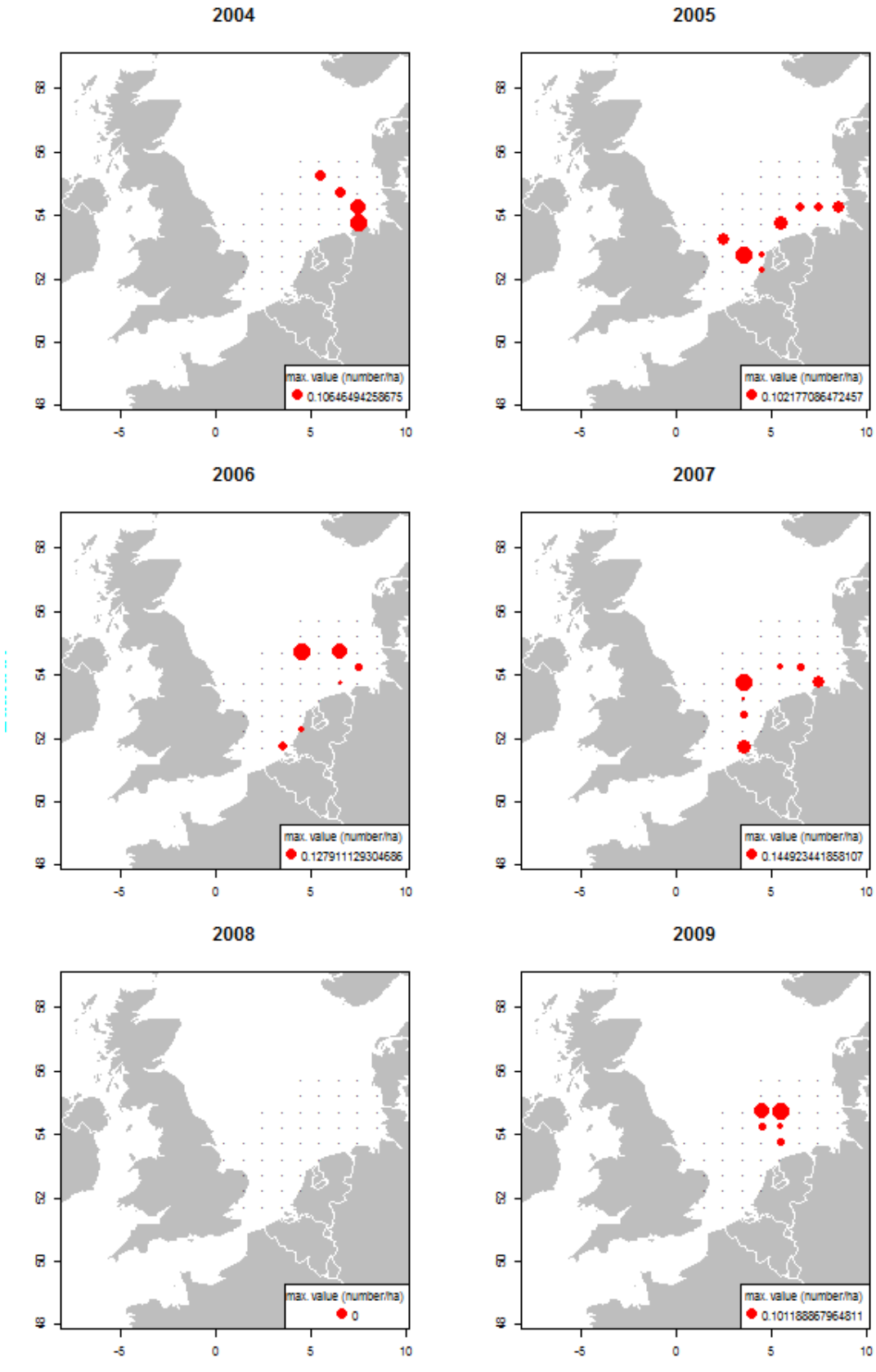
Females age group 6



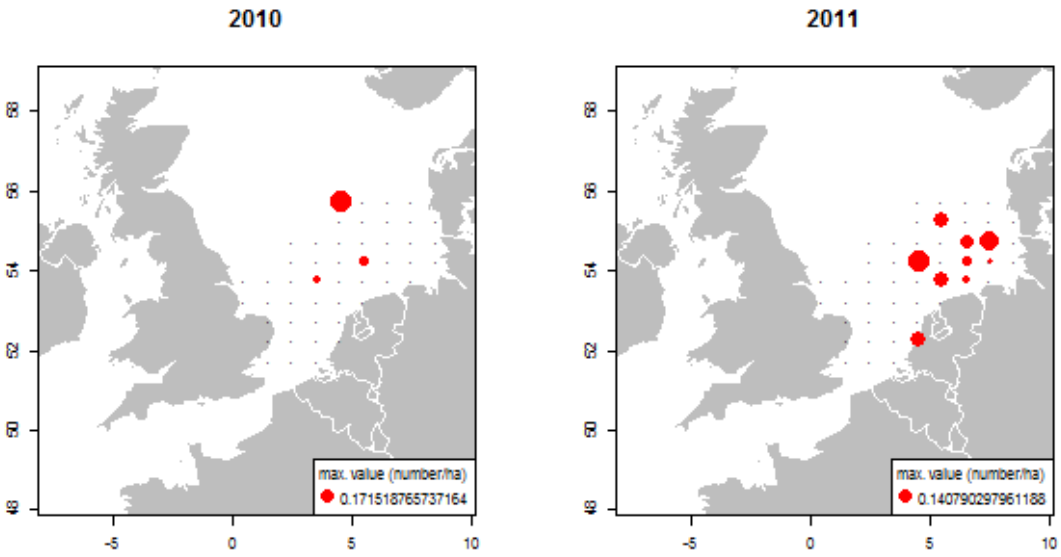
Females age group 6



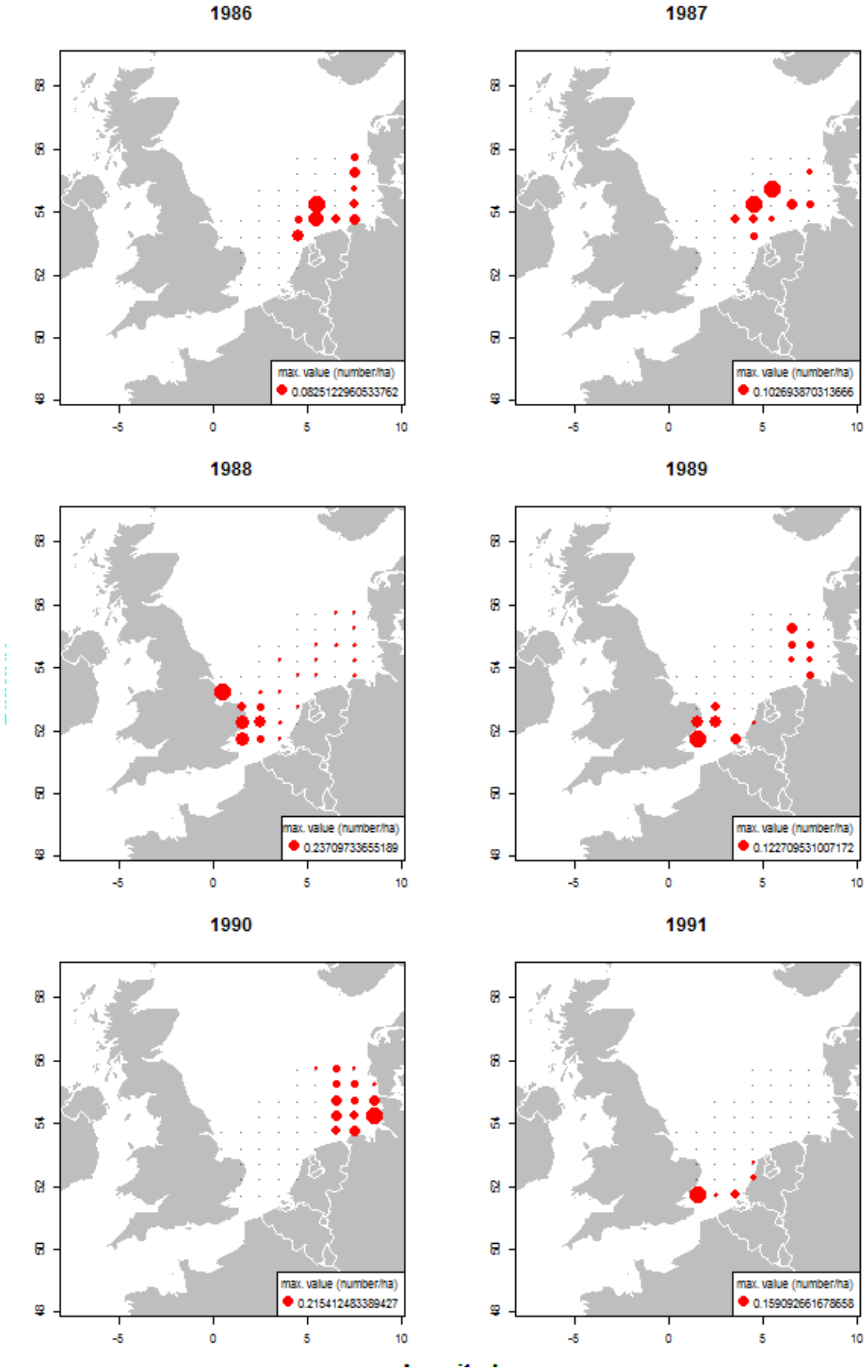
Females age group 6



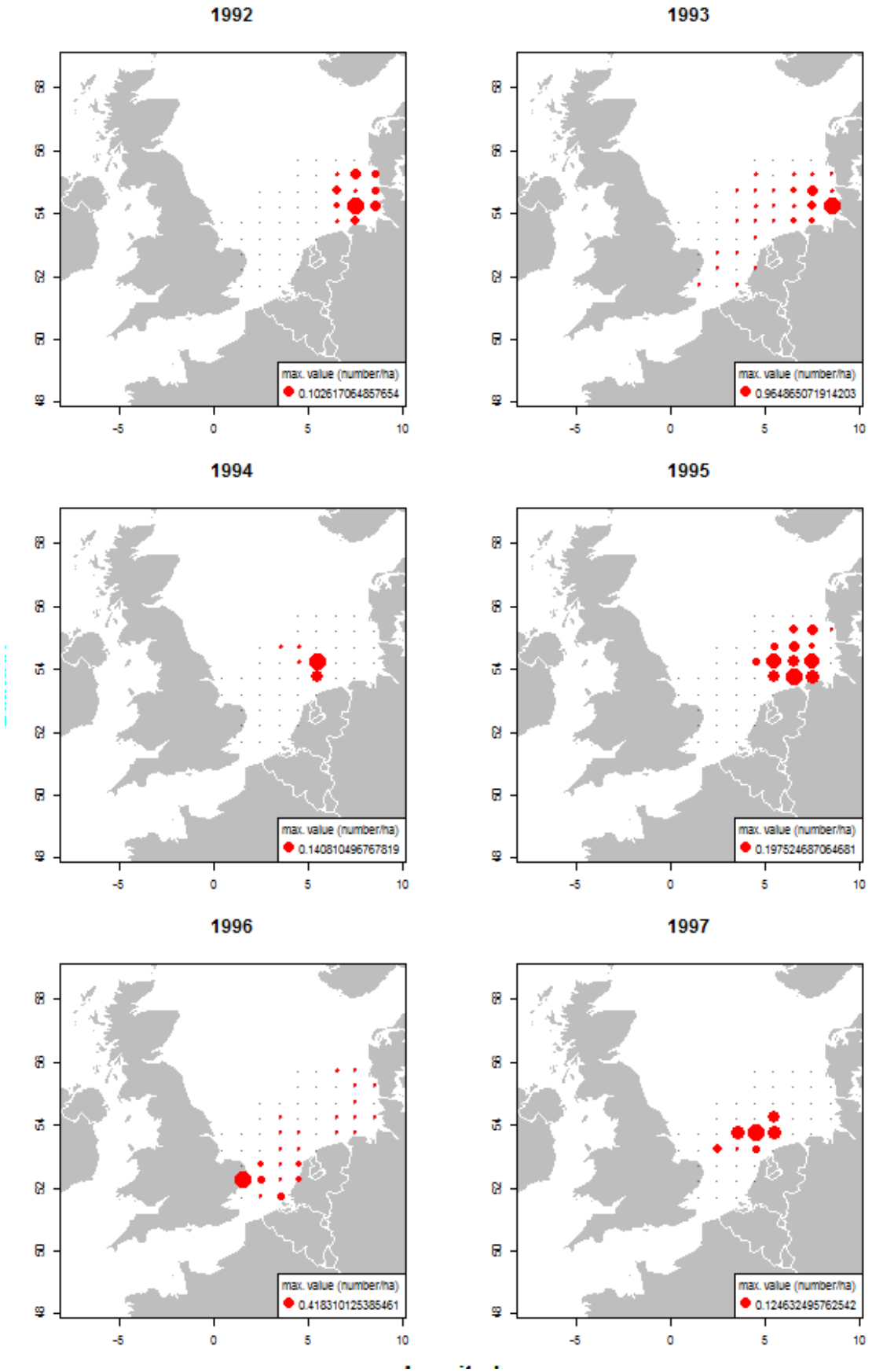
Females age group 6



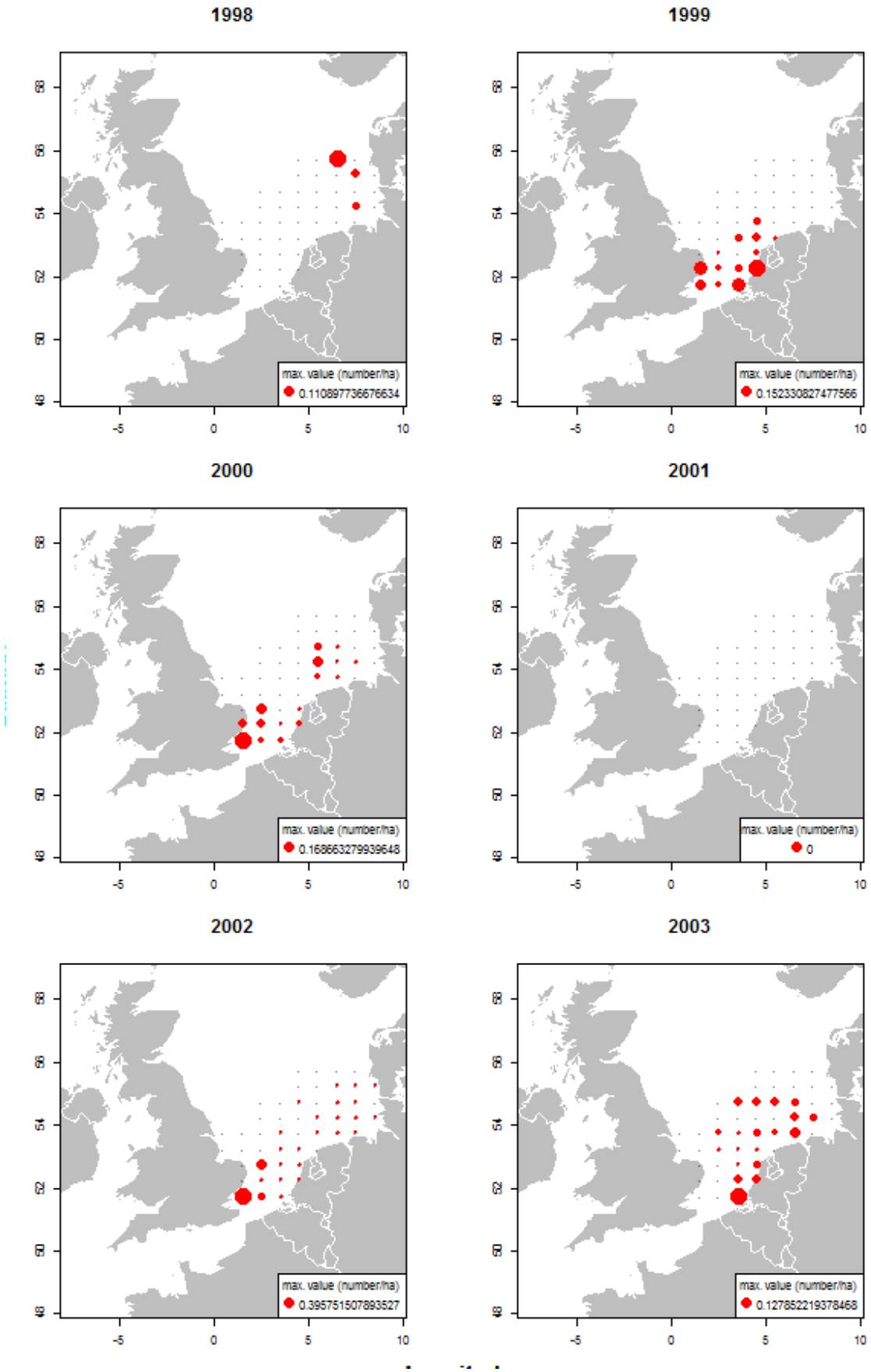
Females age group 6



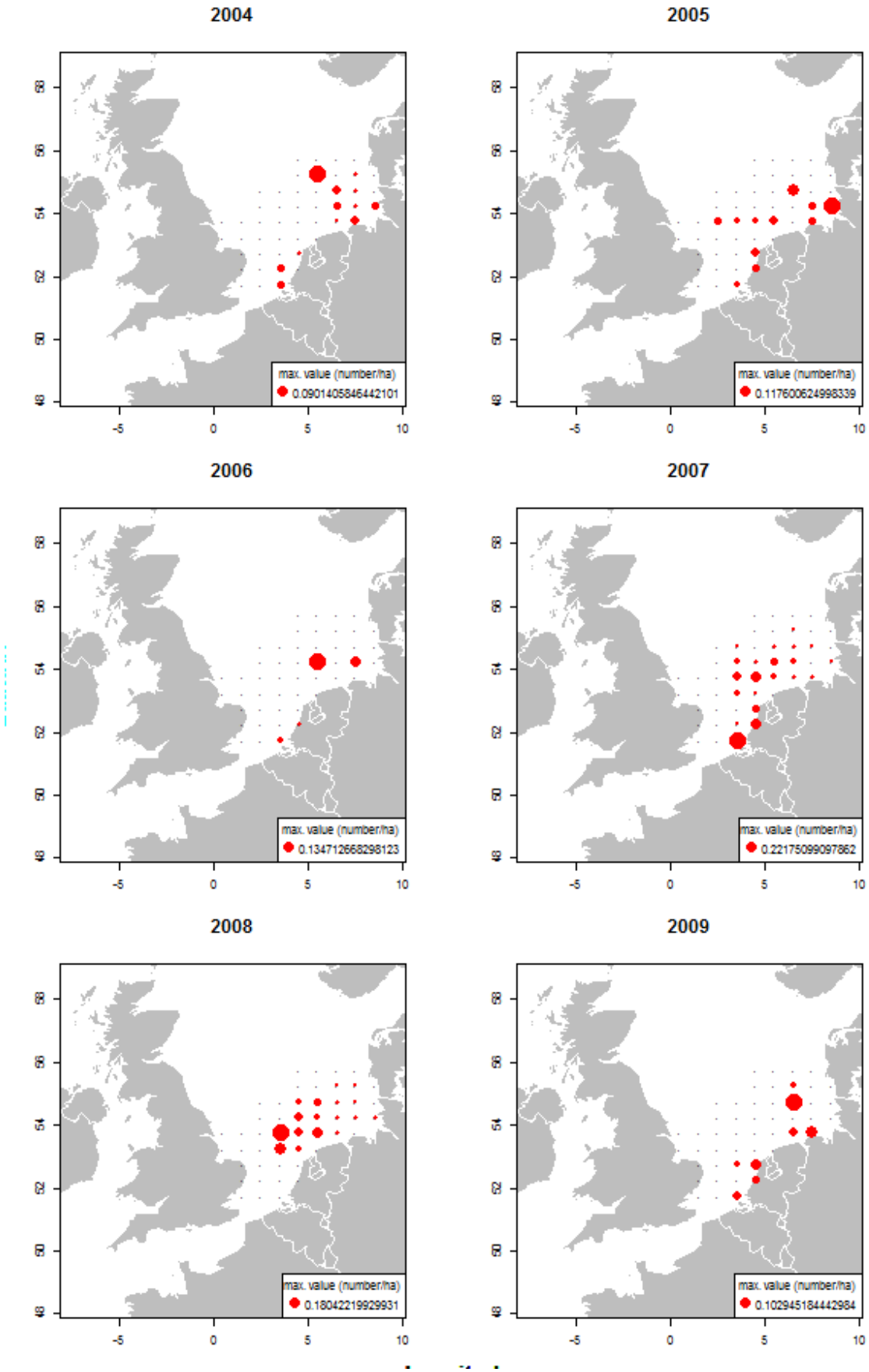
Males age group 6



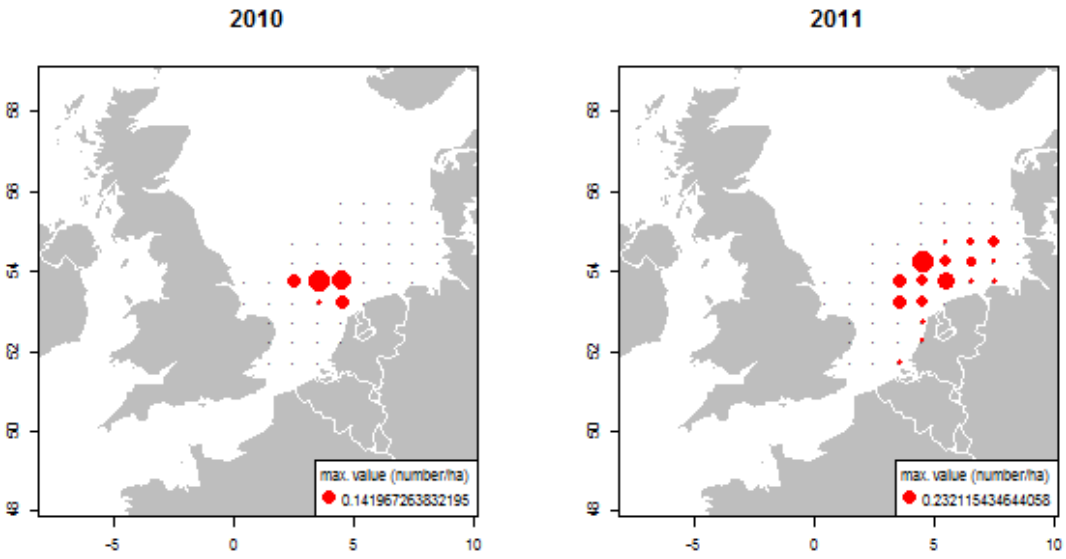
Males age group 6



Males age group 6



Males age group 6



Males age group 6

Annex 15: Litter record sheets

Litter overview

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

Litter Record Sheet

Cruise: Station: Date:

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