

Fishing activities on the Central Oyster Grounds 2006-2011



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1 Introduction

1.1 Motivation

The Central Oyster Grounds are generally awarded for their ecological values. The area is especially important for benthos because of their species diversity and density, the total biomass, distribution of species, and the balanced composition of the benthic community' (Ministry of Economic affairs, 2012). In the Marine Strategy (OIM/2012-25338), the area has been assigned as one of the search areas that will be used for spatial protection measures in the frame of the Marine Strategy Framework Directive and the Common Fisheries Policy. Because of this, the ministry has asked LEI to make an inventory of the fishing practices in the area of the Central Oyster Grounds in the period 2006-2011. Because the Dutch fishing sector also has important economic interests in foreign fishing fleets (Belgian, German and UK), these fleets are also taken into consideration.

1.2 Objectives

The objective of the current project is to give insight into the trends of the fishing activities of the Dutch and important foreign fleets (Belgian, German and UK) in the area of the Central Oyster Grounds in the period 2006-2011. In the analyses attention is given to developments in effort, landings and economic value of the landings.

1.3 Results

This resulting memo describes the developments of Dutch and foreign fleets in the Central Oyster Grounds. The developments are presented for different vessels sizes, based on their engine power (0-300 hp, 301-1500 hp and > 1500 hp) and registered gear type in the logbook. As innovative gears with far lower bottom impact (pulse trawls) have recently been increasingly used by vessels and are treated differently in spatial management measures, these vessels are also distinguished. For each of the fisheries (combination of hp-class, gear type and country) an analysis of the coverage of the data is provided.

1.4 Contents

This memo describes the time trends in the fishing activities in the Central Oyster Grounds. Chapter 2 contains an explanation of the various sources of the data and the manner in which the data were processed. Chapter 3 reviews the importance of the various areas to the Dutch and non-Dutch fisheries. Chapter 4 discusses the methods and results, and is completed with the conclusions and recommendations.

2 Methods

The methods applied and the data used were similar to those used for the previous study (Van Oostenbrugge et al., 2010). In addition, some extra data checks were included and another data processing platform was used for part of the analysis. Because of the large similarity in the method, this report contains a limited description focusing on small adjustments that have been made. A complete description can be found in Van Oostenbrugge et al. (2010).

2.1 Data sources

Several data sources were used in the evaluation. The data sources used were Vessel Monitoring System (VMS) data, catch data from VIRIS (Fish Registration and Information System), Fleet data from the Netherlands Register of Fishing Vessels (NRV), average monthly price data per species collected by the Productschap Vis (Netherlands Fish Product Board) and economic data (the LEI panel). The datasets used and the data coverage are described in more detail in Appendix 1 and Appendix 2.

2.2 Processing of data for Dutch vessels

Several steps were needed to process the Dutch data for the analysis. First of all, the VMS data were processed and the patterns in fishing efforts were determined. To clean up the VMS data set, the R package VMStools was used (Hinzen et al., 2011). Duplicated points, points in harbour, points on land and points with impossible speed or location were removed.

Next, the fishing efforts were used to distribute the catches between the various points. The method used is illustrated by the example included in Table 2.1. First, the sailing speed was used to determine whether the vessel was fishing or sailing at each VMS point based on fixed speed thresholds derived from South et al. (2009).

Table 2.1					Example of a calculation of the catch at the VMS positions during one trip of a vessel of 300 hp using Otter board Trawl (OTB)
DH1	Time	Speed	Duration	Catch	
21-aug	14:00	0.2			
21-aug	15:00	5.6	1:00	0	
21-aug	17:00	3.4	2:00	1,200	
21-aug	18:00	3.2	1:00	600	
21-aug	19:00	0	1:00	0	
Total catch				1,800	

Table 2.2 shows the thresholds per gear determining fishing and steaming activities. Any gears missing in this table were assigned the activity 'Unknown'.

In Table 2.1 the speed of the VMS point at time 14:00 is too low to be fishing. At the second VMS point (15:00) the speed is too high to be fishing. Therefore neither of these points gets catch attributed. The next two VMS points (17:00 and 18:00) have a speed that falls within the fishing speed range. These points get catch assigned. Next, the duration was determined for each position (the time interval between the current and previous position). The catch (kg) was distributed on the basis of the duration at the various positions at which the vessel was fishing.

Table 2.2 Determination fishing and steaming activity		
Gear	Fishing	Steaming
Gill nets, Danish seines	speed<0.3	speed>=0.3
Scottish seine	speed<7	speed>=7
Beam trawl, shrimp trawl	Speed within 3 to 6	Speed<3 or speed>6
Otter board trawl 0-300hp	Speed within 3 to 5	Speed<3 or speed>5
Otter board trawl >300hp	Speed within 3 to 4	Speed<3 or speed>4
Twin trawl 0-300hp	Speed within 3 to 5	Speed<3 or speed>5
Twin trawl >300hp	Speed within 3 to 4	Speed<3 or speed>4
Source: South et al. (2009).		

The example in Table 2.1 discusses the ideal situation where a trip is comprised of a number of fishing and/or sailing VMS points and the day catch is available. This was not always the case. Several factors could complicate the distribution of catch over the VMS points. For example, in a number of cases a vessel was sailing at all the available VMS positions on a day or data was lacking, for example on the fishing gear, HP and speed, which made it impossible to allocate an activity to a VMS point. To still be able to allocate catch to VMS locations a number of assumptions needed to be made in the case of missing data. The distribution methods used in these cases are summarised in Table 2.3.

Table 2.3 Distribution catch in several situations			
Day catch recorded for trip	Day catch recorded on day	Type of Activity	Distribution
Yes	Yes	Fishing and other	Fishing time/fishing time on fishing day
Yes	Yes	Only steaming	Catch not distributed
Yes	Yes	Only unknown	Time unknown/time on fishing day unknown
Yes	Yes	Steaming and Unknown	Catch not distributed
Yes	No	All combinations	Catch not distributed
No	No	Fishing and other	Fishing time/fishing time on fishing day
No	No	Only steaming	Catch not distributed
No	No	Only unknown	Time unknown/time on trip unknown
No	No	Steaming an unknown	Catch not distributed

The VMS data do not provide full coverage. This is, in particular, due to vessels with a length less than 15 meters and which consequently do not have on-board VMS as well as an inability to fully distribute all the catches between VMS points. This was corrected by increasing the catches by a factor based on coverage percentages (see appendix 2 for coverage in VMS data per gear). So for example if for a certain gear type the coverage was 90%, the total catches with this gear type were multiplied by a factor (1/0.9). This approach provided for the distribution of all catches as found in the VIRIS logbook data.

The catches and average auction prices were used to determine the value of the catches at the various VMS points. Finally, the contribution to the gross value added was calculated on the basis of the average percentage of the gross value added's (GVA) contribution to the production value as known in LEI's Farm Accountancy Network.

This described method is in agreement with the methods used in earlier LEI reports on the determination of the value of fishing areas (such as Van Oostenbrugge et al., 2010).

2.3 Processing of data for foreign vessels

The foreign data were processed in a similar way to the data from the Dutch vessels. However, there was one fundamental difference in the data that meant that the data needed to be processed slightly different-

ly. Namely, the VMS data for the foreign vessels only covered the Dutch section of the continental shelf. The difference in attributing catches to VMS points for the foreign vessels is illustrated by an example in Table 2.4.

First, similar as for the Dutch vessels the sailing speed was used to determine whether the vessel was fishing or sailing at each VMS point. Next, the duration was determined for each position (the time interval between the current and previous position). It was checked whether the time interval did not exceed 2 hours. In the example in Table 2.4 at time 14:00 previous VMS points were clearly lacking. Therefore the time interval at this point is corrected to 2 hours instead of the calculated 12 hours.

Since the VMS points only cover the Dutch part of the continental shelf it is very likely that the VMS points do not cover the complete trip of a foreign vessel. Therefore a distribution of the total catch over the available VMS points will most likely lead to an overestimation of the catch at each of the VMS positions. Therefore the catch to be distributed between the VMS positions was calculated from the total catch on the basis of the share of the duration that was allocated to the VMS positions and the total duration of the trip. In the example 30% of the trip was covered by the VMS positions. Therefore, only 30% of the total catch is attributed to the VMS positions. The resultant catch (kg) at the VMS positions was distributed on the basis of the duration during which the vessel fished at the various positions.

Table 2.4		Example of a calculation of the catch at the VMS positions during one trip for a foreign vessel of 300 hp using otter board trawl		
DH1	Time	Speed	Duration	Catch
21-aug, leaves port	02:00			
21-aug	14:00	0.2	12:00 2:00 a)	
21-aug	15:00	5.6	1:00	0
21-aug	17:00	3.4	2:00	360
21-aug	18:00	3.2	1:00	180
21-aug arrives at port	22:00	0	1:00	0
Total duration of trip			20:00	
Total duration of VMS			6:00	
VMS share of total duration in trip (%)			30%	
Non-allocated catch				1,260
Total catch				1,800

a) Duration of period before first ping has been adjusted to two hours, assuming it has been out of the Dutch part of the North Sea.

The VIRIS data do not provide full-coverage for foreign vessels. Foreign vessels are only included in the VIRIS dataset if they actually land their fish in a Dutch harbour. Therefore catches were scaled up to the total quantity of VMS positions. If catches were not available for a VMS position, catches were estimated on the basis of Catch Per Unit Effort (CPUE) estimates. These CPUE estimates were calculated for each country, HP category and type of fishing gear on the basis of catches at VMS positions for which catch data were available.

The catches and average auction prices were used to determine the value of the catches at the various VMS points similar to the Dutch vessels. No gross value added was calculated for the foreign vessels.

2.4 Historical fishing trends in areas of interest

Landed catches, value of landed catches and GVA (for Dutch fleet only) were done for the Dutch and the foreign fleets separately. For the years 2006 to 2011, the effort, landed catch, value of landed catch in the areas were computed as the sum of the effort (landed catch/value of landed catch) of all pings of which the coordinates were in the area. For the Dutch fleet, the data were then scaled up to account for missing VMS data and the contribution to the production value was calculated.

3 Historic trends in fishing activities

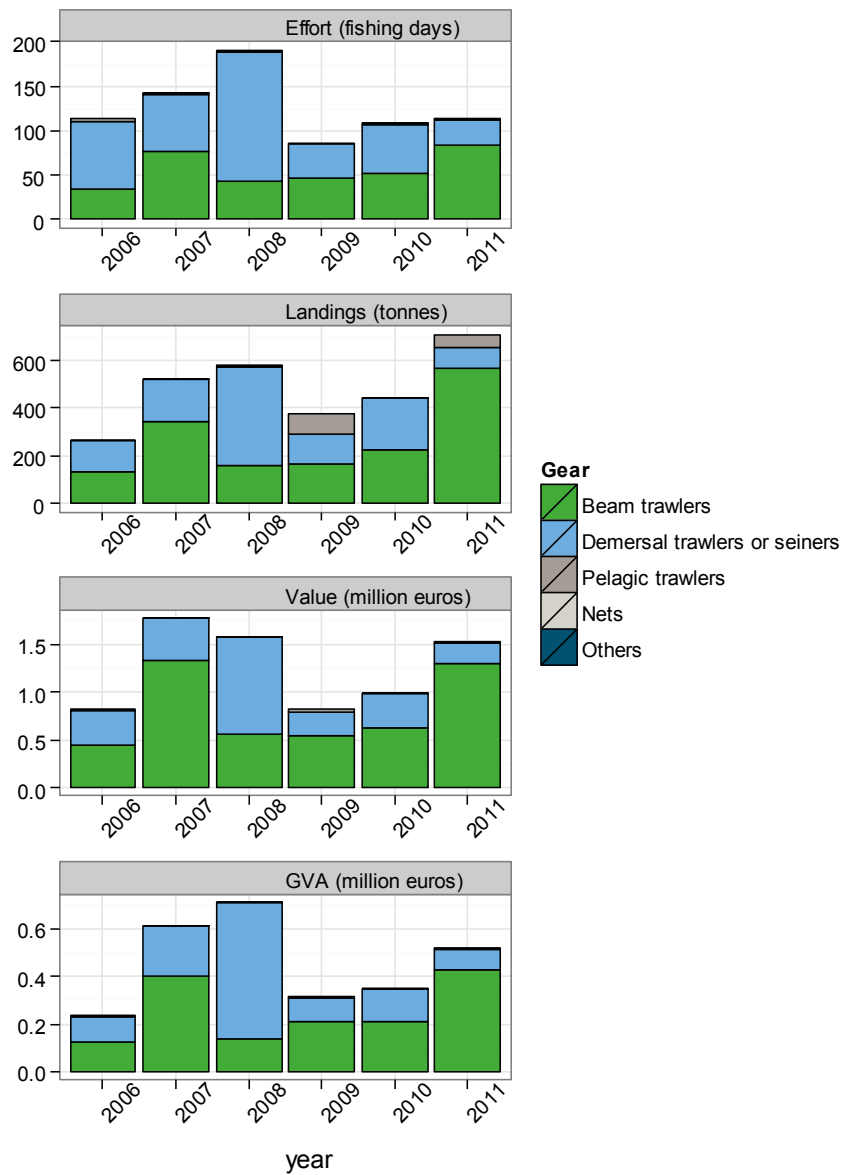
In general, the fishing intensity in the area of the Central Oyster Grounds is rather low. Because of the large size of the area, the total value of the landings from the area for the Dutch and foreign fleets together is between €1m and €2m, although it has been fluctuating considerably over the years. The trends for the Dutch and foreign fleets are discussed in more detail below.

Table 3.1 Fishing activities of the Dutch fleet and foreign fleets on the Central Oyster Grounds						
Areas	2006	2007	2008	2009	2010	2011
Dutch fishing fleet						
Landings (tonnes)	265	520	578	378	443	709
Value (kEur)	814	1765	1576	826	979	1523
Gross value added (kEur)	233	615	709	317	351	519a)
Landings value per km ² (kEur per km ²)	0.24	0.51	0.46	0.24	0.28	0.44
Foreign fishing fleets						
Landings (tonnes)	209	278	261	146	139	494
Value (kEur)	556	918	710	363	316	996
A): Provisional estimate. Source: Logbook data and VMS data, processed by LEI.						

3.1 Dutch fleet

The effort of the Dutch fleet has been highly variable over the years (Figure 3.1). The effort of beam trawlers remained around 50 fishing days for most of the period (up to 80 fishing days in 2011, Figure 3.2). Pulse fishing was not executed in this area. The fishing effort of demersal trawlers and seiners has varied a lot between 40 and 130 fishing days per year (Figure 3.2), resulting in equally large variations in landings. The main gear used in the area by the demersal trawlers was otter board trawl. Pelagic and net fleets displayed very low effort in the area.

Figure 3.1 Historical trends of the fishing activities in the Central Oyster Grounds by the Dutch fleet. Effort, landings, value of landings and GVA are given by gears aggregated at the level of European codes



Source: Logbook data and VMS data, processed by LEI.

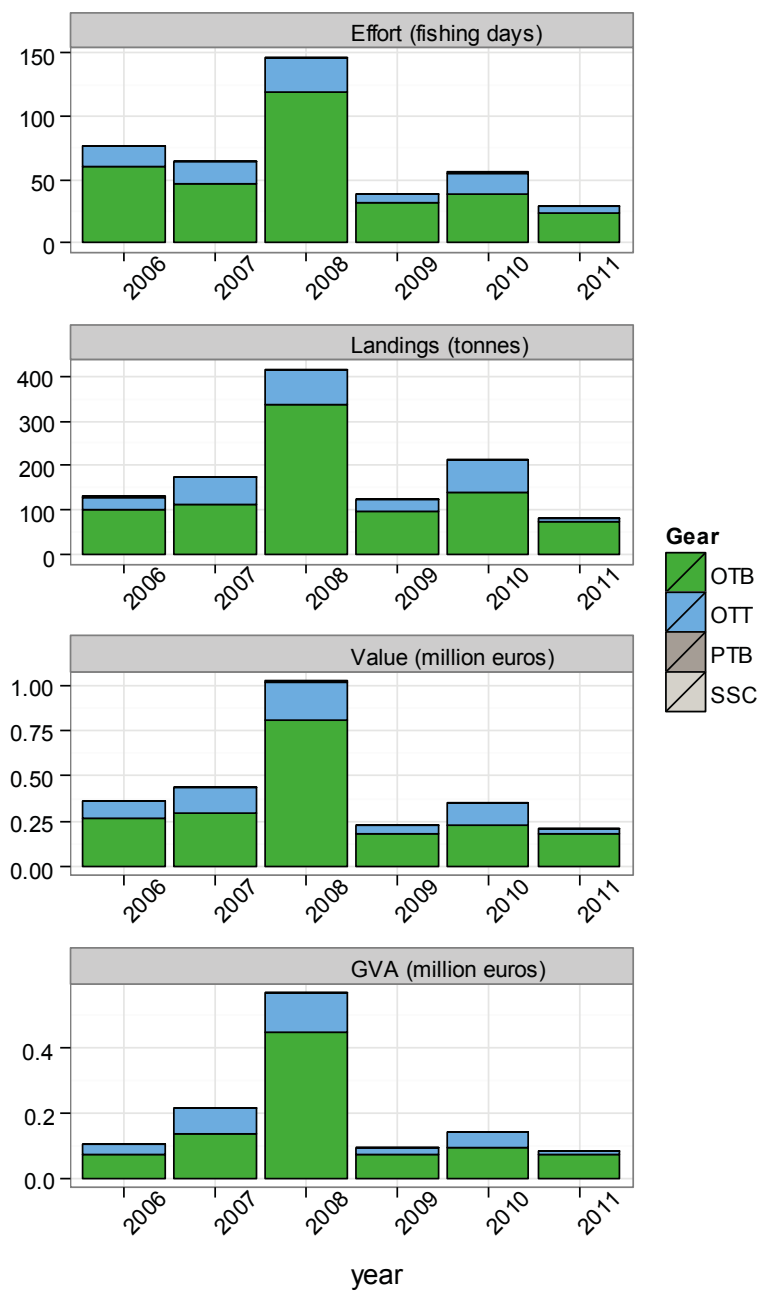
Figure 3.2 Historical trends of the fishing activities in the Central Oyster Grounds by the Dutch Beam trawlers. Effort, landings, value of landings and GVA are given for flatfish beam trawlers (TBB) and pulse trawlers (TBP)



Source: Logbook data and VMS data, processed by LEI.

Figure 3.3

Historical trends of the fishing activities in the Central Oyster Grounds by the Dutch Demersal trawlers. Effort, landings, value of landings and GVA are given for otter board trawls (OTB) twin trawls (OTT) bottom pair trails (PTB) and Scottish seines (SSC)

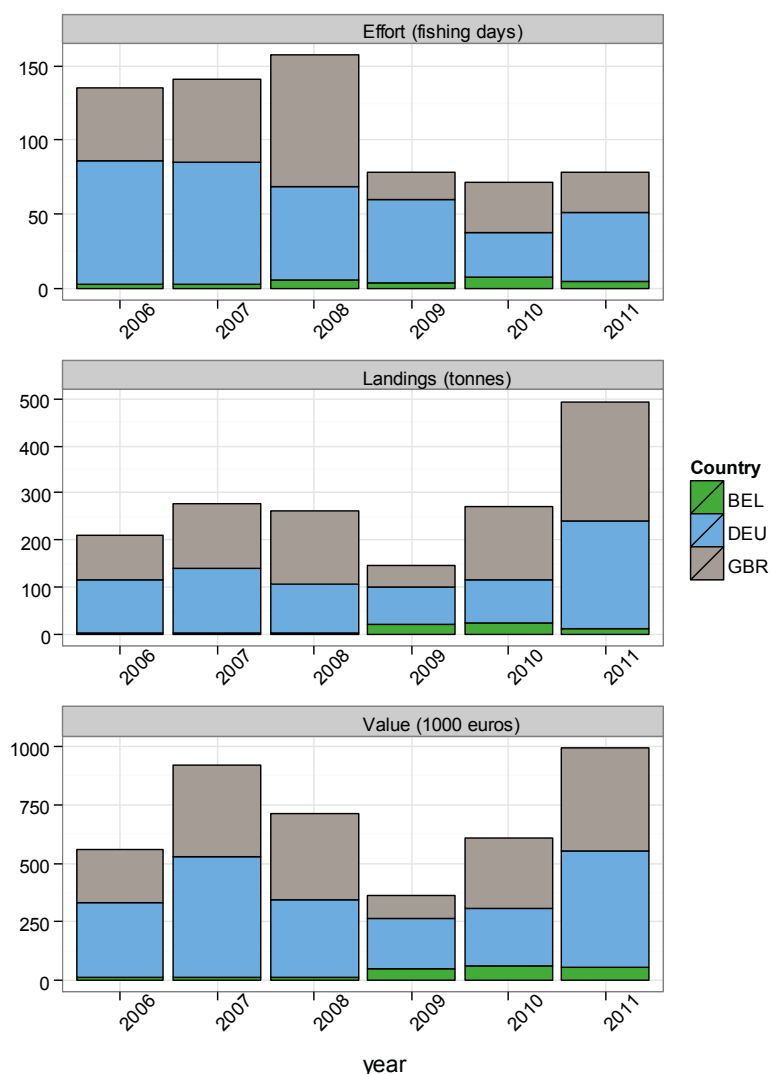


Source: Logbook data and VMS data, processed by LEI.

3.2 Foreign fleets

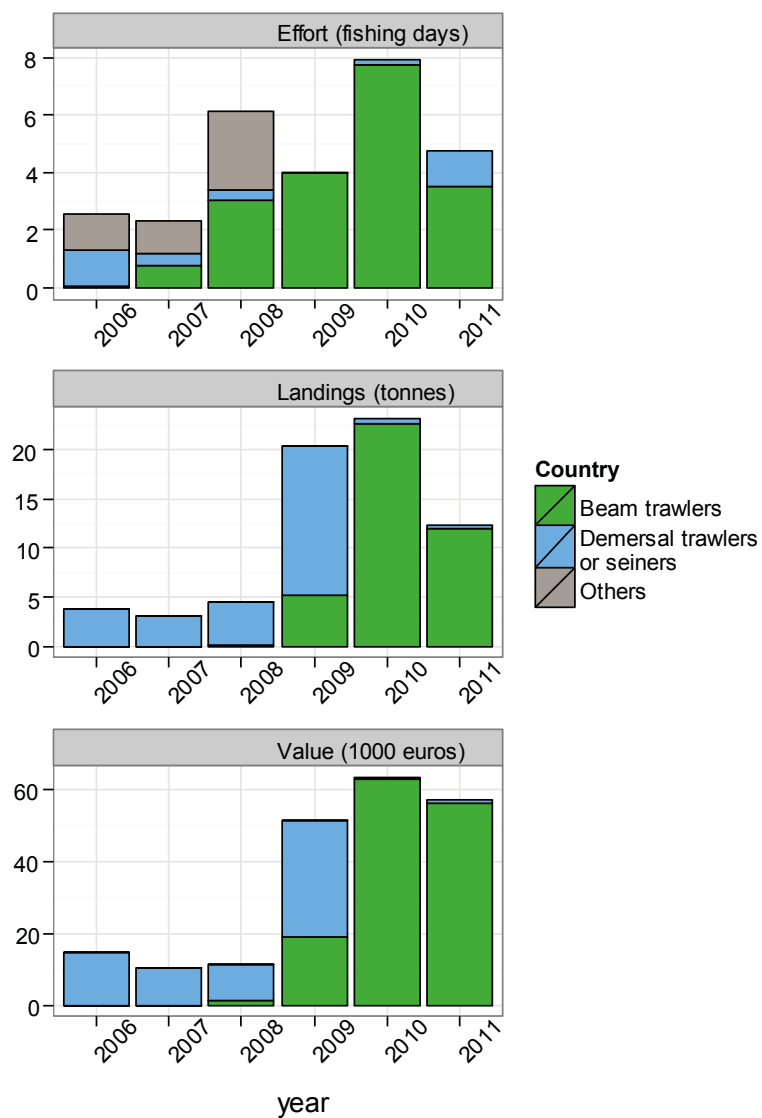
The economic importance of the area to the Belgian, German and UK fleet was slightly smaller than that of the Dutch fleet and ranged from €0.5m to €1m (Figure 3.4). German and UK beam trawlers dominated the fishing activities in the area (Figure 3.6 and Figure 3.7), but the amount of effort and the resulting landings are generally low. There is no clear overall trend in the time series, although the landings have increased from 2009 onwards. The shift in gear use in the Belgian fleet (Figure 3.5) might be caused by random variation as the activity levels for this fleet are very low and therefore the number of observations is low as well.

Figure 3.4 Historical trends of the fishing activities in the Central Oyster Grounds by the foreign fleets. Effort, landings and value of landings are given by country



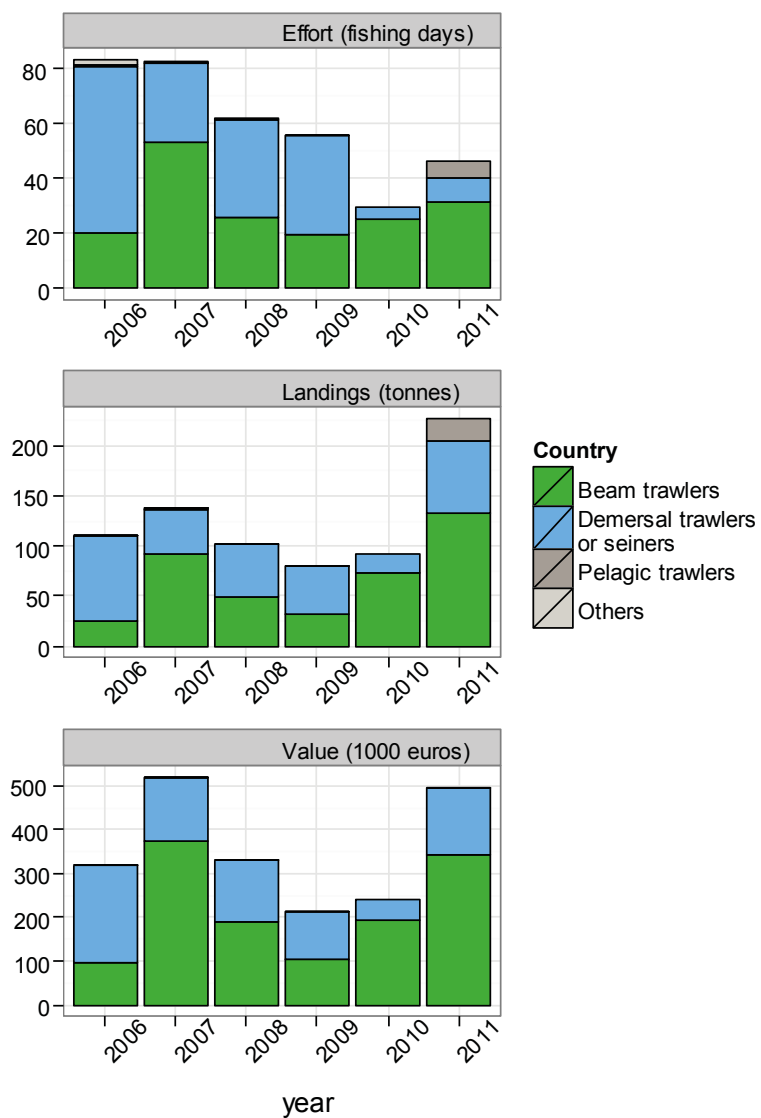
Source: Logbook data and VMS data, processed by LEI.

Figure 3.5 Historical trends of the fishing activities in the Central Oyster Grounds by the Belgian fleets. Effort, landings and value of landings are given by gear



Source: Logbook data and VMS data, processed by LEI.

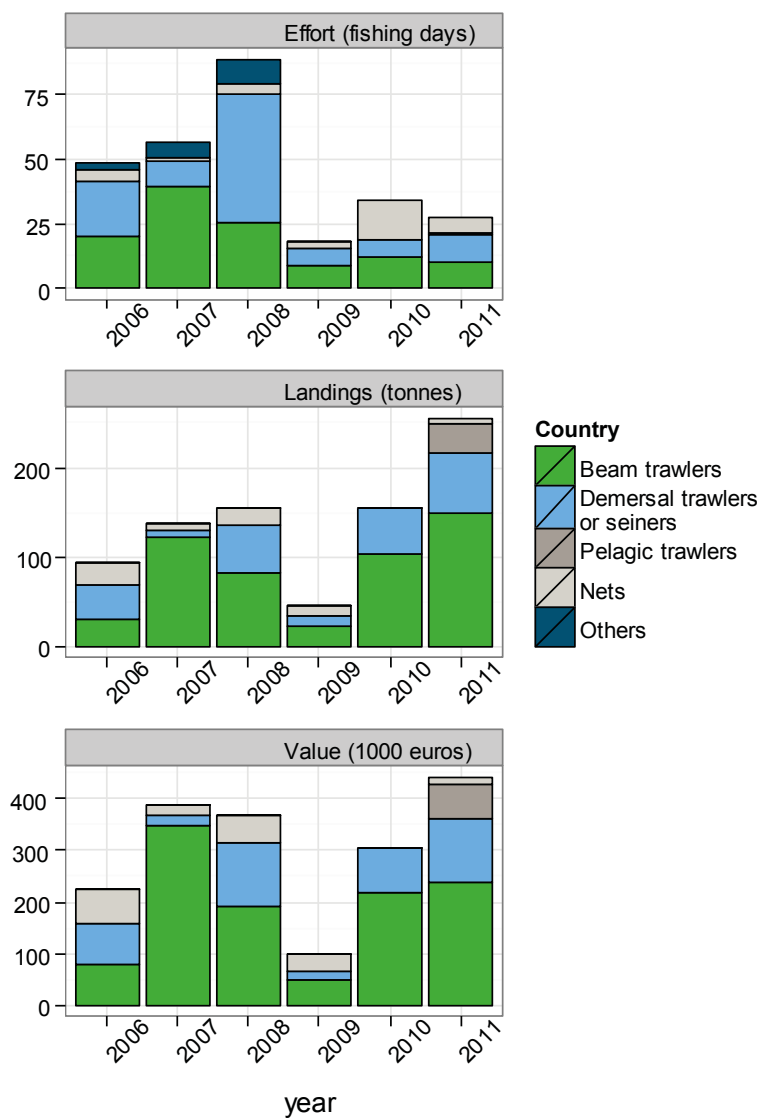
Figure 3.6 Historical trends of the fishing activities in the Central Oyster Grounds by the German fleets. Effort, landings and value of landings are given by gear



Source: Logbook data and VMS data, processed by LEI.

Figure 3.7

Historical trends of the fishing activities in the Central Oyster Grounds by the British fleets. Effort, landings and value of landings are given by gear



Source: Logbook data and VMS data, processed by LEI.

4 Discussion and conclusions

4.1 Discussion

This memorandum gives an overview of the historic fishing activities in the area of the Central Oyster Grounds. As can be seen from the results, the area is of limited importance for the fishing fleets. Despite its large surface area (6% of the total Dutch part of the continental shelf), the value of the landings obtained from the area is less than 1% of the total revenue of the Dutch cutter fleet (Taal et al. in prep). In addition, the level of fishing activity in this area is comparable with that in the Dogger Bank. The Frisian Front and Cleaver Bank have shown higher levels of fishing activity than the Central Oyster Grounds (Van Oostenbrugge et al., 2010, Bartelings et al., 2013).

Despite the complex nature of the spatial dynamics of fishing operations, some general characteristics can be mentioned, which are probably the most important reasons for the low importance of this area for the Dutch fishery:

- The fish densities of the main target species for the Dutch demersal fishery (plaice and sole) are lower in the area than in the surrounding areas, e.g. the Dogger Bank or more southward (<http://www.noordzeeatlas.nl/Kaart/Schol.htm> and [http://www.noordzeeatlas.nl/Kaart/Tong\).htm](http://www.noordzeeatlas.nl/Kaart/Tong).htm)).
- The muddy sediment is not very suitable for trawling.
- The geographic position in the North Sea (quite far north) increases the time and amount of fuel needed to come and fish in the area. It is known that over the last decades, the Dutch beam trawl fleet has increasingly concentrated its activities in the southern part of the North Sea.

Several factors affect the reliability of the results. First, the fishing effort, landings and value of individual pings are estimated based on assumptions about the speed at which fishing occurs and the equal allocation of landings to the fishing pings. Those values usually relate to pings that are emitted every two hours during which the vessels can sail more than 15 nm but the values are allocated to a single point. Fixed speed thresholds were used to decide whether a vessel was fishing or not. Recently, the method to make that distinction has been refined by basing the thresholds on actual speed frequency distributions of individual vessels for individual years. In this way individual preferences for fishing speeds and possible changes in fishing speeds caused by e.g. high fuel prices can be taken into account and the nature of the operation at every ping can be determined with a lower uncertainty. In order to be consistent with the previous study these new techniques were not applied here, but this increases the statistical uncertainty of the outcome. Second, the method of effort allocation based on vessel speed is less appropriate for static gears such as nets. The coverage of those vessels is already lower than for active gears primarily due to the size of the vessels (see Appendix 1). In addition, as the amount of vessels using this gear is low, the uncertainty of the estimate is large. Therefore any conclusion on the activity of the netters will be highly uncertain. Third, there is no speed threshold agreed for the pelagic trawlers while they are by definition very mobile. This means that every ping collected for these large trawlers will be assigned part of the large landings volume which can result in artificially landings for these vessels in an area. As these vessels catch relatively large amounts of low-value fish, compared to other fishing fleets, this only comes up in the landings figures. The high landings of pelagic fish from the Frisian Front in 2011 are probably such an artefact. Currently, LEI and IMARES, together with the industry, are working on an improved method to estimate the value of fishing grounds. This method will probably become available early 2013 and will take care of some of the concerns mentioned above.

The quality of the foreign data is an additional problem influencing the quality of the results. To estimate the value of the areas three data sets need to be combined: logbook data, fleet data and VMS data. To combine the datasets the vessel name is used. However, the vessel name is in many cases not consistent between data sets. E.g. until 2011 the logbook data has vessel names with 6 positions; however, the fleet registry shows that in many countries vessel names have more than 6 positions, which makes it

difficult to match logbook data and fleet data. Another complicating factor is that in many cases the vessel name in the VMS data set does not match vessel names in either the fleet registry or the logbook data. The vessel name in the VMS data set in some cases seems to be the radio name but in other cases could not be matched at all. These data errors complicate the data processing for the foreign fleets and the results for those fleets would be far more reliable if the datasets were checked and made more consistent by the ministry. Until these problems have been solved, data processing is very time consuming and the results of the analyses can only be regarded as indicative.

4.2 Conclusions

From this study the following can be concluded:

- The area of the Central Oyster Grounds represents limited value for both the Dutch and foreign fishing fleets with total revenues between €1-2m for the Dutch and foreign fleets combined. For the Dutch fishery, landings from the area represent less than 1% of the total landings value.
- The fishing intensity in the area has been highly variable and has increased substantially during 2010 and 2011.
- Results for analysis for foreign fleets could be enhanced considerably in case consistency and quality of the basic data (logbook, VMS, fleet) for these fleets would be increased.

Literature

South, A., J. Lee, C. Darby, N. Hintzen, E. LeBlonde, M. Laurans en N. Campbell, april 2009. *Spatial and temporal analysis of VMS data to provide standardised estimates of fishing effort in consultation with the fishing industry. Developing standard European protocol for estimating fishing effort from VMS data.* Report from EU Lot7 workshop. Cefas Lowestoft 6-7.

Oostenbrugge, J.A.E. van, H. Bartelings en F.C. Buisman, 2010. *Distribution maps for the North Sea fisheries methods and application in Natura 2000 areas.* Report 2010-067. Den Haag: LEI.

The Ministry of Infrastructure and the Environment and The Ministry of Economic Affairs, Agriculture and Innovation, 2012. *Draft marine strategy for the Dutch part of the North sea 2012-2020, Part I.* <http://ec.europa.eu/environment/marine/pdf/Marine%20Strategy%20Dutch%2020120609.pdf>

Taal et al., 2013 in pres. *Visserij in cijfers 2012.* Rapport. Den Haag: LEI.

Appendix 1

Data sources

VIRIS data

The catch data originate from the VIRIS (Fish Registration and Information System) database that contains records of all landings by vessels sailing under the Dutch flag and all landings by vessels sailing under a non-Dutch flag landing fish at ports in the Netherlands. These records are based on the logbooks kept by the fishers. The catches of each species controlled by quotas must be entered in this logbook per sailing day and ICES quadrant. Records of the catches of species not controlled by quotas are kept per trip.

Fleet data

The catch data for the various types of fisheries were calculated using the technical data listed in the NRV (Netherlands Register of Fishing Vessels). The combination of NRV data and VIRIS data yielded information about the technical specifications of the vessel on each trip. Not all the technical specifications of non-Dutch vessels are known.

VMS data

Since 1 January 2000, an increasingly large proportion of fishing vessels are under the obligation to operate an onboard VMS system (Vessel Monitoring System) within the context of the European inspection policy. This VMS system transmits the position of the vessel, vessel identification code and the vessel's sailing speed to a central computer about once every two hours. The computer stores these data (EU Regulation 2244/2003). The vessel's sailing speed can be used to make a distinction between the various activities (fishing, sailing and at anchor). Although this distinction cannot be made completely, the potential error is small relative to the total number of records. Information about the presence of non-Dutch vessels in the Dutch section of the North Sea is also available.

Price data

The value of the catches was determined using the average monthly price data per species collected by the Productschap Vis (Netherlands Fish Product Board). Price data are not collected for all the species listed in VIRIS. When specific price data were not available for fish species then the value of the catches was determined using the average price of less specific market categories (for example, 'other seafish'). Appendix 2 lists the classification of fish species. In addition, prices from other sources were used for a number of fish species (in particular, sprat and herring, grey mullet and smelt) (requested from fishers and collected from the accounts of the high-sea fisheries) since these species are rarely traded on the fish auctions and the auction prices are not representative of the actual prices paid for the fish. The average auction price of catches by vessels with fixed fishing gear were increased by 15%: an analysis of a limited dataset with price data for the fisheries with fixed fishing gear and discussions with fishers revealed that these fisheries' catches are, in general, traded at higher auction prices due to a different market grading (in general, larger sole) and quality (fresh fish with less damage as compared to fish caught with beam trawls).

Economic data

The LEI panel has economic data for the various fisheries over the entire period of the study. The data contain the total annual proceeds of the Dutch cutter fisheries in the various fisheries and the relationships between the total proceeds and the gross value added. However, these data are not classified by fishing area. Consequently, the economic data need to be combined with catch data to arrive at an estimate of the contribution each fishing area makes to the economy.

Appendix 2

Quality of the data

This Section discusses the quality of the data of each data source.

Data used for Dutch vessels

VIRIS data

The VIRIS data cover the entire Dutch fleet. It is possible that some of the catches are not recorded in the VIRIS database since vessels with a length of more than 10 metres do not need to keep records of catches of less than 50 kg per species. This was examined for a number of vessels: this revealed that the differences between actual and registered landings are small. However, it is possible that these differences are of relevance for some other vessels. Nevertheless, it may be assumed that this underestimation is negligible. A small fraction of the catches were allocated retrospectively to the trip catch on the basis of the auction data and then distributed between the fishing days. Although this distribution results in additional uncertainty, this error, in view of the small quantities involved, will also be very small.

VMS data

Table A2.1 lists the coverage percentages of the VMS data on the basis of the total distributed catches. The coverage is good for most types of fishing gear used by the cutter fleet. The VMS coverage is high for the most common forms of fishing gear such as beam trawl. The coverage is low to very low for a number of types of fishing gear that are not used frequently, such as angling lines. However, the catches made with these types of fishing gear are also limited.

Table A2.1		Coverage percentages of VMS data and average catch per type of fishing gear and HP category in the years from 2006 to 2011 inclusive							
Fleet	Gear a)	HP category	2006	2007	2008	2009	2010	2011	Mean total catch 2006-2011 (* 1,000 kg)
cutter	AG	301-1,500					100	100	9
cutter	BTF	>1,500					100		10
cutter	DRB	301-1,500	97	92	91	99	96	91	1,869
cutter	FPO	0-300	1	0	0	0	0	40	41
cutter	FPO	unknown					0		7
cutter	FYK	0-300						0	1
cutter	GN	0-300	65	53	65	29	61	0	6
cutter	GND	0-300	0				0		2
cutter	GNS	0-300	31	34	24	39	36	38	341
cutter	GNS	301-1,500	7	0	0	59	55	75	37
cutter	GNS	unknown	0	0	0	0	0		3
cutter	GTR	0-300	0	0	0	6	4	15	41
cutter	GTR	301-1,500				100	100	77	28
cutter	HMD	301-1,500				87	80	78	864
cutter	LHM	0-300					100	58	2
cutter	LHM	301-1,500			100	100			12
cutter	LHP	0-300	0	0	0	0	0	0	96
cutter	LHP	301-1,500	0	0	0	0	0	0	28
cutter	LHP	unknown				0	0		4

cutter	MIS	0-300	7	26	4	2	0	0	119
cutter	MIS	301-1,500	99	99	98	99	100		508
cutter	MIS	>1,500	100	100					181
cutter	NK	0-300					0		24
cutter	NKN	0-300					100		4
cutter	OFG	0-300					39		4
cutter	OTB	0-300	97	97	93	94	94	95	2,554
cutter	OTB	301-1,500	100	98	99	100	84	98	955
cutter	OTB	>1500	77	99	98	100	95	98	1,025
cutter	OTG	0-300			100				2
cutter	OTM	0-300	28	71	21	16	9	30	192
cutter	OTM	301-1,500	100	100	100				796
cutter	OTM	>1,500	98	88		59	100	100	2,249
cutter	OTM	unknown		100					12,830
cutter	OTT	0-300	95	98	100	98	100	99	614
cutter	OTT	301-1,500			86	99	99	96	177
cutter	OTT	>1,500	100	100	100	100			122
cutter	PS	0-300	34	51	23	6	2	1	47
cutter	PTB	0-300	94	100		93	100	93	22
cutter	PTB	301-1,500		86					10
cutter	PTM	0-300	0	0	0	0	0		3
cutter	PTM	>1500				0			144
cutter	SDN	301-1,500		100	99		96	100	308
cutter	SSC	0-300	0			100	96	100	190
cutter	SSC	301-1,500	97	97	96	98	98	99	3,489
cutter	TBB	0-300	97	97	97	97	94	96	4,069
cutter	TBB	301-1,500	100	100	95	100	99	98	864
cutter	TBB	>1,500	98	99	99	99	97	98	38,292
cutter	TBB	unknown	89				0		1
cutter	TBP	0-300						96	794
cutter	TBP	301-1,500					92	100	200
cutter	TBP	>1500					97	98	2,514
cutter	TBS	0-300	93	92	90	94	89	90	16,708
cutter	TBS	301-1,500	100	95		100	100		46
cutter	TGB	>1,500			100				11
cutter	UKN	0-300	8	68	13	88	79		64
cutter	UKN	301-1,500	97	100	92	100	92		389
cutter	UKN	>1,500	0	100	100	100	100		7,376
cutter	UKN	unknown	0	31					14,658
highseas	OTB	>1,500				100		100	1,672
highseas	OTM	>1,500	100	100	99	100	99	99	24,2807
highseas	OTM	unknown			100	100	95	100	24,744
highseas	PTM	>1,500	100	100	100	98	100	100	17,540
highseas	UKN	>1,500		100	100	100	100		5,805
highseas	UKN	unknown			11	100			32,562
a) Fishing gear codes are included in Appendix 4.									
Source: Logbook data and VMS data, processed by LEI.									

Tables A2.2 to A2.7 for 2006 to 2011 show how the VMS catches were distributed between the three categories, whereby a distinction was made in terms of the availability of catch day figures (see also Table

2.2). It was readily feasible to determine the VMS points where vessels fitted with the most important types of fishing gear, such as beam trawl (TBB) and bottom otter trawl (OTB) fishing gear had fished. Shrimp vessels (shrimp trawl [TBS], <300 HP) are not under the obligation to report day catches: consequently, trip catches were used for these vessels instead of day catches. However, it was possible to allocate catches to the VMS points in practically all instances.

Table A2.2		Share of the VMS catches distributed in the various manners (see also Table 2.2) per HP category and type of fishing gear in 2006				
Gear a)	HP category	VMS catch (tonnes)	With catch day		Without catch day	
			Normal day	Only unknown	Normal trip	Only unknown
Cutter fleet						
DRB	301-1,500	1,379	0	100	0	0
FPO	0-300	0	0	100	0	0
GN	0-300	1	94	0	6	0
GNS	0-300	99	99	0	2	0
GNS	301-1,500	1	100	0	0	0
MIS	0-300	11	0	100	0	0
MIS	301-1,500	646	0	100	0	0
MIS	>1,500	255	0	100	0	0
OTB	0-300	1,979	99	0	1	0
OTB	301-1,500	688	99	0	1	0
OTB	>1,500	142	100	0	0	0
OTM	0-300	52	0	100	0	0
OTM	301-1,500	1,344	0	100	0	0
OTM	>1,500	5,268	0	96	0	4
OTT	0-300	672	99	0	1	0
OTT	>1500	49	100	0	0	0
PS	0-300	8	0	98	0	2
PTB	0-300	72	0	98	0	2
SSC	301-1,500	1,659	99	0	0	0
TBB	0-300	4,076	100	0	1	0
TBB	301-1,500	1,071	100	0	0	0
TBB	>1,500	41,241	100	0	0	0
TBB	unknown	1	0	100	0	0
TBS	0-300	14,676	0	0	100	0
TBS	301-1,500	10	0	0	100	0
UKN	0-300	3	0	0	0	100
UKN	301-1,500	606	0	0	0	100
UKN	>1,500	53	0	0	0	100
High Seas fleet						
OTM	>1,500	318,459	0	99	0	1
PTM	>1,500	22,213	0	100	0	0
a) Fishing gear codes are included in Appendix 4. Source: Logbook data and VMS data, processed by LEI.						

Table A2.3		Share of the VMS catches distributed in the various manners (see also Table 2.2) per HP category and type of fishing gear in 2007				
Gear a)	HP category	VMS catch (tonnes)	With catch day		Without catch day	
			Normal day	Only unknown	normal trip	Only unknown
Cutter fleet						
DRB	301-1,500	1,726	0	100	0	0
GN	0-300	3	100	0	0	0
GNS	0-300	101	100	0	0	0
MIS	0-300	59	0	100	0	0
MIS	301-1,500	714	0	100	0	0
MIS	>1500	107	0	100	0	0
OTB	0-300	2,396	100	0	1	0
OTB	301-1,500	934	100	0	1	0
OTB	>1,500	460	99	0	0	0
OTM	0-300	56	0	100	0	0
OTM	301-1,500	1,035	0	100	0	0
OTM	>1,500	1,360	0	100	0	0
OTM	unknown	12,830	0	10	0	90
OTT	0-300	449	99	0	1	0
OTT	>1,500	16	99	0	1	0
PS	0-300	11	0	100	0	0
PTB	0-300	6	0	100	0	0
PTB	301-1,500	8	0	100	0	0
SDN	301-1,500	104	99	0	1	0
SSC	301-1,500	2,546	99	0	1	0
TBB	0-300	3,587	98	0	2	0
TBB	301-1,500	858	100	0	0	0
TBB	>1,500	43,527	99	0	0	0
TBS	0-300	14,945	0	0	100	0
TBS	301-1,500	113	0	0	100	0
UKN	0-300	16	0	0	0	100
UKN	301-1,500	485	0	0	0	100
UKN	>1,500	45	0	0	0	100
UKN	unknown	9,094	0	0	0	100
High Seas fleet						
OTM	>1,500	319,014	0	100	0	0
PTM	>1,500	18,404	0	100	0	0
UKN	>1,500	4,518	0	0	0	100

a) Fishing gear codes are included in Appendix 4.

Source: Logbook data and VMS data, processed by LEI.

Table A2.4		Share of the VMS catches distributed in the various manners (see also Table 2.2) per HP category and type of fishing gear in 2008				
Gear a)	HP category	VMS catch (tonnes)	With catch day		Without catch day	
			Normal day	Only unknown	Normal trip	Only unknown
Cutter fleet						
DRB	301-1,500	1,637	0	100	0	0
GN	0-300	3	100	0	0	0
GNS	0-300	88	99	0	1	0
LHM	301-1,500	4	0	100	0	0
MIS	0-300	7	0	100	0	0
MIS	301-1,500	665	0	100	0	0
OTB	0-300	2,603	99	0	1	0
OTB	301-1,500	1,009	99	0	1	0
OTB	>1,500	1,759	100	0	0	0
OTG	0-300	2	0	100	0	0
OTM	0-300	32	0	100	0	0
OTM	301-1,500	10	0	98	0	2
OTT	0-300	409	100	0	0	0
OTT	301-1,500	58	99	0	1	0
OTT	>1,500	109	100	0	0	0
PS	0-300	15	0	100	0	0
SDN	301-1,500	569	100	0	0	0
SSC	301-1,500	2,613	100	0	0	0
TBB	0-300	3,994	99	0	1	0
TBB	301-1,500	877	100	0	0	0
TBB	>1,500	33,641	100	0	0	0
TBS	0-300	14,028	0	0	100	0
TGB	>1,500	11	0	97	0	3
UKN	0-300	2	0	0	0	100
UKN	301-1,500	496	0	0	0	100
UKN	>1,500	79	0	0	0	100
High Seas fleet						
OTM	>1,500	256,274	0	98	0	2
OTM	unknown	12,084	0	94	0	6
PTM	>1,500	15,131	0	100	0	0
UKN	>1,500	4,047	0	0	0	100
UKN	unknown	3,500	0	0	0	100

a) Fishing gear codes are included in Appendix 4.

Source: Logbook data and VMS data, processed by LEI.

Table A2. 5		Share of the VMS catches distributed in the various manners (see also Table 2.2) per HP category and type of fishing gear in 2009				
Gear a)	HP category	VMS catch (tonnes)	With catch day		Without catch day	
			Normal day	Only unknown	Normal trip	Only unknown
Cutter fleet						
DRB	301-1,500	1,148	0	100	0	0
FPO	0-300	0	0	100	0	0
GN	0-300	2	100	0	0	0
GNS	0-300	163	100	0	0	0
GNS	301-1,500	34	100	0	0	0
GTR	0-300	7	0	99	0	1
GTR	301-1,500	13	0	100	0	0
HMD	301-1,500	945	0	100	0	0
LHM	301-1,500	19	0	100	0	0
MIS	0-300	3	0	100	0	0
MIS	301-1,500	480	0	100	0	0
OTB	0-300	2,332	97	0	4	0
OTB	301-1,500	975	100	0	1	0
OTB	>1,500	783	100	0	0	0
OTM	0-300	44	0	93	0	7
OTM	>1,500	855	0	100	0	0
OTT	0-300	528	99	0	1	0
OTT	301-1,500	207	94	0	6	0
OTT	>1,500	313	100	0	0	0
PS	0-300	3	0	100	0	0
PTB	0-300	6	0	100	0	0
SSC	0-300	0	100	0	0	0
SSC	301-1,500	3,611	94	0	5	0
TBB	0-300	4,311	98	0	2	0
TBB	301-1,500	983	98	0	2	0
TBB	>1,500	36,089	97	0	3	0
TBS	0-300	18,047	0	0	100	0
TBS	301-1,500	52	0	0	100	0
UKN	0-300	193	0	0	0	100
UKN	301-1,500	283	0	0	0	100
UKN	>1,500	178	0	0	0	100
High Seas fleet						
OTB	>1,500	1,424	100	0	0	0
OTM	>1,500	189,699	0	100	0	0
OTM	unknown	12,211	0	97	0	3
PTM	>1,500	15,603	0	96	0	4
UKN	>1,500	9,913	0	0	0	100
UKN	unknown	34,307	0	0	0	100

a) Fishing gear codes are included in Appendix 4.

Source: Logbook data and VMS data, processed by LEI.

Table A2.6		Share of the VMS catches distributed in the various manners (see also Table 2.2) per HP category and type of fishing gear in 2010				
Gear a)	HP category	VMS catch (tonnes)	With catch day		Without catch day	
			Normal day	Only unknown	Normal trip	Only unknown
Cutter fleet						
AG	301-1,500	5	0	100	0	0
BTF	>1,500	10	0	100	0	0
DRB	301-1,500	2,360	0	100	0	0
GN	0-300	8	98	0	2	0
GNS	0-300	128	100	0	1	0
GNS	301-1,500	28	92	0	9	0
GTR	0-300	4	0	99	0	1
GTR	301-1,500	32	0	99	0	1
HMD	301-1,500	354	0	100	0	0
LHM	0-300	0	0	100	0	0
MIS	301-1,500	6	0	100	0	0
OFG	0-300	3	0	100	0	0
OTB	0-300	2,924	98	0	2	0
OTB	301-1,500	783	99	0	1	0
OTB	>1,500	1,622	100	0	0	0
OTM	0-300	52	0	100	0	0
OTM	>1,500	1,362	0	100	0	0
OTT	0-300	610	99	0	0	0
OTT	301-1,500	239	98	0	2	0
PS	0-300	2	0	100	0	0
PTB	0-300	4	0	96	0	4
SDN	301-1,500	191	100	0	0	0
SSC	0-300	383	99	0	1	0
SSC	301-1,500	4,655	100	0	1	0
TBB	0-300	3,855	92	0	9	0
TBB	301-1,500	784	100	0	1	0
TBB	>1500	38,354	100	0	1	0
TBP	301-1,500	182	100	0	0	0
TBP	>1,500	1,195	99	0	0	0
TBS	0-300	15,748	0	0	100	0
TBS	301-1,500	3	0	0	100	0
UKN	0-300	27	0	0	0	100
UKN	301-1,500	11	0	0	0	100
UKN	>1,500	22	0	0	0	100
High Seas fleet						
OTM	>1500	224,514	0	100	0	0
OTM	unknown	49,007	0	100	0	0
PTM	>1,500	17,823	0	100	0	0
UKN	>1,500	4,742	0	0	0	100
a) Fishing gear codes are included in Appendix 4. Source: Logbook data and VMS data, processed by LEI.						

Table A2.7		Share of the VMS catches distributed in the various manners (see also Table 2.2) per HP category and type of fishing gear in 2011				
Gear a)	HP category	VMS catch (tonnes)	With catch day		Without catch day	
			Normal day	Only unknown	Normal trip	Only unknown
Cutter fleet						
AG	301-1,500	13	0	100	0	0
DRB	301-1,500	2,270	0	100	0	0
FPO	0-300	48	0	100	0	0
GNS	0-300	112	100	0	0	0
GNS	301-1,500	45	100	0	0	0
GTR	0-300	5	0	100	0	0
GTR	301-1,500	30	0	100	0	0
HMD	301-1,500	825	0	100	0	0
LHM	0-300	3	0	100	0	0
LHP	0-300	0	0	100	0	0
OTB	0-300	2,295	100	0	0	0
OTB	301-1,500	1,129	100	0	0	0
OTB	>1,500	1,201	100	0	0	0
OTM	0-300	31	0	100	0	0
OTM	>1500	1,524	0	100	0	0
OTT	0-300	951	82	0	18	0
OTT	301-1,500	183	100	0	0	0
PS	0-300	0	0	100	0	0
PTB	0-300	15	0	100	0	0
SDN	301-1,500	356	100	0	0	0
SSC	0-300	358	100	0	0	0
SSC	301-1,500	5,381	100	0	0	0
TBB	0-300	3,722	96	0	4	0
TBB	301-1,500	538	100	0	0	0
TBB	>1,500	33,044	100	0	0	0
TBP	0-300	759	90	0	11	0
TBP	301-1,500	202	100	0	0	0
TBP	>1,500	3,713	100	0	0	0
TBS	0-300	14,214	0	0	100	0
High Seas fleet						
OTB	>1,500	1,921	100	0	0	0
OTM	>1,500	143,650	0	100	0	0
OTM	unknown	22,821	0	100	0	0
PTM	>1,500	15,613	0	100	0	0

a) Fishing gear codes are included in Appendix 4.

Source: Logbook data and VMS data, processed by LEI.

Price data

The price data cover all landings of species controlled by quotas in the Netherlands. Landings outside the Netherlands are not included in these data. However, the quantities of most species are relatively small. The coverage for the catches of shrimps is somewhat lower since much of the catch is sold directly to the processing industry. However, it is assumed that the prices are indicative.

Economic data

The economic data cover the major segments and types of fishing gear. The average ratio of the landing value to the gross value added for various types of fishing gear is used for the other types of fishing gear.

Data used for non-Dutch vessels

VIRIS data

The VIRIS data cover trips of non-Dutch vessels that land in the Netherlands. Consequently, no catch data are available for some VMS points. Non-Dutch vessels, in analogy with Dutch vessels, with a length of more than 10 metres do not need to keep records of catches of less than 50 kg per species. As indicated earlier, this can be of relevance to specific vessels. However, it is safe to assume that this underestimation is relatively small. Table 3.5 lists the coverage percentages of the VIRIS data on the basis of the duration at the VMS points. The coverage is reasonably good for most types of fishing gear, although much lower than for the Dutch segments.

Table A2. 8 Fishing effort in VMS data for foreign fleets, VIRIS catch allocated to VMS pings and coverage percentages of VMS effort in VIRIS for 2006					
Fleet	Gear a)	HP category	Fishing effort in VMS (fishing days)	Viris catch allocated to VMS pings (tonnes)	Percentage of VMS effort linked to Viris
BEL	OTB	0-300	57	87	94
BEL	OTB	301-1,500	2	10	44
BEL	TBB	0-300	109	41	88
BEL	TBB	301-1,500	14	32	38
BEL	TBS	0-300	153	144	96
BEL	UKN	unknown	7	0	0
BEL	UKN	0-300	117	0	0
BEL	UKN	301-1,500	127	0	1
DEU	GN	0-300	3	17	39
DEU	GNS	0-300	10	17	58
DEU	OTB	0-300	302	410	93
DEU	OTB	301-1,500	81	125	98
DEU	OTM	>1,500	13	202	12
DEU	OTT	0-300	0	2	100
DEU	PTB	0-300	29	21	68
DEU	PTB	301-1,500	3	0	46
DEU	SPR	0-300	13	4	39
DEU	TBB	0-300	383	259	87
DEU	TBB	301-1,500	637	1,035	94
DEU	TBS	0-300	81	38	52
DEU	UKN	unknown	10	0	0
DEU	UKN	0-300	131	0	1
DEU	UKN	301-1,500	45	0	0
DEU	UKN	>1,500	4	0	0
GBR	FPO	301-1,500	40	1	1
GBR	GN	0-300	31	122	5
GBR	OTB	301-1,500	12	49	100
GBR	OTM	>1,500	16	870	31
GBR	OTT	301-1,500	53	135	87
GBR	PTM	>1,500	21	760	32
GBR	SSC	301-1,500	10	1	10
GBR	TBB	unknown	26	47	78
GBR	TBB	0-300	3	1	88
GBR	TBB	301-1,500	893	1,996	79
GBR	TBB	>1,500	141	390	79
GBR	UKN	unknown	140	0	0
GBR	UKN	0-300	573	0	0
GBR	UKN	301-1,500	350	0	0
GBR	UKN	>1,500	5	0	0
a) Fishing gear codes are included in Appendix 4. Source: Logbook data and VMS data, processed by LEI.					

Table A2.9 Fishing effort in VMS data for foreign fleets, VIRIS catch allocated to VMS pings and coverage percentages of VMS effort in VIRIS for 2007					
Fleet	Gear a)	HP category	Fishing effort in VMS (fishing days)	Viris catch allocated to VMS pings (tonnes)	Percentage of VMS effort linked to Viris
BEL	OTB	0-300	8	161	100
BEL	OTB	301-1,500	8	43	41
BEL	TBB	0-300	273	254	88
BEL	TBB	301-1,500	89	370	81
BEL	TBS	0-300	177	117	97
BEL	UKN	unknown	34	0	0
BEL	UKN	0-300	313	0	0
BEL	UKN	301-1,500	1,257	0	0
DEU	GN	unknown	5	4	10
DEU	GN	0-300	2	5	52
DEU	GNS	0-300	13	6	11
DEU	MIS	0-300	5	1	44
DEU	OTB	unknown	5	2	70
DEU	OTB	0-300	273	417	99
DEU	OTB	301-1,500	84	136	88
DEU	OTM	>1,500	13	91	1
DEU	PTB	0-300	9	6	89
DEU	TBB	unknown	62	41	90
DEU	TBB	0-300	120	96	100
DEU	TBB	301-1,500	615	1,048	95
DEU	TBS	0-300	111	26	26
DEU	UKN	unknown	112	0	0
DEU	UKN	0-300	4,619	0	0
DEU	UKN	301-1,500	664	0	0
DEU	UKN	>1,500	83	0	0
GBR	FPO	0-300	2	5	80
GBR	FPO	301-1,500	79	324	100
GBR	GN	0-300	16	62	12
GBR	OTB	301-1,500	30	156	100
GBR	OTM	>1,500	8	8	1
GBR	OTT	301-1,500	52	172	91
GBR	OTT	>1,500	7	40	100
GBR	PTM	>1,500	18	471	24
GBR	SSC	301-1,500	25	19	30
GBR	SSC	>1,500	1	0	0
GBR	TBB	0-300	12	159	75
GBR	TBB	301-1,500	1,116	3,188	90
GBR	TBB	>1500	218	719	89
GBR	TBS	301-1,500	12	1	1
GBR	UKN	unknown	3,042	0	0
GBR	UKN	0-300	4,305	0	0
GBR	UKN	301-1,500	6,435	0	0
GBR	UKN	>1,500	300	36	1
a) Fishing gear codes are included in Appendix 4. Source: Logbook data and VMS data, processed by LEI.					

Table A2.10 Fishing effort in VMS data for foreign fleets, VIRIS catch allocated to VMS pings and coverage percentages of VMS effort in VIRIS for 2008					
Fleet	Gear a)	HP category	Fishing effort in VMS (fishing days)	Viris catch allocated to VMS pings (tonnes)	Percentage of VMS effort linked to Viris
BEL	OTB	0-300	8	34	100
BEL	OTB	301-1,500	3	47	10
BEL	TBB	0-300	183	159	97
BEL	TBB	301-1,500	39	45	66
BEL	TBS	0-300	209	227	98
BEL	UKN	unknown	28	0	0
BEL	UKN	0-300	441	0	0
BEL	UKN	301-1,500	1,441	0	0
DEU	GN	0-300	13	22	43
DEU	GNS	0-300	30	24	21
DEU	OTB	0-300	214	364	88
DEU	OTB	301-1,500	72	183	92
DEU	OTM	>1,500	23	1,964	47
DEU	TBB	unknown	6	4	100
DEU	TBB	0-300	109	69	88
DEU	TBB	301-1,500	550	955	92
DEU	TBS	unknown	7	6	100
DEU	TBS	0-300	84	64	56
DEU	UKN	unknown	42	0	0
DEU	UKN	0-300	4,181	0	0
DEU	UKN	301-1,500	769	0	0
DEU	UKN	>1,500	69	0	0
GBR	FPO	301-1,500	248	558	90
GBR	GN	0-300	45	158	2
GBR	OTB	301-1,500	195	654	87
GBR	OTB	>1,500	47	153	100
GBR	OTM	>1,500	23	841	27
GBR	OTT	301-1,500	140	571	98
GBR	OTT	>1,500	14	56	96
GBR	PTB	301-1,500	5	13	100
GBR	PTM	>1500	27	393	13
GBR	SSC	301-1500	22	46	62
GBR	TBB	unknown	28	141	97
GBR	TBB	0-300	8	46	96
GBR	TBB	301-1,500	1,196	4,711	91
GBR	TBB	>1,500	213	823	86
GBR	UKN	unknown	1,083	0	0
GBR	UKN	0-300	8,787	0	0
GBR	UKN	301-1,500	8,434	0	0
GBR	UKN	>1,500	932	0	0
GBR	SDN	0-300	3	5	50
a) Fishing gear codes are included in Appendix 4. Source: Logbook data and VMS data, processed by LEI.					

Table A2.11		Fishing effort in VMS data for foreign fleets, VIRIS catch allocated to VMS pings and coverage percentages of VMS effort in VIRIS for 2009			
Fleet	Gear a)	HP category	Fishing effort in VMS (fishing days)	Viris catch allocated to VMS pings (tonnes)	Percentage of VMS effort linked to Viris
BEL	OTB	0-300	49	63	100
BEL	OTB	301-1,500	7	14	91
BEL	OTT	0-300	0	1	-
BEL	TBB	unknown	0	23	-
BEL	TBB	0-300	277	80	95
BEL	TBB	301-1,500	234	114	73
BEL	TBS	0-300	244	318	99
DEU	GN	0-300	4	4	100
DEU	GNS	0-300	172	25	48
DEU	GTR	0-300	47	10	79
DEU	OTB	0-300	483	187	95
DEU	OTB	301-1,500	147	141	94
DEU	OTM	>1,500	723	86	11
DEU	OTT	0-300	51	0	2
DEU	PTB	0-300	44	8	71
DEU	TBB	0-300	201	60	86
DEU	TBB	301-1,500	570	771	93
DEU	TBS	0-300	91	54	60
GBR	FPO	0-300	7	7	99
GBR	FPO	301-1,500	192	387	88
GBR	GN	0-300	20	100	62
GBR	GNS	0-300	21	12	3
GBR	MIS	0-300	3	3	100
GBR	OTB	0-300	40	114	100
GBR	OTB	301-1,500	320	1,436	95
GBR	OTB	>1,500	0	1	100
GBR	OTM	>1,500	255	28,029	77
GBR	OTT	>1,500	24	129	81
GBR	PTM	>1,500	124	4,770	61
GBR	SDN	0-300	6	13	68
GBR	SSC	301-1,500	59	101	75
GBR	TBB	0-300	160	6	70
GBR	TBB	301-1,500	1,115	5,224	88
a) Fishing gear codes are included in Appendix 4. Source: Logbook data and VMS data, processed by LEI.					

Table A2.12 Fishing effort in VMS data for foreign fleets, VIRIS catch allocated to VMS pings and coverage percentages of VMS effort in VIRIS for 2010

Fleet	Gear a)	HP category	Fishing effort in VMS (fishing days)	Viris catch allocated to VMS pings (tonnes)	Percentage of VMS effort linked to Viris
BEL	GNS	0-300	0	0	0
BEL	GNS	301-1,500	3	0	0
BEL	OTB	301-1,500	34	27	35
BEL	TBB	0-300	532	305	44
BEL	TBB	301-1,500	444	206	11
DEU	DRB	0-300	2	0	0
DEU	DRB	301-1,500	63	0	0
DEU	GNS	0-300	155	111	83
DEU	OTB	0-300	67	0	0
DEU	OTB	301-1,500	207	514	61
DEU	OTB	>1,500	32	0	0
DEU	OTM	301-1,500	24	0	0
DEU	OTM	>1,500	12	0	0
DEU	SDN	0-300	5	0	0
DEU	TBB	0-300	972	593	34
DEU	TBB	301-1,500	377	1,093	96
GBR	DRB	0-300	278	0	0
GBR	DRB	301-1,500	494	0	0
GBR	FPO	0-300	249	0	0
GBR	FPO	301-1,500	202	205	67
GBR	GNS	0-300	176	0	0
GBR	GNS	301-1,500	4	0	0
GBR	HMD	0-300	69	0	0
GBR	HMD	301-1,500	643	0	0
GBR	LLD	301-1,500	0	0	0
GBR	LLS	301-1,500	39	0	0
GBR	OTB	0-300	556	0	0
GBR	OTB	301-1,500	1,437	633	8
GBR	OTB	>1500	180	0	0
GBR	OTM	0-300	8	0	0
GBR	OTM	301-1,500	34	0	0
GBR	OTM	>1,500	357	17,876	48
GBR	OTT	0-300	111	31	23
GBR	OTT	301-1,500	255	0	0
GBR	OTT	>1,500	90	220	22
GBR	PTB	301-1,500	581	0	0
GBR	PTM	301-1,500	41	0	0
GBR	PTM	>1,500	390	0	0
GBR	SDN	0-300	58	0	0
GBR	SSC	0-300	12	0	0
GBR	SSC	301-1,500	183	0	0
GBR	TBB	0-300	101	224	45
GBR	TBB	301-1,500	664	3,548	49

a) Fishing gear codes are included in Appendix 4.

Source: Logbook data and VMS data, processed by LEI.

Table A2.13		Fishing effort in VMS data for foreign fleets, VIRIS catch allocated to VMS pings and coverage percentages of VMS effort in VIRIS for 2011			
Fleet	Gear a)	HP category	Fishing effort in VMS (fishing days)	Viris catch allocated to VMS pings (tonnes)	Percentage of VMS effort linked to Viris
BEL	GNS	301-1,500	14	0	0
BEL	OTB	301-1,500	72	57	23
BEL	SSC	301-1,500	86	116	37
BEL	TBB	0-300	1,876	648	24
BEL	TBB	301-1,500	1,348	487	8
DEU	DRB	0-300	35	0	0
DEU	DRB	301-1,500	280	0	0
DEU	FPO	301-1,500	3	0	0
DEU	GNS	0-300	171	45	44
DEU	GNS	301-1,500	2	0	0
DEU	LLS	301-1,500	14	0	0
DEU	OTB	0-300	102	0	0
DEU	OTB	301-1,500	533	613	24
DEU	OTB	>1,500	98	2,091	13
DEU	OTM	301-1,500	67	0	0
DEU	OTM	>1,500	109	8,368	58
DEU	TBB	0-300	2,777	1,180	14
DEU	TBB	301-1,500	237	1,031	96
GBR	DRB	0-300	115	0	0
GBR	DRB	301-1,500	545	0	0
GBR	FPO	0-300	482	0	0
GBR	FPO	301-1,500	403	460	47
GBR	GNS	0-300	388	130	29
GBR	GNS	301-1,500	91	0	0
GBR	HMD	0-300	35	0	0
GBR	HMD	301-1,500	1,148	0	0
GBR	LLS	301-1,500	3	0	0
GBR	OTB	0-300	788	0	0
GBR	OTB	301-1,500	1,903	232	2
GBR	OTB	>1,500	333	22,691	29
GBR	OTM	0-300	56	0	0
GBR	OTM	301-1,500	48	0	0
GBR	OTM	>1,500	343	861	2
GBR	OTT	0-300	199	239	19
GBR	OTT	301-1,500	421	0	0
GBR	OTT	>1,500	94	423	41
GBR	PTB	0-300	116	0	0
GBR	PTB	301-1,500	933	0	0
GBR	PTM	301-1,500	28	0	0
GBR	PTM	>1,500	346	3,270	27
GBR	SDN	0-300	243	0	0
GBR	SSC	0-300	111	0	0
GBR	SSC	301-1,500	770	1,753	38
GBR	TBB	0-300	119	0	0
GBR	TBB	301-1,500	610	6,693	80
a) Fishing gear codes are included in Appendix 4. Source: Logbook data and VMS data, processed by LEI.					

VMS data

The Netherlands is responsible for the control of fishing vessels in the Dutch section of the continental shelf and, consequently, has all VMS data relating to the area at its disposal. However, this is often only part of the VMS information about the trip since these vessels spend only part of the time of their trip in the Dutch section of the continental shelf. Vessels with a length of 15 metres are not governed by the VMS obligation. It is assumed that the number of non-Dutch vessels of a length of less than 15 metres that fish in the Dutch section of the continental shelf is negligible.

Price data

The price data cover all landings of species controlled by quotas in the Netherlands. Since the large majority of the catches are landed in the Netherlands, it has been decided that these prices will also be used for non-Dutch vessels.

Appendix 3

Fishing trends in the areas

This section contains the historical trends of fishing activities of the Dutch and foreign Fleets in the Central Oyster Grounds. The data have been aggregated by Fleet, horsepower categories and gear type. Years covered are 2006 to 2011.

Dutch Fleet

Table A3.1		Effort of each fleet segment in the Central Oyster Grounds area (days at sea) and the proportion of the time spent fishing							
Fleet	HP category	Gear a)	Effort						Time spent fishing
			2006	2007	2008	2009	2010	2011	
cutter	0-300	OTB	65	45	100	29	45	32	0.68
cutter	0-300	OTM	3						1.00
cutter	0-300	OTT	23	25	27	14	24	10	0.62
cutter	0-300	PTB	1						1.00
cutter	0-300	TBB	2		7		1	3	0.72
cutter	0-300	TBS		0				1	0.30
cutter	0-300	UKN					0		1.00
cutter	301-1,500	OTB	13	23	36	16	11	7	0.60
cutter	301-1,500	OTT				1	1	0	0.24
cutter	301-1,500	SSC		0	2	0	1	0	0.45
cutter	301-1,500	TBB	13	17	10	14	21	27	0.88
cutter	>1,500	OTB	7	2	48	6	4	5	0.56
cutter	>1,500	OTT	3		13	0			0.86
cutter	>1,500	TBB	58	126	52	62	65	143	0.46
cutter	>1,500	TBP						1	0.94
cutter	>1,500	UKN			1				1.00
highseas	>1,500	OTM		1	1	0	0	0	1.00
highseas	>1,500	PTM				0		1	1.00

a) Fishing gear codes are included in Appendix 4.

Source: Logbook data and VMS data, processed by LEI.

Table A3.2 Landings of each fleet segment in the Central Oyster Grounds area (tonnes)								
Fleet	HP category	Gear a)	Landings					
			2006	2007	2008	2009	2010	2011
cutter	0-300	OTB	76	83	155	62	104	58
cutter	0-300	OTM	1					
cutter	0-300	OTT	27	60	54	25	73	8
cutter	0-300	PTB	0					
cutter	0-300	TBB	2		12		0	3
cutter	0-300	TBS		0				5
cutter	0-300	UKN					1	
cutter	301-1,500	OTB	13	30	63	25	29	14
cutter	301-1,500	OTT				0	1	0
cutter	301-1,500	SSC		0	1	0	2	0
cutter	301-1,500	TBB	19	31	19	22	38	55
cutter	>1,500	OTB	11	1	120	12	7	4
cutter	>1,500	OTT	3		23	0		
cutter	>1,500	TBB	111	314	130	146	189	501
cutter	>1,500	TBP						3
cutter	>1,500	UKN			2			
highseas	>1,500	OTM		0	0	86	0	40
highseas	>1,500	PTM				0		18
a) Fishing gear codes are included in Appendix 4. Source: Logbook data and VMS data, processed by LEI.								

Table A3.3a		Value of landed catches of each fleet segment in the Central Oyster Grounds area (€1,000)						
Fleet	HP category	Gear a)	Value					
			2006	2007	2008	2009	2010	2011
cutter	0-300	OTB	197	208	385	114	186	140
cutter	0-300	OTM	3					
cutter	0-300	OTT	81	144	134	49	117	31
cutter	0-300	PTB	1					
cutter	0-300	TBB	7		28		1	13
cutter	0-300	TBS		0				10
cutter	0-300	UKN					1	
cutter	301-1,500	OTB	42	86	144	48	34	31
cutter	301-1,500	OTT				0	1	1
cutter	301-1,500	SSC		0	2	1	2	0
cutter	301-1,500	TBB	60	118	70	73	107	149
cutter	>1,500	OTB	29	3	277	19	11	6
cutter	>1,500	OTT	11		79	0		
cutter	>1,500	TBB	384	1206	454	477	518	1,113
cutter	>1,500	TBP						9
cutter	>1,500	UKN			3			
highseas	>1,500	OTM		0	0	45	0	13
highseas	>1,500	PTM				0		6

a) Fishing gear codes are included in Appendix 4.
Source: Logbook data and VMS data, processed by LEI.

Table A3.3b		Value of landed catches of each fleet segment in the Central Oyster Grounds area (€1,000) aggregated by fleet and gear					
		Value					
Fleet	Gear a)	2006	2007	2008	2009	2010	2011
cutter	OTB	268	297	806	181	231	177
cutter	OTM	3					
cutter	OTT	92	144	213	49	118	32
cutter	PTB	1					
cutter	SSC		0	2	1	2	0
cutter	TBB	451	1,324	552	550	626	1275
cutter	TBP						9
cutter	TBS		0				10
cutter	UKN			3		1	
highseas	OTM		0	0	45	0	13
highseas	PTM				0		6

a) Fishing gear codes are included in Appendix 4.
Source: Logbook data and VMS data, processed by LEI.

Table A3.4a Gross value added (GVA) of landed catches of each fleet segment in the Central Oyster Grounds area (€1,000)

Fleet	HP category	Gear a)	GVA					
			2006	2007	2008	2009	2010	2011 b)
cutter	0-300	OTB	70	112	215	56	72	55
cutter	0-300	OTM	1					
cutter	0-300	OTT	29	77	75	24	46	12
cutter	0-300	PTB	0					
cutter	0-300	TBB	2		10		0	4
cutter	0-300	TBS		0				5
cutter	0-300	UKN						
cutter	301-1,500	OTB	1	24	80	9	16	15
cutter	301-1,500	OTT				0	1	0
cutter	301-1,500	SSC		0	0	0	1	0
cutter	301-1,500	TBB	10	20	7	28	48	67
cutter	>1,500	OTB	5	1	155	6	5	3
cutter	>1,500	OTT	2		44	0		
cutter	>1,500	TBB	114	381	124	182	161	347
cutter	>1,500	TBP						5
cutter	>1,500	UKN						
highseas	>1,500	OTM		0	0	11	0	4
highseas	>1,500	PTM				0		2

a) Fishing gear codes are included in Appendix 4.

Source: Logbook data and VMS data, processed by LEI.

Table A3.4b Gross value added of landed catches of each fleet segment in the Central Oyster Grounds (€1,000) aggregated by fleet and gear

Fleet	Gear a)	GVA					
		2006	2007	2008	2009	2010	2011 b)
cutter	OTB	76	137	450	71	93	73
cutter	OTM	1					
cutter	OTT	31	77	119	24	47	12
cutter	PTB	0					
cutter	SSC		0	0	0	1	0
cutter	TBB	126	401	141	210	209	418
cutter	TBP						5
cutter	TBS		0				5
cutter	UKN						
highseas	OTM		0	0	11	0	4
highseas	PTM				0		2

a) Fishing gear codes are included in Appendix 4.

Source: Logbook data and VMS data, processed by LEI.

Foreign Fleet

Table A3.5 Effort of each foreign fleet segment in the Central Oyster Grounds area (days at sea) and the proportion of the time spent fishing

Fleet	HP category	Gear a)	Effort (days at sea)						Time spent fishing
			2006	2007	2008	2009	2010	2011	
BEL	0-300	OTB	5	3	1	6			0.09
BEL	0-300	TBB					6	7	0.55
BEL	301-1,500	OTB	0	2	2	7	0	1	0.15
BEL	301-1,500	SSC						1	0.18
BEL	301-1,500	TBB	0	1	4	6	5	0	0.76
BEL	301-1,500	UKN	1	1	3	0			1
DEU	unknown	TBB		0					1
DEU	unknown	UKN	0			0			1
DEU	0-300	OTB	51	35	59	77			0.56
DEU	0-300	PTB	2	0					1
DEU	0-300	SPR	0						1
DEU	0-300	TBB	6	2	0	3	19	27	0.6
DEU	0-300	TBS	1	1	0				1
DEU	0-300	UKN	0						1
DEU	301-1,500	OTB	26	6	4	8	7	19	0.71
DEU	301-1,500	OTM						6	1
DEU	301-1,500	TBB	15	56	28	19	18	32	0.83
DEU	301-1,500	UKN	1	0	1	0			1
DEU	>1,500	OTB					0	0	1
DEU	>1,500	OTM	0	0				0	1
GBR	unknown	TBB	2		0				1
GBR	unknown	UKN	0	4	1				1
GBR	0-300	GN	29	10	17	14			0.15
GBR	0-300	GNS				4	17	6	0.86
GBR	0-300	OTB				1		1	0.31
GBR	0-300	OTT						3	0.49
GBR	0-300	SDN			0				1
GBR	0-300	TBB		2			0		0.08
GBR	0-300	UKN	1	2	7	0			1
GBR	301-1,500	FPO	1			0			1
GBR	301-1,500	OTB	6	3	40	15	14	12	0.45
GBR	301-1,500	OTT	36	17	33				0.47
GBR	301-1,500	SSC	1	1	1	1	1	8	0.41
GBR	301-1,500	TBB	33	52	31	20	25	32	0.57
GBR	301-1,500	TBS		0					1
GBR	301-1,500	UKN	0	0	1	0			1
GBR	>1,500	OTB			34		0	0	0.44
GBR	>1,500	OTM						0	1
GBR	>1,500	OTT		0	0	0	0	3	0.43
GBR	>1,500	TBB	5	1	3				0.42
GBR	>1,500	UKN	0	0	0	0			1

a) Fishing gear codes are included in Appendix 4.

Source: Logbook data and VMS data, processed by LEI.

Fleet	HP category	Gear a)	Landings (tons)					
			2006	2007	2008	2009	2010	2011
BEL	unknown	TBB				0		
BEL	0-300	OTB	3	2	0	8		
BEL	0-300	TBB					6	11
BEL	301-1,500	OTB	0	1	4	7	1	0
BEL	301-1,500	SSC						0
BEL	301-1,500	TBB	0	0	0	5	16	2
BEL	301-1,500	UKN	0	0	0	0		
DEU	unknown	TBB		0				
DEU	unknown	UKN	0			0		
DEU	0-300	OTB	52	40	45	37		
DEU	0-300	OTT				0		
DEU	0-300	PTB	2	0				
DEU	0-300	SPR	0					
DEU	0-300	TBB	4	0	0	2	39	51
DEU	0-300	TBS	0	0	0			
DEU	0-300	UKN	0					
DEU	301-1,500	OTB	32	5	7	11	20	72
DEU	301-1,500	OTM						0
DEU	301-1,500	TBB	22	92	49	30	33	81
DEU	301-1,500	UKN	0	0	0	0		
DEU	>1,500	OTB					0	0
DEU	>1,500	OTM	0	1				23
GBR	unknown	TBB	0		0			
GBR	unknown	UKN	0	0	0			
GBR	0-300	GN	26	7	18	10		
GBR	0-300	GNS				2	0	6
GBR	0-300	OTB				0		1
GBR	0-300	OTT						11
GBR	0-300	SDN			0			
GBR	0-300	TBB		6			0	
GBR	0-300	UKN	0	0	0	0		
GBR	301-1,500	FPO	0			0		
GBR	301-1,500	OTB	2	2	15	11	49	41
GBR	301-1,500	OTT	36	5	21			
GBR	301-1,500	SSC	0	0	0	0	1	4
GBR	301-1,500	TBB	28	117	75	22	102	150
GBR	301-1,500	TBS		0				
GBR	301-1,500	UKN	0	0	0	0		
GBR	>1,500	OTB			18		0	0
GBR	>1,500	OTM						33
GBR	>1,500	OTT		0	0	0	1	10
GBR	>1,500	TBB	2	0	7			
GBR	>1,500	UKN	0	0	0	0		

a) Fishing gear codes are included in Appendix 4.
Source: Logbook data and VMS data, processed by LEI.

Table A3.7 Value of landed catches of each foreign fleet segment in Central Oyster Grounds area (€1000)

Fleet	HP category	Gear a)	Value (€1000)					
			2006	2007	2008	2009	2010	2011
BEL	unknown	TBB				0		
BEL	0-300	OTB	13	7	1	24		
BEL	0-300	TBB					26	52
BEL	301-1,500	OTB	1	3	9	9	1	0
BEL	301-1,500	SSC						1
BEL	301-1,500	TBB	0	0	1	19	36	5
BEL	301-1,500	UKN	0	0	0	0		
DEU	unknown	TBB		0				
DEU	unknown	UKN	0			0		
DEU	0-300	OTB	137	132	124	92		
DEU	0-300	OTT				0		
DEU	0-300	PTB	8	0				
DEU	0-300	SPR	0					
DEU	0-300	TBB	12	1	0	5	80	126
DEU	0-300	TBS	0	0	0			
DEU	0-300	UKN	0					
DEU	301-1,500	OTB	76	13	18	17	49	154
DEU	301-1,500	OTM						0
DEU	301-1,500	TBB	85	373	189	99	114	216
DEU	301-1,500	UKN	0	0	0	0		
DEU	>1,500	OTB					0	0
DEU	>1,500	OTM	0	1				0
GBR	unknown	TBB	0		0			
GBR	unknown	UKN	0	0	0			
GBR	0-300	GN	64	20	54	28		
GBR	0-300	GNS				6	0	16
GBR	0-300	OTB				0		1
GBR	0-300	OTT						14
GBR	0-300	SDN			0			
GBR	0-300	TBB		17			1	
GBR	0-300	UKN	0	0	0	0		
GBR	301-1,500	FPO	0			0		
GBR	301-1,500	OTB	5	6	32	17	80	84
GBR	301-1,500	OTT	77	12	43			
GBR	301-1,500	SSC	0	0	0	0	3	6
GBR	301-1,500	TBB	72	332	177	48	216	239
GBR	301-1,500	TBS		0				
GBR	301-1,500	UKN	0	0	0	0		
GBR	>1,500	OTB			45		1	0
GBR	>1,500	OTM						66
GBR	>1,500	OTT		0	0	0	2	16
GBR	>1,500	TBB	6	0	16			
GBR	>1,500	UKN	0	0	0	0		

a) Fishing gear codes are included in Appendix 4.

Source: Logbook data and VMS data, processed by LEI.

Appendix 4

Gear codes

Table A4.1 Gear codes used in the report and the gear types	
Gear code	Gear type
FPO	Pots
GN	Gillnets (not specified)
GNC	Encircling gillnets
GND	Drift nets
GNS	Set gillnets (anchored)
GTN	Combined gillnets-Trammel nets
GTR	Trammel nets
LHP	Hand-lines and pole-lines (hand operated)
LL	Longlines (not specified)
LLD	Drifting longlines
LLS	Set lines (longlines set)
LN	Lift nets (not specified)
MIS	MISCELLANEOUS GEAR
OTB	Otter trawls bottom
OTM	Otter trawls midwater
OTT	Otter twin trawls
PTB	Pair trawls bottom
PTM	Pair trawls mid-water
SDN	Danish seines
SSC	Scottish seines
TBB	Beam trawls
TBS	Shrimp trawls

LEI Wageningen UR develops economic expertise for government bodies and industry in the field of food, agriculture and the natural environment. By means of independent research, LEI offers its customers a solid basis for socially and strategically justifiable policy choices.

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