

# Distribution maps for the North Sea fisheries

Methods and application in Natura 2000 areas



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# Distribution maps for the North Sea fisheries

## Methods and application in Natura 2000 areas

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in Natura 2000 areas**

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In the study presented here, a database was developed with the spatial distribution pattern of fishing effort, catches and catch values of the Dutch and non-Dutch fisheries in the Dutch section of the North Sea. Distribution maps were produced on the basis of this database. In addition, estimates were made of the value of different fisheries in areas designated by the Netherlands as Natura 2000 areas.

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# Preface

The Minister has reported four areas to the European Commission pursuant to the Habitats Directive to give shape to the implementation of the Pan-European Ecological Network (PEEN) in the marine environment. In view of the detrimental effect of the various forms of fisheries on the ecosystem, the fisheries operations are the most important activity to be restricted in the implementation of the nature conservation policy in these areas. However, when imposing these restrictions it is necessary to make an appropriate assessment of the economical and ecological interests to arrive at an optimum solution both for nature *and* the fisheries.

This report constitutes the first step in the assessment, whereby the information available about the value of the fisheries in the Dutch section of the North Sea is mapped and combined to produce a spatial database containing detailed information about the fishing efforts, catches and catch values of the Dutch and non-Dutch fisheries. Consequently, the report is primarily focused on the quality of the data and the method that was used. The next steps of the programme will make use of this information to compare the economic effects of various packages of measures and arrive at a suitable balance of interests.

During the work on the project a number of presentations of the method and the provisional results were given to the Fisheries Measures at Protected North Sea sites Steering Group (VIBEG). I would like to take this opportunity to thank the members of the Steering Committee for their extremely valuable contribution and comments. I would also like to thank our IMARES colleagues for their willingness to discuss and give thought to the project.



Professor R.B.M. Huirne  
Managing Director LEI



# Summary

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The Netherlands has reported four areas to the European Commission pursuant to the Habitats Directive. One of the implementation programme's major elements is the protection of these areas' nature from the detrimental effect of the various forms of fisheries operations in the North Sea. The Ministry of Agriculture, Nature and Food Quality can arrive at an appropriate assessment and optimisation of the management only when ecological studies of the fisheries' effects on nature are supplemented with an insight into the economic effects of potential measures. This report contains the results from the detailing of the first phase of a programme designed to determine the economic effects of restricting measures in certain areas of the North Sea. During this study, detailed data of the fishing efforts, catches and fish prices of the Dutch and non-Dutch fisheries sector was collected and a method was developed to combine and process the data to prepare GIS maps of the value of the Dutch and non-Dutch fisheries in the Dutch section of the North Sea. These maps were used to determine the economic value of the operations in the Dogger Bank, Cleaver Bank, Frisian Front, *Vlakte van de Raan* and North Sea coastal zone. In addition, an initial impetus was given to the determination of the statistical uncertainty of the estimates.

## *Conclusions*

The link between the logbook data and VMS data can provide extremely valuable information about the distribution of the efforts, the catches and their value and create an opportunity for estimates of the value of specific areas to the fisheries.

During this period the value of the Dutch fisheries catches in the designated Natura 2000 areas was substantial (on average, €16 million per annum in the 2006-2008 period), whereby the shrimp/prawn catches in the coastal zone were of particular importance (on average, €8.9 million per annum in the 2006-2008 period).

The Dogger Bank was the most important fishing area for the non-Dutch fisheries in the Dutch section of the continental shelf, with a total catch value of an average of €2.6 million per annum in the 2006-2008 period.

The method for the estimation of the catches and the determination of the estimation error used in this report lays the foundations for further development.

The effects of management measures in the areas can be determined only by mapping the dependencies of individual entrepreneurs on these areas and the feasibility of the relocation of their operations. An international perspective is of great importance to both of these requirements.

# 1 Introduction

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## 1.1 Motivation

In her letter to the House of Representatives of the State-General of 22 December 2008, the Minister of Agriculture, Nature and Food Quality announced that she had notified the European Commission of four areas that come into consideration for the Habitats Directive. The objective of this notification was to comply with a European obligation, namely that areas which qualify for protection pursuant to the Habitats Directive should receive that protection by means of this instrument. A project has been initiated for the implementation of the provisions of this Directive in Dutch legislation and policy, namely the North Sea Marine Protected Areas project. The objective of this project is to carry out the actions required to protect the relevant areas. The most important actions are the amendment of the Nature Conservancy Act to expand the applicability of the Act to the Netherlands Exclusive Economic Zone, the arrangements for a study of the conservation objectives, the preparations for the implementation of fisheries measures in the relevant areas and, where relevant, the arrangements for suitable assessments in the 12-mile zone (see also IDON, 2005).

### *Principles*

One of the project's major elements is the protection of nature in these areas from the detrimental effect of the various forms of fisheries operations in the North Sea. The Ministry of Agriculture, Nature and Food Quality needs to supplement ecological studies of the fisheries' effects on nature with the acquisition of an insight into the economic effects of potential measures. This in turn requires the performance of relevant economic studies.

The selection of the measures is governed by a number of principles:

- non-discrimination principle;
- 'level playing field' principle;
- feasible and affordable.

### *Questions to be addressed by the study*

Economic studies are required to apply these principles, whereby the following answers will need to be answered:

- Which fishing vessels are active on the North Sea, as defined by flag and origin by community?
- Which species of fish are caught by these vessels, to what extent at which locations and with which fishing gear?
- Which landing values are caught at the locations to be designated pursuant to the nature policy?
- What is the non-Dutch fisheries' share of the catches?

## 1.2 Results

The results from this study shall be as comprehensive as possible GIS database of European fishing operations in the North Sea that can be used to determine the fishing efforts, catches and catch values in each area. This database serves as the basis of distribution maps that can be used during the policy discussions. These maps were also used to determine the economic value of the professional fisheries operations in the Dogger Bank, Cleaver Bank, Frisian Front, *Vlakte van de Raan* and North Sea coastal zone (Table 1.1).

<b>Table 1.1</b>		<b>Location of the centre of the areas (longitude and latitude) surface area (hectares) and depth (m relative to Amsterdam Ordnance Datum, NAP)</b>				
<b>Name of area</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Surface area (hectares)</b>	<b>Min (m)</b>	<b>Max (m)</b>	<b>Average (m)</b>
Cleaver Bank	03 05 07	54 01 21	123,764	-71	-30	-42
Dogger Bank	03 29 02	55 08 17	471,772	-45	-20	-33
North Sea coastal zone	05 34 39 a)	53 29 19 a)	123,800	-39	1	-11
<i>Vlakte van de Raan</i>	03 18 36	51 29 44	22,639	-36	1	-8

a) The centre of the coastal zone as determined by the standard method of calculation lies outside the zone. This is due to the curved form of the coastal zone. For this reason a specific method of calculation was used to determine a centre that *does* lie within the zone.  
Source: Table reproduced from Bos *et al.* (2008).

### **1.3 Contents**

This report describes the basic information and method used to process data to arrive at a GIS database of the Dutch and non-Dutch professional fishing sector active in the North Sea. Chapter 2 contains an explanation of the various sources of the data and the manner in which the data was processed. Chapter 3 provides an insight into the quality of the various basic data sets on the basis of information about the coverage of and potential inaccuracies in the data, followed by an explanation of the method used to determine the statistical error of the estimates. Chapters 4 and 5 contain the results for the distribution patterns of efforts, catches and values of the catches. Chapters 6 and 7 review the importance of the various areas to the Dutch and non-Dutch fisheries.

Chapter 8 discusses the methods and results, and is completed with the conclusions and recommendations.

## 2 Description of the data processing

---

### 2.1 Data used for this study

#### 2.1.1 VIRIS data

The catch data originates 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 quota must be entered in this logbook per sailing day and ICES quadrant. Records of the catches of species not controlled by quota are kept per trip. Annex 1 contains a brief description of the VIRIS database.

#### 2.1.2 Fleet data

The catch data for the various types of fisheries was 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.

#### 2.1.3 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 this 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.

#### 2.1.4 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 is not collected for all the species listed in VIRIS. When specific price data was 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 seafood'). Annex 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).

#### 2.1.5 LEI economic data

The LEI panel has economic data for the various fisheries over the entire period of the study. The data contains 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, this data is not classified by fishing area. Consequently, the economic data needs to be combined with catch data to arrive at an estimate of the contribution each fishing area makes to the economy.

### 2.2 Processing of data for Dutch vessels

A distinction can be made between a number of steps in the processing of the spatial distribution data. These are reviewed below. First of all, the VMS data was processed and the patterns in fishing efforts were determined. Next, the fishing efforts were used to distribute the catches between the various points. These first steps are illustrated by the example included in Table 2.1.

<b>Table 2.1</b>		<b>Example of a calculation of the catch at the VMS positions during one trip a)</b>		
<b>DH1</b>	<b>Time</b>	<b>Speed</b>	<b>Duration</b>	<b>Catch</b>
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

a) First, 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). The catch (kg) was distributed on the basis of the duration at the various positions at which the vessel was fishing.

The catches and average auction prices were used to determine the value of the catches. Finally, the contribution to the gross value added was calculated. A GIS application could then be used to make an estimate of the effort, catches, catch value and contribution to the gross value added in specific fishing areas. This 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.*, 2009).

### 2.2.1 Processing of VIRIS data

The catches in VIRIS were, when possible, allocated to fishing days. However, records of some catches are kept solely at trip level. These relate, in general, to corrections to the totals of the day catches recorded in the logbook that are made on the basis of the auction data. When these corrections related to species for which information on day catches during the same trip, then these extra quantities were distributed between the fishing days on the basis of the catch quantities by species. When this was not feasible, then the extra quantities were distributed between the fishing days on the basis of the fishing effort. The potential error introduced in adopting this approach is very small with respect to the total catches and common species. However, the error can be greater with rare species.



### 2.2.2 Processing of VMS data

The VMS data was used to determine the spatial distribution of the fisheries pattern. First, this data was linked to the VIRIS data on the basis of the vessel and the date and time. In the first instance, this provided for the selection of the VMS positions that fall within a trip. Next, the duration was determined for each position (the time interval between the current and previous position). Time intervals of longer than four hours (due, in particular, to lacking VMS signals) were set to 2 hours. The records for each position that include a sailing speed were then used to determine whether the vessel was sailing or fishing on the basis of the fishing gear that was used and the size of the vessel. This was carried out using the values reported by South *et al.* (2009). When one of the data items was lacking the activity at the VMS point was regarded as unknown. Vessels that fished with pelagic otter trawls (OTM) were not classified by activity since this data was lacking in the aforementioned workshop.

### 2.2.3 Distribution of catches between the VMS points

The combination of VMS data with information from the logbook yielded information about the geographic positions during each trip and the total catch during the trip or - when the relevant data was available - the catch per day. On assuming that the catch per fishing hour was constant during the trip/day, the catch could be distributed between the positions on the basis of the duration at each position. An example of a calculation is included in Table 2.1. Self-evidently, the determination of the catch per VMS position on the basis of the trip is somewhat less accurate than the distribution of the catch at day level.

A normal trip/day is comprised of a number of fishing and/or sailing VMS points. On a small number of trips, a vessel was sailing at all the available VMS positions on a day. When data was lacking, for example on the fishing gear, HP and speed, then it was not possible to allocate an activity to a VMS point. These points were classified as 'only unknown'. When the relevant vessels had recorded day catches, then these were not distributed directly. However, the catches were taken into account when scaling up the catches to the entire fleet. When there were day catches during a trip but not on a day for which VMS data was available, then no catches were allocated to these VMS points. When only trip catches were available, then the same distribution was used as for the day catches, but now based on the total time of the trip. The distribution methods used in the various situations are shown in Table 2.2.

<b>Table 2.2</b>			
<b>Basis for the distribution of the catches in various situations</b>			
<b>Day catches recorded for trip</b>	<b>Day catch recorded on day</b>	<b>Type of activity</b>	<b>Distribution</b>
yes	yes	Fishing and other	Fishing time/fishing time on fishing day
yes	yes	Only sailing	Catch not distributed
yes	yes	Only unknown	Time unknown/time on fishing day unknown
yes	yes	Sailing and unknown	Catch not distributed
yes	no	All combinations	No catch
no		Fishing and other	Fishing time/fishing time on trip
no		Only sailing	Catch not distributed
no		Only unknown	Time unknown/time on trip unknown
no		Sailing and unknown	Catch not distributed

#### 2.2.4 Scaling up to the entire fleet

Since the VMS data does not provide complete coverage (see also 3.1.2) the estimated catches and values underestimate the actual values. This is, in particular, due to vessels with a length of less than 15 metres - and which, consequently, do not have an onboard VMS - as well as to the inability to distribute a number of catches between VMS points. This was corrected by increasing the catches by a factor based on the coverage percentages. This was based on the monthly pattern per HP category and type of fishing gear or, when this was not possible, on the annual pattern per HP category and type fishing gear. This approach provided for the distribution of all catches made by Dutch vessels.

#### 2.2.5 Determination of the value of the catches

The catch values were determined from the catch data using the statutory conversion factors from live to market weight and the average market prices per species and month. This was carried out for each combination of VMS point and species.

### 2.2.6 Determination of the landed catches, value of the catches and gross value added within fishing areas

A GIS application was used to determine which of the VMS positions (with the accompanying catches and values) lay within the planned locations and the catches and their value were determined for each fishing area. This method was also used earlier in the determination of the economic effects of the closure of parts of the *Voordelta* on the fisheries (Van Oostenbrugge, 2006).

The maps were prepared using the aggregated catches and catch values of each VMS point, whereby the values for individual points were distributed over a 10 \*10 km square to take account of the fact that the VMS point data constitute snapshots of hauls of several hours that covers a distance of 5-15 nautical miles.

The associated gross value added assigned to each segment of the fleet was estimated on the basis of the average percentage of the gross value added's contribution to the production value as known in LEI's Farm Accountancy Data Network. This method provides for the determination of the reduction in catch value and gross added value caused by the closure of the areas.

## 2.3 Processing of data for non-Dutch vessels

A distinction can be also made between a number of steps in the processing of the spatial distribution data for non-Dutch vessels. These are reviewed below. This data distinguishes itself from the data for Dutch vessels in that solely the VMS data for the Dutch section of the continental shelf provides complete coverage. This is also why a different method was used to distribute the catches between the VMS points. However, first of all the VMS data was processed and the patterns in fishing efforts were determined. Next, the fishing efforts were used to distribute the available catches between the various points. These first steps are illustrated by the example included in Table 2.3.

**Table 2.3 Example of a calculation of the catch at the VMS positions during one trip of a non-Dutch vessel a)**

DH1	Time	Speed	Duration	Catch
21 Aug. leaves port	2;00			
21 Aug.	14:00	0.2	2:00 b)	
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			
Total duration of trip			20:00	
Total duration of VMS			6:00	
VMS's share of total duration of trip (%)			30%	
Non-allocated catch				1,260
Total catch				1,800

a) First, 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). Where necessary, this was corrected with the standard time interval (2 hours). 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. 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; b) this time interval as compared to the beginning of the trip is twelve hours. However, it was corrected to two hours because the previous VMS points were probably lacking.

The catches and average auction prices were used to determine the value of the catches. No gross value added was calculated for non-Dutch vessels. A GIS application could then be used to make an estimate of the effort, catches and catch value in specific fishing areas.

### 2.3.1 Processing of VIRIS data

The data was processed in the same manner as for Dutch vessels.

### 2.3.2 Processing of VMS data

The data was processed in the same manner as for Dutch vessels.

### 2.3.3 Distribution of catches between the VMS points

The combination of VMS data with information from the logbook yielded information about the geographic positions during each trip and the total catch during the trip or - when the relevant data was available - the catch per day. On assuming that the catch per fishing hour was constant during the trip/day the catch could be distributed between the positions on the basis of the duration at each position. However, since VMS positions are available solely for the Dutch section of the continental shelf some of the VMS positions were probably lacking and, consequently, some information about catch locations was also lacking. For this reason, a distribution of the catch between the available VMS positions would result in an overestimation of the catch at each of the positions. This was avoided by assuming that each segment of the trip is equally productive. On the basis of this assumption the total catch made at the VMS positions could be estimated from the total time assigned to the VMS positions and the total duration of the trip. The catch at the various positions was then distributed on the basis of the method used for Dutch vessels.

### 2.3.4 Scaling up to the entire fleet

It cannot be assumed, in contrast to the situation with the Dutch vessels, that the VIRIS data provides full coverage for non-Dutch vessels. Nor does the VMS data necessarily provide full coverage for all non-Dutch vessels, although it is assumed that the small non-Dutch vessels fishing in the Dutch section of the continental shelf account for only a very small proportion. For this reason, the catches were scaled up to the total quantity for VMS positions. The catches at VMS points for which catch data was not available were estimated on the basis of CPUE estimates. These were in turn calculated for each country, HP category and type of fishing gear on the basis of catches at VMS positions for which catch data was available.

### 2.3.5 Determination of the value of the catches

The data was processed in the same manner as for Dutch vessels.

### 2.3.6 Determination of the landed catches, value of the catches and gross value added within fishing areas

The data was processed in the same manner as for Dutch vessels. No gross value added was calculated for non-Dutch vessels.

## 3 Determination of the data quality

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This Section begins with a discussion of the quality of the data from each source and continues with a presentation of an analysis of the effects on the quality of the estimates.

### 3.1 Data used for Dutch vessels

#### 3.1.1 VIRIS data

The VIRIS data covers 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.

#### 3.1.2 VMS data

Table 3.1 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 3.1** Coverage percentages of VMS data and average catch per type of fishing gear and HP category in the years from 2006 to 2008 inclusive

Fleet	Gear a)	HP category	Average total catch 2006-2008 (* 1,000 kg)	2006	2007	2008
cutter	DRB	301-1,500	1,700	99	92	99
cutter	FPO	0-300	6	7	44	33
cutter	GN	0-300	4	39	41	50
cutter	GND	0-300	2	0		
cutter	GNS	unknown	4	0	0	0
cutter	GNS	0-300	324	24	26	17
cutter	GNS	301-1,500	17	7	0	0
cutter	GTR	0-300	1	0	0	0
cutter	LH	0-300	0	0		
cutter	LHM	301-1,500	4			100
cutter	LHP	0-300	81	0	0	0
cutter	LHP	301-1,500	21	0	0	0
cutter	LL	0-300	0		0	0
cutter	MIS	unknown	0		0	
cutter	MIS	0-300	180	11	41	7
cutter	MIS	301-1,500	682	99	97	96
cutter	MIS	>1,501	121	100	100	
cutter	UKN	0-300	0	100	100	100
cutter	UKN	301-1,500	296	100	100	100
cutter	OTB	0-300	2,483	94	96	92
cutter	OTB	301-1,500	889	99	95	96
cutter	OTB	>1,501	812	63	95	96
cutter	OTG	0-300	1			100
cutter	OTM	0-300	141	31	83	33
cutter	OTM	301-1,500	796	100	100	100
cutter	OTM	>1,501	3,807	100	88	
cutter	OTT	0-300	525	94	95	99
cutter	OTT	301-1,500	22			85
cutter	OTT	>1,501	58	100	44	100
cutter	PS	unknown	0			0
cutter	PS	0-300	37	35	51	24



<b>Table 3.1</b>		<b>Coverage percentages of VMS data and average catch per type of fishing gear and HP category in the years from 2006 to 2008 inclusive (continued)</b>				
<b>Fleet</b>	<b>Gear a)</b>	<b>HP category</b>	<b>Average total catch 2006-2008 (* 1,000 kg)</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
cutter	PTB	0-300	27	94	100	
cutter	PTB	301-1,500	3		77	
cutter	PTM	0-300	1	0	0	0
cutter	SDN	301-1,500	223		29	36
cutter	SSC	0-300	1	0		
cutter	SSC	301-1,500	2,345	97	97	95
cutter	TBB	unknown	1	100		
cutter	TBB	0-300	4,028	94	96	94
cutter	TBB	301-1,500	952	95	97	97
cutter	TBB	>1,501	40,437	94	99	98
cutter	TBS	0-300	14,880	96	97	96
cutter	TBS	301-1,500	41	41	92	0
high seas	OTM	>1,501	317,447	100	100	99
high seas	PTM	>1,501	18,583	100	100	100

a) Fishing gear codes are included in Annex 3.  
Source: Logbook data and VMS data, processed by LEI.

Tables 3.2 to 3.4 for 2006 to 2008 show how the VMS catches were distributed between the three categories, whereby a distinction was made in terms of the availability of day-catch 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 3.2** 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 (* 1,000 kg)	With day catch		Without day catch	
			Normal day	Only unknown	Normal trip	Only unknown
<i>Cutter fleet</i>						
DRB	301-1,500	1,408	0	100	0	0
FPO	<300	0	0	100	0	0
GN	<300	1	100	0	6	0
GNS	<300	100	100	0	2	0
GNS	301-1,500	1	100	0	0	0
MIS	<300	17	0	97	0	3
MIS	301-1,500	640	0	100	0	0
MIS	>1,501	255	0	100	0	0
UKN	<300	3	0	0	0	100
UKN	301-1,500	609	0	0	0	100
UKN	>1,501	53	0	0	0	100
OTB	<300	2,089	100	0	1	0
OTB	301-1,500	686	100	0	1	0
OTB	>1,501	183	100	0	0	0
OTM	<300	59	0	100	0	0
OTM	301-1,500	1,344	0	100	0	0
OTM	>1,501	9,872	0	100	0	0
OTT	<300	672	100	0	1	0
OTT	>1,501	49	100	0	0	0
PS	<300	8	0	98	0	2
PTB	<300	72	0	98	0	2
SSC	301-1,500	1,674	100	0	0	0
TBB	unknown	2	0	100	0	0
TBB	<300	4,089	100	0	1	0
TBB	301-1,500	1,073	100	0	0	0
TBB	>1,501	41,687	100	0	0	0
TBS	<300	14,900	0	0	100	0
TBS	301-1,500	10	0	0	100	0

**Table 3.2** 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 (continued)

Gear a)	HP category	VMS catch (* 1,000 kg)	With day catch		Without day catch	
			Normal day	Only unknown	Normal trip	Only unknown
<i>High seas fleet</i>						
OTM	>1,501	329,689	0	99	0	1
PTM	>1,501	22,213	0	100	0	0
a) Fishing gear codes are included in Annex 3. Source: Logbook data and VMS data, processed by LEI.						

**Table 3.3** 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 (* 1,000 kg)	With day catch		Without day catch	
			Normal day	Only unknown	Normal trip	Only unknown
<i>Cutter fleet</i>						
DRB	301-1,500	1,728	0	100	0	0
FPO	<300	3	0	87	0	13
GN	<300	3	100	0	0	0
GNS	<300	118	100	0	0	0
MIS	<300	88	0	100	0	0
MIS	301-1,500	700	0	100	0	0
MIS	>1,501	107	0	100	0	0
UKN	<300	19	0	0	0	100
UKN	301-1,500	487	0	0	0	100
UKN	>1,501	60	0	0	0	100
OTB	<300	2,401	99	0	1	0
OTB	301-1,500	935	99	0	1	0
OTB	>1,501	460	100	0	0	0
OTM	<300	66	0	100	0	0
OTM	301-1,500	1,035	0	100	0	0
OTM	>1,501	1,365	0	100	0	0

**Table 3.3** 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 (continued)

Gear a)	HP category	VMS catch (* 1,000 kg)	With day catch		Without day catch	
			Normal day	Only unknown	Normal trip	Only unknown
OTT	<300	454	100	0	1	0
OTT	>1,501	16	99	0	1	0
PS	<300	11	0	100	0	0
PTB	<300	6	0	100	0	0
PTB	301-1,500	7	0	100	0	0
SDN	301-1,500	101	99	0	1	0
SSC	301-1,500	2,539	99	0	1	0
TBB	<300	3,652	98	0	2	0
TBB	301-1,500	855	100	0	0	0
TBB	>1,501	43,954	99	0	0	0
TBS	<300	15,366	0	0	100	0
<i>High seas fleet</i>						
UKN	>1,501	13,612	0	0	0	100
OTM	>1,501	343,951	0	96	0	4
PTM	>1,501	18,404	0	100	0	0
a) Fishing gear codes are included in Annex 3. Source: Logbook data and VMS data, processed by LEI.						

**Table 3.4** 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 (* 1,000 kg)	With day catch		Without day catch	
			Normal day	Only unknown	Normal trip	Only unknown
<i>Cutter fleet</i>						
DRB	301-1,500	1,790	0	100	0	0
FPO	<300	2	0	92	0	8
GN	<300	4	100	0	0	0
GNS	<300	95	100	0	0	0
LHM	301-1,500	12	0	100	0	0

**Table 3.4** 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 (continued)

Gear a)	HP category	VMS catch (* 1,000 kg)	With day catch		Without day catch	
			Normal day	Only unknown	Normal trip	Only unknown
MIS	<300	12	0	100	0	0
MIS	301-1,500	653	0	100	0	0
UKN	<300	5	0	0	0	100
UKN	301-1,500	510	0	0	0	100
UKN	>1,501	79	0	0	0	100
OTB	<300	2,669	99	0	1	0
OTB	301-1,500	1,009	99	0	1	0
OTB	>1501	1,788	99	0	0	0
OTG	<300	2	0	100	0	0
OTM	<300	49	0	100	0	0
OTM	301-1,500	10	0	98	0	2
OTT	<300	410	100	0	0	0
OTT	301-1,500	58	99	0	1	0
OTT	>1,501	109	100	0	0	0
PS	<300	15	0	100	0	0
SDN	301-1,500	555	100	0	0	0
SSC	301-1,500	2,589	99	0	0	0
TBB	<300	4,045	99	0	1	0
TBB	301-1,500	902	100	0	0	0
TBB	>1,501	34,339	99	0	0	0
TBS	<300	14,462	0	0	99	1
TGB	>1,501	11	0	97	0	3
<i>High seas fleet</i>						
UKN	>1,501	7,547	0	0	0	100
OTM	>1,501	294,987	0	98	0	2
PTM	>1,501	15,131	0	100	0	0

a) Fishing gear codes are included in Annex 3.  
Source: Logbook data and VMS data, processed by LEI.

### 3.1.3 Price data

The price data covers all landings of species controlled by quota in the Netherlands. Landings outside the Netherlands are not included in this 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.

### 3.1.4 Economic data

The economic data covers 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.

## **3.2 Data used for non-Dutch vessels**

### 3.2.1 VIRIS data

The VIRIS data covers trips of non-Dutch vessels that land in the Netherlands. Consequently, no catch data is 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 3.5 Coverage percentages of catch data and average catch per type of fishing gear and HP category in the years from 2006 to 2008 inclusive**

Country	HP category	Gear a)	2006	2007	2008
BEL			0	0	0
BEL		TBB	0	0	0
BEL	<300		0	0	0
BEL	<300	OTB	99	100	100
BEL	<300	TBB	96	98	100
BEL	<300	TBS	99	99	99
BEL	301-1,500		1	0	0
BEL	301-1,500	OTB	97	98	97
BEL	301-1,500	TBB	93	98	97
DEU			0	0	0
DEU		GN	0	89	0
DEU		OTB	0	90	0
DEU		OTM	0	0	0
DEU		TBB	0	98	100
DEU		TBS	0	100	100
DEU	<300		0	0	0
DEU	<300	GN	98	97	98
DEU	<300	GNS	94	87	92
DEU	<300	MIS	100	55	0
DEU	<300	UKN	100	0	0
DEU	<300	OTB	99	100	98
DEU	<300	OTM	100	0	0
DEU	<300	OTT	100	0	0
DEU	<300	PTB	90	94	0
DEU	<300	SPR	72	0	0
DEU	<300	TBB	98	100	98
DEU	<300	TBS	59	35	61
DEU	301-1,500		0	0	0
DEU	301-1,500	OTB	100	98	99
DEU	301-1,500	PTB	46	0	0
DEU	301-1,500	SSC	0	75	0
DEU	301-1,500	TBB	99	99	99
DEU	>1,501		0	0	0

**Table 3.5**

**Coverage percentages of catch data and average catch per type of fishing gear and HP category in the years from 2006 to 2008 inclusive (continued)**

Country	HP category	Gear a)	2006	2007	2008
DEU	>1,501	OTM	22	44	56
DNK			0	0	0
DNK		GN	87	100	0
DNK		GNS	0	94	0
DNK		OTB	91	0	0
DNK		OTT	0	100	0
DNK		SDN	0	98	0
DNK		SSC	0	82	0
DNK	<300		0	0	0
DNK	<300	GN	98	99	96
DNK	<300	GND	0	38	0
DNK	<300	GNS	93	90	94
DNK	<300	GTR	89	13	0
DNK	<300	OTB	16	0	0
DNK	<300	SDN	85	88	87
DNK	<300	TBB	62	0	16
DNK	301-1,500		0	0	0
DNK	301-1,500	GN	100	100	95
DNK	301-1,500	GNS	94	77	0
DNK	301-1,500	GTR	0	0	0
DNK	301-1,500	OTB	94	100	98
DNK	301-1,500	OTT	85	88	90
DNK	301-1,500	SSC	91	72	90
DNK	301-1,500	TBB	87	0	0
DNK	>1,501		0	0	0
FRA			0	0	0
FRA	<300		0	0	0
FRA	301-1,500		0	0	0
FRA	>1,501		0	0	0
FRA			0	0	0
GBR			0	0	0



**Table 3.5 Coverage percentages of catch data and average catch per type of fishing gear and HP category in the years from 2006 to 2008 inclusive (continued)**

Country	HP category	Gear a)	2006	2007	2008
GBR		TBB	96	0	100
GBR	<300		0	0	0
GBR	<300	FPO	0	80	0
GBR	<300	GN	85	90	79
GBR	<300	SDN	0	0	95
GBR	<300	TBB	37	100	99
GBR	301-1,500		0	0	0
GBR	301-1,500	DRB	0	0	0
GBR	301-1,500	FPO	1	100	90
GBR	301-1,500	OTB	100	100	99
GBR	301-1,500	OTT	98	98	100
GBR	301-1,500	PTB	0	0	91
GBR	301-1,500	SSC	30	75	94
GBR	301-1,500	TBB	97	99	99
GBR	301-1,500	TBS	0	11	0
GBR	>1,501		0	1	0
GBR	>1,501	OTB	0	0	100
GBR	>1,501	OTM	43	3	18
GBR	>1,501	OTT	100	100	100
GBR	>1,501	PTM	33	25	20
GBR	>1,501	SSC	0	14	0
GBR	>1,501	TBB	97	99	98
IRL			0	0	0
IRL	<300		0	0	0
IRL	301-1,500		0	0	0
IRL	301-1,500	FPO	0	27	42
IRL	>1,501		0	0	0
IRL	>1,501	OTM	0	0	0
LTU			0	0	0
LTU	>1,501	OTM	81	56	0
NOR			0	0	0

**Table 3.5** Coverage percentages of catch data and average catch per type of fishing gear and HP category in the years from 2006 to 2008 inclusive (continued)

Country	HP category	Gear a)	2006	2007	2008
NOR	301-1,500		0	0	0
NOR	>1,501		0	0	0
POL			0	0	0
RUS			0	0	0
SWE			0	0	0
UKN			0	0	0
XNE			0	0	0

a) Country and fishing gear codes are included in Annex 3.

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

### 3.2.2 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.

### 3.2.3 Price data

The price data covers all landings of species controlled by quota 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.

## 3.3 Error margin (statistical) in the estimates

The error margin in the estimates of the catches and the associated economic proceeds (catch value and gross value added) depends on a large number of factors:

- uncertainties about the distribution of the fishing efforts (location of the hauls);
- uncertainty about the distinction between fishing and sailing;
- uncertainties about the distribution of the catches between the hauls;
- uncertainties about the prices of the species;
- uncertainties about the relationship between income and gross value added.

The following assumptions were made in the calculation of the error margin in the estimates. It is extremely difficult to determine the potential error in the distribution of fishing effort and for this reason the error has not been taken into account. Consequently, this implies an underestimation of the potential error.

The variance in the catches from hauls is assumed to be the same in all trips, namely approximately  $CV = 0.6$  (Van Densen, 2001). The average catch per haul can now be used to calculate the standard error in the estimate of the catch in the area for each trip (formula 1).

The variance in the estimator for each stratum ( $v(\bar{Y}_{Dh})$ ) can be calculated from the standard deviation in the stratum ( $s_{y,h}^2$ ) using the formula:

$$v(\bar{Y}_{Dh}) = \frac{(1-f_h)}{n_h} s_{y,h}^2 \quad (1)$$

where:

$$f_h = \frac{n_h}{N_h} \quad (2)$$

$n_h$  is the number of random sample units (hauls within the area) and  $N_h$  the total number of hauls. This implies that the variance in the estimator (uncertainty) decreases when a larger proportion of the total number of hauls is made in the area: when all hauls during one day are made in the area then the uncertainty of the estimate is 0 and when only a small proportion of the hauls are made in the area then the uncertainty is large.

The variance in the total catch can be estimated from the variance in the estimate of individual trips using the following formula:

$$\sum_{i=1}^n \text{var}(X_i) + 2 \sum_{i=1}^n \sum_{j=i+1}^n \text{cov}(X_i, X_j) \quad (3)$$

where  $\text{var}(X_i)$  is the variance in the estimate of each trip and  $\text{cov}(X_i, X_j)$  is the covariance between the estimates of different trips.

The variance in the estimate of the total population can be calculated from the variance in the catch from individual trips ( $\text{var}(X_i)$ ) together with an estimate of the covariance between the estimates of the catches ( $\text{cov}(X_i, X_j)$ ), whereby a number of covariances play a role: spatial, temporal and between vessels. This covariance is estimated on the basis of a logistics regression analysis of the probability of catches in the areas. The explained variance obtained from this analysis, which serves as a rough measure for the correlation between the results from the trips, is approximately 0.3.

This can be calculated using the formula:

$$\text{Correlation} = r_{xy} = \frac{\text{COV } xy}{s_x s_y} \quad (4)$$

The aforementioned variance in the results from the trips and the correlation between trips yields an uncertainty (standard error) in the estimates of the total catches of between 15 and 30% for most variants, with a single outlier of 50%.

The variation in the value per haul is lower than the variance in the catch due to the compensation for the value of the various species. For this reason, the calculation of the variance in the estimates per trip assumes a CV of 0.4. This results in an uncertainty (standard error) in the estimates of the total value in the areas that is lower than for the catches, namely between 10 and 20%.

However, this estimate also needs to take account of the error caused by the calculation of catch values on the basis of average monthly prices and the calculation of the gross value added on the basis of the average ratio of the landing value to gross value added per fleet segment.

The potential error caused by using monthly prices is estimated by carrying out a regression analysis of the actual known catch values per trip listed in LEI's accounts (about 25% of the vessels) against the derived catch values determined from the catches and auction prices. This analysis reveals that the average market prices offer a good indication of the actual price and that for the number of trips that are concerned (within the areas) the resultant additional error in the total value of the catch is small (relative standard error < 0.05). Consequently, the total relative error in the value of the catches is also between 10 and 20%.

The error in the calculation of the gross value added per fleet segment is small: the relative standard error is also below 5%. As a result, the total relative error in the added value lies between 15 and 25%.

The confidence limits (the maximum possible deviation of the actual value) can be estimated by multiplying the relative errors (on the basis of the assumption of a normal distribution curve) by 1.96.

In view of the problems in the distribution of the catches by non-Dutch vessels these segments' catch patterns and catches/catch values in the areas can be regarded solely as indicative. Consequently, no estimate of the errors has been made for these vessels.

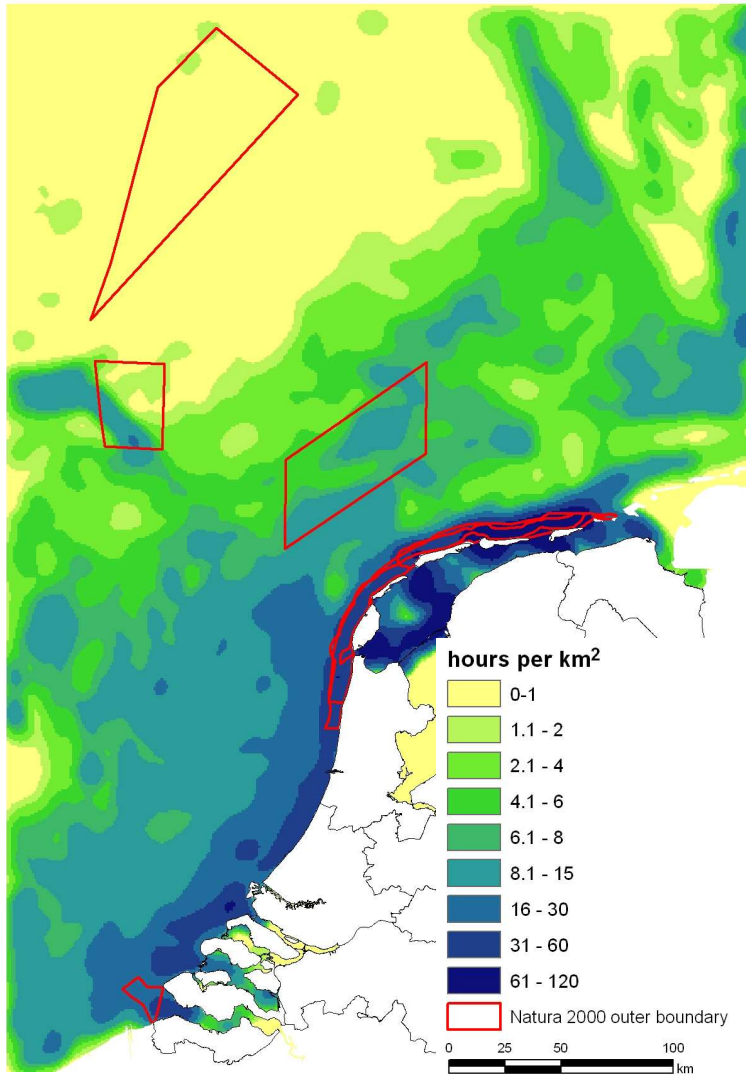
## 4 Patterns in the Dutch fisheries

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This Section presents the Dutch fisheries' patterns in effort, catches and catch value for the 2006-2008 period. Distribution maps for the catches and catch values obtained with the most common types (beam trawl, shrimp trawl and bottom otter trawl) in 2008 are included in Annex 4.

## 4.1 Effort

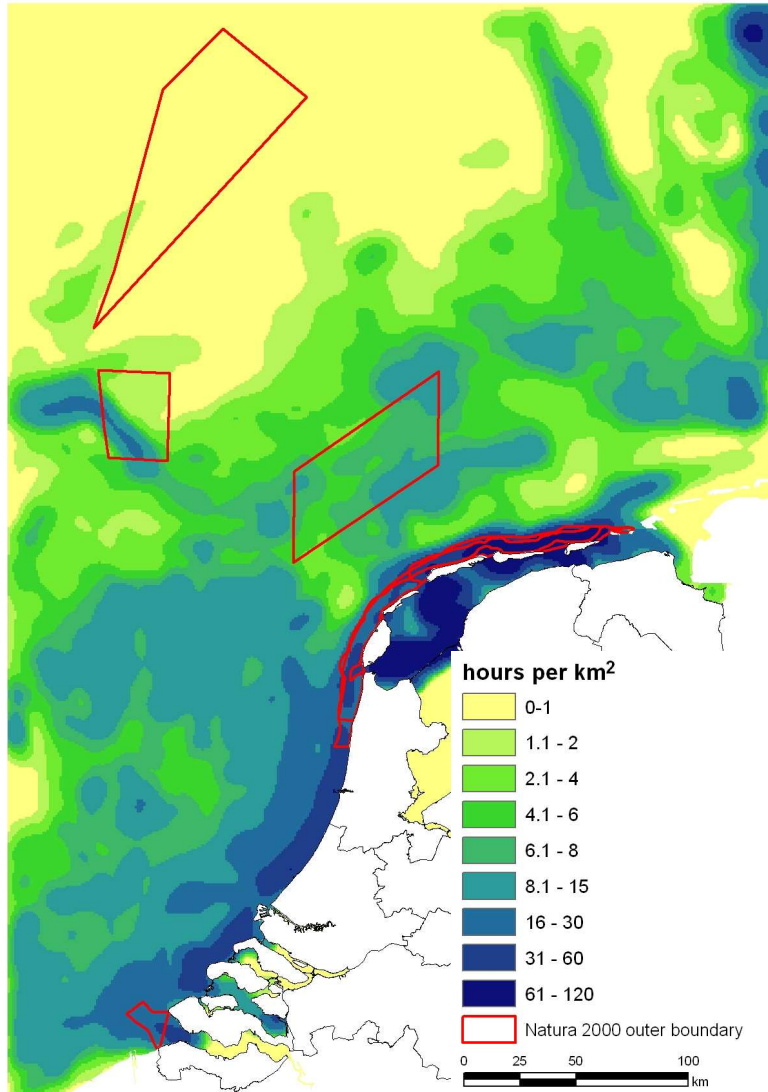
**Figure 4.1** Distribution of the effort of the Dutch fleet in the North Sea in 2006 and the position of the five designated Natura 2000 areas



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

Figure 4.2

Distribution of the effort of the Dutch fleet in the North Sea in 2007 and the position of the five designated Natura 2000 areas

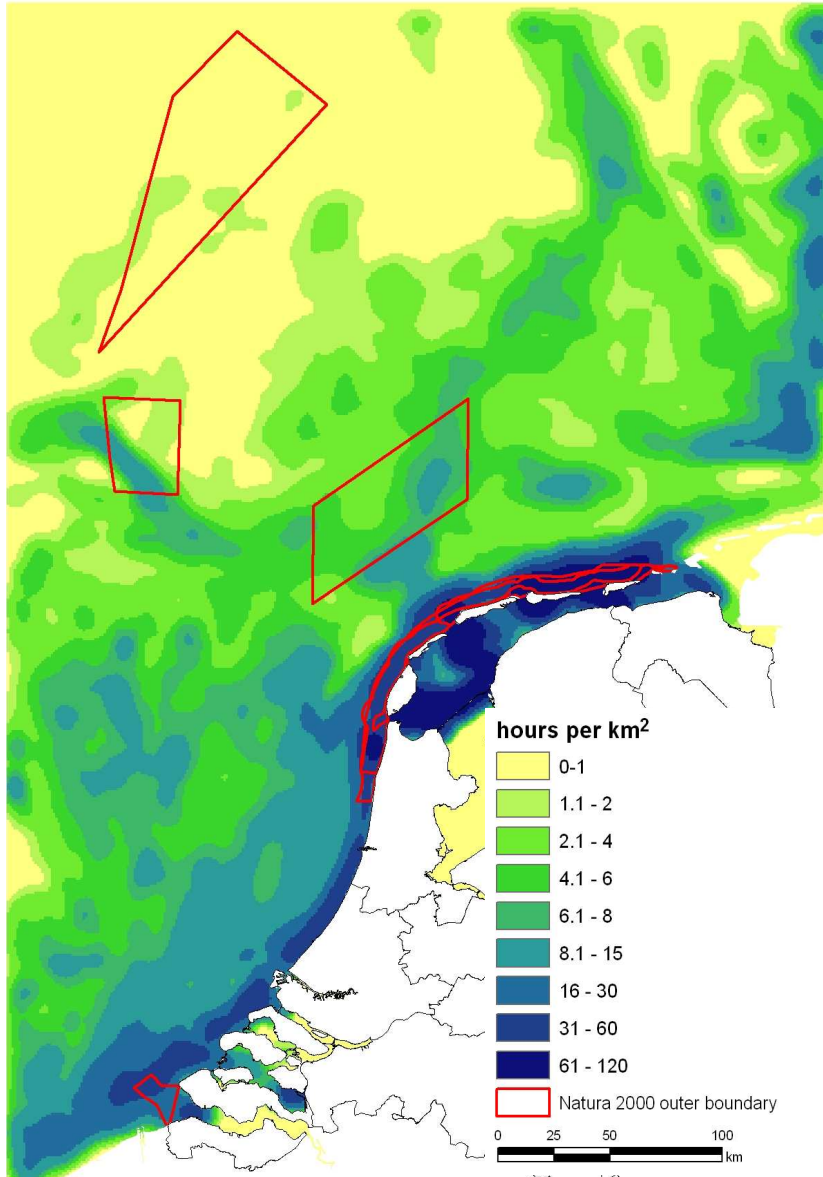


Source: Logbook data and VMS data, processed by LEI.



Figure 4.3

Distribution of the effort of the Dutch fleet in the North Sea in 2008 and the position of the five designated Natura 2000 areas



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

## 4.2 Catch

**Figure 4.4** Distribution of the catch of the Dutch fleet in the North Sea in 2006 and the position of the five designated Natura 2000 areas

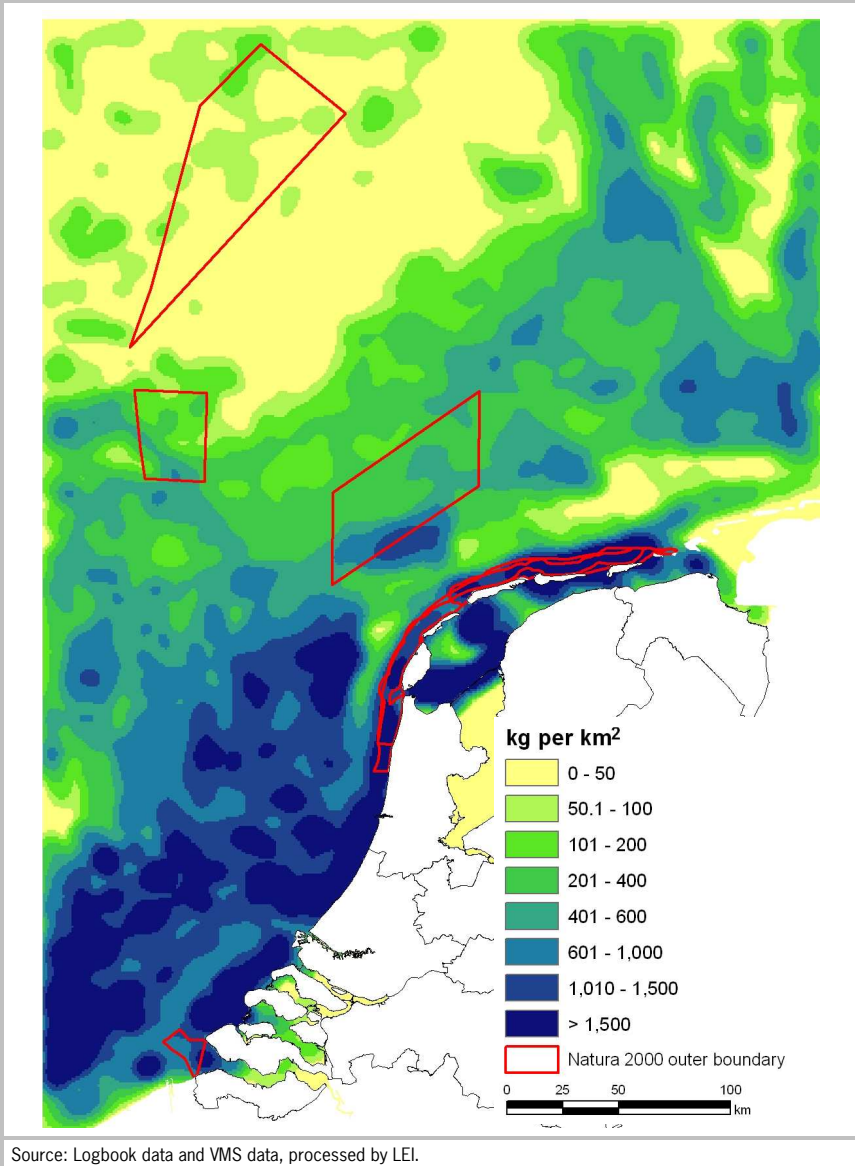
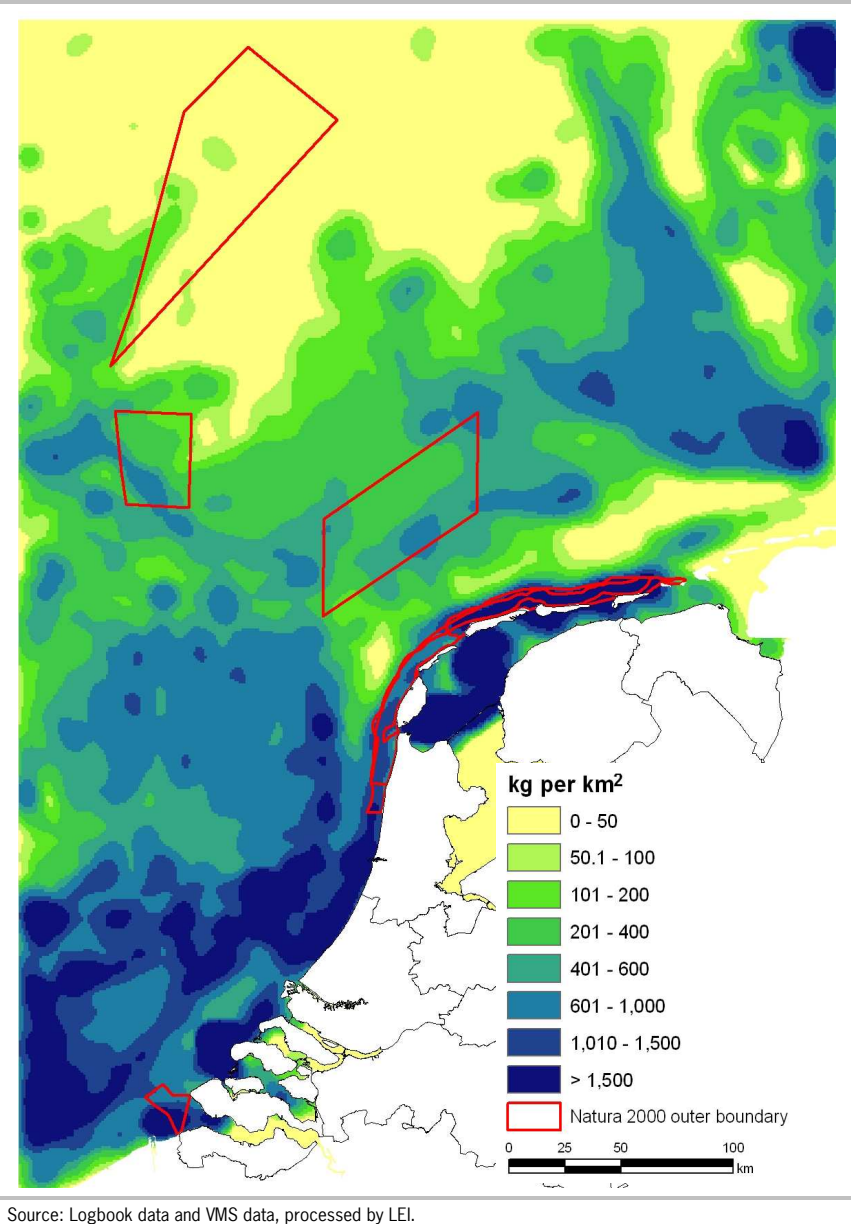


Figure 4.5

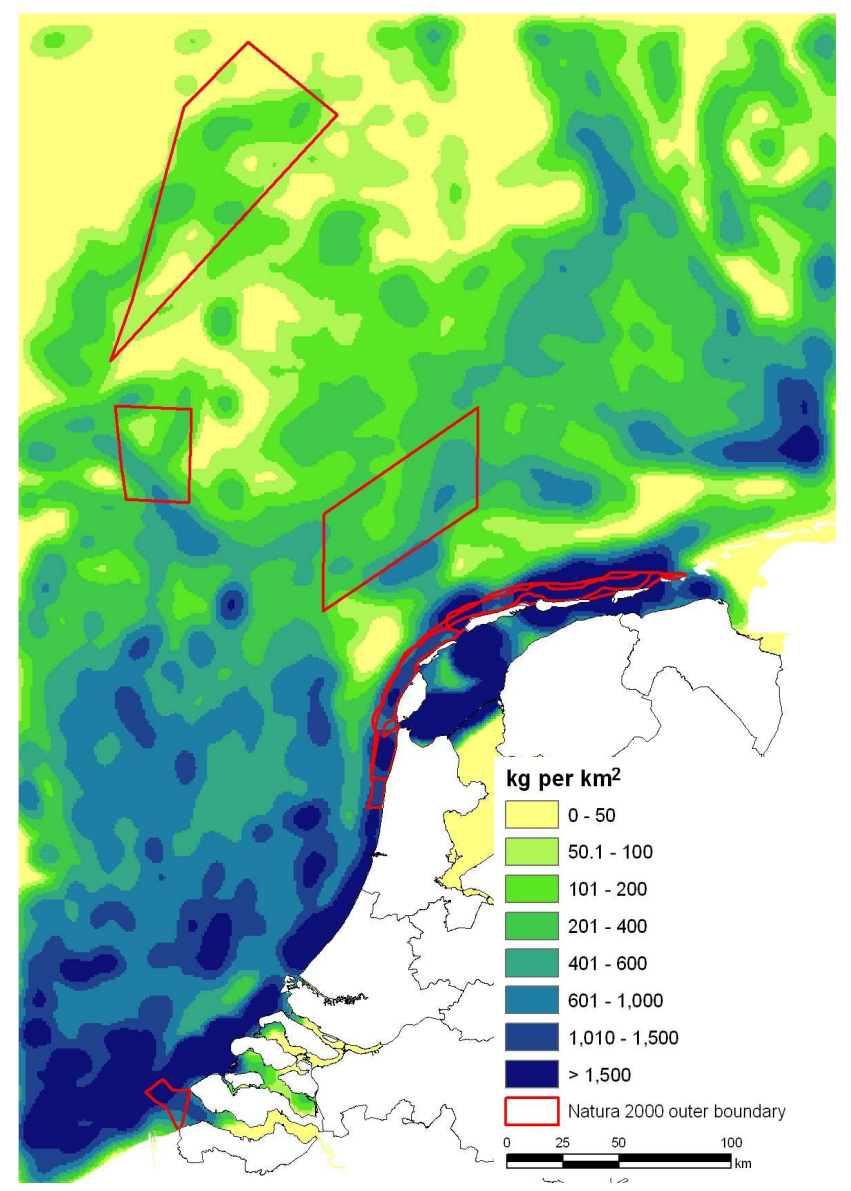
Distribution of the catch of the Dutch fleet in the North Sea in 2007 and the position of the five designated Natura 2000 areas



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

Figure 4.6

Distribution of the catch of the Dutch fleet in the North Sea in 2008 and the position of the five designated Natura 2000 areas



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

### 4.3 Catch value

**Figure 4.7** Distribution of the catch value of the Dutch fleet in the North Sea in 2006 and the position of the five designated Natura 2000 areas

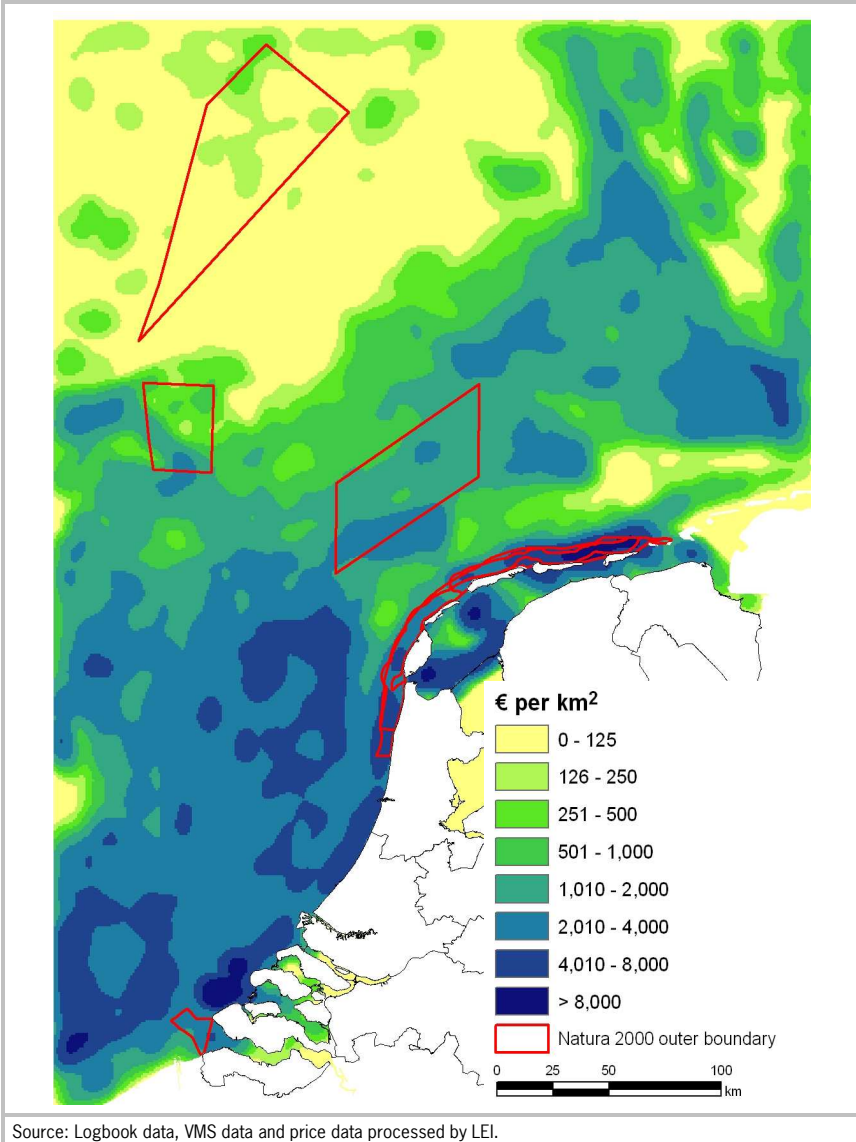
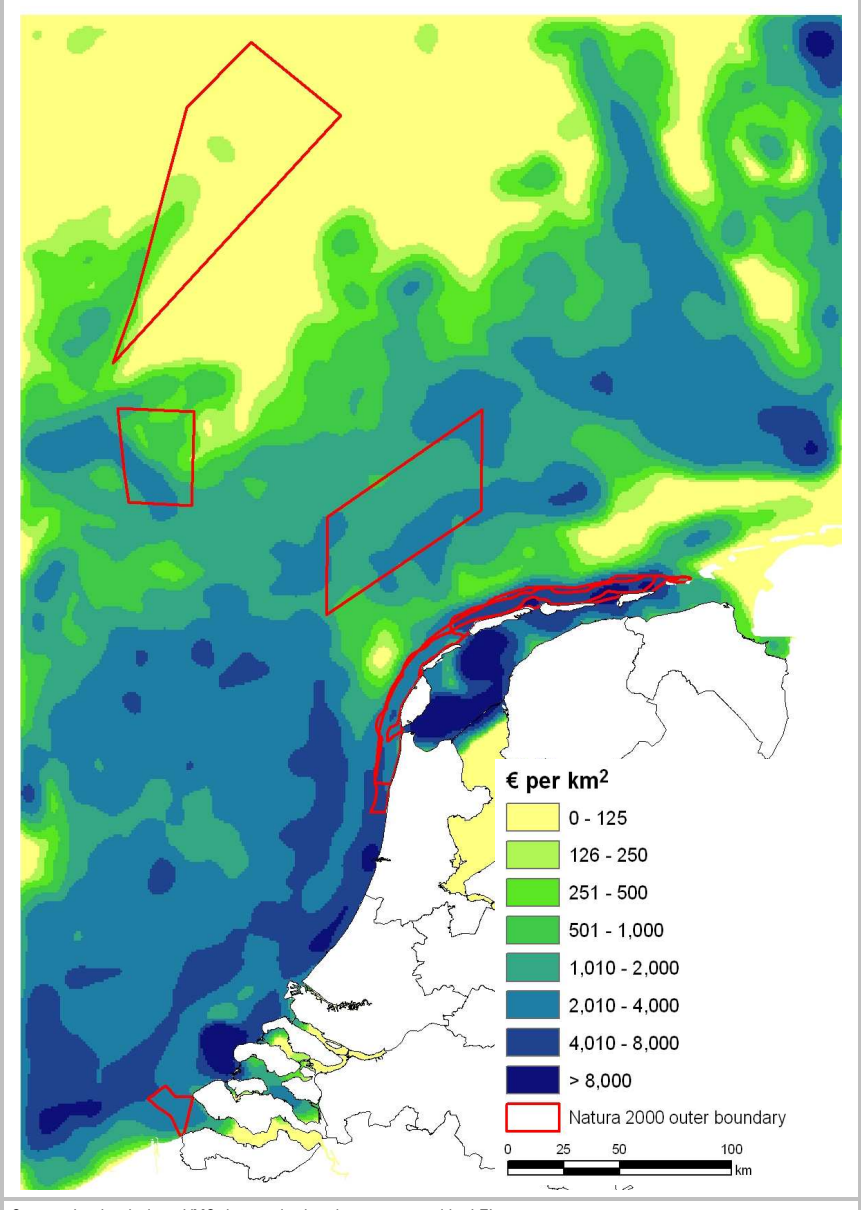


Figure 4.8

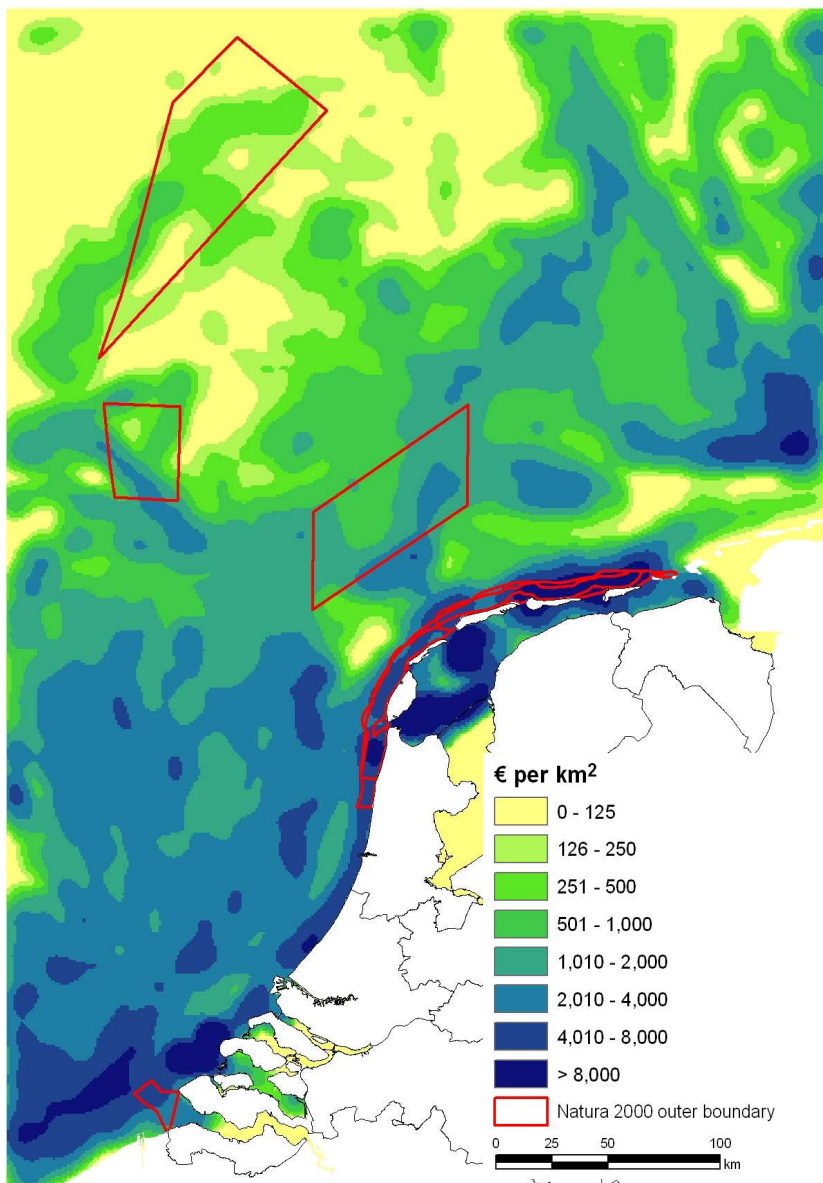
Distribution of the catch value of the Dutch fleet in the North Sea in 2007 and the position of the five designated Natura 2000 areas



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

Figure 4.9

Distribution of the catch value of the Dutch fleet in the North Sea in 2008 and the position of the five designated Natura 2000 areas



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

## 5 Patterns in the non-Dutch fisheries

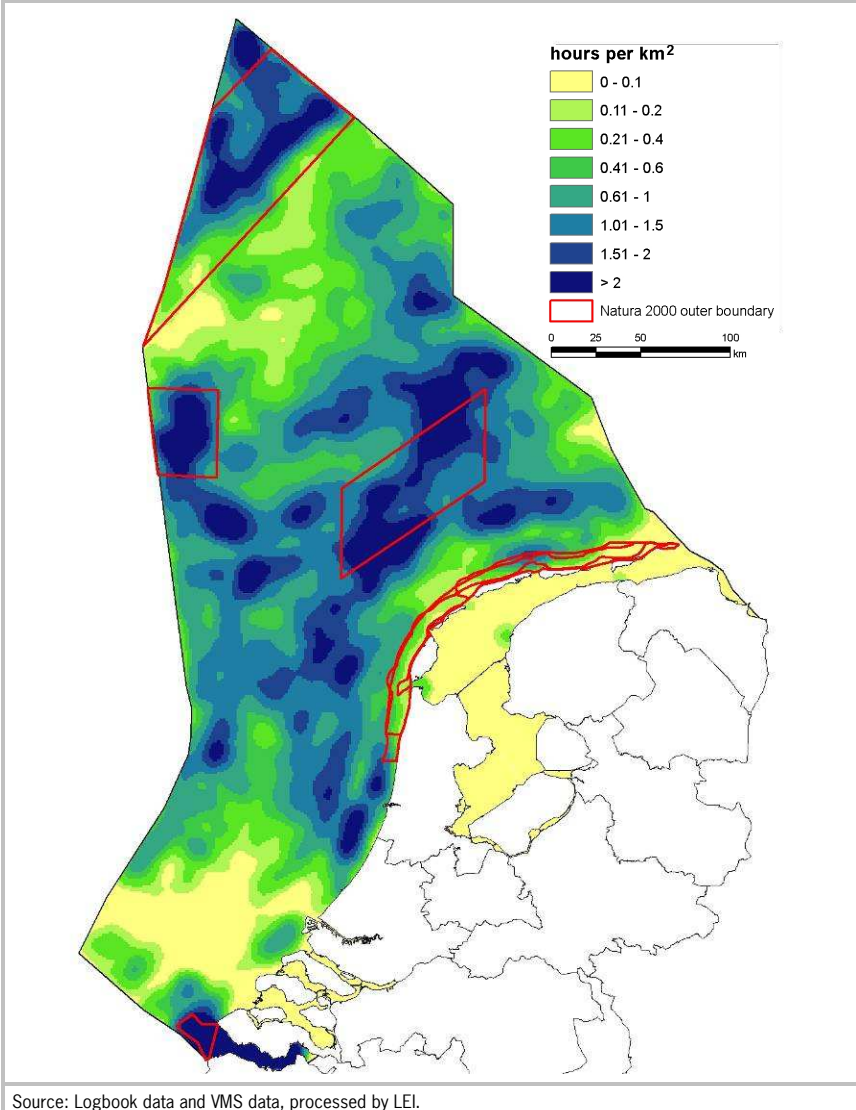
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This Section presents the non-Dutch fisheries' patterns in effort, catches and catch value for the 2006-2008 period.



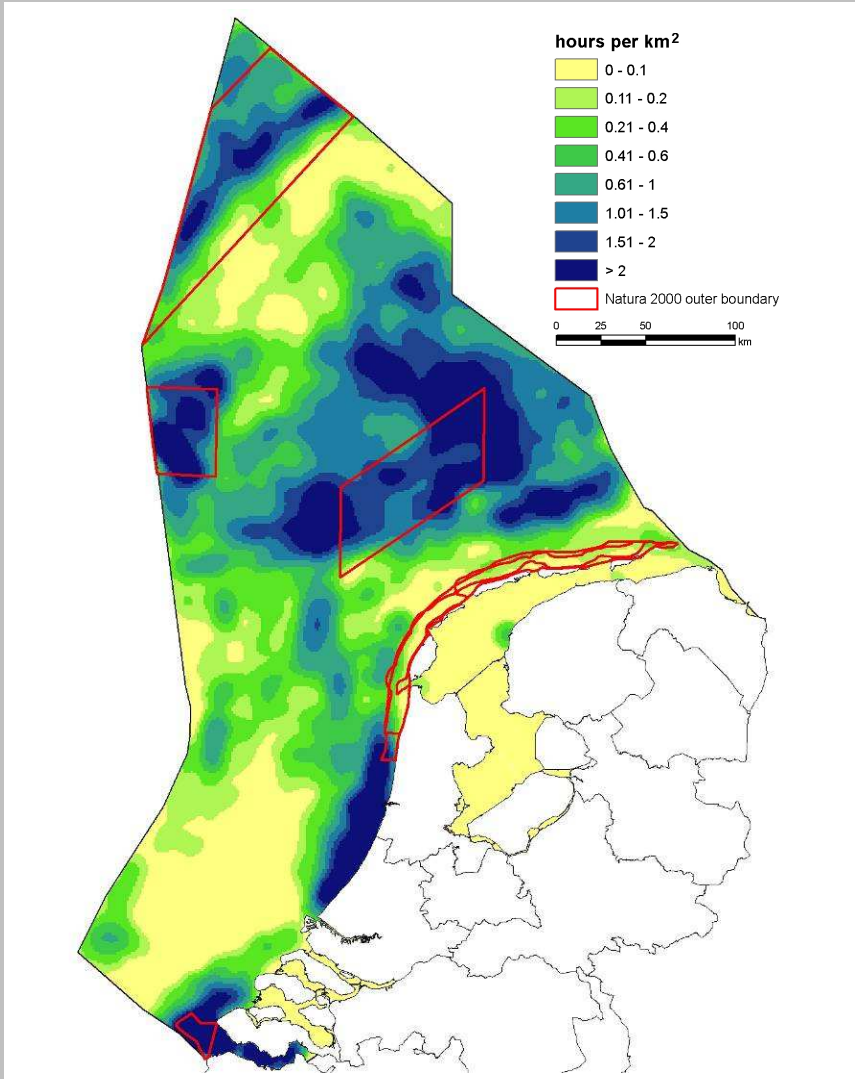
## 5.1 Effort

**Figure 5.1** Distribution of the effort of the non-Dutch fleet in the North Sea in 2006 and the position of the five designated Natura 2000 areas



**Figure 5.2**

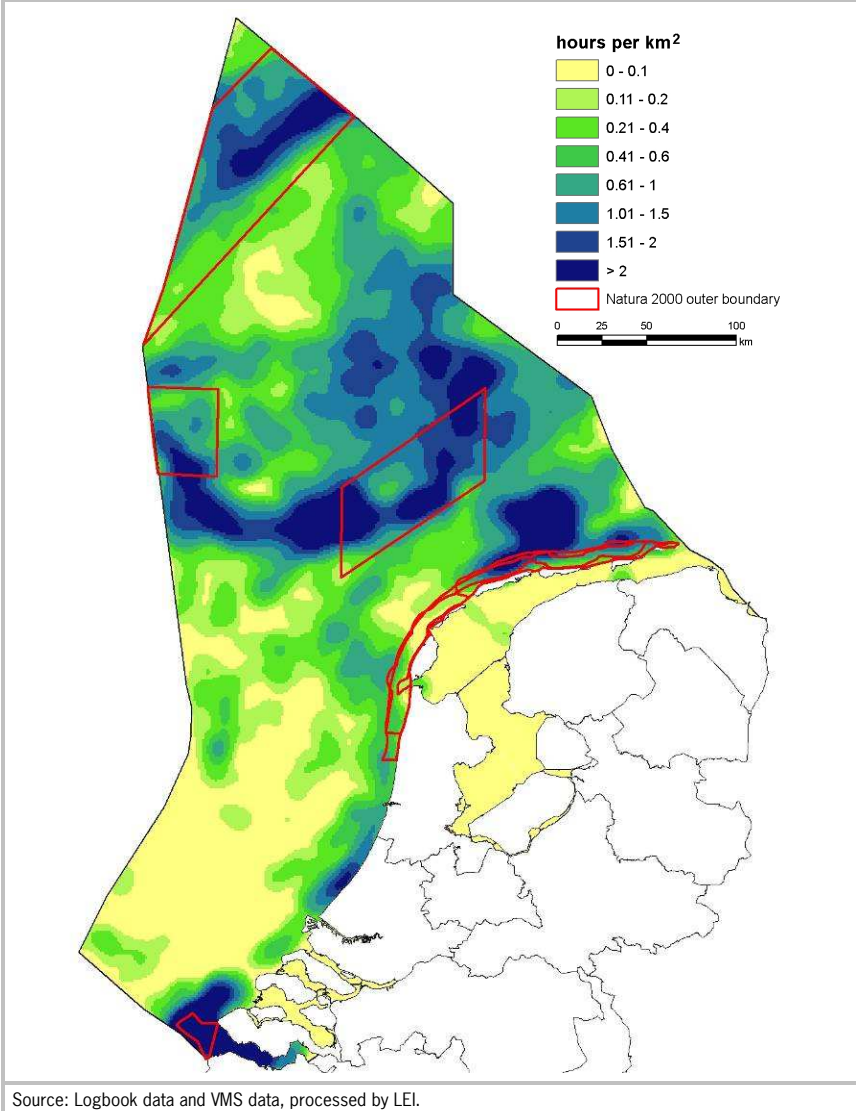
**Distribution of the effort of the non-Dutch fleet in the North Sea in 2007 and the position of the five designated Natura 2000 areas**



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

**Figure 5.3**

**Distribution of the effort of the non-Dutch fleet in the North Sea in 2008 and the position of the five designated Natura 2000 areas**



## 5.2 Catch

**Figure 5.4** Distribution of the catch of the non-Dutch fleet in the North Sea in 2006 and the position of the five designated Natura 2000 areas

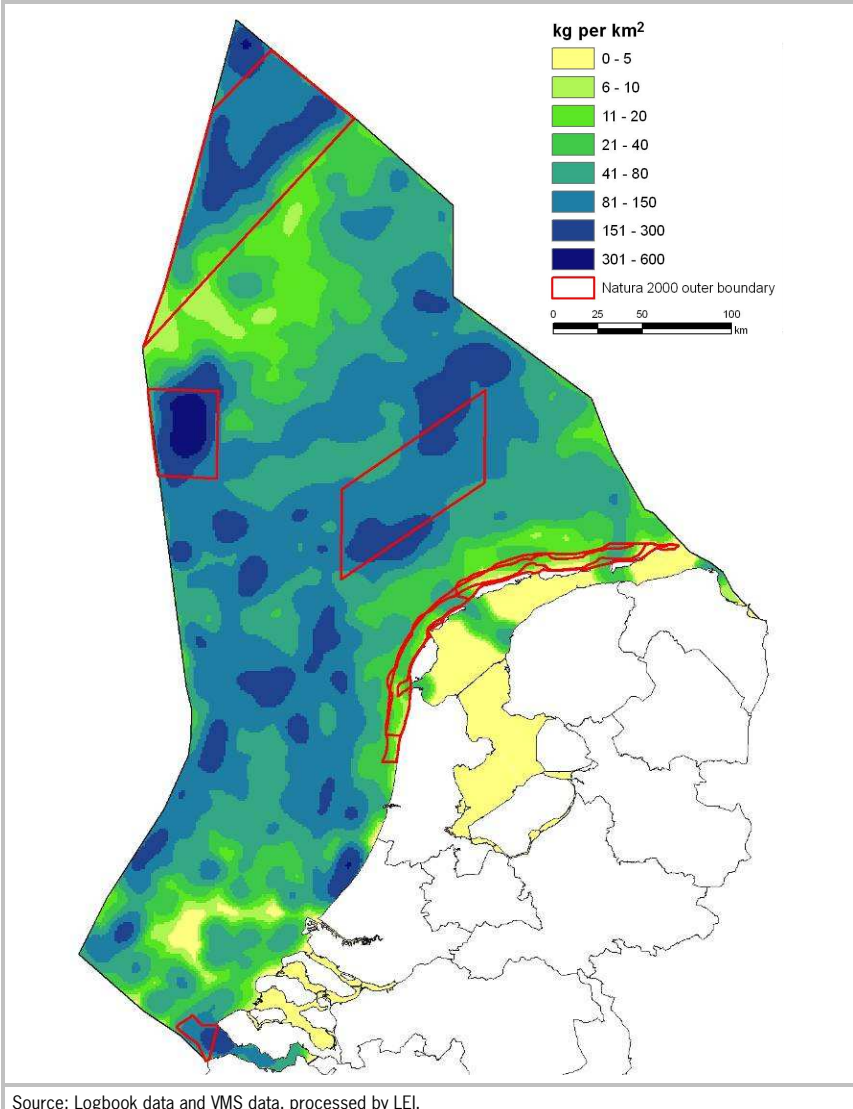
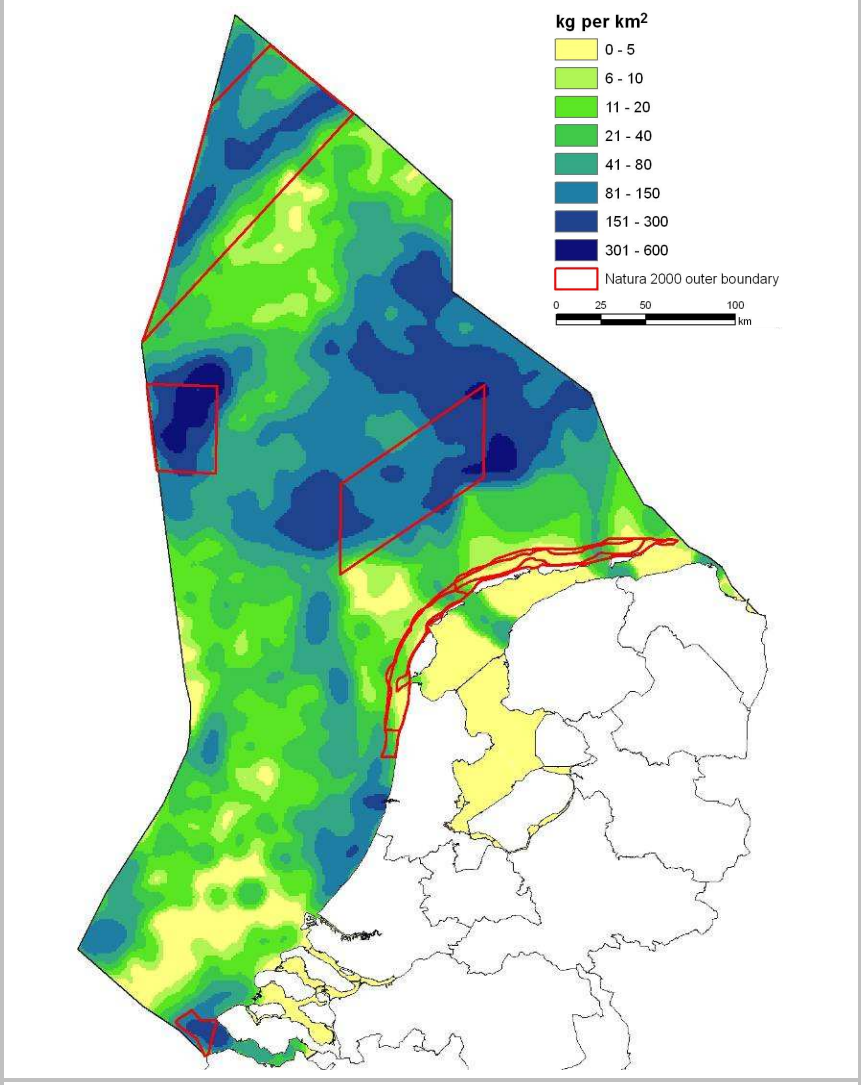


Figure 5.5

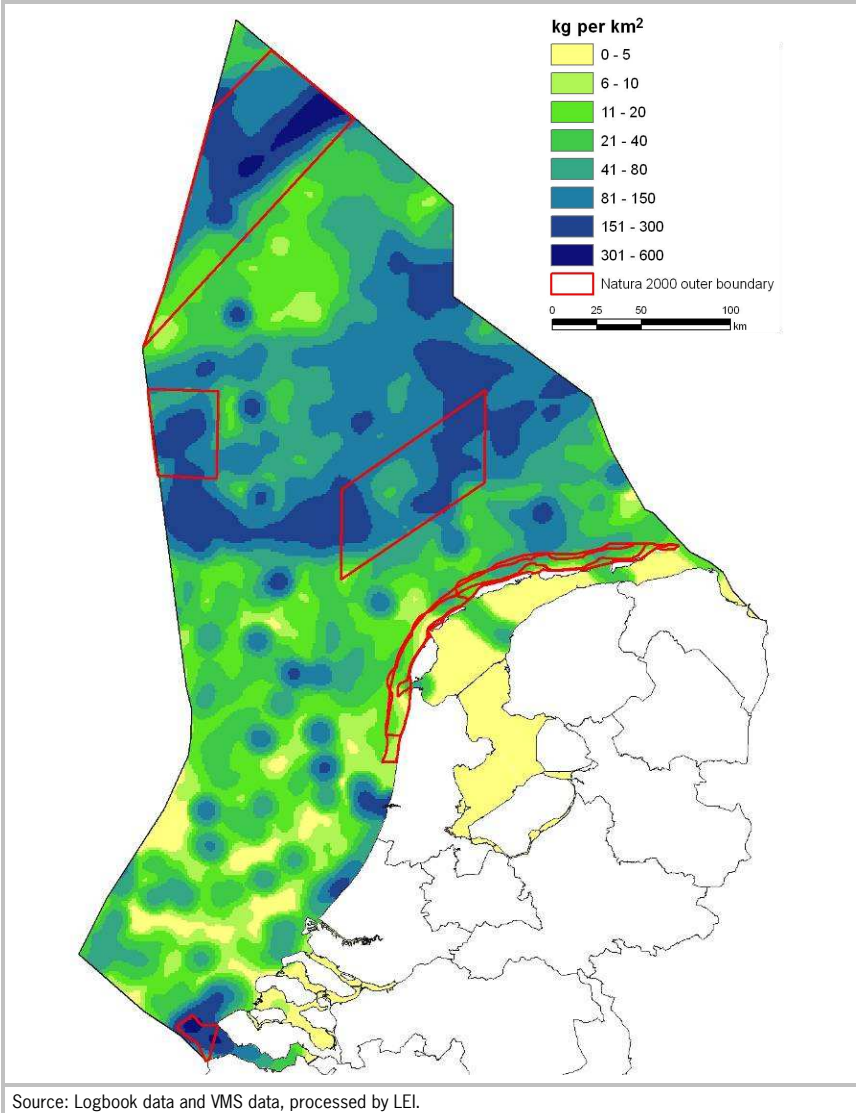
Distribution of the catch of the non-Dutch fleet in the North Sea in 2007 and the position of the five designated Natura 2000 areas



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

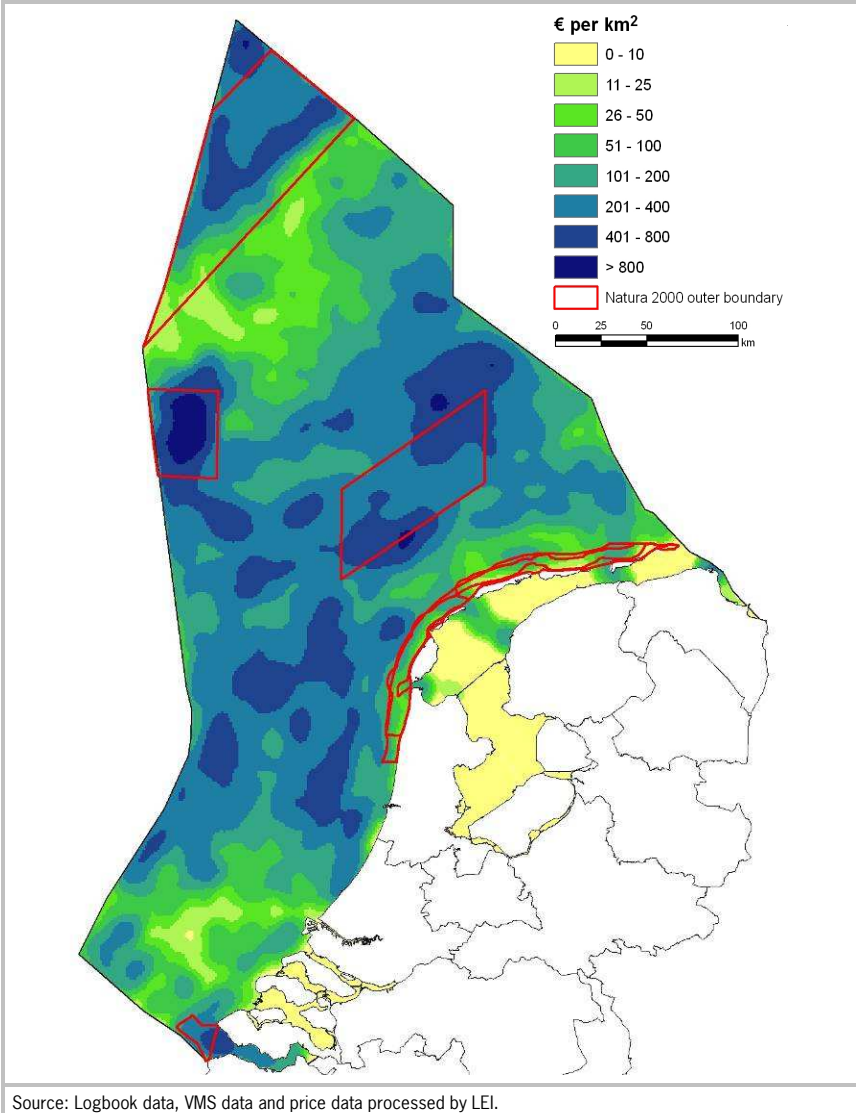
**Figure 5.6**

**Distribution of the catch of the non-Dutch fleet in the North Sea in 2008 and the position of the five designated Natura 2000 areas**



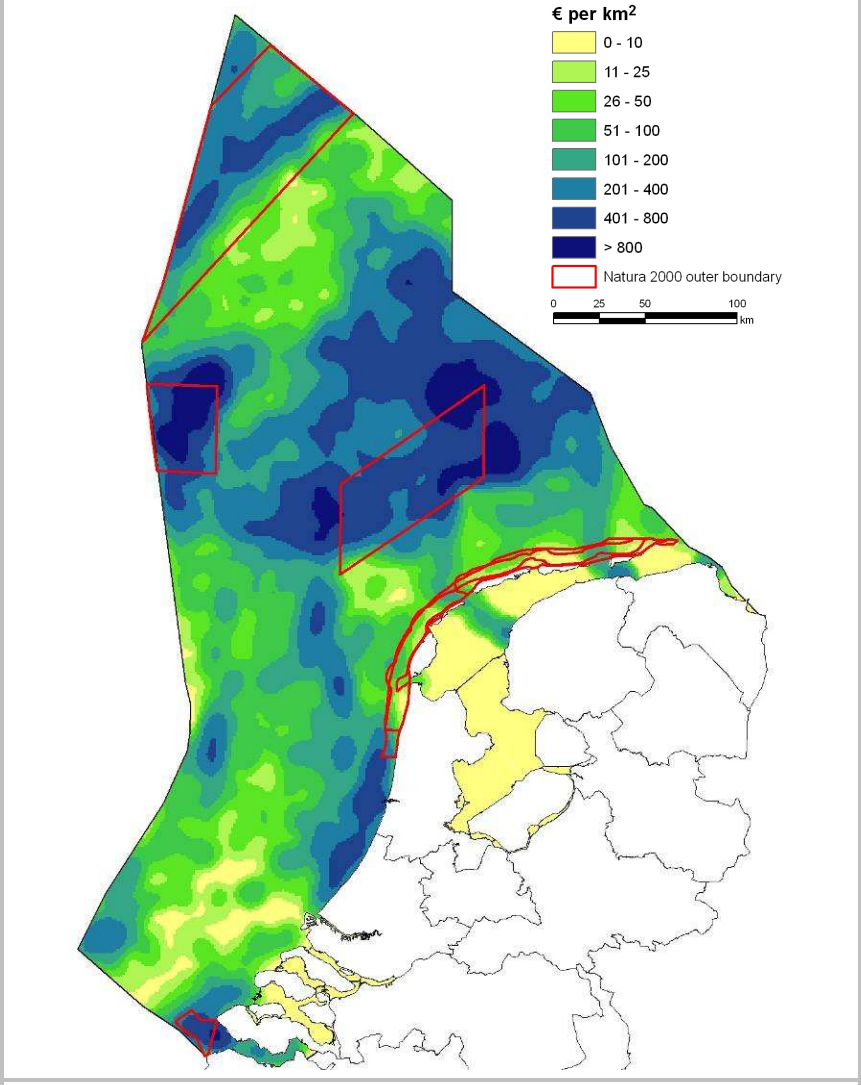
### 5.3 Catch value

**Figure 5.7** Distribution of the catch value of the non-Dutch fleet in the North Sea in 2006 and the position of the five designated Natura 2000 areas



**Figure 5.8**

**Distribution of the catch value of the non-Dutch fleet in the North Sea in 2007 and the position of the five designated Natura 2000 areas**

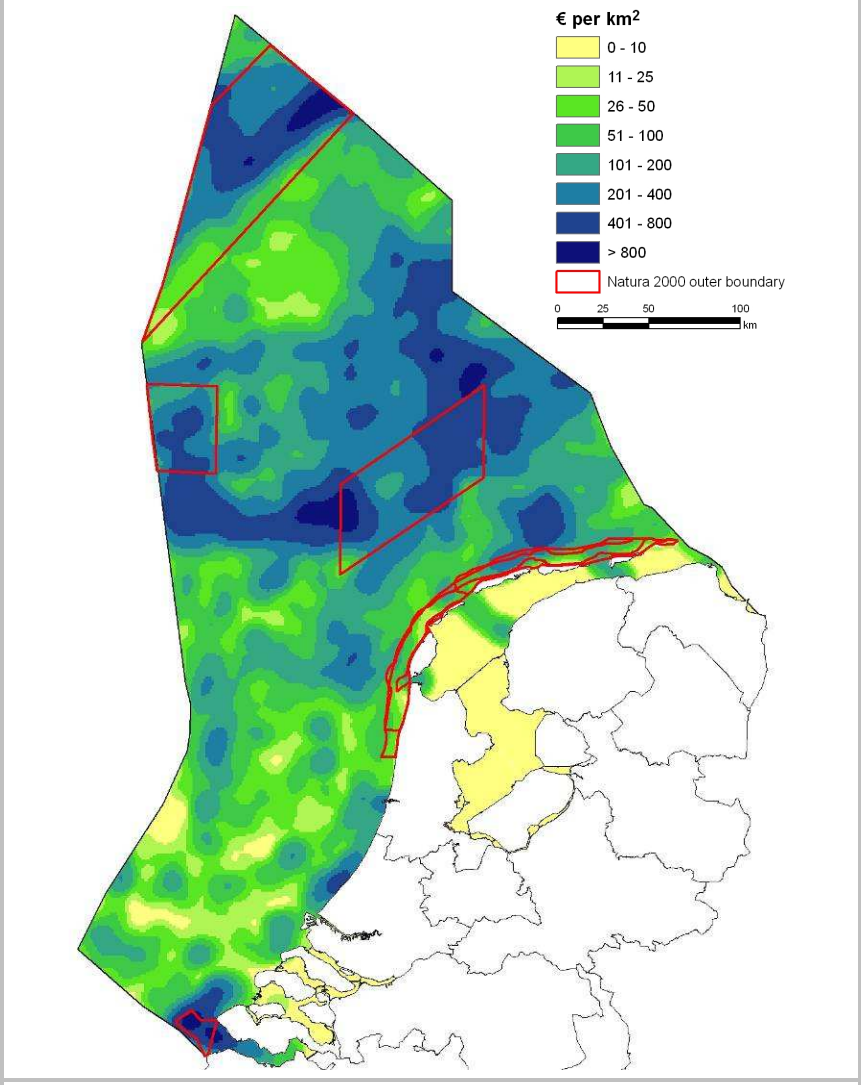


Source: Logbook data, VMS data and price data processed by LEI.



Figure 5.9

Distribution of the catch value of the non-Dutch fleet in the North Sea in 2008 and the position of the five designated Natura 2000 areas



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

## 6 Value areas for the Dutch fleet

The distribution maps were used to make an estimate of the fishing efforts, catches and catch values in the various areas that may be or have been designated as Natura 2000 areas: the Dogger Bank, Cleaver Bank, Frisian Front, the North Sea coastal zone and *Vlakte van de Raan*. The following tables list the results in each area. The estimated catches and catch values by species in each area are included in Annex 5.

<b>Table 6.0</b>		<b>Total landings, landings and gross value added of the fisheries in the various areas</b>			
<b>Area</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Average</b>	
<i>Landings (*1,000 kg)</i>					
Dogger Bank	199	125	564	296	
Frisian Front	1,347	1,228	1,019	1,198	
Cleaver Bank	314	475	336	375	
Coastal zone	3,234	2,470	3,158	2,954	
<i>Vlakte van de Raan</i>	147	231	253	210	
<i>Value (* €1,000)</i>					
Dogger Bank	462	294	1,190	649	
Frisian Front	5,031	5,191	4,099	4,774	
Cleaver Bank	1,035	1,667	1,141	1,281	
Coastal zone	8,167	7,684	10,847	8,899	
<i>Vlakte van de Raan</i>	357	439	759	518	
<i>Gross value added (* €1,000)</i>					
Dogger Bank	127	94	396	206	
Frisian Front	1,388	1,651	1,283	1,441	
Cleaver Bank	286	667	515	489	
Coastal zone	3,383	4,025	4,963	4,124	
<i>Vlakte van de Raan</i>	121	188	347	218	

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

## 6.1 Dogger Bank

Fleet	HP category	Gear a)	Effort (days at sea)				Time spent fishing
			2006	2007	2008	Average	
cutter	0-300	OTB	16	16	59	30	0.25
cutter	0-300	OTM	2			1	0.00
cutter	301-1,500	OTB	30	10	22	20	0.40
cutter	301-1,500	SSC		2	5	2	0.25
cutter	301-1,500	TBB	1			0	0.00
cutter	>1,501	UKN		4	3	2	0.00
cutter	>1,501	OTB	8	47	418	158	0.26
cutter	>1,501	TBB	323	150	277	250	0.17
high seas	>1,501	OTM		0		0	0.00
high seas	>1,501	PTM	0	0	0	0	0.00

a) Fishing gear codes are included in Annex 3.  
Source: Logbook data, VMS data and price data processed by LEI.

Fleet	HP category	Gear a)	Landings (*1,000 kg)			
			2006	2007	2008	Average
cutter	0-300	OTB	7	6	38	17
cutter	0-300	OTM	1			0
cutter	301-1,500	OTB	15	0	9	8
cutter	301-1,500	SSC		1	1	1
cutter	301-1,500	TBB	0			0
cutter	>1,501	UKN		0	0	0
cutter	>1,501	OTB	1	23	235	86
cutter	>1,501	TBB	166	91	251	169
high seas	>1,501	OTM		1		0
high seas	>1,501	PTM	9	4	30	15
Total			199	125	564	296

a) Fishing gear codes are included in Annex 3  
Source: Logbook data, VMS data and price data processed by LEI.

**Table 6.3** Value of the landed catches of each fleet segment from the Dogger Bank area (\* €1,000)

Fleet	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
cutter	0-300	OTB	17	11	81	36
cutter	0-300	OTM	4			1
cutter	301-1,500	OTB	30	1	17	16
cutter	301-1,500	SSC		1	2	1
cutter	301-1,500	TBB	1			0
cutter	>1,501	UKN		0	0	0
cutter	>1,501	OTB	3	49	486	179
cutter	>1,501	TBB	405	231	596	411
high seas	>1,501	OTM		0		0
high seas	>1,501	PTM	2	1	8	4
Total			462	294	1,190	649

a) Fishing gear codes are included in Annex 3.

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

**Table 6.4** Gross value added (GVA) of the landed catches of each fleet segment from the Dogger Bank area (\* €1,000)

Fleet	HP category	Gear a)	GVA (* €1,000)			Average
			2006	2007	2008	
cutter	0-300	OTB	6	6	53	22
cutter	301-1,500	OTB	0	0	7	3
cutter	301-1,500	SSC		1	1	1
cutter	301-1,500	TBB	0			0
cutter	>1,501	UKN		0	0	0
cutter	>1,501	OTB	0	14	170	62
cutter	>1,501	TBB	120	73	165	119
Total			127	94	396	206

a) Fishing gear codes are included in Annex 3.

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

## 6.2 Frisian Front

Fleet	HP category	Gear a)	Effort (days at sea)				Time spent fishing
			2006	2007	2008	Average	
cutter	0-300	UKN		1		0	0.00
cutter	0-300	OTB	872	444	547	621	0.35
cutter	0-300	OTT	489	167	184	280	0.41
cutter	0-300	PTB	4			1	0.00
cutter	0-300	TBB	254	166	125	182	0.27
cutter	0-300	TBS			0	0	1.00
cutter	301-1,500	OTB	243	184	121	183	0.39
cutter	301-1,500	OTT			20	7	0.39
cutter	301-1,500	SSC	11	13	4	10	0.45
cutter	301-1,500	TBB	943	738	554	745	0.15
cutter	>1,501	UKN	9	4	2	5	0.00
cutter	>1,501	OTB	4	54	52	37	0.46
cutter	>1,501	OTT	9		12	7	0.55
cutter	>1,501	TBB	2,814	3,423	2,309	2,849	0.16
high seas	>1,501	OTM		0		0	0.00

a) Fishing gear codes are included in Annex 3.  
Source: Logbook data, VMS data and price data processed by LEI.

**Table 6.6 Landings of each fleet segment from the Frisian Front area (\* 1,000 kg)**

Fleet	HP category	Gear a)	Landings (* 1,000 kg)			Average
			2006	2007	2008	
cutter	0-300	UKN		0		0
cutter	0-300	OTB	138	73	94	102
cutter	0-300	OTT	76	18	31	41
cutter	0-300	PTB	1			0
cutter	0-300	TBB	32	29	20	27
cutter	0-300	TBS			0	0
cutter	301-1,500	OTB	45	26	24	32
cutter	301-1,500	OTT			6	2
cutter	301-1,500	SSC	3	5	0	3
cutter	301-1,500	TBB	183	136	120	146
cutter	>1,501	UKN	0	0	0	0
cutter	>1,501	OTB	0	7	4	4
cutter	>1,501	OTT	2		1	1
cutter	>1,501	TBB	867	927	718	837
high seas	>1,501	OTM		8		3
Total			1,347	1,228	1,019	1,198

a) Fishing gear codes are included in Annex 3.

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

**Table 6.7** Value of the landed catches of each fleet segment from the Frisian Front area (\* €1,000)

Fleet	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
cutter	0-300	UKN		0		0
cutter	0-300	OTB	606	294	418	440
cutter	0-300	OTT	150360	81	129	190
cutter	0-300	PTB	1			0
cutter	0-300	TBB	106	149	89	115
cutter	0-300	TBS			0	0
cutter	301-1,500	OTB	229	123	109	154
cutter	301-1,500	OTT			26	9
cutter	301-1,500	SSC	10	8	1	6
cutter	301-1,500	TBB	687	547	468	567
cutter	>1,501	UKN	0	0	0	0
cutter	>1,501	OTB	0	24	13	12
cutter	>1,501	OTT	7		3	3
cutter	>1,501	TBB	3,026	3,963	2,844	3,278
high seas	>1,501	OTM		3		1
Total			5,031	5,191	4,099	4,774

a) Fishing gear codes are included in Annex 3.

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

**Table 6.8** Gross value added (GVA) of the landed catches of each fleet segment from the Frisian Front area (\* €1,000)

Fleet	HP category	Gear a)	GVA (* €1,000)			Average
			2006	2007	2008	
cutter	0-300	UKN		0		0
cutter	0-300	OTB	215	158	274	215
cutter	0-300	OTT	127	43	85	85
cutter	0-300	TBB	27	64	34	41
cutter	0-300	TBS			0	0
cutter	301-1,500	OTB	3	34	46	28
cutter	301-1,500	OTT			11	4
cutter	301-1,500	SSC	5	3	0	3
cutter	301-1,500	TBB	112	91	41	81
cutter	>1,501	UKN	0	0	0	0
cutter	>1,501	OTB	0	7	4	4
cutter	>1,501	OTT	0		1	0
cutter	>1,501	TBB	899	1,251	788	979
Total			1,388	1,651	1,283	1,441

a) Fishing gear codes are included in Annex 3.

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



### 6.3 Cleaver Bank

<b>Table 6.9</b>		<b>Effort of each fleet segment in the Cleaver Bank area (days at sea) and the proportion of the time spent fishing</b>					
<b>Fleet</b>	<b>HP category</b>	<b>Gear a)</b>	<b>Effort (days at sea)</b>				<b>Time spent fishing</b>
			<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Average</b>	
cutter	0-300	UKN		1		0	0.00
cutter	0-300	OTB	407	625	445	492	0.27
cutter	0-300	OTM	40			13	0.00
cutter	0-300	OTT	288	248	81	206	0.25
cutter	0-300	PTB	23	20		14	0.00
cutter	0-300	TBB	22	3	8	11	0.87
cutter	301-1,500	OTB	168	205	312	228	0.34
cutter	301-1,500	OTT			33	11	0.41
cutter	301-1,500	SDN			175	58	0.97
cutter	301-1,500	SSC	6	54	34	31	0.43
cutter	301-1,500	TBB	5	2		2	1.00
cutter	>1,501	UKN			1	0	0.00
cutter	>1,501	OTB		11	24	12	0.82
cutter	>1,501	OTT	1			0	0.50
cutter	>1,501	TBB	416	615	344	459	0.19
high seas	>1,501	OTM	0	0	0	0	0.00

a) Fishing gear codes are included in Annex 3.  
Source: Logbook data, VMS data and price data processed by LEI.

**Table 6.10** Landings of each fleet segment from the Cleaver Bank area (\*1,000 kg)

Fleet	HP category	Gear a)	Landings (*1,000 kg)			Average
			2006	2007	2008	
cutter	0-300	UKN		0		0
cutter	0-300	OTB	60	102	81	81
cutter	0-300	OTM	6			2
cutter	0-300	OTT	43	44	16	34
cutter	0-300	PTB	3	3		2
cutter	0-300	TBB	1	0	3	1
cutter	301-1,500	OTB	30	49	63	47
cutter	301-1,500	OTT			10	3
cutter	301-1,500	SDN			10	3
cutter	301-1,500	SSC	2	19	13	11
cutter	301-1,500	TBB	0	0		0
cutter	>1,501	UKN			0	0
cutter	>1,501	OTB		0	3	1
cutter	>1,501	OTT	0			0
cutter	>1,501	TBB	138	219	135	164
high seas	>1,501	OTM	31	40	2	24
Total			314	475	336	375

a) Fishing gear codes are included in Annex 3.

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

**Table 6.11 Value of the landed catches of each fleet segment from the Cleaver Bank area (\* €1,000)**

Fleet	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
cutter	0-300	UKN		0		0
cutter	0-300	OTB	226	491	330	349
cutter	0-300	OTM	14			5
cutter	0-300	OTT	198	208	70	159
cutter	0-300	PTB	6	18		8
cutter	0-300	TBB	5	0	12	6
cutter	301-1,500	OTB	130	233	233	199
cutter	301-1,500	OTT			28	9
cutter	301-1,500	SDN			21	7
cutter	301-1,500	SSC	3	47	40	30
cutter	301-1,500	TBB	0	0		0
cutter	>1,501	UKN			0	0
cutter	>1,501	OTB		0	8	3
cutter	>1,501	OTT	0			0
cutter	>1,501	TBB	444	660	397	500
high seas	>1,501	OTM	8	10	1	6
Total			1,035	1,667	1,141	1,281

a) Fishing gear codes are included in Annex 3.

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

**Table 6.12** Gross value added (GVA) of the landed catches of each fleet segment from the Cleaver Bank area (\* €1,000)

Fleet	HP category	Gear a)	GVA (* €1,000)			Average
			2006	2007	2008	
cutter	0-300	UKN		0		0
cutter	0-300	OTB	80	263	216	186
cutter	0-300	OTT	70	112	46	76
cutter	0-300	PTB				
cutter	0-300	TBB	1	0	5	2
cutter	301-1,500	OTB	2	65	98	55
cutter	301-1,500	OTT			12	4
cutter	301-1,500	SDN			9	3
cutter	301-1,500	SSC	2	19	17	12
cutter	301-1,500	TBB	0	0		0
cutter	>1,501	UKN			0	0
cutter	>1,501	OTB		0	3	1
cutter	>1,501	OTT	0			0
cutter	>1,501	TBB	132	208	110	150
<b>Total</b>			<b>286</b>	<b>667</b>	<b>515</b>	<b>489</b>

a) Fishing gear codes are included in Annex 3.

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

## 6.4 Coastal zone

**Table 6.13** Effort of each fleet segment in the Coastal zone 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	Average	
cutter	xxx	TBB	0			0	0.00
cutter	0-300	GN	1	14	2	6	0.94
cutter	0-300	GNS	124	84	388	198	0.87
cutter	0-300	MIS	19			6	0.00
cutter	0-300	UKN		0		0	0.00
cutter	0-300	OTB	59	46	58	54	0.95
cutter	0-300	OTT	31	20	18	23	0.96
cutter	0-300	PTB	1			0	0.00
cutter	0-300	TBB	783	420	684	629	0.27
cutter	0-300	TBS	3,653	2,940	3,557	3,383	0.52
cutter	301-1,500	DRB		0		0	0.00
cutter	301-1,500	MIS		1		0	0.00
cutter	301-1,500	UKN	37	51	37	42	0.00
cutter	301-1,500	OTB	18	17	12	16	0.96
cutter	301-1,500	OTT			2	1	1.00
cutter	301-1,500	SDN		14	12	9	1.00
cutter	301-1,500	SSC	12	18	10	13	0.85
cutter	301-1,500	TBB	22	18	8	16	0.98
cutter	301-1,500	TBS	0	19		7	0.46
cutter	>1,501	UKN	1	3	2	2	0.00
cutter	>1,501	OTB	0	1	10	4	1.00
cutter	>1,501	OTT	1		3	1	1.00
cutter	>1,501	TBB	290	261	169	240	0.98

a) Fishing gear codes are included in Annex 3.

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

**Table 6.14** Landings of each fleet segment from the Coastal zone area (\* 1,000 kg)

Fleet	HP category	Gear a)	Landings (* 1,000 kg)			Average
			2006	2007	2008	
cutter	xxx	TBB	0			0
cutter	0-300	GN	0	0	0	0
cutter	0-300	GNS	16	9	34	20
cutter	0-300	MIS	3			1
cutter	0-300	UKN		0		0
cutter	0-300	OTB	1	1	5	2
cutter	0-300	OTT	0	0	1	0
cutter	0-300	PTB	1			0
cutter	0-300	TBB	105	81	128	104
cutter	0-300	TBS	2,993	2,259	2,812	2,688
cutter	301-1,500	DRB		0		0
cutter	301-1,500	MIS		1		0
cutter	301-1,500	UKN	113	102	173	129
cutter	301-1,500	OTB	0	0	3	1
cutter	301-1,500	OTT			0	0
cutter	301-1,500	SDN		0	0	0
cutter	301-1,500	SSC	0	3	1	1
cutter	301-1,500	TBB	0	0	0	0
cutter	301-1,500	TBS	0	12		4
cutter	>1,501	UKN	0	0	0	0
cutter	>1,501	OTB	0	0	0	0
cutter	>1,501	OTT	0		0	0
cutter	>1,501	TBB	1	1	2	1
<b>Total</b>			<b>3,234</b>	<b>2,470</b>	<b>3,158</b>	<b>2,954</b>

a) Fishing gear codes are included in Annex 3.

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

**Table 6.15** Value of the landed catches of each fleet segment from the Coastal zone area (\* €1,000)

Fleet	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
cutter	xxx	TBB	0			0
cutter	0-300	GN	0	5	0	2
cutter	0-300	GNS	196	96	304	199
cutter	0-300	MIS	27			9
cutter	0-300	UKN		0		0
cutter	0-300	OTB	2	5	8	5
cutter	0-300	OTT	0	0	2	1
cutter	0-300	PTB	2			1
cutter	0-300	TBB	597	413	669	560
cutter	0-300	TBS	7,102	6,851	9,347	7,767
cutter	301-1,500	DRB		0		0
cutter	301-1,500	MIS		2		1
cutter	301-1,500	UKN	235	259	506	333
cutter	301-1,500	OTB	0	1	3	1
cutter	301-1,500	OTT			0	0
cutter	301-1,500	SDN		0	0	0
cutter	301-1,500	SSC	1	10	1	4
cutter	301-1,500	TBB	1	0	0	0
cutter	301-1,500	TBS	0	39		13
cutter	>1,501	UKN	0	0	0	0
cutter	>1,501	OTB	0	0	0	0
cutter	>1,501	OTT	0		0	0
cutter	>1,501	TBB	6	3	7	5
<b>Total</b>			<b>8,167</b>	<b>7,684</b>	<b>10,847</b>	<b>8,899</b>

a) Fishing gear codes are included in Annex 3.

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

**Table 6.16** Gross value added (GVA) of the landed catches of each fleet segment from the Coastal zone area (\* €1,000)

Fleet	HP category	Gear a)	GVA (* €1,000)			Average
			2006	2007	2008	
cutter	0-300	GN	0	2	0	1
cutter	0-300	GNS	77	41	131	83
cutter	0-300	UKN		0		0
cutter	0-300	OTB	1	3	5	3
cutter	0-300	OTT	0	0	1	0
cutter	0-300	TBB	153	176	252	194
cutter	0-300	TBS	3,151	3,776	4,571	3,833
cutter	301-1,500	OTB	0	0	1	0
cutter	301-1,500	OTT			0	0
cutter	301-1,500	SDN		0	0	0
cutter	301-1,500	SSC	0	4	0	2
cutter	301-1,500	TBB	0	0	0	0
cutter	301-1,500	TBS	0	21		7
cutter	>1,501	UKN	0	0	0	0
cutter	>1,501	OTB	0	0	0	0
cutter	>1,501	OTT	0		0	0
cutter	>1,501	TBB	2	1	2	2
Total			3,383	4,025	4,963	4,124

a) Fishing gear codes are included in Annex 3.

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



## 6.5 Vlakte van de Raan

Fleet	HP category	Gear a)	Effort (days at sea)				Time spent fishing
			2006	2007	2008	Average	
cutter	0-300	GNS	1	0		0	1.00
cutter	0-300	MIS	1	4		2	0.00
cutter	0-300	UKN	0		3	1	0.00
cutter	0-300	OTB	51	118	74	81	0.37
cutter	0-300	OTM	53	36	11	33	0.00
cutter	0-300	TBB	110	171	457	246	0.48
cutter	0-300	TBS	145	114	167	142	0.35
cutter	301-1,500	DRB	1	0		0	0.00
cutter	301-1,500	OTM		0		0	0.00
cutter	301-1,500	SSC			1	0	1.00
cutter	>1,501	TBB	48	55	39	48	0.99
high seas	>1,501	OTM		0		0	0.00

a) Fishing gear codes are included in Annex 3.  
Source: Logbook data, VMS data and price data processed by LEI.

**Table 6.18** Landings of each fleet segment from the *Vlakte van de Raan* area (\* 1,000 kg)

Fleet	HP category	Gear a)	Landings (* 1,000 kg)			Average
			2006	2007	2008	
cutter	0-300	GNS	0	0		0
cutter	0-300	MIS	0	0		0
cutter	0-300	UKN	0		0	0
cutter	0-300	OTB	31	51	51	45
cutter	0-300	OTM	16	15	3	11
cutter	0-300	TBB	19	34	96	50
cutter	0-300	TBS	73	46	103	74
cutter	301-1,500	DRB	7	0		2
cutter	301-1,500	OTM		3		1
cutter	301-1,500	SSC			0	0
cutter	>1,501	TBB	0	0	0	0
high seas	>1,501	OTM		80		27
<b>Total</b>			<b>147</b>	<b>231</b>	<b>253</b>	<b>210</b>

a) Fishing gear codes are included in Annex 3.

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

**Table 6.19** Value of the landed catches of each fleet segment from the *Vlakte van de Raan* area (\* €1,000)

Fleet	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
cutter	0-300	GNS	0	0		0
cutter	0-300	MIS	0	0		0
cutter	0-300	UKN	0		0	0
cutter	0-300	OTB	67	96	103	88
cutter	0-300	OTM	30	28	5	21
cutter	0-300	TBB	68	129	348	181
cutter	0-300	TBS	180	147	304	210
cutter	301-1,500	DRB	12	1		5
cutter	301-1,500	OTM		1		0
cutter	301-1,500	SSC			0	0
cutter	>1,501	TBB	0	1	0	0
high seas	>1,501	OTM		35		12
Total			357	439	759	518

a) Fishing gear codes are included in Annex 3.

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

**Table 6.20** Gross value added (GVA) of the landed catches of each fleet segment from the *Vlakte van de Raan* area (\* €1,000)

Fleet	HP category	Gear a)	GVA (* €1,000)			Average
			2006	2007	2008	
cutter	0-300	GNS	0	0		0
cutter	0-300	UKN	0		0	0
cutter	0-300	OTB	24	52	67	47
cutter	0-300	TBB	17	55	131	68
cutter	0-300	TBS	80	81	148	103
cutter	>1,501	TBB	0	0	0	0
Total			121	188	347	218

a) Fishing gear codes are included in Annex 3.

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

## 6.6 Statistical confidence in the estimates for the Dutch fisheries

Table 6.21 lists the standard errors of the estimates of the total catch, catch value and gross value added in the various areas. This reveals, in particular, that the confidence in the estimates for the smaller areas is lower than for the larger areas. The relative standard errors are also large for the Dogger Bank: this is due to the lower fishing efforts in this area. This is primarily due to the smaller number of observations in areas that are fished less (smaller areas and areas with lower fishing intensities).

Consequently the method used here, in which day catches are distributed between VMS locations on the basis of time intervals, does not yield information about the exact catches at specific locations. Local large/small catches are averaged out with other smaller/larger catches when fishing at a specific location for a very short period of time. This is manifested in the form of a low confidence in the estimates of the value of small areas. This could be improved by the incorporation of more detailed catch data. However, this data was not available for this study.

**Table 6.21** Relative standard errors of the estimates of catches, catch values and gross value added in the various areas in the 2006-2008 period

	<b>Dogger Bank</b>	<b>Frisian Front</b>	<b>Cleaver Bank</b>	<b>North Sea coastal zone</b>	<b>Vlakte van de Raan</b>
<i>2006</i>					
Catch	0.30	0.18	0.83	0.19	0.42
Catch value	0.13	0.12	0.16	0.14	0.44
Gross value added	0.15	0.14	0.18	0.16	0.47
<i>2007</i>					
Catch	0.14	0.15	0.16	0.08	0.45
Catch value	0.11	0.11	0.11	0.06	0.17
Gross value added	0.13	0.13	0.13	0.08	0.19
<i>2008</i>					
Catch	0.27	0.23	0.23	0.17	0.38
Catch value	0.10	0.13	0.14	0.11	0.30
Gross value added	0.12	0.15	0.17	0.13	0.33
<i>Average</i>					
Catch	0.24	0.19	0.41	0.14	0.42
Catch value	0.11	0.12	0.14	0.10	0.30
Gross value added	0.13	0.14	0.16	0.12	0.33

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

## 7 Value areas for the non-Dutch fleets

The distribution maps were used to make an estimate of the fishing efforts, catches and catch values in the various areas that may be or have been designated as Natura 2000 areas: the Dogger Bank, Cleaver Bank, Frisian Front, the North Sea coastal zone and *Vlakte van de Raan*. The following tables list the results in each area.

<b>Table 7.0</b>		<b>Total landings, landings and gross value added of the non-Dutch fisheries in the various areas</b>			
<b>Area</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Average</b>	
<i>Landings (*1,000 kg)</i>					
Dogger Bank	1,103	1,013	1,309	1,142	
Frisian Front	335	451	393	393	
Cleaver Bank	381	388	154	308	
Coastal zone	17	33	64	38	
<i>Vlakte van de Raan</i>	51	48	95	65	
<i>Value (* €1,000)</i>					
Dogger Bank	2,938	2,327	2,727	2,664	
Frisian Front	1,221	1,859	1,505	1,528	
Cleaver Bank	1,174	1,190	438	934	
Coastal zone	85	149	257	164	
<i>Vlakte van de Raan</i>	136	139	293	189	

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

## 7.1 Dogger Bank

<b>Table 7.1</b>		<b>Effort of each fleet segment in the Dogger Bank area (days at sea) and the proportion of the time spent fishing</b>					
			<b>Effort (days at sea)</b>				<b>Time spent</b>
<b>Country</b>	<b>HP category</b>	<b>Gear a)</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Average</b>	<b>fishing</b>
BEL	301-1,500	UKN		1	1	1	0.00
BEL	301-1,500	OTB		54	27	27	0.86
BEL	301-1,500	TBB	1			0	1.00
DEU	xxx	UKN	0			0	0.00
DEU	0-300	UKN	0		1	0	0.00
DEU	0-300	OTB	28	112	40	60	0.26
DEU	301-1,500	UKN	7	3	9	6	0.00
DEU	301-1,500	OTB	3	0	5	3	0.33
DEU	301-1,500	TBB	18			6	0.10
DEU	>1,501	OTM		0	0	0	0.00
DNK	xxx	UKN	58	21	30	36	0.00
DNK	xxx	SDN		0		0	1.00
DNK	0-300	UKN	35	28		21	0.00
DNK	0-300	SDN	79	14	103	65	0.84
DNK	301-1,500	UKN	723	278	170	391	0.00
DNK	301-1,500	OTB			1	0	1.00
DNK	301-1,500	OTT	5		12	6	0.16
DNK	301-1,500	SSC		1		0	0.33
DNK	>1,501	UKN	19	28	17	21	0.00
FRA	0-300	UKN	0	0	0	0	0.00
FRA	301-1,500	UKN		0	2	1	0.00
FRA	>1,501	UKN	2	1	1	1	0.00
FRA	xxx	UKN	1	1	1	1	0.00
GBR	xxx	UKN		5	0	2	0.00
GBR	xxx	TBB	7			2	0.00
GBR	0-300	GN	5	4	5	4	1.00
GBR	0-300	UKN	2	6	11	7	0.00
GBR	301-1,500	UKN	0	1	0	1	0.00
GBR	301-1,500	OTB		65	113	59	0.44
GBR	301-1,500	OTT	32	93	22	49	0.46

**Table 7.1 Effort of each fleet segment in the Dogger Bank area (days at sea) and the proportion of the time spent fishing (continued)**

Country	HP category	Gear a)	Effort (days at sea)				Time spent fishing
			2006	2007	2008	Average	
GBR	301-1,500	TBB	1,051	794	913	919	0.14
GBR	>1,501	UKN	0	1	1	0	0.00
GBR	>1,501	OTT		7		2	0.52
GBR	>1,501	PTM	0			0	0.00
GBR	>1,501	TBB	239	112	131	161	0.24
IRL	xxx	UKN			3	1	0.00
NOR	xxx	UKN	3	7	2	4	0.00
NOR	301-1,500	UKN		1		0	0.00
NOR	>1,501	UKN	0	2	1	1	0.00
SWE	xxx	UKN	20	4	1	8	0.00
UKN	xxx	UKN		0		0	0.00
XNE	xxx	UKN	0	3		1	0.00

a) Country and fishing gear codes are included in Annex 3.

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

**Table 7.2 Landings of each fleet segment from the Dogger Bank area (\*1,000 kg)**

Country	HP category	Gear a)	Landings (*1,000 kg)			
			2006	2007	2008	Average
BEL	301-1,500	UKN		0	0	0
BEL	301-1,500	OTB		16	7	8
BEL	301-1,500	TBB	0			0
DEU	0-300	UKN	0		0	0
DEU	0-300	OTB	14	48	19	27
DEU	301-1,500	UKN	2	1	3	2
DEU	301-1,500	OTB	1	0	2	1
DEU	301-1,500	TBB	6			2
DEU	>1,501	OTM		3	3	2
DNK	xxx	UKN	5	9		5
DNK	xxx	SDN		0		0
DNK	0-300	UKN	4	4		3
DNK	0-300	SDN	37	2	61	33



**Table 7.2 Landings of each fleet segment from the Dogger Bank area (\* 1,000 kg) (continued)**

Country	HP category	Gear a)	Landings (* 1,000 kg)			Average
			2006	2007	2008	
DNK	301-1,500	UKN	156	55	40	84
DNK	301-1,500	OTB			0	0
DNK	301-1,500	OTT	3		8	4
DNK	301-1,500	SSC		0		0
DNK	>1,501	UKN	0	0		0
FRA	>1,501	UKN	0			0
GBR	xxx	UKN			0	0
GBR	xxx	TBB	4			1
GBR	0-300	GN	0	0	0	0
GBR	0-300	UKN	0	1	3	1
GBR	301-1,500	UKN	0	1	0	0
GBR	301-1,500	OTB		61	92	51
GBR	301-1,500	OTT	16	75	11	34
GBR	301-1,500	TBB	671	630	896	732
GBR	>1,501	UKN	1	11	1	4
GBR	>1,501	OTT		2		1
GBR	>1,501	PTM	9			3
GBR	>1,501	TBB	175	94	164	144
Total			1,103	1,013	1,309	1,142

a) Country and fishing gear codes are included in Annex 3.

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

**Table 7.3 Value of the landed catches of each fleet segment from the Dogger Bank area (\* €1,000)**

Country	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
BEL	301-1,500	UKN		1	1	0
BEL	301-1,500	OTB		34	16	17
BEL	301-1,500	TBB	0			0
DEU	0-300	UKN	0		0	0
DEU	0-300	OTB	29	102	38	57
DEU	301-1,500	UKN	6	3	10	6
DEU	301-1,500	OTB	1	0	4	2
DEU	301-1,500	TBB	13			4
DEU	>1,501	OTM		6	4	3

**Table 7.3** Value of the landed catches of each fleet segment from the Dogger Bank area (\* €1,000)

Country	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
DNK	xxx	UKN	41	19		20
DNK	xxx	SDN		0		0
DNK	0-300	UKN	38	33		24
DNK	0-300	SDN	75	4	123	67
DNK	301-1,500	UKN	753	252	161	388
DNK	301-1,500	OTB			0	0
DNK	301-1,500	OTT	7		16	8
DNK	301-1,500	SSC		0		0
DNK	>1,501	UKN	0	0		0
FRA	>1,501	UKN	0			0
GBR	xxx	UKN			0	0
GBR	xxx	TBB	12			4
GBR	0-300	GN	0	0	0	0
GBR	0-300	UKN	0	4	8	4
GBR	301-1,500	UKN	0	2	0	1
GBR	301-1,500	OTB		122	183	102
GBR	301-1,500	OTT	34	158	22	72
GBR	301-1,500	TBB	1,533	1,362	1,823	1,572
GBR	>1,501	UKN	1	30	1	10
GBR	>1,501	OTT		3		1
GBR	>1,501	PTM	2			1
GBR	>1,501	TBB	394	194	316	301
<b>Total</b>			<b>2,938</b>	<b>2,327</b>	<b>2,727</b>	<b>2,664</b>

a) Country and fishing gear codes are included in Annex 3  
Source: Logbook data, VMS data and price data processed by LEI.

## 7.2 Frisian Front

<b>Table 7.4</b>		<b>Effort of each fleet segment in the Frisian Front area (days at sea) and the proportion of the time spent fishing</b>					
<b>Coun-try</b>	<b>HP category</b>	<b>Gear a)</b>	<b>Effort (days at sea)</b>				<b>Time spent</b>
			<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Average</b>	<b>fishing</b>
BEL	0-300	OTB	30	69		33	0.93
BEL	0-300	TBB	0			0	0.00
BEL	301-1,500	UKN	6	9	7	7	0.00
BEL	301-1,500	OTB	0	12	1	4	1.00
BEL	301-1,500	TBB	11	22	5	12	0.60
DEU	xxx	GN		0		0	1.00
DEU	xxx	UKN		0		0	0.00
DEU	xxx	TBB		59		20	0.00
DEU	0-300	GN			0	0	1.00
DEU	0-300	GNS			2	1	0.92
DEU	0-300	UKN		0		0	0.00
DEU	0-300	OTB	46	217	162	141	0.39
DEU	0-300	PTB	1			0	0.00
DEU	0-300	SPR	6			2	0.00
DEU	0-300	TBB	189	24	0	71	0.11
DEU	0-300	TBS			1	0	1.00
DEU	301-1,500	UKN	0			0	0.00
DEU	301-1,500	OTB	2	63	25	30	0.25
DEU	301-1,500	TBB	735	1,021	962	906	0.14
DEU	>1,501	OTM	0	0		0	0.00
DNK	xxx	UKN	3	2	1	2	0.00
DNK	xxx	OTB	7			2	0.00
DNK	xxx	OTT		1		0	0.00
DNK	xxx	SDN		3		1	0.59
DNK	0-300	GN	1		1	1	1.00
DNK	0-300	GND		0		0	0.00
DNK	0-300	GNS	0		7	2	0.94
DNK	0-300	UKN	12			4	0.00
DNK	0-300	SDN	1	0	1	1	1.00
DNK	301-1,500	GN			2	1	1.00
DNK	301-1,500	GNS	0			0	1.00

**Table 7.4 Effort of each fleet segment in the Frisian Front area (days at sea) and the proportion of the time spent fishing (continued)**

Country	HP category	Gear a)	Effort (days at sea)				Time spent fishing
			2006	2007	2008	Average	
DNK	301-1,500	UKN	36	32	17	28	0.00
DNK	301-1,500	OTB	38	11	1	17	0.80
DNK	301-1,500	OTT	7	0	1	3	0.99
DNK	301-1,500	SSC		2	3	2	0.75
DNK	>1,501	UKN	3	2	1	2	0.00
FRA	0-300	UKN	0	0	1	0	0.00
FRA	301-1,500	UKN		0		0	0.00
FRA	>1,501	UKN		0	0	0	0.00
FRA	xxx	UKN	0			0	0.00
GBR	xxx	UKN		4	0	1	0.00
GBR	xxx	TBB	1		13	4	0.00
GBR	0-300	GN	8	2	2	4	0.99
GBR	0-300	UKN	1	0	1	1	0.00
GBR	0-300	TBB		25	16	14	0.86
GBR	301-1,500	UKN	0	0	4	1	0.00
GBR	301-1,500	OTB		9	15	8	0.99
GBR	301-1,500	OTT	11	13	8	11	0.98
GBR	301-1,500	SSC		2	1	1	0.40
GBR	301-1,500	TBB	280	427	197	302	0.34
GBR	>1,501	UKN	0	0	0	0	0.00
GBR	>1,501	OTT		1		0	1.00
GBR	>1,501	TBB	20	42	35	33	0.48
IRL	xxx	UKN			1	0	0.00
IRL	301-1,500	UKN		0	0	0	0.00
IRL	>1,501	UKN		0	1	0	0.00
LTU	xxx	UKN	0	0		0	0.00
NOR	xxx	UKN	5	1	1	2	0.00
NOR	>1,501	UKN	0	0	0	0	0.00
SWE	xxx	UKN	1			0	0.00
UKN	xxx	UKN	0	0	0	0	0.00

a) Country and fishing gear codes are included in Annex 3.

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

**Table 7.5 Landings of each fleet segment from the Frisian Front area (\*1,000 kg)**

Country	HP category	Gear a)	Landings (*1,000 kg)			Average
			2006	2007	2008	
BEL	0-300	OTB	4	5		3
BEL	0-300	TBB	0			0
BEL	301-1,500	UKN	3	2	1	2
BEL	301-1,500	OTB	0	0	0	0
BEL	301-1,500	TBB	2	2	1	2
DEU	xxx	GN		0		0
DEU	xxx	UKN		0		0
DEU	xxx	TBB		11		4
DEU	0-300	GN			0	0
DEU	0-300	GNS			0	0
DEU	0-300	UKN		0		0
DEU	0-300	OTB	11	30	28	23
DEU	0-300	PTB	0			0
DEU	0-300	SPR	1			0
DEU	0-300	TBB	31	4	0	12
DEU	0-300	TBS			0	0
DEU	301-1,500	UKN	0			0
DEU	301-1,500	OTB	0	12	4	5
DEU	301-1,500	TBB	164	242	264	223
DEU	>1,501	OTM	22	0		7
DNK	xxx	UKN	0	1		0
DNK	xxx	OTB	0			0
DNK	xxx	OTT		0		0
DNK	xxx	SDN		1		0
DNK	0-300	GN	0		0	0
DNK	0-300	GND		0		0
DNK	0-300	GNS	0		1	0
DNK	0-300	UKN	2			1
DNK	0-300	SDN	0	0	0	0
DNK	301-1,500	GN			0	0
DNK	301-1,500	GNS	0			0
DNK	301-1,500	UKN	8	6	4	6

**Table 7.5 Landings of each fleet segment from the Frisian Front area  
(\*1,000 kg) (continued)**

Country	HP category	Gear a)	Landings (*1,000 kg)			Average
			2006	2007	2008	
DNK	301-1,500	OTB	3	1	0	1
DNK	301-1,500	OTT	0	0	0	0
DNK	301-1,500	SSC		0	0	0
GBR	xxx	UKN			0	0
GBR	xxx	TBB	0		7	2
GBR	0-300	GN	2	0	0	1
GBR	0-300	UKN	0	0	0	0
GBR	0-300	TBB		6	10	5
GBR	301-1,500	UKN	0	0	3	1
GBR	301-1,500	OTB		0	1	0
GBR	301-1,500	OTT	1	0	0	0
GBR	301-1,500	SSC		1	0	0
GBR	301-1,500	TBB	79	117	59	85
GBR	>1,501	UKN	0	3	0	1
GBR	>1,501	OTT		0		0
GBR	>1,501	TBB	1	8	12	7
IRL	xxx	UKN				
IRL	301-1,500	UKN		1	0	0
<b>Total</b>			<b>334</b>	<b>451</b>	<b>393</b>	<b>393</b>

a) Country and fishing gear codes are included in Annex 3.

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

**Table 7.6 Value of the landed catches of each fleet segment from the Frisian Front area (\* €1,000)**

Country	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
BEL	0-300	OTB	22	24		15
BEL	0-300	TBB	0			0
BEL	301-1,500	UKN	15	6	4	8
BEL	301-1,500	OTB	0	0	0	0
BEL	301-1,500	TBB	8	9	3	7
DEU	xxx	GN		0		0
DEU	xxx	UKN		0		0
DEU	xxx	TBB		38		13
DEU	0-300	GN			0	0
DEU	0-300	GNS			3	1
DEU	0-300	UKN		0		0
DEU	0-300	OTB	26	132	136	98
DEU	0-300	PTB	0			0
DEU	0-300	SPR	3			1
DEU	0-300	TBB	116	14	0	43
DEU	0-300	TBS			0	0
DEU	301-1,500	UKN	0			0
DEU	301-1,500	OTB	0	36	13	16
DEU	301-1,500	TBB	683	995	1,041	906
DEU	>1,501	OTM	40	0		13
DNK	xxx	UKN	2	2		2
DNK	xxx	OTB	1			0
DNK	xxx	OTT		1		0
DNK	xxx	SDN		1		0
DNK	0-300	GN	0		0	0
DNK	0-300	GND		0		0
DNK	0-300	GNS	0		7	2
DNK	0-300	UKN	13			4
DNK	0-300	SDN	0	0	0	0
DNK	301-1,500	GN			0	0
DNK	301-1,500	GNS	0			0
DNK	301-1,500	UKN	37	29	16	27
DNK	301-1,500	OTB	15	5	0	7

**Table 7.6** Value of the landed catches of each fleet segment from the Frisian Front area (\* €1,000) (continued)

Country	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
DNK	301-1,500	OTT	0	0	0	0
DNK	301-1,500	SSC		1	1	1
DNK	>1,501	UKN				
GBR	xxx	UKN			0	0
GBR	xxx	TBB	0		18	6
GBR	0-300	GN	4	0	0	1
GBR	0-300	UKN	0	0	1	0
GBR	0-300	TBB		24	33	19
GBR	301-1,500	UKN	0	0	6	2
GBR	301-1,500	OTB		0	1	0
GBR	301-1,500	OTT	2	0	0	1
GBR	301-1,500	SSC		1	0	0
GBR	301-1,500	TBB	227	495	188	303
GBR	>1,501	UKN	0	7	0	3
GBR	>1,501	OTT		0		0
GBR	>1,501	TBB	4	38	36	26
IRL	301-1,500	UKN		1	0	1
Total			1,221	1,859	1,505	1,528

a) Country and fishing gear codes are included in Annex 3.

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



### 7.3 Cleaver Bank

<b>Table 7.7 Effort of each fleet segment in the Cleaver Bank area (days at sea) and the proportion of the time spent fishing</b>							
Country	HP category	Gear a)	Effort (days at sea)				Time spent
			2006	2007	2008	Average	fishing
BEL	xxx	UKN			6	2	0.00
BEL	0-300	OTB		39		13	0.94
BEL	301-1,500	UKN	20	26	14	20	0.00
BEL	301-1,500	OTB		1	0	0	0.75
BEL	301-1,500	TBB	19	47	10	25	0.39
DEU	0-300	OTB	43	288	14	115	0.18
DEU	0-300	PTB	1	8		3	0.00
DEU	0-300	TBB			0	0	1.00
DEU	301-1,500	UKN	1			0	0.00
DEU	301-1,500	OTB	28	63	40	44	0.23
DEU	301-1,500	PTB	0			0	0.00
DEU	301-1,500	TBB	42	49	49	46	0.15
DEU	>1,501	OTM	0		0	0	0.00
DNK	xxx	UKN	6	1		2	0.00
DNK	xxx	SDN		0		0	1.00
DNK	0-300	GNS	0			0	1.00
DNK	0-300	SDN			0	0	1.00
DNK	301-1,500	UKN	63	11	13	29	0.00
DNK	301-1,500	OTB	1	1	0	1	1.00
DNK	301-1,500	OTT	3	1	0	1	0.27
DNK	>1,501	UKN	1	1	1	1	0.00
FRA	0-300	UKN	2	2	3	2	0.00
FRA	301-1,500	UKN	25	35	24	28	0.00
FRA	>1,501	UKN	1	0	0	1	0.00
FRA	xxx	UKN	0	0	0	0	0.00
GBR	xxx	UKN		1	0	0	0.00
GBR	0-300	FPO	0			0	0.00
GBR	0-300	GN	2	2	2	2	1.00
GBR	0-300	UKN	5	1	10	5	0.00
GBR	301-1,500	FPO	2			1	0.00
GBR	301-1,500	UKN	5	5	9	7	0.00

**Table 7.7** Effort of each fleet segment in the Cleaver Bank area (days at sea) and the proportion of the time spent fishing (continued)

Country	HP category	Gear a)	Effort (days at sea)				Time spent fishing
			2006	2007	2008	Average	
GBR	301-1,500	OTB		4	2	2	1.00
GBR	301-1,500	OTT		1		0	1.00
GBR	301-1,500	TBB	475	222	117	271	0.21
GBR	>1,501	UKN	0	0		0	0.00
GBR	>1,501	OTT		7		2	0.77
GBR	>1,501	TBB	392	396	80	289	0.21
IRL	>1,501	OTM	0			0	0.00
NOR	xxx	UKN	2	2	1	1	0.00
NOR	301-1,500	UKN		0		0	0.00
NOR	>1,501	UKN		1	0	0	0.00
SWE	xxx	UKN	0			0	0.00
UKN	xxx	UKN		0	0	0	0.00
XNE	xxx	UKN		0		0	0.00

a) Country and fishing gear codes are included in Annex 3.

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

**Table 7.8** Landings of each fleet segment from the Cleaver Bank area (\*1,000 kg)

Country	HP category	Gear a)	Landings (*1,000 kg)			
			2006	2007	2008	Average
BEL	0-300	OTB		5		2
BEL	301-1,500	UKN	10	6	2	6
BEL	301-1,500	OTB		0	0	0
BEL	301-1,500	TBB	7	13	3	8
DEU	0-300	OTB	5	55	4	21
DEU	0-300	PTB	0	3		1
DEU	0-300	TBB			0	0
DEU	301-1,500	UKN	0			0
DEU	301-1,500	OTB	18	24	21	21
DEU	301-1,500	PTB	0			0
DEU	301-1,500	TBB	9	17	20	15
DEU	>1,501	OTM	8		3	4

**Table 7.8 Landings of each fleet segment from the Cleaver Bank area (\*1,000 kg) (continued)**

Coun-try	HP category	Gear a)	Landings (*1,000 kg)			Average
			2006	2007	2008	
DNK	xxx	UKN	1	0		0
DNK	xxx	SDN		0		0
DNK	0-300	GNS	0			0
DNK	0-300	SDN			0	0
DNK	301-1,500	UKN	14	2	3	6
DNK	301-1,500	OTB	0	0	0	0
DNK	301-1,500	OTT	1	0	0	0
DNK	>1,501	UKN		0		0
FRA	301-1,500	UKN		0		0
GBR	xxx	UKN			0	0
GBR	0-300	FPO	0			0
GBR	0-300	GN	0	0	0	0
GBR	0-300	UKN	0	0	2	1
GBR	301-1,500	FPO	9			3
GBR	301-1,500	UKN	2	3	6	4
GBR	301-1,500	OTB		0	0	0
GBR	301-1,500	OTT		0		0
GBR	301-1,500	TBB	164	94	56	105
GBR	>1,501	UKN	0	2		1
GBR	>1,501	OTT		1		0
GBR	>1,501	TBB	134	162	34	110
Total			381	388	155	308

a) Country and fishing gear codes are included in Annex 3.

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

**Table 7.9 Value of the landed catches of each fleet segment from the Cleaver Bank area (\* €1,000)**

Country	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
BEL	0-300	OTB		29		10
BEL	301-1,500	UKN	53	16	8	26
BEL	301-1,500	OTB		1	0	0
BEL	301-1,500	TBB	19	37	9	22
DEU	0-300	OTB	20	289	9	106
DEU	0-300	PTB	0	9		3
DEU	0-300	TBB			0	0
DEU	301-1,500	UKN	1			0
DEU	301-1,500	OTB	37	53	51	47
DEU	301-1,500	PTB	0			0
DEU	301-1,500	TBB	35	50	68	51
DEU	>1,501	OTM	2		13	5
DNK	xxx	UKN	5	1		2
DNK	xxx	SDN		0		0
DNK	0-300	GNS	0			0
DNK	0-300	SDN			0	0
DNK	301-1,500	UKN	65	10	13	29
DNK	301-1,500	OTB	0	0	0	0
DNK	301-1,500	OTT	2	0	0	1
DNK	>1,501	UKN		0		0
FRA	301-1,500	UKN		0		0
GBR	xxx	UKN			1	0
GBR	0-300	FPO	0			0
GBR	0-300	GN	0	0	0	0
GBR	0-300	UKN	1	0	7	3
GBR	301-1,500	FPO	17			6
GBR	301-1,500	UKN	5	7	15	9
GBR	301-1,500	OTB		0	0	0
GBR	301-1,500	OTT		0		0

**Table 7.9** Value of the landed catches of each fleet segment from the Cleaver Bank area (\* €1,000) (continued)

Country	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
GBR	301-1,500	TBB	509	249	154	304
GBR	>1,501	UKN	0	6		2
GBR	>1,501	OTT		3		1
GBR	>1,501	TBB	404	431	92	309
Total			1,175	1,190	438	934

a) Country and fishing gear codes are included in Annex 3.

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

## 7.4 Coastal zone

<b>Table 7.10</b>		<b>Effort of each fleet segment in the Coastal zone area (days at sea) and the proportion of the time spent fishing</b>					
<b>Country</b>	<b>HP category</b>	<b>Gear a)</b>	<b>Effort (days at sea)</b>				<b>Time spent fishing</b>
			<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Average</b>	
BEL	0-300	UKN		0		0	0.00
BEL	0-300	OTB	1	9		3	1.00
BEL	0-300	TBB	33	24	97	51	0.22
BEL	0-300	TBS	0	5	20	8	0.52
BEL	301-1,500	UKN		0	0	0	0.00
BEL	301-1,500	OTB		2	0	1	1.00
BEL	301-1,500	TBB	8	5	4	6	0.93
DEU	xxx	GN		0		0	1.00
DEU	xxx	UKN	0	1	0	0	0.00
DEU	xxx	TBB		2	1	1	0.00
DEU	xxx	TBS		0	4	1	0.61
DEU	0-300	GN		1	1	1	1.00
DEU	0-300	GNS	1		1	1	1.00
DEU	0-300	UKN	11	31	27	23	0.00
DEU	0-300	OTB	5	23	3	10	0.97
DEU	0-300	SPR	1			0	0.00
DEU	0-300	TBB	9	12	0	7	0.96
DEU	0-300	TBS	2	6	3	4	0.50
DEU	301-1,500	UKN	3	12	7	7	0.00
DEU	301-1,500	OTB	2	4	3	3	1.00
DEU	301-1,500	PTB	0			0	0.00
DEU	301-1,500	SSC		0		0	0.00
DEU	301-1,500	TBB	25	26	21	24	0.95
DNK	xxx	GN		9		3	0.98
DNK	xxx	GNS		8		3	0.96
DNK	xxx	UKN	1	0	1	0	0.00
DNK	xxx	OTT		0		0	0.00
DNK	xxx	SDN		1		0	1.00
DNK	xxx	SSC		0		0	1.00
DNK	0-300	GN	1	9	1	4	0.94

**Table 7.10 Effort of each fleet segment in the Coastal zone area (days at sea) and the proportion of the time spent fishing (continued)**

Country	HP category	Gear a)	Effort (days at sea)				Time spent fishing
			2006	2007	2008	Average	
DNK	0-300	GNS	20	15	2	12	0.94
DNK	0-300	GTR	0	0		0	0.00
DNK	0-300	UKN		0	0	0	0.00
DNK	0-300	OTB	0			0	1.00
DNK	0-300	SDN	1	0	1	1	1.00
DNK	0-300	TBB	0			0	1.00
DNK	301-1,500	GN		2	3	2	0.74
DNK	301-1,500	GNS	1	0		1	1.00
DNK	301-1,500	UKN	17	34	75	42	0.00
DNK	301-1,500	OTB	1	3	0	1	1.00
DNK	301-1,500	OTT	5	3	1	3	1.00
DNK	301-1,500	SSC	3	1	2	2	0.91
DNK	301-1,500	TBB	0			0	0.00
DNK	>1,501	UKN	1	1	1	1	0.00
FRA	301-1,500	UKN		1	1	1	0.00
GBR	xxx	UKN	0	1	1	1	0.00
GBR	xxx	TBB	0		2	1	0.00
GBR	0-300	GN	0		0	0	1.00
GBR	0-300	UKN	1	1	0	1	0.00
GBR	0-300	TBB		3	3	2	0.94
GBR	301-1,500	UKN	1	1	1	1	0.00
GBR	301-1,500	OTB		2	3	2	1.00
GBR	301-1,500	OTT	2	3	2	2	1.00
GBR	301-1,500	SSC		0		0	1.00
GBR	301-1,500	TBB	46	67	32	49	0.97
GBR	>1,501	UKN			0	0	0.00
GBR	>1,501	OTT		0		0	1.00
GBR	>1,501	TBB	14	8	7	10	0.90
IRL	xxx	UKN			1	0	0.00
NOR	xxx	UKN	0	0		0	0.00
UKN	xxx	UKN	46	3	18	22	0.00

a) Country and fishing gear codes are included in Annex 3.

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

**Table 7.11 Landings of each fleet segment from the Coastal zone area (\* 1,000 kg)**

Country	HP category	Gear a)	Landings (*1,000 kg)			Average
			2006	2007	2008	
BEL	0-300	UKN		0		0
BEL	0-300	OTB	0	0		0
BEL	0-300	TBB	5	2	12	6
BEL	0-300	TBS	0	4	17	7
BEL	301-1,500	UKN		0	0	0
BEL	301-1,500	OTB		0	0	0
BEL	301-1,500	TBB	0	0	0	0
DEU	xxx	GN		0		0
DEU	xxx	UKN		0	0	0
DEU	xxx	TBB		0	0	0
DEU	xxx	TBS		0	3	1
DEU	0-300	GN		0	0	0
DEU	0-300	GNS	0		0	0
DEU	0-300	UKN	2	6	7	5
DEU	0-300	OTB	0	0	0	0
DEU	0-300	SPR	0			0
DEU	0-300	TBB	0	0	0	0
DEU	0-300	TBS	1	3	1	2
DEU	301-1,500	UKN	1	3	2	2
DEU	301-1,500	OTB	0	0	0	0
DEU	301-1,500	PTB	0			0
DEU	301-1,500	SSC		0		0
DEU	301-1,500	TBB	0	0	0	0
DNK	xxx	GN		0		0
DNK	xxx	GNS		1		0
DNK	xxx	UKN	0	0		0
DNK	xxx	OTT		0		0
DNK	xxx	SDN		0		0
DNK	xxx	SSC		0		0
DNK	0-300	GN	0	1	0	0
DNK	0-300	GNS	1	3	0	1
DNK	0-300	GTR	0	0		0
DNK	0-300	UKN		0	0	0



**Table 7.11 Landings of each fleet segment from the Coastal zone area (\*1,000 kg) (continued)**

Country	HP category	Gear a)	Landings (*1,000 kg)			Average
			2006	2007	2008	
DNK	0-300	OTB	0			0
DNK	0-300	SDN	0	0	0	0
DNK	0-300	TBB	0			0
DNK	301-1,500	GN		0	1	0
DNK	301-1,500	GNS	0	0		0
DNK	301-1,500	UKN	4	7	18	9
DNK	301-1,500	OTB	0	0	0	0
DNK	301-1,500	OTT	0	0	0	0
DNK	301-1,500	SSC	0	0	0	0
DNK	301-1,500	TBB	0			0
GBR	xxx	UKN	0		1	0
GBR	xxx	TBB	0		1	0
GBR	0-300	GN	0		0	0
GBR	0-300	UKN	0	0	0	0
GBR	0-300	TBB		0	0	0
GBR	301-1,500	UKN	0	1	1	1
GBR	301-1,500	OTB		0	0	0
GBR	301-1,500	OTT	0	0	0	0
GBR	301-1,500	SSC		0		0
GBR	301-1,500	TBB	1	1	1	1
GBR	>1,501	UKN			0	0
GBR	>1,501	OTT		0		0
GBR	>1,501	TBB	1	0	0	0
Total			17	32	64	38

a) Country and fishing gear codes are included in Annex 3.

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

**Table 7.12 Value of the landed catches of each fleet segment from the Coastal zone area (\* €1,000)**

Country	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
BEL	0-300	UKN		0		0
BEL	0-300	OTB	0	0		0
BEL	0-300	TBB	34	8	79	40
BEL	0-300	TBS	1	12	52	22
BEL	301-1,500	UKN		0	0	0
BEL	301-1,500	OTB		0	0	0
BEL	301-1,500	TBB	0	1	0	0
DEU	xxx	GN		0		0
DEU	xxx	UKN		0	0	0
DEU	xxx	TBB		1	1	0
DEU	xxx	TBS		0	7	2
DEU	0-300	GN		0	0	0
DEU	0-300	GNS	0		0	0
DEU	0-300	UKN	6	20	21	15
DEU	0-300	OTB	0	1	0	0
DEU	0-300	SPR	0			0
DEU	0-300	TBB	0	0	0	0
DEU	0-300	TBS	4	10	4	6
DEU	301-1,500	UKN	3	11	7	7
DEU	301-1,500	OTB	0	0	0	0
DEU	301-1,500	PTB	0			0
DEU	301-1,500	SSC		0		0
DEU	301-1,500	TBB	1	0	1	1
DNK	xxx	GN		4		1
DNK	xxx	GNS		6		2
DNK	xxx	UKN	0	0		0
DNK	xxx	OTT		0		0
DNK	xxx	SDN		0		0
DNK	xxx	SSC		0		0
DNK	0-300	GN	0	12	0	4
DNK	0-300	GNS	9	22	0	10
DNK	0-300	GTR	0	0		0
DNK	0-300	UKN		0	0	0

**Table 7.12** Value of the landed catches of each fleet segment from the Coastal zone area (\* €1,000) (continued)

Country	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
DNK	0-300	OTB	0			0
DNK	0-300	SDN	0	0	0	0
DNK	0-300	TBB	0			0
DNK	301-1,500	GN		4	4	3
DNK	301-1,500	GNS	0	0		0
DNK	301-1,500	UKN	18	31	71	40
DNK	301-1,500	OTB	0	0	0	0
DNK	301-1,500	OTT	0	0	0	0
DNK	301-1,500	SSC	0	0	0	0
DNK	301-1,500	TBB	2			1
GBR	xxx	UKN	0		1	1
GBR	xxx	TBB	0		3	1
GBR	0-300	GN	0		0	0
GBR	0-300	UKN	0	1	0	0
GBR	0-300	TBB		0	1	0
GBR	301-1,500	UKN	1	1	2	1
GBR	301-1,500	OTB		0	0	0
GBR	301-1,500	OTT	0	0	0	0
GBR	301-1,500	SSC		0		0
GBR	301-1,500	TBB	3	3	2	3
GBR	>1,501	UKN			1	0
GBR	>1,501	OTT		0		0
GBR	>1,501	TBB	3	1	0	1
Total			85	149	258	164

a) Country and fishing gear codes are included in Annex 3

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

## 7.5 Vlakte van de Raan

**Table 7.13** Effort of each fleet segment in the *Vlakte van de Raan* area (days at sea) and the proportion of the time spent fishing

Country	HP category	Gear a)	Effort (days at sea)				Time spent fishing
			2006	2007	2008	Average	
BEL	xxx	UKN		2		1	0.00
BEL	0-300	UKN	24	27	45	32	0.00
BEL	0-300	TBB	20	35	27	27	0.14
BEL	0-300	TBS	82	126	171	127	0.40
BEL	301-1,500	UKN	0	1	0	0	0.00
BEL	301-1,500	TBB			0	0	1.00
DEU	xxx	GN		0		0	1.00
FRA	0-300	UKN	0			0	0.00
FRA	301-1,500	UKN	0	0		0	0.00
GBR	301-1,500	UKN		0		0	0.00
NOR	xxx	UKN		0		0	0.00
UKN	xxx	UKN			0	0	0.00

a) Country and fishing gear codes are included in Annex 3.

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

**Table 7.14** Landings of each fleet segment from the *Vlakte van de Raan* area (\*1,000 kg)

Country	HP category	Gear a)	Landings (*1,000 kg)			
			2006	2007	2008	Average
BEL	0-300	UKN	6	4	12	7
BEL	0-300	TBB	3	7	6	5
BEL	0-300	TBS	42	37	77	52
BEL	301-1,500	UKN	0	0	0	0
BEL	301-1,500	TBB			0	0
DEU	xxx	GN		0		0
GBR	301-1,500	UKN		0		0
Total			51	48	95	64

a) Country and fishing gear codes are included in Annex 3.

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

**Table 7.15** Value of the landed catches of each fleet segment from the *Vlakte van de Raan* area (\* €1,000)

Country	HP category	Gear a)	Value (* €1,000)			Average
			2006	2007	2008	
BEL	0-300	UKN	18	16	41	25
BEL	0-300	TBB	15	19	23	19
BEL	0-300	TBS	102	103	230	145
BEL	301-1,500	UKN	0	0	0	0
BEL	301-1,500	TBB			0	0
DEU	xxx	GN		0		0
GBR	301-1,500	UKN		0		0
Total			136	139	294	189

a) Country and fishing gear codes are included in Annex 3.

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

## 8 Discussion and conclusions

### 8.1 Discussion

The institution of Natura 2000 areas and management regimes in these areas are sensitive issues in the fisheries sector. This report makes a contribution to this discussion by providing economic data about the value of the catches in the various areas. The analyses reveal that the areas to be designated are of importance to the various fisheries. Table 8.1 lists the values of the catches of the Dutch and non-Dutch fisheries in the various areas.

Area	Dutch fisheries	Non-Dutch fisheries	Total
Dogger Bank	649	2,664	3,313
Frisian Front	4,774	1,528	6,302
Cleaver Bank	1,281	934	2,215
Coastal zone	8,899	164	9,063
<i>Vlakte van de Raan</i>	518	189	707
Total	16,121	5,479	21,600

a) Country and fishing gear codes are included in Annex 3.  
Source: Logbook data, VMS data and price data processed by LEI.

The value of the catches in the coastal zone is striking, namely €9 million. The catches by the shrimp fisheries account for the majority of this value (€8 million), a value which accounts for 15% of the total value of the shrimp fisheries' catches in the Netherlands (Taal *et al.*, 2009). The Frisian Front is also of importance to the Dutch sector: the total catch value amounts to almost €5 million. The total value of the fish caught in the areas under consideration amounts to approximately €16 million and makes a contribution of €6.5 million to the Dutch fisheries' gross value added (return on investments and labour). The Dogger Bank is of particular importance to the non-Dutch fleets (including cutters sailing under another flag) (€2.7 million), followed by the Frisian Front (€1.5 million). However, the method used in this study has its limitations: these are reviewed briefly below.

Firstly, the catch values determined in this study are historic values for the 2006-2008 period. This in turn implies that these values are in part determined

by the policy context during the period: a variety of measures (in particular, the introduction of the days at sea regime) implemented in the years since 2000 have resulted in a shift of fishing efforts. Consequently, forecasts of the future values of catches in these areas are greatly dependent on the European policy context and this study does not provide an answer to the question of the potential of these areas.

The methodology used in this study is largely comparable with the methodology used in earlier studies of the value of the fisheries in specific areas (Van Oostenbrugge *et al.*, 2006; Van Oostenbrugge *et al.*, 2009): however, this analysis is the first for which a complete set of VMS data and logbook data were available. This has greatly improved the expressiveness of the results. The data available for the non-Dutch fleets is suboptimal: in view of the absence of complete logbook data and the uncertainty about the coverage of the VMS data, the results for these fisheries can be regarded solely as indicative.

The methodology used in this study is also undergoing rapid development. In recent years a number of publications have appeared that clarify issues and sub-issues such as methods for improved estimations of vessel trajectories (such as Hintzen *et al.*, 2010; Lee *et al.*, 2010; Pedersen *et al.*, 2009). LEI's Dutch (IMARES), German and British colleagues, in particular, are carrying out work on this methodology. Consequently, further harmonisation and standardisation of the methods is required to ensure that the results are comparable and can be integrated. New sources of data such as e-logbooks and more precise location data may also offer an opportunity for the further development of the distribution analyses.

Analyses of distribution data published in the available literature have given very little attention (virtually none) to analyses of the uncertainty of the results. However, in view of the large number of assumptions made during the processing of the data (see Section 3), it is certainly necessary to quantify the uncertainties to avoid giving the impression that the results from these studies constitute the only truth. This report takes the first step in this quantification: as such, this has already revealed that there are great differences in the reliability of the estimates by area and fishery. However, a great deal of work still needs to be carried out on the further development of this method.

The results from this study give rise to a logical question: do the estimated values give an indication of the costs of the possible partial or full closure of these areas? This question cannot be answered from these results. The costs incurred on the partial or full closure of areas are not determined so much by the value of the catches in the area but rather by the feasibility of relocating the fisheries operations. This feasibility is greatly dependent on two linked factors:

1. the degree to which the individual entrepreneurs are dependent on the relevant areas;
2. the availability of alternative fishing locations.

The degree of dependency on an area is determined by a large number of factors (such as specialisation in a certain habitat/fish species, the proximity of a port, personal preferences and tradition). Individual fishers who are greatly dependent on specific areas will incur greater costs in the relocation of their fishing activities since this involves greater changes to their operations. Fishers who are less dependent on specific areas will need to make less fundamental changes to their operations and will incur lower costs. Earlier studies revealed that this dependency varied greatly between areas and fisheries (Van Oostenbrugge, 2006).

The fisheries are increasingly confronted with the problem of the availability of alternative locations. Consequently, this will need to be taken into account in the determination of the costs of the relocation of fishing efforts: spatial claims on areas in the North Sea have increased continually in recent years and are reducing the area available for fishing. These claims are not restricted to the Dutch section of the North Sea, but are also being made in the Danish, German and British sections. For this reason an appropriate insight into the feasibility of relocating operations on the closure of an area can be obtained only by adopting an integral approach to the spatial planning activities for the North Sea. The FIMPAS project offers an ideal opportunity for the further detailing of this approach.

## **8.2 Conclusions**

With respect to the research question of economic importance of the designated areas, the following conclusions can be drawn from the results.

The link between the logbook data and VMS data can provide extremely valuable information about the distribution of the efforts, the catches and their value and create an opportunity for estimates of the value of specific areas to the fisheries.

During this period, the value of the Dutch fisheries' catches in the designated Natura 2000 areas was substantial (on average, €16 million per annum in the 2006-2008 period), whereby the catches (shrimp) in the coastal zone were of particular importance (on average, €8.9 million per annum in the 2006-2008 period).



The Dogger Bank was the most important fishing area for the non-Dutch fisheries in the Dutch section of the continental shelf, with a total catch value of an average of €2.6 million per annum in the 2006-2008 period.

The method for the estimation of the catches and the determination of the estimation error used in this report lays the foundations for further development.

The effects of management measures in the areas can be determined only by mapping the dependencies of individual entrepreneurs on these areas and the feasibility of the relocation of their operations. This needs to be reviewed from an international perspective.

# Literature

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# Appendix 1

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## The VIRIS database<sup>1</sup>

All catches landed at Dutch auctions and all catches made by Dutch vessels (and, consequently, excluding vessels sailing under another flag) since 1990 are registered in the VIRIS database. The information in their logbooks<sup>2</sup> is used to make records of the dates on which each vessel leaves port and returns to port at the beginning and end of a trip. Consequently, the number of days at sea is known for each trip. In addition, a record is made of the type of fishing gear used on each trip. The records of the vessels include specifications such as their engine power and length. This data yields information about the fishing efforts. The records include the total landing (kg) of each species per ICES quadrant for each trip. An ICES quadrant is (at the Netherlands' latitude) a square of 56 x 56 km (0.5 degree of latitude x 1 degree of longitude). Records of catches made by non-Dutch vessels landing at Dutch auctions have been kept since 1995, when a new version of VIRIS was introduced. Records of shrimp catches have also been kept since 1995 (more-or-less memorandum accounts, i.e. outside the control system). Records have been made of the landings of virtually all species in VIRIS since 2000. As a result, VIRIS is not just a control system but also a statistical system. No records are kept of catches made by non-Dutch vessels in the Dutch coastal zone that are not landed in the Netherlands. However, records are kept of catches that Dutch vessels land outside the Netherlands. No information is available about discards of fish caught in hauls.

Since the records specify solely catches by ICES quadrant the VIRIS dataset has a low spatial resolution: for example, large areas of the quadrants used to specify the catches in the coastal zone lie outside the 12 mile zone. Since the records include information about individual vessels a distinction can be made between euro cutters (capacity <300 HP) and large cutters (capacity >300 HP).

However, the VIRIS database does have a number of significant limitations:

- the databank was designed for control purposes. For this reason data that are less important for control purposes - such as catches by quadrant - are entered with less precision and, consequently, are less reliable;

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<sup>1</sup> The information about the VIRIS database is reproduced from Buisman *et al.* (2002).

<sup>2</sup> The information about the VIRIS database is reproduced from Buisman *et al.* (2002).

- for this same reason the majority of the records of shrimp catches do not specify the ICES quadrant. As a result, the catch areas cannot be derived from the data and data by fishing area in the coastal zone - an important fishing area for shrimp - are largely lacking.

## Appendix 2

### Classification of fish species into market categories and the associated conversion factors

<b>Table B2.1 Classification of fish species into market categories and the associated conversion factors</b>		
<b>Species</b>	<b>Market category</b>	<b>Conversion factor</b>
Anchovy	sprat	1
Blue whiting	pelagic fish	1
Flounder	flounder	1.01
Bream	freshwater fish	1
Dolphin	other seafish	1
Spiny dogfish	shark	1.33
East Atlantic red gurnard	red gurnard	1.24
Shrimp	shrimp	1.18
Garfish	garfish	1
Common octopus	other seafish	1
Grey gurnard	grey gurnard	1.24
Brill	brill	1.11
Shark	shark	1
Mullet	freshwater fish	1.01
Herring	herring	1.01
Hake	hake	1.17
Halibut	halibut	1.11
Horse mackerel	horse mackerel	1
Squid	other seafish	1
Cod	cod	1.15
Carp	freshwater fish	1
Norway pout	pelagic fish	1
Cockle	other seafish	1
Pollack	pollack	1.22
Lobster	other seafish	1
Langoustine	langoustine	1
Largehead hairtail	other seafish	1
Ling	ling	1.17

<b>Table B2.1</b>		<b>Classification of fish species into market categories and the associated conversion factors (continued)</b>
<b>Species</b>	<b>Market category</b>	<b>Conversion factor</b>
Mackerel	mackerel	1
Mackerel	mackerel	1
Mullet	bass	1.01
North sea crab	other seafood	1.01
Other seafood	other seafood	1
Eel	freshwater fish	1.04
Weever	other seafood	1
Pollack	other seafood	1.22
Viviparous blenny	other seafood	1.01
Chromis	other seafood	1
Red gurnard	red gurnard	1.24
Ray	ray	1.14
Golden redfish	golden redfish	1.16

<b>Table B2.2</b>		<b>Classification of fish species into market categories and the associated conversion factors and price flexibilities</b>
<b>Species</b>	<b>Market category</b>	<b>Conversion factor</b>
Sardine	pelagic fish	1
Sardine	pelagic fish	1
Sardine	pelagic fish	1
Dab	dab	1.13
Megrim	megrim	1.11
Razor clam	other seafood	1
Bivalves	other seafood	1
Bivalves	other seafood	1
Haddock	haddock	1.17
Plaice	plaice	1.05
Cuttlefish	other seafood	1
Pike	freshwater fish	1
Pike-perch	freshwater fish	1
Smelt	freshwater fish	1
Spisula	other seafood	1
Sprat	sprat	1

<b>Table B2.2</b>		<b>Classification of fish species into market categories and the associated conversion factors and price flexibilities (continued)</b>
<b>Species</b>	<b>Market category</b>	<b>Conversion factor</b>
Scallop	other seafish	1
Pout	pouting	1.3
Turbot	turbot	1.11
Tiger shark	shark	1
Sole	sole	1.04
Sole	sole	1.04
Lemon sole	lemon sole	1.11
Tuna	other seafish	1.1
Whiting	whiting	1.14
Witch	lemon sole	1.11
Whelk	other seafish	1
Salmon	other seafish	1.22
Sand lance	other seafish	1
Scaldfish	sole	1.04
Bass	bass	1.01
Sea bream	bass	1.01
Monkfish	monkfish	3
Sea bream	other seafish	1
Conger eel	other seafish	1.01
Seaweed	other seafish	1
Catfish	catfish	1.3
Silver smelt	pelagic fish	1



## Appendix 3

### Abbreviations for countries and fishing gear

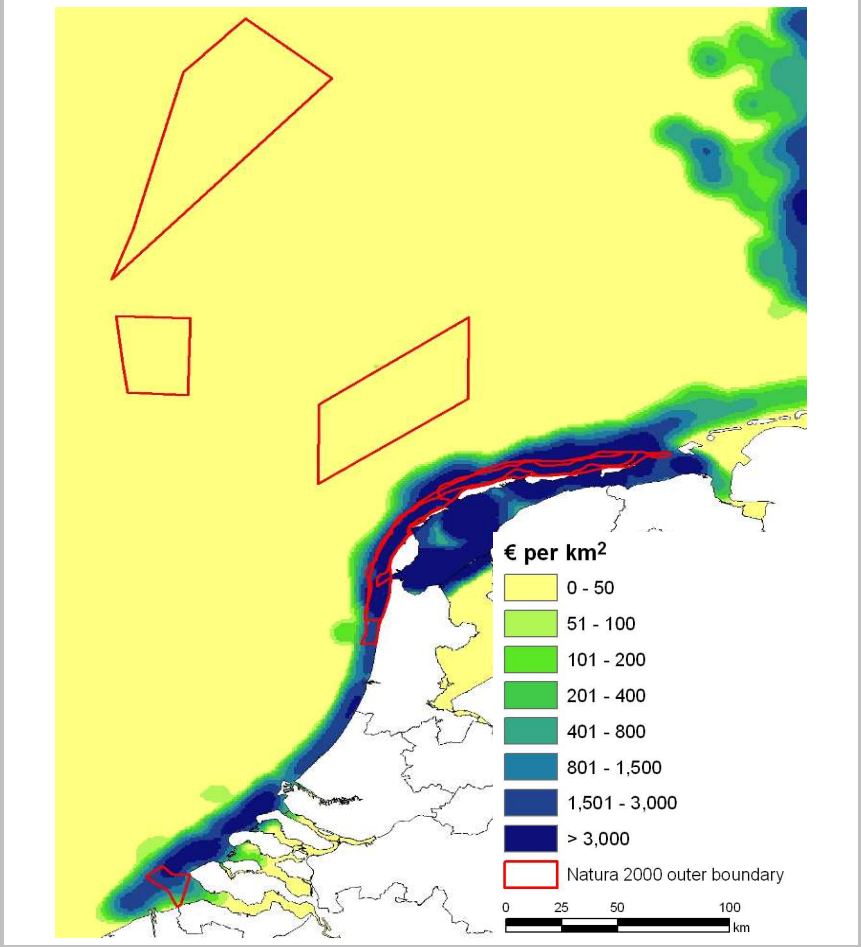
<b>Abbreviation</b>	<b>Name</b>
DRB	Dedges (bivalves)
FPO	Pots
GN	Gill nets (not specified)
GND	Drift nets
GNS	Set gill nets (anchored)
GTR	Trammel nets
LH	Towed lines
LHM	Towed lines (mechanised)
LHP	Towed lines (hand operated)
LL	Longlines
MIS	Miscellaneous gear
UKN	Unknown
OTB	Bottom otter trawls
OTG	Other towed gears
OTM	Pelagic otter trawls
OTT	Otter twin trawls
PS	Purse seines
PTB	Bottom pair trawls
PTM	Pelagic pair trawls
SDN	Danish seines
SSC	Scottish seines
TBB	Beam trawls
TBS	Shrimp trawls
TGB	Unknown

<b>Table B3.2      Abbreviations for countries</b>	
<b>Abbreviation</b>	<b>Country</b>
BEL	Belgium
DEU	Germany
DNK	Denmark
FRA	France
GBR	Great Britain
IRL	Ireland
LTU	Lithuania
NOR	Norway
POL	Poland
RUS	Russia
SWE	Sweden
UKN	unknown
XNE	No information

# Appendix 4

## Catches and effort by fishing gear

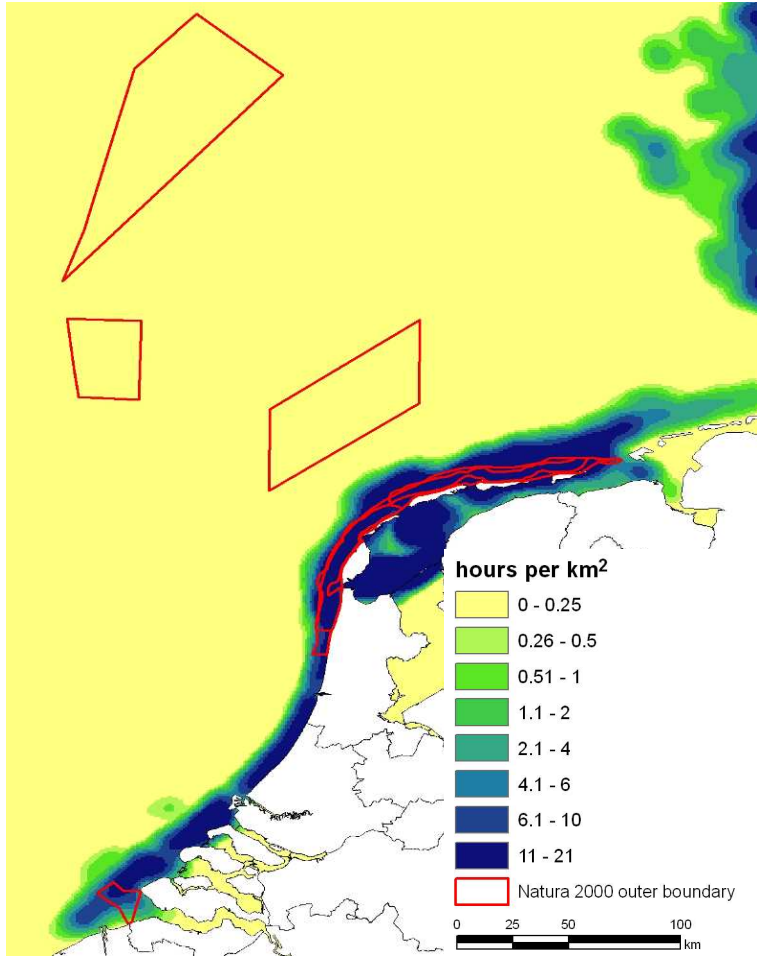
**Figure B4.1** Distribution of the catch value of the shrimp fisheries in the North Sea in 2008 and the position of the five designated Natura 2000 areas



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

**Figure B4.2**

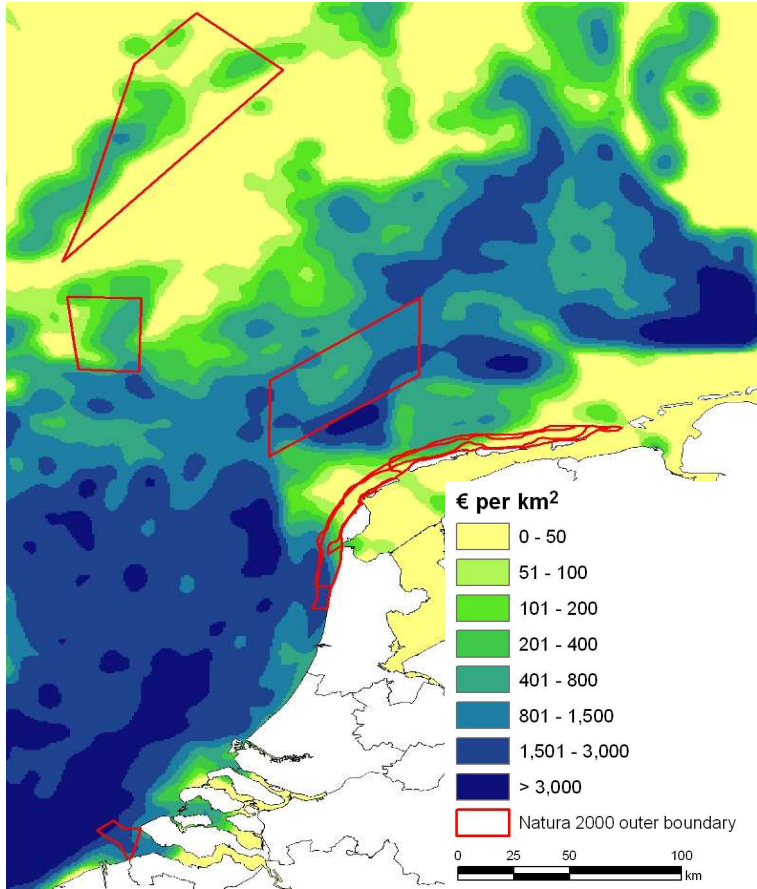
**Distribution of the effort of the shrimp fisheries in the North Sea in 2008 and the position of the five designated Natura 2000 areas**



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

**Figure B4.3**

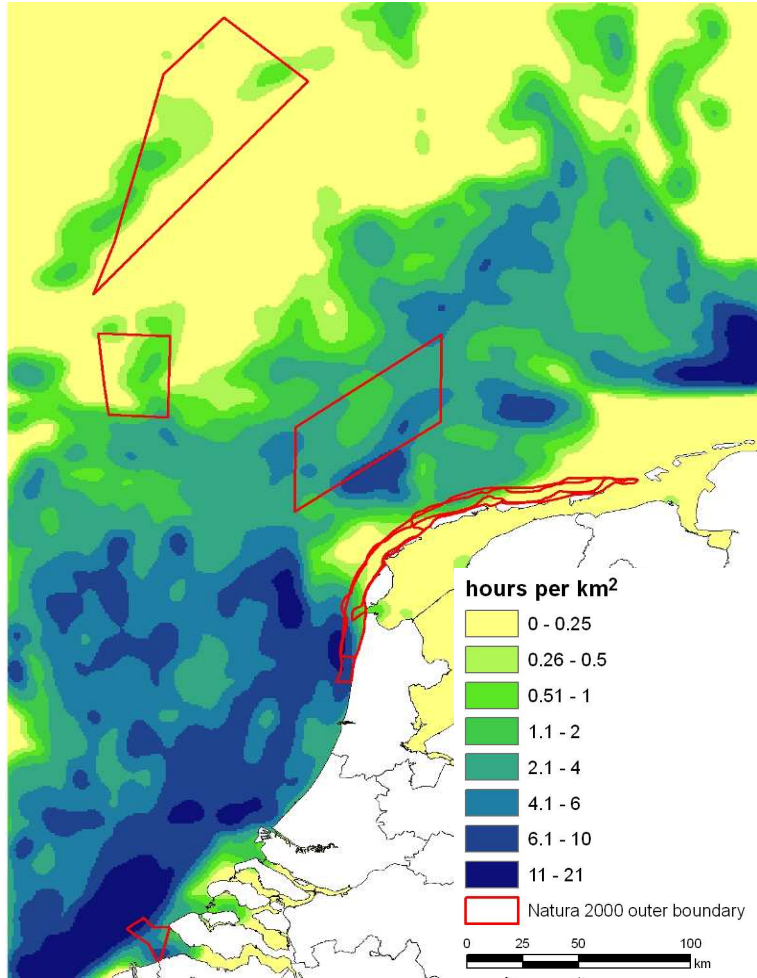
**Distribution of the catch value of the beam trawl fisheries in the North Sea in 2008 and the position of the five designated Natura 2000 areas**



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

**Figure B4.4**

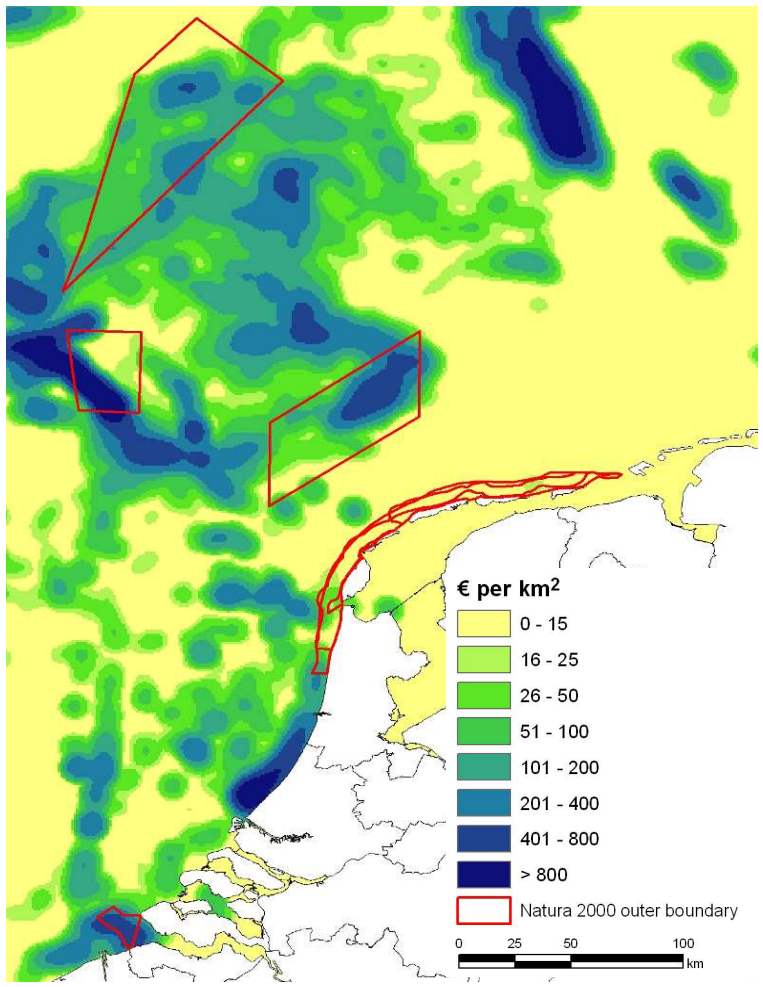
**Distribution of the effort of the beam trawl fisheries in the North Sea in 2008 and the position of the five designated Natura 2000 areas**



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

Figure B4.5

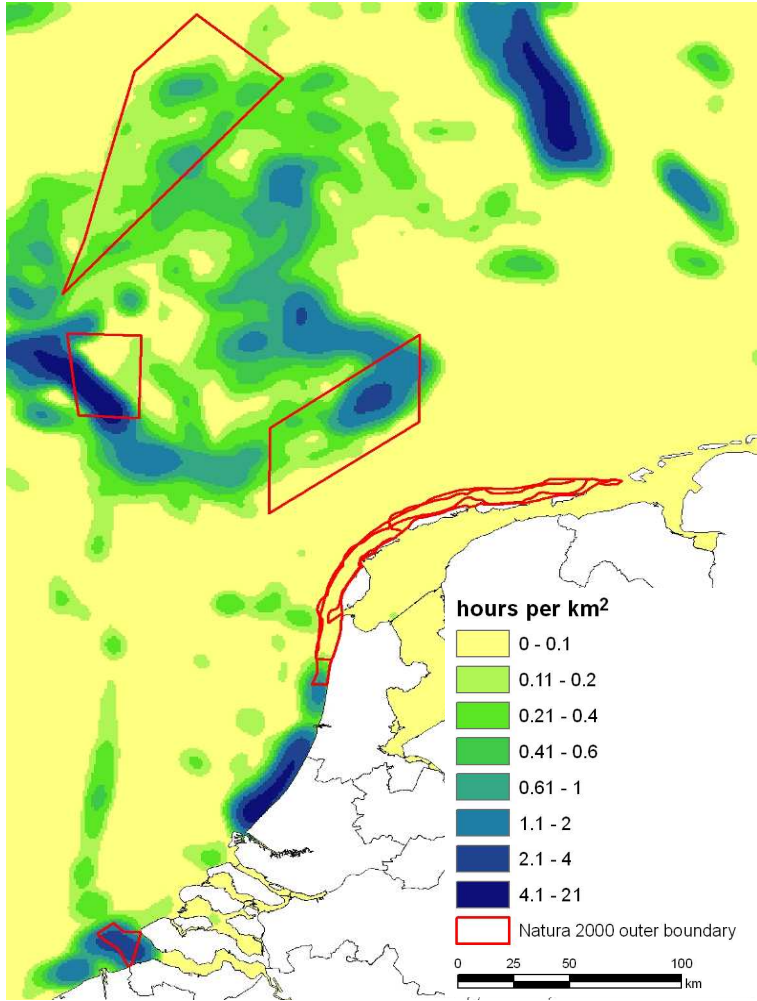
Distribution of the catch value of the otter twin trawl fisheries in the North Sea in 2008 and the position of the five designated Natura 2000 areas



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

**Figure B4.6**

**Distribution of the effort of the otter twin trawl fisheries in the North Sea in 2008 and the position of the five designated Natura 2000 areas**



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



# Appendix 5

## Estimated catches by species

<b>Table B5.1</b>		<b>Estimated catches (x 1,000 kg) and catch values (* €1,000) of the individual species by area</b>				
	<b>Catch</b>			<b>Catch value</b>		
	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<i>Dogger Bank</i>						
grey gurnard		0.2			0.0	
herring	9.3	4.7	30.2	2.4	1.3	7.8
horse mackerel	0.1			0.4		
cod	3.5	0.6	1.2	9.5	1.5	3.7
mackerel	0.8			2.9		
dab	29.1	11.6	35.0	21.4	9.9	26.9
plaice	132.7	84.0	433.3	307.7	167.7	825.0
lemon sole	1.8	1.5	17.9	7.5	5.4	58.1
whiting	0.2	3.7		0.3	4.4	
Other	21.1	18.9	46.8	109.3	104.1	268.7
<i>Frisian Front</i>						
flounder	134.7	25.9	24.0	69.2	20.6	16.1
grey gurnard	0.1	0.4	0.2	0.0	0.1	0.1
horse mackerel		7.6			3.3	
cod	0.1			0.2		
langoustine	132.3	45.5	74.0	843.1	269.5	405.2
mackerel	0.3	0.2	0.0	1.3	0.6	0.1
mullet	0.5	0.2	0.0	5.0	1.7	0.4
red gurnard	0.9	3.5	0.1	1.3	3.8	0.1
dab	160.1	149.2	86.4	115.2	123.1	69.2
plaice	601.0	486.7	508.4	1,115.2	936.3	870.4
turbot	60.9	95.2	51.0	583.0	844.9	510.7
sole	163.7	279.7	191.5	1,969.0	2,529.5	1,862.5
Other	92.2	134.5	82.7	328.7	457.6	363.9

**Table B5.1** Estimated catches (x 1,000 kg) and catch values (\* €1,000) of the individual species by area (continued)

	Catch			Catch value		
	2006	2007	2008	2006	2007	2008
<i>Cleaver Bank</i>						
grey gurnard			1.1			0.4
herring	31.2	39.7		8.0	10.2	
squid			0.6			1.2
cod	14.6	33.1	27.3	34.4	83.0	74.9
langoustine	66.7	113.5	67.9	409.3	725.6	391.1
mackerel			0.5			0.9
mullet			0.7			6.8
red gurnard			1.6			2.4
ray	0.3			0.5		
dab	0.0		0.7	0.0		0.7
plaice	117.7	175.4	155.8	229.3	344.3	281.6
turbot	0.0			0.0		
sole	11.0	23.1	11.5	138.5	196.0	105.5
whiting	1.0	1.2	2.1	1.1	1.6	2.1
whelk	11.1	8.9	5.5	22.5	19.0	14.0
Other	60.0	80.2	60.1	190.8	287.0	259.1
<i>North Sea coastal zone</i>						
flounder	37.1	32.6	37.9	30.2	26.6	25.3
shrimp	2,989.8	2,268.2	2,805.2	7,097.1	6,886.0	9,336.7
horse	0.7	0.6	0.1	1.7	2.6	0.6
cod	0.2	0.3	2.2	0.4	0.6	4.7
mackerel	0.5	0.3	0.0	0.9	1.2	0.2
mullet	0.0	0.5		0.7	5.8	
red gurnard	0.1	0.8	0.0	0.3	1.0	0.0
dab	11.7	7.5	20.4	8.0	5.9	15.2
Razor clam	112.8	102.7	173.1	234.5	258.8	506.2
plaice	0.9	0.3	1.0	1.8	0.6	1.7
spisula		0.1			0.2	
turbot	0.1	0.1	0.1	1.1	0.5	1.2
sole	59.3	42.1	93.5	701.6	448.8	885.1
whiting	0.1	0.3	1.2	0.1	0.3	0.9
Other	20.7	13.5	22.4	88.3	44.7	69.1

**Table B5.1** Estimated catches (x 1,000 kg) and catch values (\* €1,000) of the individual species by area (continued)

	Catch			Catch value		
	2006	2007	2008	2006	2007	2008
<i>Vlakte van de Raan</i>						
flounder	11.3	16.3	26.1	9.2	13.5	17.6
shrimp	69.3	42.4	96.9	173.4	142.5	295.8
herring		3.2			0.8	
horse mackerel		80.2			35.3	
cod	36.8	43.5	43.2	76.9	102.3	98.3
dab	6.8	23.6	36.8	6.2	21.8	24.7
Razor clam	6.8	0.3		12.3	1.3	
plaice	1.9	2.2	5.7	4.1	4.5	10.7
sprat	0.1	0.1		0.1	0.1	
sole	3.9	10.3	27.6	48.7	98.0	263.2
whiting		0.0	0.0		0.0	0.0
Other	10.3	8.8	16.6	25.5	18.6	48.7

a) Country and fishing gear codes are included in Annex 3.

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

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