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# Fishing effort in protected areas in the Dutch part of the North Sea. Data for 2014-2021

Background document to the Joint Recommendation for Fisheries Management under the revised Common Fisheries Policy

Auteur(s): R.H. Jongbloed, N.T. Hintzen, O.G. Bos

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Authors: R.H. Jongbloed, N.T. Hintzen, O.G. Bos

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# Summary

Fishery measures in protected areas are coordinated at European level, via the Article 11 procedure of the Common Fisheries Policy (CFP). For this procedure two types of documents need to be submitted to the European Commission: (1) Joint Recommendations and (2) background documents. Joint Recommendations contain a request to the European Commission to regulate fisheries to ensure a key contribution to achieving Natura 2000 or Marine Strategy Framework Directive (MSFD) conservation objectives. Background documents contain more information on the ecology and fisheries. The Joint Recommendations and the background documents are compiled by the Ministry of LNV (Agriculture, Nature and Food Quality) in collaboration with Wageningen Marine Research and Wageningen Economic Research.

In the North Sea Agreement a number of closed areas have been proposed, in which fishery measures will be taken in the Dutch part of the North Sea. These areas are Dogger Bank, Cleaver Bank, Frisian Front, Central Oyster Grounds, Brown Ridge and Borkum Reef Grounds. The Dogger Bank is subdivided between its Natura 2000 part and a MSFD-strip attached at the south of the Natura 2000 area, indicated in this report as Dogger Bank N2000 and Dogger Bank South, respectively.

In addition, in this report we provide data for a number of smaller areas (VIBEG2 areas) within the North Sea Coastal Zone that will be subject to national fishery measures under the North Sea Coastal Fisheries Agreement. These areas will not part of the Art 11 procedure of the CFP.

This report provides data on national and international fishing effort as input for the Joint Recommendations and the background documents. The underlying fisheries information was obtained through an international data call. Since the report is meant as input for area specific documents, no integral analysis is made on the spatial or temporal trends in general. The fishing effort is reported in tables for the period 2014-2021 by gear, member state, and season, both for gear types that will be prohibited as for gear types that remain to be allowed. Maps are provided of fishing effort by gear and season. An overview of economic fisheries data for the same time period is provided by Wageningen Economic Research (Hamon & Klok, 2023). A summary of the main fishing activity data is shown in the table below.

Area	Effort (fishin g days)	Effort per km <sup>2</sup>	Main countries	Main gear types	Main gear groups	Main season (months)	Main trend over years
Borkum Reef Grounds	59	0.086	NLD	TBS*, FPO	Beam trawl	Oct-Jan	Irregular with recent increase
Brown Ridge	383	0.280	NLD	TBB+	Beam trawl	Jan-May	Increase but irregular
Central Oyster Grounds	127	0.062	NLD, GER, DNK	OTB, OTM	Bottom trawl	Aug-Dec	No clear trend
Cleaver Bank	106	0.085	NLD	TBB+	Beam-trawl, Flyshooting seine	June	Decrease
Dogger Bank N2000	52	0.038	NLD	OTB, TBB+	Bottom trawl, Beam trawl	Apr-Jul	Decrease
Dogger Bank South	13	0.025	NLD	OTB, OTM, OTT	Bottom trawl	Apr-Oct	Decrease
Frisian Front subarea 1	299	0.181	NLD, GER	TBB+, OTB	Beam trawl, Bottom trawl	May-Jul	No clear trend
Frisian Front subarea 2	13	0.036	NLD	SSC, GNS, OTM, TBB+	Flyshooting seine, Nets	May-Jun	Decrease
North Sea Coastal Zone (VIBEG2)	108	0.684	NLD, GER, DNK	TBS*	Beam trawl	Jul-Nov	Decrease
North Sea Coastal Zone (N2000)	4959	3.392	NLD	TBS*	Beam trawl	Jun-Nov	Decrease

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# 1 Introduction

In the North Sea Agreement (OFL, 2020) a number of protected areas along with fishery measures in the Dutch part of the North Sea have been proposed. These areas are: Dogger Bank, Cleaver Bank, Frisian Front, Central Oyster Grounds, Brown Ridge and Borkum Reef Grounds (**Figure 1**). The Dogger Bank is subdivided between its Natura 2000 part and a Marine Strategy Framework Directive part (MSFD) attached at the south of the Natura 2000 area and these areas are indicated in this report as Dogger Bank N2000 and Dogger Bank South, respectively. These fishery measures are implemented via the Article 11 procedure of the Common Fisheries Policy (CFP) (Regulation 1380/2013; EU, 2013), for which the Dutch Ministry of LNV (Agriculture, Nature and Food Quality) is responsible. In addition, six small areas (VIBEG2 areas) within and just outside the Natura 2000 site North Sea Coastal Zone (**Figure 2**) are subject of fishery measures as agreed in the North Sea Coastal Fisheries Agreement (Min EZ, 2017). These fishery measures will be implemented via a national process and are not part of the other fishery measures which are implemented via the Article 11 procedure of the Common Fisheries Policy (CFP). We also provide insight in the fisheries in the N2000 site North Sea Coastal Zone. Fisheries in the North Sea Coastal Zone (N2000) is regulated through the Natura 2000 management plan for this site.

An overview of the total set of protected areas and their surface area and type of designation is listed in Table 2.

The Ministry of LNV has prepared a number of documents as provided for art. 11 of the CFP and a similar document for the national process: (1) Joint Recommendations that contain a request to the European Commission to regulate fisheries in these areas to ensure a key contribution to achieving Natura 2000 or Marine Strategy Framework Directive (MSFD) conservation objectives, and (2) background documents with information on the ecology and fisheries, according to the guidelines described in EC (2018). The procedure requires among others that the best scientific information available should be provided and that the process is transparent on the data being used, as well as on the steps being taken and the methodology used.

Fisheries in these protected areas is carried out by a variety of fishing gears and different fleets, not only from The Netherlands but also from other countries like Belgium, Denmark, France, Germany, Sweden and the UK. In this document the fishing effort is reported for the period 2014-2021 for these areas, distinguished by country, gear and season. Economic data for the same time period are described in a report by Wageningen Economic Research (Hamon & Klok, 2023). UK data are not taken into account, because the UK is no longer part of the EU.

## Prohibited gear types

In this report, fishery effort is reported for both prohibited gear types, and gear types that remain to be allowed, to be able to compare their relative importance. More information can be found in the Joint Recommendations that are prepared by the Ministry of LNV (see **Table 1**). In short, the fishery measures concern:

- Prohibition of towed bottom gears (Dogger Bank, Cleaver Bank, Central Oyster Grounds, Frisian Front subarea 2, and Borkum Reef Grounds)
- Prohibition of gill nets (Brown Ridge) between 1 April to 31 September of each year,
- Banning of any fishing activity 'no take zone' (Frisian Front subarea 1)

And three different management schemes are proposed for the North Sea Coastal Zone:

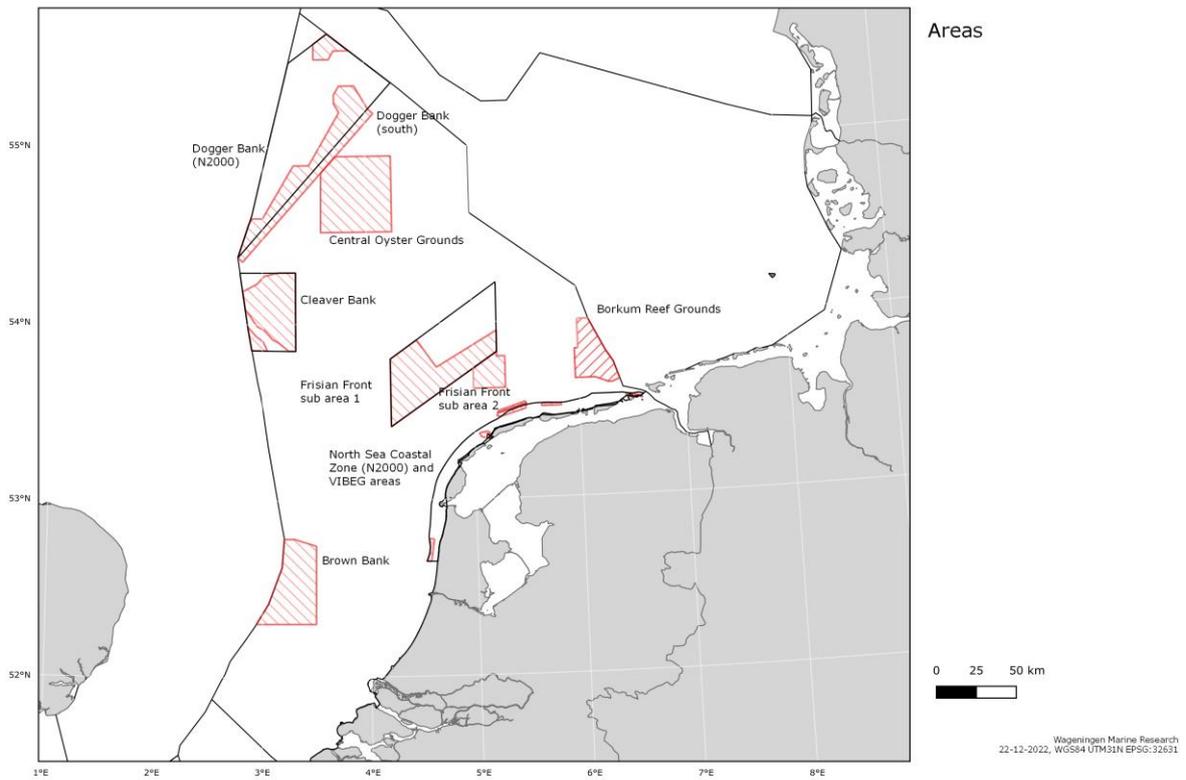
- Zone I: Any fishing activity is prohibited (no-take-zone) (VIBEG2 areas Petten, Stortemelk, Terschelling zuid, Ameland and Rottum; **Figure 2**).
- Zone II: Use of towed bottom gear types listed in **Table 1** are prohibited (VIBEG2 area Terschelling noord).

- Zone III: Restricted area, based on the Dutch Nature Conservation Act.<sup>1</sup> (Rest of the North Sea Coastal Zone).

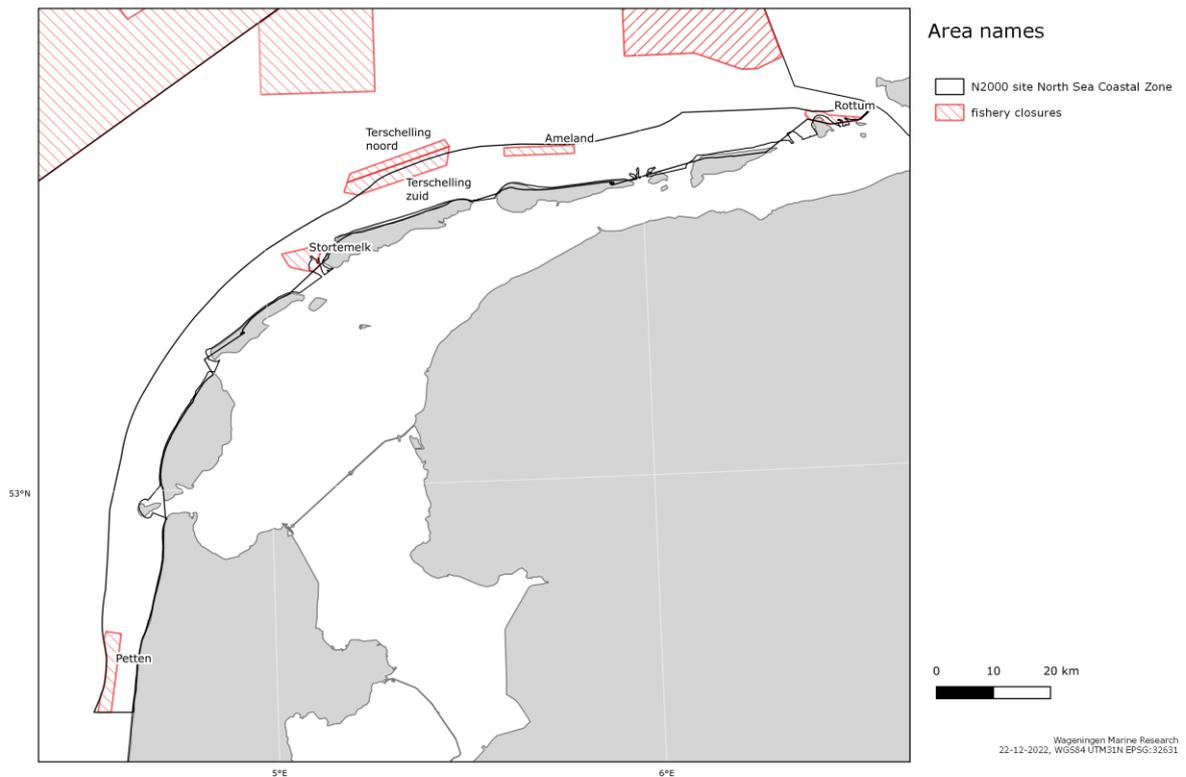
**Table 1** Prohibited towed bottom contacting gear types (source: Ministry of LNV).

Gear groups that are prohibited in the management zones	Gear Code Annex XI in Implementing Regulation (EU) 404/2011	International Standard Classification of Fishing Gears (ISSCFG)	Areas
Towed bottom gears			Dogger Bank Cleaver Bank Central Oyster Grounds Frisian Front subarea 2 Borkum Reef Grounds North Sea Coastal Zone (VIBEG2 Zone II)
Beam trawl	TBB	03.1.1	
Bottom Otter Board Trawl	OTB, OTT, PTB, TBN, TBS, TB, BTM	03.1.2, 03.3.0, 03.1.3, 03.1.9	
Dredges	DRB, HMD	04.1.0, 04.2.0, DRM, DRX	
Seines	SDN, SSC, SPR, SV, SX	SPR, SDN, SSC, SV, SX	
Gill nets			Brown Ridge between 1 April to 31 September of each year
Gill nets	GN, GNS, GND, GNC, GTN, GTR	07.9.1, 07.1.0, 07.2.0, 07.3.0, 07.6.0, 07.5.0	
Any fishing activity	All codes	All codes	Frisian Front subarea 1 North Sea Coastal Zone (VIBEG2 Zone I)

<sup>1</sup> access only for those vessels which are licensed under the Dutch Nature Conservation Act by the Dutch Minister of Agriculture, Nature and Food Quality, based on Annex 1 of the Basic Reg. (within the meaning of article 5(2) Basic Reg.).



**Figure 1.** Marine protected areas and fishery management zones in the Dutch part of the North Sea treated in this report (source: North Sea Agreement; OFL, 2020).



**Figure 2.** Natura 2000-site North Sea Coastal Zone and the VIBEG2 areas (Van Stralen & Craeymeersch, 2018).

**Table 2.** Overview of the protected areas proposed for fishery closure and their surface areas (km<sup>2</sup>)

Name of the area	Surface in km <sup>2</sup>	Type of closure
Borkum Reef Grounds	684	MSFD
Brown Ridge	1367	N2000 (Birds Directive)
Central Oyster Grounds	2063	MSFD
Cleaver Bank	1241	N2000
Dogger Bank N2000	1351	N2000
Dogger Bank South	528	MSFD
Frisian Front subarea 1	1650	MSFD
Frisian Front subarea 2	366	MSFD
North Sea Coastal Zone N2000	1462	N2000
North Sea Coastal Zone VIBEG2	158	VIBEG2

## 1.1 Aim of this report

This report is mainly a data report. The aim is to provide fishing effort data for proposed fishery management zones in the Dutch North Sea. These data serve as input for the Joint Recommendations and the background documents under Article 11 of the Common Fisheries Policy (CFP), which the Ministry of LNV will submit to the European Commission to establish international fishery management zones. These zones are situated in the proposed protected areas in the Dutch part of the North Sea.

The fishing effort data concern all fishing gear types of Dutch and foreign fleets active in these protected areas, as far as these data are available and the countries involved are relevant from the CFP regulation perspective. Data are shown for gear types that will be prohibited, and for gear types that remain to be allowed. Fishery data (2014-2021) of fleets from Belgium, Denmark, France, Germany, Sweden and The Netherlands were collected through an international data call and subsequently analysed and reported. Since the United Kingdom is not part of the EU anymore, UK data were not taken into account<sup>2</sup>.

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<sup>2</sup> Before Brexit, UK vessels could fish in EU waters, but these data are not taken into account. After Brexit, UK vessels can still fish in EU waters and need a special licence (more info: see <https://www.gov.uk/guidance/united-kingdom-single-issuing-authority-uk-vessellist>)

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## 2 Methods

### 2.1 Collection and processing of data for fishing effort

#### 2.1.1 Data sources and processing

Two data sources were used in this study: Vessel Monitoring System (VMS) data and catch data from logbooks (Fish Registration and Information System). Data were analysed in a standardised manner, using an R-script that describes the processing and analysis of the data sets and can be applied by any nation that has similar VMS and logbook data in a standardised format.

A data call to relevant EU member states was sent out in autumn 2022. Wageningen Research provided the R-script to collect data from the Dutch, Danish, German, Belgian, Swedish and French fleets. No UK data were used, since they are not part of the EU anymore. The pre-processing of the data follows the approach developed in Hintzen et al. (2013).

A comprehensive description of the standardised processing of fishing activity data for this study can be found in the report of Roskam et al. (2021) who conducted an economic analysis of the fisheries activities in the protected areas on the Dutch part of the North Sea.

Since the 1st of January 2005, all fishing vessels longer than 15 meters are equipped with VMS (Vessel Monitoring System), while VMS was introduced on-board of vessels longer than 12 meters since the 1st of January 2012. A VMS transponder sends a signal about every 2 hours to a satellite providing information on the vessel's ID, position, time, date, direction and speed. Since 2015, the interval time between registrations has shortened from every 2 hours to 30 minutes for some of the vessels. Hence, VMS is a useful data source to study the distribution of the fishing fleet in both time and space. The Dutch Ministry of Economic Affairs is tasked with the collection of VMS data of all (sizable) Dutch fishing vessels. VMS data of foreign vessels, even inside the Dutch EEZ, are made irregularly available for scientific purposes. All VMS positions are collected in the WGS84 coordinate reference system. VMS does not contain any information on the fisheries activities, e.g. regarding fishing gear, catch composition, departure harbour or vessel dimensions. For many fisheries related studies, VMS is coupled to fisheries logbooks. These logbooks report when fishermen leave the harbour, what gear has been used, the catch composition and a rough estimate of the location of the catches for each 24-hour period and for every fishing trip. Both VMS and logbook data relate on the fishing vessel ID, which allows for the coupling of the two datasets and for studying fisheries distribution at smaller spatial and temporal scales. WMR receives logbook and VMS information of the Dutch fishing fleet from the Ministry and the information is stored in a database called "VISSTAT". A detailed description on the processing and assumptions made during the process can be found in Hintzen et al. (2013).

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### 2.1.2 Data for fishing effort calculations

After data processing, the following variables and values were used for further analysis of fishing effort:

- Year: 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021
- Months: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11,12
- Countries: Netherlands (NLD), Germany (GER), France (FRA), Denmark (DNK), Belgium (BEL), Sweden (SWE). Data were provided by research institutes WUR (NLD), TI (GER), IFREMER (FRA), DTUAQUA (DNK), ILVO (BEL) and SLU (SWE).  
Sweden appeared to have a very low fishing activity in the protected areas with less than 5 fishing days. Therefore the effort of the Swedish fleet is not included in the tables and figures in this background document.
- Gear type: TBB, PUL, TBS, TBC, OTB, OTT, SSC, SDN, HMD, DRB, GNS, GN, GTR, OTM, PTM, FPO (see **Table 3**).
- Geographical units:
  - Proposed protected areas (Dogger Bank N2000, Dogger Bank South, Cleaver Bank, Central Oyster Grounds, Frisian Front subarea 1, Frisian Front subarea 2, North Sea Coastal Zone N2000, North Sea Coastal Zone VIBEG2, Borkum Reef Grounds, Brown Ridge)
  - 1/16 ICES rectangles covering the whole of the study area.
- Fisheries intensity (minutes). We transformed fishing minutes to fishing days by dividing them by 60 (to get hours) and then by 24 (to get days). The unit used in this report is thus "fishing days". One fishing day is 24 h of fishing.

### 2.1.3 Maps

QGIS was used to create maps. Data were all transformed to WGS84 UTM31N for spatial calculations. Data used for GIS maps consisted of:

- A shapefile with the North Sea Agreement areas (fishery management zones) provided by the Ministry of LNV including the proposed protected areas Dogger Bank N2000, Dogger Bank South, Cleaver Bank, Central Oyster Grounds, Frisian Front subarea 1, Frisian Front subarea 2, N2000, North Sea Coastal Zone VIBEG2, Borkum Reef Grounds and Brown Ridge.
- A shapefile of the Natura 2000 site North Sea Coastal Zone (<https://www.nationaalgeoregister.nl/>)
- Coordinates of VIBEG2 zones: Van Stralen & Craeymeersch (2018)
- A shapefile of Europe: Flanders Marine Institute (2020).
- A map of 1/16 ICES sub rectangles provided by Niels Hintzen (WMR).
- Data are expressed in "fishing days" (1 fishing day = 24h of fishing, see above)

## 2.2 Fishing gear types and groups

In all protected areas analysed in this background document a total of 16 gear types have been used in the period 2014-2021 in one or more of the areas. Gear types and codes are listed in **Table 3**, as well as the gear groups they were assigned to. This is relevant for the impact on the conservation objectives.

**Table 3.** Overview of gear types and gear groups used in this report. TBB (beam trawls) and PUL (pulse trawls) are combined in the effort analysis in this report and indicated as TBB+. Also TBS (shrimp trawls) and TBC (beam trawls Crangon) are combined and indicated as TBS\*.

Gear group	Gear subgroup	Gear code	Gear name
<b>Benthic (seafloor disturbing) gears</b>			
Beam trawls	TBB+	TBB	Beam trawls
		PUL	Pulse fishery
	TBS*	TBS	Shrimp trawls
		TBC	Beam trawl Crangon
Demersal trawlers/seiners	Bottom trawls	OTB	Otter trawls (bottom trawl)
		OTT	Otter twin trawls
	Flyshooting seine	SSC	Scottish seines
	Anchored seine	SDN	Danish seines
Dredge		HMD	Mechanized dredges
		DRB	Boat dredges
<b>Pelagic and passive gears</b>			
Nets		GNS	Set gillnets
		GN	Gillnets (not specified)
		GTR	Trammel nets
Pelagic trawl		OTM	Otter trawl (midwater trawl)
		PTM	Pair trawls (midwater trawl)
Traps/Pots		FPO	Traps/Pots

### 3 Overview fishing activities in all areas

This chapter provides a summary of the main fishery activities per area and per state (**Table 4**) and an explanation in the text. In the Appendices of this report detailed information is provided. In this chapter we do not present total efforts of all areas together, because the closures do not represent identical types of closures.

#### 3.1 Fleet activity in effort

Areas were compared for the total fishing effort **Table 4** (fishing days; sum 2014-2021) as well as the relative fishing effort (fishing days per km<sup>2</sup>; sum 2014-2021). The ranking (high to low) is shown in Table 5 and Table 6, based on the average annual fishing effort during the period 2014-2021. There is a big difference in the total fishing effort among the areas. Of the proposed fishery closures, not taking into account the Natura 2000 site North Sea Coastal Zone, the highest total effort is in the Brown Ridge area (383 fishing days), and the lowest in Frisian Front subarea 2 (13 fishing days). Per km<sup>2</sup>, the North Sea Coastal zone (VIBEG2) areas are most intensely fished (sum of 0.68 days per km<sup>2</sup> for 2014-2021) and the Dogger Bank South the least (0.025 days).

**Table 4.** Summary of the main fishing activity results. Main countries and gear groups are chosen as the countries and gears contributing to at least 20% of the total fishing activity (fishing days) over the period 2014-2021. Main gear types as the gear types contributing to at least 10% of the total fishing activity over the period.

Area	Effort (fishing days)	Effort per km <sup>2</sup>	Main countries	Main gear types	Main gear groups	Main season (months)	Main trend over years
Borkum Reef Grounds	59	0.086	NLD	TBS*, FPO	Beam trawl	Oct-Jan	Irregular with recent increase
Brown Ridge	383	0.280	NLD	TBB+	Beam trawl	Jan-May	Increase but irregular
Central Oyster Grounds	127	0.062	NLD, GER, DNK	OTB, OTM	Bottom trawl	Aug-Dec	No clear trend
Cleaver Bank	106	0.085	NLD	TBB+	Beam-trawl, Flyshooting seine	June	Decrease
Dogger Bank N2000	52	0.038	NLD	OTB, TBB+	Bottom trawl, Beam trawl	Apr-Jul	Decrease
Dogger Bank South	13	0.025	NLD	OTB, OTM, OTT	Bottom trawl	Apr-Oct	Decrease
Frisian Front subarea 1	299	0.181	NLD, GER	TBB+, OTB	Beam trawl, Bottom trawl	May-Jul	No clear trend
Frisian Front subarea 2	13	0.036	NLD	SSC, GNS, OTM, TBB+	Flyshooting seine, Nets	May-Jun	Decrease
North Sea Coastal Zone (VIBEG2)	108	0.684	NLD, GER, DNK	TBS*	Beam trawl	Jul-Nov	Decrease
North Sea Coastal Zone (N2000)	4959	3.392	NLD	TBS*	Beam trawl	Jun-Nov	Decrease

**Table 5.** Ranking of areas based on total effort (sum 2014-2021).

Ranking	Area	Effort (fishing days)
1	North Sea Coastal Zone (N2000)	4959
2	Brown Ridge	383
3	Frisian Front subarea 1	299
4	Central Oyster Grounds	127
5	North Sea Coastal Zone (VIBEG2)	108
6	Cleaver Bank	106
7	Borkum Reef Grounds	59
8	Dogger Bank N2000	52
9	Dogger Bank South	13
10	Frisian Front subarea 2	13

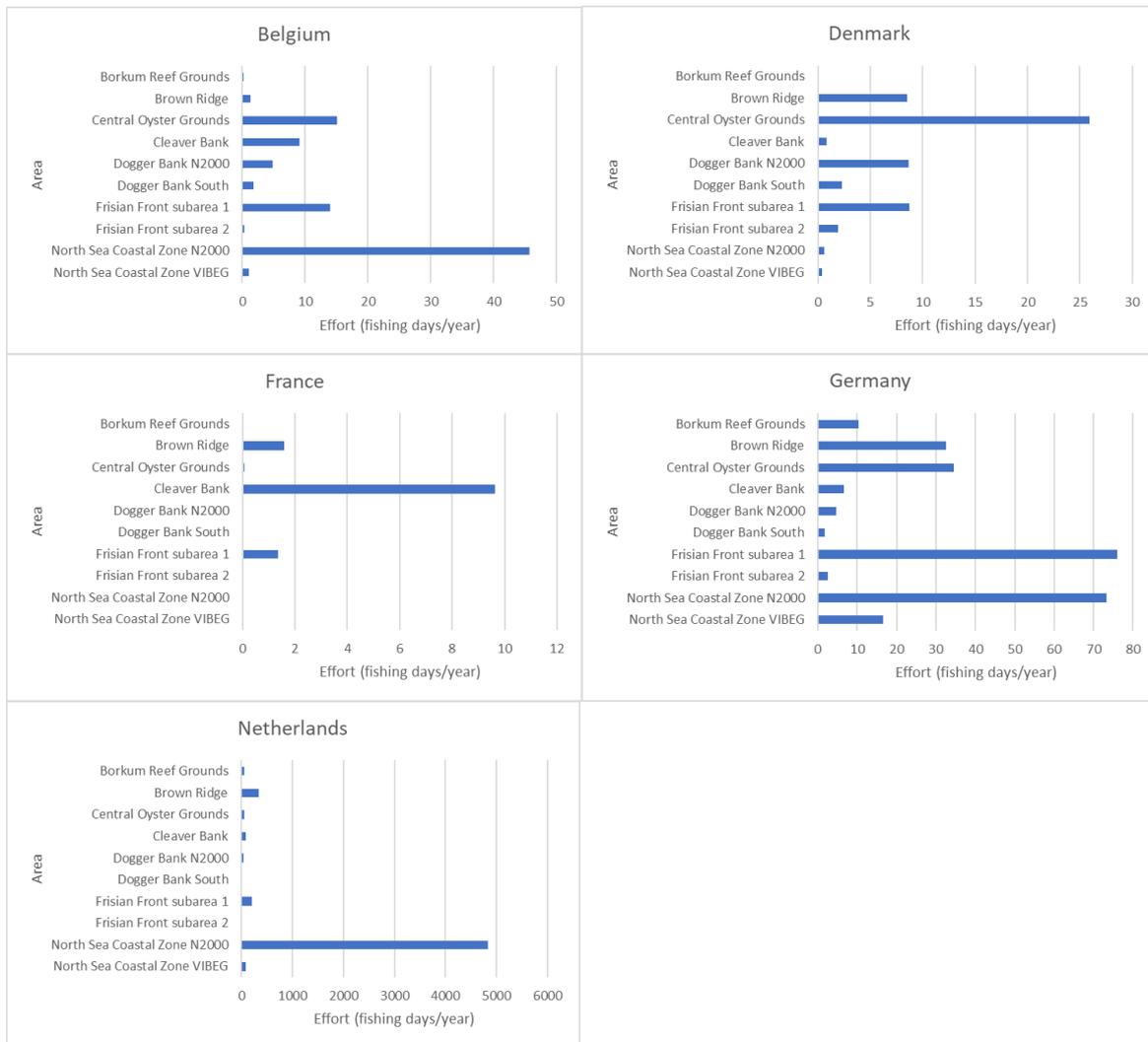
**Table 6.** Ranking of areas based on effort per km<sup>2</sup> (sum 2014-2021).

Ranking	Area	Effort per km <sup>2</sup>
1	North Sea Coastal Zone (N2000)	3.392
2	North Sea Coastal Zone (VIBEG2)	0.684
3	Brown Ridge	0.280
4	Frisian Front subarea 1	0.181
5	Borkum Reef Grounds	0.086
6	Cleaver Bank	0.085
7	Central Oyster Grounds	0.062
8	Dogger Bank N2000	0.038
9	Frisian Front subarea 2	0.036
10	Dogger Bank South	0.025

### 3.1 Fleet activity by state

The results for the fishing effort of national fleets over all protected areas combined reveal that the effort decreased during 2014-2021 for DNK and NLD, whereas no clear trend has occurred for BEL, FRA and GER. For the Danish, Dutch and German fleets the fishing effort was higher in summer and autumn as compared to winter and spring. The Belgian and French fleet fished most intensely in the summer.

Based on the fishing activity data in the previous years the significance of the areas for the national fleets can be derived (**Figure 3**). This produces a different picture for each of the five national fleets. The Belgian fleet mainly fished in the North Sea Coastal Zone N2000, Central Oyster Grounds and Frisian Front subarea 1. The Danish fleet fished mainly in the Central Oyster Grounds, Frisian Front subarea 1, Dogger Bank N2000 and Brown Ridge. The French fleet fished most frequently in the Cleaver Bank, Brown Ridge and Frisian Front subarea 1. The German fleet fished mainly in the Frisian Front subarea 1, North Sea Coastal Zone N2000, Central Oyster Grounds and Brown Ridge. For the Dutch fleet the North Sea Coastal Zone N2000 is by far the most intensely fished area. Other frequently fished areas are Brown Ridge and Frisian Front subarea 1. The other areas are relatively much less frequently fished but in absolute terms the fishery effort in each of these areas is much higher for the Dutch fleets than for the other national fleets separately and also higher than for the other national fleets combined, except the Central Oyster Grounds where the share of the Dutch fleet is below 50%, namely 41%.



**Figure 3.** Fishing effort (days per year) in the proposed management zones for fleets (countries). Note that the horizontal scale differs per graph.

## 3.2 Gears and gear groups

The seafloor contacting gear groups effort is dominant by far (**Table 7**): In the North Sea Coastal Zone 2000 the effort of the seafloor contacting gear groups was almost 100% (99.7%) and in the other nine areas combined 94.2%. In general, beam trawling in near shore areas is more intense than in further offshore areas (**Figure 5**). Fishing with dredges is almost completely confined to the North Sea Coastal Zone N2000 and fishing with traps is mainly carried out in the North Sea Coastal Zone N2000 and Borkum Reef Grounds. The offshore areas have been fished more frequently than the near shore areas in case of bottom trawl, flyshooting seine, anchored seine and pelagic trawl.

Table 7 Overview of fishery effort (fishing days) per year of gear types in the proposed management zone of all areas.

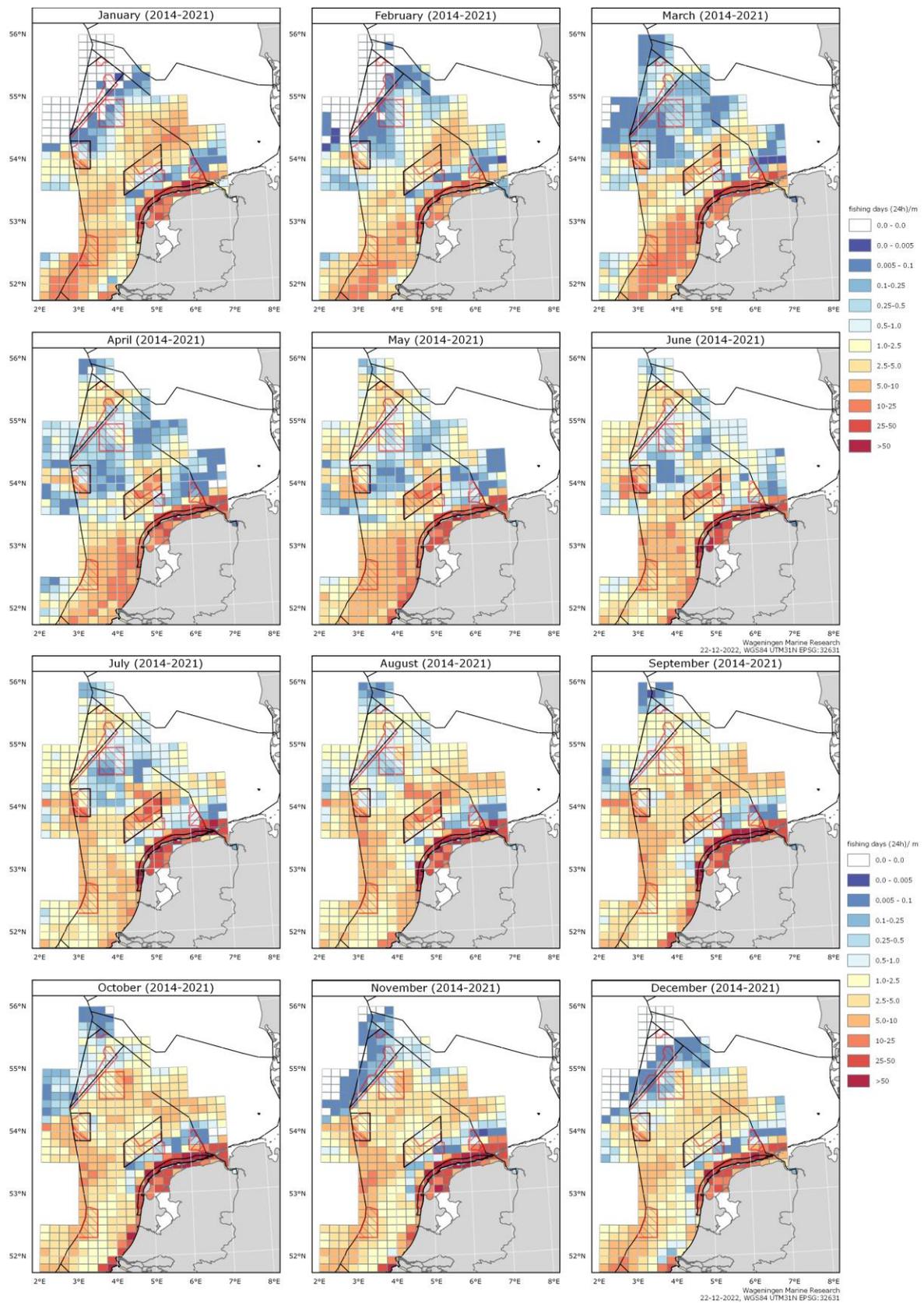
Area	Seafloor disturbing gears								Pelagic and passive gears					Total
	TBB+	TBS*	OTB	OTT	SSC	SDN	HMD	DRB	GNS	GN	FPO	OTM	PTM	
Borkum Reef Grounds	1	46	0	0	4	0			0	8	0			<b>59</b>
Brown Ridge	339	0	2		23	2			16	1	0	0		<b>383</b>
Central Oyster Grounds	9	0	87	10	0	1			4	0		15	0	<b>127</b>
Cleaver Bank	51	0	10	1	36	5			0			2	0	<b>106</b>
Dogger Bank N2000	16		26	5	0	0				0	0	4		<b>52</b>
Dogger Bank South	1		9	2	0							2	0	<b>13</b>
Frisian Front subarea 1	176	0	77	28	9	0			3	0	0	6		<b>299</b>
Frisian Front subarea 2	2	0	1	0	6	0			3	0	0	2		<b>13</b>
North Sea Coastal Zone N2000	67	4795	2	0	0		81	1	3	0	10	0		<b>4959</b>
North Sea Coastal Zone VIBEG2	4	103	0	0	0	0	0	0	1		0	0	0	<b>108</b>
<b>Total</b>	<b>664</b>	<b>4944</b>	<b>216</b>	<b>46</b>	<b>79</b>	<b>8</b>	<b>81</b>	<b>1</b>	<b>29</b>	<b>2</b>	<b>18</b>	<b>32</b>	<b>0</b>	<b>6120</b>

### 3.3 Seasonal and annual variation in fishing activity

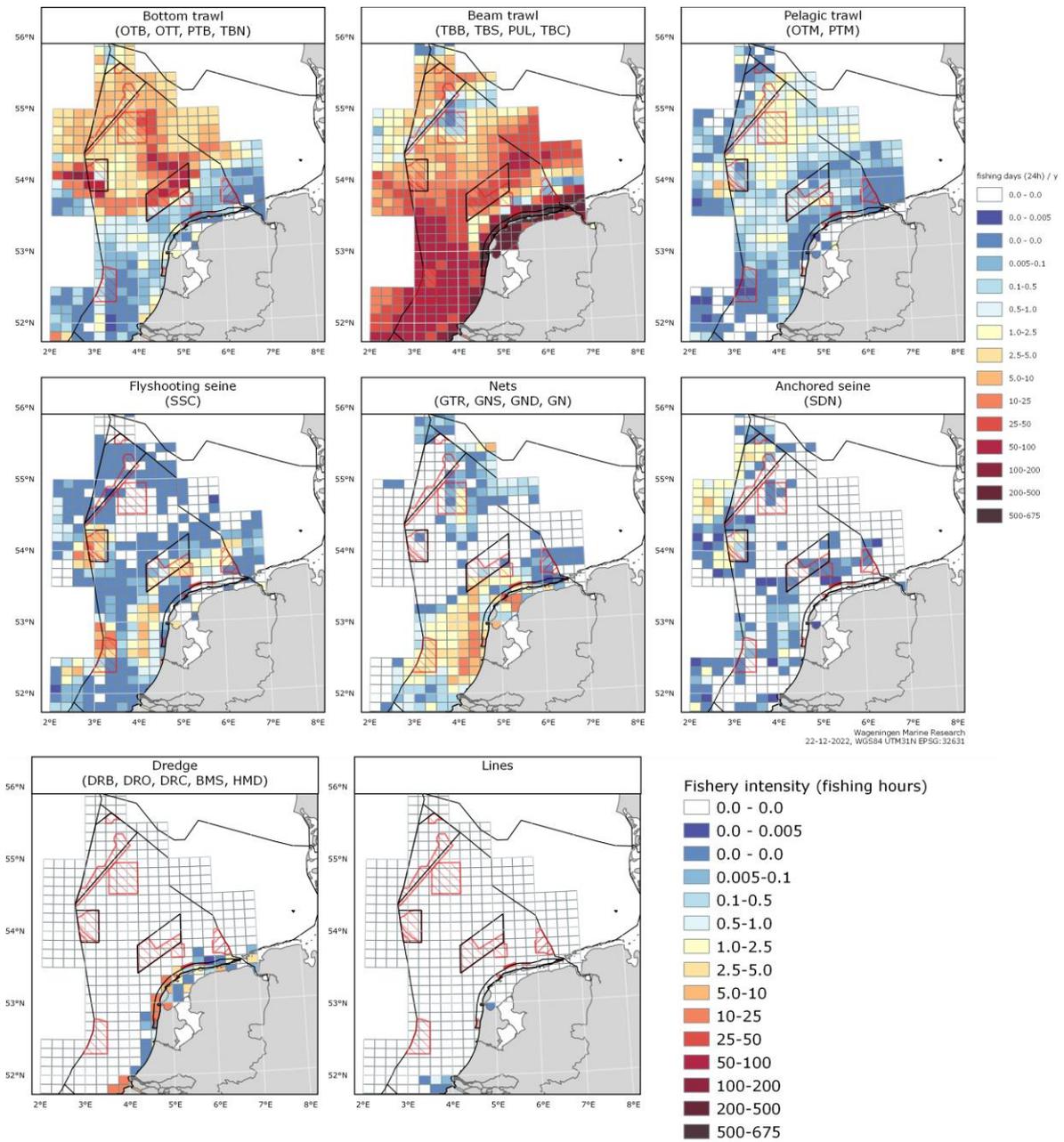
Clear seasonal patterns in fishing effort are present for national fleets, gear types and gear groups (Appendices Tables B1, B2, B3). In general the highest effort occurred from late spring, during summer to late autumn (May-November). This can be attributed to the effort of many gear types (TBS\*, OTB, OTT, SDN, FPO, OTM) (Appendix Table B2) and the corresponding gear groups (beam trawl, bottom trawl, anchored seine, traps, pelagic trawl) (Appendix Table B3). The effort of GNS (nets) is most intense in spring and the effort of TBB+ is somewhat higher in winter and spring. For gear types SSC, HMD, DRB, GN, PTM and linked gear groups flyshooting seine and dredge no clear seasonal pattern is observed (Appendices Tables B2 and B3).

### 3.4 Spatial distribution of fishing activity

Maps for the spatial distribution of the fishing activity of all gear groups combined and of the fishing activity of eight distinguished gear groups for the Dutch North Sea with all protected areas can be seen in **Figure 4** and **Figure 5**. Most fisheries effort is present in the North Sea Coastal Zone and the southern and middle part of the Dutch North Sea. Beam trawl and bottom trawl are dominant fisheries. More observations are described above.



**Figure 4.** Fishing effort per month, of all gears groups combined (fishing days/month) in the Dutch part of the North Sea.



**Figure 5.** Fishing effort (fishing days/year) per gear group in the Dutch part of the North Sea.

# 4 Fishing activities on the Borkum Reef Grounds

## 4.1 Fleet activity in effort

Data on the fishing activity of fleets, gear types and gear groups on the Borkum Reef Grounds for each year in the period 2014 to 2021 is shown in **Table 8**, **Table 9**, **Table 10** and **Figure 6**. The extent and trends in the fishing activity are described in the next sections.

**Table 8.** Overview of fishery effort (fishing days) per year of fleet nationality in the proposed management zone of the Borkum Reef Grounds.

Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
Belgium			1				0	1	0
Denmark		0	0			0	0	1	0
France									0
Germany	6	3	9	13	3	3	18	26	10
Netherlands	16	16	14	22	11	7	78	221	48
<i>Total</i>	<i>23</i>	<i>19</i>	<i>24</i>	<i>34</i>	<i>15</i>	<i>10</i>	<i>95</i>	<i>249</i>	<i>59</i>

**Table 9.** Overview of fishery effort (fishing days) per year of gear types in the proposed management zone of the Borkum Reef Grounds.

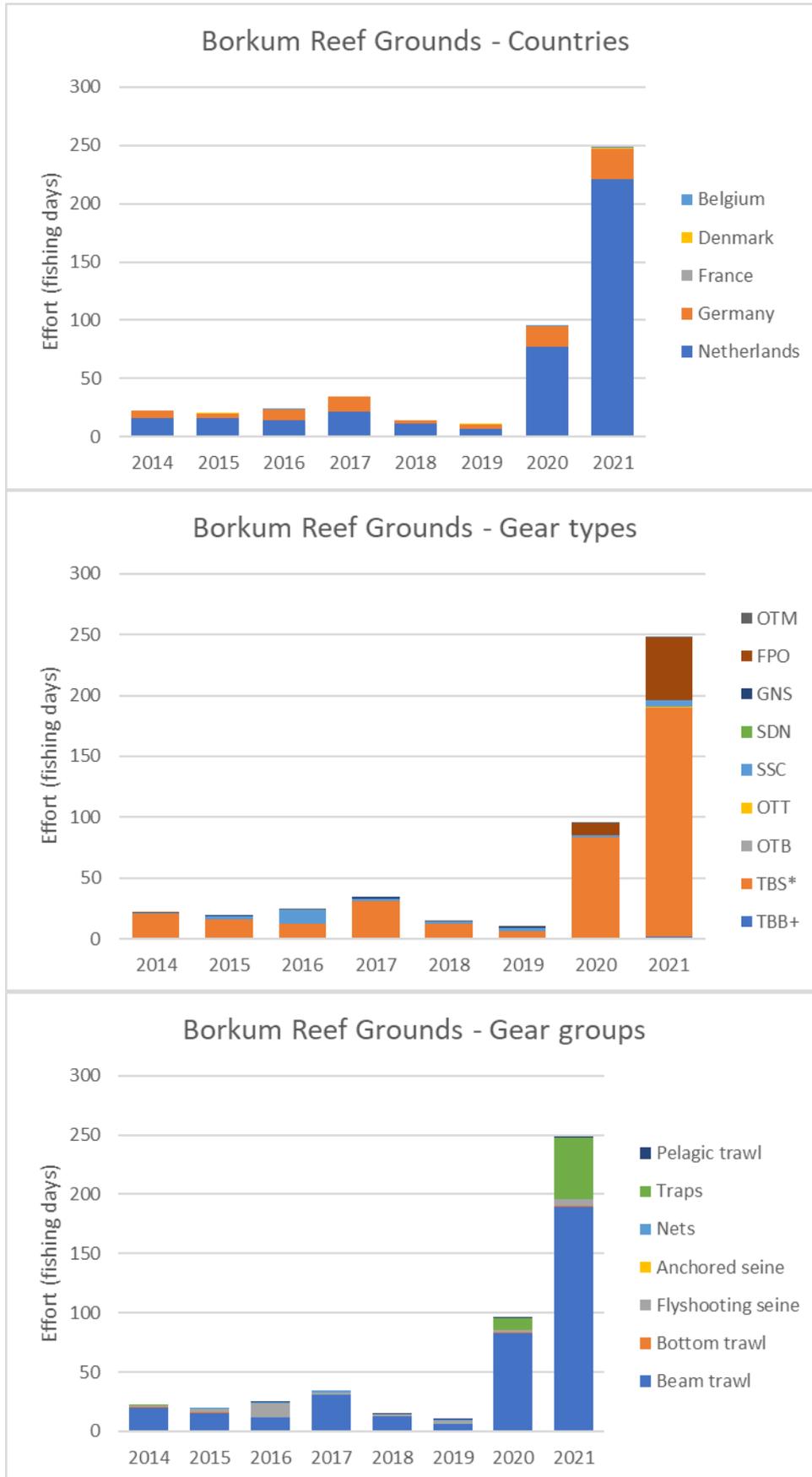
Gear type	2014	2015	2016	2017	2018	2019	2020	2021	Average
TBB+	0.8	0.8	0.3	0.2	0.2	0.8	0.6	1.7	0.7
TBS*	19.6	15.0	11.8	30.6	12.1	5.3	82.6	188.1	45.6
OTB		0.1			0.1	0.2	0.4	0.2	0.1
OTT	0.2	0.0					0.3	0.6	0.1
SSC	1.2	2.8	11.9	2.1	1.7	2.5	1.5	5.1	3.6
SDN						0.6			0.1
**GNS		0.8	0.3	1.5	0.4	0.7			0.4
**FPO	0.7					0.2	10.0	51.9	7.8
**OTM			0.1		0.2	0.0	0.1	1.0	0.2
<i>Total</i>	<i>22.5</i>	<i>19.5</i>	<i>24.4</i>	<i>34.5</i>	<i>14.6</i>	<i>10.2</i>	<i>95.4</i>	<i>248.6</i>	<i>58.7</i>

\*\*not part of the proposed fishery measures

**Table 10.** Overview of fishery effort (fishing days) per year of gear groups in the proposed management zone of the Borkum Reef Grounds.

Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
Beam trawl	20.4	15.8	12.1	30.8	12.3	6.1	83.2	189.8	46.3
Bottom trawl	0.2	0.1			0.1	0.2	0.7	0.8	0.3
Flyshooting seine	1.2	2.8	11.9	2.1	1.7	2.5	1.5	5.1	3.6
Anchored seine						0.6			0.1
**Nets		0.8	0.3	1.5	0.4	0.7			0.4
**Traps	0.7					0.2	10.0	51.9	7.8
**Pelagic trawl			0.1		0.2	0.0	0.1	1.0	0.2
<i>Total</i>	<i>22.5</i>	<i>19.5</i>	<i>24.4</i>	<i>34.5</i>	<i>14.6</i>	<i>10.2</i>	<i>95.4</i>	<i>248.6</i>	<i>58.7</i>

\*\*not part of the proposed fishery measures



**Figure 6.** Fishery effort (fishing days) per year in the proposed management zone Borkum Reef Grounds for fleets (countries), gear types and gear groups. Gear types 'OTM', 'FPO' and 'GNS' and gear groups 'Pelagic trawl', 'Traps' and 'Nets' are not part of the proposed fishery measures.

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## 4.2 Fleet activity by state

Nearly all fishing effort in the Borkum Reef Grounds is carried out by the Dutch fleet and the German fleet with on average 82% and 17% of the total effort of 59 fishing days per year for the five countries considered. There was a negligible share of the Belgian fleet (0.32%) and Danish fleet (0.20%) and no fishing activity of the French fleet.

Over the period 2014-2021 there was an irregular trend of the total fishery activity, with a sharp increase in the last 2 years. This increase occurred for both the Dutch and German fleet. Comparing the effort in 2021 with the one in 2014 the increase was 10-fold for all fleets combined, 14-fold for the Dutch fleet and 4-fold for the German fleet.

## 4.3 Gears and gear groups

In the period 2014-2021 fishing took place with nine different gear types in the Borkum Reef Grounds. The fishing effort was heavily dominated by shrimp trawling (TBS\*) with a percentage of 77.8% and also considerable fishing with pots (FPO) occurred (13.4%). A small percentage was taken by SSC (6.1%), TBB+ (1.1%) and GNS (0.8%). The share of OTB, OTM and OTT was below 0.3% (**Figure 6**). This means that 85.6% of all fishery effort was caused by fishing gear contacting the seafloor.

Over the 2014-2021 period there was a trend of in the effort for the shrimp trawling and pot fishery. The shrimp fishery effort showed a 10-fold increase in 2021 as compared with 2014.

## 4.4 Seasonal variation in fishing activity

Data on the fishing activity per month of fleets, gear types and gear groups in the Borkum Reef Grounds in the period 2014-2021 is shown in **Table 11**, **Table 12**, **Table 13** and **Figure 7**.

**Table 11.** Overview of fishery effort (fishing days) per month of fleets nationality in the proposed management zone of Borkum Reef Grounds. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Country	1	2	3	4	5	6	7	8	9	10	11	12	Average
Belgium	0.02		0.01		0.06	0.00			0.02		0.07		0.02
Denmark	0.01					0.01	0.06	0.05					0.01
France													0.00
Germany	1.19	0.54	0.45	0.56	0.25	0.02	0.36	0.85	0.43	1.28	3.00	1.33	0.85
Netherlands	3.73	2.93	1.87	1.63	1.22	2.59	2.52	1.16	1.03	3.31	17.13	9.02	4.01
<i>Total</i>	<i>4.95</i>	<i>3.47</i>	<i>2.34</i>	<i>2.18</i>	<i>1.54</i>	<i>2.61</i>	<i>2.94</i>	<i>2.05</i>	<i>1.48</i>	<i>4.59</i>	<i>20.21</i>	<i>10.35</i>	<i>4.89</i>

**Table 12.** Overview of fishery effort (fishing days) per month of gear types in the proposed management zone of Borkum Reef Grounds.

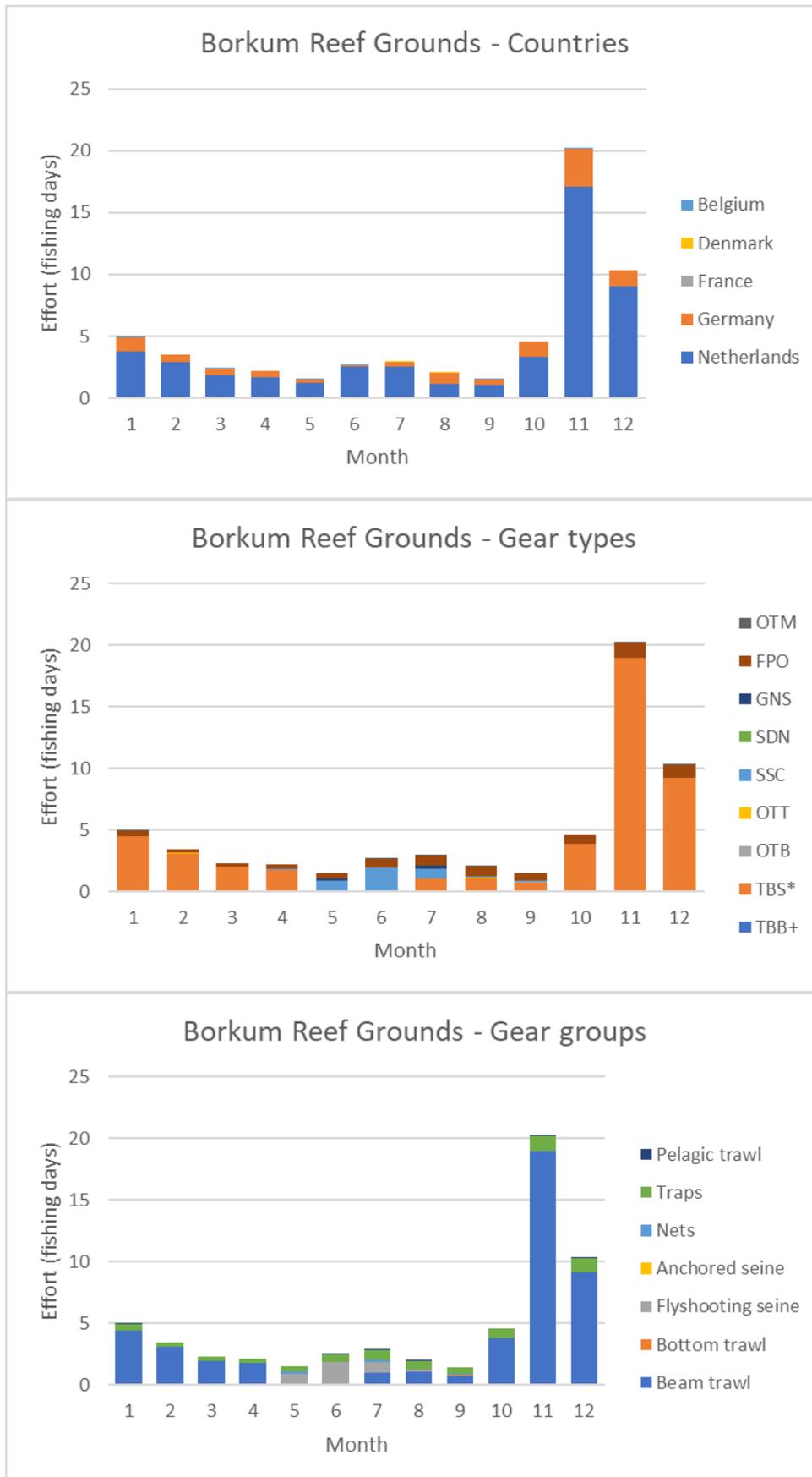
Gear	1	2	3	4	5	6	7	8	9	10	11	12	Average
TBB+	0.11	0.03	0.05	0.05	0.05	0.10	0.01	0.03	0.04	0.02	0.12	0.05	0.06
TBS*	4.34	3.05	1.94	1.72	0.04	0.01	1.02	1.04	0.71	3.82	18.84	9.13	3.80
OTB	0.01	0.02	0.00	0.03	0.01	0.02	0.00	0.03	0.01				0.01
OTT	0.01	0.04	0.02		0.01			0.02	0.03		0.01		0.01
SSC				0.02	0.80	1.79	0.83	0.12	0.06				0.30
SDN						0.07							0.01
**GNS	0.00				0.18		0.22		0.05				0.04
**FPO	0.48	0.34	0.33	0.37	0.46	0.62	0.80	0.76	0.58	0.75	1.23	1.14	0.65
**OTM	0.01					0.01	0.06	0.06			0.01	0.03	0.01
<i>Total</i>	<i>4.95</i>	<i>3.47</i>	<i>2.34</i>	<i>2.18</i>	<i>1.54</i>	<i>2.61</i>	<i>2.94</i>	<i>2.05</i>	<i>1.48</i>	<i>4.59</i>	<i>20.21</i>	<i>10.35</i>	<i>4.89</i>

\*\*not part of the proposed fishery measures

**Table 13.** Overview of fishery effort (fishing days) per month of gear groups in the proposed management zone of Borkum Reef Grounds.

Gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
Beam trawl	4.45	3.08	1.99	1.77	0.09	0.11	1.03	1.07	0.75	3.84	18.96	9.18	3.86
Bottom trawl	0.02	0.05	0.02	0.03	0.02	0.02	0.00	0.05	0.05		0.01		0.02
Flyshooting seine				0.02	0.80	1.79	0.83	0.12	0.06				0.30
Anchored seine					0.00		0.00		0.00				0.01
**Nets					0.18		0.22		0.05				0.04
**Traps		0.48	0.34	0.33	0.37	0.46	0.62	0.80	0.76	0.58	0.75	1.14	0.65
**Pelagic trawl	0.01					0.01	0.06	0.06			0.01	0.03	0.01
<i>Total</i>	<i>4.95</i>	<i>3.47</i>	<i>2.34</i>	<i>2.18</i>	<i>1.54</i>	<i>2.61</i>	<i>2.94</i>	<i>2.05</i>	<i>1.48</i>	<i>4.59</i>	<i>20.21</i>	<i>10.35</i>	<i>4.89</i>

\*\*not part of the proposed fishery measures



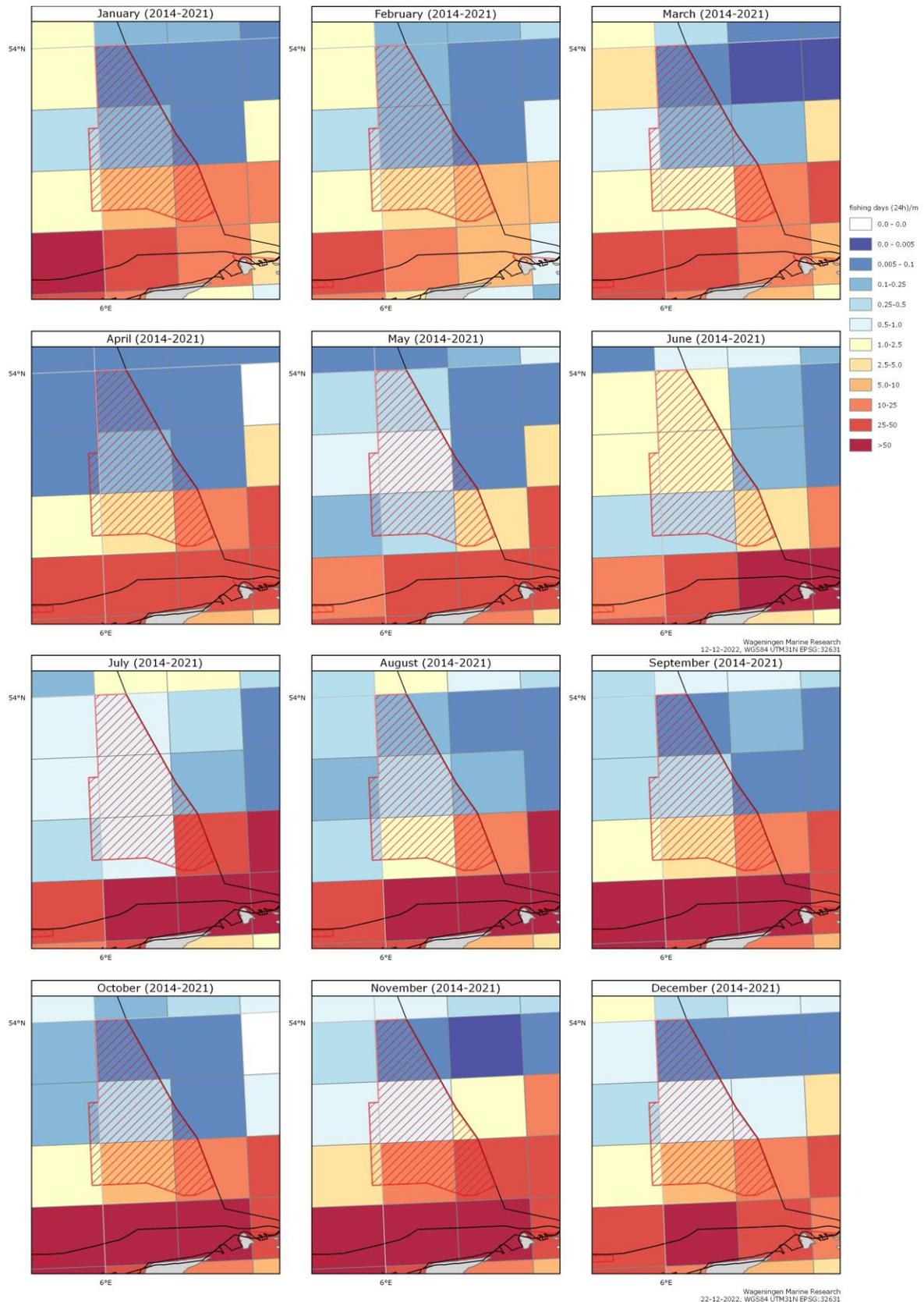
**Figure 7.** Fishery effort (fishing days) per month in the proposed management zone Borkum Reef Grounds for fleets (countries), gear types and gear groups. Months are numbered as follows: 1: January; 2: February; 3: March; 4: April; 5: May; 6: June; 7: July; 8: August; 9: September; 10: October; 11: November; 12: December.

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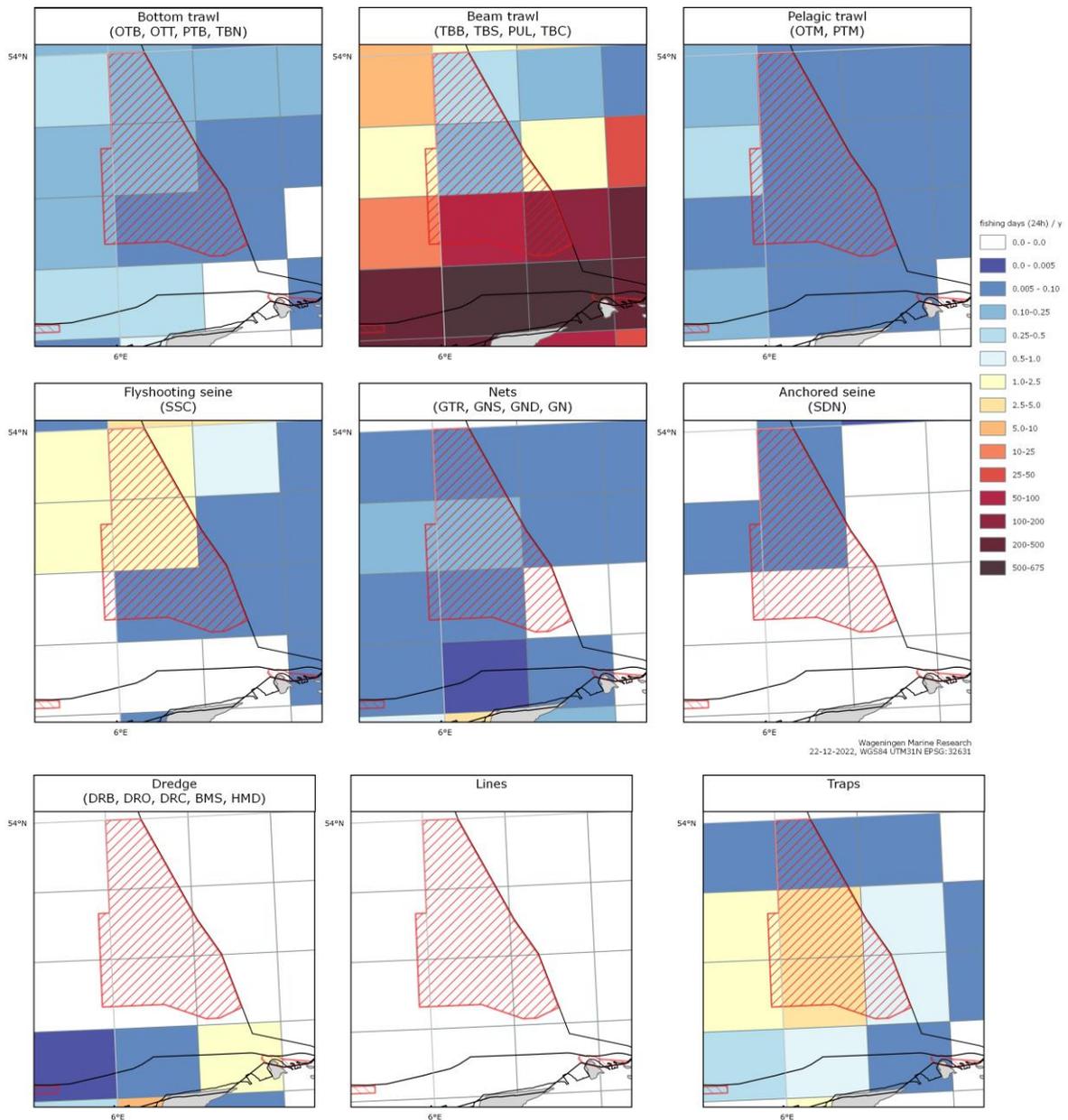
There was a clear seasonal pattern for the fishing activity in the Borkum Reef Grounds (**Figure 7**). The relative fishing activity over an average year is the highest in the period October-January. This seasonal pattern for overall effort is caused by the effort of the Dutch and German shrimp fishery fleet (TBS\*).

## 4.5 Spatial distribution of fishing activity

Maps for the Borkum Reef Grounds are shown in **Figure 8** and **Figure 9**. Fishing on shrimp mainly takes place in the southern part of the area, closest to the coast, outside the proposed fisheries closure.



**Figure 8.** Borkum Reef Grounds: Fishing effort per month, of all gears groups combined (fishing days/month).



**Figure 9.** Borkum Reef Grounds: Fishing effort (fishing days/year) per gear group. Gear groups 'Pelagic trawl', 'Nets', 'Lines' and 'Traps' are not part of the proposed fishery measures.

# 5 Fishing activities on the Brown Ridge

## 5.1 Fleet activity in effort

Data on the annual fishing activity of fleets, gear types and gear groups on the Brown Ridge in the period 2014 to 2021 is shown in **Table 14**, **Table 15**, **Table 16** and **Figure 10**. The extent and trends in the fishing activity are described in the next sections.

**Table 14.** Overview of fishery effort (fishing days) per year of fleet nationality in the proposed management zone of the Brown Ridge.

Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
Belgium	1	0	4	4	0		0	1	1
Denmark	31	16	4		9	6	2		8
France	0		3	2	3	1	3	1	2
Germany	16	18	8	22	44	58	46	49	33
Netherlands	230	261	293	382	376	416	381	376	339
<i>Total</i>	<i>277</i>	<i>295</i>	<i>313</i>	<i>410</i>	<i>432</i>	<i>481</i>	<i>432</i>	<i>427</i>	<i>383</i>

**Table 15.** Overview of fishery effort (fishing days) per year of gear types in the proposed management zone of the Brown Ridge.

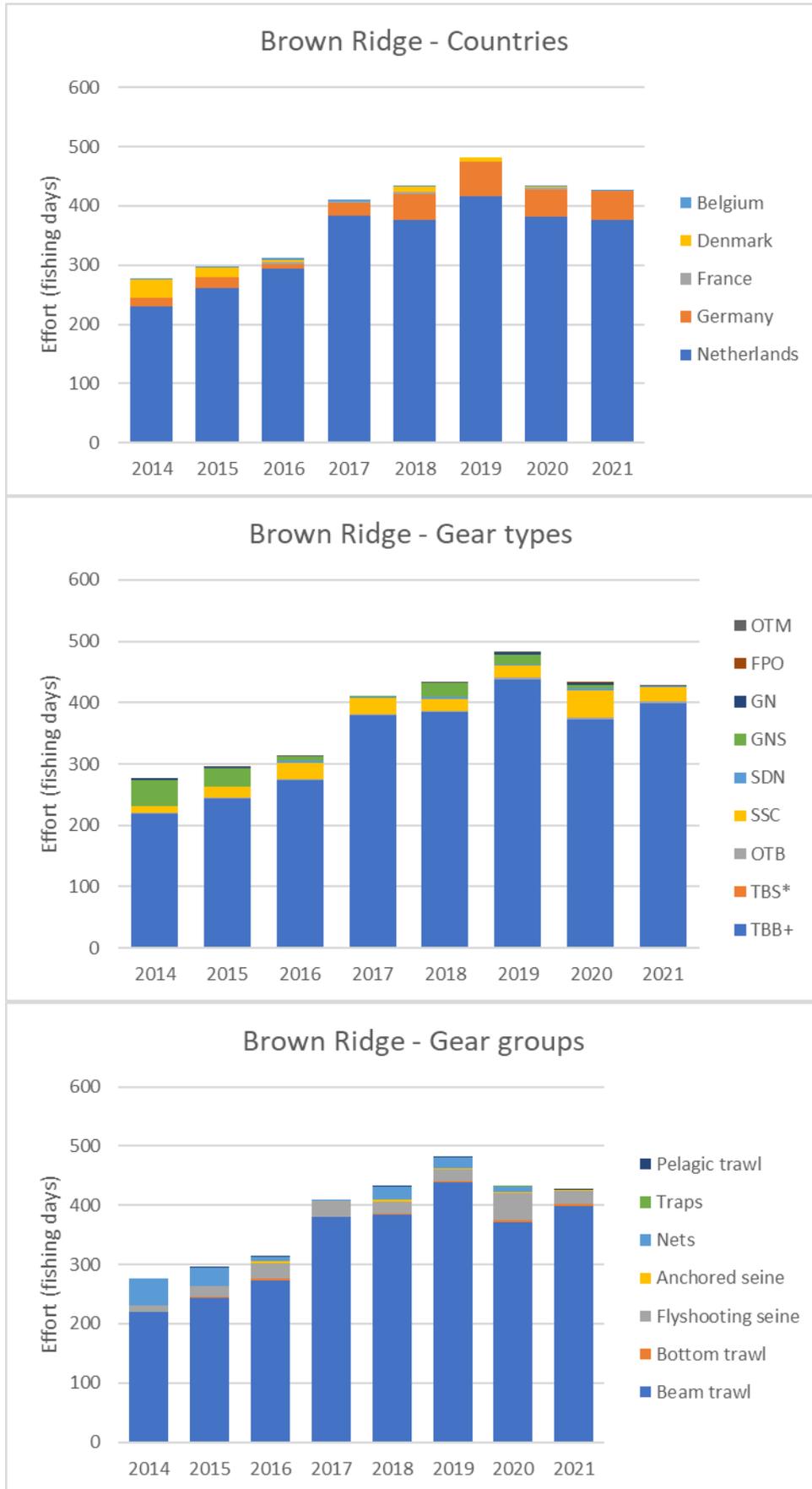
Gear type	2014	2015	2016	2017	2018	2019	2020	2021	Average
**TBB+	219.6	243.4	273.5	380.2	384.4	437.7	371.6	398.6	338.6
**TBS*						0.5			0.1
**OTB	0.5	1.8	2.1	1.1	1.5	2.7	4.0	3.0	2.1
**SSC	10.6	18.4	26.2	25.7	19.6	19.2	44.6	22.9	23.4
**SDN			3.0	1.6	3.1	1.6	2.9	1.6	1.7
GNS	42.6	29.1	6.7	1.7	23.5	16.0	6.2	0.4	15.8
GN	3.3	1.2	0.8			3.5	2.0		1.3
**FPO							0.9	0.2	0.1
**OTM		1.6	0.4		0.1	0.1		0.0	0.3
<i>Total</i>	<i>276.7</i>	<i>295.5</i>	<i>312.7</i>	<i>410.2</i>	<i>432.2</i>	<i>481.2</i>	<i>432.3</i>	<i>426.8</i>	<i>383.5</i>

\*\*not part of the proposed fishery measures

**Table 16.** Overview of fishery effort (fishing days) per year of gear groups in the proposed management zone of the Brown Ridge.

Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
**Beam trawl	219.6	243.4	273.5	380.2	384.4	438.2	371.6	398.6	338.7
**Bottom trawl	0.5	1.8	2.1	1.1	1.5	2.7	4.0	3.0	2.1
**Flyshooting seine	10.6	18.4	26.2	25.7	19.6	19.2	44.6	22.9	23.4
**Anchored seine			3.0	1.6	3.1	1.6	2.9	1.6	1.7
Nets	45.9	30.4	7.4	1.7	23.5	19.5	8.2	0.4	17.1
**Traps							0.9	0.2	0.1
**Pelagic trawl		1.6	0.4		0.1	0.1		0.0	0.3
<i>Total</i>	<i>276.7</i>	<i>295.5</i>	<i>312.7</i>	<i>410.2</i>	<i>432.2</i>	<i>481.2</i>	<i>432.3</i>	<i>426.8</i>	<i>383.5</i>

\*\*not part of the proposed fishery measures



**Figure 10.** Fishery effort (fishing days) per year in the proposed management zone Brown Ridge for fleets (countries), gear types and gear groups. Gear types 'GN' and 'GNS' and gear group 'Nets' are part of the proposed fisheries measures, the rest is shown for comparison.

## 5.2 Fleet activity by state

The main fishing effort in the Brown Ridge is carried out by the Dutch fleet and the German fleet with on average 89% and 9% of the total effort of 383 fishing days per year for the five countries considered. There was a small share of the Danish fleet (2.2%), and very small share of the French fleet (0.4%) and Belgian fleet (0.3%).

Over the period 2014-2021 there was a trend of increase (average: 9.3% per year) in total fishery activity in the Brown Ridge. However, the pattern for the effort over the 8-year period was irregular for some national fleets.

## 5.3 Gears and gear groups

In the period 2014-2021 fishing took place with nine different gear types in the Brown Ridge. The fishing effort was heavily dominated by beam trawling (TBB+) with a percentage of 88.3%. A small percentage was taken by SSC (6.1%), GNS (4.1%) and GN (2.8%). The share of other individual gear types was below 0.6% (**Figure 10****Figure 6**). This means that 6.8% of all fishery effort was caused by gill nets, the type of fishery prohibited in the Brown Ridge management zone.

Over the 2014-2021 period there was a trend of increase in the effort for the gear types TBB+ and SSC.

## 5.4 Seasonal variation in fishing activity

Data on the fishing activity per month of fleets, gear types and gear groups in the Brown Ridge in the period 2014-2021 is shown in **Table 17**, **Table 18**, **Table 19** and **Figure 11**.

**Table 17.** Overview of fishery effort (fishing days) per month of fleets nationality in the proposed management zone of Brown Ridge. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Country	1	2	3	4	5	6	7	8	9	10	11	12	Average
Belgium	0.0	0.1	0.3	0.0	0.0	0.1	0.3	0.2	0.1	0.1	0.0	0.0	0.1
Denmark		0.1	5.4	1.8	0.3	0.2	0.2		0.3			0.2	0.7
France			0.0	0.0	0.2	0.8	0.5	0.1	0.0		0.0	0.0	0.1
Germany	3.0	1.1	8.0	5.8	4.3	4.6	2.0	0.7	0.8	0.5	1.2	0.7	2.7
Netherlands	48.4	31.2	29.6	20.7	37.4	23.3	21.0	26.9	21.3	23.1	29.1	27.5	28.3
<i>Total</i>	<i>51.4</i>	<i>32.5</i>	<i>43.3</i>	<i>28.3</i>	<i>42.2</i>	<i>28.9</i>	<i>24.1</i>	<i>27.8</i>	<i>22.5</i>	<i>23.6</i>	<i>30.4</i>	<i>28.4</i>	<i>32.0</i>

**Table 18.** Overview of fishery effort (fishing days) per month of gear types in the proposed management zone of Brown Ridge.

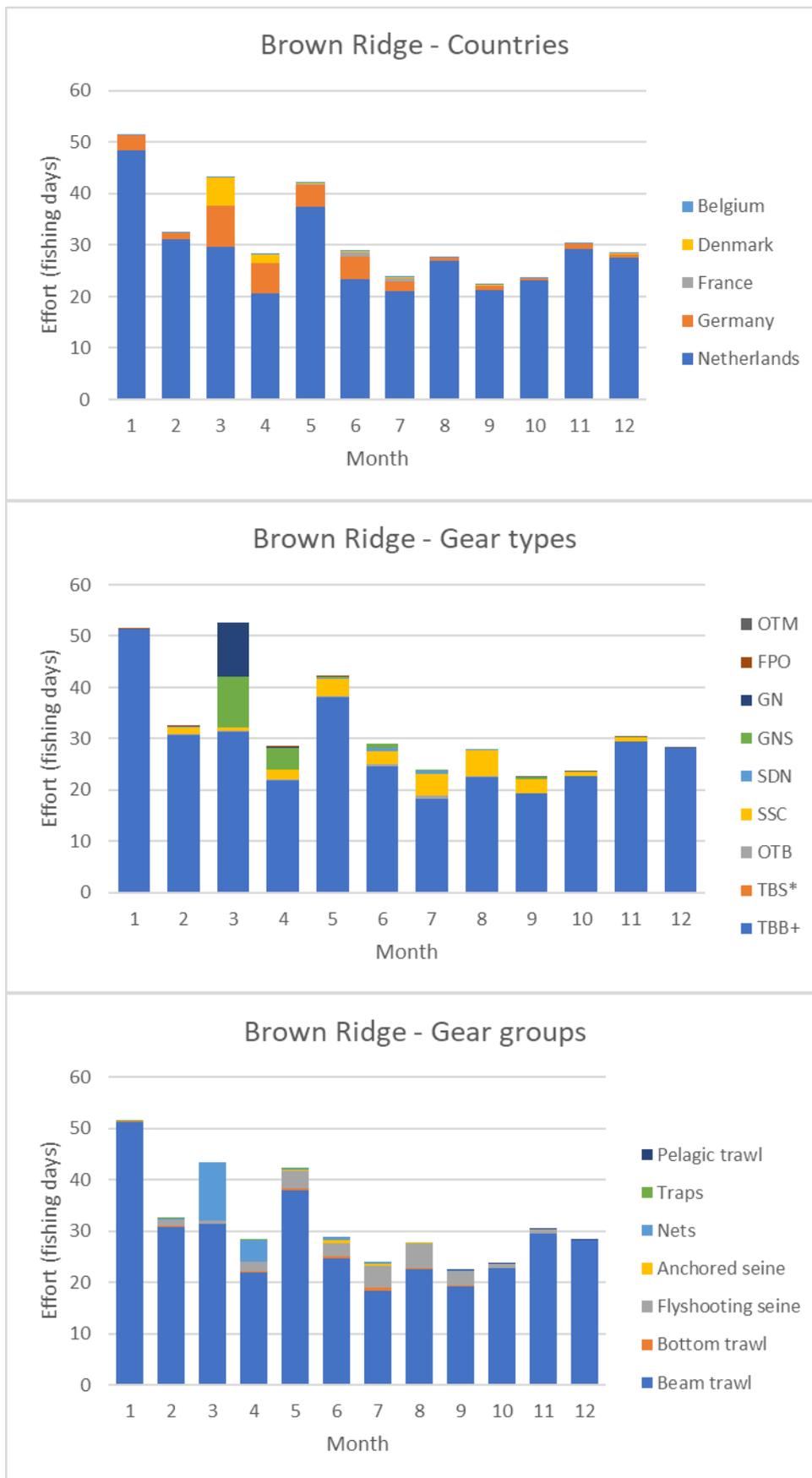
Gear	1	2	3	4	5	6	7	8	9	10	11	12	Average
**TBB+	51.3	30.8	31.3	21.9	38.0	24.7	18.3	22.6	19.3	22.7	29.4	28.2	28.2
**TBS*											0.1		0.0
**OTB	0.1	0.1	0.1	0.1	0.3	0.4	0.6	0.1	0.1	0.0	0.0	0.1	0.2
**SSC		1.3	0.6	2.0	3.4	2.5	4.2	5.0	2.8	0.8	0.8		2.0
**SDN		0.1	0.0	0.0	0.2	0.7	0.5	0.1	0.0				0.1
GNS		0.1	9.9	4.2	0.3	0.7	0.4		0.3	0.0			1.3
GN			10.6	0.1									0.1
**FPO	0.0	0.1		0.0	0.0						0.0		0.0
**OTM									0.1	0.0	0.0	0.2	0.0
<i>Total</i>	<i>51.4</i>	<i>32.5</i>	<i>43.3</i>	<i>28.3</i>	<i>42.2</i>	<i>28.9</i>	<i>24.1</i>	<i>27.8</i>	<i>22.5</i>	<i>23.6</i>	<i>30.4</i>	<i>28.4</i>	<i>32.0</i>

\*\*not part of the proposed fishery measures

**Table 19** Overview of fishery effort (fishing days) per month of gear groups in the proposed management zone of Brown Ridge.

Gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
**Beam trawl	51.3	30.8	31.3	21.9	38.0	24.7	18.3	22.6	19.3	22.7	29.5	28.2	28.2
**Bottom trawl	0.1	0.1	0.1	0.1	0.3	0.4	0.6	0.1	0.1	0.0	0.0	0.1	0.2
**Flyshooting seine		1.3	0.6	2.0	3.4	2.5	4.2	5.0	2.8	0.8	0.8		2.0
**Anchored seine		0.1	0.0	0.0	0.2	0.7	0.5	0.1	0.0				0.1
Nets		0.1	11.2	4.2	0.3	0.7	0.4		0.3	0.0			1.4
Traps		0.0	0.1		0.0	0.0					0.0		0.0
**Pelagic trawl									0.1	0.0	0.0	0.2	0.0
<i>Total</i>	<i>51.4</i>	<i>32.5</i>	<i>43.3</i>	<i>28.3</i>	<i>42.2</i>	<i>28.9</i>	<i>24.1</i>	<i>27.8</i>	<i>22.5</i>	<i>23.6</i>	<i>30.4</i>	<i>28.4</i>	<i>32.0</i>

\*\*not part of the proposed fishery measures

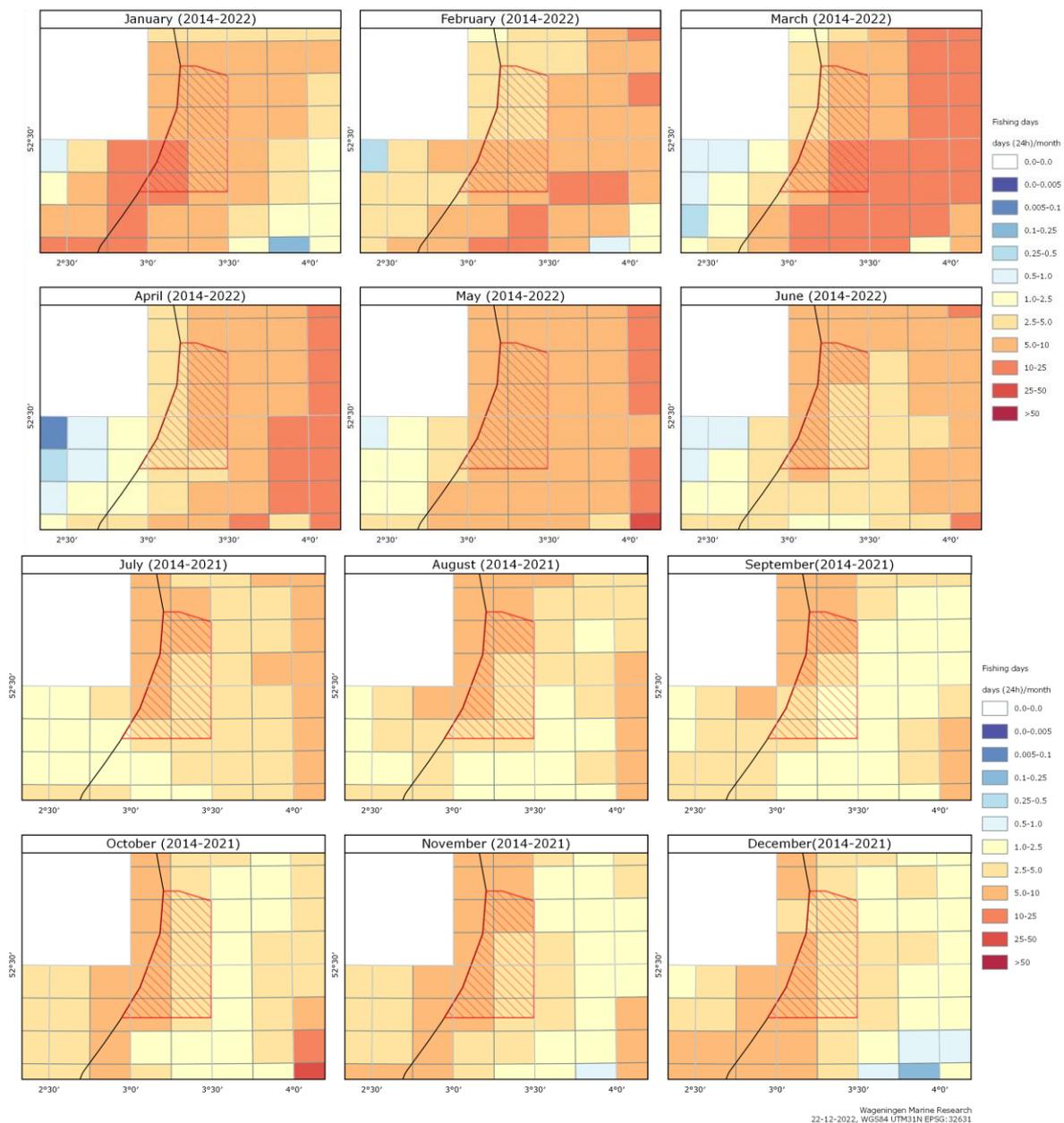


**Figure 11.** Fishery effort (fishing days) per month in the proposed management zone Brown Ridge for fleets (countries), gear types and gear groups. Months are numbered as follows: 1: January; 2: February; 3: March; 4: April; 5: May; 6: June; 7: July; 8: August; 9: September; 10: October; 11: November; 12: December. Gear types 'GN' and 'GNS' and gear group 'Nets' are part of the proposed fisheries measures, the rest is shown for comparison.

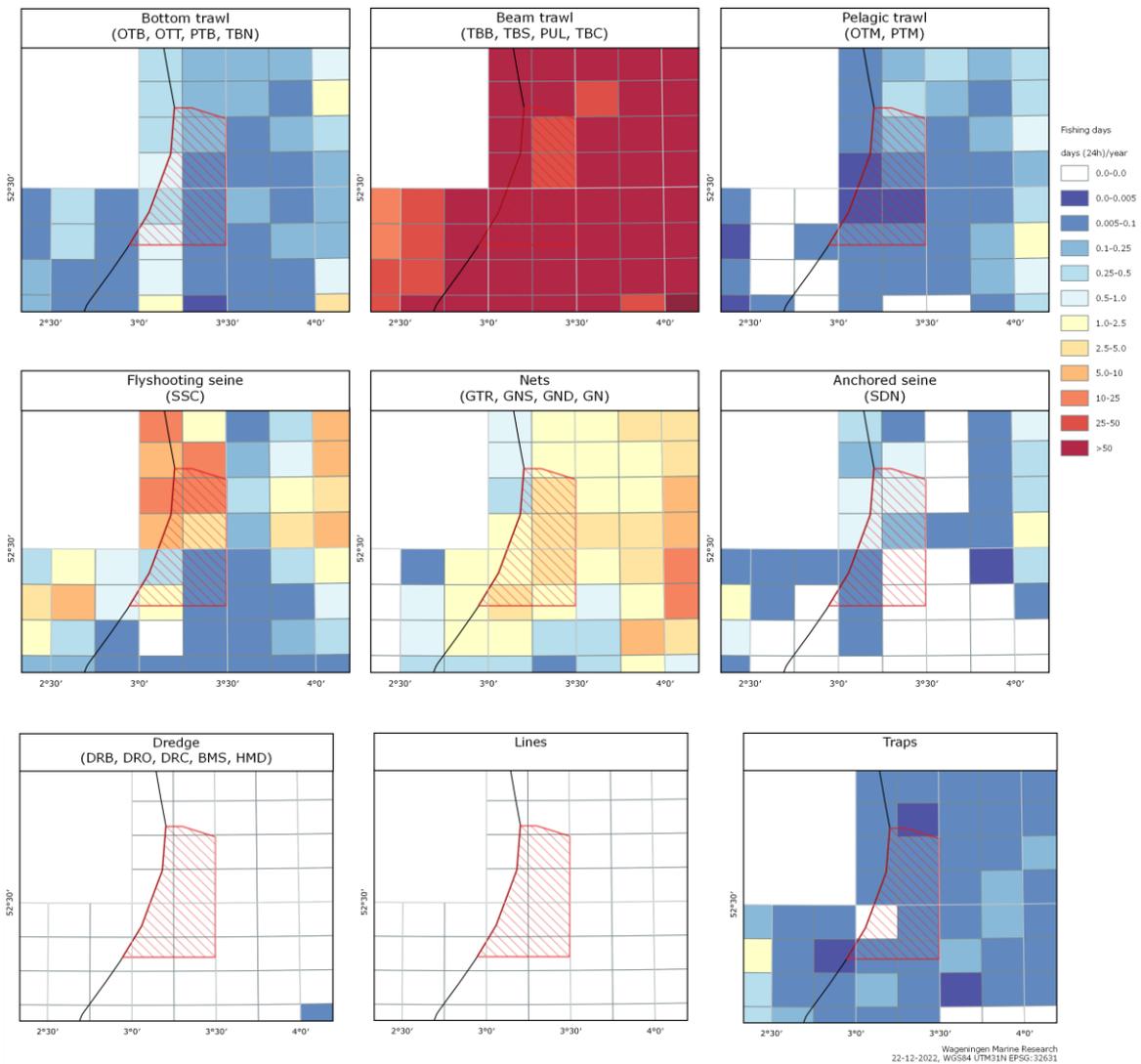
There was a seasonal pattern for the fishing activity in the Brown Ridge (**Figure 11**). The relative fishing activity over an average year is the highest in the period January-May. This seasonal pattern for overall effort also applies to the relative high effort of the Dutch and German fleets, as well as the gear types TBB+, GN and GNS.

## 5.5 Spatial distribution of fishing activity

Maps for the spatial distribution of the fishing activity of all gear groups combined and of the fishing activity of eight distinguished gear groups in the Brown Ridge and their surroundings are shown in **Figure 12** and **Figure 13**. The same type of maps for a much larger area (the Dutch North Sea with all protected areas) can be seen in Figure 4 and Figure 5. The area is mainly used by the beam trawl gear group.



**Figure 12.** Brown Ridge: Fishing effort per month, of all gears groups combined (fishing days/month).



**Figure 13.** Brown Ridge: Fishing effort (fishing days/year) per gear group. Gear group 'Nets' is part of the proposed fisheries measures, the rest is shown for comparison.

# 6 Fishing activities on the Central Oyster Grounds

## 6.1 Fleet activity in effort

Data on the fishing activity of fleets, gear types and gear groups for each year in the period 2014 to 2021 is shown for the Central Oyster Grounds (**Table 20**, **Table 21**, **Table 22** and **Figure 14**). The observations on extent and trends in the fishing activity are described in the next sections.

**Table 20.** Overview of fishery effort (fishing days) per year of fleet nationality in the proposed management zone of the Central Oyster Grounds.

Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
Belgium	5	3	4	27	16	28	22	16	15
Denmark	22	78	42	19	14	10	5	17	26
France				1					0
Germany	22	29	31	59	25	60	24	26	34
Netherlands	40	33	38	82	29	109	43	37	52
<i>Total</i>	<i>89</i>	<i>142</i>	<i>114</i>	<i>188</i>	<i>85</i>	<i>207</i>	<i>94</i>	<i>96</i>	<i>127</i>

**Table 21.** Overview of fishery effort (fishing days) per year of gear types in the proposed management zone of the Central Oyster Grounds.

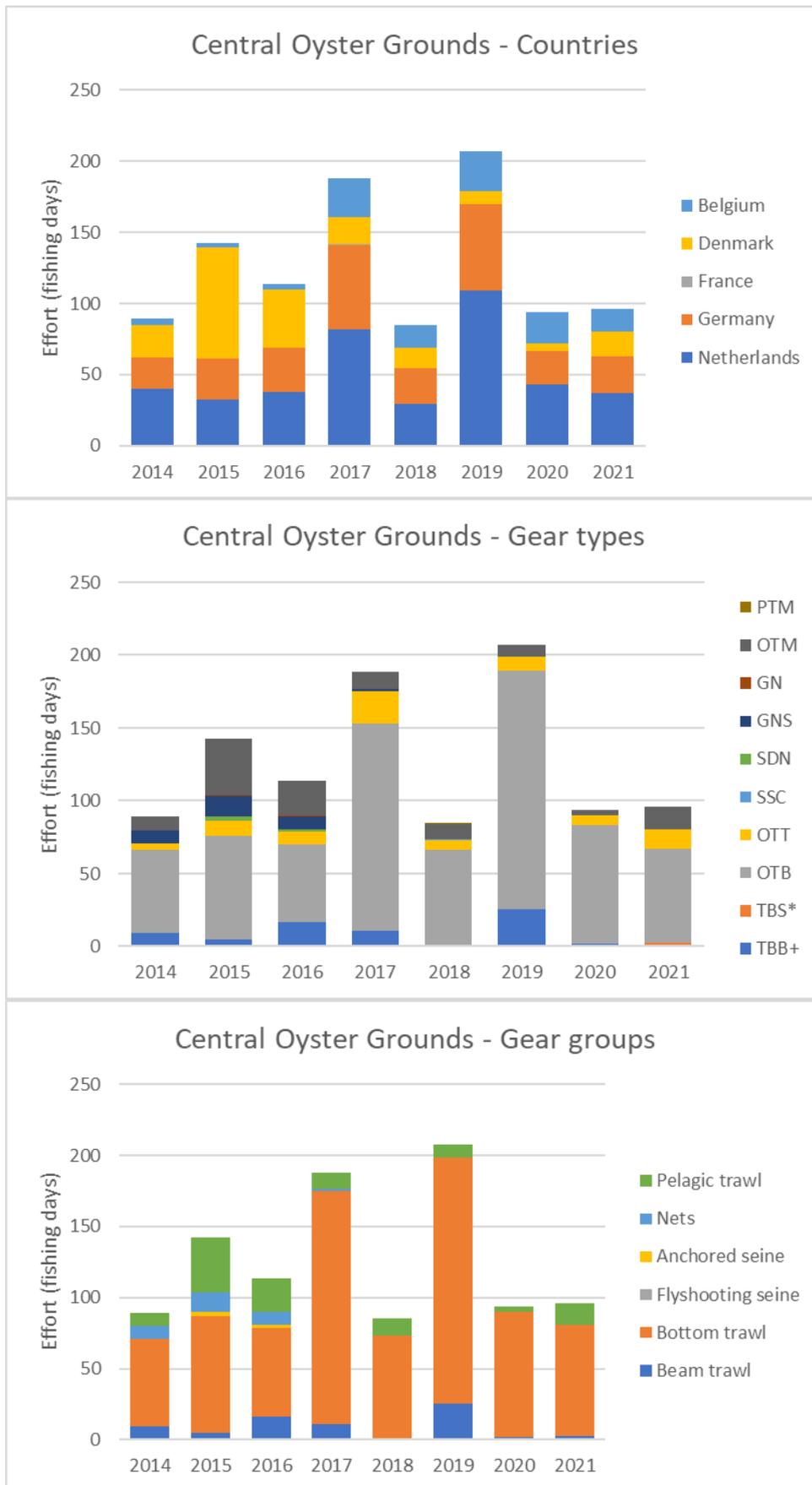
Gear type	2014	2015	2016	2017	2018	2019	2020	2021	Average
TBB+	9.0	4.4	16.6	10.6	1.3	25.3	1.9	0.5	8.7
TBS*		0.2						1.8	0.2
OTB	57.0	71.1	53.6	142.0	64.7	163.8	81.8	65.1	87.4
OTT	5.0	10.9	8.6	22.4	7.0	9.7	6.0	13.1	10.3
SSC			0.1		0.3				0.1
SDN		3.0	1.9						0.6
**GNS	8.9	13.9	8.6	1.7					4.1
**GN		0.5	0.3						0.1
**OTM	9.3	38.5	24.1	11.6	10.7	8.5	3.9	15.6	15.3
**PTM					0.9				0.1
<i>Total</i>	<i>89.2</i>	<i>142.4</i>	<i>113.7</i>	<i>188.2</i>	<i>85.0</i>	<i>207.3</i>	<i>93.6</i>	<i>96.1</i>	<i>126.9</i>

\*\*not part of the proposed fishery measures

**Table 22** Overview of fishery effort (fishing days) per year of gear groups in the proposed management zone of the Central Oyster Grounds.

Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
Beam trawl	9.0	4.6	16.6	10.6	1.3	25.3	1.9	2.3	8.9
Bottom trawl	62.0	82.0	62.1	164.4	71.7	173.5	87.8	78.2	97.7
Flyshooting seine			0.1		0.3				0.1
Anchored seine		3.0	1.9						0.6
**Nets	8.9	14.4	8.9	1.7					4.2
**Pelagic trawl	9.3	38.5	24.1	11.6	11.6	8.5	3.9	15.6	15.4
<i>Total</i>	<i>89.2</i>	<i>142.4</i>	<i>113.7</i>	<i>188.2</i>	<i>85.0</i>	<i>207.3</i>	<i>93.6</i>	<i>96.1</i>	<i>126.9</i>

\*\*not part of the proposed fishery measures



**Figure 14.** Fishery effort (fishing days) per year in the proposed management zone of Central Oyster Grounds for fleets (countries), gear types and gear groups. Gear types 'PTM', 'OTM', 'GN' and 'GNS' and gear groups 'Pelagic trawl' and 'Nets' are not part of the proposed fishery measures.

## 6.2 Fleet activity by state

The majority of the fishing activities on the **Central Oyster Grounds** is carried out by the Dutch fleet with on average 52 fishing days per year amounting to 41% of total effort of 127 fishing days for the fleets of the five countries considered. Next highest fishing activities are found for Germany, Denmark, Belgium and France with a share of 27%, 20%, 12% and 0.1%, respectively.

### Trends over years

Over the period 2014-2021 there was no clear trend in the total fishery activity in the **Central Oyster Grounds**. However, there was a very irregular pattern with time. For instance in 2018 the total fishery activity was 60% lower than in 2019. The effort of the Belgian fleet somewhat increased, whereas the effort of the Danish fleet decreased in the period 2014-2021. For the Dutch and German fleets no regular trend of increase or decrease was observed.

## 6.3 Gears and gear groups

In the **Central Oyster Grounds** the fishing effort was with 87 fishing days per year the highest for OTB (69%), followed by OTM (12%), OTT (8%), TBB+ (7%) and GNS (3%) (**Table 21**).

The effort of the bottom-contacting gears comprised 85% of the total fishery activity in the Central Oyster Grounds (**Table 22**).

## 6.4 Seasonal variation in fishing activity

Data on the fishing activity per month of fleets, gear types and gear groups in the period 2014-2021 are shown for the Central Oyster Grounds (**Table 23**, **Table 24**, **Table 25** and **Figure 15**).

**Table 23.** Overview of fishery effort (fishing days) per month of fleets nationality in the proposed management zone of the Central Oyster Grounds. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Country	1	2	3	4	5	6	7	8	9	10	11	12	Average
Belgium	0.14	0.07	0.24	0.91	1.30	0.86	0.46	0.89	1.99	3.54	3.46	1.19	1.25
Denmark	0.52	0.17		0.04	2.21	2.38	0.75	2.06	7.90	7.53	1.08	1.27	2.16
France									0.07				0.01
Germany	0.79	1.06	0.45	2.53	0.81	0.86	0.47	2.99	4.11	7.64	7.89	4.83	2.87
Netherlands	0.75	1.28	1.37	2.92	3.27	3.73	1.87	3.00	4.12	12.22	13.12	3.86	4.29
<i>Total</i>	<i>2.20</i>	<i>2.58</i>	<i>2.06</i>	<i>6.40</i>	<i>7.58</i>	<i>7.83</i>	<i>3.55</i>	<i>8.95</i>	<i>18.19</i>	<i>30.92</i>	<i>25.55</i>	<i>11.14</i>	<i>10.58</i>

**Table 24.** Overview of fishery effort (fishing days) per month of gear types in the proposed management zone of the Central Oyster Grounds.

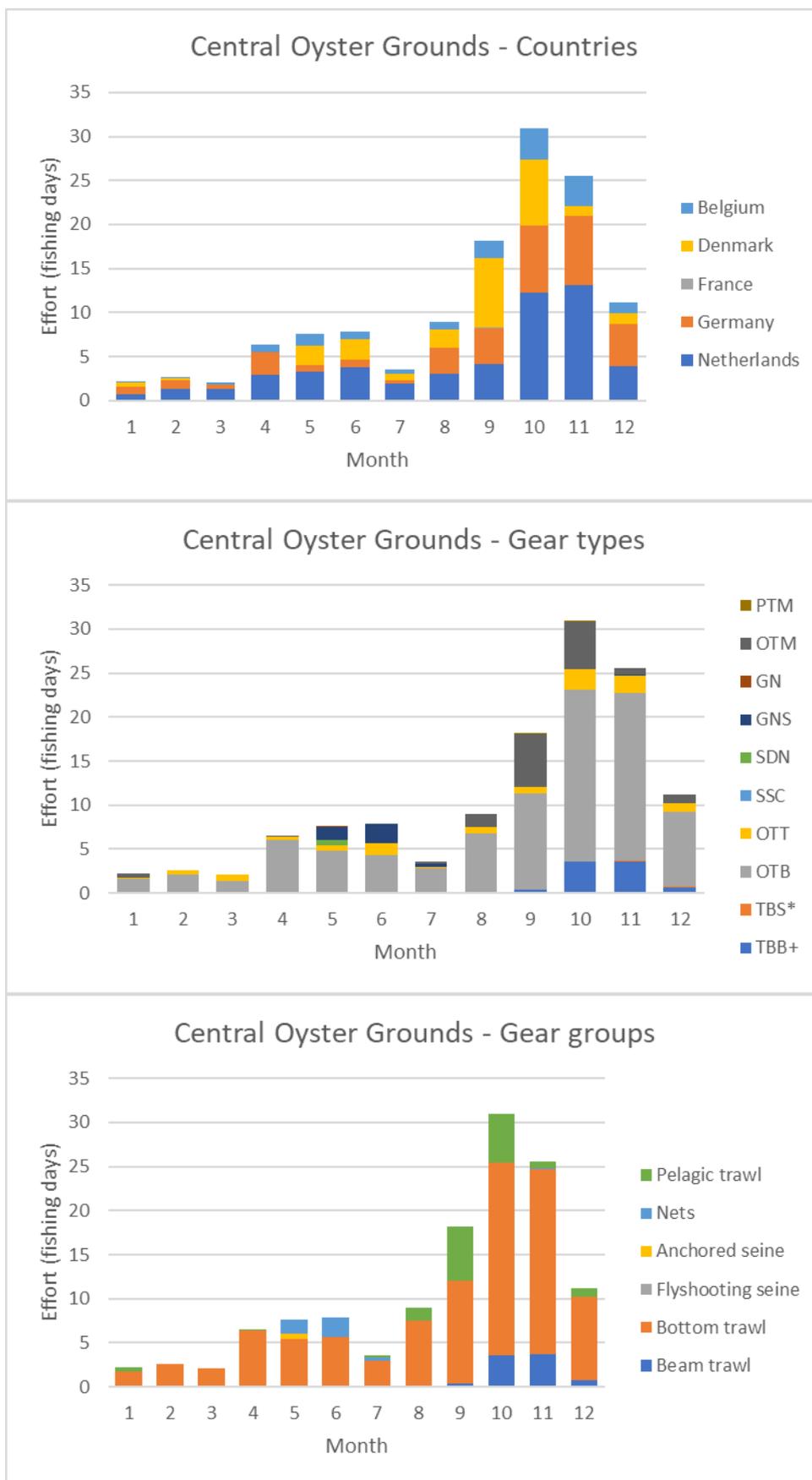
Gear type	1	2	3	4	5	6	7	8	9	10	11	12	Average
TBB+	0.09	0.11	0.03	0.06	0.01		0.04	0.09	0.45	3.59	3.53	0.69	0.72
TBS*											0.23	0.02	0.02
OTB	1.55	2.03	1.30	6.00	4.81	4.35	2.75	6.71	10.89	19.50	19.01	8.48	7.28
OTT	0.09	0.44	0.73	0.31	0.55	1.32	0.13	0.67	0.73	2.34	1.99	1.02	0.86
SSC								0.04		0.01			0.00
SDN					0.61								0.05
**GNS					1.52	2.16	0.44				0.02		0.34
**GN					0.07				0.03				0.01
**OTM	0.47		0.02				0.19	1.43	6.00	5.45	0.77	0.93	1.27
**PTM									0.09	0.03			0.01
<i>Total</i>	<i>2.20</i>	<i>2.58</i>	<i>2.06</i>	<i>6.40</i>	<i>7.58</i>	<i>7.83</i>	<i>3.55</i>	<i>8.95</i>	<i>18.19</i>	<i>30.92</i>	<i>25.55</i>	<i>11.14</i>	<i>10.58</i>

\*\*not part of the proposed fishery measures

**Table 25.** Overview of fishery effort (fishing days) per month of gear groups in the proposed management zone of the Central Oyster Grounds.

Gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
Beam trawl	0.09	0.11	0.03	0.06	0.01		0.04	0.09	0.45	3.59	3.76	0.71	0.74
Bottom trawl	1.64	2.47	2.03	6.32	5.37	5.67	2.87	7.38	11.62	21.84	21.00	9.50	8.14
Flyshooting seine								0.04		0.01			0.00
Anchored seine					0.61								0.05
**Nets					1.60	2.16	0.44		0.03		0.02		0.35
**Pelagic trawl	0.47		0.02				0.19	1.43	6.09	5.47	0.77	0.93	1.28
<i>Total</i>	<i>2.20</i>	<i>2.58</i>	<i>2.06</i>	<i>6.40</i>	<i>7.58</i>	<i>7.83</i>	<i>3.55</i>	<i>8.95</i>	<i>18.19</i>	<i>30.92</i>	<i>25.55</i>	<i>11.14</i>	<i>10.58</i>

\*\*not part of the proposed fishery measures



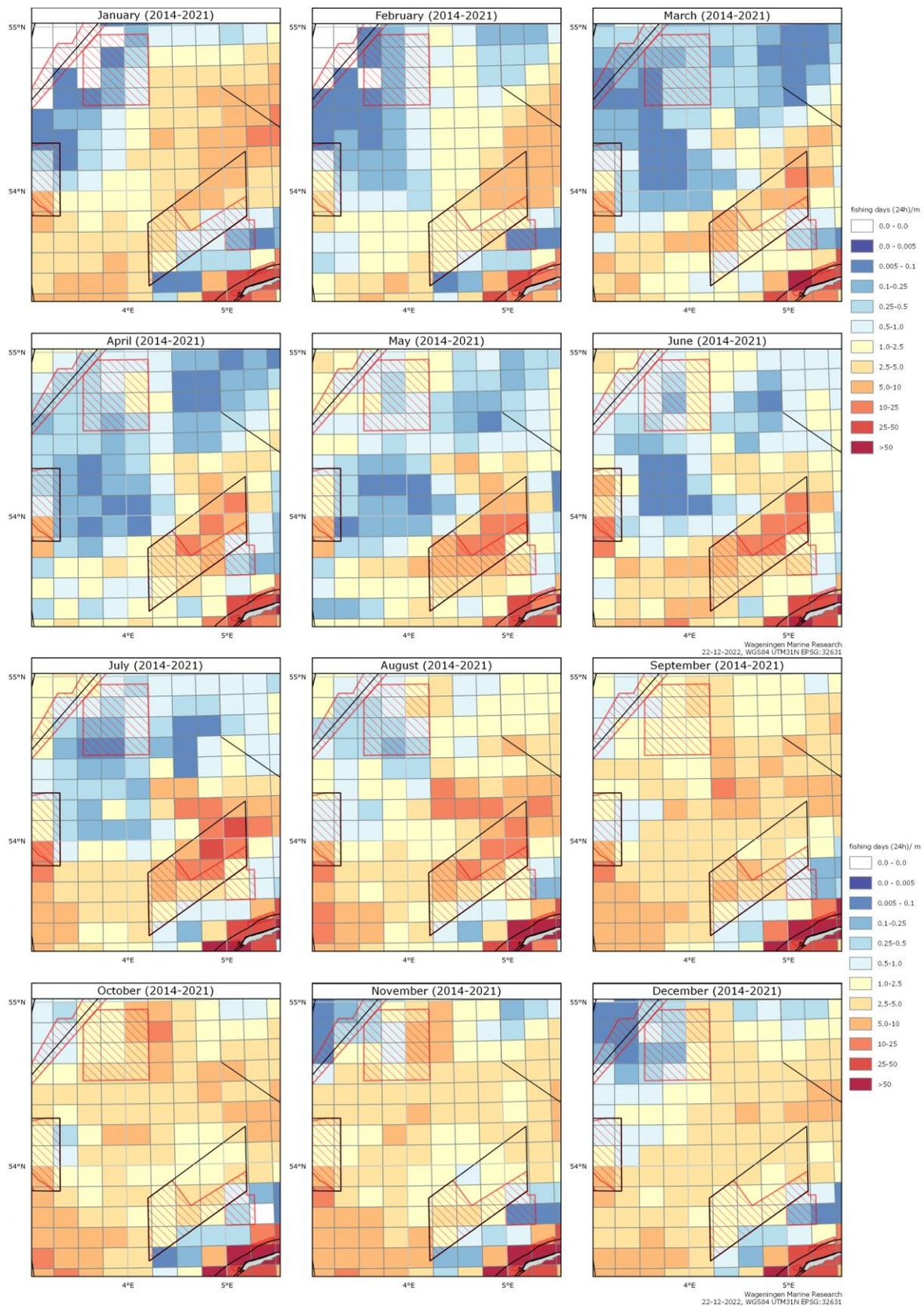
**Figure 15.** Fishery effort (fishing days) per month in the proposed management zone of Central Oyster Grounds for fleets (countries), gear types and gear groups. Months are numbered as follows: 1: January; 2: February; 3: March; 4: April; 5: May; 6: June; 7: July; 8: August; 9: September; 10: October; 11: November; 12: December. Gear types 'PTM', 'OTM', 'GN' and 'GNS' and gear groups 'Pelagic trawl' and 'Nets' are not part of the proposed fishery measures

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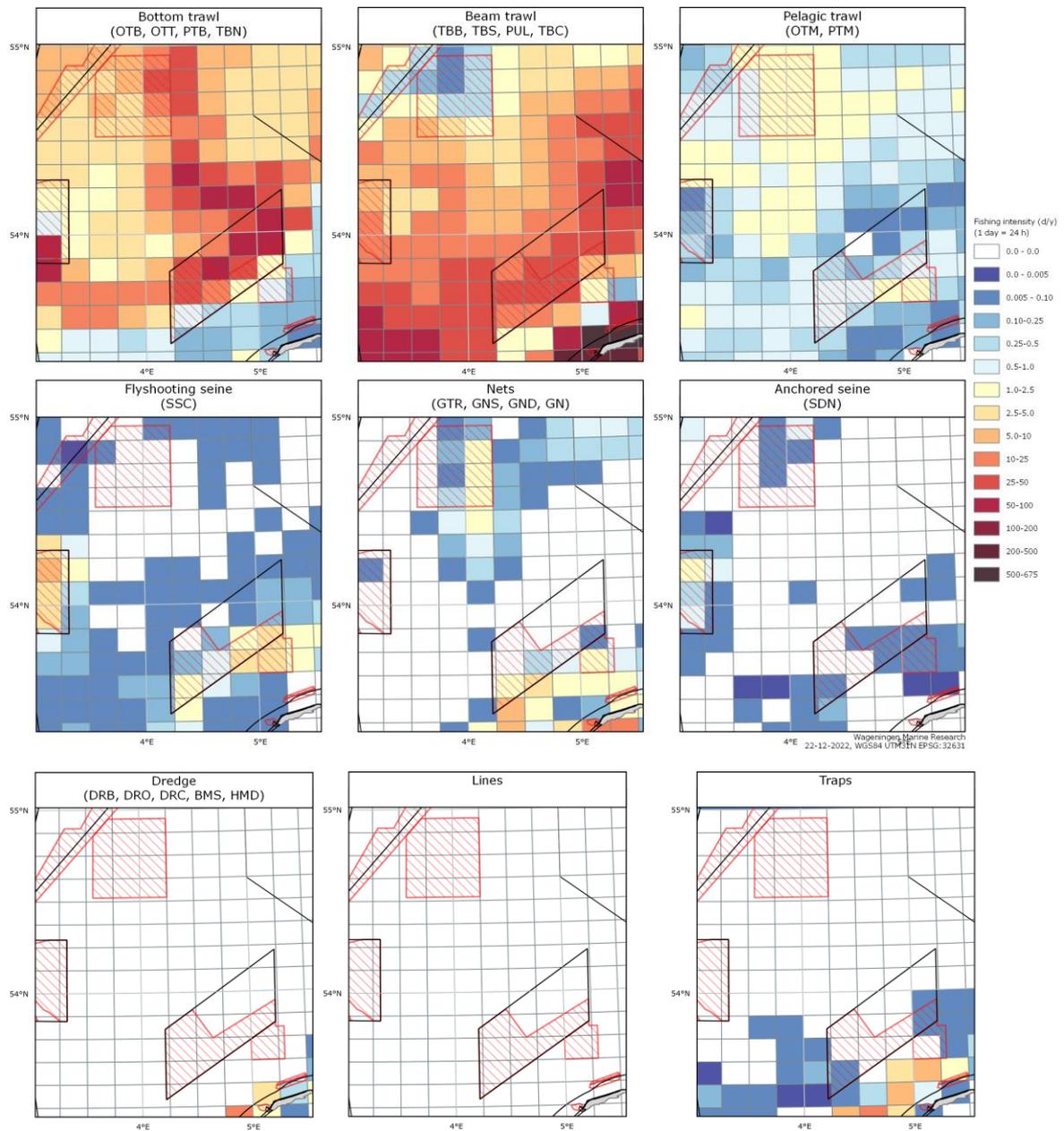
There was a clear seasonal pattern for the fishing activity on the **Central Oyster Grounds (Figure 15)**. The relative fishing activity over an average year is the highest in the period August to December (9-31 fishing days per month), with a peak in October. The effort is relatively low in the months January to July (2-8 fishing days per month). In general, this seasonal pattern also applies to the effort of the four frequently applied fishing gear types (OTB, OTM, TBB+) and the effort of the Belgian, Danish, German and Dutch fleets.

## 6.5 Spatial distribution of fishing activity

Maps for the spatial distribution of the fishing activity of all gear groups combined and of the fishing activity of the various gear groups in the Central Oyster Grounds and their surroundings are shown in **Figure 16** and **Figure 17**. The same type of maps for a much larger area (the Dutch North Sea with all protected areas) can be seen in Figure 4 and Figure 5.



**Figure 16.** Frisian Front and Central Oyster Grounds: fishing effort per month, of all gears groups combined (fishing days (24 h)/month).



**Figure 17.** Frisian Front and Central Oyster Grounds: Fishing effort (fishing days/year) per gear group. Central Oyster Grounds and Frisian Front subarea 2: Gear groups 'Pelagic trawl', 'Nets', 'Lines' and 'Traps' are not part of the proposed fishery measures. Frisian Front subarea 1: all gear types are proposed to be excluded.

# 7 Fishing activities on the Cleaver Bank

## 7.1 Fleet activity in effort

Similarly, data on the fishing activity of fleets, gear types and gear groups for each year in the period 2014 to 2021 in Cleaver Bank is shown in **Table 26**, **Table 27**, **Table 28** and **Figure 18**. The extent and trends in the fishing activity are described in the next sections.

**Table 26.** Overview of fishery effort (days) per year of fleet nationality in the proposed management zones of the Cleaver Bank.

Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
Belgium	24	12	15	5	8	1	3	5	9
Denmark	1	2	0	1	1	0	1	0	1
France	1	3	13	8	17	7	22	7	10
Germany	3	8	8	8	11	9	4	1	7
Netherlands	131	121	94	51	65	44	86	47	80
Total	160	146	130	72	103	62	116	59	106

**Table 27.** Overview of fishery effort (days) per year of gear types in the proposed management zones of the Cleaver Bank.

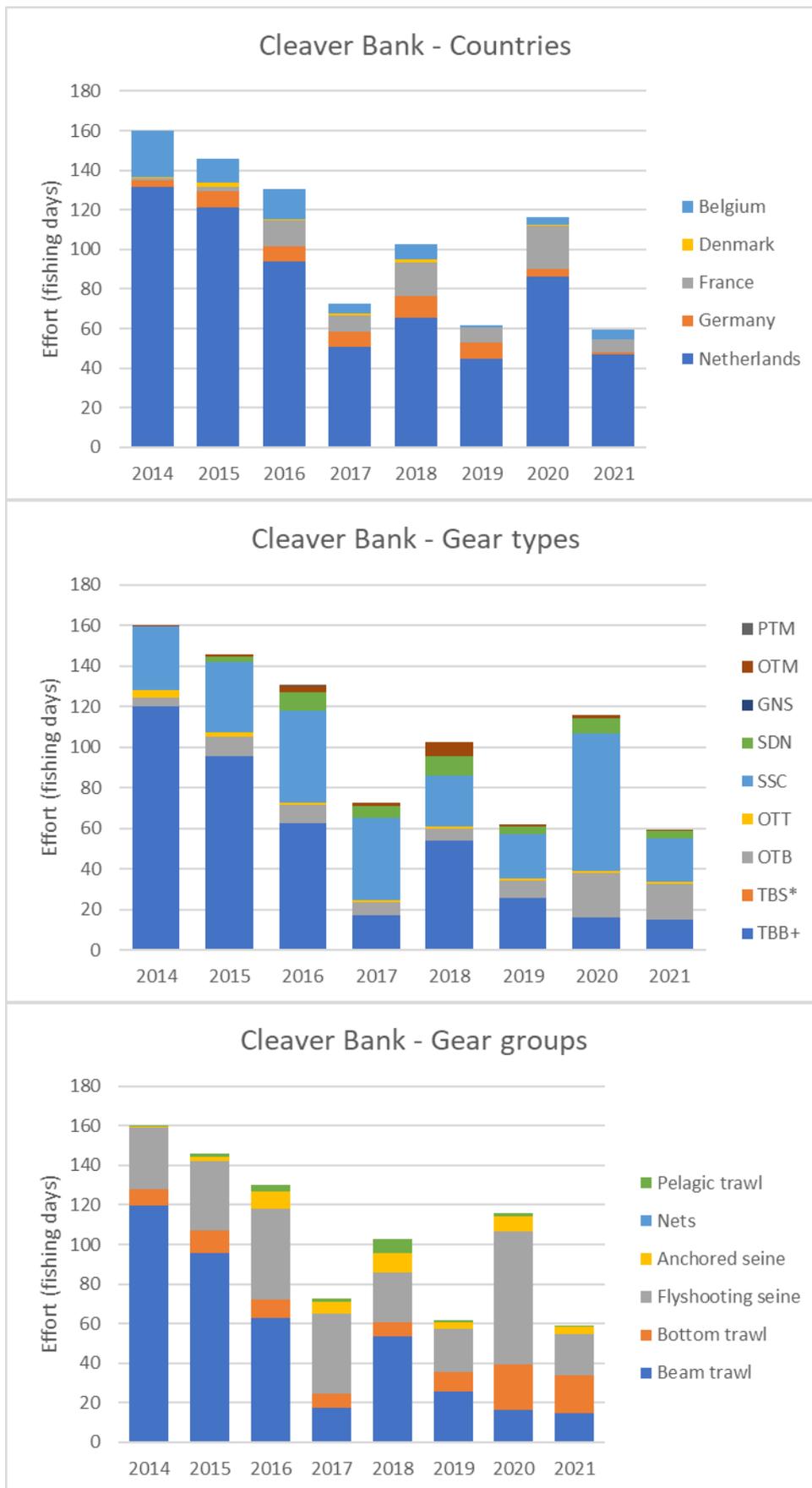
Gear type	2014	2015	2016	2017	2018	2019	2020	2021	Average
TBB+	119.9	95.7	62.7	17.3	53.8	25.6	16.2	14.8	50.7
TBS*								0.2	0.0
OTB	4.4	9.6	8.8	6.4	6.3	8.5	22.0	17.8	10.5
OTT	3.6	2.0	0.9	0.9	0.7	1.1	1.1	0.9	1.4
SSC	31.4	34.8	45.7	40.7	25.1	22.0	67.5	21.2	36.0
SDN	0.3	2.4	9.0	5.8	9.7	3.7	7.4	3.8	5.3
**GNS	0.0								0.0
**OTM	0.3	1.4	3.2	1.4	7.0	0.8	1.9	0.6	2.1
**PTM			0.0						0.0
Total	160.0	145.9	130.4	72.5	102.6	61.7	116.0	59.3	106.0

\*\*not part of the proposed fishery measures

**Table 28** Overview of fishery effort (days) per year of gear groups in the proposed management zones of the Cleaver Bank.

Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
Beam trawl	119.9	95.7	62.7	17.3	53.8	25.6	16.2	15.0	50.8
Bottom trawl	8.0	11.6	9.7	7.3	7.0	9.6	23.1	18.7	11.9
Flyshooting seine	31.4	34.8	45.7	40.7	25.1	22.0	67.5	21.2	36.0
Anchored seine	0.3	2.4	9.0	5.8	9.7	3.7	7.4	3.8	5.3
*Nets	0.0								0.0
*Pelagic trawl	0.3	1.4	3.3	1.4	7.0	0.8	1.9	0.6	2.1
Total	160.0	145.9	130.4	72.5	102.6	61.7	116.0	59.3	106.0

\*\*not part of the proposed fishery measures



**Figure 18.** Fishery effort (fishing days) per year in the proposed management zones of the Cleaver Bank for fleets (countries), gear types and gear groups. Gear types 'PTM', 'OTM' and 'GNS' and gear groups 'Pelagic trawl' and 'Nets' are not part of the proposed fishery measures.

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## 7.2 Fleet activity by state

Most of the fishing activities on the Cleaver Bank is carried out by the Dutch fleet with 80 days per year on average with a share of 75% of total effort of the average 106 fishing days per year. The Belgian, French and German fleet activities are around 7-10 days per year, on average and a share of each 6-9% of total effort. The Danish fleet activity was minor on the Cleaver Bank with an effort of 1 days per year, at maximum which is approx. 1% of the total effort in the area.

During the 2014-2021 period there was a clear decline in effort of all fleet nationalities combined. This can be attributed to the decline in effort of the Dutch and Belgian fleets on the Cleaver Bank. The annual effort of the French fleet seems to increase but the pattern was very irregular. For the Danish and German fleets no regular trend of increase or decrease was observed.

## 7.3 Gears and gear groups

During the studied period, fishing took place with six different gear types in the Cleaver Bank. The effort in the Cleaver Bank among the gear types was the highest for beam trawls (TBB+) with 51 fishing days which means a share of 48% of total effort, followed by Scottish seine (SSC) (34%), otter-board trawls (OTB) (10%), anchored seine (SDN) (5%) and otter trawl midwater (OTM) (2%) (**Figure 18**). Grouping the gear types revealed that 98% of all fishery activity on the Cleaver Bank was carried out using bottom-contacting gears.

Over the 8 year period (2014-2021), a major decrease in TBB+ activity occurred. The trend for the SDN was very irregular with some pronounced peaks in effort from year to year which could largely be attributed to the effort by the French SDN-fleet.

## 7.4 Seasonal variation in fishing activity

Data on the fishing activity per month of fleets, gear types and gear groups in the Cleaver Bank in the period 2014-2021 is shown in **Table 29**, **Table 30**, **Table 31** and **Figure 19**.

**Table 29.** Overview of fishery effort (fishing days) per month of fleets nationality in the proposed management zones of the Cleaver Bank. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Country	1	2	3	4	5	6	7	8	9	10	11	12	Average
Belgium	0.17	0.07	0.07	0.08	1.01	1.41	1.28	0.84	2.24	1.08	0.26	0.54	0.76
Denmark	0.04				0.01	0.15	0.05	0.14	0.10	0.19	0.05	0.13	0.07
France				0.01	2.46	6.11	1.07						0.80
Germany	0.59	0.07	0.10	0.02	0.28	0.16	0.44	0.48	0.54	0.65	2.00	1.19	0.54
Netherlands	3.83	5.66	5.74	2.41	7.06	20.13	5.98	3.10	4.61	8.15	8.30	5.00	6.66
<b>Total</b>	<b>4.62</b>	<b>5.80</b>	<b>5.92</b>	<b>2.52</b>	<b>10.81</b>	<b>27.95</b>	<b>8.83</b>	<b>4.56</b>	<b>7.49</b>	<b>10.08</b>	<b>10.61</b>	<b>6.85</b>	<b>8.84</b>

**Table 30.** Overview of fishery effort (fishing days) per month of gear types in the proposed management zones of the Cleaver Bank.

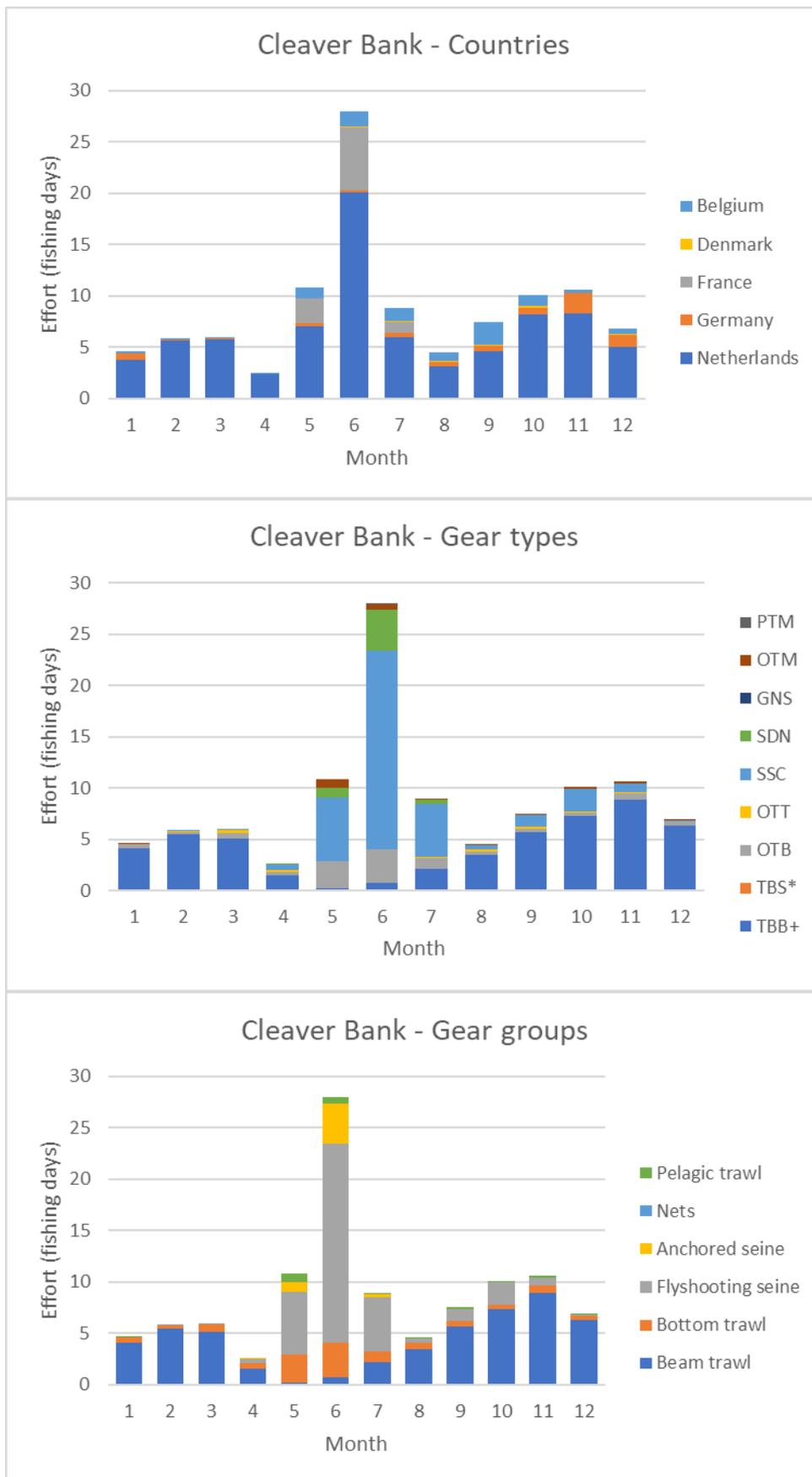
Gear type	1	2	3	4	5	6	7	8	9	10	11	12	Average
TBB+	4.08	5.46	5.09	1.50	0.21	0.72	2.13	3.47	5.64	7.30	8.87	6.28	4.23
TBS*							0.02						0.00
OTB	0.39	0.20	0.51	0.34	2.60	3.28	1.02	0.38	0.37	0.31	0.65	0.43	0.87
OTT	0.10	0.10	0.29	0.19	0.06	0.03	0.06	0.18	0.16	0.11	0.08	0.03	0.12
SSC		0.04	0.04	0.49	6.15	19.37	5.21	0.41	1.20	2.24	0.84	0.06	3.00
SDN				0.01	0.96	3.95	0.36						0.44
**GNS						0.01							0.00
**OTM	0.04				0.82	0.59	0.02	0.13	0.13	0.13	0.18	0.05	0.17
**PTM						0.01							0.00
<b>Total</b>	<b>4.6</b>	<b>5.8</b>	<b>5.9</b>	<b>2.5</b>	<b>10.8</b>	<b>27.9</b>	<b>8.8</b>	<b>4.6</b>	<b>7.5</b>	<b>10.1</b>	<b>10.6</b>	<b>6.9</b>	<b>8.84</b>

\*\*not part of the proposed fishery measures

**Table 31.** Overview of fishery effort (fishing days) per month of gear groups in the proposed management zones of the Cleaver Bank.

Gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
Beam trawl	4.08	5.46	5.09	1.50	0.21	0.72	2.15	3.47	5.64	7.30	8.87	6.28	4.23
Bottom trawl	0.50	0.30	0.79	0.53	2.66	3.31	1.08	0.55	0.53	0.42	0.73	0.46	0.99
Flyshooting seine		0.04	0.04	0.49	6.15	19.37	5.21	0.41	1.20	2.24	0.84	0.06	3.00
Anchored seine				0.01	0.96	3.95	0.36						0.44
**Nets						0.01							0.00
**Pelagic trawl	0.04				0.82	0.59	0.02	0.13	0.13	0.13	0.18	0.05	0.17
<b>Total</b>	<b>4.62</b>	<b>5.80</b>	<b>5.92</b>	<b>2.52</b>	<b>10.81</b>	<b>27.95</b>	<b>8.83</b>	<b>4.56</b>	<b>7.49</b>	<b>10.08</b>	<b>10.61</b>	<b>6.85</b>	<b>8.84</b>

\*\*not part of the proposed fishery measures

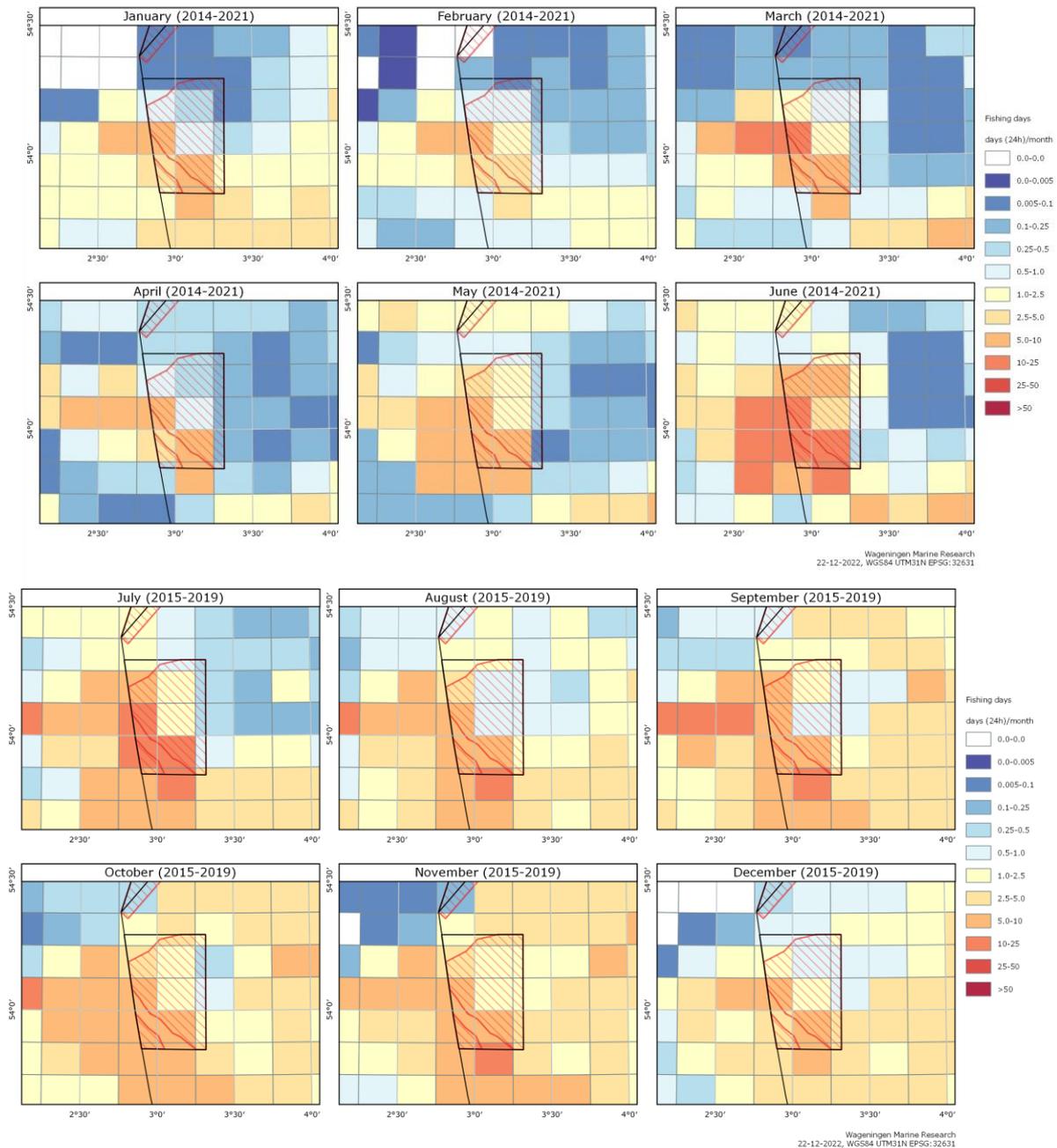


**Figure 19.** Fishery effort (fishing days) per month in the proposed management zones of the Cleaver Bank for fleets (countries), gear types and gear groups. Months are numbered as follows: 1: January; 2: February; 3: March; 4: April; 5: May; 6: June; 7: July; 8: August; 9: September; 10: October; 11: November; 12: December. Gear types 'PTM', 'OTM' and 'GNS' and gear groups 'Pelagic trawl' and 'Nets' are not part of the proposed fishery measures.

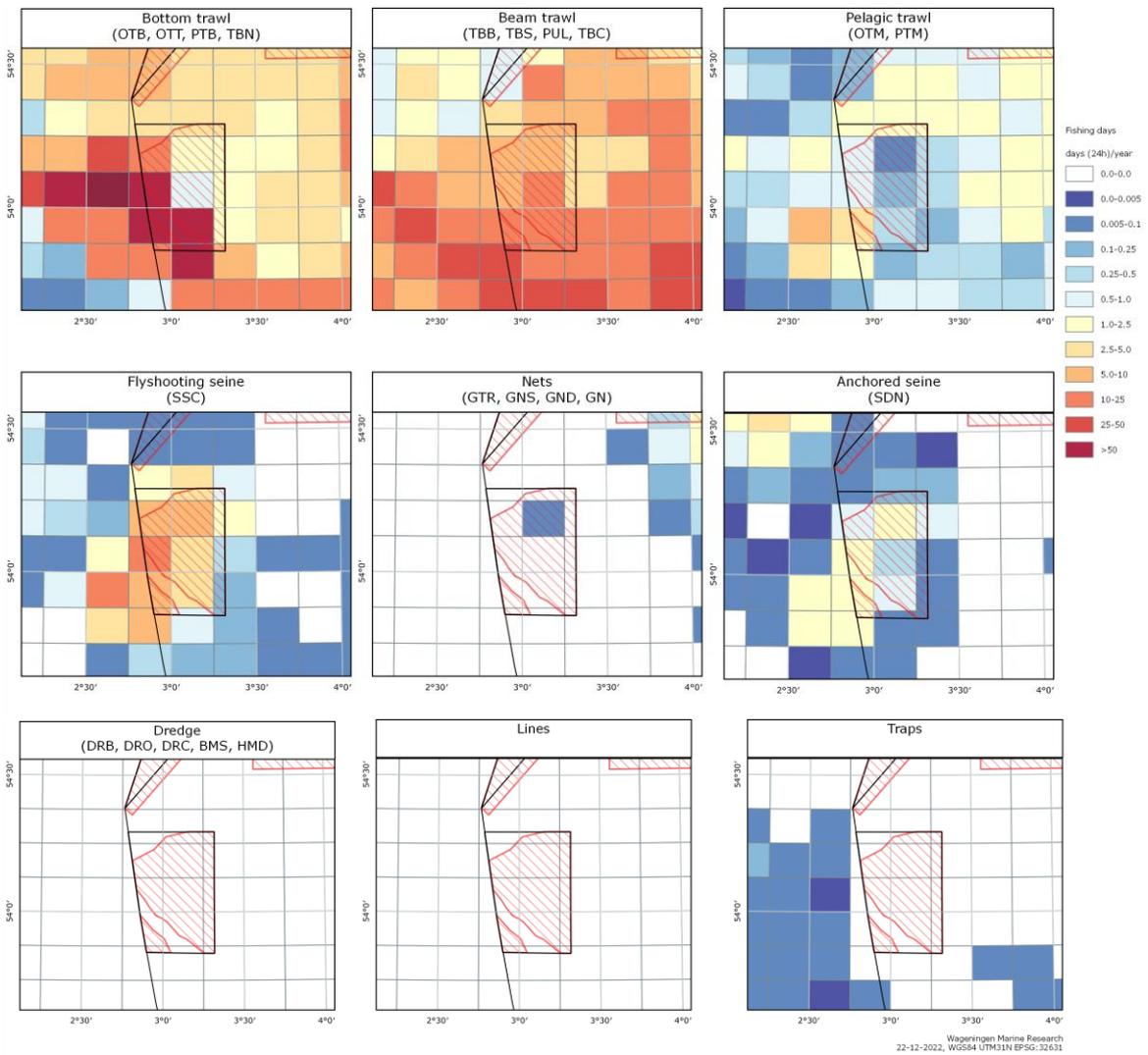
There was a high seasonal variation in fishing activity on the Cleaver Bank (**Figure 19**). During the month of June the fishing activity peaked with 28 fishing days per month compared to the other period of the year with 3-11 fishing days per month. The peak in June can be mainly attributed to the higher effort of SSC fishery.

## 7.5 Spatial distribution of fishing activity

Maps for the spatial distribution of the fishing activity of all gear groups combined and of the fishing activity of the various gear groups are shown for the Cleaver Bank and its surroundings (**Figure 20** and **Figure 21**). The same type of maps for a much larger area (the Dutch North Sea with all protected areas) can be seen in Figure 4 and Figure 5.



**Figure 20.** Cleaver Bank: fishing effort per month, of all gears groups combined (fishing days/month).



**Figure 21.** Cleaver Bank: Fishing effort (fishing days/year) per gear group. Gear groups 'Pelagic trawl', 'Nets', 'Lines' and 'Traps' are not part of the proposed fishery measures.

# 8 Fishing activities on the Dogger Bank (N2000)

## 8.1 Management zone areas

For this call the Dogger Bank was split in two distinct areas (**Figure 1**): the designated Natura 2000 area and the strip added on the South of the Dogger Bank. Fishery effort information is presented for both areas separately. The fishery effort for Dogger Bank N2000 is described in this chapter and the one for Dogger Bank South in chapter 9.

## 8.1 Fleet activity in effort

Data on the fishing activity of fleets, gear types and gear groups for each year in the period 2014 to 2021 on the Dutch part of Dogger Bank are shown in **Table 32**, **Table 33**, **Table 34** and **Figure 22**. Fishing effort data are expressed in fishing days (1 day = 24 h).

**Table 32.** Overview of fishery effort (fishing days) per year of fleet nationality in the proposed management zones of the Dogger Bank N2000.

Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
Belgium	1	5	3	8	8	6	3	4	5
Denmark	15	12	8	6	5	18	4	3	9
France	0	0	0	0	0	0	0	0	0
Germany	6	8	3	4	4	4	4	5	5
Netherlands	21	58	54	33	42	25	22	16	34
<i>Total</i>	<i>43</i>	<i>82</i>	<i>68</i>	<i>51</i>	<i>59</i>	<i>53</i>	<i>32</i>	<i>28</i>	<i>52</i>

**Table 33.** Overview of fishery effort (fishing days) per year of gear types in the proposed management zones of the Dogger Bank N2000.

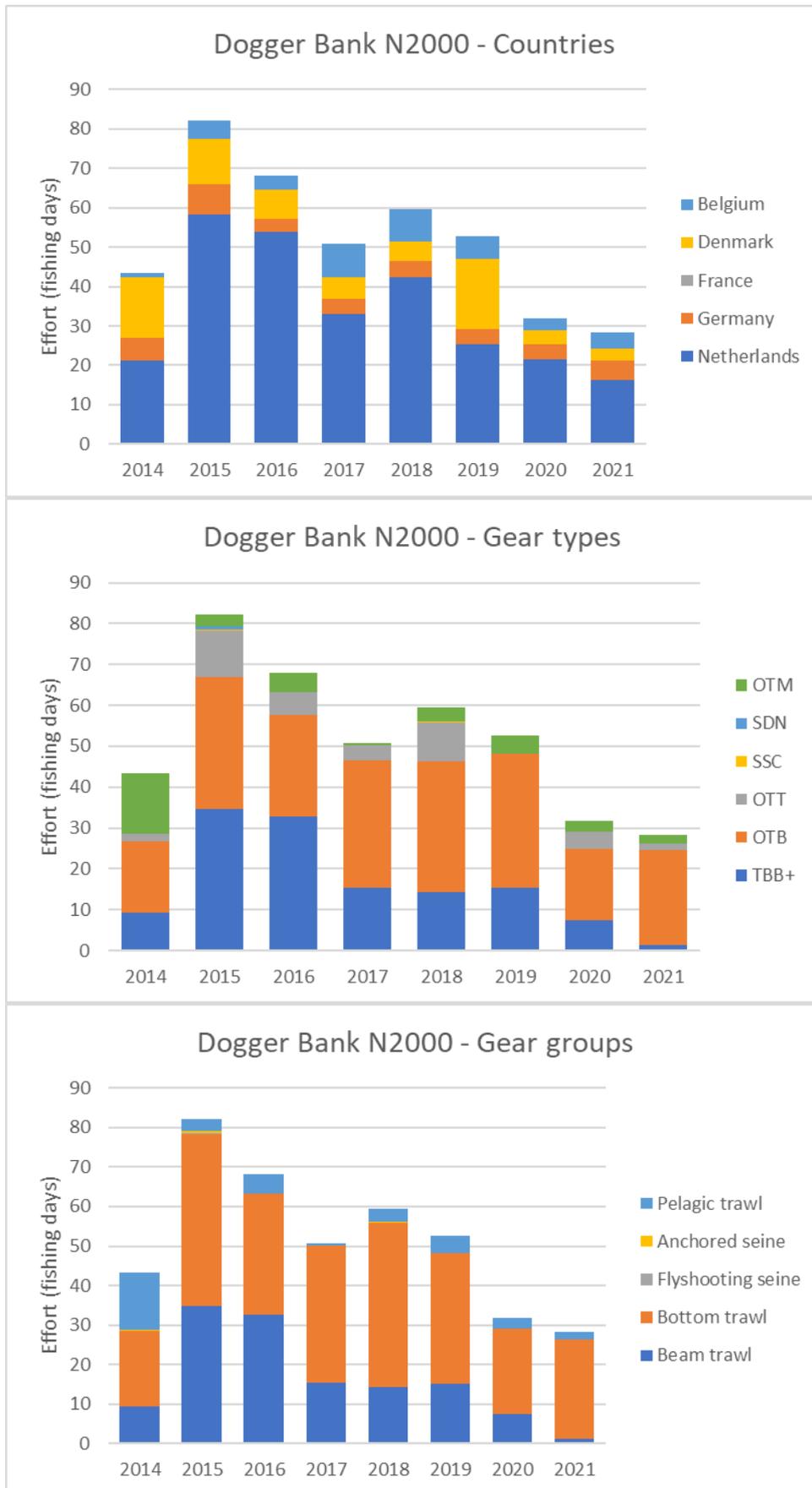
Gear type	2014	2015	2016	2017	2018	2019	2020	2021	Average
TBB+	9.3	34.7	32.8	15.4	14.3	15.3	7.5	1.2	16.3
OTB	17.3	32.3	25.0	31.2	32.0	32.7	17.3	23.5	26.4
OTT	2.0	11.3	5.4	3.7	9.6	0.2	4.5	1.5	4.8
SSC		0.2			0.2				0.0
SDN	0.0	0.7			0.0				0.1
**OTM	14.7	3.0	5.0	0.6	3.4	4.5	2.6	2.0	4.5
<i>Total</i>	<i>43.4</i>	<i>82.2</i>	<i>68.1</i>	<i>50.8</i>	<i>59.5</i>	<i>52.7</i>	<i>31.9</i>	<i>28.2</i>	<i>52.1</i>

\*\*not part of the proposed fishery measures

**Table 34.** Overview of fishery effort (fishing days) per year of gear groups in the proposed management zones of the Dogger Bank N2000.

Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
Beam trawl	9.3	34.7	32.8	15.4	14.3	15.3	7.5	1.2	16.3
Bottom trawl	19.3	43.6	30.4	34.8	41.6	33.0	21.7	25.0	31.2
Flyshooting seine		0.2			0.2				0.0
Anchored seine	0.0	0.7			0.0				0.1
**Pelagic trawl	14.7	3.0	5.0	0.6	3.4	4.5	2.6	2.0	4.5
<i>Total</i>	<i>43.4</i>	<i>82.2</i>	<i>68.1</i>	<i>50.8</i>	<i>59.5</i>	<i>52.7</i>	<i>31.9</i>	<i>28.2</i>	<i>52.1</i>

\*\*not part of the proposed fishery measures



**Figure 22** Fishing effort (days) per year in the proposed management zones on the Dogger Bank N2000 for fleets (countries), gear types and gear groups. Gear type 'OTM' and gear group 'Pelagic trawl' is not part of the proposed fishery measures.

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## 8.2 Fleet activity by state

The majority of the fishing activities on the Dogger Bank N2000 is carried out by the Dutch fleet with an average of 34 fishing days per year, which represents 65% of total average fishing effort of 52 fishing days per year of the five countries considered. Next highest fishing activities are found for Denmark, Belgium and Germany with a share of 17%, 9% and 9%, respectively. There was no fishing activity of the French fleet.

Over the period 2015-2021, there was a clear trend of decrease in total fishery activity in the Dogger Bank N2000. The first year (2014) was a year with one of the lowest effort values. This increased in 2015, but from 2015 to 2021 a 66% decrease in effort occurred. This can be mainly attributed to decrease in the effort of the Dutch fleet.

## 8.1 Gears and gear groups

During 2014-2021 fishing took place with six different gear types in the Dogger Bank N2000. The average share of the gear types in the total fishing effort in the Dogger Bank N2000 was with 26 fishing days per year the highest for OTB (51%), followed by TBB+ (31%) and OTT (9%) (**Figure 22**). There was very little seining activity with 0.2% and 0.1% for SDN and SSC, respectively. Thus, approximately 91% of all fishery activity was carried out using bottom-contacting gears.

Over the whole 2014-2021 period there was no fishery type that showed an increasing trend. The OTB and TBB+ effort decreased while the other gear fisheries showed no trend.

## 8.2 Seasonal variation in fishing activity

Data on the fishing activity per month of fleets, gear types and gear groups in the period 2014-2021 are shown in **Table 35**, **Table 36**, **Table 37** and **Figure 23**. There was a remarkably pronounced seasonal pattern for the fishing activity on the Dogger Bank N2000 (**Figure 23**). The relative fishing activity over an average year is the highest in the period April to July. and relatively low from November to January. In general, this seasonal pattern also applies to the three most applied fishing gear types (OTB, TBB+, OTT) and also to the national fleets (countries) individually.

**Table 35.** Overview of fishery effort (fishing days) per month of fleets nationality in the proposed management zones of the Dogger Bank N2000. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Country	1	2	3	4	5	6	7	8	9	10	11	12	Average
Belgium			0.11	0.49	0.91	1.21	1.16	0.39	0.37	0.14	0.01		0.40
Denmark	0.01			1.90	0.29	1.27	1.07	0.59	0.85	1.57	0.47	0.66	0.72
France													0.00
Germany		0.03	0.37	0.39	0.48	1.20	0.78	0.21	0.50	0.52	0.06	0.09	0.39
Netherlands			2.22	4.93	7.46	5.13	6.70	2.98	2.93	1.29	0.29	0.06	2.83
<i>Total</i>	<i>0.01</i>	<i>0.03</i>	<i>2.69</i>	<i>7.71</i>	<i>9.15</i>	<i>8.81</i>	<i>9.71</i>	<i>4.17</i>	<i>4.65</i>	<i>3.53</i>	<i>0.83</i>	<i>0.81</i>	<i>4.34</i>

**Table 36.** Overview of fishery effort (fishing days) per month of gear types in the proposed management zones of the Dogger Bank N2000.

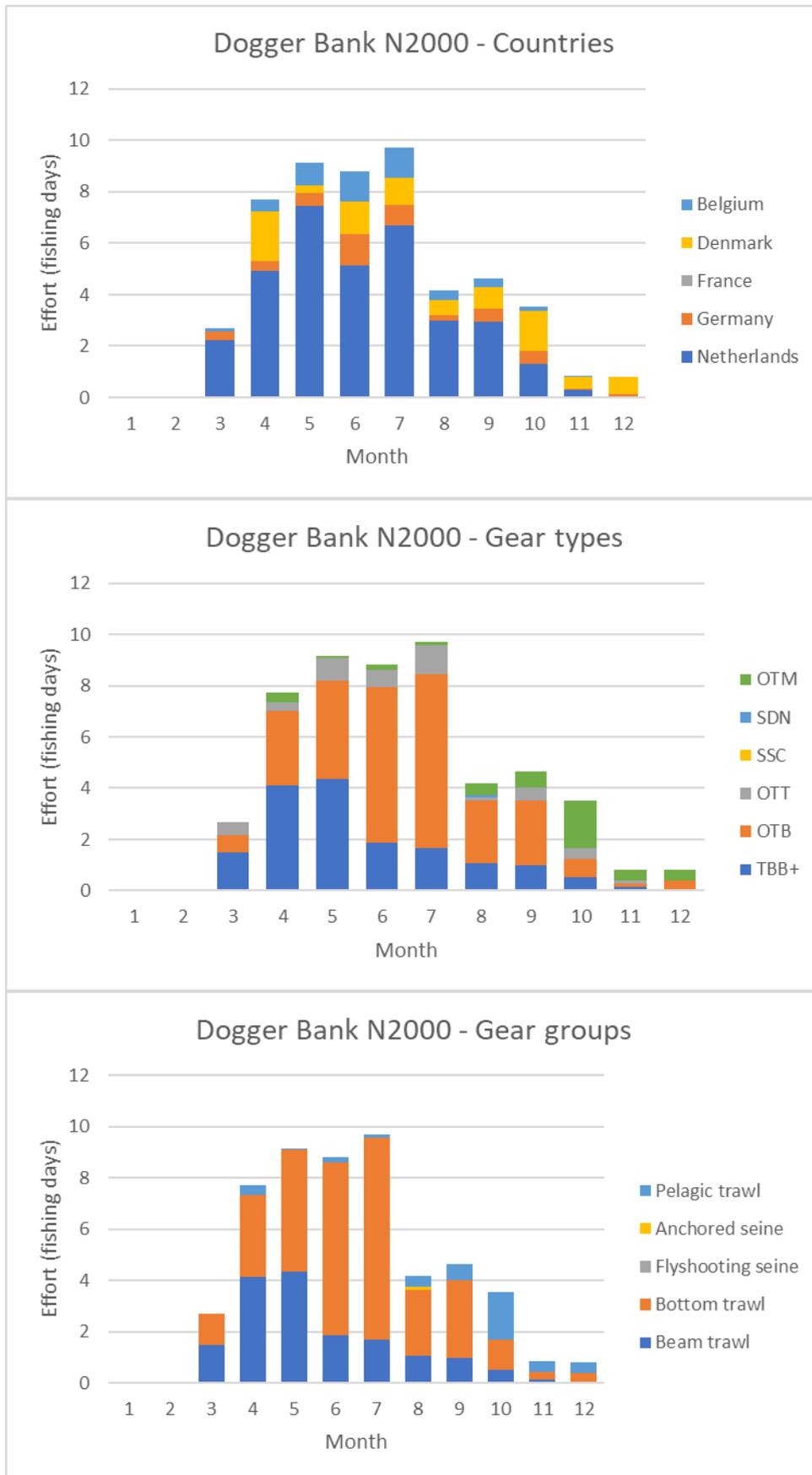
Gear type	1	2	3	4	5	6	7	8	9	10	11	12	Average
TBB+			1.50	4.12	4.36	1.87	1.68	1.08	0.99	0.52	0.15	0.03	1.36
OTB	0.01	0.03	0.66	2.87	3.82	6.07	6.75	2.44	2.53	0.73	0.14	0.35	2.20
OTT			0.53	0.36	0.91	0.67	1.14	0.11	0.49	0.42	0.12	0.02	0.40
SSC							0.01	0.02	0.01				0.00
SDN							0.01	0.09					0.01
**OTM				0.36	0.06	0.20	0.12	0.43	0.62	1.85	0.42	0.40	0.37
<i>Total</i>	<i>0.01</i>	<i>0.03</i>	<i>2.69</i>	<i>7.71</i>	<i>9.15</i>	<i>8.81</i>	<i>9.71</i>	<i>4.17</i>	<i>4.65</i>	<i>3.53</i>	<i>0.83</i>	<i>0.81</i>	<i>4.34</i>

\*\*not part of the proposed fishery measures

**Table 37.** Overview of fishery effort (fishing days) per month of gear groups in the proposed management zones of the Dogger Bank N2000.

Gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
Beam trawl			1.50	4.12	4.36	1.87	1.68	1.08	0.99	0.52	0.15	0.03	1.36
Bottom trawl	0.01	0.03	1.19	3.24	4.73	6.74	7.89	2.55	3.02	1.15	0.26	0.37	2.60
Flyshooting seine							0.01	0.02	0.01				0.00
Anchored seine							0.01	0.09					0.01
**Pelagic trawl				0.36	0.06	0.20	0.12	0.43	0.62	1.85	0.42	0.40	0.37
<i>Total</i>	<i>0.01</i>	<i>0.03</i>	<i>2.69</i>	<i>7.71</i>	<i>9.15</i>	<i>8.81</i>	<i>9.71</i>	<i>4.17</i>	<i>4.65</i>	<i>3.53</i>	<i>0.83</i>	<i>0.81</i>	<i>4.34</i>

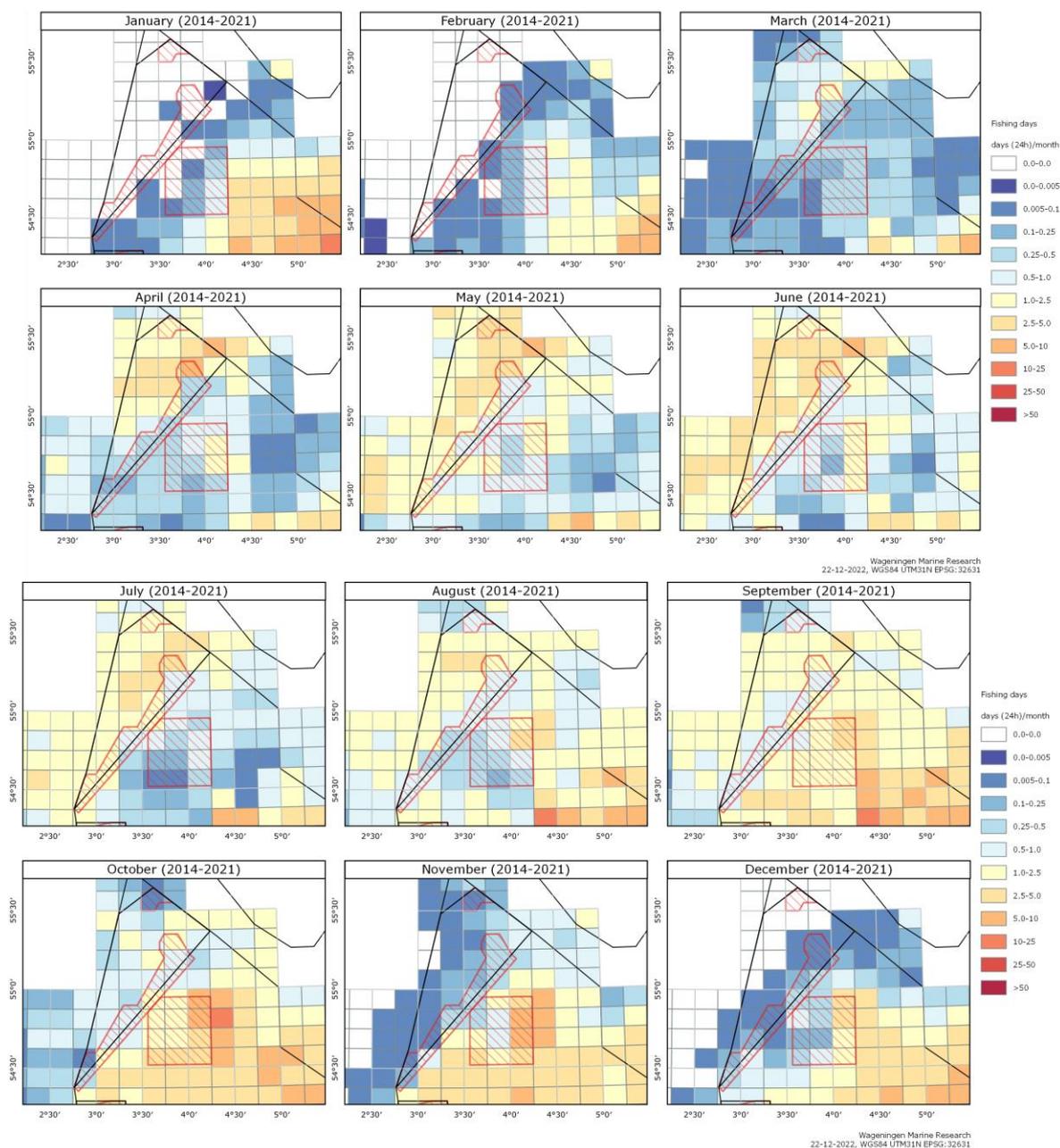
\*\*not part of the proposed fishery measures



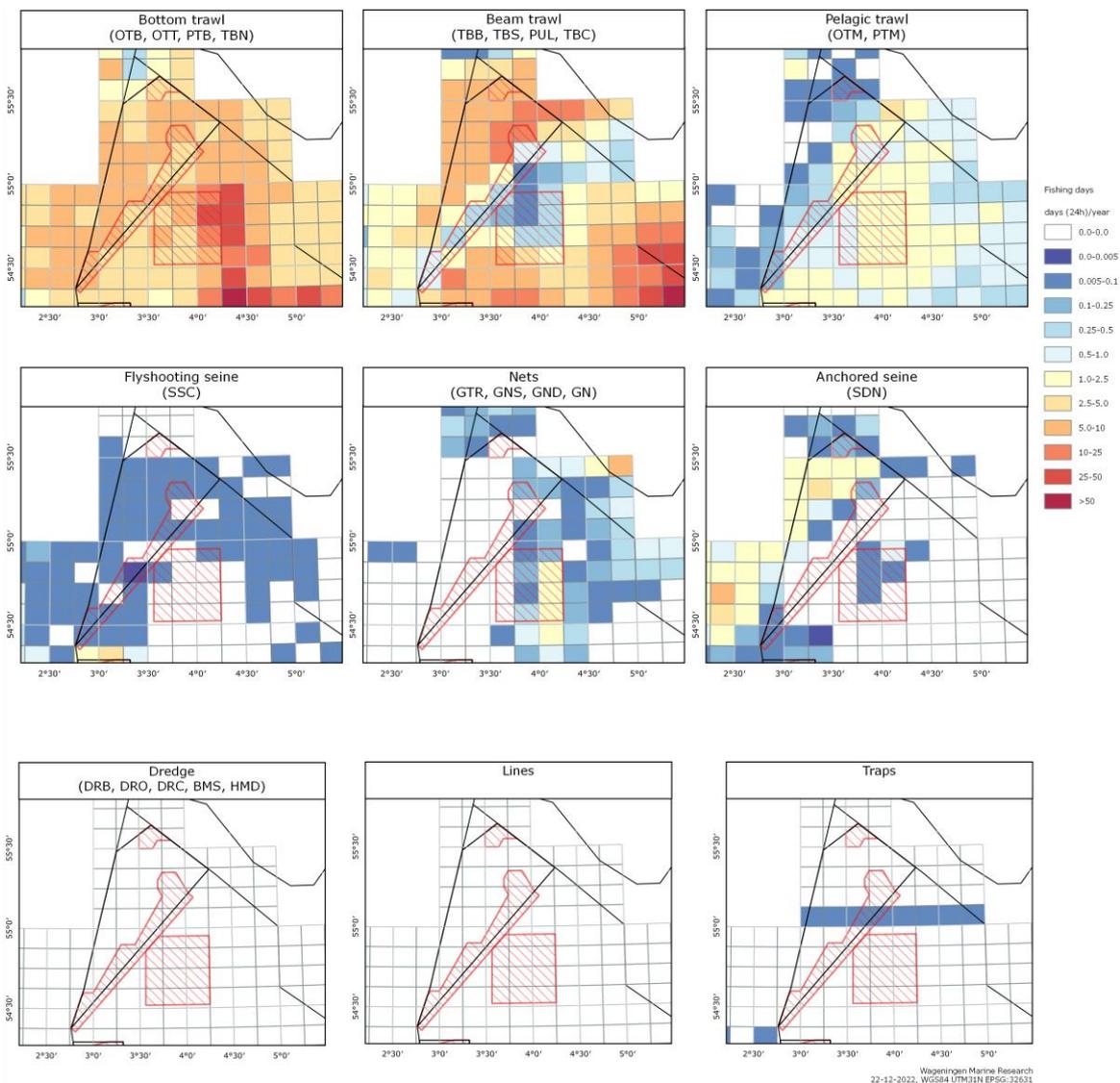
**Figure 23.** Fishery effort (days) per month in the proposed management zones of the Dogger Bank N2000 for fleets (countries), gear types and gear groups. Months are numbered as follows: 1: January; 2: February; 3: March; 4: April; 5: May; 6: June; 7: July; 8: August; 9: September; 10: October; 11: November; 12: December. Gear type 'OTM' and gear group 'Pelagic trawl' is not part of the proposed fishery measures.

## 8.1 Spatial distribution of fishing activity

Maps for the spatial distribution of the fishing activity of all gear groups combined and of the fishing activity of the various gear groups in the Dutch part of the North Sea are shown in Figure 4 and Figure 5. The composition of the gear groups is the same as the one applied in the other sections of this report. The same type of maps for the Dogger Bank N2000 and Dogger Bank South and surroundings are shown in **Figure 24** and **Figure 25**.



**Figure 24.** Dogger Bank N2000 and Dogger Bank South: fishing effort per month, of all gears groups combined (fishing days/month).



**Figure 25.** Dogger Bank N2000 and Dogger Bank South: Fishing effort (fishing days/year) per gear group. Gear groups 'Pelagic trawl', 'Nets', 'Lines' and 'Traps' are not part of the proposed fishery measures.

# 9 Fishing activities on the Dogger Bank (South)

## 9.1 Management zone areas

For this call the Dogger Bank was split in two distinct areas (**Figure 1**): the designated Natura 2000 area and the strip added on the South of the Dogger Bank. Fishery effort information is presented for both areas separately. The fishery effort on the Dogger Bank South is described in this chapter 9 and the fishery effort on Dogger Bank N2000 in chapter 8.

## 9.2 Fleet activity in effort

Data on the fishing activity of fleets, gear types and gear groups for each year in the period 2014 to 2021 on the Dutch part of Dogger Bank South are shown in **Table 38**, **Table 39**, **Table 40** and **Figure 26**. Fishing effort data are expressed in fishing days (1 day = 24 h).

**Table 38.** Overview of fishery effort (fishing days) per year of fleet nationality in the proposed management zones of the Dogger Bank South.

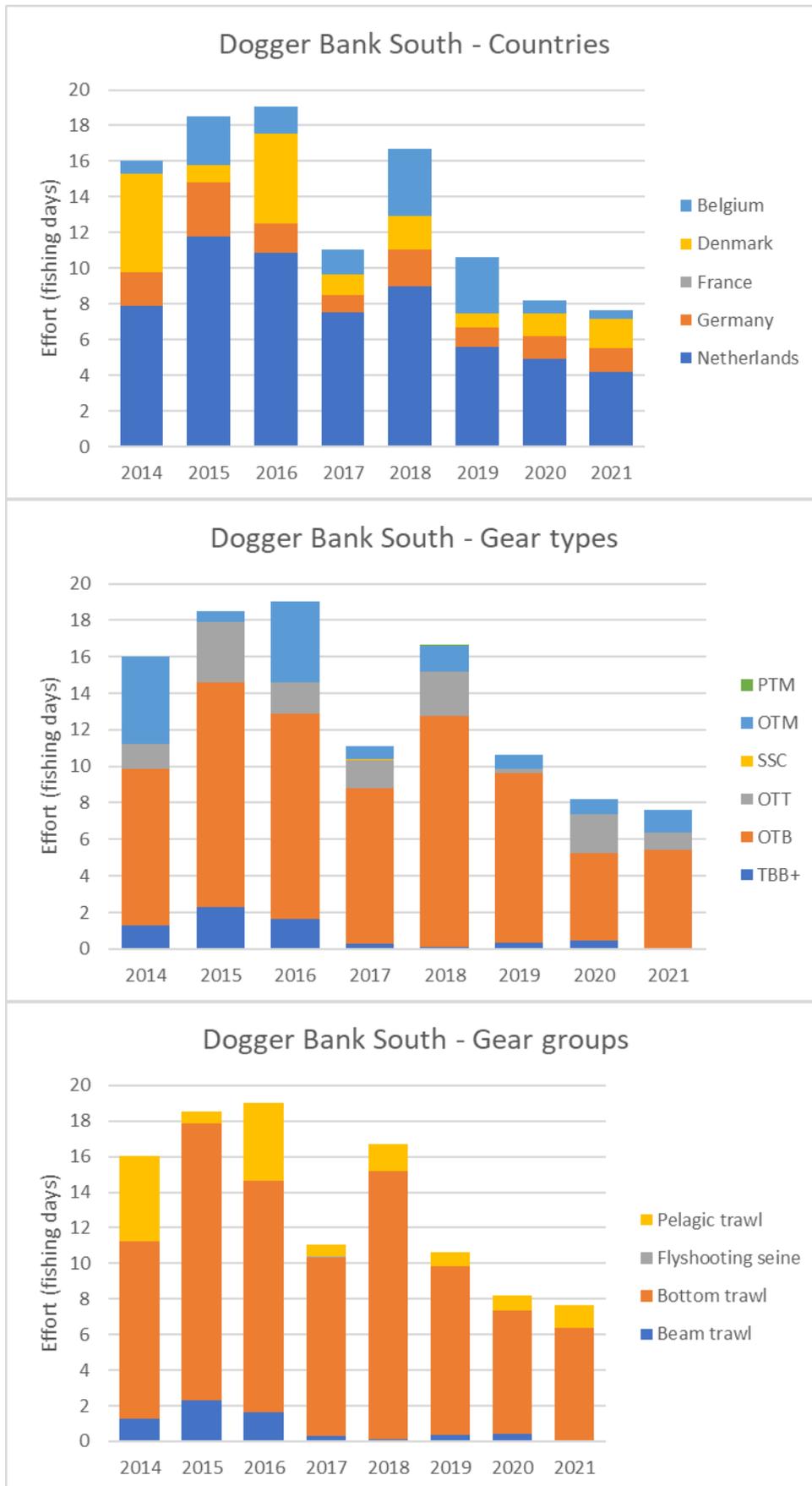
Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
Belgium	1	3	2	1	4	3	1	0	2
Denmark	6	1	5	1	2	1	1	2	2
France	0	0	0	0	0	0	0	0	0
Germany	2	3	2	1	2	1	1	1	2
Netherlands	8	12	11	7	9	6	5	4	8
<i>Total</i>	<i>16</i>	<i>19</i>	<i>19</i>	<i>11</i>	<i>17</i>	<i>11</i>	<i>8</i>	<i>8</i>	<i>13</i>

**Table 39.** Overview of fishery effort (fishing days) per year of gear types in the proposed management zones of the Dogger Bank South.

Gear type	2014	2015	2016	2017	2018	2019	2020	2021	Average
TBB+	1.3	2.3	1.6	0.3	0.1	0.4	0.4		0.8
OTB	8.6	12.3	11.3	8.5	12.6	9.2	4.8	5.4	9.1
OTT	1.4	3.3	1.7	1.5	2.4	0.3	2.1	1.0	1.7
SSC				0.1					0.0
OTM	4.8	0.6	4.4	0.7	1.4	0.8	0.8	1.3	1.9
PTM					0.1				0.0
<i>Total</i>	<i>16.0</i>	<i>18.5</i>	<i>19.0</i>	<i>11.1</i>	<i>16.7</i>	<i>10.7</i>	<i>8.2</i>	<i>7.6</i>	<i>13.5</i>

**Table 40.** Overview of fishery effort (fishing days) per year of gear groups in the proposed management zones of the Dogger Bank South.

Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
Beam trawl	1.3	2.3	1.6	0.3	0.1	0.4	0.4		0.8
Bottom trawl	10.0	15.6	13.0	10.0	15.0	9.5	6.9	6.4	10.8
Flyshooting seine				0.1					0.0
Pelagic trawl	4.8	0.6	4.4	0.7	1.5	0.8	0.8	1.3	1.9
<i>Total</i>	<i>16.0</i>	<i>18.5</i>	<i>19.0</i>	<i>11.1</i>	<i>16.7</i>	<i>10.7</i>	<i>8.2</i>	<i>7.6</i>	<i>13.5</i>



**Figure 26.** Fishing effort (days) per year in the proposed management zones on the Dogger Bank South for fleets (countries), gear types and gear groups. Gear types 'PTM' and 'OTM' and gear group 'Pelagic trawl' are not part of the proposed fishery measures.

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## 9.3 Fleet activity by state

The majority of the fishing activities on the Dogger Bank South is carried out by the Dutch fleet with an average of 8 fishing days per year, which represents 57% of total average fishing effort of 13 fishing days per year of the five countries considered. Next highest fishing activities are found for Denmark, Belgium and Germany with a share of 17%, 13% and 12%, respectively. There was no fishing activity of the French fleet.

The trend of the fishery effort over the period 2014-2021 in Dogger Bank South is comparable with the one in Dogger bank N2000. There was a strong trend of decrease in total fishery activity in the Dogger Bank South amounting to an average decrease of 8.2% per year. This is mainly caused by the decrease in the effort of the Dutch fleet. For the Belgian, Danish and German fleets no clear trend occurred.

## 9.4 Gears and gear groups

During 2014-2021 fishing took place with six different gear types in the Dogger Bank South. The average share of the gear types in the annual total fishing effort in the Dogger Bank South was with 9 fishing days per year the highest for OTB (67%), followed by OTM (14%), OTT (13%) and TBB+ (6%) (**Figure 26**). There was very little fishing activity with SSC (0.1%) and PTM (0.1%). Thus, approx. 86% of all fishery activity was carried out with bottom-contacting gears.

Over the whole 2014-2021 period there was a decreasing trend in the fishery activity of OTB and TBB+, but no trend for OTT.

## 9.5 Seasonal variation in fishing activity

Data on the fishing activity per month of fleets, gear types and gear groups in the period 2014-2021 are shown in **Table 41**, **Table 42**, **Table 43** and **Figure 27**. There was a remarkably pronounced seasonal pattern for the fishing activity on the Dogger Bank South (**Figure 27**). The relative fishing activity over an average year is the highest in the period April to July. It is also relatively high in the period August-October. The effort is relatively low in the months November, December and March. There is no fishing activity in the months January and February. In general, this seasonal pattern also applies to the three most applied fishing gear types (OTB, TBB+, OTT) and also to the national fleets (countries) individually.

**Table 41.** Overview of fishery effort (fishing days) per month of fleets nationality in the proposed management zones of the Dogger Bank South. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Country	1	2	3	4	5	6	7	8	9	10	11	12	Average
Netherlands			0.45	0.45	1.42	1.16	1.42	0.85	0.95	0.47	0.42	0.12	0.64
Germany		0.01	0.04	0.11	0.29	0.44	0.26	0.07	0.12	0.17	0.06	0.12	0.14
France													0.00
Denmark	0.01	0.01		0.01	0.01	0.03	0.05	0.22	0.37	1.03	0.17	0.40	0.19
Belgium			0.04	0.21	0.26	0.18	0.31	0.21	0.47	0.10	0.03		0.15
<i>Total</i>	<i>0.01</i>	<i>0.02</i>	<i>0.52</i>	<i>0.77</i>	<i>1.98</i>	<i>1.80</i>	<i>2.04</i>	<i>1.35</i>	<i>1.91</i>	<i>1.77</i>	<i>0.67</i>	<i>0.64</i>	<i>1.12</i>

**Table 42.** Overview of fishery effort (fishing days) per month of gear types in the proposed management zones of the Dogger Bank South.

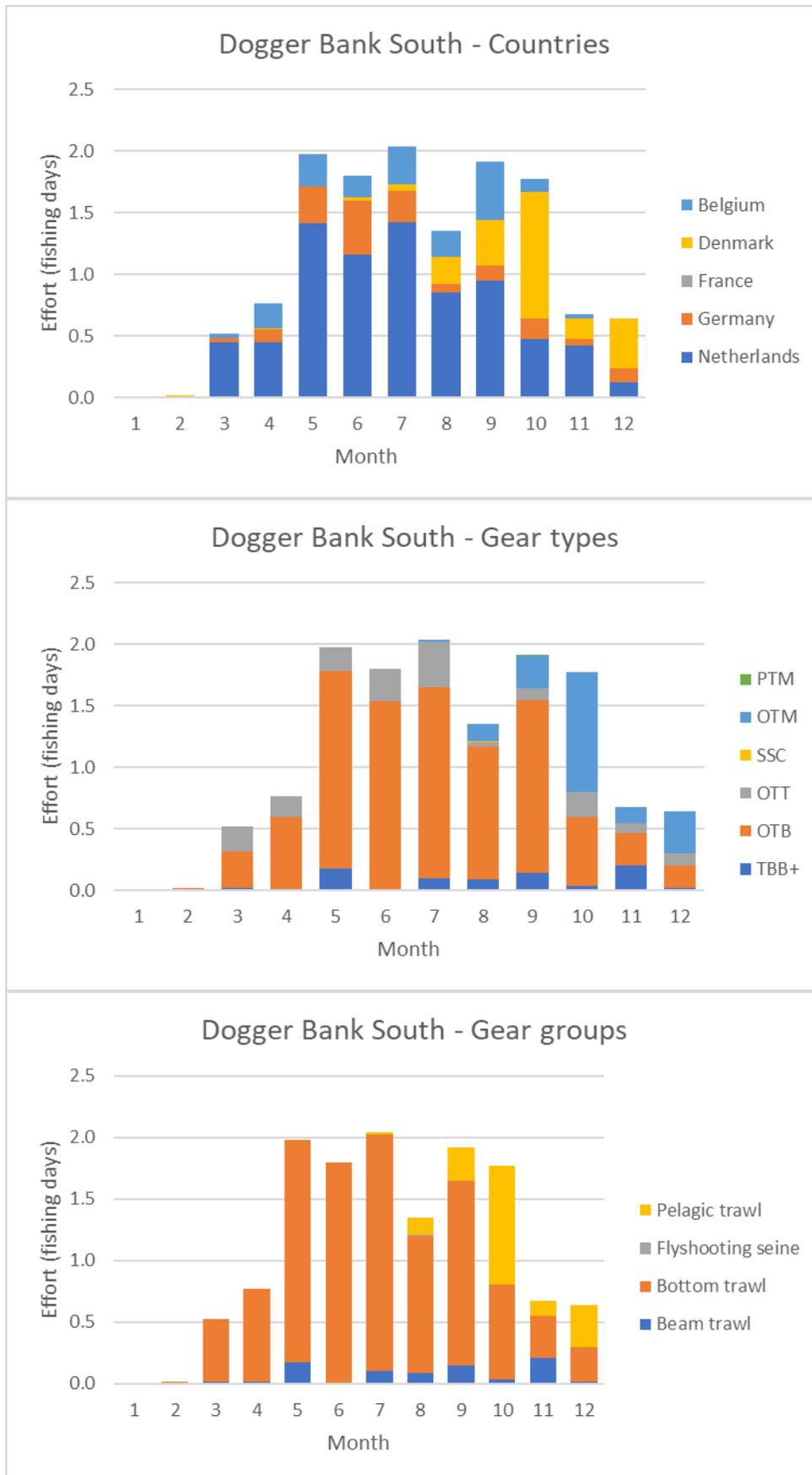
Gear type	1	2	3	4	5	6	7	8	9	10	11	12	Average
TBB+			0.02	0.01	0.17	0.00	0.10	0.09	0.14	0.04	0.21	0.02	0.07
OTB	0.01	0.02	0.30	0.58	1.61	1.53	1.55	1.08	1.40	0.57	0.26	0.19	0.76
OTT			0.21	0.17	0.19	0.26	0.37	0.03	0.10	0.20	0.08	0.09	0.14
SSC								0.01				0.00	0.00
**OTM							0.02	0.14	0.26	0.97	0.13	0.34	0.15
**PTM									0.01				0.00
<i>Total</i>	<i>0.01</i>	<i>0.02</i>	<i>0.52</i>	<i>0.77</i>	<i>1.98</i>	<i>1.80</i>	<i>2.04</i>	<i>1.35</i>	<i>1.91</i>	<i>1.77</i>	<i>0.67</i>	<i>0.64</i>	<i>1.12</i>

\*\*not part of the proposed fisheries measures

**Table 43** Overview of fishery effort (fishing days) per month of gear groups in the proposed management zones of the Dogger Bank South.

Gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
Beam trawl			0.02	0.01	0.17	0.00	0.10	0.09	0.14	0.04	0.21	0.02	0.07
Bottom trawl	0.01	0.02	0.50	0.75	1.80	1.80	1.92	1.11	1.50	0.77	0.34	0.28	0.90
Flyshooting seine								0.01					0.00
**Pelagic trawl							0.02	0.14	0.27	0.97	0.13	0.34	0.16
<i>Total</i>	<i>0.01</i>	<i>0.02</i>	<i>0.52</i>	<i>0.77</i>	<i>1.98</i>	<i>1.80</i>	<i>2.04</i>	<i>1.35</i>	<i>1.91</i>	<i>1.77</i>	<i>0.67</i>	<i>0.64</i>	<i>1.12</i>

\*\*not part of the proposed fisheries measures



**Figure 27.** Fishery effort (days) per month in the proposed management zones of the Dogger Bank South for fleets (countries), gear types and gear groups. Months are numbered as follows: 1: January; 2: February; 3: March; 4: April; 5: May; 6: June; 7: July; 8: August; 9: September; 10: October; 11: November; 12: December. Gear types 'PTM', 'OTM' and gear group 'Pelagic trawl' is not part of the proposed fishery measures.

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## 9.6 Spatial distribution of fishing activity

Maps for the spatial distribution of the fishing activity of all gear groups combined and of the fishing activity of the various gear groups in the Dutch part of the North Sea are shown in **Figure 4** and **Figure 5**. The composition of the gear groups is the same as the one applied in the other sections of this report. The same type of maps for the Dogger Bank South and surroundings are shown in **Figure 24** and **Figure 25**.

# 10 Fishing activities on the Frisian Front

## 10.1 Management zones subarea 1 and subarea 2

Within the Frisian Front there are two distinctive areas with proposed fishery measures. These are Frisian Front subarea 1 and Frisian Front subarea 2 which are both protected under the MSFD (**Figure 1**). The fishery effort information of these areas is presented in separate tables and figures in this chapter.

## 10.2 Fleet activity in effort

### 10.2.1 Frisian Front subarea 1

Data on the fishing activity of fleets, gear types and gear groups for each year in the period 2014 to 2021 is shown for the three areas Frisian Front subarea 1 (**Table 44**, **Table 45**, **Table 46** and **Figure 28**), Frisian Front subarea 2 (**Table 47**, **Table 48**, **Table 49**, **Figure 29**). The observations on extent and trends in the fishing activity are described in the next sections.

**Table 44.** Overview of fishery effort (fishing days) per year of fleet nationality in the proposed management zone of the Frisian Front subarea 1.

Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
Belgium	6	9	19	37	25	6	4	5	14
Denmark	7	26	18	1	7		9	3	9
France					5	6	0	0	1
Germany	52	49	112	73	43	58	121	99	76
Netherlands	130	204	290	263	160	157	191	199	199
<i>Total</i>	<i>195</i>	<i>288</i>	<i>438</i>	<i>374</i>	<i>239</i>	<i>227</i>	<i>325</i>	<i>307</i>	<i>299</i>

**Table 45.** Overview of fishery effort (fishing days) per year of gear types in the proposed management zone of the Frisian Front subarea 1. All gear types are part of the proposed fishery measures.

Gear type	2014	2015	2016	2017	2018	2019	2020	2021	Average
TBB+	120.8	157.9	240.4	154.3	141.5	89.0	252.7	255.2	176.5
TBS*		0.2				0.3			0.1
OTB	40.7	77.6	98.7	148.8	62.4	104.1	52.3	35.2	77.5
OTT	21.9	18.9	81.6	49.8	17.4	15.2	10.5	6.2	27.7
SSC	4.6	11.6	3.9	18.0	14.4	9.7	4.1	8.0	9.3
SDN						0.5		0.3	0.1
GNS	6.1	3.3		3.2	0.7	7.2	0.2		2.6
GN				0.4					0.0
FPO						0.6		0.1	0.1
OTM	1.4	18.8	13.4	0.0	3.1		5.6	1.8	5.5
<i>Total</i>	<i>195.4</i>	<i>288.3</i>	<i>438.0</i>	<i>374.4</i>	<i>239.3</i>	<i>226.7</i>	<i>325.3</i>	<i>306.9</i>	<i>299.3</i>

**Table 46.** Overview of fishery effort (fishing days) per year of gear groups in the proposed management zone of the Frisian Front subarea 1. All gear groups are part of the proposed fishery measures.

Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
Beam trawl	120.8	158.1	240.4	154.3	141.5	89.3	252.7	255.2	176.5
Bottom trawl	62.5	96.5	180.3	198.5	79.8	119.3	62.8	41.5	105.1
Flyshooting seine	4.6	11.6	3.9	18.0	14.4	9.7	4.1	8.0	9.3
Anchored seine						0.5		0.3	0.1
Nets	6.1	3.3		3.6	0.7	7.2	0.2		2.6
Traps						0.6		0.1	0.1
Pelagic trawl	1.4	18.8	13.4	0.0	3.1		5.6	1.8	5.5
<i>Total</i>	<i>195.4</i>	<i>288.3</i>	<i>438.0</i>	<i>374.4</i>	<i>239.3</i>	<i>226.7</i>	<i>325.3</i>	<i>306.9</i>	<i>299.3</i>

## 10.2.2 Frisian Front subarea 2

**Table 47.** Overview of fishery effort (fishing days) per year of fleet nationality in the proposed management zone of the Frisian Front subarea 2.

Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
Belgium	1	0	0	0	0		0	1	0
Denmark	0	8	4	0			1	1	2
France			0	0				0	0
Germany	0	2	3	7	3	3	1	0	2
Netherlands	22	8	8	7	6	6	3	8	8
<i>Total</i>	<i>24</i>	<i>19</i>	<i>14</i>	<i>14</i>	<i>10</i>	<i>9</i>	<i>5</i>	<i>10</i>	<i>13</i>

**Table 48.** Overview of fishery effort (fishing days) per year of gear types in the proposed management zone of the Frisian Front subarea 2.

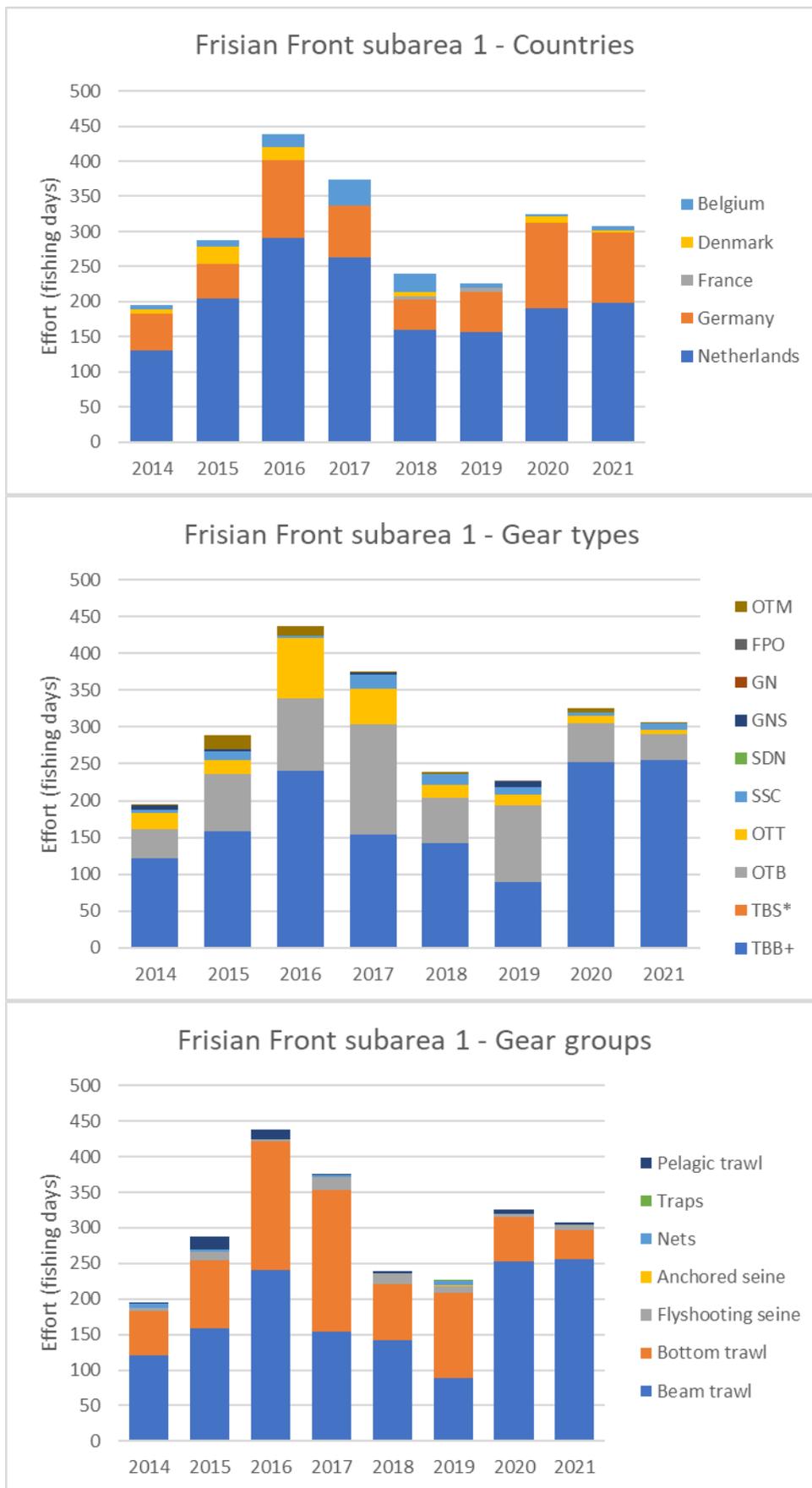
Gear type	2014	2015	2016	2017	2018	2019	2020	2021	Average
TBB+	0.8	1.3	3.8	1.8	0.7	0.7	0.7	2.1	1.5
TBS*	0.1			0.1		0.1			0.0
OTB	0.1	2.3	1.0	0.2	0.3	0.6	0.4	1.5	0.8
OTT	0.1	0.1	0.1			0.2			0.1
SSC	16.1	6.8	5.4	5.8	4.4	4.0	3.0	5.5	6.4
SDN			0.0	0.1				0.3	0.1
**GNS	6.1		1.2	6.1	4.5	3.2			2.6
**GN				0.5					0.1
**FPO	0.2								0.0
**OTM	0.1	8.5	2.8				1.1	1.2	1.7
<i>Total</i>	<i>23.5</i>	<i>19.0</i>	<i>14.4</i>	<i>14.5</i>	<i>9.9</i>	<i>8.9</i>	<i>5.1</i>	<i>10.5</i>	<i>13.2</i>

\*\*not part of the proposed fishery measures

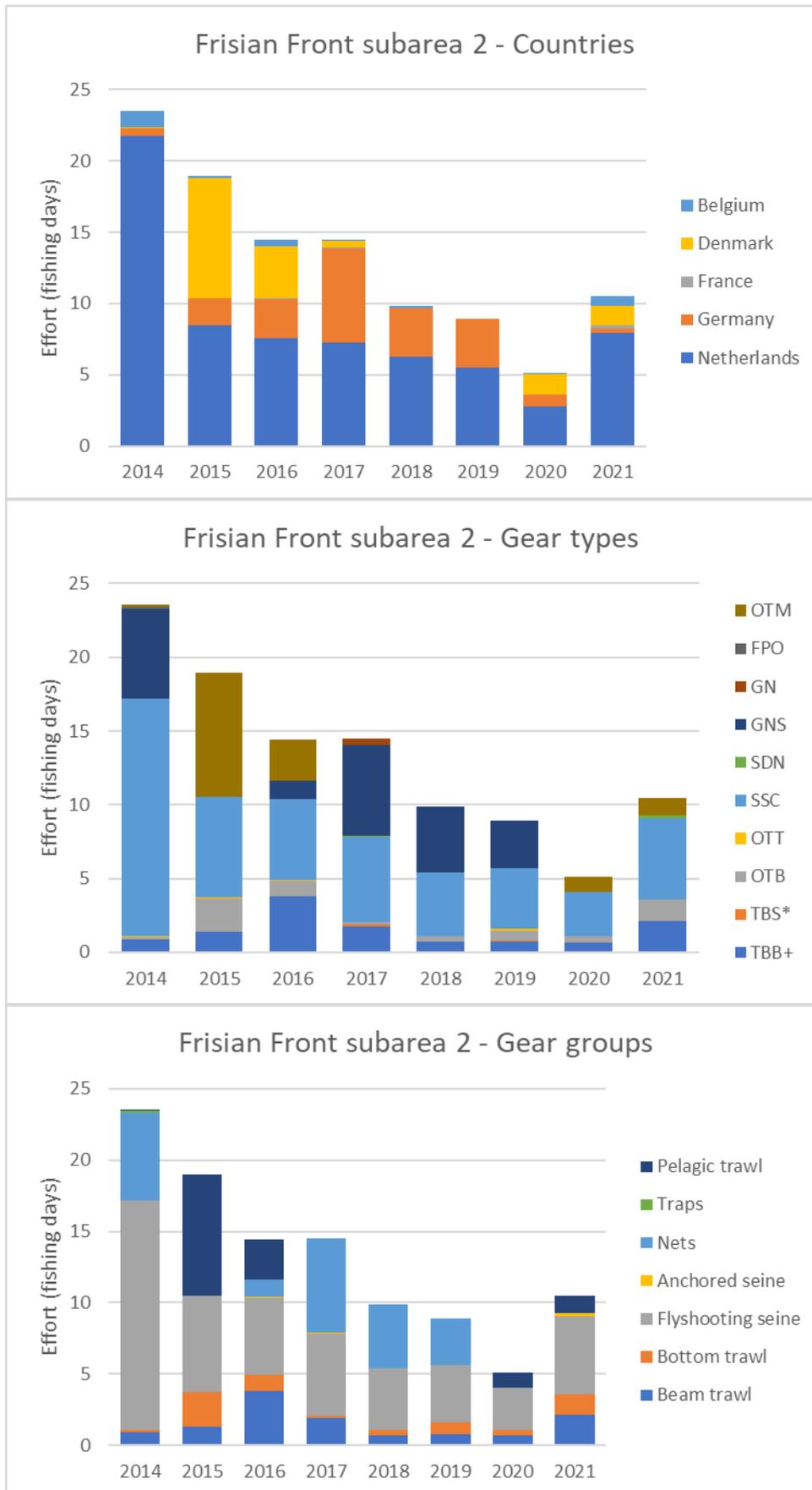
**Table 49.** Overview of fishery effort (fishing days) per year of gear groups in the proposed management zone of the Frisian Front subarea 2.

Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
Beam trawl	0.9	1.3	3.8	1.9	0.7	0.8	0.7	2.1	1.5
Bottom trawl	0.2	2.4	1.1	0.2	0.3	0.8	0.4	1.5	0.9
Flyshooting seine	16.1	6.8	5.4	5.8	4.4	4.0	3.0	5.5	6.4
Anchored seine			0.0	0.1				0.3	0.1
**Nets	6.1		1.2	6.6	4.5	3.2			2.7
**Traps	0.2								0.0
**Pelagic trawl	0.1	8.5	2.8				1.1	1.2	1.7
<i>Total</i>	<i>23.5</i>	<i>19.0</i>	<i>14.4</i>	<i>14.5</i>	<i>9.9</i>	<i>8.9</i>	<i>5.1</i>	<i>10.5</i>	<i>13.2</i>

\*\*not part of the proposed fishery measures



**Figure 28.** Fishery effort (fishing days) per year in the proposed management zones of Frisian Front subarea 1 for fleets (countries), gear types and gear groups.



**Figure 29.** Fishery effort (fishing days) per year in the proposed management zone of Frisian Front subarea 2 for fleets (countries), gear types and gear groups. Gear types 'OTM', 'FPO', 'GN', and 'GNS' and gear groups 'Pelagic trawl', 'Traps' and 'Nets' are not part of the proposed fishery measures.

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## 10.3 Fleet activity by state

### 10.3.1 Frisian Front subarea 1

Most of the fishing activities on the **Frisian Front subarea 1** in the period 2014-2021 is carried out by the Dutch fleet with on average 199 fishing days per year which is 67% of total average effort of 299 fishing days per year for the fleets on the five countries considered. Next highest fishing activities are found for Germany, Belgium, Denmark and France with a share of 25%, 5%, 3% and 0.5%, respectively.

#### Trends over years

Over the 2014-2021 period there was no clear trend of increase or decrease in total fishery activity in the **Frisian Front subarea 1**. There was an irregular pattern from year to year, mainly determined by the changes in effort by the Dutch fleet. The effort of the French fleet was zero in the period 2014-2021, but some effort occurred in 2018 and 2019 with 5 and 6 fishing days, respectively.

### 10.3.2 Frisian Front subarea 2

On the **Frisian Front subarea 2** most fishing activity is carried out by the Dutch fleet with on average 8 fishing days per year which is 64% of total effort of 13 fishing days for the five countries considered. Next highest fishing activities are found for Germany, Denmark and Belgium with a share of 19%, 14%, 3% and 0.4%, respectively.

Over the 2014-2021 period there is an average annual 10.4% decrease in total fishery activity in the **Frisian Front subarea 2**. This could be mainly attributed to the decrease in the effort of the Dutch fleet. For the other countries the effort was so low and irregular that not trend could be observed.

## 10.4 Gears and gear groups

### 10.4.1 Frisian Front subarea 1

During 2014-2021 the average share of the gear types in the total fishing effort in the **Frisian Front subarea 1** was with 176 fishing days per year the highest for TBB+ (59%), followed by OTB (26%), OTT (9%), SSC (3%), OTM (2%) and GNS (1%) (**Figure 28**).

The effort of the bottom-contacting gears comprised 97% of the total fishery activity in Frisian Front subarea 1.

### 10.4.2 Frisian Front subarea 2

The main gear type used in the **Frisian Front subarea 2** was with 6 fishing days per year SSC (48%), followed by GNS (19%), OTM (13%), TBB+ (11%), OTB (6%) and SDN (0.4%) (**Figure 29**).

The effort of the bottom-contacting gears comprised 67% of the total fishery activity in Frisian Front subarea 2, respectively.

The total fishing activity per km<sup>2</sup> was much higher in the Frisian Front subarea 1 compared to the Frisian Front subarea 2 and Central Oyster Grounds, by approximately a factor 4 and 2, respectively.

## 10.5 Seasonal variation in fishing activity

### 10.5.1 Frisian Front subarea 1

Data on the fishing activity per month of fleets, gear types and gear groups in the period 2014-2021 are shown for Frisian Front subarea 1 (**Table 50, Table 51, Table 52, Figure 30**) and Frisian Front subarea 2 (**Table 53, Table 54, Table 55, Figure 31**).

**Table 50.** Overview of fishery effort (fishing days) per month of fleets nationality in the proposed management zone of the Frisian Front subarea 1. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Country	1	2	3	4	5	6	7	8	9	10	11	12	Average
Belgium	0.3	0.1	1.3	1.1	1.3	2.5	3.0	2.3	0.7	0.3	0.5	0.7	1.2
Denmark	0.7	0.3	0.6		0.0	0.1	1.2	3.5	0.6	0.4	0.6	0.7	0.7
France					0.1	0.0	0.8	0.5					0.1
Germany	3.7	5.0	4.3	5.6	9.5	7.8	9.7	4.9	7.6	6.2	6.5	5.3	6.3
Netherlands	8.3	9.3	12.9	13.4	33.0	31.3	31.9	15.8	15.7	11.4	8.0	8.1	16.6
<i>Total</i>	<i>13.0</i>	<i>14.8</i>	<i>19.0</i>	<i>20.1</i>	<i>43.9</i>	<i>41.7</i>	<i>46.6</i>	<i>27.1</i>	<i>24.5</i>	<i>18.2</i>	<i>15.6</i>	<i>14.8</i>	<i>24.9</i>

**Table 51.** Overview of fishery effort (fishing days) per month of gear types in the proposed management zone of the Frisian Front subarea 1.

Gear type	1	2	3	4	5	6	7	8	9	10	11	12	Average
TBB+	12.0	14.2	17.3	13.6	17.3	17.1	13.9	7.3	18.9	16.3	14.6	13.9	14.7
TBS*					0.0	0.0						0.0	0.0
OTB	0.6	0.3	1.0	4.5	15.4	15.5	23.0	11.5	3.7	1.1	0.4	0.5	6.5
OTT			0.2	1.8	5.6	5.2	8.2	5.2	1.1	0.4			2.3
SSC				0.2	5.0	2.7	0.9	0.3	0.1	0.0			0.8
SDN					0.1	0.0							0.0
GNS			0.6	0.1	0.4	1.1	0.0	0.3	0.1				0.2
GN									0.0				0.0
FPO									0.1				0.0
OTM	0.4	0.2					0.6	2.5	0.5	0.3	0.5	0.4	0.5
<i>Total</i>	<i>13.0</i>	<i>14.8</i>	<i>19.0</i>	<i>20.1</i>	<i>43.9</i>	<i>41.7</i>	<i>46.6</i>	<i>27.1</i>	<i>24.5</i>	<i>18.2</i>	<i>15.6</i>	<i>14.8</i>	<i>24.94</i>

**Table 52.** Overview of fishery effort (fishing days) per month of gear groups in the proposed management zone of the Frisian Front subarea 1.

Gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
Beam trawl	12.0	14.2	17.3	13.6	17.3	17.2	13.9	7.3	18.9	16.3	14.6	13.9	14.7
Bottom trawl	0.6	0.3	1.2	6.2	21.0	20.8	31.1	16.6	4.8	1.5	0.5	0.5	8.8
Flyshooting seine				0.2	5.0	2.7	0.9	0.3	0.1	0.0			0.8
Anchored seine					0.1	0.0							0.0
Nets			0.6	0.1	0.4	1.1	0.0	0.3	0.2				0.2
Traps									0.1				0.0
Pelagic trawl							0.6	2.5	0.5	0.3	0.5	0.4	0.5
<i>Total</i>	<i>13.0</i>	<i>14.8</i>	<i>19.0</i>	<i>20.1</i>	<i>43.9</i>	<i>41.7</i>	<i>46.6</i>	<i>27.1</i>	<i>24.5</i>	<i>18.2</i>	<i>15.6</i>	<i>14.8</i>	<i>24.9</i>

## 10.5.2 Frisian Front subarea 2

**Table 53.** Overview of fishery effort (fishing days) per month of fleets nationality in the proposed management zone of the Frisian Front subarea 2. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Country	1	2	3	4	5	6	7	8	9	10	11	12	Average
Belgium			0.04	0.01	0.20		0.06		0.02			0.01	0.03
Denmark							0.16	1.19	0.26	0.30	0.01		0.16
France						0.05	0.01						0.00
Germany		0.01	0.03	0.14	0.39	0.91	0.18	0.49	0.26	0.01	0.03	0.04	0.21
Netherlands	0.18	0.09	0.41	0.41	3.11	2.78	0.88	0.24	0.16	0.01	0.07	0.12	0.70
<i>Total</i>	<i>0.18</i>	<i>0.09</i>	<i>0.48</i>	<i>0.55</i>	<i>3.69</i>	<i>3.74</i>	<i>1.29</i>	<i>1.92</i>	<i>0.70</i>	<i>0.32</i>	<i>0.11</i>	<i>0.17</i>	<i>1.10</i>

**Table 54.** Overview of fishery effort (fishing days) per month of gear types in the proposed management zone of the Frisian Front subarea 2.

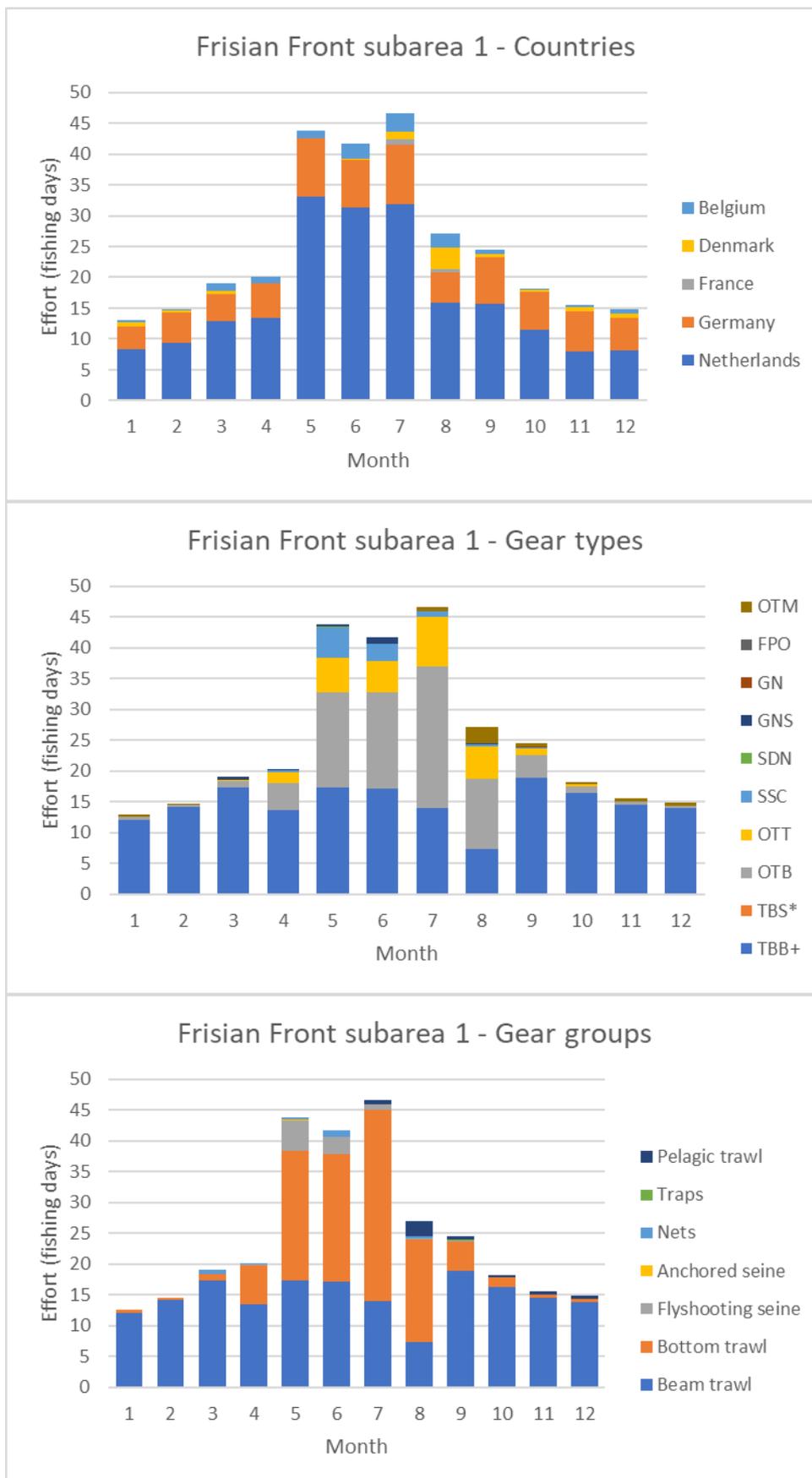
Gear type	1	2	3	4	5	6	7	8	9	10	11	12	Average
TBB+	0.14	0.07	0.20	0.14	0.13	0.25	0.22	0.07	0.07	0.01	0.04	0.16	0.13
TBS*	0.02											0.01	0.00
OTB	0.01	0.02		0.02	0.07	0.14	0.09	0.35	0.08	0.01	0.02		0.07
OTT			0.01	0.01	0.01	0.01	0.01						0.00
SSC				0.09	2.99	2.26	0.76	0.15	0.09		0.03		0.53
SDN						0.05	0.01						0.00
**GNS			0.25	0.28	0.50	1.03	0.09	0.23	0.26				0.22
**GN									0.06				0.00
**FPO	0.02												0.00
**OTM							0.12	1.13	0.14	0.30	0.02		0.14
<i>Total</i>	<i>0.18</i>	<i>0.09</i>	<i>0.48</i>	<i>0.55</i>	<i>3.69</i>	<i>3.74</i>	<i>1.29</i>	<i>1.92</i>	<i>0.70</i>	<i>0.32</i>	<i>0.11</i>	<i>0.17</i>	<i>1.10</i>

\*\* not part of the proposed fisheries measures

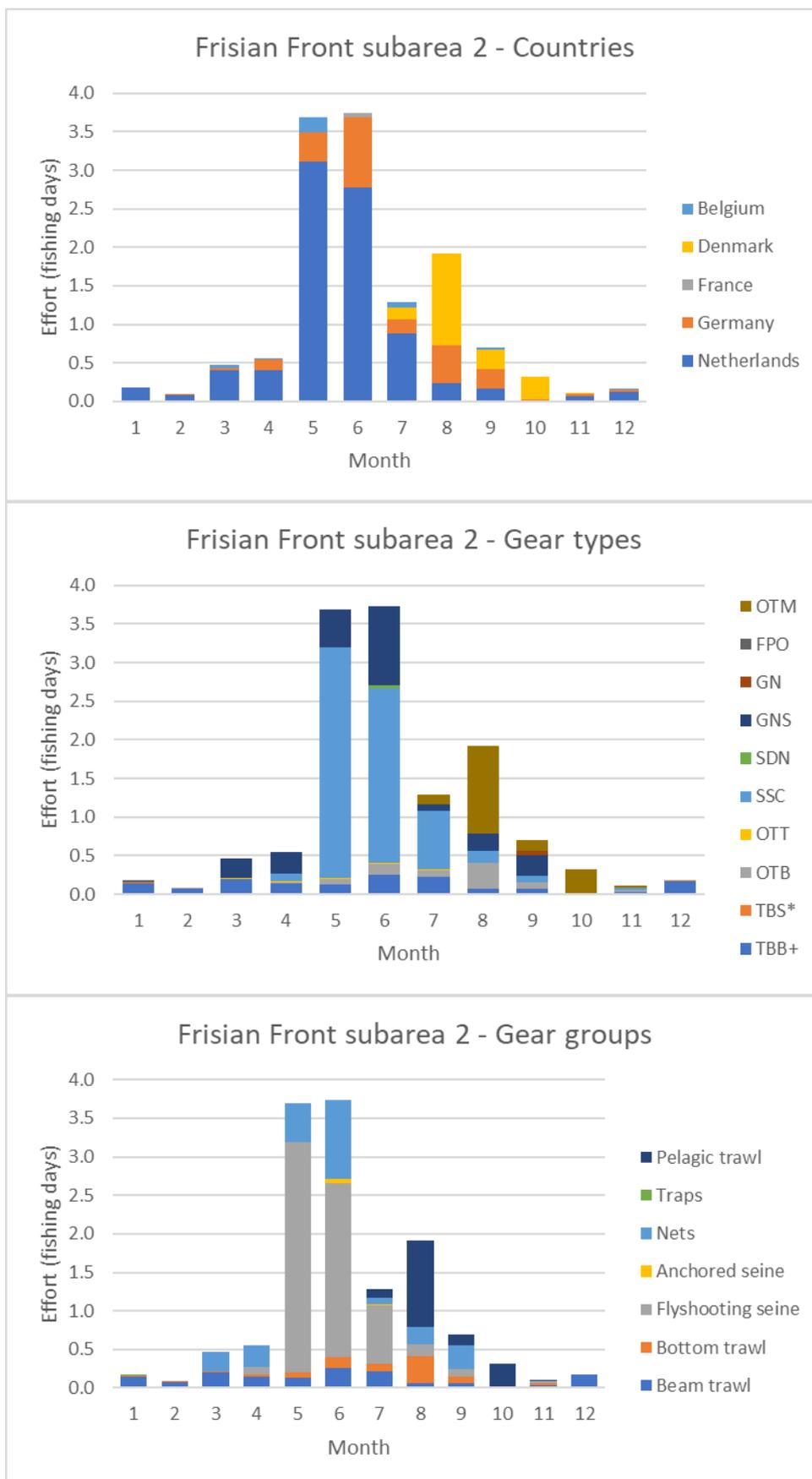
**Table 55.** Overview of fishery effort (fishing days) per month of gear groups in the proposed management zone of the Frisian Front subarea 2.

Gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
Beam trawl	0.15	0.07	0.21	0.14	0.13	0.25	0.22	0.07	0.07	0.01	0.04	0.17	0.13
Bottom trawl	0.01	0.02	0.01	0.03	0.08	0.15	0.10	0.35	0.08	0.01	0.02		0.07
Flyshooting seine				0.09	2.99	2.26	0.76	0.15	0.09		0.03		0.53
Anchored seine						0.05	0.01						0.00
**Nets			0.25	0.28	0.50	1.03	0.09	0.23	0.32				0.22
**Traps	0.02												0.00
**Pelagic trawl							0.12	1.13	0.14	0.30	0.02		0.14
<i>Total</i>	<i>0.18</i>	<i>0.09</i>	<i>0.48</i>	<i>0.55</i>	<i>3.69</i>	<i>3.74</i>	<i>1.29</i>	<i>1.92</i>	<i>0.70</i>	<i>0.32</i>	<i>0.11</i>	<i>0.17</i>	<i>1.10</i>

\*\* not part of the proposed fisheries measures



**Figure 30.** Fishery effort (fishing days) per month in the proposed management zone of Frisian Front subarea 1 for fleets (countries), gear types and gear groups. Months are numbered as follows: 1: January; 2: February; 3: March; 4: April; 5: May; 6: June; 7: July; 8: August; 9: September; 10: October; 11: November; 12: December.



**Figure 31.** Fishery effort (fishing days) per month in the proposed management zone of Frisian Front subarea 2 for fleets (countries), gear types and gear groups. Months are numbered as follows: 1: January; 2: February; 3: March; 4: April; 5: May; 6: June; 7: July; 8: August; 9: September; 10: October; 11: November; 12: December. Gear types 'OTM', 'FPO', 'GN', and 'GNS' and gear groups 'Pelagic trawl', 'Traps' and 'Nets' are not part of the proposed fishery measures.

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There was a clear seasonal pattern for the fishing activity on the **Frisian Front subarea 1 (Figure 30)**. The relative fishing activity over an average year was the highest in the period May to July (42-47 fishing days per month). The effort is relatively low in the months October to April (13 to 20 fishing days per month). This seasonal pattern also applies to the effort of three of the four frequently applied fishing gear types (OTB, OTT, SSC) and the national fleets (Belgium, Germany, Netherlands).

Similarly a very high seasonal variation in fishing activity was observed for the **Frisian Front subarea 2**, although it should be noticed that the monthly effort is always low (between 0 and 4 fishing days) (**Figure 31**). During the months of May and June the fishing activity peaked with 4 fishing days due to SSC and GNS activity. In the period October to March the fishery activity is very low (varying between 0.1 and 0.6 fishing day per month).

## 10.6 Spatial distribution of fishing activity

Maps for the spatial distribution of the fishing activity of all gear groups combined and of the fishing activity of the various gear groups in the Frisian Front subareas 1 and 2 and the Central Oyster Grounds and their surroundings are shown in **Figure 16** and **Figure 17**. The same type of maps for a much larger area (the Dutch North Sea with all protected areas) can be seen in Figure 4 and Figure 5.

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# 11 Fishing activities in the North Sea Coastal Zone

## 11.1 Management areas North Sea Coastal Zone N2000 and VIBEG2

For this call the North Sea Coastal Zone was split in two distinct types of areas (**Figure 1**): the designated Natura 2000 area, and six small areas which lie partly mainly in the N2000 area but also outside the N2000 and called VIBEG2 areas for which fishery closure measures will be taken. These measures will be implemented nationally and not via the Art 11 procedure of the CFP. Fishery effort information is presented for both type of areas separately. Data for the Natura 2000-site North Sea Coastal Zone are presented as background information on the main trends in the area. Fisheries in this area is regulated through the Natura 2000 management plan for this site.

## 11.2 Available data

The Natura 2000 site North Sea Coastal Zone covers an area of 1445 km<sup>2</sup> and is situated along the north-western and northern coast of the Netherlands. To assist in the implementation of Natura 2000 goals, a national process, VIBEG ('Visserij In BEschermde Gebieden' or Fisheries in Protected Areas), was set up in which the Dutch fishing industry, nature organisations and the Dutch government were involved. The VIBEG Agreement was made in 2011 and applies to the two coastal Natura 2000 areas: the North Sea Coastal Zone and the Vlakke van de Raan (VIBEG, 2011) and the fishery management zones were officially designated in 2013 (Min EZ, 2013). In 2017, the agreement was amended specifically for the North Sea coastal zone for the period 2017-2026 with the closure of areas and a reduction of the effect of shrimp fishing (Min EZ, 2017). The North Sea Agreement between the Dutch government and North Sea stakeholders (OFL, 2020) describes the implementation of necessary measures for fisheries and for the North Sea Coastal Zone this means exclusion from seabed-disturbing fishery in the VIBEG2 areas comprising six areas with a total area of 158 km<sup>2</sup> (**Figure 2, Figure 32**). In this report these VIBEG2 areas are combined and referred to as VIBEG2 or VIBEG (in figures).

In the data call, fishing effort and landings values were requested for the Natura 2000 site 'North Sea Coastal Zone' as a whole, as well as for the total set of VIBEG2 area which are mainly located within the Natura 2000 site 'North Sea Coastal Zone', but also partially outside the Natura 2000 site.

Data for the Natura 2000-site North Sea Coastal Zone are presented as background information on the main trends in the area. Fisheries in this area is regulated through the Natura 2000 management plan for this site.



**Figure 32.** Overview of planned VIBEG2-areas in Zone I (Petten, Stortemelk, Terschelling zuid, Ameland and Rottum) and Zone II (Terschelling noord).

## 11.3 Fleet activity in effort

Data on the fishing activity of fleets, gear types and gear groups for each year in the period 2014 to 2021 for the Natura 2000 site North Sea Coastal Zone are presented in **Table 56**, **Table 57** and **Table 58** and **Figure 33** and for the VIBEG2 areas (North Sea Coastal Zone VIBEG) is shown in **Table 59**, **Table 60**, **Table 61** and **Figure 34**. The extent and trends in the fishing activity are described in the next sections.

### 11.3.1 North Sea Coastal Zone N2000

Numbers presented here are for the Natura 2000-site North Sea Coastal Zone as a whole, so that trends in the proposed VIBEG2 management zones can be compared to this larger area.

**Table 56.** Effort (fishing days) per year in Natura 2000-area North Sea Coastal Zone for fleets (countries).

Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
Belgium	21	32	76	98	73	10	28	25	46
Denmark	1	0		2	0	0		2	1
France									0
Germany	52	60	282	48	44	31	51	18	73
Netherlands	6022	5082	6269	3673	4642	3960	4872	4196	4840
<b>Total</b>	<b>6096</b>	<b>5175</b>	<b>6627</b>	<b>3821</b>	<b>4760</b>	<b>4002</b>	<b>4952</b>	<b>4241</b>	<b>4959</b>

**Table 57.** Effort (fishing days) per year in Natura 2000-area North Sea Coastal Zone for gear types.

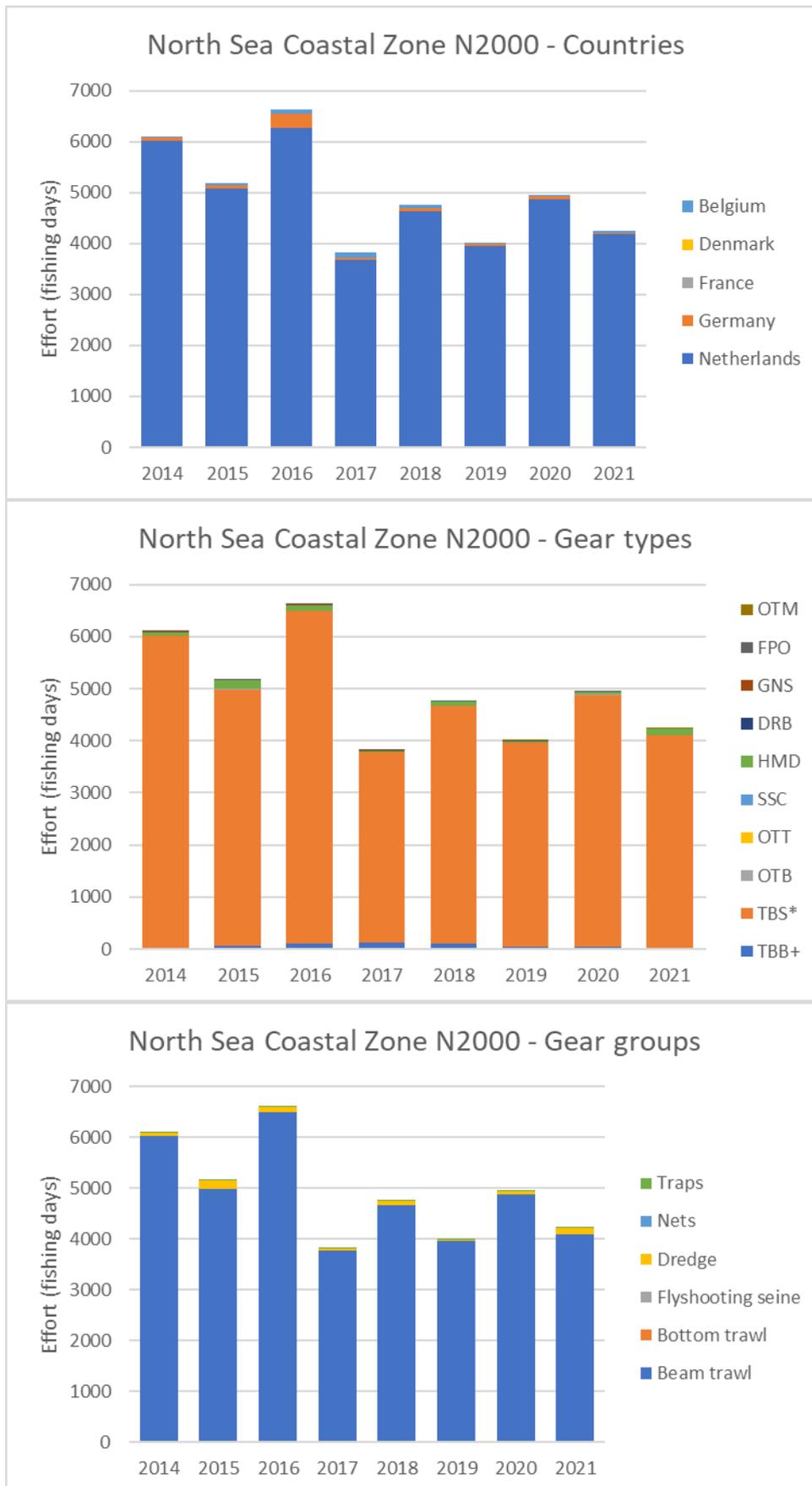
Gear type	2014	2015	2016	2017	2018	2019	2020	2021	Average
TBB+	29.3	57.0	110.9	123.1	106.2	35.1	38.5	32.4	66.6
TBS*	5995.1	4930.4	6386.2	3645.4	4563.0	3925.1	4848.1	4068.3	4795.2
OTB	1.1	4.4	1.2	1.5	0.9	5.5	2.1	3.0	2.5
OTT	0.6	0.3	0.6	0.2	0.3	0.1	0.8	0.4	0.4
SSC			0.2	0.2	0.1		0.1	0.0	0.1
HMD	57.2	167.6	107.1	36.5	76.0	25.1	53.4	123.1	80.7
DRB		5.0	3.2						1.0
**GNS	9.5	2.1	3.2	3.9	1.6	1.9	0.1	1.5	3.0
**FPO	3.6	7.9	14.7	9.8	11.8	8.8	8.5	11.1	9.5
**OTM						0.3		1.0	0.2
<i>Total</i>	<i>6096.3</i>	<i>5174.6</i>	<i>6627.1</i>	<i>3820.6</i>	<i>4759.9</i>	<i>4001.8</i>	<i>4951.7</i>	<i>4240.8</i>	<i>4959.1</i>

\*\*not part of the proposed fishery measures in VIBEG2 Zone II, but part of proposed fishery measures in VIBEG2 Zone I.

**Table 58.** Effort (fishing days) per year in Natura 2000-area North Sea Coastal Zone for gear groups.

Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
Beam trawl	6024.4	4987.4	6497.1	3768.5	4669.2	3960.1	4886.6	4100.7	4861.8
Bottom trawl	1.6	4.6	1.7	1.7	1.2	5.5	2.9	3.4	2.9
Flyshooting seine			0.2	0.2	0.1		0.1	0.0	0.1
Dredge	57.2	172.5	110.3	36.5	76.0	25.1	53.4	123.1	81.7
**Nets	9.5	2.1	3.2	3.9	1.6	1.9	0.1	1.5	3.0
**Traps	3.6	7.9	14.7	9.8	11.8	8.8	8.5	11.1	9.5
**Pelagic trawl						0.3		1.0	0.2
<i>Total</i>	<i>6096.3</i>	<i>5174.6</i>	<i>6627.1</i>	<i>3820.6</i>	<i>4759.9</i>	<i>4001.8</i>	<i>4951.7</i>	<i>4240.8</i>	<i>4959.1</i>

\*\*not part of the proposed fishery measures in VIBEG2 Zone II, but part of proposed fishery measures in VIBEG2 Zone I.



**Figure 33.** Fishery effort (fishing days) per year in the Natura 2000 area North Sea Coastal Zone for fleets (countries), gear types and gear groups. Gear types 'OTM', 'FPO' and 'GNS' and gear groups 'Traps' and 'Nets' are not part of the proposed fishery measures in VIBEG2 Zone II, but are part of proposed fishery measures in VIBEG2 Zone I.

### 11.3.2 VIBEG2

**Table 59.** Effort (fishing days) per year in VIBEG2 for fleets (countries).

Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
Belgium	3	1	3	1		0	0	1	1
Denmark	0	0		1				1	0
France									0
Germany	24	9	62	6	6	6	17	2	17
Netherlands	318	104	52	15	43	33	88	64	90
<i>Total</i>	<i>345</i>	<i>115</i>	<i>117</i>	<i>23</i>	<i>49</i>	<i>39</i>	<i>106</i>	<i>68</i>	<i>108</i>

**Table 60.** Effort (fishing days) per year in VIBEG2 for gear types.

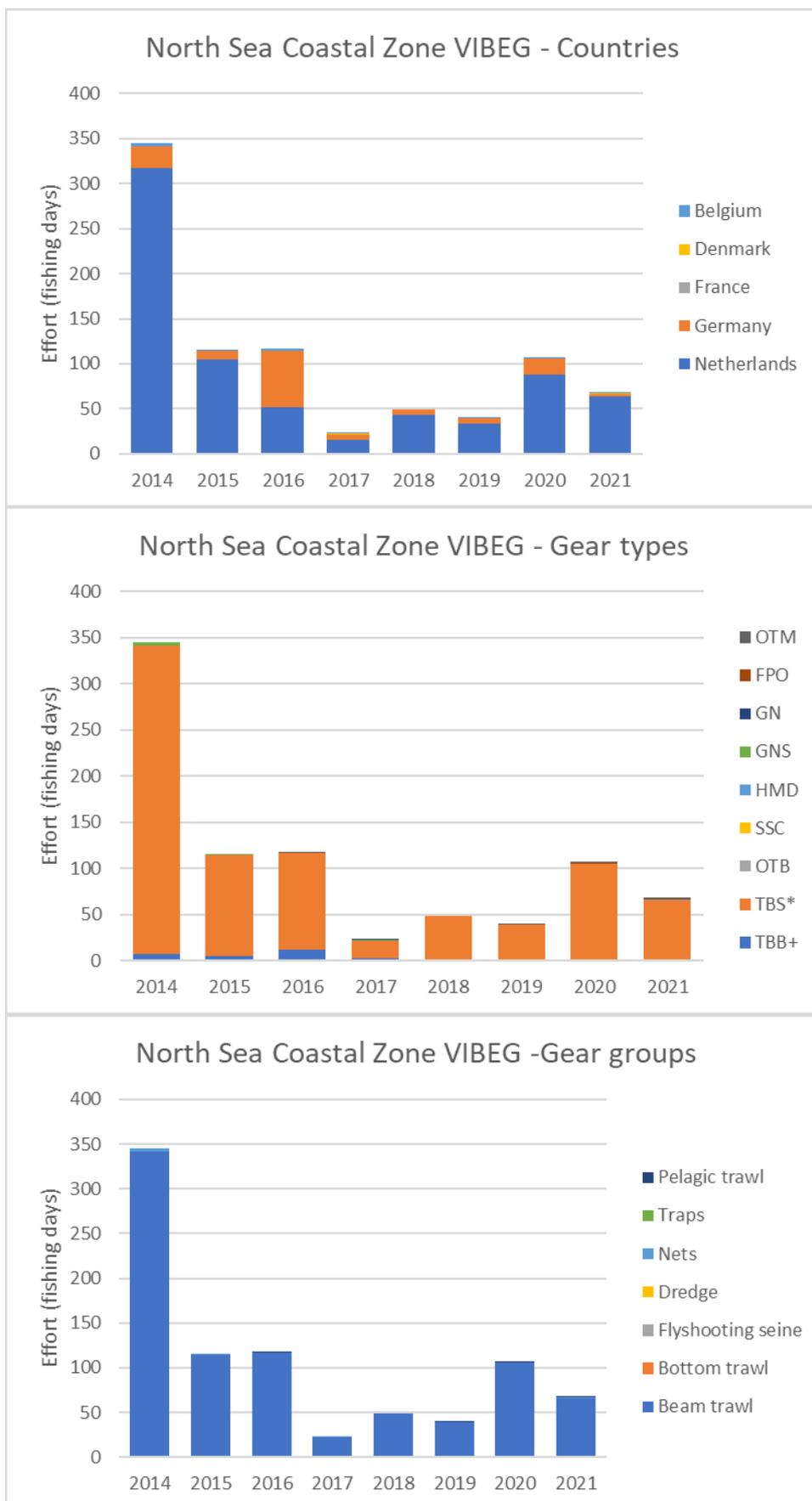
Gear type	2014	2015	2016	2017	2018	2019	2020	2021	Average
TBB+	7.4	5.6	12.4	2.4	1.2	1.6	0.6	0.9	4.0
TBS*	334.3	109.1	104.2	19.4	48.0	37.7	104.9	64.5	102.7
OTB	0.1	0.0		0.1			0.2	0.9	0.2
SSC				0.1					0.0
HMD			0.2						0.0
GNS	3.2	0.2	0.0	0.7		0.1		0.4	0.6
GN				0.5					0.1
FPO			0.1			0.1	0.1	0.5	0.1
OTM								0.6	0.1
<i>Total</i>	<i>344.9</i>	<i>114.9</i>	<i>116.9</i>	<i>23.2</i>	<i>49.1</i>	<i>39.4</i>	<i>105.8</i>	<i>67.8</i>	<i>107.8</i>

\*\*Gear types 'OTM', 'FPO', 'GNS' and 'GN' are not part of the proposed fishery measures in VIBEG2 Zone II, but are part of proposed fishery measures in VIBEG2 Zone I.

**Table 61.** Effort (fishing days) per year in VIBEG2 for gear groups.

Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
Beam trawl	341.6	114.7	116.6	21.8	49.1	39.3	105.4	65.4	106.8
Bottom trawl	0.1	0.0		0.1			0.2	0.9	0.2
Flyshooting seine				0.1					0.0
Dredge			0.2						0.0
Nets	3.2	0.2	0.0	1.2		0.1		0.4	0.6
Traps			0.1			0.1	0.1	0.5	0.1
Pelagic trawl								0.6	0.1
<i>Total</i>	<i>344.9</i>	<i>114.9</i>	<i>116.9</i>	<i>23.2</i>	<i>49.1</i>	<i>39.4</i>	<i>105.8</i>	<i>67.8</i>	<i>107.8</i>

\*\*Gear groups 'Nets', 'Traps' and 'Pelagic trawl' are not part of the proposed fishery measures in VIBEG2 Zone II, but are part of proposed fishery measures in VIBEG2 Zone I.



**Figure 34.** Fishery effort (fishing days) per year in the VIBEG2 zones for fleets (countries), for gear types and gear groups. TBS\* = TBS+TBC (shrimp trawls). Gear types 'OTM', 'FPO' and 'GNS' and gear groups 'Traps' and 'Nets' are not part of the proposed fishery measures in VIBEG2 Zone II, but are part of proposed fishery measures in VIBEG2 Zone I.

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## 11.1 Fleet activity by state

### 11.1.1 North Sea Coastal Zone N2000

The vast majority of the fishing activities in the North Sea Coastal Zone was carried out by the Dutch fleet with an average of 4840 fishing days per year, which is approx. 97.6% of the total effort of 4959 for the five countries considered. The German and Belgian fleets had a percentage of 1.5% and 0.9%, respectively. There was a negligible share of the Danish fleet (0.01%) and no fishing activity of the French fleet.

Over the whole 2014-2021 period there was a trend of decrease in total fishery activity in the North Sea Coastal Zone. The average annual decrease in effort was 4.4% and 4.2% for all fleets combined and for the Dutch fleet alone, respectively. The pattern for the effort over the 8-year period was irregular for both the German and Belgian fleet.

### 11.1.2 VIBEG2

The main part of the fishing activities in the proposed VIBEG2 management zones was carried out by the Dutch fleet with an average of about 90 fishing days per year (2014-2021) or 83.3% of the total fishing effort (108 fishing days). The shares of German, Belgian and Danish fleet were 15.4%, 1.0% and 0.4%, respectively. There was no fishing activity of the French fleet.

Over the whole 2014-2021 period the total fishery activity in the VIBEG2 areas greatly varied from year to year with far the highest value in 2014 (345 fishing days). In 2021 the effort was 68 fishing days which is only 20% of the effort in 2014. The Dutch fleet shows the biggest relative (and absolute) decrease in effort during the 2014-2021 period.

## 11.2 Gears and gear groups

### 11.2.1 North Sea Coastal Zone N2000

In the period 2014-2021 fishing took place with ten different gear types in the North Sea Coastal Zone. The fishing effort was heavily dominated by shrimp trawling (TBS + TBC) by 97%. A small share was taken by HMD (mechanised dredges) (1.6%), TBB+ (1.3%), FPO (0.2%) and GNS (0.1%), OTB (0.03%) The share of DRB (boat dredges), OTT, SSC and OTM was below 0.02% (**Figure 33**). This means that 99.7% of all fishery effort was caused by fishing gear contacting the seafloor.

Over the 2014-2021 period there was a trend of decrease in the effort for the shrimp trawling. The decrease in effort was 32% for when the effort in 2021 was compared with the one in 2014. For the other gear types there was no clear trend due to the irregular pattern.

### 11.2.2 VIBEG2

In the period 2014-2021 fishing was carried out with nine different gear types in North Sea Coastal Zone VIBEG2. The fishing effort was heavily dominated by shrimp trawling (TBS+TBC) taking a share of 95.3%. A small share was taken by beam trawl (TBB+; 3.7%), gillnets (GNS + GN; 0.6%), OTB (0.15%), FPO (0.09%), OTM (0.07%) and dredge (HMD, 0.02%) and SSC (0.01%). This means that 99.2% of all fishery effort was caused by fishing gear contacting the seafloor.

Over the period 2014-2021 there was decrease of 81% in the effort for the shrimp trawling (TBS+TBC) from 334 fishing days per year in VIBEG2 areas in 2014 to 64 days in 2021 (**Table 60**).

## 11.3 Seasonal variation in fishing activity

### 11.3.1 North Sea Coastal Zone N2000

Data on the fishing activity per month of fleets, gear types and gear groups in the Natura 2000 area North Sea Coastal Zone in the period 2014-2021 is shown in **Table 62**, **Table 63**, **Table 64** and **Figure 35**.

**Table 62.** Effort (fishing days) per month in Natura 2000 area North Sea Coastal Zone for fleets (countries).

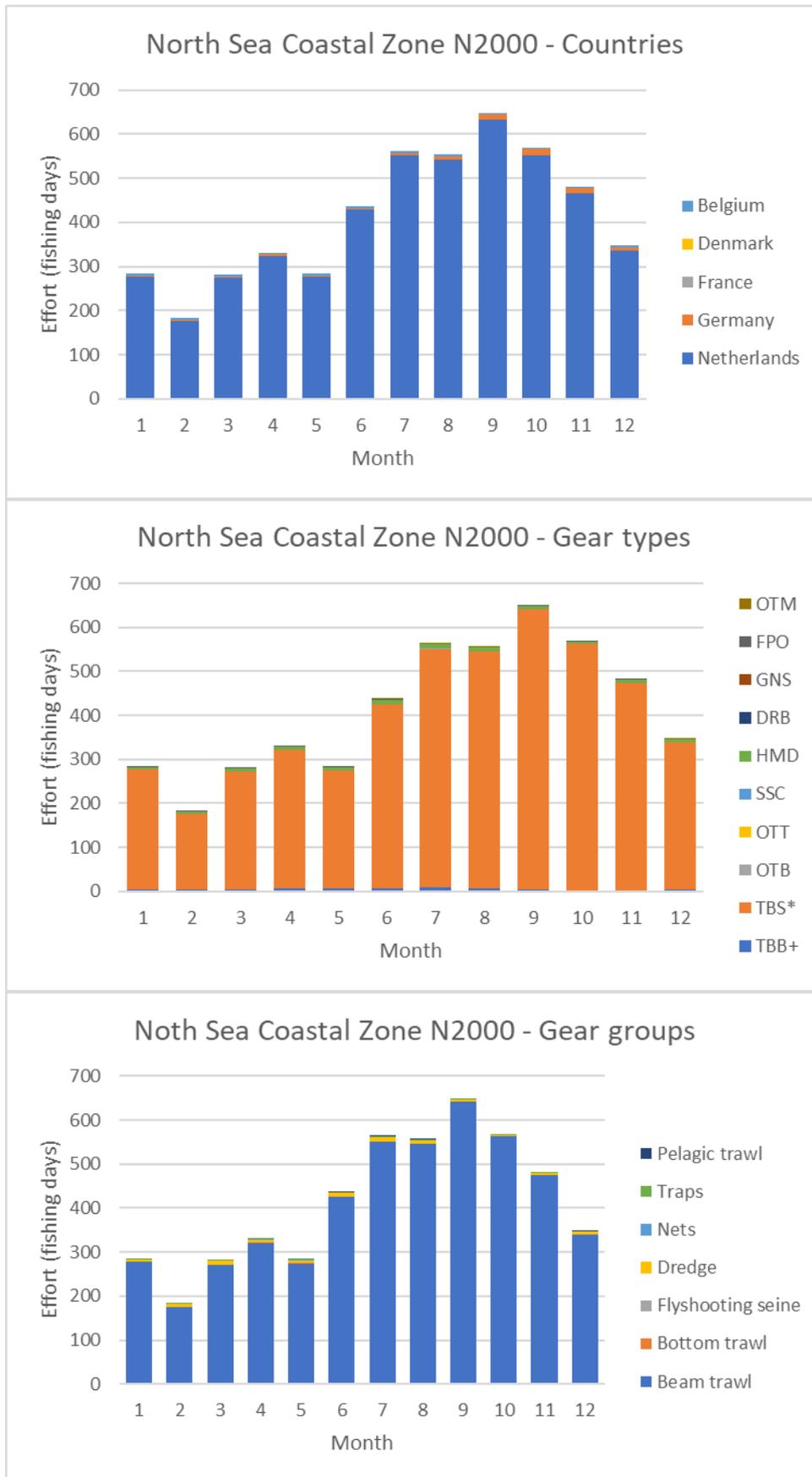
Country	1	2	3	4	5	6	7	8	9	10	11	12	Average
Belgium	4.4	3.8	4.5	2.3	2.8	3.4	6.5	6.2	3.3	0.9	3.0	4.6	3.8
Denmark					0.0	0.1	0.1	0.2	0.2	0.0		0.0	0.1
France													0.0
Germany	2.9	1.2	2.2	4.6	3.8	4.1	3.8	6.9	11.0	14.2	12.9	5.7	6.1
Netherlands	276.6	177.6	274.2	323.0	276.8	428.5	552.4	541.9	634.1	552.4	465.3	336.8	403.3
<i>Total</i>	<i>283.9</i>	<i>182.6</i>	<i>280.9</i>	<i>329.9</i>	<i>283.4</i>	<i>436.2</i>	<i>562.8</i>	<i>555.1</i>	<i>648.5</i>	<i>567.4</i>	<i>481.1</i>	<i>347.2</i>	<i>413.3</i>

**Table 63.** Effort (fishing days) per month in Natura 2000 area North Sea Coastal Zone for gear types.

Gear type	1	2	3	4	5	6	7	8	9	10	11	12	Average
TBB+	4.9	4.1	5.8	7.2	7.9	7.0	8.7	7.3	4.2	1.4	3.3	4.9	5.5
TBS*	273.7	171.4	266.2	313.9	266.6	417.9	542.6	537.8	637.8	561.4	471.7	334.0	399.6
OTB	0.0	0.1	0.0	0.3	0.1	0.3	0.5	0.7	0.1	0.1	0.1	0.1	0.2
OTT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
SSC					0.0	0.0	0.0						0.0
HMD	4.7	6.2	7.5	7.0	7.1	9.2	9.4	8.2	5.2	3.8	5.2	7.3	6.7
DRB	0.1	0.2	0.3	0.1	0.1	0.2							0.1
GNS	0.0	0.1	0.7	0.6	0.6	0.4	0.3	0.1	0.2				0.2
FPO	0.5	0.5	0.4	0.6	0.9	1.2	1.2	0.8	1.0	0.7	0.9	0.8	0.8
OTM						0.0	0.0	0.1				0.0	0.0
<i>Total</i>	<i>283.9</i>	<i>182.6</i>	<i>280.9</i>	<i>329.9</i>	<i>283.4</i>	<i>436.2</i>	<i>562.8</i>	<i>555.1</i>	<i>648.5</i>	<i>567.4</i>	<i>481.1</i>	<i>347.2</i>	<i>413.3</i>

**Table 64.** Effort (fishing days) per month in Natura 2000 area North Sea Coastal Zone for gear groups.

Gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
Beam trawl	278.5	175.5	272.0	321.2	274.5	424.9	551.3	545.1	642.0	562.8	475.0	339.0	405.1
Bottom trawl	0.1	0.1	0.1	0.3	0.1	0.3	0.6	0.8	0.1	0.1	0.1	0.1	0.2
Flyshooting seine					0.0	0.0	0.0						0.0
Dredge	4.8	6.4	7.8	7.1	7.2	9.4	9.4	8.2	5.2	3.8	5.2	7.3	6.8
Nets	0.0	0.1	0.7	0.6	0.6	0.4	0.3	0.1	0.2				0.2
Traps	0.5	0.5	0.4	0.6	0.9	1.2	1.2	0.8	1.0	0.7	0.9	0.8	0.8
Pelagic trawl						0.0	0.0	0.1				0.0	0.0
<i>Total</i>	<i>283.9</i>	<i>182.6</i>	<i>280.9</i>	<i>329.9</i>	<i>283.4</i>	<i>436.2</i>	<i>562.8</i>	<i>555.1</i>	<i>648.5</i>	<i>567.4</i>	<i>481.1</i>	<i>347.2</i>	<i>413.3</i>



**Figure 35.** Fishery effort (fishing days) per month in the Natura 2000 area North Sea Coastal Zone for fleets (countries), gear types and gear groups. Months are numbered as follows: 1: January; 2: February; 3: March; 4: April; 5: May; 6: June; 7: July; 8: August; 9: September; 10: October; 11: November; 12: December.

There was a clear seasonal pattern for the fishing activity in the Natura 2000 area North Sea Coastal Zone N2000 (**Figure 35**). The relative fishing activity over an average year is the highest in summer and autumn (June-November) due to the shrimp trawling (TBS\*) activity. This pattern is also observed for the national fleets of The Netherlands and Germany (countries) individually. The activity of HMD and TBB+ is the highest from spring to midsummer (March-July).

### 11.3.2 VIBEG2

Data on the fishing activity per month of fleets, gear types and gear groups in the proposed VIBEG2 management zones in the period 2014-2021 is shown in **Table 65**, **Table 66**, **Table 67** and **Figure 36**.

**Table 65.** Effort (fishing days) per month, averaged per year (2014-2021) in the proposed management zones of VIBEG2 for fleets (countries).

Country	1	2	3	4	5	6	7	8	9	10	11	12	Average
Belgium	0.21	0.15	0.11				0.17	0.13	0.07	0.08	0.07	0.10	0.09
Denmark						0.01	0.11	0.16	0.09			0.01	0.03
France													0.00
Germany	0.36	0.06	0.66	1.09	0.67	0.48	0.42	1.48	2.04	4.45	3.95	0.92	1.38
Netherlands	4.54	4.12	7.90	5.53	2.15	3.73	9.27	10.76	16.27	10.69	10.14	4.60	7.48
<i>Total</i>	<i>5.11</i>	<i>4.32</i>	<i>8.67</i>	<i>6.62</i>	<i>2.82</i>	<i>4.21</i>	<i>9.96</i>	<i>12.53</i>	<i>18.47</i>	<i>15.22</i>	<i>14.17</i>	<i>5.63</i>	<i>8.98</i>

**Table 66** Effort (fishing days) per month, averaged per year (2014-2021) in the proposed management zones of VIBEG2 areas for gear types.

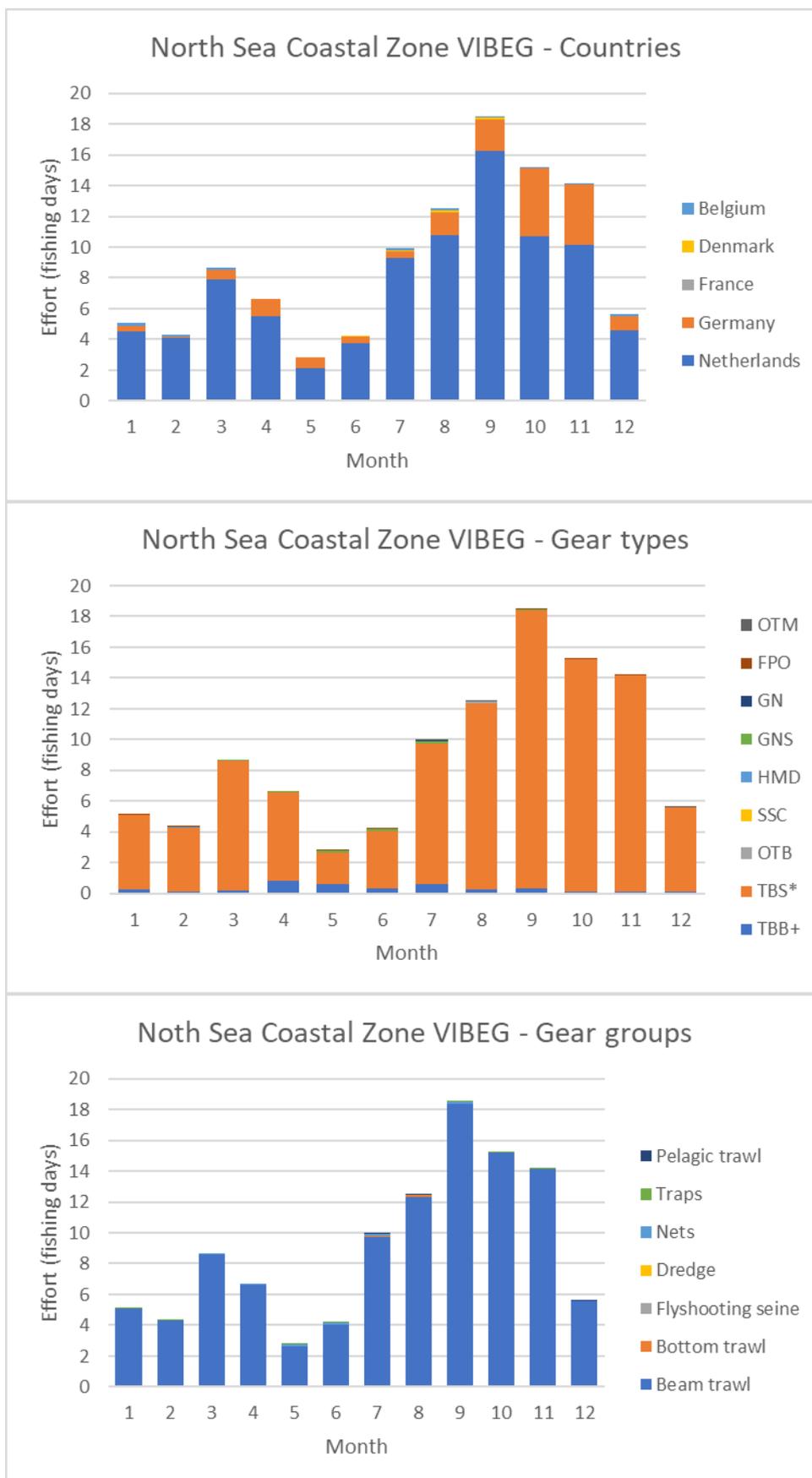
Gear type	1	2	3	4	5	6	7	8	9	10	11	12	Average
TBB+	0.27	0.15	0.19	0.87	0.61	0.33	0.63	0.28	0.32	0.16	0.12	0.10	0.33
TBS*	4.83	4.15	8.44	5.74	2.04	3.73	9.09	12.06	18.05	15.07	14.05	5.50	8.56
OTB		0.01	0.00				0.03	0.12					0.01
SSC							0.01						0.00
HMD		0.02											0.00
**GNS			0.05	0.02	0.15	0.14	0.11	0.02	0.09				0.05
**GN							0.06						0.01
**FPO	0.01	0.00			0.03	0.01	0.02	0.00	0.01	0.00	0.00	0.01	0.01
**OTM							0.01	0.05				0.02	0.01
<i>Total</i>	<i>5.11</i>	<i>4.32</i>	<i>8.67</i>	<i>6.62</i>	<i>2.82</i>	<i>4.21</i>	<i>9.96</i>	<i>12.53</i>	<i>18.47</i>	<i>15.22</i>	<i>14.17</i>	<i>5.63</i>	<i>8.98</i>

\*\*Gear types 'OTM', 'FPO' and 'GNS' and 'GN' are not part of the proposed fishery measures in VIBEG2 Zone II, but are part of proposed fishery measures in VIBEG2 Zone I.

**Table 67.** Effort (fishing days) per month, averaged per year (2014-2021) in the proposed management zones of VIBEG2 areas for gear groups.

Gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
Beam trawl	5.11	4.29	8.62	6.60	2.65	4.06	9.72	12.34	18.37	15.22	14.16	5.60	8.90
Bottom trawl	0.01	0.00					0.03	0.12					0.01
Flyshooting seine							0.01						0.00
Dredge	0.02												0.00
Nets			0.05	0.02	0.15	0.14	0.17	0.02	0.09				0.05
Traps	0.01	0.00			0.03	0.01	0.02	0.00	0.01	0.00	0.00	0.01	0.01
Pelagic trawl							0.01	0.05				0.02	0.01
<i>Total</i>	<i>5.11</i>	<i>4.32</i>	<i>8.67</i>	<i>6.62</i>	<i>2.82</i>	<i>4.21</i>	<i>9.96</i>	<i>12.53</i>	<i>18.47</i>	<i>15.22</i>	<i>14.17</i>	<i>5.63</i>	<i>8.98</i>

Gear groups 'Traps' and 'Nets' and 'Pelagic trawls' are not part of the proposed fishery measures in VIBEG2 Zone II, but are part of proposed fishery measures in VIBEG2 Zone I.

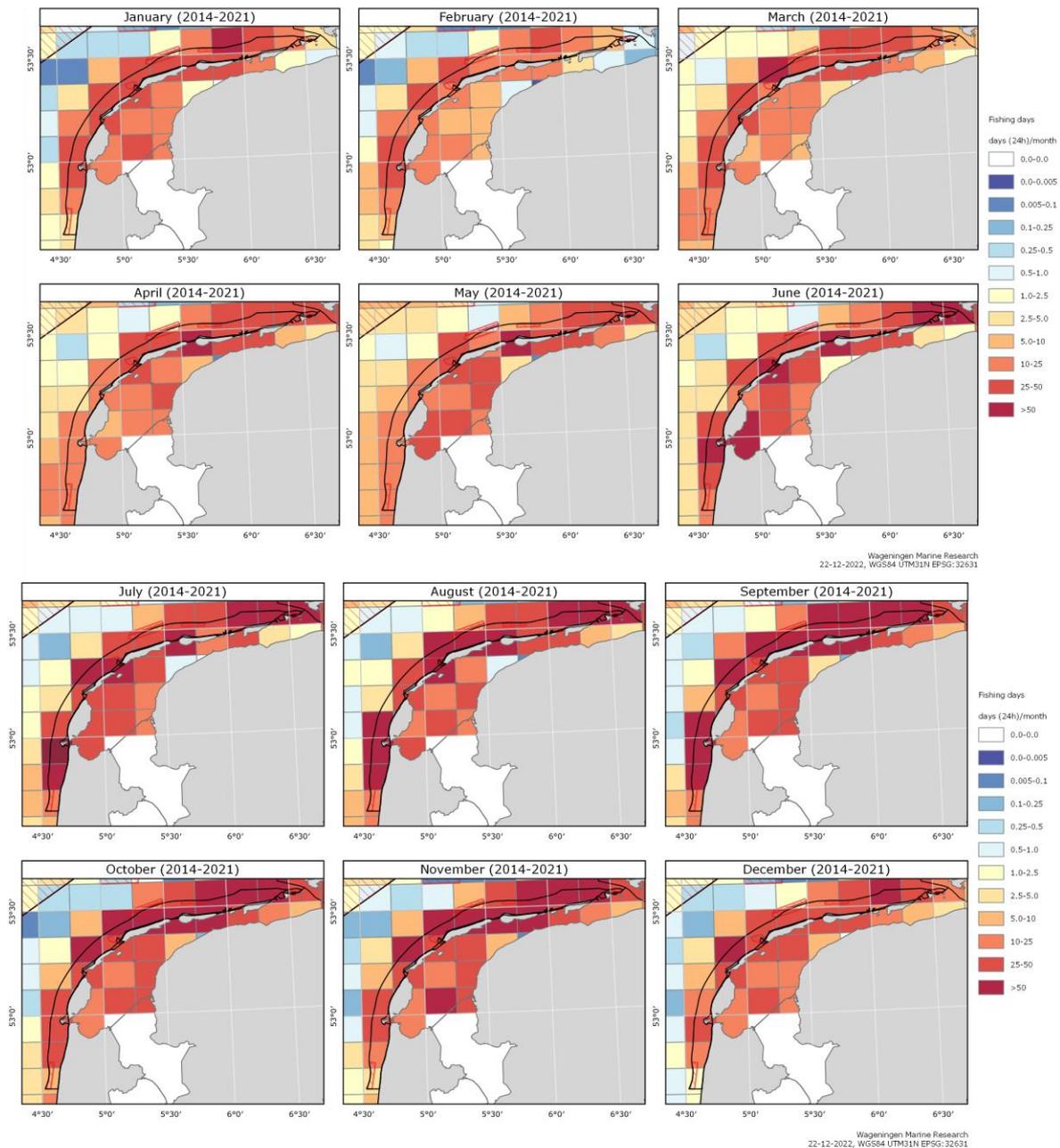


**Figure 36.** Fishery effort (fishing days) per month in the proposed management zones of VIBEG2 areas for fleets (countries), gear types and gear groups. Months are numbered as follows: 1: January; 2: February; 3: March; 4: April; 5: May; 6: June; 7: July; 8: August; 9: September; 10: October; 11: November; 12: December. Gear types 'OTM', 'FPO', 'GNS' and 'GN' and gear groups 'Traps' and 'Nets' are not part of the proposed fishery measures in VIBEG2 Zone II, but are part of proposed fishery measures in VIBEG2 Zone I.

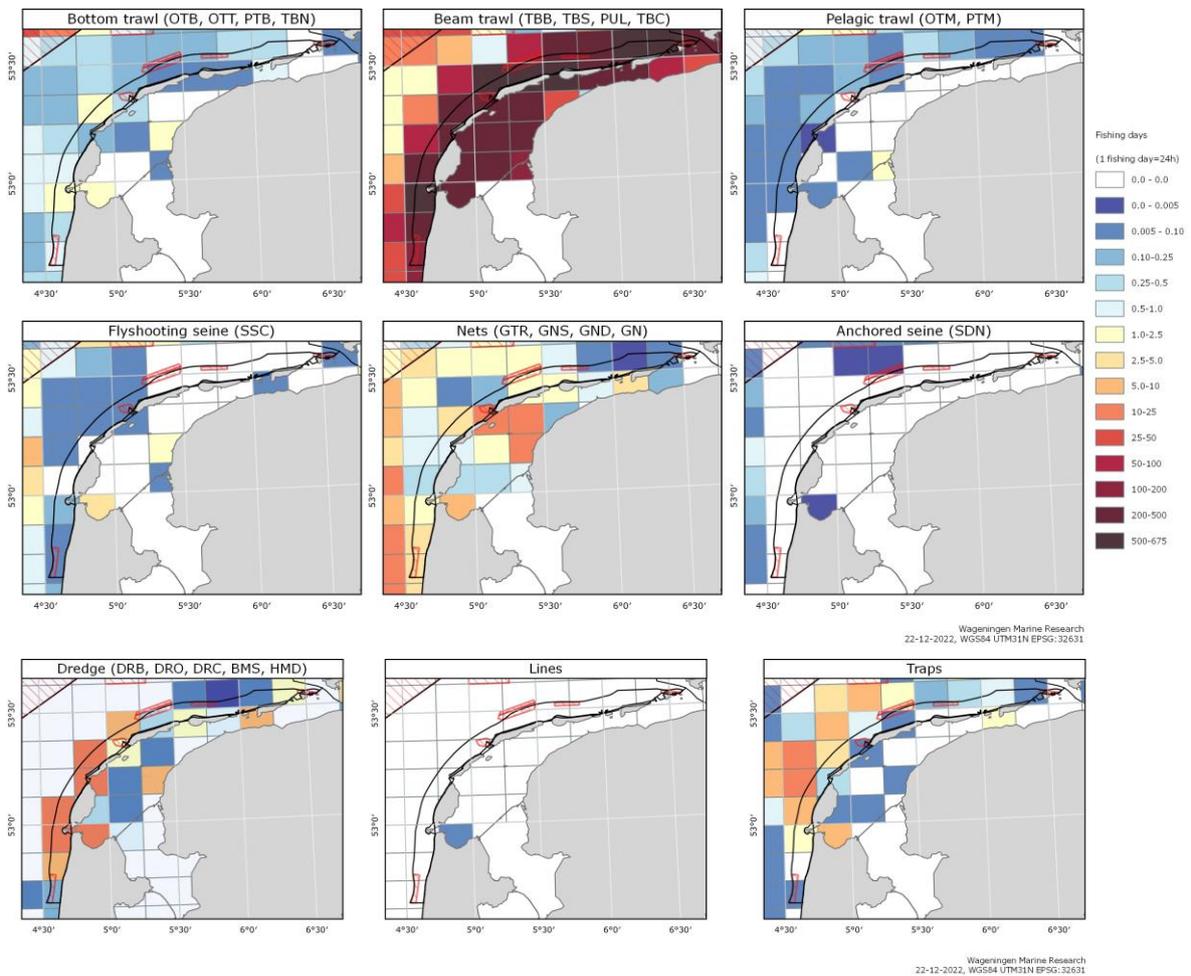
There was a pronounced seasonal pattern for the fishing activity in VIBEG2 (**Figure 36**). The relative fishing activity over an average year is the highest in summer and autumn (July-November) due to the shrimp trawling (TBS\*) activity carried out by the national fleets of The Netherlands, Germany and Denmark. The highest activity of TBB+ and GNS/GN is earlier in the year namely from spring to midsummer (March-July).

## 11.4 Spatial distribution of fishing activity

Maps for the spatial distribution of total fishing activity and of fishing activity of gear groups in the in the proposed VIBEG2 management zones, and the Natura 2000 area North Sea Coastal Zone and surroundings are shown in **Figure 37** and **Figure 38**. The same type of maps for a much larger area (the Dutch North Sea with all protected areas) can be seen in **Figure 4** and **Figure 5**.



**Figure 37.** Total number of fishing days per month for 6 years during 2014-2021 for all fisheries combined in the proposed VIBEG2 management zones and the Natura 2000 area North Sea Coastal Zone.



**Figure 38.** Total number of fishing days (1 day=24 h) per year per gear group (2014-2021) in the proposed VIGEG management zones and the Natura 2000 area North Sea Coastal Zone. groups 'Pelagic trawls', 'Nets', 'Lines' and 'Traps' are not part of the proposed fishery measures in VIBEG2 Zone II, but are part of proposed fishery measures in VIBEG2 Zone I.

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# 12 Quality Assurance

Wageningen Marine Research utilises an ISO 9001:2015 certified quality management system. The organisation has been certified since 27 February 2001. The certification was issued by DNV.

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# Justification

Report C106/21

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The scientific quality of this report has been peer reviewed by a colleague scientist and a member of the Management Team of Wageningen Marine Research

Approved: Dr. R.G. Jak  
Researcher

Signature:



Date: 28 February 2023

Approved: Dr. Ir. T.P. Bult  
Director

B/a Drs. J.J. Riensema

Signature:



Date: 28 February 2023

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# Appendices

**Table A1.** Effort (fishing days) per fleet nationality (country) per area per year

Sum of Effort per year		Year								
Area	Country	2014	2015	2016	2017	2018	2019	2020	2021	Average
<b>Borkum Reef</b>	Belgium			0.5				0.3	0.7	0.2
	Denmark		0.0	0.1			0.0	0.1	0.7	0.1
	Germany	6.5	3.1	9.3	12.9	3.3	3.0	17.5	26.2	10.2
	Netherlands	16.0	16.3	14.4	21.6	11.3	7.1	77.5	221.0	48.2
<b>Borkum Reef Total</b>		<b>22.5</b>	<b>19.5</b>	<b>24.4</b>	<b>34.5</b>	<b>14.6</b>	<b>10.2</b>	<b>95.4</b>	<b>248.6</b>	<b>58.7</b>
<b>Brown Ridge</b>	Belgium	0.9	0.3	3.9	3.6	0.4		0.3	0.8	1.3
	Denmark	30.5	16.0	4.1		9.2	6.1	2.0		8.5
	France	0.1		3.1	1.8	3.1	0.7	3.0	1.0	1.6
	Germany	15.5	18.4	8.3	22.3	43.8	58.0	45.7	49.0	32.6
	Netherlands	229.7	260.8	293.4	382.5	375.7	416.4	381.3	376.0	339.5
<b>Brown Ridge Total</b>		<b>276.7</b>	<b>295.5</b>	<b>312.7</b>	<b>410.2</b>	<b>432.2</b>	<b>481.2</b>	<b>432.3</b>	<b>426.8</b>	<b>383.5</b>
<b>Central Oyster Grounds</b>	Belgium	4.7	3.0	3.5	27.4	16.3	28.1	21.7	15.7	15.0
	Denmark	22.2	78.0	41.5	19.0	14.2	9.6	5.1	17.5	25.9
	France				0.5					0.1
	Germany	22.0	28.8	30.5	59.3	25.3	60.2	23.7	25.7	34.4
	Netherlands	40.4	32.6	38.1	81.9	29.2	109.4	43.1	37.3	51.5
<b>Central Oyster Grounds Total</b>		<b>89.2</b>	<b>142.4</b>	<b>113.7</b>	<b>188.2</b>	<b>85.0</b>	<b>207.3</b>	<b>93.6</b>	<b>96.1</b>	<b>126.5</b>
<b>Cleaver Bank</b>	Belgium	23.7	12.2	15.2	4.7	7.8	0.9	3.4	4.6	9.1
	Denmark	0.5	2.0	0.3	1.4	1.4	0.3	0.7	0.2	0.9
	France	0.9	2.5	13.0	7.8	16.8	7.4	21.8	6.8	9.6
	Germany	3.5	8.0	8.1	8.0	11.2	8.6	3.8	1.0	6.5
	Netherlands	131.4	121.2	93.7	50.6	65.4	44.5	86.3	46.7	80.0
<b>Cleaver Bank Total</b>		<b>160.0</b>	<b>145.9</b>	<b>130.4</b>	<b>72.5</b>	<b>102.6</b>	<b>61.7</b>	<b>116.0</b>	<b>59.3</b>	<b>106.0</b>
<b>Dogger Bank N2000</b>	Belgium	1.1	4.6	3.4	8.3	8.2	5.8	2.8	4.0	4.8
	Denmark	15.5	11.6	7.6	5.6	4.9	17.8	3.6	2.8	8.7
	Germany	5.6	7.7	3.2	4.0	4.1	3.6	3.9	5.0	4.6
	Netherlands	21.3	58.3	53.9	32.9	42.3	25.5	21.5	16.3	34.6
<b>Dogger Bank N2000 Total</b>		<b>43.4</b>	<b>82.2</b>	<b>68.1</b>	<b>50.8</b>	<b>59.5</b>	<b>52.7</b>	<b>31.9</b>	<b>28.2</b>	<b>52.1</b>
<b>Dogger Bank South</b>	Belgium	0.8	2.7	1.5	1.4	3.7	3.2	0.8	0.5	1.8
	Denmark	5.5	1.0	5.1	1.1	1.9	0.8	1.2	1.7	2.3
	Germany	1.9	3.0	1.6	1.0	2.1	1.1	1.3	1.3	1.7
	Netherlands	7.9	11.7	10.9	7.5	9.0	5.6	4.9	4.2	7.7
<b>Dogger Bank South Total</b>		<b>16.0</b>	<b>18.5</b>	<b>19.0</b>	<b>11.1</b>	<b>16.7</b>	<b>10.7</b>	<b>8.2</b>	<b>7.6</b>	<b>13.5</b>
<b>Frisian Front subarea 1</b>	Belgium	6.5	9.3	18.5	36.9	25.0	6.4	4.1	5.0	14.0
	Denmark	6.5	25.6	17.6	1.0	6.7		9.1	3.4	8.7
	France					4.5	6.0	0.0	0.3	1.4
	Germany	52.3	49.3	111.9	73.2	43.4	57.7	121.0	99.2	76.0
	Netherlands	130.1	204.1	290.0	263.4	159.7	156.6	191.1	198.9	199.2
<b>Frisian Front subarea 1 Total</b>		<b>195.4</b>	<b>288.3</b>	<b>438.0</b>	<b>374.4</b>	<b>239.3</b>	<b>226.7</b>	<b>325.3</b>	<b>306.9</b>	<b>299.3</b>
<b>Frisian Front subarea 2</b>	Belgium	1.2	0.2	0.4	0.1	0.2		0.1	0.7	0.3
	Denmark	0.1	8.4	3.7	0.5			1.4	1.3	1.9
	France			0.0	0.1				0.3	0.1
	Germany	0.5	2.0	2.7	6.6	3.5	3.4	0.8	0.3	2.5
	Netherlands	21.8	8.4	7.6	7.3	6.2	5.5	2.8	8.0	8.5
<b>Frisian Front subarea 2 Total</b>		<b>23.5</b>	<b>19.0</b>	<b>14.4</b>	<b>14.5</b>	<b>9.9</b>	<b>8.9</b>	<b>5.1</b>	<b>10.5</b>	<b>13.2</b>

<b>North Sea Coastal Zone N2000</b>	Belgium	21.2	32.4	76.4	98.2	73.3	10.3	28.4	25.2	45.7
	Denmark	0.7	0.1		2.0	0.3	0.3		1.6	0.6
	Germany	51.9	60.2	282.0	47.5	44.1	31.1	51.0	18.1	73.2
	Netherlands	6022.4	5081.9	6268.7	3672.9	4642.3	3960.2	4872.3	4195.9	4839.6
<b>North Sea Coastal Zone N2000 Total</b>		<b>6096.3</b>	<b>5174.6</b>	<b>6627.1</b>	<b>3820.6</b>	<b>4759.9</b>	<b>4001.8</b>	<b>4951.7</b>	<b>4240.8</b>	<b>4959.1</b>
<b>North Sea Coastal Zone VIBEG2</b>	Belgium	3.3	1.1	2.7	0.5			0.4	0.6	1.1
	Denmark	0.3			1.3				1.4	0.4
	Germany	23.8	9.4	62.4	6.1	5.7	6.0	17.4	1.8	16.6
	Netherlands	317.5	104.4	51.8	15.3	43.5	33.2	88.1	63.9	89.7
<b>North Sea Coastal Zone VIBEG2 Total</b>		<b>344.9</b>	<b>114.9</b>	<b>116.9</b>	<b>23.2</b>	<b>49.1</b>	<b>39.4</b>	<b>105.8</b>	<b>67.8</b>	<b>107.8</b>
<b>Grand Total</b>		<b>7268.1</b>	<b>6300.7</b>	<b>7864.7</b>	<b>5000.0</b>	<b>5768.9</b>	<b>5100.5</b>	<b>6165.4</b>	<b>5492.7</b>	<b>6120.1</b>

**Table A2.** Effort (fishing days) per area per gear type per year

Sum of Effort per year Area	Gear type	Year								
		2014	2015	2016	2017	2018	2019	2020	2021	Average
<b>Borkum Reef</b>	FPO	0.7					0.2	10.0	51.9	7.8
	GNS		0.8	0.3	1.5	0.4	0.7			0.4
	OTB		0.1			0.1	0.2	0.4	0.2	0.1
	OTM			0.1		0.2	0.0	0.1	1.0	0.2
	OTT	0.2	0.0					0.3	0.6	0.1
	SDN						0.6			0.1
	SSC	1.2	2.8	11.9	2.1	1.7	2.5	1.5	5.1	3.6
	TBB+	0.8	0.8	0.3	0.2	0.2	0.8	0.6	1.7	0.7
<b>Borkum Reef Total</b>		<b>22.5</b>	<b>19.5</b>	<b>24.4</b>	<b>34.5</b>	<b>14.6</b>	<b>10.2</b>	<b>95.4</b>	<b>248.6</b>	<b>58.7</b>
<b>Brown Ridge</b>	FPO							0.9	0.2	0.1
	GN	3.3	1.2	0.8			3.5	2.0		1.3
	GNS	42.6	29.1	6.7	1.7	23.5	16.0	6.2	0.4	15.8
	OTB	0.5	1.8	2.1	1.1	1.5	2.7	4.0	3.0	2.1
	OTM		1.6	0.4		0.1	0.1		0.0	0.3
	SDN			3.0	1.6	3.1	1.6	2.9	1.6	1.7
	SSC	10.6	18.4	26.2	25.7	19.6	19.2	44.6	22.9	23.4
	TBB+	219.6	243.4	273.5	380.2	384.4	437.7	371.6	398.6	338.6
<b>Brown Ridge Total</b>		<b>276.7</b>	<b>295.5</b>	<b>312.7</b>	<b>410.2</b>	<b>432.2</b>	<b>481.2</b>	<b>432.3</b>	<b>426.8</b>	<b>383.5</b>
<b>Central Oyster Grounds</b>	GN		0.5	0.3						0.1
	GNS	8.9	13.9	8.6	1.7					4.1
	OTB	57.0	71.1	53.6	142.0	64.7	163.8	81.8	65.1	87.4
	OTM	9.3	38.5	24.1	11.6	10.7	8.5	3.9	15.6	15.3
	OTT	5.0	10.9	8.6	22.4	7.0	9.7	6.0	13.1	10.3
	PTM					0.9				0.1
	SDN		3.0	1.9						0.6
	SSC			0.1		0.3				0.1
<b>Central Oyster Grounds Total</b>		<b>89.2</b>	<b>142.4</b>	<b>113.7</b>	<b>188.2</b>	<b>85.0</b>	<b>207.3</b>	<b>93.6</b>	<b>96.1</b>	<b>126.9</b>
<b>Cleaver Bank</b>	GNS	0.0								0.0
	OTB	4.4	9.6	8.8	6.4	6.3	8.5	22.0	17.8	10.5
	OTM	0.3	1.4	3.2	1.4	7.0	0.8	1.9	0.6	2.1
	OTT	3.6	2.0	0.9	0.9	0.7	1.1	1.1	0.9	1.4
	PTM			0.0						0.0
	SDN	0.3	2.4	9.0	5.8	9.7	3.7	7.4	3.8	5.3
	SSC	31.4	34.8	45.7	40.7	25.1	22.0	67.5	21.2	36.0
	TBB+	119.9	95.7	62.7	17.3	53.8	25.6	16.2	14.8	50.7
<b>Cleaver Bank Total</b>		<b>160.0</b>	<b>145.9</b>	<b>130.4</b>	<b>72.5</b>	<b>102.6</b>	<b>61.7</b>	<b>116.0</b>	<b>59.3</b>	<b>106.0</b>
<b>Dogger Bank N2000</b>	FPO							0.0		0.0
	GN							0.0		0.0
	OTB	17.3	32.3	25.0	31.2	32.0	32.7	17.3	23.5	26.4
	OTM	14.7	3.0	5.0	0.6	3.4	4.5	2.6	2.0	4.5

	OTT	2.0	11.3	5.4	3.7	9.6	0.2	4.5	1.5	4.8
	SDN	0.0	0.7			0.0				0.1
	SSC		0.2			0.2				0.0
	TBB+	9.3	34.7	32.8	15.4	14.3	15.3	7.5	1.2	16.3
<b>Dogger Bank N2000 Total</b>		<b>43.4</b>	<b>82.2</b>	<b>68.1</b>	<b>50.8</b>	<b>59.5</b>	<b>52.7</b>	<b>31.9</b>	<b>28.2</b>	<b>52.1</b>
<b>Dogger Bank South</b>	OTB	8.6	12.3	11.3	8.5	12.6	9.2	4.8	5.4	9.1
	OTM	4.8	0.6	4.4	0.7	1.4	0.8	0.8	1.3	1.9
	OTT	1.4	3.3	1.7	1.5	2.4	0.3	2.1	1.0	1.7
	PTM					0.1				0.0
	SSC				0.1					0.0
	TBB+	1.3	2.3	1.6	0.3	0.1	0.4	0.4		0.8
<b>Dogger Bank South Total</b>		<b>16.0</b>	<b>18.5</b>	<b>19.0</b>	<b>11.1</b>	<b>16.7</b>	<b>10.7</b>	<b>8.2</b>	<b>7.6</b>	<b>13.5</b>
<b>Frisian Front subarea 1</b>	FPO						0.6		0.1	0.1
	GN				0.4					0.0
	GNS	6.1	3.3		3.2	0.7	7.2	0.2		2.6
	OTB	40.7	77.6	98.7	148.8	62.4	104.1	52.3	35.2	77.5
	OTM	1.4	18.8	13.4	0.0	3.1		5.6	1.8	5.5
	OTT	21.9	18.9	81.6	49.8	17.4	15.2	10.5	6.2	27.7
	SDN						0.5		0.3	0.1
	SSC	4.6	11.6	3.9	18.0	14.4	9.7	4.1	8.0	9.3
	TBB+	120.8	157.9	240.4	154.3	141.5	89.0	252.7	255.2	176.5
	TBS*		0.2				0.3			0.1
<b>Frisian Front subarea 1 Total</b>		<b>195.4</b>	<b>288.3</b>	<b>438.0</b>	<b>374.4</b>	<b>239.3</b>	<b>226.7</b>	<b>325.3</b>	<b>306.9</b>	<b>299.3</b>
<b>Frisian Front subarea 2</b>	FPO	0.2								0.0
	GN				0.5					0.1
	GNS	6.1		1.2	6.1	4.5	3.2			2.6
	OTB	0.1	2.3	1.0	0.2	0.3	0.6	0.4	1.5	0.8
	OTM	0.1	8.5	2.8				1.1	1.2	1.7
	OTT	0.1	0.1	0.1			0.2			0.1
	SDN			0.0	0.1				0.3	0.1
	SSC	16.1	6.8	5.4	5.8	4.4	4.0	3.0	5.5	6.4
	TBB+	0.8	1.3	3.8	1.8	0.7	0.7	0.7	2.1	1.5
	TBS*	0.1			0.1		0.1			0.0
<b>Frisian Front subarea 2 Total</b>		<b>23.5</b>	<b>19.0</b>	<b>14.4</b>	<b>14.5</b>	<b>9.9</b>	<b>8.9</b>	<b>5.1</b>	<b>10.5</b>	<b>13.2</b>
<b>North Sea Coastal Zone N2000</b>	DRB		5.0	3.2						1.0
	FPO	3.6	7.9	14.7	9.8	11.8	8.8	8.5	11.1	9.5
	GNS	9.5	2.1	3.2	3.9	1.6	1.9	0.1	1.5	3.0
	HMD	57.2	167.6	107.1	36.5	76.0	25.1	53.4	123.1	80.7
	OTB	1.1	4.4	1.2	1.5	0.9	5.5	2.1	3.0	2.5
	OTM						0.3		1.0	0.2
	OTT	0.6	0.3	0.6	0.2	0.3	0.1	0.8	0.4	0.4
	SSC			0.2	0.2	0.1		0.1	0.0	0.1
	TBB+	29.3	57.0	110.9	123.1	106.2	35.1	38.5	32.4	66.6
	TBS*	5995.1	4930.4	6386.2	3645.4	4563.0	3925.1	4848.1	4068.3	4795.2
<b>North Sea Coastal Zone N2000 Total</b>		<b>6096.3</b>	<b>5174.6</b>	<b>6627.1</b>	<b>3820.6</b>	<b>4759.9</b>	<b>4001.8</b>	<b>4951.7</b>	<b>4240.8</b>	<b>4959.1</b>
<b>North Sea Coastal Zone VIBEG2</b>	FPO			0.1			0.1	0.1	0.5	0.1
	GN		0.0		0.5					0.1
	GNS	3.2	0.2		0.7		0.1		0.4	0.6
	HMD			0.2						0.0
	OTB	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.9	0.2
	OTM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1

	SSC				0.1					0.0
	TBB+	7.4	5.6	12.4	2.4	1.2	1.6	0.6	0.9	4.0
	TBS*	334.3	109.1	104.2	19.4	48.0	37.7	104.9	64.5	102.7
<b>North Sea Coastal Zone VIBEG2 Total</b>		<b>344.9</b>	<b>114.9</b>	<b>116.9</b>	<b>23.2</b>	<b>49.1</b>	<b>39.4</b>	<b>105.8</b>	<b>67.8</b>	<b>107.8</b>
<b>Grand Total</b>		<b>7268</b>	<b>6301</b>	<b>7865</b>	<b>5000</b>	<b>5769</b>	<b>5100</b>	<b>6165</b>	<b>5493</b>	<b>6120</b>

**Table A3.** Effort (fishing days) per area per gear group per year

Sum of Effort per year		Year								
Area	Gear group	2014	2015	2016	2017	2018	2019	2020	2021	Average
<b>Borkum Reef</b>	Anchored seine						0.6			0.1
	Beam trawl	20.4	15.8	12.1	30.8	12.3	6.1	83.2	189.8	46.3
	Bottom trawl	0.2	0.1			0.1	0.2	0.7	0.8	0.3
	Flyshooting seine	1.2	2.8	11.9	2.1	1.7	2.5	1.5	5.1	3.6
	Nets		0.8	0.3	1.5	0.4	0.7			0.4
	Pelagic trawl			0.1		0.2	0.0	0.1	1.0	0.2
	Traps	0.7					0.2	10.0	51.9	7.8
<b>Borkum Reef Total</b>		<b>22.5</b>	<b>19.5</b>	<b>24.4</b>	<b>34.5</b>	<b>14.6</b>	<b>10.2</b>	<b>95.4</b>	<b>248.6</b>	<b>58.7</b>
<b>Brown Ridge</b>	Anchored seine			3.0	1.6	3.1	1.6	2.9	1.6	1.7
	Beam trawl	219.6	243.4	273.5	380.2	384.4	438.2	371.6	398.6	338.7
	Bottom trawl	0.5	1.8	2.1	1.1	1.5	2.7	4.0	3.0	2.1
	Flyshooting seine	10.6	18.4	26.2	25.7	19.6	19.2	44.6	22.9	23.4
	Nets	45.9	30.4	7.4	1.7	23.5	19.5	8.2	0.4	17.1
	Pelagic trawl		1.6	0.4		0.1	0.1		0.0	0.3
	Traps							0.9	0.2	0.1
<b>Brown Ridge Total</b>		<b>276.7</b>	<b>295.5</b>	<b>312.7</b>	<b>410.2</b>	<b>432.2</b>	<b>481.2</b>	<b>432.3</b>	<b>426.8</b>	<b>383.5</b>
<b>Central Oyster Grounds</b>	Anchored seine		3.0	1.9						0.6
	Beam trawl	9.0	4.6	16.6	10.6	1.3	25.3	1.9	2.3	8.9
	Bottom trawl	62.0	82.0	62.1	164.4	71.7	173.5	87.8	78.2	97.7
	Flyshooting seine			0.1		0.3				0.1
	Nets	8.9	14.4	8.9	1.7					4.2
	Pelagic trawl	9.3	38.5	24.1	11.6	11.6	8.5	3.9	15.6	15.4
<b>Central Oyster Grounds Total</b>		<b>89.2</b>	<b>142.4</b>	<b>113.7</b>	<b>188.2</b>	<b>85.0</b>	<b>207.3</b>	<b>93.6</b>	<b>96.1</b>	<b>126.9</b>
<b>Cleaver Bank</b>	Anchored seine	0.3	2.4	9.0	5.8	9.7	3.7	7.4	3.8	5.3
	Beam trawl	119.9	95.7	62.7	17.3	53.8	25.6	16.2	15.0	50.8
	Bottom trawl	8.0	11.6	9.7	7.3	7.0	9.6	23.1	18.7	11.9
	Flyshooting seine	31.4	34.8	45.7	40.7	25.1	22.0	67.5	21.2	36.0
	Nets	0.0								0.0
	Pelagic trawl	0.3	1.4	3.3	1.4	7.0	0.8	1.9	0.6	2.1
<b>Cleaver Bank Total</b>		<b>160.0</b>	<b>145.9</b>	<b>130.4</b>	<b>72.5</b>	<b>102.6</b>	<b>61.7</b>	<b>116.0</b>	<b>59.3</b>	<b>106.0</b>
<b>Dogger Bank N2000</b>	Anchored seine	0.0	0.7			0.0				0.1
	Beam trawl	9.3	34.7	32.8	15.4	14.3	15.3	7.5	1.2	16.3
	Bottom trawl	19.3	43.6	30.4	34.8	41.6	33.0	21.7	25.0	31.2
	Flyshooting seine		0.2			0.2				0.0
	Nets							0.0		0.0
	Pelagic trawl	14.7	3.0	5.0	0.6	3.4	4.5	2.6	2.0	4.5
	Traps							0.0		0.0
<b>Dogger Bank N2000 Total</b>		<b>43.4</b>	<b>82.2</b>	<b>68.1</b>	<b>50.8</b>	<b>59.5</b>	<b>52.7</b>	<b>31.9</b>	<b>28.2</b>	<b>52.1</b>
<b>Dogger Bank South</b>	Beam trawl	1.3	2.3	1.6	0.3	0.1	0.4	0.4		0.8
	Bottom trawl	10.0	15.6	13.0	10.0	15.0	9.5	6.9	6.4	10.8
	Flyshooting seine				0.1					0.0
	Pelagic trawl	4.8	0.6	4.4	0.7	1.5	0.8	0.8	1.3	1.9
<b>Dogger Bank South Total</b>		<b>16.0</b>	<b>18.5</b>	<b>19.0</b>	<b>11.1</b>	<b>16.7</b>	<b>10.7</b>	<b>8.2</b>	<b>7.6</b>	<b>13.5</b>
<b>Frisian Front subarea 1</b>	Anchored seine						0.5		0.3	0.1

	Beam trawl	120.8	158.1	240.4	154.3	141.5	89.3	252.7	255.2	176.5
	Bottom trawl	62.5	96.5	180.3	198.5	79.8	119.3	62.8	41.5	105.1
	Flyshooting seine	4.6	11.6	3.9	18.0	14.4	9.7	4.1	8.0	9.3
	Nets	6.1	3.3		3.6	0.7	7.2	0.2		2.6
	Pelagic trawl	1.4	18.8	13.4	0.0	3.1		5.6	1.8	5.5
	Traps						0.6		0.1	0.1
<b>Frisian Front subarea 1 Total</b>		<b>195.4</b>	<b>288.3</b>	<b>438.0</b>	<b>374.4</b>	<b>239.3</b>	<b>226.7</b>	<b>325.3</b>	<b>306.9</b>	<b>299.3</b>
<b>Frisian Front subarea 2</b>	Anchored seine			0.0	0.1				0.3	0.1
	Beam trawl	0.9	1.3	3.8	1.9	0.7	0.8	0.7	2.1	1.5
	Bottom trawl	0.2	2.4	1.1	0.2	0.3	0.8	0.4	1.5	0.9
	Flyshooting seine	16.1	6.8	5.4	5.8	4.4	4.0	3.0	5.5	6.4
	Nets	6.1		1.2	6.6	4.5	3.2			2.7
	Pelagic trawl	0.1	8.5	2.8				1.1	1.2	1.7
	Traps	0.2								0.0
<b>Frisian Front subarea 2 Total</b>		<b>23.5</b>	<b>19.0</b>	<b>14.4</b>	<b>14.5</b>	<b>9.9</b>	<b>8.9</b>	<b>5.1</b>	<b>10.5</b>	<b>13.2</b>
<b>North Sea Coastal Zone N2000</b>	Beam trawl	6024	4988	6497	3769	4669	3960	4887	4101	4862
	Bottom trawl	1.6	4.6	1.7	1.7	1.2	5.5	2.9	3.4	2.9
	Dredge	57.2	172.5	110.3	36.5	76.0	25.1	53.4	123.1	81.7
	Flyshooting seine			0.2	0.2	0.1		0.1	0.0	0.1
	Nets	9.5	2.1	3.2	3.9	1.6	1.9	0.1	1.5	3.0
	Pelagic trawl						0.3		1.0	0.2
	Traps	3.6	7.9	14.7	9.8	11.8	8.8	8.5	11.1	9.5
<b>North Sea Coastal Zone N2000 Total</b>		<b>6096</b>	<b>5175</b>	<b>6627</b>	<b>3821</b>	<b>4760</b>	<b>4002</b>	<b>4952</b>	<b>4241</b>	<b>4959</b>
<b>North Sea Coastal Zone VIBEG2</b>	Beam trawl	341.6	114.7	116.6	21.8	49.1	39.3	105.4	65.4	106.8
	Bottom trawl	0.1	0.0		0.1			0.2	0.9	0.2
	Dredge			0.2						0.0
	Flyshooting seine				0.1					0.0
	Nets	3.2	0.2	0.0	1.2		0.1		0.4	0.6
	Pelagic trawl								0.6	0.1
	Traps			0.1			0.1	0.1	0.5	0.1
<b>North Sea Coastal Zone VIBEG2 Total</b>		<b>344.9</b>	<b>114.9</b>	<b>116.9</b>	<b>23.2</b>	<b>49.1</b>	<b>39.4</b>	<b>105.8</b>	<b>67.8</b>	<b>107.8</b>
<b>Grand Total</b>		<b>7268</b>	<b>6301</b>	<b>7865</b>	<b>5000</b>	<b>5769</b>	<b>5100</b>	<b>6165</b>	<b>5493</b>	<b>6120</b>

**Table B1.** Effort (fishing days) per fleet nationality (country) per area per month. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Area and country	1	2	3	4	5	6	7	8	9	10	11	12	Average
<b>Borkum Reef</b>	<b>4.9</b>	<b>3.5</b>	<b>2.3</b>	<b>2.2</b>	<b>1.5</b>	<b>2.6</b>	<b>2.9</b>	<b>2.1</b>	<b>1.5</b>	<b>4.6</b>	<b>20.2</b>	<b>10.3</b>	<b>4.9</b>
Belgium	0.0		0.0		0.1	0.0			0.0		0.1		0.0
Denmark	0.0					0.0	0.1	0.0					0.0
Germany	1.2	0.5	0.5	0.6	0.3	0.0	0.4	0.8	0.4	1.3	3.0	1.3	0.9
Netherlands	3.7	2.9	1.9	1.6	1.2	2.6	2.5	1.2	1.0	3.3	17.1	9.0	4.0
<b>Brown Ridge</b>	<b>51.4</b>	<b>32.5</b>	<b>43.3</b>	<b>28.3</b>	<b>42.2</b>	<b>28.9</b>	<b>24.1</b>	<b>27.8</b>	<b>22.5</b>	<b>23.6</b>	<b>30.4</b>	<b>28.4</b>	<b>32.0</b>
Belgium	0.0	0.1	0.3	0.0	0.0	0.1	0.3	0.2	0.1	0.1	0.0	0.0	0.1
Denmark		0.1	5.4	1.8	0.3	0.2	0.2		0.3			0.2	0.7
France			0.0	0.0	0.2	0.8	0.5	0.1	0.0		0.0	0.0	0.1
Germany	3.0	1.1	8.0	5.8	4.3	4.6	2.0	0.7	0.8	0.5	1.2	0.7	2.7
Netherlands	48.4	31.2	29.6	20.7	37.4	23.3	21.0	26.9	21.3	23.1	29.1	27.5	28.3
<b>Central Oyster Grounds</b>	<b>2.2</b>	<b>2.6</b>	<b>2.1</b>	<b>6.4</b>	<b>7.6</b>	<b>7.8</b>	<b>3.5</b>	<b>8.9</b>	<b>18.2</b>	<b>30.9</b>	<b>25.6</b>	<b>11.1</b>	<b>10.6</b>
Belgium	0.1	0.1	0.2	0.9	1.3	0.9	0.5	0.9	2.0	3.5	3.5	1.2	1.3
Denmark	0.5	0.2		0.0	2.2	2.4	0.7	2.1	7.9	7.5	1.1	1.3	2.2
France									0.1				0.0
Germany	0.8	1.1	0.4	2.5	0.8	0.9	0.5	3.0	4.1	7.6	7.9	4.8	2.9
Netherlands	0.8	1.3	1.4	2.9	3.3	3.7	1.9	3.0	4.1	12.2	13.1	3.9	4.3
<b>Cleaver Bank</b>	<b>4.6</b>	<b>5.8</b>	<b>5.9</b>	<b>2.5</b>	<b>10.8</b>	<b>27.9</b>	<b>8.8</b>	<b>4.6</b>	<b>7.5</b>	<b>10.1</b>	<b>10.6</b>	<b>6.9</b>	<b>8.8</b>
Belgium	0.2	0.1	0.1	0.1	1.0	1.4	1.3	0.8	2.2	1.1	0.3	0.5	0.8
Denmark	0.0				0.0	0.1	0.1	0.1	0.1	0.2	0.0	0.1	0.1
France				0.0	2.5	6.1	1.1						0.8
Germany	0.6	0.1	0.1	0.0	0.3	0.2	0.4	0.5	0.5	0.7	2.0	1.2	0.5
Netherlands	3.8	5.7	5.7	2.4	7.1	20.1	6.0	3.1	4.6	8.2	8.3	5.0	6.7
<b>Dogger Bank N2000</b>	<b>0.0</b>	<b>0.0</b>	<b>2.7</b>	<b>7.7</b>	<b>9.1</b>	<b>8.8</b>	<b>9.7</b>	<b>4.2</b>	<b>4.6</b>	<b>3.5</b>	<b>0.8</b>	<b>0.8</b>	<b>4.3</b>
Belgium			0.1	0.5	0.9	1.2	1.2	0.4	0.4	0.1	0.0		0.4
Denmark	0.0			1.9	0.3	1.3	1.1	0.6	0.8	1.6	0.5	0.7	0.7
Germany		0.0	0.4	0.4	0.5	1.2	0.8	0.2	0.5	0.5	0.1	0.1	0.4
Netherlands			2.2	4.9	7.5	5.1	6.7	3.0	2.9	1.3	0.3	0.1	2.8
<b>Dogger Bank South</b>	<b>0.0</b>	<b>0.0</b>	<b>0.5</b>	<b>0.8</b>	<b>2.0</b>	<b>1.8</b>	<b>2.0</b>	<b>1.3</b>	<b>1.9</b>	<b>1.8</b>	<b>0.7</b>	<b>0.6</b>	<b>1.1</b>
Belgium			0.0	0.2	0.3	0.2	0.3	0.2	0.5	0.1	0.0	0.0	0.2
Denmark	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	1.0	0.2	0.4	0.2
Germany		0.0	0.0	0.1	0.3	0.4	0.3	0.1	0.1	0.2	0.1	0.1	0.1
Netherlands			0.4	0.4	1.4	1.2	1.4	0.9	1.0	0.5	0.4	0.1	0.6
<b>Frisian Front subarea 1</b>	<b>13.0</b>	<b>14.8</b>	<b>19.0</b>	<b>20.1</b>	<b>43.9</b>	<b>41.7</b>	<b>46.6</b>	<b>27.1</b>	<b>24.5</b>	<b>18.2</b>	<b>15.6</b>	<b>14.8</b>	<b>24.9</b>
Belgium	0.3	0.1	1.3	1.1	1.3	2.5	3.0	2.3	0.7	0.3	0.5	0.7	1.2
Denmark	0.7	0.3	0.6		0.0	0.1	1.2	3.5	0.6	0.4	0.6	0.7	0.7
France					0.1	0.0	0.8	0.5					0.1
Germany	3.7	5.0	4.3	5.6	9.5	7.8	9.7	4.9	7.6	6.2	6.5	5.3	6.3
Netherlands	8.3	9.3	12.9	13.4	33.0	31.3	31.9	15.8	15.7	11.4	8.0	8.1	16.6
<b>Frisian Front subarea 2</b>	<b>0.2</b>	<b>0.1</b>	<b>0.5</b>	<b>0.6</b>	<b>3.7</b>	<b>3.7</b>	<b>1.3</b>	<b>1.9</b>	<b>0.7</b>	<b>0.3</b>	<b>0.1</b>	<b>0.2</b>	<b>1.1</b>
Belgium			0.0	0.0	0.2		0.1		0.0			0.0	0.0
Denmark							0.2	1.2	0.3	0.3	0.0		0.2
France						0.0	0.0						0.0
Germany		0.0	0.0	0.1	0.4	0.9	0.2	0.5	0.3	0.0	0.0	0.0	0.2
Netherlands	0.2	0.1	0.4	0.4	3.1	2.8	0.9	0.2	0.2	0.0	0.1	0.1	0.7
<b>North Sea Coastal Zone N2000</b>	<b>283.9</b>	<b>182.6</b>	<b>280.9</b>	<b>329.9</b>	<b>283.4</b>	<b>436.2</b>	<b>562.8</b>	<b>555.1</b>	<b>648.5</b>	<b>567.4</b>	<b>481.1</b>	<b>347.2</b>	<b>413.3</b>

Belgium	4.4	3.8	4.5	2.3	2.8	3.4	6.5	6.2	3.3	0.9	3.0	4.6	3.8
Denmark					0.0	0.1	0.1	0.2	0.2			0.0	0.1
Germany	2.9	1.2	2.2	4.6	3.8	4.1	3.8	6.9	11.0	14.2	12.9	5.7	6.1
Netherlands	276.6	177.6	274.2	323.0	276.8	428.5	552.4	541.9	634.1	552.4	465.3	336.8	403.3
<b>North Sea Coastal Zone VIBEG</b>	<b>5.1</b>	<b>4.3</b>	<b>8.7</b>	<b>6.6</b>	<b>2.8</b>	<b>4.2</b>	<b>10.0</b>	<b>12.5</b>	<b>18.5</b>	<b>15.2</b>	<b>14.2</b>	<b>5.6</b>	<b>9.0</b>
Belgium	0.2	0.1	0.1				0.2	0.1	0.1	0.1	0.1	0.1	0.1
Denmark						0.0	0.1	0.2	0.1			0.0	0.0
Germany	0.4	0.1	0.7	1.1	0.7	0.5	0.4	1.5	2.0	4.4	4.0	0.9	1.4
Netherlands	4.5	4.1	7.9	5.5	2.2	3.7	9.3	10.8	16.3	10.7	10.1	4.6	7.5
<b>Grand Total</b>	<b>365.4</b>	<b>246.2</b>	<b>366.0</b>	<b>405.1</b>	<b>407.0</b>	<b>563.8</b>	<b>671.7</b>	<b>645.5</b>	<b>748.4</b>	<b>675.7</b>	<b>599.3</b>	<b>426.0</b>	<b>510.0</b>

**Table B2.** Effort (fishing days) per area per gear type per month. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Area and gear type	1	2	3	4	5	6	7	8	9	10	11	12	Average
<b>Borkum Reef</b>	<b>4.95</b>	<b>3.47</b>	<b>2.34</b>	<b>2.18</b>	<b>1.54</b>	<b>2.61</b>	<b>2.94</b>	<b>2.05</b>	<b>1.48</b>	<b>4.59</b>	<b>20.21</b>	<b>10.35</b>	<b>4.89</b>
FPO	0.48	0.34	0.33	0.37	0.46	0.62	0.80	0.76	0.58	0.75	1.23	1.14	0.65
GNS					0.18		0.22		0.05				0.04
OTB	0.01	0.02		0.03	0.01	0.02	0.00	0.03	0.01				0.01
OTM	0.01					0.01	0.06	0.06			0.01	0.03	0.01
OTT	0.01	0.04	0.02		0.01			0.02	0.03		0.01		0.01
SDN						0.07							0.01
SSC				0.02	0.80	1.79	0.83	0.12	0.06				0.30
TBB+	0.11	0.03	0.05	0.05	0.05	0.10	0.01	0.03	0.04	0.02	0.12	0.05	0.06
TBS*	4.34	3.05	1.94	1.72	0.04	0.01	1.02	1.04	0.71	3.82	18.84	9.13	3.80
<b>Brown Ridge</b>	<b>51.42</b>	<b>32.49</b>	<b>43.34</b>	<b>28.32</b>	<b>42.19</b>	<b>28.94</b>	<b>24.05</b>	<b>27.82</b>	<b>22.47</b>	<b>23.61</b>	<b>30.42</b>	<b>28.38</b>	<b>31.96</b>
FPO	0.01	0.06		0.02	0.03						0.01		0.01
GN			1.33	0.01									0.11
GNS		0.10	9.89	4.22	0.25	0.65	0.38		0.26	0.03			1.32
OTB	0.11	0.14	0.15	0.12	0.29	0.39	0.63	0.13	0.07	0.01	0.02	0.06	0.17
OTM									0.06	0.02	0.03	0.16	0.02
SDN		0.09	0.01		0.23	0.73	0.49	0.13	0.04				0.14
SSC		1.28	0.63	2.01	3.36	2.50	4.23	4.97	2.76	0.83	0.84		1.95
TBB+	51.30	30.83	31.33	21.93	38.03	24.67	18.32	22.60	19.28	22.73	29.45	28.17	28.22
TBS*											0.07		0.01
<b>Central Oyster Grounds</b>	<b>2.20</b>	<b>2.58</b>	<b>2.06</b>	<b>6.40</b>	<b>7.58</b>	<b>7.83</b>	<b>3.55</b>	<b>8.95</b>	<b>18.19</b>	<b>30.92</b>	<b>25.55</b>	<b>11.14</b>	<b>10.58</b>
GN					0.07				0.03				0.01
GNS					1.52	2.16	0.44				0.02		0.34
OTB	1.55	2.03	1.30	6.00	4.81	4.35	2.75	6.71	10.89	19.50	19.01	8.48	7.28
OTM	0.47			0.02			0.19	1.43	6.00	5.45	0.77	0.93	1.27
OTT	0.09	0.44	0.73	0.31	0.55	1.32	0.13	0.67	0.73	2.34	1.99	1.02	0.86
PTM									0.09	0.03			0.01
SDN					0.61								0.05
SSC								0.04		0.01			0.00
TBB+	0.09	0.11	0.03	0.06	0.01		0.04	0.09	0.45	3.59	3.53	0.69	0.72
TBS*											0.23	0.02	0.02
<b>Cleaver Bank</b>	<b>4.62</b>	<b>5.80</b>	<b>5.92</b>	<b>2.52</b>	<b>10.81</b>	<b>27.95</b>	<b>8.83</b>	<b>4.56</b>	<b>7.49</b>	<b>10.08</b>	<b>10.61</b>	<b>6.85</b>	<b>8.84</b>
GNS						0.01							0.00
OTB	0.39	0.20	0.51	0.34	2.60	3.28	1.02	0.38	0.37	0.31	0.65	0.43	0.87
OTM	0.04				0.82	0.59	0.02	0.13	0.13	0.13	0.18	0.05	0.17
OTT	0.10	0.10	0.29	0.19	0.06	0.03	0.06	0.18	0.16	0.11	0.08	0.03	0.12
PTM						0.01							0.00
SDN				0.01	0.96	3.95	0.36						0.44
SSC		0.04	0.04	0.49	6.15	19.37	5.21	0.41	1.20	2.24	0.84	0.06	3.00
TBB+	4.08	5.46	5.09	1.50	0.21	0.72	2.13	3.47	5.64	7.30	8.87	6.28	4.23
TBS*							0.02						0.00
<b>Dogger Bank N2000</b>	<b>0.01</b>	<b>0.03</b>	<b>2.69</b>	<b>7.71</b>	<b>9.15</b>	<b>8.81</b>	<b>9.71</b>	<b>4.17</b>	<b>4.65</b>	<b>3.53</b>	<b>0.83</b>	<b>0.81</b>	<b>4.34</b>
FPO					0.01								0.00
GN									0.01				0.00
OTB	0.01	0.03	0.66	2.87	3.82	6.07	6.75	2.44	2.53	0.73	0.14	0.35	2.20
OTM				0.36	0.06	0.20	0.12	0.43	0.62	1.85	0.42	0.40	0.37

OTT			0.53	0.36	0.91	0.67	1.14	0.11	0.49	0.42	0.12	0.02	0.40
SDN							0.01	0.09					0.01
SSC							0.01	0.02	0.01				0.00
TBB+			1.50	4.12	4.36	1.87	1.68	1.08	0.99	0.52	0.15	0.03	1.36
<b>Dogger Bank South</b>	<b>0.01</b>	<b>0.02</b>	<b>0.52</b>	<b>0.77</b>	<b>1.98</b>	<b>1.80</b>	<b>2.04</b>	<b>1.35</b>	<b>1.91</b>	<b>1.77</b>	<b>0.67</b>	<b>0.64</b>	<b>1.12</b>
OTB	0.01	0.02	0.30	0.58	1.61	1.53	1.55	1.08	1.40	0.57	0.26	0.19	0.76
OTM							0.02	0.14	0.26	0.97	0.13	0.34	0.15
OTT			0.21	0.17	0.19	0.26	0.37	0.03	0.10	0.20	0.08	0.09	0.14
PTM									0.01				0.00
SSC								0.01					0.00
TBB+			0.02	0.01	0.17	0.00	0.10	0.09	0.14	0.04	0.21	0.02	0.07
<b>Frisian Front subarea 1</b>	<b>13.01</b>	<b>14.76</b>	<b>19.03</b>	<b>20.13</b>	<b>43.87</b>	<b>41.70</b>	<b>46.56</b>	<b>27.06</b>	<b>24.51</b>	<b>18.24</b>	<b>15.60</b>	<b>14.81</b>	<b>24.94</b>
FPO									0.09				0.01
GN									0.05				0.00
GNS			0.58	0.09	0.45	1.06	0.01	0.27	0.12				0.21
OTB	0.60	0.28	1.01	4.47	15.36	15.55	22.96	11.49	3.67	1.13	0.44	0.49	6.45
OTM	0.37	0.22					0.59	2.54	0.51	0.35	0.54	0.38	0.46
OTT	0.02	0.04	0.18	1.77	5.61	5.20	8.16	5.16	1.09	0.40	0.04	0.02	2.31
SDN					0.06	0.04							0.01
SSC				0.25	5.05	2.68	0.89	0.31	0.10	0.02			0.77
TBB+	12.02	14.23	17.26	13.56	17.31	17.15	13.95	7.29	18.89	16.35	14.58	13.89	14.71
TBS*				0.02	0.02							0.02	0.01
<b>Frisian Front subarea 2</b>	<b>0.18</b>	<b>0.09</b>	<b>0.48</b>	<b>0.55</b>	<b>3.69</b>	<b>3.74</b>	<b>1.29</b>	<b>1.92</b>	<b>0.70</b>	<b>0.32</b>	<b>0.11</b>	<b>0.17</b>	<b>1.10</b>
FPO	0.02												0.00
GN									0.06				0.00
GNS			0.25	0.28	0.50	1.03	0.09	0.23	0.26				0.22
OTB	0.01	0.02		0.02	0.07	0.14	0.09	0.35	0.08	0.01	0.02		0.07
OTM							0.12	1.13	0.14	0.30	0.02		0.14
OTT			0.01	0.01	0.01	0.01	0.01						0.00
SDN						0.05	0.01						0.00
SSC				0.09	2.99	2.26	0.76	0.15	0.09		0.03		0.53
TBB+	0.14	0.07	0.20	0.14	0.13	0.25	0.22	0.07	0.07	0.01	0.04	0.16	0.13
TBS*	0.02		0.01									0.01	0.00
<b>North Sea Coastal Zone N2000</b>	<b>283.94</b>	<b>182.62</b>	<b>280.91</b>	<b>329.87</b>	<b>283.41</b>	<b>436.22</b>	<b>562.78</b>	<b>555.09</b>	<b>648.54</b>	<b>567.44</b>	<b>481.14</b>	<b>347.17</b>	<b>413.26</b>
DRB	0.09	0.21	0.30	0.15	0.12	0.15							0.08
FPO	0.53	0.51	0.40	0.58	0.94	1.16	1.19	0.84	0.97	0.74	0.86	0.80	0.79
GNS	0.01	0.09	0.65	0.64	0.59	0.39	0.29	0.09	0.23				0.25
HMD	4.70	6.23	7.48	7.00	7.08	9.25	9.45	8.17	5.17	3.75	5.19	7.26	6.73
OTB	0.05	0.08	0.05	0.31	0.08	0.30	0.51	0.72	0.12	0.09	0.07	0.07	0.20
OTM						0.04	0.01	0.08				0.04	0.01
OTT	0.03	0.03	0.03	0.04	0.03	0.03	0.04	0.06	0.03	0.03	0.03	0.02	0.03
SSC					0.03	0.03	0.01						0.01
TBB+	4.85	4.07	5.78	7.23	7.90	6.96	8.65	7.30	4.20	1.38	3.29	4.95	5.55
TBS*	273.68	171.40	266.21	313.94	266.64	417.90	542.61	537.82	637.82	561.44	471.69	334.04	399.60
<b>North Sea Coastal Zone VIBEG</b>	<b>5.11</b>	<b>4.32</b>	<b>8.67</b>	<b>6.62</b>	<b>2.82</b>	<b>4.21</b>	<b>9.96</b>	<b>12.53</b>	<b>18.47</b>	<b>15.22</b>	<b>14.17</b>	<b>5.63</b>	<b>8.98</b>
FPO	0.01	0.00			0.03	0.01	0.02	0.00	0.01	0.00	0.00	0.01	0.01
GN							0.06						0.01
GNS			0.05	0.02	0.15	0.14	0.11	0.02	0.09				0.05

HMD	0.02													0.00
OTB	0.01	0.00					0.03	0.12						0.01
OTM							0.01	0.05				0.02		0.01
SSC							0.01							0.00
TBB+	0.27	0.15	0.19	0.87	0.61	0.33	0.63	0.28	0.32	0.16	0.12	0.10		0.33
TBS*	4.83	4.15	8.44	5.74	2.04	3.73	9.09	12.06	18.05	15.07	14.05	5.50		8.56
<b>Grand Total</b>	<b>365.43</b>	<b>246.18</b>	<b>365.96</b>	<b>405.08</b>	<b>407.04</b>	<b>563.80</b>	<b>671.70</b>	<b>645.50</b>	<b>748.42</b>	<b>675.72</b>	<b>599.32</b>	<b>425.96</b>		<b>510.01</b>

**Table B3.** Effort (fishing days) per area per gear group per month. Months are numbered as follows: 1 January; 2 February; 3 March; 4 April; 5 May; 6 June; 7 July; 8 August; 9 September; 10 October; 11 November; 12 December.

Area and gear group	1	2	3	4	5	6	7	8	9	10	11	12	Average
<b>Borkum Reef</b>	<b>4.9</b>	<b>3.5</b>	<b>2.3</b>	<b>2.2</b>	<b>1.5</b>	<b>2.6</b>	<b>2.9</b>	<b>2.1</b>	<b>1.5</b>	<b>4.6</b>	<b>20.2</b>	<b>10.3</b>	<b>4.9</b>
Anchored seine						0.1							0.0
Beam trawl	4.4	3.1	2.0	1.8	0.1	0.1	1.0	1.1	0.8	3.8	19.0	9.2	3.9
Bottom trawl	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0		0.0		0.0
Flyshooting seine				0.0	0.8	1.8	0.8	0.1	0.1				0.3
Nets					0.2		0.2		0.0				0.0
Pelagic trawl	0.0					0.0	0.1	0.1			0.0	0.0	0.0
Traps	0.5	0.3	0.3	0.4	0.5	0.6	0.8	0.8	0.6	0.7	1.2	1.1	0.7
<b>Brown Ridge</b>	<b>51.4</b>	<b>32.5</b>	<b>43.3</b>	<b>28.3</b>	<b>42.2</b>	<b>28.9</b>	<b>24.1</b>	<b>27.8</b>	<b>22.5</b>	<b>23.6</b>	<b>30.4</b>	<b>28.4</b>	<b>32.0</b>
Anchored seine		0.1	0.0	0.0	0.2	0.7	0.5	0.1	0.0				0.1
Beam trawl	51.3	30.8	31.3	21.9	38.0	24.7	18.3	22.6	19.3	22.7	29.5	28.2	28.2
Bottom trawl	0.1	0.1	0.1	0.1	0.3	0.4	0.6	0.1	0.1	0.0	0.0	0.1	0.2
Flyshooting seine		1.3	0.6	2.0	3.4	2.5	4.2	5.0	2.8	0.8	0.8		2.0
Nets		0.1	11.2	4.2	0.3	0.7	0.4		0.3	0.0			1.4
Pelagic trawl									0.1	0.0	0.0	0.2	0.0
Traps	0.0	0.1		0.0	0.0						0.0		0.0
<b>Central Oyster Grounds</b>	<b>2.2</b>	<b>2.6</b>	<b>2.1</b>	<b>6.4</b>	<b>7.6</b>	<b>7.8</b>	<b>3.5</b>	<b>8.9</b>	<b>18.2</b>	<b>30.9</b>	<b>25.6</b>	<b>11.1</b>	<b>10.6</b>
Anchored seine					0.6								0.1
Beam trawl	0.1	0.1	0.0	0.1	0.0		0.0	0.1	0.4	3.6	3.8	0.7	0.7
Bottom trawl	1.6	2.5	2.0	6.3	5.4	5.7	2.9	7.4	11.6	21.8	21.0	9.5	8.1
Flyshooting seine								0.0		0.0			0.0
Nets					1.6	2.2	0.4		0.0	0.0	0.0		0.4
Pelagic trawl	0.5			0.0			0.2	1.4	6.1	5.5	0.8	0.9	1.3
<b>Cleaver Bank</b>	<b>4.6</b>	<b>5.8</b>	<b>5.9</b>	<b>2.5</b>	<b>10.8</b>	<b>27.9</b>	<b>8.8</b>	<b>4.6</b>	<b>7.5</b>	<b>10.1</b>	<b>10.6</b>	<b>6.9</b>	<b>8.8</b>
Anchored seine				0.0	1.0	3.9	0.4						0.4
Beam trawl	4.1	5.5	5.1	1.5	0.2	0.7	2.1	3.5	5.6	7.3	8.9	6.3	4.2
Bottom trawl	0.5	0.3	0.8	0.5	2.7	3.3	1.1	0.6	0.5	0.4	0.7	0.5	1.0
Flyshooting seine		0.0	0.0	0.5	6.1	19.4	5.2	0.4	1.2	2.2	0.8	0.1	3.0
Nets						0.0							0.0
Pelagic trawl	0.0				0.8	0.6	0.0	0.1	0.1	0.1	0.2	0.1	0.2
<b>Dogger Bank N2000</b>	<b>0.0</b>	<b>0.0</b>	<b>2.7</b>	<b>7.7</b>	<b>9.1</b>	<b>8.8</b>	<b>9.7</b>	<b>4.2</b>	<b>4.6</b>	<b>3.5</b>	<b>0.8</b>	<b>0.8</b>	<b>4.3</b>
Anchored seine							0.0	0.1					0.0
Beam trawl			1.5	4.1	4.4	1.9	1.7	1.1	1.0	0.5	0.2	0.0	1.4
Bottom trawl	0.0	0.0	1.2	3.2	4.7	6.7	7.9	2.5	3.0	1.2	0.3	0.4	2.6
Flyshooting seine							0.0	0.0	0.0				0.0
Nets									0.0				0.0
Pelagic trawl			0.4	0.1	0.2	0.1	0.4	0.6	1.8	0.4	0.4	0.4	0.4
Traps					0.0								0.0
<b>Dogger Bank South</b>	<b>0.0</b>	<b>0.0</b>	<b>0.5</b>	<b>0.8</b>	<b>2.0</b>	<b>1.8</b>	<b>2.0</b>	<b>1.3</b>	<b>1.9</b>	<b>1.8</b>	<b>0.7</b>	<b>0.6</b>	<b>1.1</b>
Beam trawl			0.0	0.0	0.2	0.0	0.1	0.1	0.1	0.0	0.2	0.0	0.1
Bottom trawl	0.0	0.0	0.5	0.8	1.8	1.8	1.9	1.1	1.5	0.8	0.3	0.3	0.9
Flyshooting seine								0.0					0.0
Pelagic trawl							0.0	0.1	0.3	1.0	0.1	0.3	0.2
<b>Frisian Front subarea 1</b>	<b>13.0</b>	<b>14.8</b>	<b>19.0</b>	<b>20.1</b>	<b>43.9</b>	<b>41.7</b>	<b>46.6</b>	<b>27.1</b>	<b>24.5</b>	<b>18.2</b>	<b>15.6</b>	<b>14.8</b>	<b>24.9</b>
Anchored seine					0.1	0.0							0.0
Beam trawl	12.0	14.2	17.3	13.6	17.3	17.2	13.9	7.3	18.9	16.3	14.6	13.9	14.7
Bottom trawl	0.6	0.3	1.2	6.2	21.0	20.8	31.1	16.6	4.8	1.5	0.5	0.5	8.8

Flyshooting seine				0.2	5.0	2.7	0.9	0.3	0.1	0.0			0.8
Nets			0.6	0.1	0.4	1.1	0.0	0.3	0.2				0.2
Pelagic trawl	0.4	0.2					0.6	2.5	0.5	0.3	0.5	0.4	0.5
Traps										0.1			0.0
<b>Frisian Front subarea 2</b>	<b>0.2</b>	<b>0.1</b>	<b>0.5</b>	<b>0.6</b>	<b>3.7</b>	<b>3.7</b>	<b>1.3</b>	<b>1.9</b>	<b>0.7</b>	<b>0.3</b>	<b>0.1</b>	<b>0.2</b>	<b>1.1</b>
Anchored seine							0.0	0.0					0.0
Beam trawl	0.2	0.1	0.2	0.1	0.1	0.3	0.2	0.1	0.1	0.0	0.0	0.2	0.1
Bottom trawl	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.3	0.1	0.0	0.0		0.1
Flyshooting seine				0.1	3.0	2.3	0.8	0.2	0.1		0.0		0.5
Nets			0.3	0.3	0.5	1.0	0.1	0.2	0.3				0.2
Pelagic trawl							0.1	1.1	0.1	0.3	0.0		0.1
Traps	0.0												0.0
<b>North Sea Coastal Zone N2000</b>	<b>283.9</b>	<b>182.6</b>	<b>280.9</b>	<b>329.9</b>	<b>283.4</b>	<b>436.2</b>	<b>562.8</b>	<b>555.1</b>	<b>648.5</b>	<b>567.4</b>	<b>481.1</b>	<b>347.2</b>	<b>413.3</b>
Beam trawl	278.5	175.5	272.0	321.2	274.5	424.9	551.3	545.1	642.0	562.8	475.0	339.0	405.1
Bottom trawl	0.1	0.1	0.1	0.3	0.1	0.3	0.6	0.8	0.1	0.1	0.1	0.1	0.2
Dredge	4.8	6.4	7.8	7.1	7.2	9.4	9.4	8.2	5.2	3.8	5.2	7.3	6.8
Flyshooting seine					0.0	0.0	0.0						0.0
Nets	0.0	0.1	0.7	0.6	0.6	0.4	0.3	0.1	0.2				0.2
Pelagic trawl							0.0	0.0	0.1			0.0	0.0
Traps	0.5	0.5	0.4	0.6	0.9	1.2	1.2	0.8	1.0	0.7	0.9	0.8	0.8
<b>North Sea Coastal Zone VIBEG</b>	<b>5.1</b>	<b>4.3</b>	<b>8.7</b>	<b>6.6</b>	<b>2.8</b>	<b>4.2</b>	<b>10.0</b>	<b>12.5</b>	<b>18.5</b>	<b>15.2</b>	<b>14.2</b>	<b>5.6</b>	<b>9.0</b>
Beam trawl	5.1	4.3	8.6	6.6	2.7	4.1	9.7	12.3	18.4	15.2	14.2	5.6	8.9
Bottom trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Dredge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flyshooting seine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nets	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Pelagic trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Traps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Grand Total</b>	<b>365.4</b>	<b>246.2</b>	<b>366.0</b>	<b>405.1</b>	<b>407.0</b>	<b>563.8</b>	<b>671.7</b>	<b>645.5</b>	<b>748.4</b>	<b>675.7</b>	<b>599.3</b>	<b>426.0</b>	<b>510.0</b>

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With knowledge, independent scientific research and advice, **Wageningen Marine Research** substantially contributes to more sustainable and more careful management, use and protection of natural riches in marine, coastal and freshwater areas.

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