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Background Document to the draft Joint Recommendation for Offshore Fisheries Management on the Cleaver Bank under the revised Common Fisheries Policy

The Hague, 7 July 2017

Draft Submission to the European Commission

Content

1. Executive Summary

PM

2. Introduction

2.1 Aim of the background document

This document contains the background information to the draft Joint Recommendation for offshore fisheries management on the Cleaver Bank as provided for in art. 11 of Regulation 1380/2013 (EU, 2013). The draft Joint Recommendation contains a request to the European Commission to regulate fisheries in parts of this area to ensure a key contribution to achieving Natura 2000 conservation objectives for reefs (habitat type 1170) in the area of the Cleaver Bank. The legal status under Community environmental law of the Cleaver Bank is that it is a Site of Community Importance. The area is located in the EEZ of Netherlands.

PM This document is submitted to the ad hoc working group of the Scheveningen Group by the initiating Member State The Netherlands. Final approval of the Joint Recommendation was agreed by those Member States with a direct fisheries management interests in the "High Level Group" and submitted to the commission by its Chair.

This chapter provides the aim, background and general principles of the proposed measures on the Cleaver Bank.
Chapter 3 contains an analysis of the Habitats Directive in the marine environment and of the Common Fisheries Policy. It describes how these two policy frameworks relate to each other.
Chapter 4 describes the history and processes leading up the current proposal. Chapter 5 describes the proposed management measures and their rationale. This section is structured in accordance with the requirements (the "11 information points") as requested by the European Commission[1]

2.2 General principles

The cooperative process was based on the following principles in accordance with article 11 of Regulation 1380/2013 (EU, 2013):

- *Sound scientific basis*

The process is centred around a scientific approach and the best scientific information available.

- *Stakeholder involvement*

Key stakeholders are involved in the process. From the start of the process fishing industry and nature organizations were invited to participate in an open and transparent manner on a national as well as European level (through the North Sea Advisory Council). [PM]

- *Transparency*

The process is transparent on the data being used, on the steps being taken and on the methodology being used.

- *Proportionality*

1 In its document entitled "Fisheries Measures for Marine Natura 2000 Sites – A consistent approach to request for fisheries management measures under the Common Fisheries Policy"; see also "Guidelines for the establishment of the Natura 2000 Network in the marine environment. Application of the Habitats and Birds Directive", for paras. 3.1 – 3.3 incl. Both documents can be found on http://ec.europa.eu/environment/nature/natura2000/marine/index_en.htm.

The proposal is delivering a key contribution to the achievement of the conservation objectives while minimizing the economic impact on the fishing industry.

- *Non discrimination*

The proposal will need to ensure that measures are not applied in a discriminatory manner. Presenting a proposal to the European Commission for regulation in the framework of the CFP, will ensure a level playing field for the fishing sector affected.

See chapter 9.2 for a more elaborate reference to these principles with regard to the proposed measures.

3. Legal Framework

3.1 European Common Fisheries Policy

The European Common Fisheries Policy (CFP) is a key policy framework for the current proposal. Any regulation of fisheries in European marine waters must follow the principles, rules and procedures of the CFP. The basic rules are laid down in Basic Regulation EC 1380/2013 (EU, 2013), which is the umbrella policy framework of the CFP. European Commission guidance on the management of fisheries in a Natura 2000 site proposes a procedure by which appropriate fisheries measures should be obtained. This procedure is explained and updated according to the revised Basic Regulation, in particular article 11, in paragraph 3.3.2 below. Using this guidance, a Member State hosting a particular SCI, Special Protection Area (SPA) or Special Area of Conservation (SAC) should formulate a request for CFP measures to the European Commission. The European Commission will then adopt this proposal into EU law. The present document substantiates and underpins such a request for regulation of fisheries in light of the conservation objectives for habitat type reefs (habitat type 1170) in the *Cleaver Bank* area. It is appended to the draft Joint Recommendation for that purpose.

3.2 Habitats Directive in marine environment

The Habitats Directive (HD)[2] was adopted in 1992. The Directive is aimed at conserving (the natural habitats of) European wild flora and fauna. An important element of this directive is the designation and protection of Special Areas of Conservation (SACs). Special Protection Areas (SPA's, Birds Directive) and SACs jointly constitute an ecologically coherent network of conservation areas, the so-called Natura 2000 Network. The main objective of the Habitats Directive is to bring habitats and species listed on Annex I and II of this directive into "favourable conservation status".

For a long time it was unclear whether the Habitats Directive was applicable outside territorial waters in the marine environment. In 2005 the European Court of Justice (ECJ) ruled that this Nature Directive not only applies to the territorial see, but also to areas outside the territorial sea where Member States exercise Sovereignty[3]. Since then, the international effort to extend the Natura 2000 network into the marine environment has picked up momentum and had grown on an annual basis. Some of the most important milestones in this respect include the establishment of the 2007 guidelines for application of the Birds & Habitats Directives in the marine environment and the 2009 Biogeographical Seminar on the listing of marine SACs in the Atlantic region. The List of Sites of Community Importance was subsequently adopted by European Commission Decision of 22 December 2009[4]. Since 2003 a European marine expert group (MEG) has been active to facilitate the implementation of the Natura2000 network in the marine environment.

2 Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, OJ L 206, 22.7.1992, p. 7–50.

3 ECJ case C-6/04, 20 Oct 2005.

4 The most recent amended version of this list was adopted by Commission Decision of 3 December 2014 (COM(2015/72).

3.3 Reconciling nature conservation and fisheries policy

Proposing fisheries measures to the European Commission poses specific challenges, because both the rules and procedures of nature policy (BD and HD) and fisheries policy (CFP) must be adhered to simultaneously. For this purpose, the European Commission has provided specific guidance documents to Member States. Notwithstanding the revised CFP these documents have been at the basis of this background document.

3.3.1 Marine Guidelines (2007)

In 2007 the European Commission established the *Guidelines for the establishment of the Natura 2000 network in the Marine Environment. Application of the Birds and Habitats Directive (May 2007)*. This guidance document provides advice inter alia on selection criteria, boundary setting, and definitions of habitat types. This document has been used as a basic starting point for Chapter 5.2 and 5.3 of the present document.

3.3.2 Guidelines for requesting CFP measures in N2000 sites (2008)

In 2008 the European Commission Services published the guidance document called *Fisheries measures for marine Natura 2000 sites - A consistent approach to request for fisheries management measures under the Common Fisheries Policy.* This document provides guidance on how Member States should prepare and submit a proposal for fisheries measures in the CFP framework, for delivering Natura 2000 conservation objectives. It contains

- 11 information items which the Commission considers they should be part of the proposal (they are discussed in detail in chapter 5 below);
- The basic procedure for proposing measures in the territorial sea and Exclusive Economic Zone (EEZ) (see also updated procedure article 11 CFP below);
- The criteria that the European Commission will consider in taking the proposal forward in the CFP decision making context:
    - Consultation with stakeholders (notably involvement of the North Sea Advisory Council (NSAC)) and scientific underpinning;
    - Proportionality (appropriate balance between sustainable exploitation of resources and the need to conserve important habitats, including a precautionary approach to fisheries management);
    - Non discrimination (equal treatment of Member States);
    - Monitoring and control measures

Article 11 Reg. 1380/2013 provides conditions for management measures affecting fisheries. Paragraph 3 of this article states the following:

> *The initiating Member State shall provide the Commission and the other Member States having a direct management interest with relevant information on the measures required, including their rationale, scientific evidence in support and details on their practical implementation and enforcement. The initiating Member State and the other Member States having a direct management interest may submit a joint recommendation, as referred to in Article 18(1), within six months from the provision of sufficient information. The Commission shall adopt the*

measures, taking into account any available scientific advice, within three months from receipt of a complete request.

Under the auspices of the High Level Scheveningen Group a Technical FISH-ENVI Working Group has been established. This group has adopted the terms of reference for the procedure of submission of a joint recommendation to the Scheveningen Group. The procedure for the adoption of this Joint Recommendation follows the terms of reference for the High Level Scheveningen Group.

4. Process

4.1 FIMPAS project

In 2009, The Netherlands started the FIMPAS project (Fisheries Measures in Marine Protected Areas)[5]. This project dealt with 3 Natura 2000 sites in the Dutch EEZ: *Frisian Front, Cleaver Bank* and the Dutch section of the *Dogger Bank*. Overall responsibility for the management of the project rested with the FIMPAS Steering Group, composed of experts from ICES, The Netherlands government and the Irish Marine Institute.

In the project a series of workshops was held with stakeholders from fishing sector, NGO's and science communities in 2010 and 2011 to review existing data and scientific information on the interaction of fisheries with natural features in the Natura 2000 sites. Preceding the three workshops literature reviews were made available to participants. ICES committed such reviews to contractors (van Hal et al., 2010; Deerenberg et al., 2010; ICES, 2011a) The basic philosophy of FIMPAS is one of transparent decision making, involving the relevant stakeholders. All relevant information was made available through a dedicated website[6].

After the 3rd workshop early 2011, a group of industry representatives presented a proposal to the FIMPAS Steering Group. This proposal was reviewed by two independent experts and assessed by the Steering Group. Subsequently, the fishing industry made further amendments to complete a final proposal to the Steering Group on May 9, 2011. The NGO's informed the FIMPAS Steering Group that they did not want to consider any changes to the original proposal as discussed at the 3rd FIMPAS Workshop.

After the finalization of the industry proposal and based upon the expert reviews the FIMPAS Steering Group concluded that the new industry proposal did not meet the management principles of the 3rd FIMPAS workshop. The Steering Group did, however, decide to amend its original proposal as tabled at FIMPAS 3, to account for the new information provided by the Industry in its proposal. This lead to a new zoning proposal of Cleaver Bank, whichwas published on 10 June 2011. Unfortunately the views of stakeholders on this proposal were a world apart; the NGOs insisted on a full closure of Cleaver Bank SCI. They wanted to maintain the original FIMPAS Steering Group proposal from the FIMPAS 3 workshop. The industry maintained its own 9 May proposal.
No new initiatives emerged to bridge the differences of views between sector and NGOs, between June 2011 and summer of 2012. In this time period the same stakeholders did invest heavily in a NSRAC[7] process to reconcile their views on the *Dogger Bank*. However, given the fact that this NSRAC process did not result in an agreement (in April 2012), no further efforts were undertaken by either side on the *Cleaver Bank* either. Thus, the Steering group proposal remained unchanged. The Chairmen of the FIMPAS Steering Group and the FIMPAS Workshops wrote a letter to inform all FIMPAS participants and other stakeholders on this process, before the next step was undertaken.

5 http://www.noordzeenatura2000.nl

6 http://groupnet.ices.dk/FIMPAS

7 North Sea Regional Advisory Council, now the North Sea Advisory Council

4.2 ICES advice

On September 4th 2012 the FIMPAS Steering Group sent in a request to ICES ACOM for scientific advice. ICES was, requested to advise on the degree to which the implementation of the proposed fisheries measures would contribute to the achievement of the conservation objectives. In preparing its response ICES was asked to advise on the changes that can be attributed solely or primarily to the implementation of the proposed fisheries measures.

ICES presented its advice to the FIMPAS Steering Group on November 23rd 2012. In essence, the ICES advise supported the zoning proposal, with the exception of the Botney Cut. ICES considers that no immediate ban on beam trawling in the Botney Cut is necessary.

Opmerking [AMS1]: The ICES advice will be added as an Annex

4.3 National process

In 2013, monitoring results demonstrated the need for additional research on the Cleaver Bank to determine more precisely where the habitat type H1170 Reefs was located. Additional surveys were done from 2013 until 2015 and a final report was published in 2016, combining side scan sonar data, ROV video data and Hamon grab sample data. National fisheries organisations and NGO's were informed of the results and it was determined by all groups that this was the best information available. In October 2016 a meeting with all national stakeholders was held, but no progress could be made towards reaching common ground. The Ministry representatives then made a proposal based on the latest research.

4.4 Regional (stakeholder) process

An important feature of the FIMPAS project was the involvement of neighbouring Member States in the process. This started from the very early stages. Governments and stakeholders from The Netherlands, Belgium, Germany, United Kingdom and Denmark attended all three FIMPAS workshops.

Following the FIMPAS process, on January 17, 2017, the Ad hoc Scheveningen Group meeting in London was informed on the Government's proposal to protect the Cleaver Bank, although the final decision on management measures was still to be formally approved. This meeting was also attended by representatives from the NSAC.

On February 23, 2017, the NSAC, meeting in Edinborough, was informed on the approved proposal for the Cleaver Bank.

This proposal was sent to the Scheveningen ad hoc group and the NS AC on 22 May 2017 and presented at the Ad hoc Scheveningen Group meeting in The Hague, June 20, 2017, also attended by NSAC representatives.

The total body of information gathered in all of the processes described above has been incorporated in the current proposal to the European Commission.

[PM next steps]

5 Spatial extent of the site boundaries

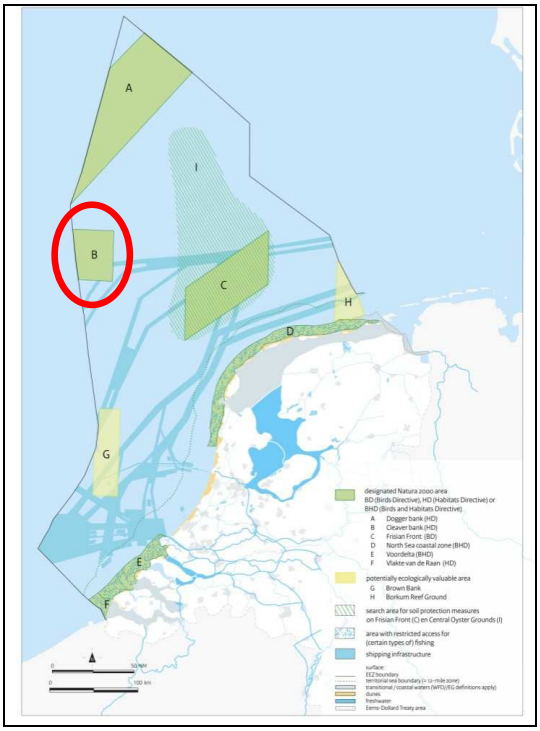


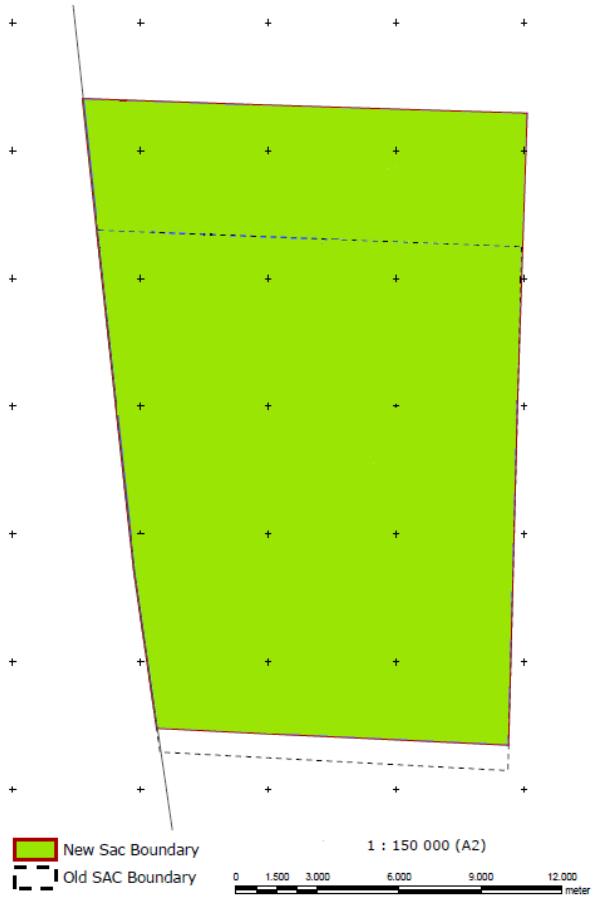
Figure 5.1: Cleaver Bank site (encircled in red), source: Beleidsnota Noordzee 2016-2021.

The original site boundaries were located slightly more southward at the time of submitting the site to the European Commission in 2009. Scientific rationale for these boundaries, as submitted in the Standard Data Form (SDF[8]) can be found in: Lindeboom et al. (2005) and Bos et al. (2008). At the time of submitting the site, it was estimated that the qualifying habitattype 1170 reefs (further explained in section 5.3.) was present in approximately half of the submitted pSCI, and that the location thereof was interdispersed throughout the Cleaver Bank.

The FIMPAS project delivered two outcomes in this respect: Firstly, the interdispersed presence of habitattype H1170 was confirmed both by the data delivered by the fishing industry in their March/May 2011 proposal, as well as by the independent reviewers and available data on the sediment (see Annex 1) This is further explained in section 3.3. Secondly, on the basis of new data by the industry on presence of stones, pebbles, cobbles and gravel, it was suggested to (1) move the Southern boundary to the North (thus excluding an area where H1170 is not present) and (2) move the Northern boundary to the North (thus including an area where H1170 is present).

[8] http://natura2000.eea.europa.eu/natura2000/

The site boundaries were amended accordingly (figure 5.1.3). As a result of these amendments the sites increases with a total of around 30.000 hectares. These amendments were operationalized in an amendment of the SDF and in the national designation decree in 2016.



X-Coordinate	Y-Coordinate
3,31794	54,2935
3,31779	54,2809
3,31636	54,0925
3,31757	53,8491
3,12688	53,851
3,03787	53,8518
2,89879	53,8531
2,8589	53,9884
2,83609	54,0808
2,8046	54,208
2,78353	54,2936
2,98263	54,2935

Figure 5.2: GIS contour and coordinates of the new Cleaver Bank site boundaries

5.1 The Cleaver Bank and its natural features

Cleaver Bank lies in the north-western region of the Dutch Exclusive Economic Zone (EEZ) and is an example of habitat type 1170 'Open-sea reefs' which is characterised by geo-morphological features that are considered to be reef structure (Jak et al., 2009). Gravel and cobbles on the Cleaver Bank originate from the last Ice Age (Schwarzer and Diesing, 2003, from Jak et al., 2009). The Cleaver Bank site is cut in two sections by the deep and silt-rich Botney Cut.

Different monitoring campaigns and subsequent studies had been performed on the Cleaver Bank, on the basis of which earlier mapping exercises and description of features had been done (van Moorsel, 2003; Laban, 2004 and Jak, 2009). From 2013 until 2015 additional side scan sonar surveys were performed by Rijkswaterstaat and analysed by Periplus Consultancy, gathering geological data covering 19% of the whole Cleaver Bank area (figure 5.1.1). In 2015, Eurofins Aquasense performed an ecological monitoring campaign using ROV video imaging and Hamon grab, gathering information on the typical species composition and faunal communities present. In total 42 Hamon grab samples were collected and 39 km of ROV video, comprising of approximately 70 hours of video material of the seafloor. After analysis, all geological and biological information was combined in an interactive pdf map document with different layers which can be turned on and off (Periplus Consultancy en Eurofins AquaSense, 2016). This map is accompanied by a short description of each layer, describing which method was used, what was monitored and a short summary of the results (Leewis et al, 2016).

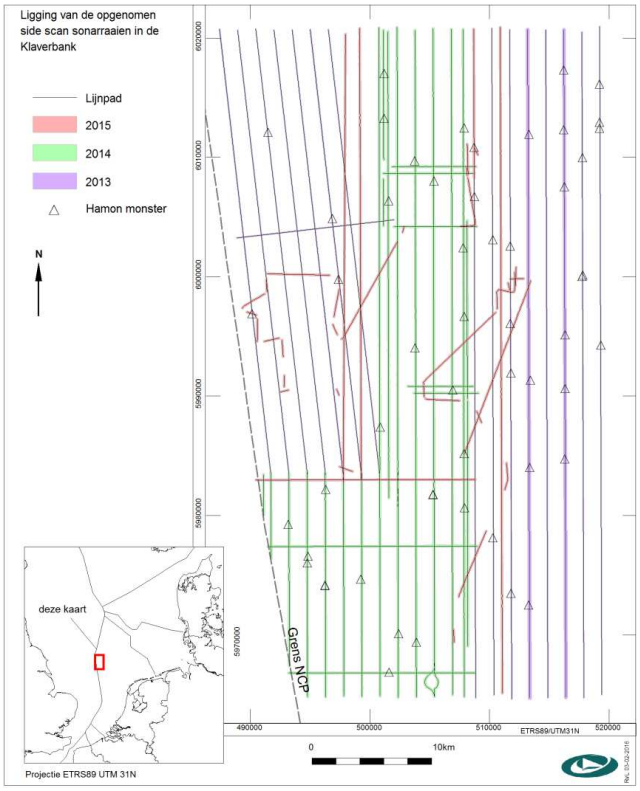


Figure 5.1.1: Side scan sonar surveys on the Cleaver Bank in the years 2013 , 2014 and 2015

The presence of large cobbles and/or coarse gravel is a characteristic feature of habitat type 1170. An additional characteristic is the presence of a mosaic of coarse sediment types that, in addition to cobbles and gravel, consists of various gravel and sand fractions (Laban, 2004). Places with gravel and boulders alternate with coarse sand and places with old shell material. Here and there, boulder clay rises to the surface.

Gravel and boulders offer a habitat for sessile epifauna to settle. Gravel with a grain size larger than 30 mm can already be covered with sessile fauna. This suggests that the mobility of these sediments is minimal. Sessile organisms are important because these organisms can aggregate loose elements on the seafloor together, as can be learned from Georges Bank (Collie et al., 1997). Sessile organisms also make the seafloor less sensitive to the effects of water movement. The accretion of these sessile organisms is responsible for a radical development of the three-dimensional structure of the habitat type, giving it complexity. This complex, three-dimensional structure creates new niches that become occupied by specialised organisms thereby increasing biodiversity (Jak et al., 2009).

Over large areas a thin layer of marine sands and silt has been deposited. Occasionally, under the influence of the dominant water current, these form 'sand ripples' that run parallel to the current direction and can be kilometres long (Laban, 2004 and Leewis et al, 2016). Maximum measured water current speeds vary between 0.25 and 0.40 m/s. Because of the significant depth of the Cleaver Bank, the sand and finest gravel fractions on the bottom are disturbed by wave action only in very heavy weather. As a consequence of this dynamic, the gravel is relatively poor in silt. The visibility is so high that sunlight penetrates even to a depth of 40 m to enable the growth of crustose calcareous red algae (van Moorsel, 2003). The mosaic pattern and the low mobility of a large part of the sediment in combination with the clarity of the water make the Cleaver Bank unique in the Dutch EEZ, although this combination of features is less rare in other parts of the North Sea (Jak et al, 2009).
Owing to the variety of sediment types, such as the occurrence of coarse sediments and cobbles, the site hosts a great diversity of species. Of all the macrobenthic species present in the EEZ, 44% occur exclusively on the Cleaver Bank (van Moorsel, 2003). The biodiversity of the macrobenthos on the Cleaver Bank is among the highest in the Dutch EEZ (Lindeboom et al., 2008, Jak et al., 2009; Bos et al., 2011, Leewis et al, 2016). In the 2015 monitoring campaign, 246 unique species were found in 42 Hamon grab samples and 24 new species for the Netherlands were discovered. To compare, in the Dutch standard monitoring campaign in 2015 a total of 164 Boxcore samples were taken in the entire Dutch EEZ, and a total of 262 unique species were identified.

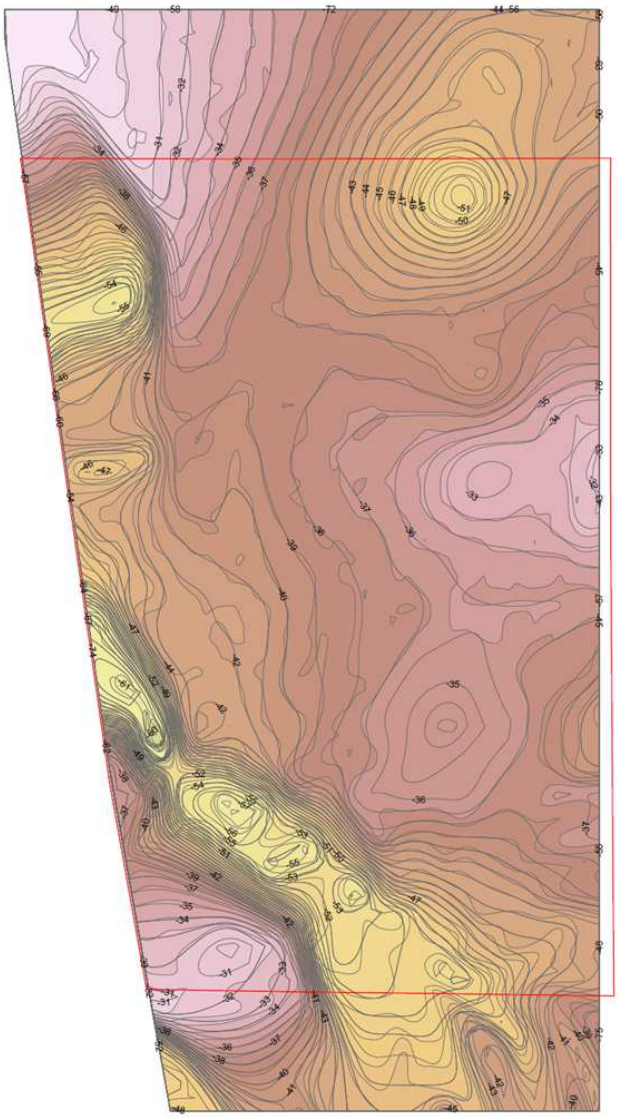
The common guillemot and razorbill are present on the Cleaver Bank primarily in April/May (Arts and Berrevoets, 2005). In summer, concentrations of the harbour porpoise can be found, particularly around the Botney Cut, and the minke whale, white-beaked dolphin and seals are also observed here (Camphuysen and Peet, 2006; Brasseur et al., 2008). A more recent review by Camphuyzen and Siemensma (2011) found no consistent patterns in space and time for harbour porpoises in the area.

5.2 Natural distribution within the site

5.2.1 Depth contours

The Cleaver bank is located in quite deep water, average depths lie within -30 to -50 meters (Jak et al., 2009), with a maximum depth of -71 m in the Botney Cut, a minimal depth of -30 m and an average depth of -43 m (Bos et al., 2008). Depth contours are shown in figure 5.2.2. The Cleaver Bank SCI is 1539 km^2 in size.

Figure 5.2.2: Cleaver Bank SCI (in red) with depth lines



5.2.2 Sediment type

A sediment map from Leewis et al (2016, layers 3.2 and 3.3) provides insight in the gravel content on the Cleaver Bank site and the identified rocks >30cm based on side scan sonar data.

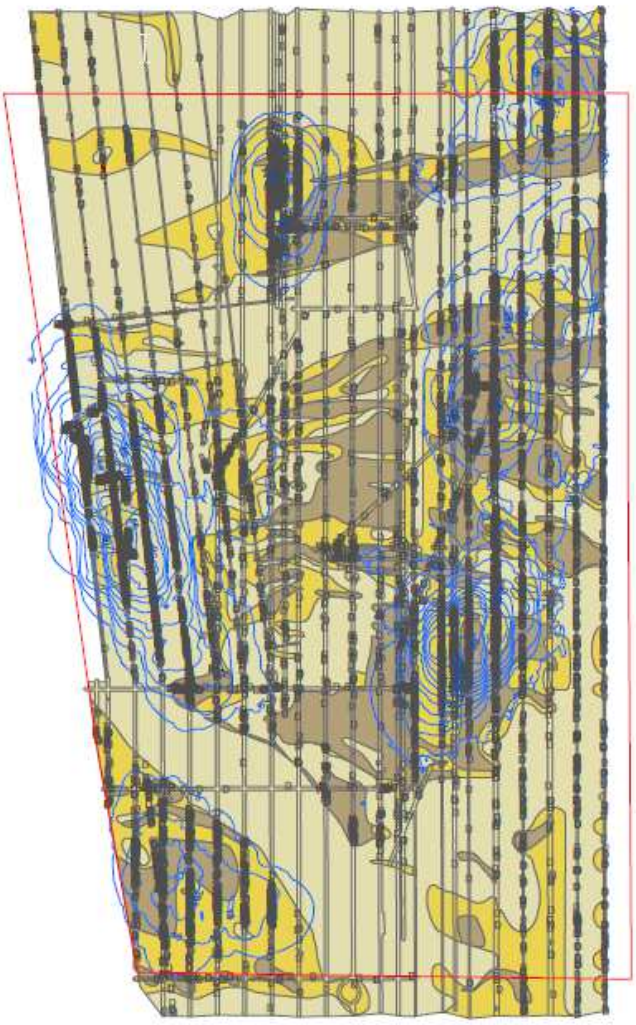


Figure 5.2.3: Cleaver Bank gravel content (dark brown = (sandy) gravel; dark yellow = gravelly sand and beige = sand or clay) and identified rocks >30cm (blue lines = contours based on actual reflection and interpolation) and SCI boundary (red line)

Figure 5.2.3 (produced in 2016) covers the entire Cleaver Bank area, but does not show the intervals in high detail. Information brought forward by the fishing industry in the FIMPAS

project (industry proposal, 2011) provides additional information on presence of stony ridges, stones, pebbles and areas known on fishermen's maps as "messy" (implying the presence of such features; see Figure 5.2.4).

This information was reviewed by two independent experts (Dr. C Laban at Marine Geological Adviceand dr. M.S.S. Lavalaye at NIOZ / Royal Netherlands Institute for Sea Research). It was found that the information provided in figure 5.2.4 was largely in accordance with data from sampling observations. An important exception to this is the stony area ('*stenen*') located in the North outside the old SCI boundary, which is different from the sampling observations (which provide no such indication). A probable explanation for this lies in the fact that this area was less densely sampled. The new research from 2016 does comply with the stony area in the Northeastern part.

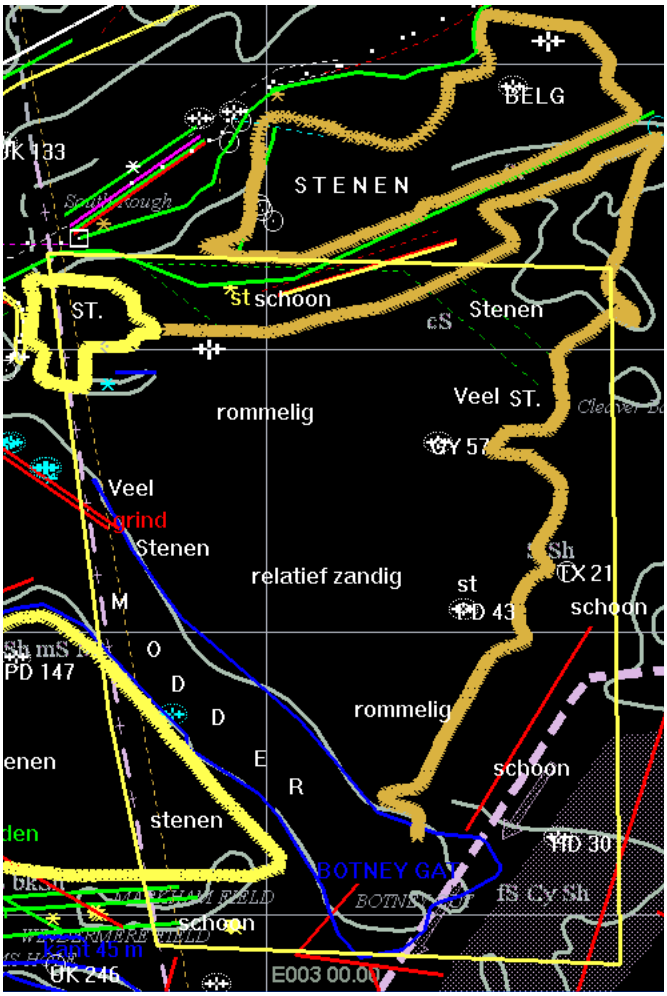


Figure 5.2.4: Industry map (Fishing industry, 2011a) depicting stony ridges (amber/yellow); stones ('*stenen*' and "st."); messy areas ('*rommelig*'), containing different sediments: sand, gravel and stones; relatively sandy areas ('*relatief zandig*'); clean areas (sandy without

stones, '*schoon*'), the muddy Botney Cut (blue, '*modder*') and the old SCI boundary (yellow line).

5.2.3 Benthic communities

Based on the report on the ecology of the Cleaver Bank by Van Moorsel (2003) and the additional research from Leewis and Verduin (2016), a good picture of the fauna of the Cleaver Bank has emerged. It is evident that the characteristic species of the Cleaver Bank are precisely those restricted to the coarse, highly permeable sands and/or species that cling to stable hard subsurface (gravel, cobbles, pebbles, stones). Van Moorsel (2003) indicated that the sediment composition is often very variable even within a transect of 1 kilometer. It is exactly this variation in the habitat which is important for the high biodiversity of the area (Figure 5.2.5) (Lavaleye, 2011 and Leewis and Verduin, 2016).

Leewis and Verduin (2016) also did a statistical analysis on the relationship between faunal communities and abiotic factors. This analysis showed two clear 'clusters' of typical H1170 species, divided over the Eastern and Western parts of the Cleaver Bank. The first cluster (West) exhibits predominantly soft-bodied typical species that live on rocks and coarse sediment and the second cluster (East) exists mainly of hard-bodied typical species usually present on coarse sand and gravel. A third cluster of species was recognised which did not clearly fall into one or the other. Reasons for this division cannot yet be statistically linked to the abiotic factors that were taken into account, however do seem to be linked to different abiotic aspects (Leewis and Verduin, 2016).

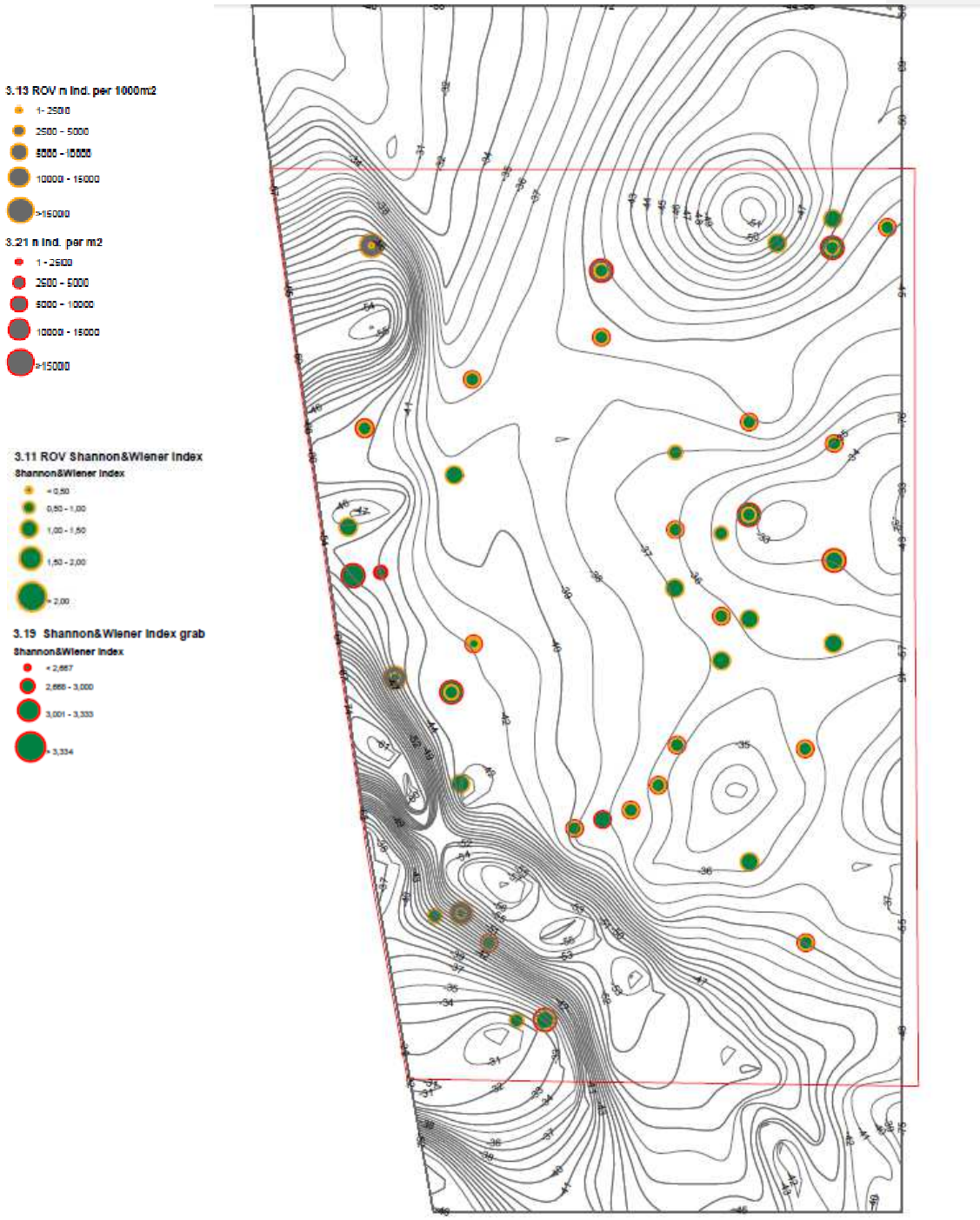


Figure 5.2.5: Map of depth contours and biodiversity aspects Shannon&Wiener index and number of species per m2 sampled by Hamon grabs and ROV images.

These results concur with van Moorsel (2003), who only covered a section of the Cleaver Bank area:

For the coarse permeable sands within the site, these characteristic species include the European lancelet (*Branchiostoma lanceolatum*) and the sea urchin (*Echinocyamus pusillus*, pea urchin). These species do not always occur in the greatest abundance but are nevertheless characteristic by virtue of their association with this specific coarse sediment. Other species named are the polychaeta *Aonides paucibranchiata, Typosyllis cornuta* and *Goniadella bobretzkii*. The amphipod *Urothoe marina* is named as a crustacean typical of coarse sand (Van Moorsel, 2003).

For the hard substrate (gravel, cobbles, pebbles, stones), characteristic sessile organisms are dead men's fingers (*Alcyonium digitatum*), crustose calcareous red algae (*Lithothamnion sonderi* and *Phymatolithon sp.*) and, for example, the keel worm (*Pomatoceros triqueter*), the ross worm (*Sabellaria spinulosa*) and the ribbed saddle oyster (*Pododesmus patelliformis*) (Van Moorsel, 2003). These last three species cement the substrate and give its structure and texture an extra dimension so that many other species can grow on it, such as the rock-boring mollusc (*Hiatella arctica*) and moss animalcules (Bryozoa).

Species that occur specifically in coarse sediment are the rayed artemis (*Dosinia exoleta*) and the blunt tellin (*Arcopagia (=Tellina) crassa*). These species have a thick shell, which makes them well suited to the incidental movements of the gravel. Precisely these species occur in the well-sorted lean (slit-poor) finer gravel and coarse sand fractions. Ocean quahog (*Arctica islandica*), too, are regularly encountered. In view of the type of substrate, the site is potentially suitable for the occurrence of the horse mussel (*Modiolus modiolus*) (Kenny and Rees, 1996). This long-lived species can form mussel beds. The common whelk (*Buccinum undatum*) can sustain itself well here because there is sufficient fixed substrate for the deposit of egg cases, and moreover the TBT (tributyltin)concentrations, which along the coast have caused imposex among common whelks, will presumably be too low here to cause effects (OSPAR, 2008).

Also found on the Cleaver Bank are various species that are otherwise only common in the deep more northern North Sea. Examples are the red whelk (*Neptunea antiqua*), the slender colus or common spindle (*Colus gracilis*), the hermit crab *Anapagurus laevis* and the purple heart urchin (*Spatangus purpureus*). A number of species new for The Netherlands has been found at the site, for example, the Norway bullhead (*Taurulus lilljeborgi*) and the spiny squat lobster *Galathea strigosa*. Northern species that occur on gravel-rich locations are the worms *Glycera lapidum*, *Dialychone dunerificta (*as opposed to *Chone Duneri*, which was determined initially, but later determined as only appearing In the Arctic*)* and *Laonice bahusiensis* (Van Moorsel, 2003). Also in 2015 many new species for the Netherlands were discovered, such as *Drilonereis filum,* the gastropod *Graphis albida*, *Nothria conchilega*, *Sphaerodoridium gracilis* and polychaetes *Ophelia celtica, Chaetozone zetlandica*. The Cleaver Bank is also probably the last site where the oval venus *Timoclea ovata* can still be found in the Netherlands. The marine gastropod mollusc *Caecum glabrum* has not been found alive often anymore, but is fairly common on the Cleaver Bank.
Less specific to the site are the burrowing crustaceans such as *Callianassa subterranea* and *Upogebia deltaura*. At this site, these species are primarily restricted to the sediments in the

deep silt-rich Botney Cut that cuts through the gravel area. These species are not characteristic of habitat type 1170.

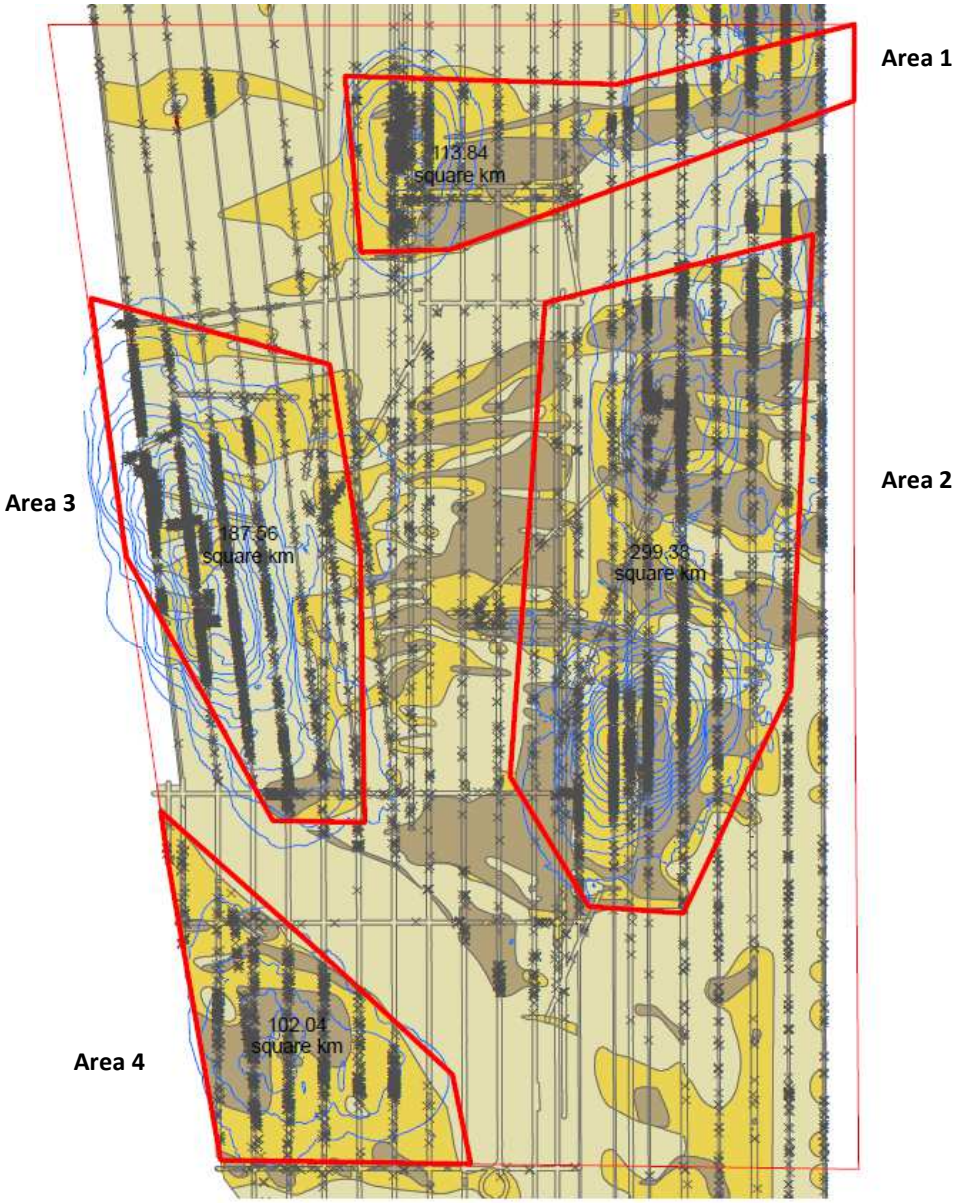
5.2.4 Fish community

Located on the Cleaver Bank are two sampling points for the monitoring of commercial fish stocks (Beam Trawl Survey and the International Bottom Beam Trawl Survey, see Lindeboom et al., 2008). The standard methodology used in this respect is inadequate for monitoring the fish species characteristic of the Cleaver Bank, many of which are small. The species concerned are those such as gobies (*Pomatoschistus spp.*), small flatfishes like the scaldfish (*Arnoglossus laterna*) and solenette (*Buglossidium luteum*) and the common dragonet (*Callionymus lyra*). These species are common throughout the North Sea and also often occur in other areas in the EEZ in large numbers (Van Moorsel, 2003). Two species prefer to live on and between cobbles and as such can be called characteristic. These are the Norway bullhead (*Taurulus liljeborgi*) and the two-spotted clingfish (*Diplecogaster bimaculata*). In the area of the Cleaver Bank various fish species spawn, such as the whiting. In addition, the site is potentially suitable as a spawning ground for herring (summarised in Ter Hofstede et al., 2005). An expansion of the herring population could give rise to the need for new spawning grounds (Van Moorsel, 2003). Finally, lancelets have not been found more commonly than on the Cleaver Bank (Leewis and Verduin, 2016).

5.3 Proposed closures in relation to feature

On the basis of the areas which provide the most certainty of presence of the habitat feature H1170, four management zones are drawn (Area 1 = North East; area 2 = East; area 3 = West and area 4 = South West) according to the definition of H1170 given in 6.2.1. This includes a combination of identified rocks larger than 30 cm (blue contours), (sandy) gravel; gravelly sand and identified areas with high biodiversity aspects, Shannon&Wiener index and average number of species per m2, based on side scan sonar, Hamon grabs and ROV images (Figure 5.3.1). As these measurements provide the most detailed information there is on this area, these four zones provide a robust protection of the habitat H1170, comprising 45% of the entire Cleaver Bank SCI.

Figure 5.3.1: Proposed closures in relation to the habitat feature H1170 according to the different layers of the additional research.



6 The Cleaver Bank in the context of the Habitats Directive

6.1 Legal status of the area

The Dutch site "Klaverbank" was included in the list of Sites of Community Importance, pursuant to Art. 4(2) of the Habitats Directive, by Commission Decision 2010/43/EU of 22 December 2009. It was designated in a national designation decree on 27 May 2016.

6.2 Standard Data Form

Tables 5.3.1 and 5.3.2 present information from the Standard Data Form submitted by The Netherlands. The Standard Data Form contains all relevant information, accompanying a submission of a candidate site of community importance (pSCI). The full Standard Data Form, including all underlying source information, are available at the website of the European Commission[9].

Table 6.1: Qualifying habitat type present on the site and assessment for it.

Habitat Type	Cover (ha)	Representativity	Relative surface	Conservation status	Global assessment
H1170	76934	B	A	C	A

Representativity: A: excellent, B: good, C: significant, D: non-significant presence
Relative surface: A: between 100 to 15%, B: 15 to 2%, C: 2 to 0%
Conservation status: A: excellent , B: good, C: average or reduced conservation
Global assessment: A: excellent, B: good, C: significant value

Table 6.2: Other natural features

Code	Name	POPULATION				SITE ASSESSMENT			
		Resident	Migratory			Population	Conservation	Isolation	Global
			Breed	Winter	Stage				
1364	**Halichoerus grypus**	C				C	B	C	C
1365	**Phoca vitulina**	R				C	B	C	C
1351	**Phocoena phocoena**	C				B	B	C	B

Population: C: common, R: rare resident
Site assessment:
Population: A: between 100 to 15%, B: 15 to 2%, C: 2 to 0%
Conservation status: A: excellent , B: good, C: average or reduced conservation
Isolation degree: A: population (almost) isolated, B: population not-isolated, but on margins of area of distribution, C: : population not-isolated within extended distribution range

[9] http://natura2000.eea.europa.eu/natura2000/

Global assessments: A: excellent, B: good, C: significant value

The scientific information for the entries in the tables can be found in: Bos et al. (2008); Jak et al. (2009) and Lindeboom et al. (2005).

6.2 Conservation objectives

6.2.1 Habitat H1170

The site Cleaver Bank has been selected as SCI for the presence of habitat type 1170. In the EC Marine guidelines (EC, 2007) habitat type 1170 "Reefs" is defined as follows: "Reefs can be either biogenic concretions or of geogenic origin. They are hard compact substrata on solid and soft bottoms, which arise from the sea floor in the sublittoral and littoral zone. Reefs may support a zonation of benthic communities of algae and animal species as well as concretions and corallogenic concretions". The main characteristics of the Cleaver Bank have been described in the previous section 5.2.

Geomorphological features
Reefs of geogenic origin are present at the Cleaver Bank site (Lindeboom et al., 2005; Bos et al., 2008 and Jak et al., 2009). Taking the definitions of the European interpretation manual and the Marine Guidelines into account, Jak et al. (2009) distinguishes 3 size classes of hard compact substrata that are (1) and can be (2, 3) part of the habitat type:

1. Hard compact substrata with a cross-section of at least 64 mm. The European definition of H1170 (Interpretation Manual of European Union Habitats (EC, 2007)) states that the minimum requirement for reefs of geogenic origin is that they consist of rocks, boulders or cobbles of 'generally >64 mm'. Thus, these are included in the habitat type.
2. Hard compact substrata with a cross-section of 8 to 64 mm. The characteristic of the benthic communities of hard compact substrata is that they are sessile. These sessile species also occur on gravel and cobbles measuring 8 to 64 mm. When the biotic community of sessile organisms extends from the cobbles larger than 64 mm to surrounding smaller cobbles, coarse gravel and shells, these are also included in the habitat type.
3. Hard compact substrata with a cross-section smaller than 8 mm. This finer gravel fraction (and possibly even finer sediments, including sand) can only form part of the habitat type if (1) these sediments form only a thin, mobile layer over cobbles and coarse gravel on which organisms live that are dependent on hard compact substrata, or (2) if they occur in mosaic with the habitat type.

Benthic communities
The presence of coarse sediments in the form of gravel and boulders offers sessile epifauna a habitat. These sessile organisms are important because they can continue to cement loose bottom elements, making the bottom even less sensitive to any disturbance by water motion. The accretion of these sessile organisms is responsible in turn for a radical development of the three-dimensional structure of the habitat type, giving it complexity. This complex, three-dimensional structure creates new niches that become occupied by

specialised organisms. As a consequence of this, the diversity increases compared to non-reef structures.

EC marine guidelines state that reefs 'may support a zonation of benthic communities of algae and animal species as well as concretions and corallogenic concretions'. Thus this is not a part of the minimum requirement but should be regarded as the good quality; without such benthic communities the quality becomes moderate (Jak et al., 2009).

6.2.2 Conservation Objective for H1170

The conservation objectives for H1170 are: maintain distribution, maintain surface area and improve quality. An improvement in quality is needed because the quality of the habitat is currently assessed to be unfavourable–inadequate (Jak et al., 2009). Side-scan sonar recordings show that in parts of the site the tracks of bottom fishery are present and that as a result there is an elevated dynamic that disturbs the biotic communities present. Bottom fishery can remove, homogenize and flatten the substrate of H1170 and cause changes (mainly reduction) in abundance of its typical species (Deerenberg et al., 2010). Jak et al (2009) concludes that the structure and function of the habitat have fundamentally deteriorated due to repeated disturbance of the bottom compared to an undisturbed situation.

Owing to the three-dimensional structure and the stable subsurface, habitat type 1170 can offer living space to a well-developed sessile hard-substrate community. For such a community to develop well, seabed stability is required (Watling and Norse, 1998). The natural development and succession of a complex sessile biotic community is possible only if the position and orientation of the hard substrate on which it grows do not change (Watling and Norse, 1998).

It can be concluded from the above that the key factor to improve quality is to ensure that habitat type 1170 is left undisturbed, by preventing human induced bottom disturbance (elevated dynamics). If undisturbed, cementing of the different fractions (gravel, stones) occurs, allowing for the establishment of typical sessile epibenthic species, while other infauna (those which are able to withstand movement and increased dynamics, e.g. from bottom fisheries) disappear.

6.2.3 Conservation Objectives for other features

There are conservation objectives for Harbour porpoise, Grey seal and Harbour seal, because these natural features listed on Annex II of the Habitats Directive, are present on the site, although the site has not been selected for these features. Objectives for Harbour porpoise and Grey seal are: maintain the extent and quality of habitat in order to maintain the population. Objectives for Harbour seal are: maintain the distribution, extent and quality of habitat in order to maintain the population.

For *harbour porpoise*, FIMPAS (ICES 2011b) and the ICES advice (annex 1b) suggest not to develop site specific measures, but rather to develop and implement generic protection through a species protection plan and the possibility of capping effort on a regional scale.

The Netherlands has therefore developed a Harbour Porpoise Species protection Plan (Camphuyzen & Siemensma, 2011) , which is currently being implemented. For *seal species*, FIMPAS and the ICES advice concluded that no site specific measures for fisheries would be needed. Therefore, this proposal **only concerns H1170** and does not concern Harbour porpoise and seal species.

7 Impact analysis

7.1 Impacts from fishing on H1170

Fishing occurs all over the southern North Sea. The Cleaver Bank is an important fishery ground, albeit as part of a much larger area in the Southern North Sea (see effort maps in section 7.5). It is important to make a distinction between different gear types in terms of their impact on habitat type 1170. In the FIMPAS project Deerenberg et al. (2010) provided an overview of the gear impacts in relation to Habitattype 1170. In the BENTHIS project (www.benthis.eu) the impact of different types of gear in combination with habitat vulnerability is further investigated (figure 7.1, Rijnsdorp et al., 2016a).

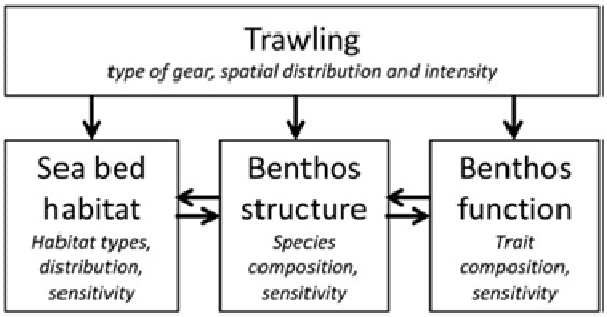


Figure 7.1 Impact of trawling on the sea bed. Source: Rijnsdorp *et al*. (2016)

Towed nets may affect the sea floor in various ways (figure 7.2, Eigaard et al., 2016). The cables and ground rope that are dragged over the sea bed may homogenize the texture of the sea bottom, destroy hard structures and move stones or shells. Heavy gear components such as the otter boards or tickler chains will penetrate into the sea bed and disturb the vertical structure of the sediment. Sediment may be brought into suspension by the turbulence generated in the wake of the gear (O'Neill and Ivanovich, 2016). The physical impact can therefore be broadly classified into:

- penetration into the sea bed, thus damaging or taking away benthos;
- collision with (hard) structures; and
- re-suspension of sediments.

As a result, the sea floor is homogenized, having an negative impact on deep digging species such as shrimps. Those species are important for the structure, chemical conditions, mineralization of the sea floor, enhancing the distribution other species (Slijkerman, 2013). Bottom structure is more important on the depth gradient to the deeper, silt-rich sea bed than for shallower sandy parts (Jak et al, 2009, referred to in Slijkerman 2013).

Bottom fishing causes mortality and results in a reduction of biomass and biodiversity. Long-lived species are more vulnerable because they need a longer time to recover. Robustly built animals are less susceptible than fragile species. Usually the share of long-lived species in fished areas is lower than in unfished areas (van Denderen et al., 2015; Rijnsdorp et al., 2016a, 2016b).

The sensitivity of the sea bed to disturbance of towed fishing gears depends primarily upon the natural disturbance (shear stress) and the structure of the sea bed. The degree of natural disturbance decreases with water depth. The grain size of the sediment is usually a good indicator of the natural disturbance. High dynamic areas are usually characterized by coarse sediments, low dynamic areas by fine sediments. The Cleaver Bank is a mixture of high and low dynamic area with a variety of rocky and coarse sediments and is characterized by a benthic community with a higher proportion of long-lived species (Rijnsdorp, 2015).
The vulnerability of habitat type 1170 on the Cleaver Bank is related to its physical features (e.g., cobbles, coarse gravel and sand in a mosaic pattern, great clarity of the water column) and the biological characteristics (e.g., sessile epifauna, trophic position) and the life histories of the typical species (e.g., longevity). The resilience of open-sea reef habitats is assumed to be low (Deerenberg et al., 2010 and Rijnsdorp, 2015).

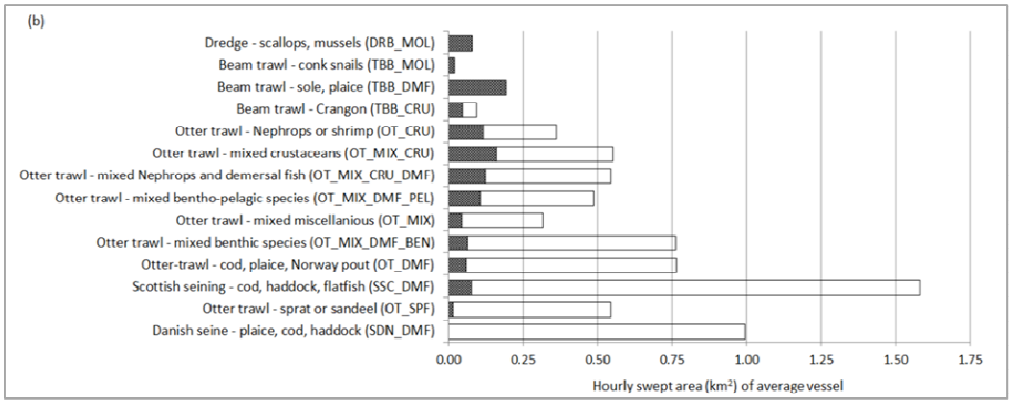


Figure 7.2 Area of seabed swept in 1 h of fishing with an average-sized vessel with impact at the surface level (sediment penetration up to 2 cm) and at both the surface and the subsurface (> 2 cm) level for 14 BENTHIS métiers. Eigaard et al. (2016)

Eigaard (2016) quantified the surface (up to 2 cm) impact and the subsurface (> 2 cm) impact area of all towed fishing gears to the sea bed (Figure 7.2). Gears with surface impact disturb the surface of the sea bed up to 2 cm. All towed gears cause abraision up to a depth of 2 cm. Gears that impact surface over a large swept area include Scottish seines and Danish seines. Almost all towed gears have a subsurface impact over 2 cm on the sea bed. A large part of the southern North Sea is affected by towed gears (Figure 7.3; ICES.)

The relative impact of towed bottom contacting fisheries on benthos is much more substantial than any other human activity at sea, even compared with extraction of surface minerals, e.g. sand (Lindeboom, 2005, mentioned in Slijkerman, 2013). The footprint of mobile bottom contacting gears is large. In only seven percent of the 1x1 minute grid cells in the North Sea no bottom trawling was recorded during a 3-year period (Eigaard et al., 2017). The trawling footprint, defined as the percentage of the sea floor trawled during a year, was estimated at 63% (0-200m depth) and 31% (200-1000m depth) North Sea wide. For the Dutch part of the North Sea this is more, 81%. Within the footprint, trawling is highly aggregated with 90% of the effort occurring in less than 50% of the footprint. In these core fishing grounds, the bulk of the landings is taken. ICES presented fishing intensity maps based on Benthis results (figure 7.3)

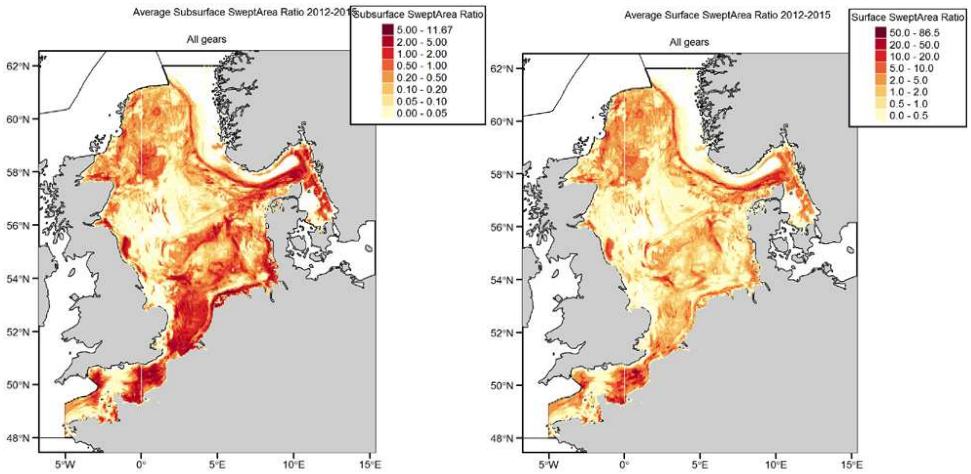


Figure 7.3 Average annual subsurface (left) and surface (right) disturbance by mobile bottom contacting fishing gear (otter trawls, beam trawls, dredges, and demersal seines) in the Greater North Sea during 2012–2015, expressed as average swept area ratios (SAR). (ICES, 2017)

The impact of the above mentioned gears on the conservation status of Habitat type 1170 including its characteristic and threatened communities and species is used in combination with data on fishing effort, to provide rationale for the proposed management measures (section 9).

BENTHIS provided information on the surface area impacted by the various mobile bottom contacting metiers. They distinguished between surface abrasion by all gear components that have bottom contact, and subsurface abrasion by gear components that penetrate more than about 2 cm into the sediment. Metiers differ widely in the surface area swept per hour of trawling (Eigaard et al., 2016). Flyshoot and otter trawls, in particular twin trawls, have a large surface footprint as compared to for instance beam trawls used in the flatfish fishery. The flatfish beam trawls, however, have a larger subsurface footprint because all gear components penetrate into the seabed.

BENTHIS results have been used in ICES to develop methodology to estimate the impact of bottom trawling (ICES 2016; ICES 2017a, 2017b). A meta-analysis of studies that estimated the mortality caused by the passage of a trawl and their subsequent recovery showed that the direct mortality is related to the penetration depth of the gear (Hiddink et al., submitted). The recovery rate was related to the longevity (life span) of the organisms: the recovery rate of short-lived species is faster than the recovery rate of long-lived species. Hence the sensitivity of the sea floor can be estimated from the proportion of long lived species that are exposed to the trawling gear. The proportion of long-lived species increased with the gravel content of the sea floor and reduced with shear bed stress (Rijnsdorp et al., 2016b). Finally, BENTHIS has shown that the impact of trawling on the benthos is dependent on the level of natural disturbance (Rijnsdorp et al., 2016b; van Denderen et al., 2016). In areas exposed to a high level of shear bed stress, no significant effect of bottom trawling

could be detected. In areas with a more stable environment, bottom trawling shifted the community to shorter lived taxa.

For the Cleaver Bank habitat with a relatively high gravel content and a low level of natural disturbance, the benthos is expected to have a higher sensitivity to trawl disturbance as compared to the more sandy habitats that are exposed to higher shear bed stress. The reef habitat type H1170 is therefore assessed as being highly sensitive to all types of bottom contacting gear, even gears with small subsurface impact, and larger surface impact.

7.2 Other human activities, and their impact on H1170.

The following section gives a preliminary assessment of impacts of other human activities vis-a-vis fishing activities. It does not preclude any further impact assessment.

Besides fisheries there are several other human activities taking place in this area:

Platforms

There is one fixed platform (for oil/gas drilling) situated within the Cleaver Bank SCI site, in the West, near the UK border. In 2010 and 2011 three operators were active with a total of 6 movable platforms (van der Burg et al., 2012, see also Annex 3, figure 1).

Mining platforms for the extraction of oil and gas form hard substrates where specific organisms (epibenthos) can settle. Tamis et al (2011) determined the footprint per platform ('legs') to be 0,025 ha. The potential loss of habitat type 1170 due to the presence of 2 fixed platforms is thus 0,050 ha (500 m^2). In comparison: the total area of habitat type 1170 on the Cleaver Bank SCI is approximately 770 km^2. Hence 0,025 ha = 0,000032% of the habitat type 1170 area. The loss of H1170 due to the placement of a movable platform is assumed to be similar to that of a fixed platform (0,025 ha). Its removal after 1-3 months provides opportunities for recolonisation of benthic communities.

Each platform has a no fishing zone with a radius of 500 meters (Lindeboom et al., 2008). These factors can influence the conservation objectives positively, whilst reducing the potential fishing activity in this small area.

Cables and Pipelines

Four pipelines currently transect the SCI: North-South from Norway towards Belgium and Norway to France and the NGT-pipeline, which transports gas to the Dutch coast. Furthermore, from 2014 there is a pipeline transporting gas from the platform in the Northwest of the SCI and one from 2006 that crosses the SCI from a UK platform in the West to a platform North of the SCI. A fifth pipeline is foreseen in 2019, which will connect the UK with Denmark. It will cross the Cleaver Bank slightly in the North West corner.

Whilst placing pipelines, the sediment is disturbed approximately 10m on each side of the pipeline (Tamis et al., 2011). Roughly estimated, the total length of pipelines that currently transect the Cleaver Bank habitat type 1170 area is 85 km. This amounts to 170 ha (0,2% of the Cleaver Bank H1170 area) of sediment that was disturbed during placement. As (1) the total footprint of these pipelines is very small, and (2) they are buried in the substrate, their impact on the conservation objectives and the fishing activities can be considered very low.

Shipping routes

There is one defined shipping route that crosses the Cleaver Bank SCI in the South-East corner (van der Burg et al., 2012). Shipping does not cause specific disturbance to habitat type 1170. The frequency with which this route is used is relatively low. However because of the fact that the ships that use this route usually transport harmful substances, effects can be substantial when calamities occur. The number of reported discharges is relatively low.

The effects of shipping are considered to be low to marginal because of the low intensity (Lindeboom et al., 2005).

8 Fleet activity on the site and in the region

Opmerking [AMS2]: This information will be updated with 2016 information and new maps will be added.

In Cleaver Bank, the spatial distribution of habitat type 1170 is used as the guiding principle in the development of the management measures. For Cleaver Bank, fisheries data have been collected in order to (1) quantify fisheries pressure on the habitat type, and (2) provide insights in the economic importance of the area for the fishing industry. Information on fishing intensity for the whole region was produced by IMARES for FIMPAS Workshop 3, 2011, for the period 2006-2008. Furthermore, economic information specific for the Cleaver Bank closures is given for the period 2010-2015 for the Dutch, British, Danish, German, Belgian, Swedish and French fishing fleets (Hamon et al., 2017).

8.1 Regional fleet activity (fishing days, effort)

Figures 8.1, 8.2 and 8.3 clearly demonstrate the dynamics of the fisheries in the whole region. The distribution of fishing effort for this period is not uniform in space or time over the Cleaver Bank. The maps show significant year to year variability in effort among the 2006-2008 years. This variability is mainly driven by TAC/quota, fishing day constraints and fuel prices. The main conclusions for the maps presented in this chapter are that (1) Fishing effort for beam and otter trawl is considerably higher than fishing effort of other gears (figure 8.1), and (2) effort is distributed all over the Cleaver Bank SCI but with significantly higher fishing intensities in the Botney Cut (figure 8.2).

Fishing effort was analysed within the framework of the FIMPAS project by IMARES for 6 Member States (Belgium, Germany, Denmark, France, United Kingdom and The Netherlands). Annex 1 contains the resulting quarterly maps of the fishing effort of beam and otter trawl (vessels with engines higher than 300 HP) in the Dutch part of the North Sea (indicated by the dotted line is the EEZ), for the years 2006 – 2008. Q1 = January-March, Q2 = April-June, Q3 = July-September, Q4 = October-December. The main conclusions from these maps are that (1) both fisheries (beam and otter board trawling) have no marked seasonality and (2) otter board trawling mainly takes place in the Botney Cut; beam trawling does not exhibit a distinct spatial pattern. These conclusions were drawn for the years 2006-2008, however more recent years also exhibit that the bulk of fisheries on the Cleaver Bank takes place in the Botney Cut.

Opmerking [AMS3]: Newer fisheries intensity map will be added

Figure 8.1a. Total fishing effort (KW*hrs) for beam and otter trawls combined for all countries (B, D, DK, F, NL, UK) by year (produced by IMARES for FIMPAS Workshop 3, 2011).

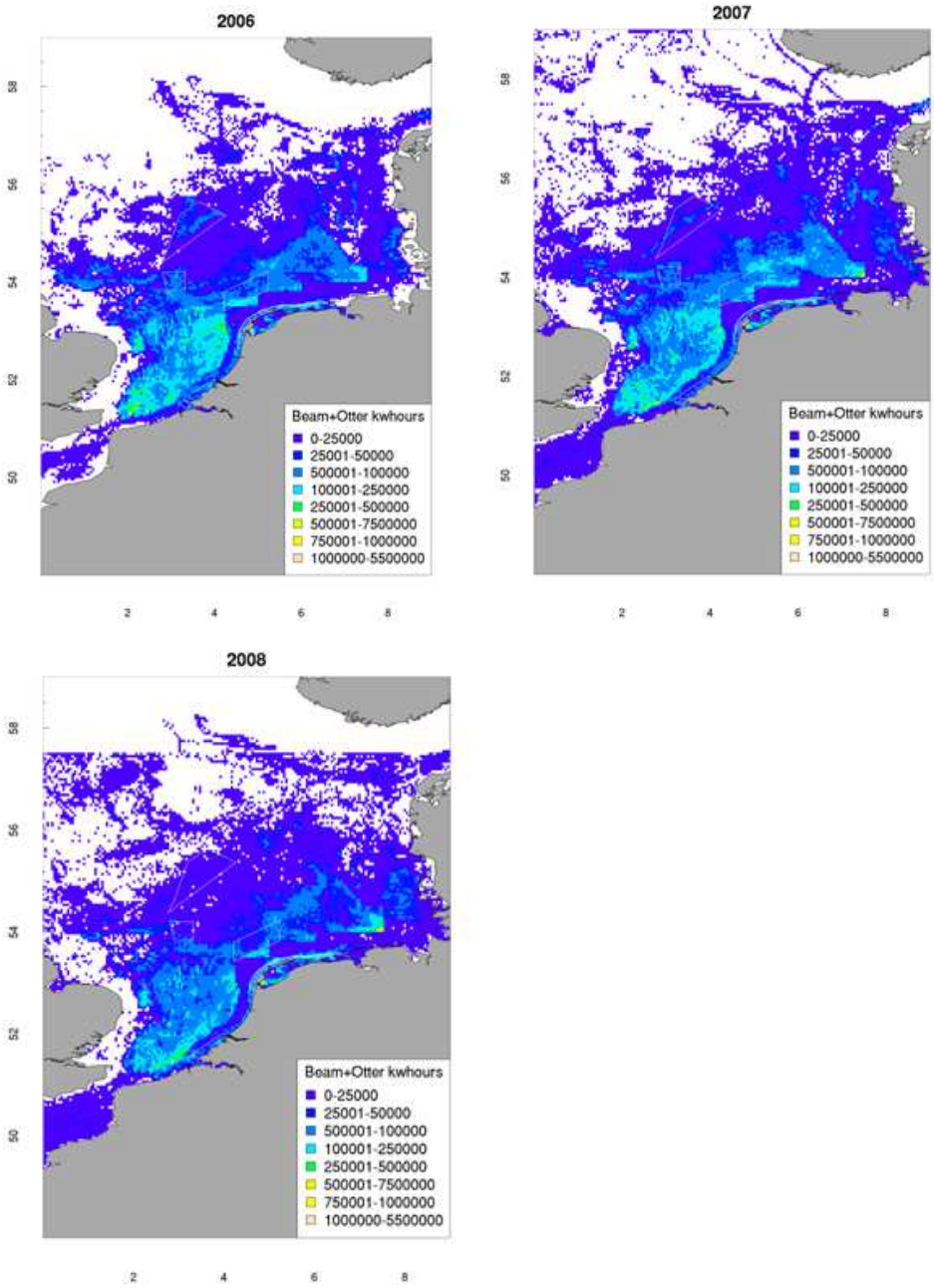


Figure 8.1b. Total fishing effort (soak time hours) for gillnets and trammel nets combined for all countries (B, D, DK, F, NL, UK) by year (produced by IMARES for FIMPAS Workshop 3, 2011). Please note that the scale is different from figure 8.1 a.

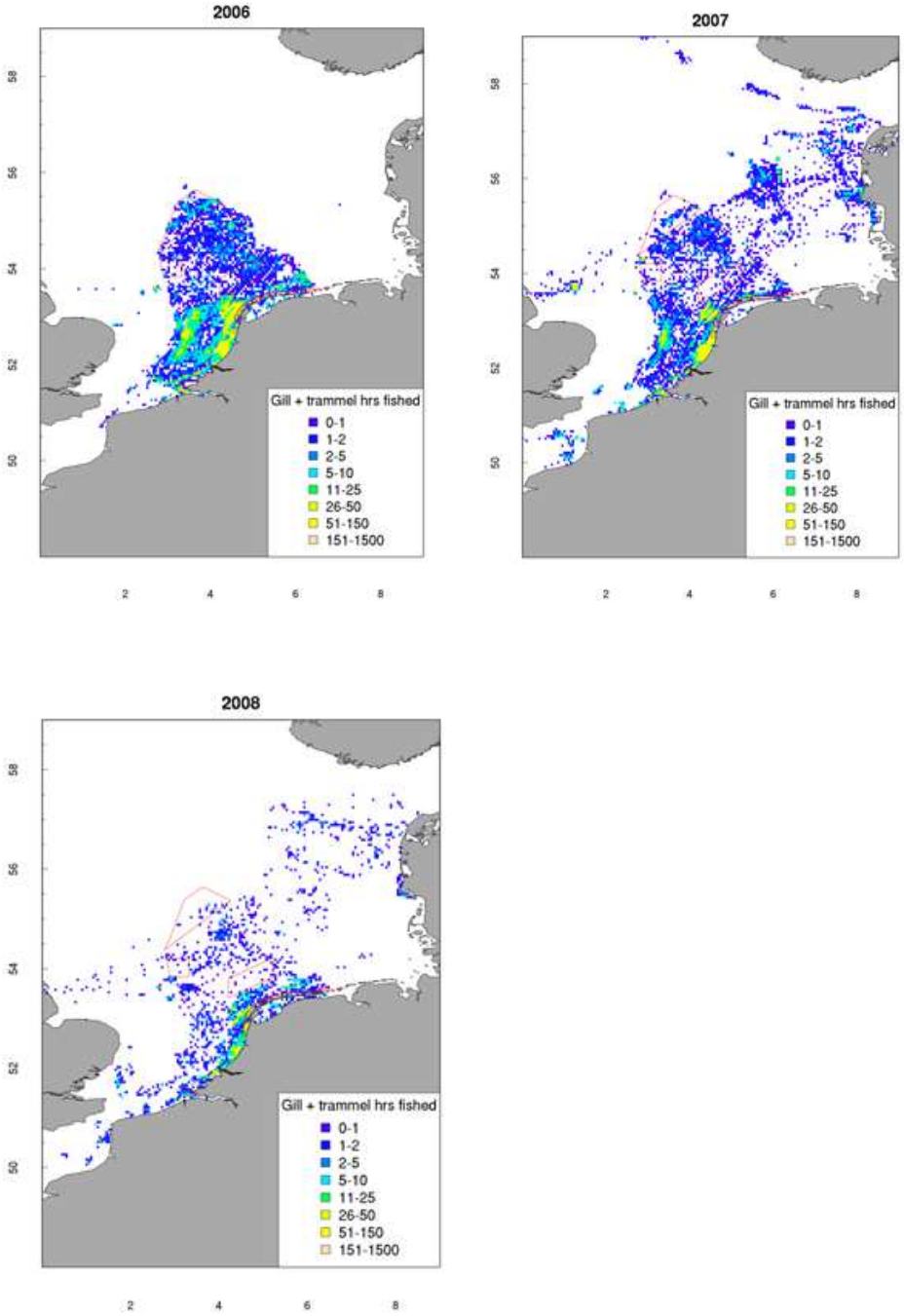


Figure 8.2. Effort of the Dutch fleet from 2006-2008. The Natura 2000 sites are marked in red/brown (Van Oostenbrugge et al., 2010). Please note difference in scale compared to Figure 8.1

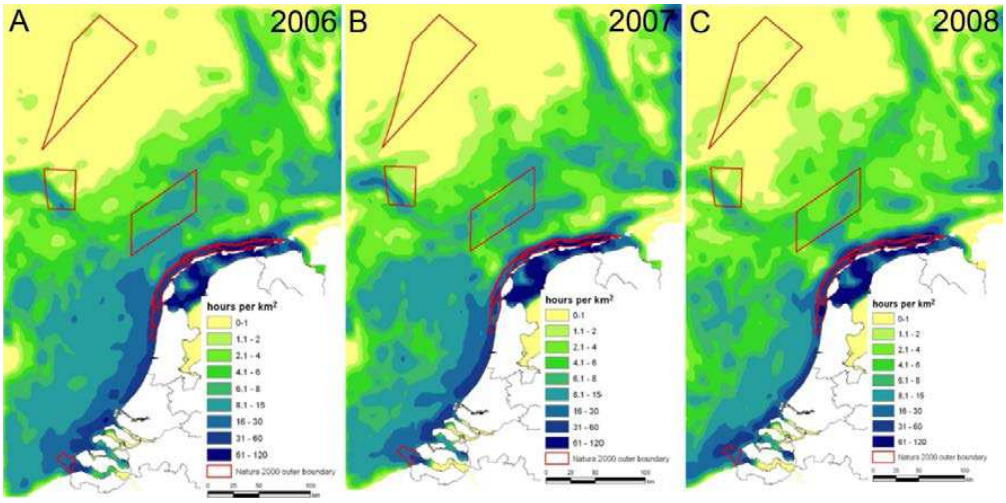
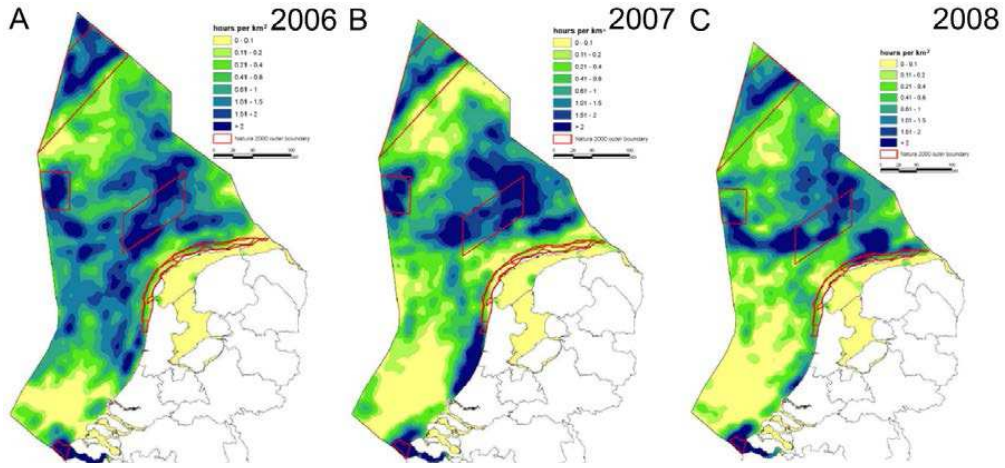


Figure 8.3. Effort of the non-Dutch fleet from 2006-2008. The Natura 2000 sites are marked in red/brown (Van Oostenbrugge et al., 2010) Please note difference in scale compared to Figure 8.2



8.2 Fleet activity in effort, landings and landing value

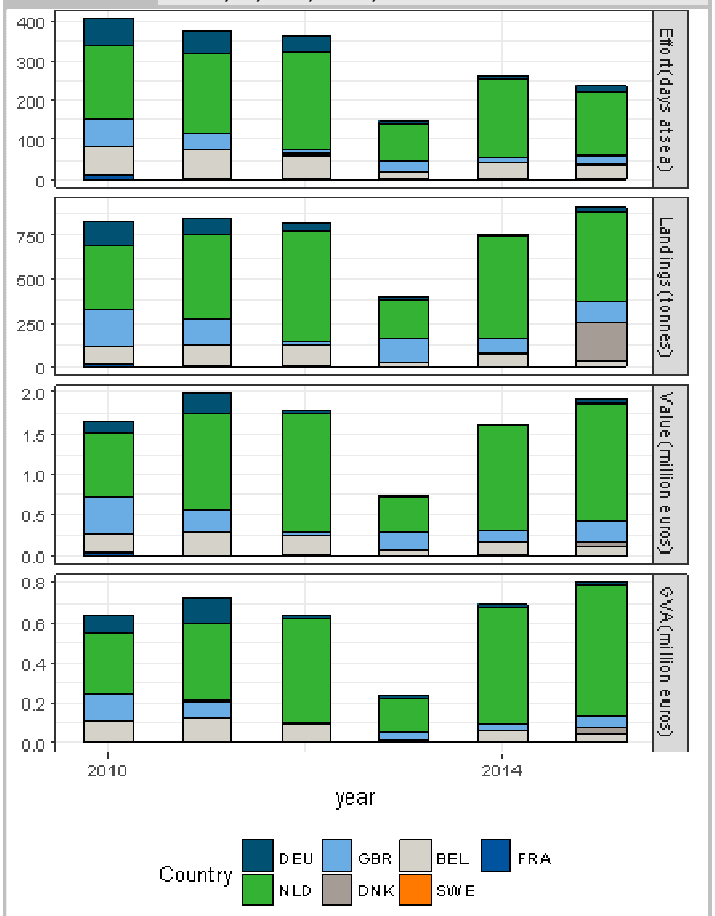
Over the 2010-2015 period the amount of fishing activities with bottom contacting gear has varied significantly from year to year in the proposed closed areas on the Cleaver Bank and seems to be declining (table 8.2 and figure 8.4). Most of the logbook records in the Cleaver Bank areas could be matched with VMS data, for all countries the coverage rate of VMS data was above 94% on average for the period studied. This result allows to focus more on the dataset where VMS and Logbooks are linked and provide greater spatial and temporal resolution. When using only the combined VMS-logbook information, it is seen that the effort in the area has varied from year to year with different patterns for the different countries. For Belgian, British and German fishing activities effort seems to be declining while Dutch activity is more variable without a clear trend. Swedish, French and Danish activity is minor on the Cleaver Bank. Over the period, the Dutch effort was on average 181 days, while British, German and Belgian activities amounted to 29, 33 and 49 days at sea respectively, about 10 to 4 times less. The effort of Sweden, France and Denmark lies in between 0-3 days at sea. While the effort showed a downward trend, the landings remained relatively stable over the period at an average of 466 tonnes for the Netherlands, 369 tonnes for Great Britain, 75 tonnes for Belgium, 59 tonnes for Germany, 38 tonnes for Denmark, 7 tonnes for France and 1 tonnes for Sweden representing a value of 1.110 k€ (The Netherlands), 231 k€ (Great Britain), 170 k€ (Belgium), 86 k€ (Germany), 11 k€ (Denmark), 10 k€ (France) and less than 1 k€ (Sweden) , and a GVA of 434 k€ (The Netherlands), 56 k€ (Great Britain), 76 k€ (Belgium), 46 k€ (Germany), 6 k€ (Denmark), 2 k€ (France) and less than 1 k€ (Sweden) (Hamon et al., 2017).

Table 8.2. Overview of effort, landings and values and gross value added of the fishing sector in the proposed closed areas of the Cleaver Bank of the different fleets (VMS and logbook merged data only)

Country	2010	2011	2012	2013	2014	2015*	Average
Effort (days at sea)							
Netherlands	185	204	252	95	193	160	181
Great Britain	66	37	6	28	16	21	29
Denmark	1	3	2	0	1	3	2
Germany	72	56	38	8	10	15	33
Belgium	74	72	60	17	39	34	49
Sweden		0					0
France	10	2	2	2	2	3	3
Landings (tonnes)							
Netherlands	354	474	639	217	584	528	466
Great Britain	211	150	17	140	77	114	118
Denmark	1	8	0	0	2	218	38
Germany	148	97	45	19	20	25	59
Belgium	104	111	108	22	72	34	75
Sweden		6					1
France	16	5	13	2	6	0	7
Value (1,000 euros)							
Netherlands	814	1,168	1,454	448	1,308	1,467	1,110
Great Britain	428	306	34	228	137	253	231
Denmark	0	4	0	0	1	60	11
Germany	149	234	54	22	23	36	86
Belgium	237	267	227	41	148	98	170

Sweden		1					0
France	30	5	15	3	7	0	10
Gross Value Added (1,000 euros)							
Netherlands	307	389	513	166	580	646	434
Great Britain	131	78	7	34	30	55	56
Denmark	0	2	0	0	0	35	6
Germany	90	118	23	15	13	19	46
Belgium	109	128	90	16	65	45	76
Sweden		1					0
France	0	1	5	1	3	0	2

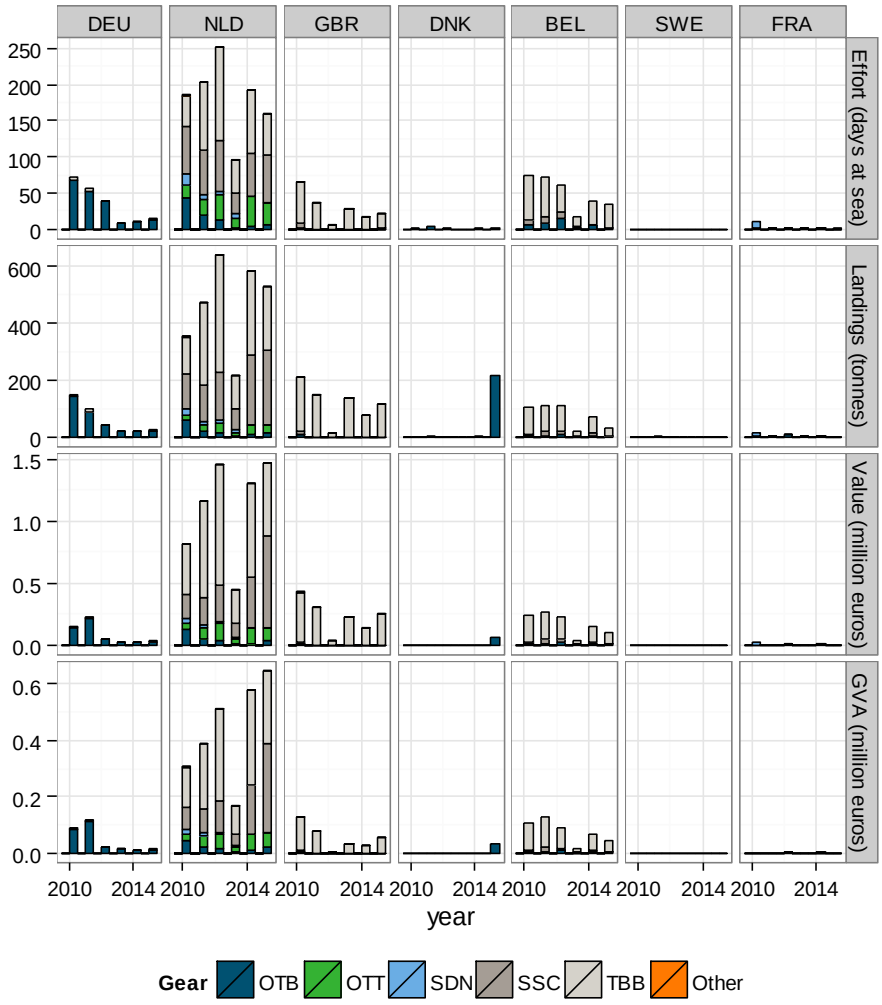
Figure 8.4 Historical trend of the fishing activities by the different fleets in the proposed closed areas of the Cleaver Bank. Effort, landings, value of landings and GVA are given by country. Source: Logbook data and VMS data and data from the Annual Economic report (STECF 2016), processed by WUR, CEFAS, TI,DTU, ILVO, SLU and IFREMER.



Source: Hamon et al., 2017

The majority of the fishing activities on the Cleaver Bank is carried out by Dutch vessels followed by Belgian, British and German fleets. The fishing occurs mainly with by beam trawls and otter-board trawls (figure 8.5). The Dutch fleet also operates seines in the area.

Figure 8.5 Historical trend of the fishing activities with different gears in the proposed closure of the Cleaver Bank for the different countries. Effort, landings, value of landings and GVA are given by country. Source: Logbook data and VMS data and data from the Annual Economic report (STECF 2016), processed by WUR, CEFAS, TI, DTU, ILVO, SLU and IFREMER.

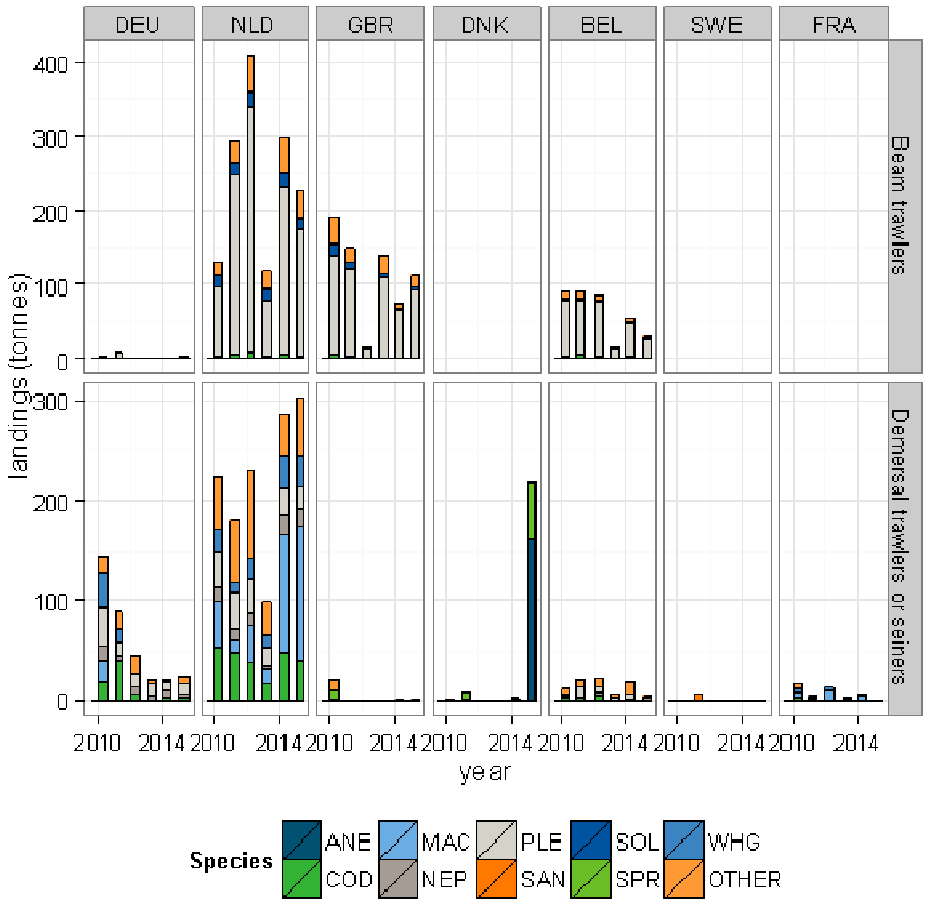


Source: Hamon et al., 2017

8.2.1 Species targeted

The main species targeted by the beam-trawl fleet on the Cleaver Bank is plaice.. The other demersal gears catch a combination of species such as mackerel, sandeel, cod and whiting. Some sole and nephrops are caught as well. All other species have much lower landings with the notable anomaly of the Danish fleet in 2014 that caught anchovy and sprat (figure 8.6).

Figure 8.6 Landings in tonnes for the top 5 species per country on the proposed closed areas of the Cleaver Bank for bottom contact gears. Source: Logbook data processed by WUR, CEFAS, TI,DTU, ILVO, SLU and IFREMER. ANE=anchovy, COD=cod, MAC=mackerel, NEP=nephrops, PLE=plaice, SAN=sandeel, SOL=sole, SPR=sprat, WHG=whiting.



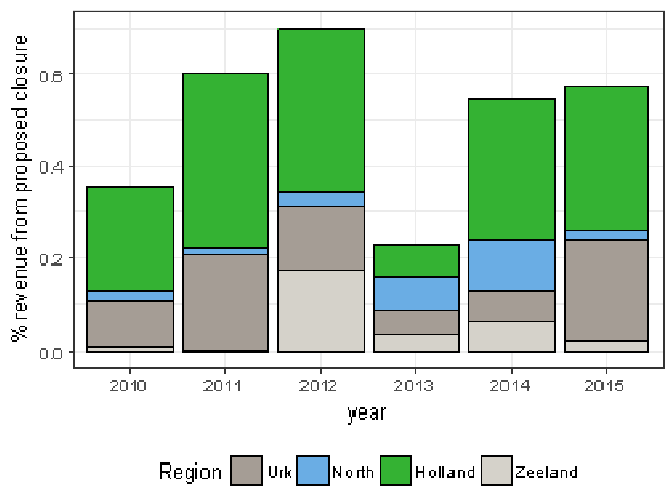
Source: Hamon et al., 2017.

8.2.2 Dutch fleet

The dependency of the Dutch fleet to the proposed closure is low at the fleet level (less than 1% of the revenue of the vessels operating at least part of the year with bottom contact gears, see figure 8.7). The vessels from Holland (South and North Holland) represent most of

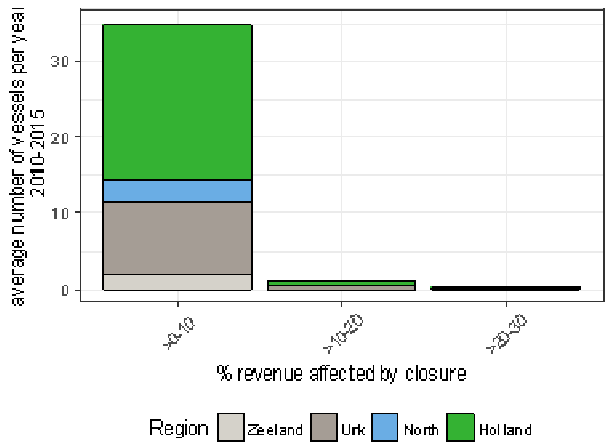
the activity in the closed areas, followed by Urk. The activity of vessels from Zeeland and North (harbours of Friesland and Groningen) can be substantial in years but does not show a constant proportion. On average around 35 vessels had some revenue from the area but for most of them the revenue from the Cleaver Bank represented less than 10% of their total revenue (on average about 3 vessels had a dependency higher than 10% per year, see figure 8.8). The number of vessels fishing in the proposed areas has increased over the years studied from 2008 to 2015 from on average 30 to on average 35 vessels (Figure 8.9).

Figure 8.7 Revenue per year and per region of origin in the proposed closed areas by bottom contact gears as a percentage of the total revenue for the Dutch fleet using bottom contact gears at least part of the year



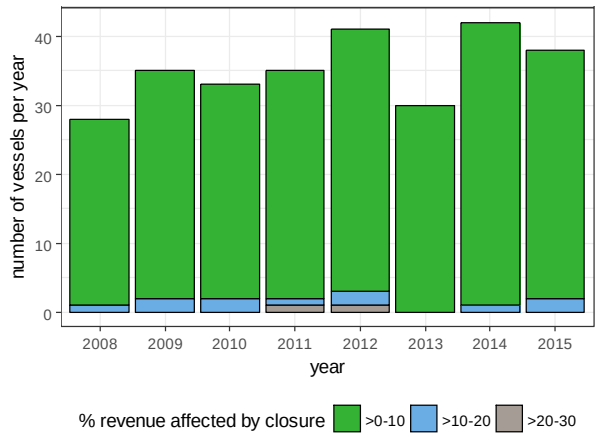
Source: Hamon et al., 2017.

Figure 8.8 Average stress profile of the Dutch bottom contact gear fleet over the years 2010-2015



Source: Hamon et al., 2017.

Figure 8.9 Number of vessels active in the proposed closed areas per year and percentage of their revenue with bottom contact gears in these areas



Source: Hamon et al., 2017.

9 Management Measures

9.1 Description of the management measures

The management measures for delivering the conservation objective for habitat type 1170 in the Cleaver Bank (as described in chapter 6.2 above) are as follows:

- A zoning system will be established, dividing the area into 4 management zones, seen on the map in figure 9.1.
- The full details/coordinates of the management zones are included in table 9.2.
- The management zones will be closed to the following mobile bottom-contacting gear (see table 9.1 for gear codes). This means that in the management zones the following fishing gears are prohibited:
    - Beam trawl
    - Bottom trawl / Otter trawl
    - Dredges
    - Seines (including Danish and Scottish Seines)
- The remaining area is open to all types of not otherwise prohibited fishing gear

Table 9.1 Gear codes for the banned mobile bottom contacting gear types

Gear groups that are banned in the closed zones	Gear Code Annex XI in EU Regulation 404/2011	International Standard Classification of Fishing Gears (ISSCFG)
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
Demersal seines	SDN, SSC, SPR, SV, SX	SPR, SDN, SSC, SV, SX

Figure 9.1. Map with four management zones on the Cleaver Bank (numbers are surface areas (ha).

Opmerking [AMS4]: Better map will be produced and one with alert zones

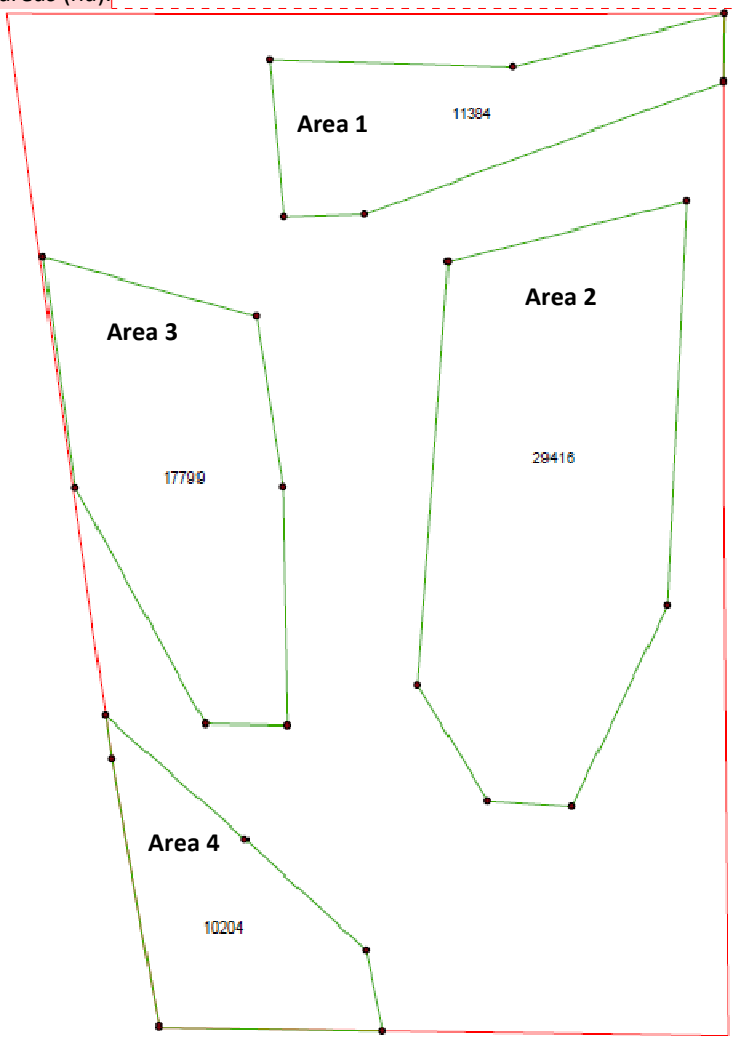


Table 9.2. Coordinates of the four management zones on the Cleaver Bank

area	x	y	orientation
1	498.711.286	6.013.985.309	ne
1	510.456.178	6.013.643.373	ne
1	520.693.794	6.016.221.701	ne
1	520.691.408	6.012.919.918	ne
1	503.275.032	6.006.515.750	ne
1	499.396.408	6.006.386.270	ne
2	487.741.562	6.004.415.561	e
2	498.052.818	6.001.555.208	e
2	499.560.853	5.981.736.397	e
2	495.591.841	5.981.827.636	e
2	489.263.202	5.993.272.336	e
2	499.378.431	5.993.345.230	e
3	518.914.778	6.007.142.651	w
3	517.957.280	5.987.565.716	w
3	513.322.804	5.977.823.860	w
3	509.245.593	5.978.110.182	w
3	505.828.742	5.983.726.718	w
3	507.350.944	6.004.199.444	w
4	504.138.566	5.967.010.825	sw
4	493.342.529	5.967.183.225	sw
4	491.049.498	5.980.133.209	sw
4	490.748.123	5.982.237.364	sw
4	497.523.274	5.976.238.696	sw
4	503.347.783	5.970.871.279	sw

9.2 Policy considerations guiding the development of the management measures

In the FIMPAS project, a number of management principles were established which were discussed with stakeholders at the third FIMPAS workshop. Also the principles mentioned in chapter 2 and 3 (legal frameworks of Habitats Directive and Common Fisheries Policy and the appropriate EC guidance documents) are of crucial importance. These principles were used to develop the appropriate policy response to mitigate the impact of fisheries in light of the conservation objectives, as specified in chapter 6. They have also been addressed specifically in the FIMPAS Steering Group proposal to explain the development of the measures (ICES, 2011a).

More specifically, the following policy considerations lead to the proposed management measure of closing the areas dominated by H1170 to bottom contacting fisheries:

1) The most important consideration is that the measure should **deliver the conservation objectives and be directly linked to it**. In this case measures were developed to prevent the physical disturbance caused by mobile bottom-contacting fishing gear in relation to the biotic and abiotic characteristics of good structure and functioning of habitat type

1170 (“Reefs”). In section 6 and 7 it has been explained that the crucial notion is to prevent human induced physical disturbance of the three dimensional shape of habitat type 1170 (Jak et al., 2009; ICES, 2012; Rijnsdorp, 2015). In essence this means that the cobbles, rocks, pebbles, boulders and gravel (which collectively constitute habitat type 1170) should not be moved or touched by fishing gear. ICES advised that heavy bottom trawl gear can destroy the physical structure of the habitat. ICES also advised that , for protected of reefs in areas frequently exposed to mobile, bottom-contacting fishing gears, complete closure may be necessary to restore habitats and species to favourable conservation status.

2) A **zoning approach** of the area is especially suitable for this purpose. In other words: the **measure can be differentiated in function of the spatial distribution of habitat type 1170**. For this reason only areas, which are dominated by habitat type 1170 (cobbles, rocks, pebbles, boulders, gravel) are proposed to be closed. Other areas, where habitat type 1170 is not dominant, are left open. ICES supported the proposal to close an area to fishing with mobile bottom-contacting gear. As the final proposal does not delineate significantly from the proposal that ICES assessed, and the scientific basis has only improved, we assume the advice is equally valid for the current proposal. As such, zoning contributes to a proportional policy response (see item 4 below). The delineation of the management zone where habitat type 1170 is dominant was challenging. Throughout the Cleaver Bank area, the reef habitat type is interdispersed with sandy and muddy grounds. In the development of the proposal, all available information was used. The starting point was geological information, including sediment maps, combined with biological information on species distribution. ICES considered this to be a good proxy for benthic community composition and therefore supports the demarcation of the closed zones. But also information brought forward by practising fishermen was used, including information on stony ridges and stones in fishing charts. In the end, the management zone was demarcated using the best available information on the presence and location of habitat type 1170. In addition, a second crucial notion in development of the zoning was the fact that the variability of and connectivity between the different benthic components on the Cleaver Bank (ridges, stones, pebbles, gravel, sand, mud, height differences, all present in a mosaic) contributes considerably to the known biodiversity of the area (Jak et al., 2009 and Lavalaye, 2011). Thirdly, enforceability and monitoring was also part of the considerations (see item 7 below).

3) The proposed measure should be **scientifically sound**, which was the reason for seeking ICES advice on it. ICES was explicitly requested to advice on the boundaries of the management zones in light of the available data. ICES supported the proposal from 2012 to close the areas dominated by habitat type 1170 to bottom contacting fishing gear. As the final proposal does not delineate significantly from the proposal that ICES assessed, and the scientific basis has only improved, we assume the advice is equally valid for the current proposal.

4) According to the EC Guidance the measure needs to be proportional: *id est* “an appropriate balance between sustainable exploitation of resources should be sought, including a precautionary approach to fisheries management”.

The proposed management is thought to be **proportional** because the closure of areas is only directed at bottom contacting fisheries in the areas dominated by habitat type 1170. It means that the areas dominated by sandy and muddy sediments are not closed to bottom contacting gears. Especially the high yielding fishing grounds of the Botney Cut are not included. Furthermore, at the request of the fishing sector, some "clean grounds" (not hosting habitat type 1170 in the South of the area) were taken out, and new areas (hosting habitat type 1170 to the North of the area) were added.

Looking at the total landings of the demersal fishing fleet (from NL, BEL, UK and GER), the income generated in the closed areas of the Cleaver Bank is deemed to be affected **proportionally**. First of all, income need not be lost, because TACs/Quota are unaffected by the measures (see also section 13). About 29% of the total landing value from the Cleaver Bank SCI (2006-2011) was obtained in the proposed management zone (Hamon et al., 2013). Specifically for the Dutch sector, an analysis by the LEI in the period 2010-2015 concludes that the management zone represented 0,22% (2013) to 0,65% (2012) of total revenue of the Dutch fleet. On average this is less than 0.5%. In comparison, TAC/quota, fishing day constraints and fuel prices have a much larger influence on total revenues. This is deemed to be proportional, although individual fisherman can be affected. According to the LEI analysis, not more than 3 vessels in any one year are affected to a considerable extent (10-30%) by the proposed measure (Hamon et al, 2017).

With regard to the **precautionary approach**: the Steering Group proposed to close the deep muddy trench (the Botney Cut) to beam trawling, because of the mud plumes such fishing could potentially cause. Such plumes could have a negative effect on some of the typical species of habitat type 1170. ICES, however, did not support this proposal given the very low effort of beam trawling in the Botney Cut. Therefore, while aligning the proposal to ICES advice, this element is dropped from the regulatory measures. At the same time, precautionary considerations on connectivity were important in the demarcation of the zone dominated by H1170 (see items 2 and 7).

5) **Consulting stakeholders and building on existing data (including socio-economic data)** were key policy considerations at the heart of the FIMPAS project and in the subsequent process. See chapter 4 for further explanations on this.

6) The measure would need to be **non-discriminatory**, which is the reason for putting this proposal to the European Commission for further decision making in the CFP context. This guarantees that the measure is not only effective in terms of delivering conservation objectives, but also equally applicable to bottom contacting gears on ships from all Member States active in the area.

7) The measure needed to be **controllable and enforceable**. The current zoning approach, with continuous and large closed areas contributes to ease of control and enforcement. In the course of the development of the proposal the fishing sector proposed a total of 8 small scattered areas contributing to a very patch zoning, which was considered to be far inferior in terms of effective control and enforcement. This is further explained in section 10.

8) An **adaptive approach** comprising a review of the regime after 6 years.

10 Control and Enforcement

[PM The content of this chapter is part of the discussions in the Joint Control Expert Group under the Scheveningen Group.]

The proposed control, enforcement and compliance regime for the Cleaver Bank SCI consists of a combination of surface and aerial surveillance, establishment of an alert zone around the management zones, and remote monitoring of vessel position and gear activity. Such a regime would be in line with future control and enforcement challenges within the CFP.

Key provisions, in accordance with Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of common fisheries policy (OJ L 343, 22.12.2009, p. 1), to be included in the delegated act to facilitate control enforcement and compliance are:

- Fishing activities of all fishing vessels in the management zones and a 4nm wide alert zone around the management zones shall be controlled by the fisheries monitoring authorities of the coastal Member State by using their system to detect and to record the vessels' entry into, transit through and exit from the fishing restricted areas.
- Fishing vessels carrying on board any prohibited gear types and travelling under six knots within the alert zone and management zone must use their vessel monitoring system for reporting fishing vessel identification, geographical position, date, time, course and speed. These data shall be transmitted every 10 minutes.
- The vessel will be under the obligation to report to the Fisheries Monitoring Centre of its flag entry and exit of alert and management zone.
- Fishing vessels may transit alert zone and management zone with prohibited gears on board provided that any prohibited gear on board be lashed and stowed during the transit; and the speed during transit is not less than six knots except in case of force majeure or adverse conditions. In such cases, the master shall without delay inform the fisheries monitoring centre of the flag Member State which shall then inform the competent authorities of the coastal Member State.
- The high frequency data can also be transmitted via GPRS/GSM. When GPRS/GSM signal is not available data shall be safely stored and forwarded to the competent authority on its request.
- A fishing vessel travelling at six knots or less that carries a prohibited gear entering the Cleaver Bank alert zone area without such a system or not transmitting or storing the data is in breach of the regulations, except in the case of force majeure or adverse conditions.

11 Monitoring

In the Netherlands all marine monitoring, including for N2000 and MSFD purposes, is programmed in the Marine Strategy for the Dutch part of the North Sea, part 2, the MSFD-monitoring programme[10]. This programme follows the structure of the MSFD on the basis of the 11 descriptors. Per descriptor a description is given of: the environmental targets, the associated indicators, the research needs per indicator, the research strategy, the functional measurement needs, the monitoring strategy and the measurement plan.
Based on the measurement data, the Monitoring Programme provides insight into:

1. the status of the indicators, thereby indicating the extent to which an environmental target is achieved (MSFD, Art. 10), in order to facilitate the ongoing assessment and periodic updating of the environmental targets (MSFD, Art. 5)
2. the effectiveness of the programme of measures to be implemented under the MSFD, of which N2000 measures are also part.

The "Informatiehuis Marien" is the supporting body which plays a central role in implementing the MSFD monitoring cycle, particularly in monitoring quality, transparency, availability and cost efficiency[11].

To reduce costs and improve consistency, the MSFD-monitoring programme is aligned as much as possible with the existing monitoring programmes for the Birds and Habitats Directive and the Water Framework Directive. International collaboration is pursued in all steps of implementing the monitoring cycle. OSPAR plays an important role in achieving regional cooperation, be it on common indicators, or joint monitoring.

In 2015 a baseline measurement campaign was done for benthos, focusing on the MPA's in the Netherlands, also on the Cleaver Bank. The baseline campaign and subsequent monitoring focuses on the typical species (in accordance with the Habitats Directive) and on a set of species indicative for the structure and function of the habitats, species that are sensitive to disturbance by human activities and species indicative for recovery. The data will be used for the update of the Initial Assessment in 2018, and also the reporting for the Habitats Directive in 2019, and the evaluation of management plans for the different MPA's. The measurement campaigns will be repeated every three years, to be able to evaluate the status and effectiveness of measures.

The Dutch monitoring plan is adaptive. The monitoring plan that has currently been designed is able to detect a change of 50% in population distribution based on hit rate of the species within the samples, with a power of 80%. Here, hit rate is considered to be a good proxy for species distribution and/or abundance.
Once every three years samples are taken with a grab sampler and video tracks, both are randomly located within the boundaries of the Natura 2000-site[12]. If a change of 50% in

[10] https://www.noordzeeloket.nl/images/Marine%20Strategy%20for%20the%20Dutch%20part%20of%20the%20North%20Sea%202012-2020%20Part%202%20-%20MSFD%20Monitoring%20Programme%20-%20summary_5169.pdf

[11] http://www.informatiehuismarien.nl/uk/

[12] Since the Botney Cut is not defined as a habitat under the Habitat Directive (deep, silty trench) no monitoring is required.

population distribution is detected, a further assessment and an adjustment of the monitoring plan can take place if necessary.

All species found in the samples (grab and video) are recorded. The analysis needed for the detection of an increase in hit rate will be performed only for the indicator species as mentioned in table 11.1. A 50% change in hit rate for an indicator species triggers further analysis of the monitoring plan, both at the level of (indicator) species and that of the basic principles (spatial and temporal distribution).

This paragraph is based on Wijnhoven et al. (2013) and Troost et al. (2013)

11.1 Suitable biological and pressure indicators

The basic principle of a suitable *biological indicator* is that it indicates the quality of the habitat type. This can be either a 'positive indication' (indicates quality improvement) or a 'negative indication' (indicates quality deterioration). The Marine Strategy Framework Directive published a new Commission Decision ((EU) 2017/848), which provides a set of indicators or criteria to assess the condition and change of the benthic environment. The Netherlands have taken up the following criteria accordingly:

- Spatial extent and distribution of physical loss (permanent change) of the natural seabed (D6C1) and of the natural extent of the habitat type in the assessment area (D6C4).
- Spatial extent and distribution of physical disturbance pressures on the seabed (D6C2).
- Spatial extent of each habitat type which is adversely affected, through change in its biotic and abiotic structure and its functions (e.g. through changes in species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), by physical disturbance (D6C3).
- The extent of adverse effects from anthropogenic pressures on the condition of the habitat type, including alteration to its biotic and abiotic structure and its functions (e.g. its typical species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), does not exceed a specified proportion of the natural extent of the habitat type in the assessment area (D6C5).

Quality of the habitat is defined by the following quality aspects:

- physical structure
- diversity
- community structure
- typical species

Considering the conservation objective for habitat type 1170 on the Cleaver Bank (quality improvement), biological indicators aim to indicate the improvement of these quality aspects. And, considering the quality aspects, suitable indicator species are selected based on the typical species from the Habitats Directive and species selected specifically for MSFD purposes. A national benthos indicator was developed to assess the quality and account for

changes in quality on the Dutch part of the North Sea and the different protected areas, among which the Cleaver Bank.

Besides the biological indicators, fisheries data are an important indicator to analyse the temporal and spatial fine-scale distribution of fishing efforts through the Physical Disturbance Indicator, which is developed by ICES and the Benthis project[13].
This indicator is a *pressure indicator* (impact of fisheries on the areas not closed for fishing effort) by combining VMS data and information on footprint.

11.2 Principal properties of indicator species
The following principle properties of indicators species are hereby defined:

- Species should indicate improvement in the quality aspects of the habitat type.
- Species should be sensitive to the impact of mobile bottom contacting gear.
- The time of reaction of a species on the measure (being reduction or removal of bottom contacting activities) should be considered (preferably after 6 or, at the latest, 12 years).
- Species should be abundant enough to give quantitative information about the effect/ effectiveness of the measure.

To assess quality status and detect effectiveness of measures, a list of indicator species is drawn up. These are all benthic species (epi- and infauna) (table 11.1) and are considered to cover the relevant quality aspects of the habitat as mentioned above. Mobile species, such as fish, and rare species are excluded, since there is a low hit rate for these species. These species will however be reported whenever found in video samples.

[13] www.benthis.eu

Table 11.1. Indicator species to monitor the improvement of habitat type 1170 on the Cleaver Bank.

Amphipoda	*Urothoe marina*
Anthozoa	*Alcyonium digitatum*
	Cerianthus lloydii
	Urticina sp.
Bivalvia	*Aequipecten opercularis*
	Arcopagia crassa
	Arctica islandica
	Pododesmus sp.
	Polititapes rhomboides
	Timoclea ovata
Echinoidea	*Echinocyamus pusillus*
Florideophyceae	*Lithothamnion sonderi* & *Phymatolithon* sp.
Gastropoda	*Aporrhais pespelecani*
	Buccinum undatum
	Pododesmus sp.
	Polititapes rhomboides
	Simnia patula
Malacostraca	*Galathea intermedia*
	Liocarcinus sp.
	Paguridae
	Pagurus cuanensis
	Upogebia deltaura
Polychaeta	*Aonides paucibranchiata*
	Chone duneri
	Goniadella bobrezkii
	Protodorvillea kefersteini
	Sabellaria spinulosa
	Spiophanes kroyeri
	Spirobranchus triqueter
	Terebellides stroemii
Porifera	undefined phylum

12 Evaluation of possible displacement of fishing effort and impact on new areas

Because certain areas of the SCI will be closed for certain gear types, some displacement is likely to happen, both within the SCI and outside the SCI.
Displacement is difficult to quantify, and it is impossible to predict where exactly activities will be displaced to. However, according to the ICES advice on Cleaver Bank, displacement of (otter board, beam) trawl fisheries is not an issue of concern.
According to the WER report (WER, 2017) the future value of fishing areas will decline and closure of these specific areas may result in smaller economic losses, when fishers move their effort to different locations. It is assumed that fishers move their effort to other locations in case of area closures. The effects of moving effort to another location (displacement) on catch and revenue are less well understood and are not necessarily negative. If effects are small at the scale of the fleet, this does not imply that individual fishers will not be affected substantially by a closure of a specific area at sea. The effects of closing a specific area are generally thought to have less effect fleet wide than on specific individuals or fishing companies.
Because not all of the SCI is closed, some displacement will take place to areas within the SCI that are not closed. Such a displacement within the SCI could lead to deterioration of those areas left open and thus could jeopardize reaching the conservation objectives which are designed to contribute significantly to the favourable conservation status. However, because the closed areas will benefit from the prohibition of certain gears and given the knowledge that 1st and 2nd trawl pass (Schroeder et al, 2008) are the most damaging, such potential further deterioration is extremely difficult to assess. In any case, such developments are dependent on the fishing intensity and distribution before the closure, the added fishing activity caused by displacement and external factors (such as fish distribution, TAC/quota, fuel prices, other spatial claims).
Therefore , as a part of the overall monitoring programme (see paragraph 11), the changes in effort distribution within the SCI and any possible effects will be monitored. The monitoring of activity in each site could assist in any future considerations relating to displacement and could be used to indicate any changes in fishing trends and activity.

13 Implementation

In case of EC Regulation there is no need for implementation in national law. In order to enforce the regulation a provision will be made in the Uitvoeringsregeling Zeevisserij (implementing regulation for marine fisheries) under the Visserijwet 1963 (Fisheries Act 1963).

After a period of 6 years after the publication of the Regulation the initiating Member State will assess the impact of the measure on the benthic ecosystem.

Fisheries industry and nature conservation organisations are invited to jointly give guidance to the implementation process, the communication on it, the monitoring of the ecological

effects and evaluation of the measure and to the improvement of compliance and enforcement.

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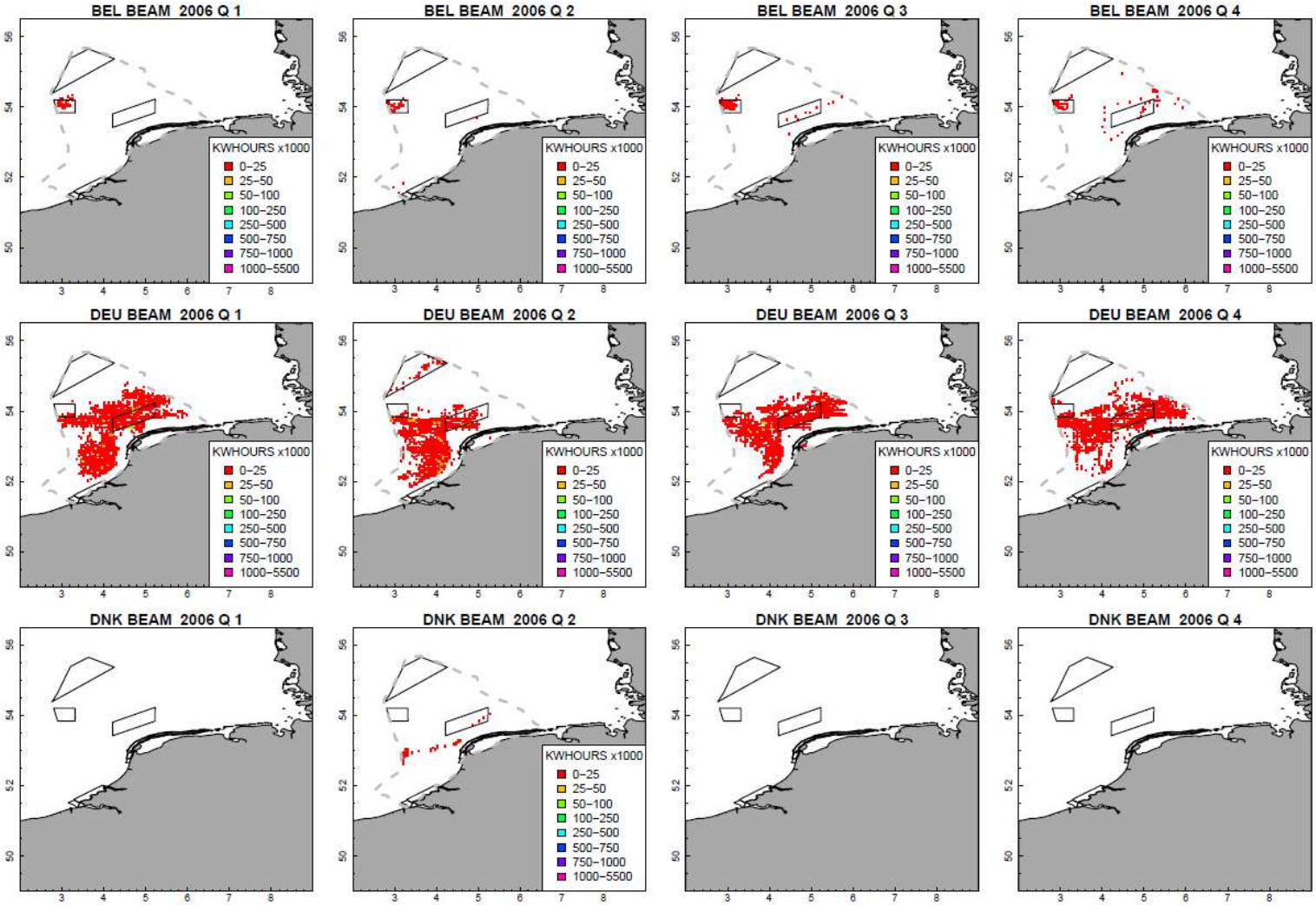
Annex 1

Seasonal trends in fisheries over the years 2006-2008

Beam and otter trawl are by far the two most important fisheries on the Cleaver Bank (see also section 5.5). Fishing effort was analysed within the framework of the FIMPAS project by IMARES for 6 Member States (Belgium, Germany, Denmark, France, United Kingdom and The Netherlands). This section 5.6 contains the resulting quarterly maps of the fishing effort of beam and otter trawl (vessels with engines higher than 300 HP) in the Dutch part of the North Sea (indicated by the dotted line is the EEZ), for the years 2006 – 2008. Q1 = January-March, Q2 = April-June, Q3 = July-September, Q4 = October-December.

The main conclusions from these maps are:

- Both fisheries (beam and otter board trawling) have no marked seasonality
- Otter board trawling mainly takes place in the Botney Cut; Beam trawling does not exhibit a distinct spatial pattern.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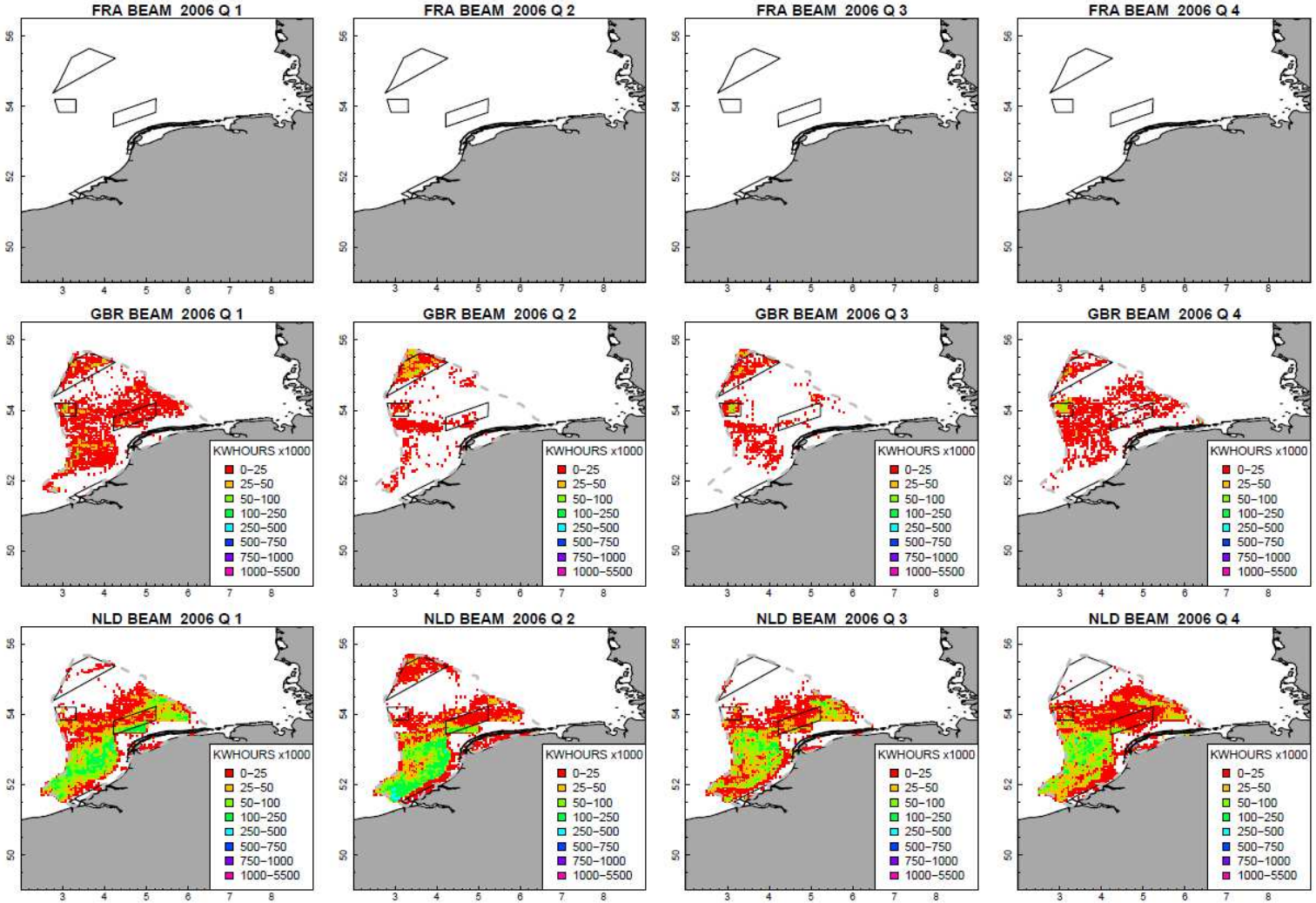
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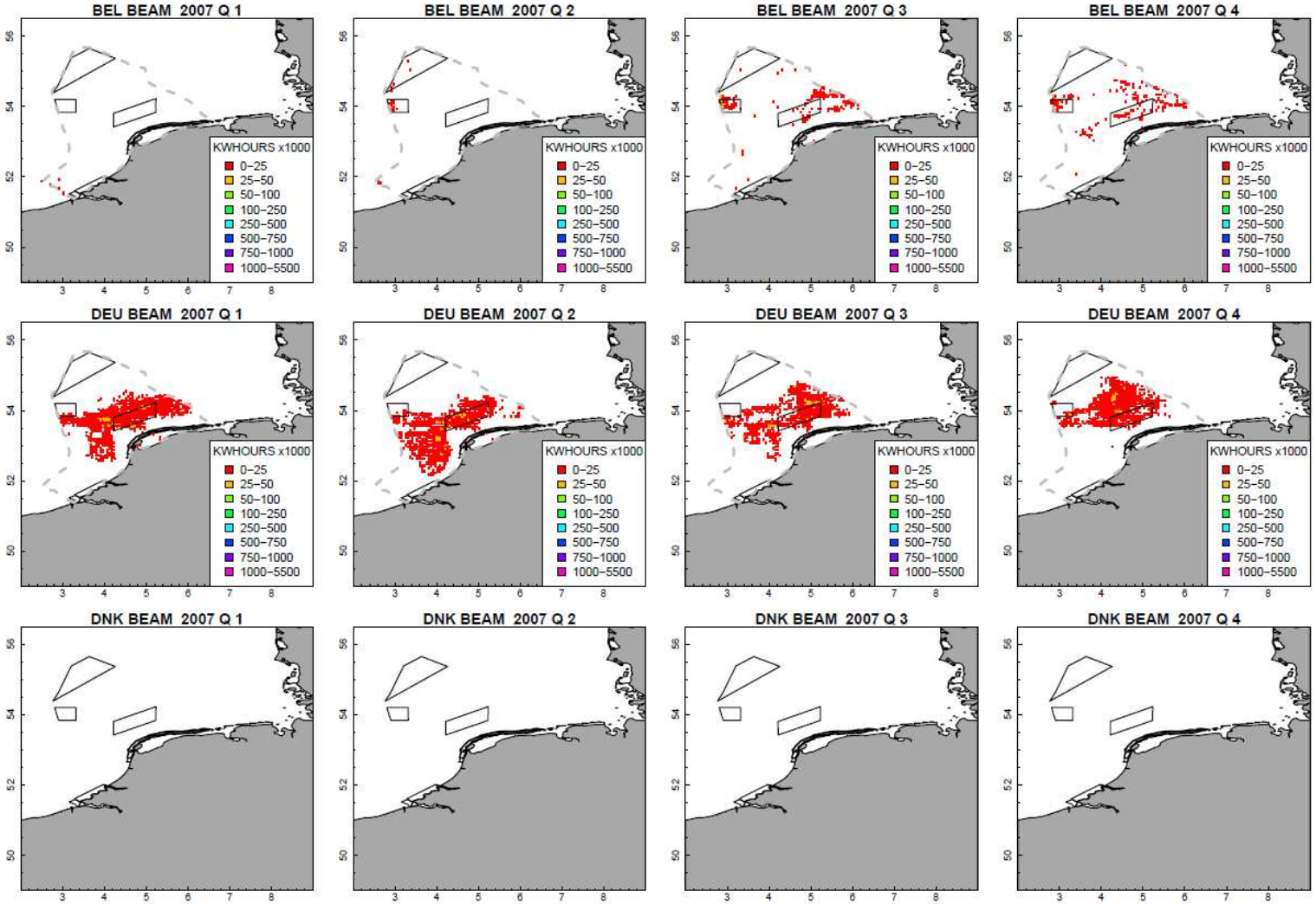
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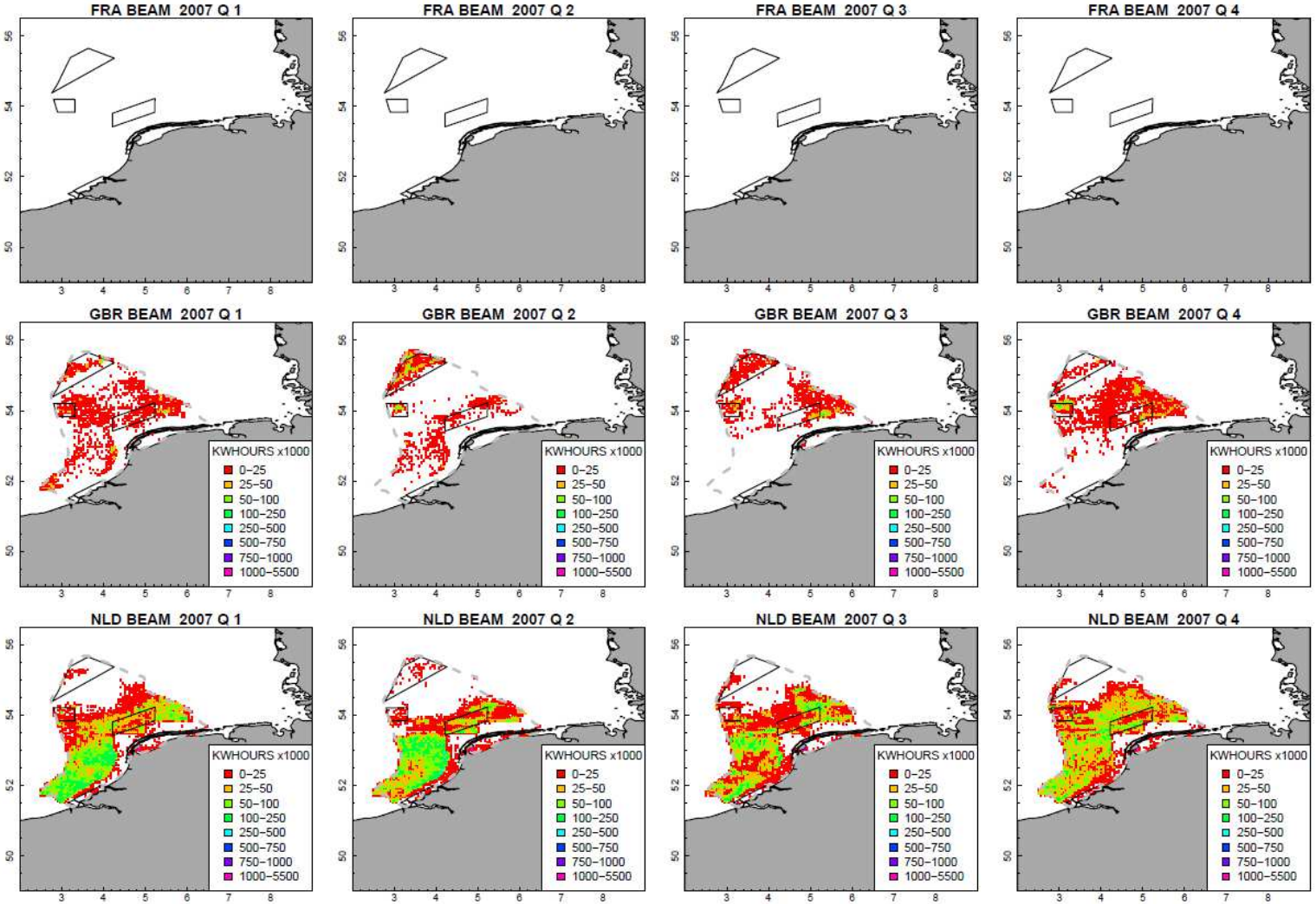
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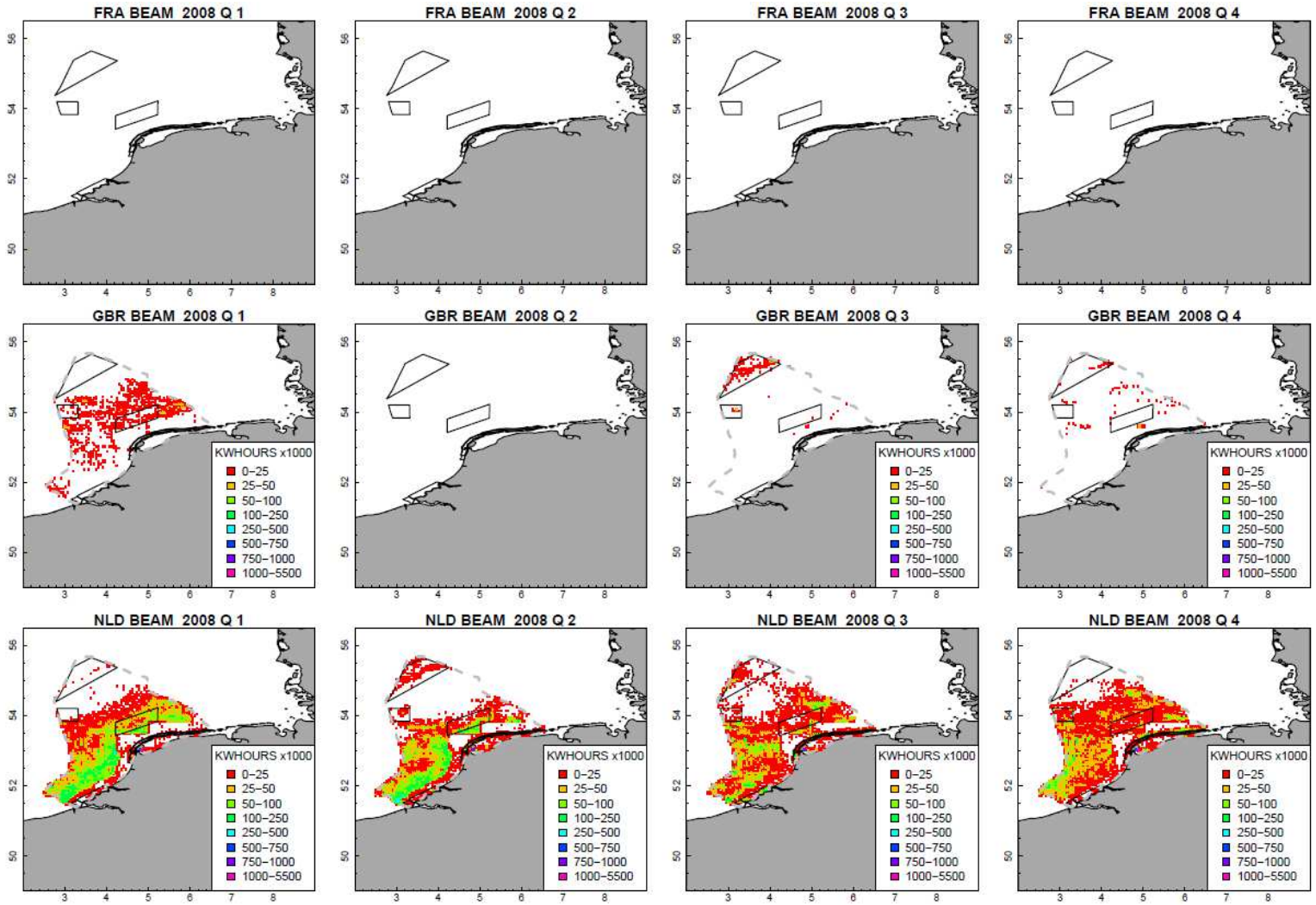
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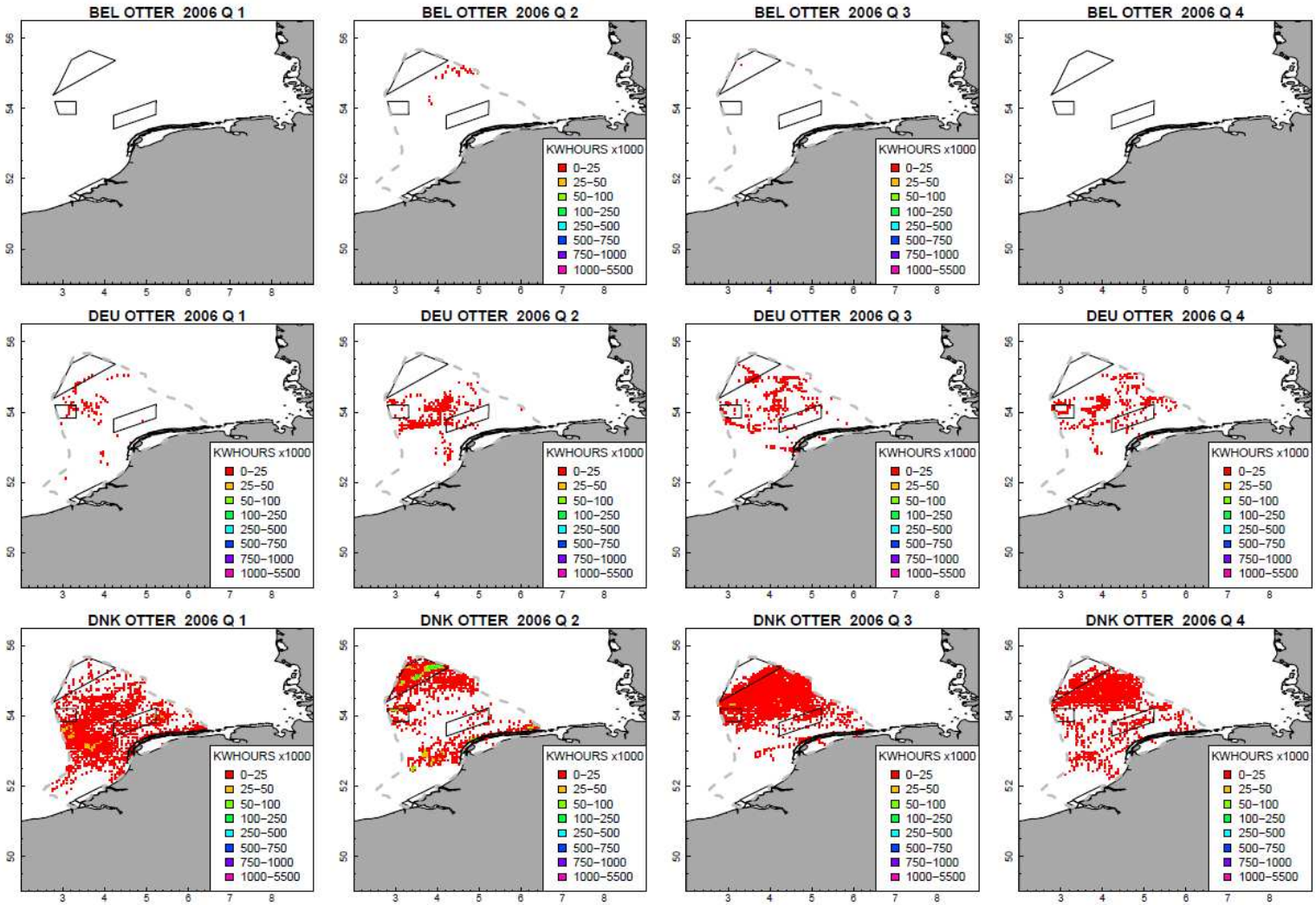
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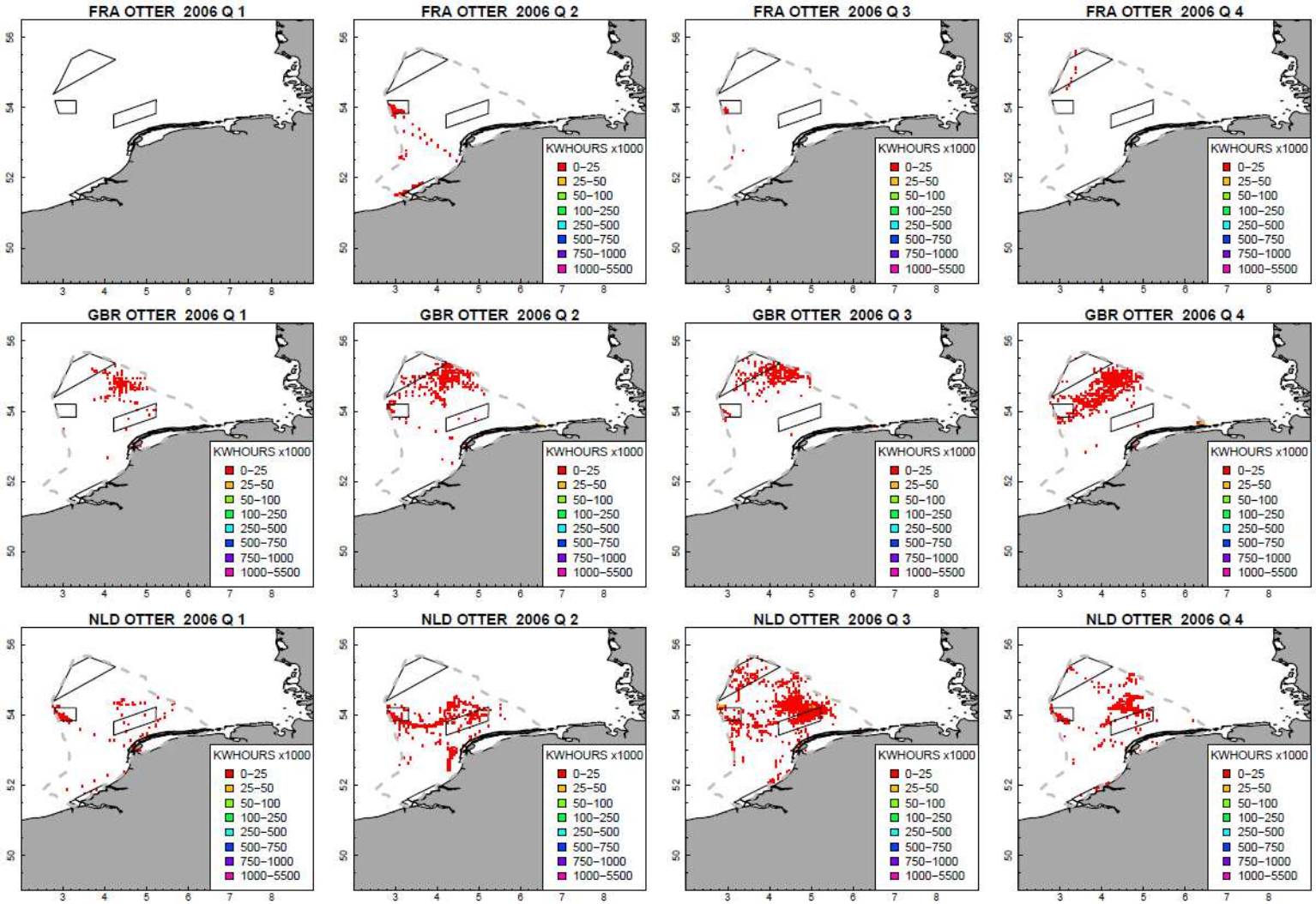
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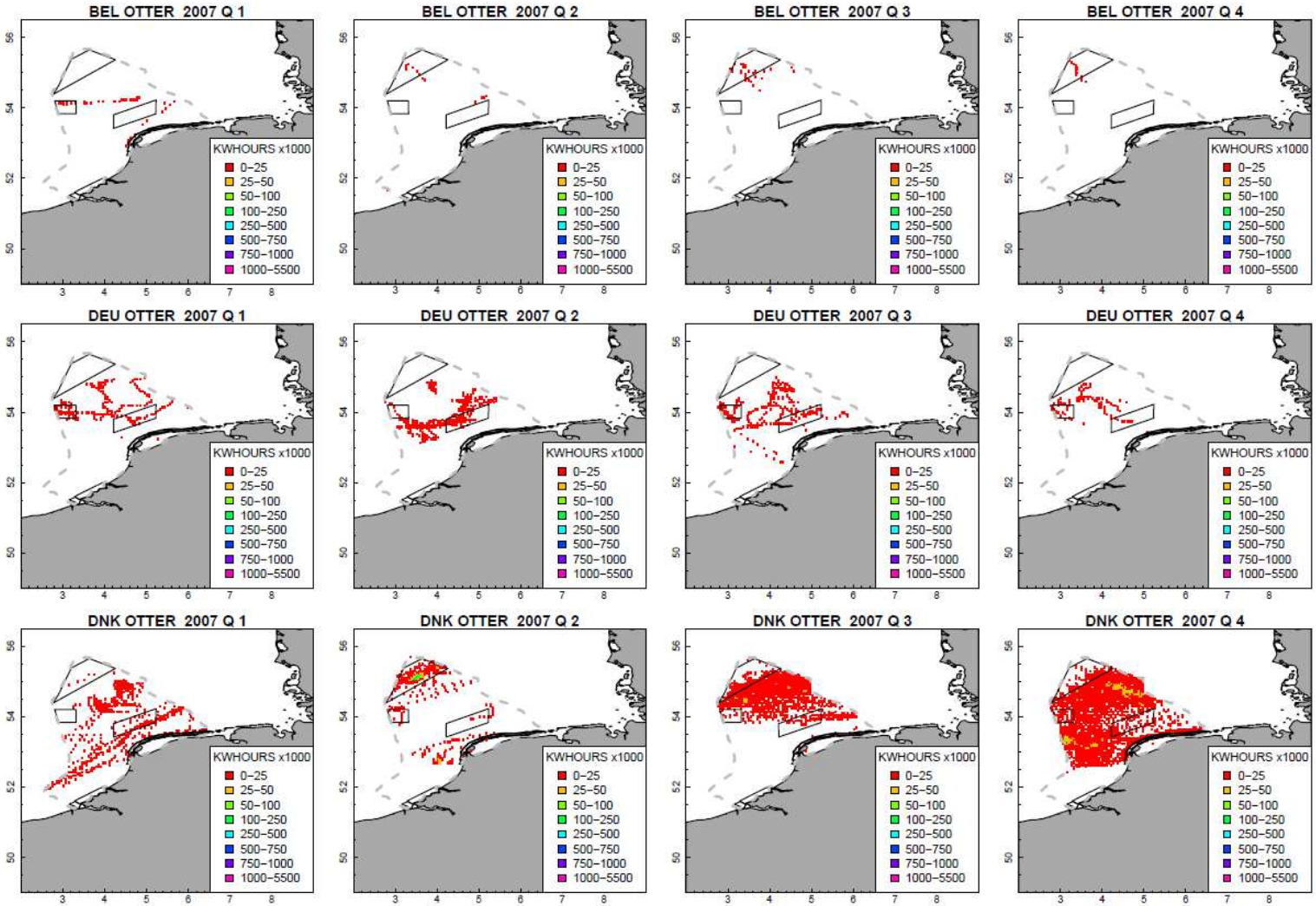
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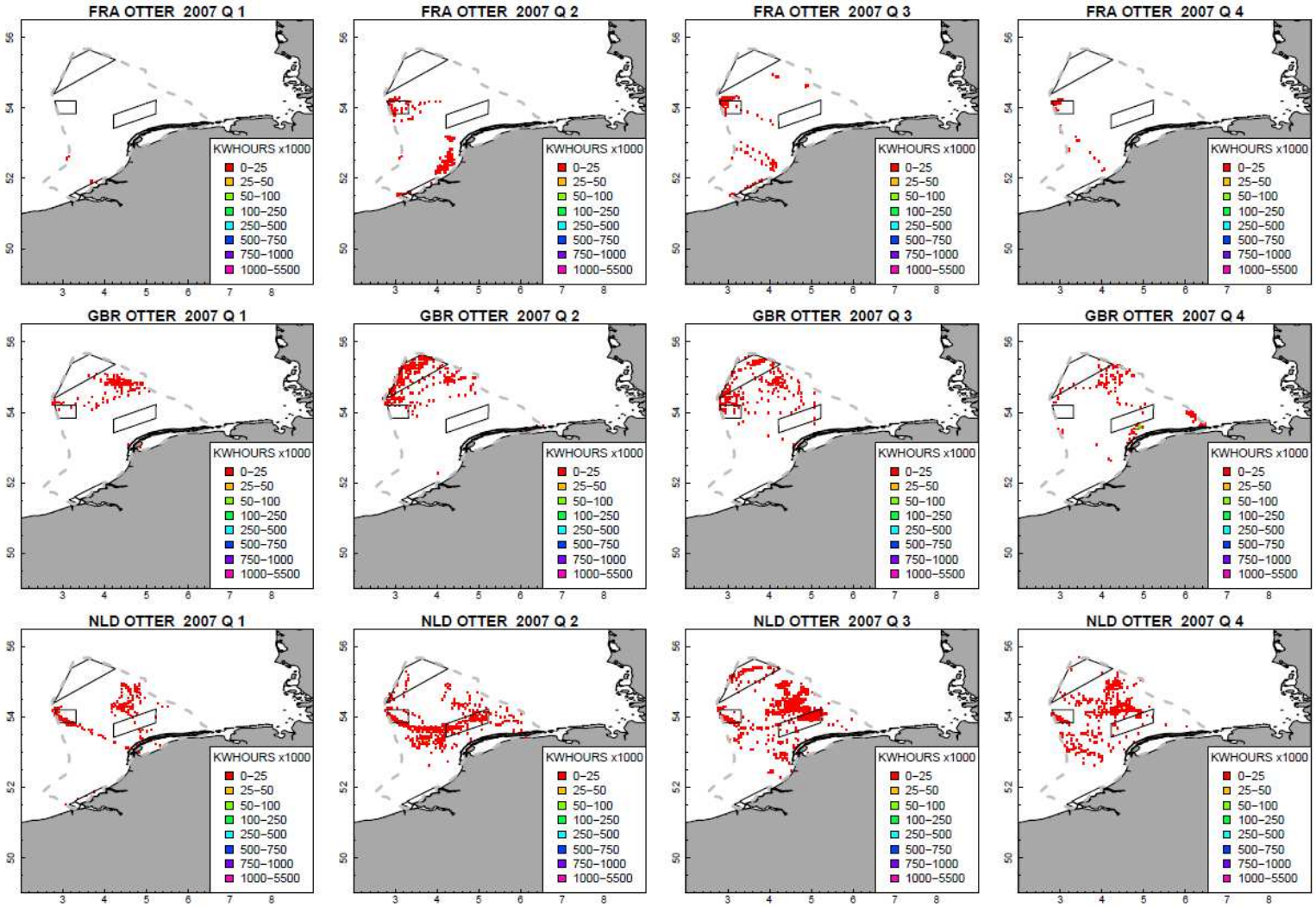
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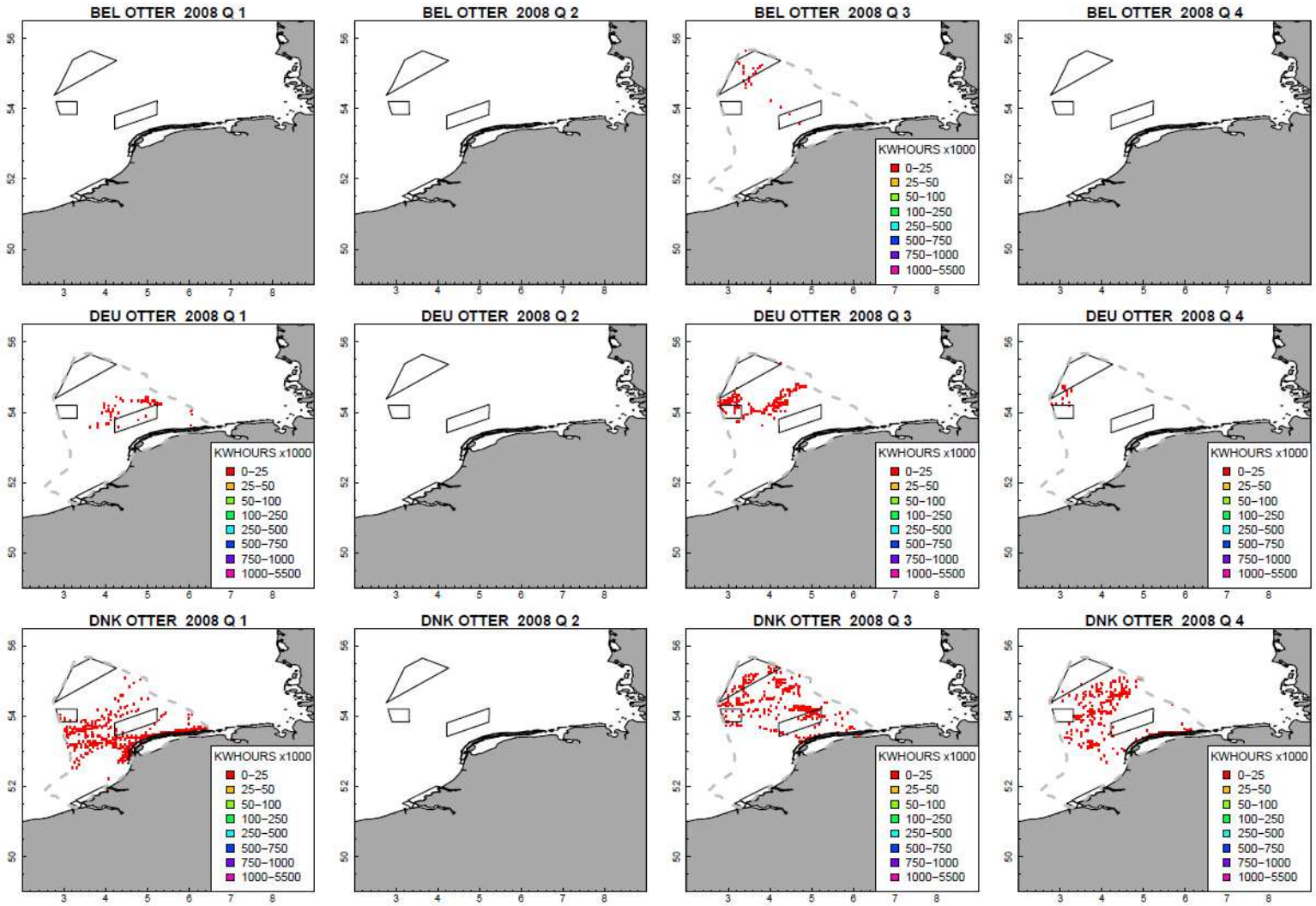
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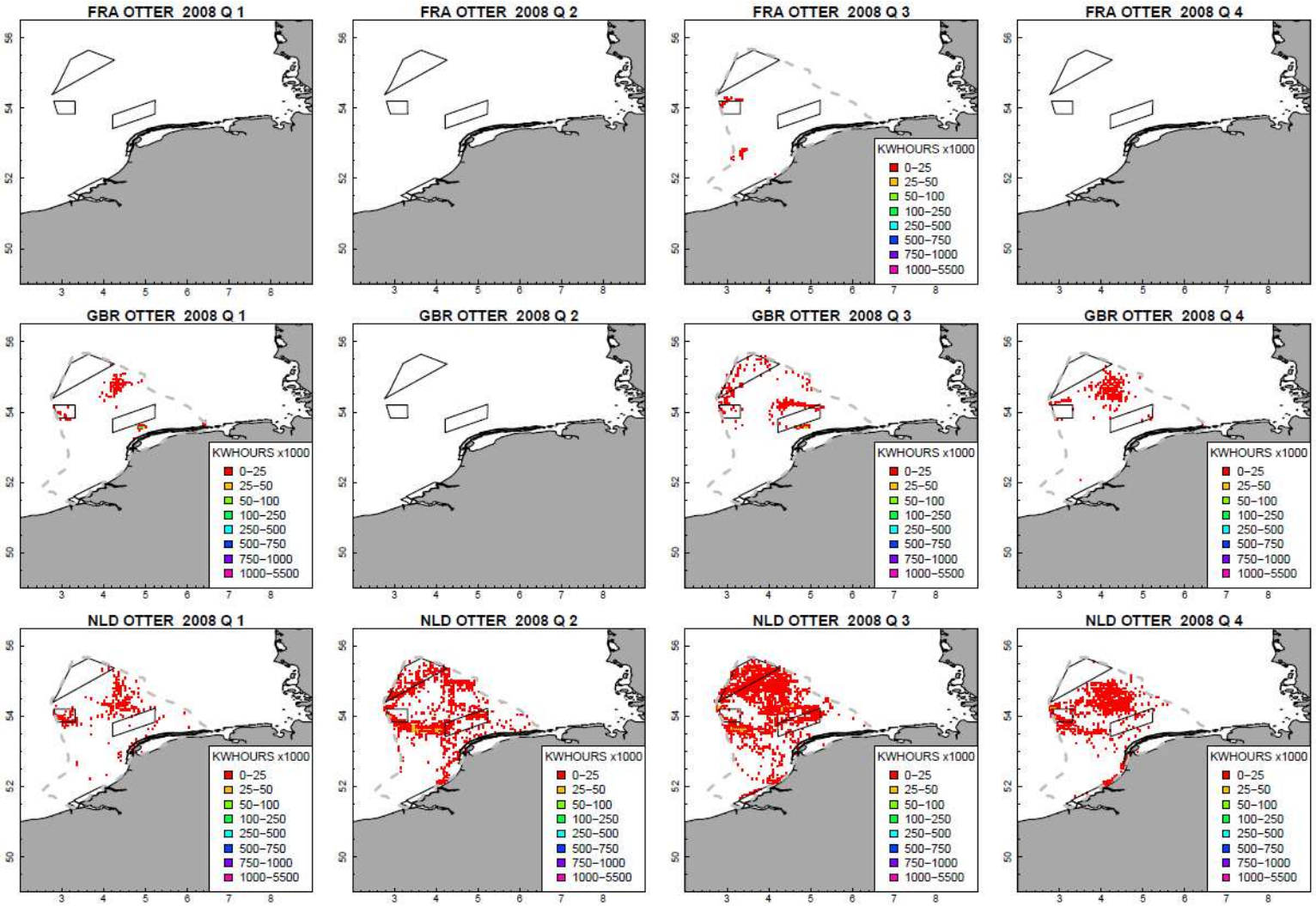
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