

# FIMPAS MEASURES REPORT 2011

FIMPAS STEERING GROUP

Fisheries Measures in Protected Areas (FIMPAS) within the Exclusive Economic Zone (EEZ) of the Dutch part of the North Sea: areas outside the 12 nautical miles zone: Proposals



**ICES**

International Council for  
the Exploration of the Sea

**CIEM**

Conseil International pour  
l'Exploration de la Mer

## **International Council for the Exploration of the Sea Conseil International pour l'Exploration de la Mer**

H. C. Andersens Boulevard 44-46  
DK-1553 Copenhagen V  
Denmark  
Telephone (+45) 33 38 67 00  
Telefax (+45) 33 93 42 15  
[www.ices.dk](http://www.ices.dk)  
[info@ices.dk](mailto:info@ices.dk)

Recommended format for purposes of citation:

ICES. 2011. Fisheries Measures in Protected Areas (FIMPAS) within the Exclusive Economic Zone (EEZ) of the Dutch part of the North Sea: areas outside the 12 nautical miles zone: Proposals, Dates, Venue. FIMPAS Steering Group. 35 pp.  
<https://doi.org/10.17895/ices.pub.19281014>

For permission to reproduce material from this publication, please apply to the General Secretary.

The document is a report of an Expert Group under the auspices of the International Council for the Exploration of the Sea and does not necessarily represent the views of the Council.

© 2011 International Council for the Exploration of the Sea

## Contents

---

<b>1</b>	<b>Foreword.....</b>	<b>1</b>
<b>2</b>	<b>Background and legislative context .....</b>	<b>2</b>
2.1	Conservation objectives .....	4
2.1.1	Habitats types.....	4
2.1.2	Species considered under the Habitats directive.....	4
2.1.3	Birds Directive.....	4
<b>3</b>	<b>Fisheries impact .....</b>	<b>5</b>
<b>4</b>	<b>Fishing gear and environmental impact.....</b>	<b>6</b>
<b>5</b>	<b>Marine Mammals.....</b>	<b>9</b>
<b>6</b>	<b>Fishing in the Natura 2000 areas .....</b>	<b>9</b>
6.1	Economic evaluation .....	14
<b>7</b>	<b>Designing management measures.....</b>	<b>15</b>
7.1	Low impact fishing (environmental friendly fishing) .....	16
7.2	Zoning approach.....	16
7.3	Formulating management measure proposals.....	17
7.4	Principles .....	18
7.5	Monitoring.....	20
7.6	Effort displacement or re-rigging .....	20
<b>8</b>	<b>Proposal for management measures .....</b>	<b>20</b>
8.1	Conservation objective for “Marine mammals” .....	20
8.1.1	Effect on seals from fishing.....	21
8.1.2	Effect on Harbour porpoises from fishing.....	21
8.1.3	Agreement on the analysis .....	21
8.1.4	Conclusion on need for action .....	21
8.1.5	Potential management options .....	22
8.1.6	Proposed management measures .....	22
8.2	Conservation objective for “Dogger Bank” (habitat type H1110, Habitats Directive).....	22
8.2.1	Conservation objectives .....	22
8.2.2	Fishing activity .....	23
8.2.3	Effect on habitat from fishing.....	23
8.2.4	Agreement on the analysis .....	23
8.2.5	Conclusion on need for action .....	24
8.2.6	Potential management options .....	24
8.2.7	Otter trawls.....	24
8.2.8	Proposed management measures .....	25
8.2.9	Monitoring.....	25

8.3	Conservation objective for “Cleaver Bank” (habitat type H1170, Habitats Directive).....	25
8.3.1	Conservation objectives .....	25
8.3.2	Fishing activity .....	26
8.3.3	Agreement on the analysis .....	26
8.3.4	Conclusion on need for action .....	27
8.3.5	Potential management options .....	27
8.3.6	Proposed management measures .....	27
8.3.7	Monitoring.....	28
8.4	Conservation objective for four bird species in the “Frisian Front” (Birds Directive).....	28
8.4.1	Qualifying species.....	28
8.4.2	Fishing activity .....	28
8.4.3	Agreement on the analysis .....	29
8.4.4	Conclusion on need for action .....	29
8.4.5	Potential management options .....	29
8.4.6	Proposed management measures .....	29
9	<b>References .....</b>	<b>30</b>

## 1 Foreword

---

This paper is based on summaries of the existing data and knowledge produced by consultants (Jak *et al.* 2009, Hal *et al.* 2010 and Oostenbrugge *et al.* 2010). References to the prime literature are found in these reports. These inputs were discussed at the two FIMPAS workshops 26-28 February and 26-28 June 2010. The reports from these workshops should be consulted for background on the discussions.

The paper is presented as a basis for discussion at the FIMPAS Workshop 3 at 24-26 January 2011 (Den Helder).

This proposal for fisheries measures in Natura 2000 areas in the Dutch EEZ is built on:

- 1) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)
- 2) Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (Birds Directive)
- 3) Guidelines for the establishment of the Natura 2000 network in the marine environment. Birds and Habitats Directive, European Commissions, May 2007  
([http://ec.europa.eu/environment/nature/natura2000/marine/docs/marine\\_guidelines.pdf](http://ec.europa.eu/environment/nature/natura2000/marine/docs/marine_guidelines.pdf))
- 4) Guidelines for fisheries measures for marine Natura 2000 sites: A consistent approach to requests for fisheries management measures under the Common Fisheries Policy  
([http://ec.europa.eu/environment/nature/natura2000/marine/docs/marine\\_guidelines.pdf](http://ec.europa.eu/environment/nature/natura2000/marine/docs/marine_guidelines.pdf))
- 5) Notification of the areas by the Dutch government to the European Commission, December 2008. Subsequent placement on the EU list of Habitats of Community importance by the European Commission in December 2009 and notification of this new list in February 2010  
([http://ec.europa.eu/environment/nature/natura2000/sites\\_hab/biogeog\\_regions/index\\_en.htm](http://ec.europa.eu/environment/nature/natura2000/sites_hab/biogeog_regions/index_en.htm))
- 6) Conservation objectives as guided by the Dutch government (Jak *et al.* 2009, Ch. 7)
- 7) Review of the data availability in relation to the conservation objectives and specification of reference periods as discussed and agreed at the FIMPAS workshop 1, 22-24 February 2009
- 8) Review of the gear impact matrix and distribution of fishing effort as discussed at FIMPAS workshop 2, 26-28 June 2009
- 9) Pre-assessment of the impact of fisheries on the conservation objectives (Deerenberg *et al.* 2010)
- 10) Additional analysis on effects of gillnets and effort distribution conducted during autumn 2010 and to be presented as an update of the IMARES report for FIMPAS workshop 2
- 11) Analysis of the geographical distribution of the effort, income, and value from capture fisheries (2006-2008). LEI October 2010 (Oostenbrugge *et al.* 2010)

- 12) The present paper describes a set of principles for the conservation of the habitat and seabird populations that was used to develop the management measure proposal. These principles are built on and consistent with the precautionary approach and precautionary principle as laid down by the United Nations Fisheries agreement (1995) and the Rio declaration (1992)

The basic model for building the proposal is to assess the impact from fishing on the conservation objectives by studying the potential impact expressed as a gear impact matrix and relating this potential impact to the actual fishing activities in the Dutch EEZ. There are two main concerns: habitat impact from trawling (beam and bottom otter trawls) and bycatch of marine mammals and seabirds by gillnets. Concerning the habitat impact Lokkeborg (2004) provides an overview of trawling impact on habitats while available VMS/logbook information is used to assess the fishing activities for the period 2006-2008.

There are other marine environmental issues related to fisheries such as ghost fishing, marine litter and discards, which are not addressed through the proposed measures.

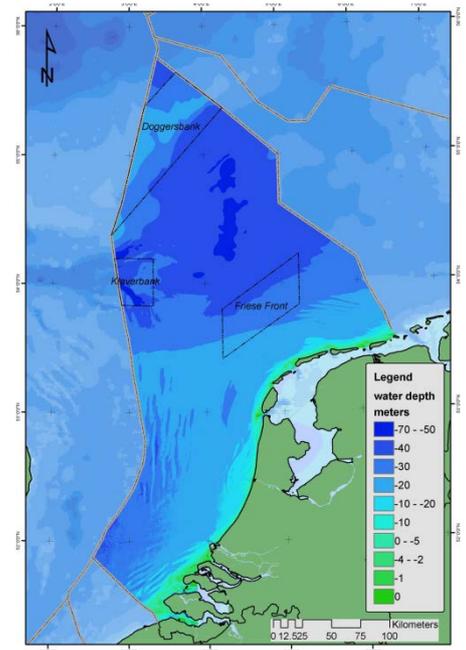
## 2 Background and legislative context

The spatial management of marine activities and conservation requirements is an essential component of the ecosystem-based approach to manage human activities. For fisheries, the often conflicting “short term socio-economics” and the “longer term conservation needs” must be managed in an open, fair, effective and reasonable manner. Under the EU Habitats Directive Member States have an obligation to select, based on scientific ecological criteria, Natura 2000 sites and to establish conservation objectives for these. In implementing measures to achieve these objectives account must be taken of economic, social and cultural requirements and characteristics. Progress towards achieving these objectives is measured by the conservation status and any measures taken shall be designed to maintain or to restore a favourable conservation status. Under the Common Fisheries Policy (CFP), measures taken for sites outside the 12 Nm zone fall under the exclusive competency of the European Community, and Member States must make a formal request to the Directorate-General for Maritime Affairs and Fisheries (DG Mare) for the adoption of such measures (EC 2008).

Measures proposed will be evaluated by the Commission to ensure an appropriate balance between sustainable exploitation of resources and the need to conserve important habitats.

Fishing activities that have a significant impact on the environment will be strictly regulated or even banned whereas fishing activities with a minor impact could be allowed. The principles of consultation, proportionality, non discrimination and effective control guide the adoption of fisheries measures under the CFP. In addition, the precautionary approach to fisheries management dictates that the absence of adequate scientific information should not be used as a reason for postponing or failing to take management measures designated to reach a favourable conservation status.

**Figure 1. The map shows the Dutch Natura 2000 off-shore areas**



The ultimate purpose is to contribute to the establishment of a coherent European ecological network of Natura 2000 sites, coordinated with neighbouring Member States, e.g. coordination with the German EMPAS project on the Dogger Bank.

The EC guidelines prescribe scientific and technical information backing Member States requests for fisheries management measures under the CFP. Such requests must include the following elements:

- 1) Comprehensive description of the natural features including distribution within the site.
- 2) Scientific rationale for the site's selection in accordance with the information provided in the Natura 2000 data form. Intrinsic value of its features. Specific conservation objectives.
- 3) Basis for the spatial extent of the site boundary clearly justified in terms of conservation objectives.
- 4) Threats to habitats and species from different types of fishing gear. List of other human activities in the area that could damage the habitats.
- 5) Fleet activity in the area and in the region, distribution of fleets (by nation, gear and species), and information on target and bycatch species, all over the last 3 years.
- 6) Seasonal trends in fisheries over the last 3 years.
- 7) Proposed fisheries management measures to maintain the habitats features in favourable condition. Are they proportionate and enforceable? Other conservation measures that apply to the area.
- 8) Control measures envisaged by the Member State, possible ecological and control buffer zones to ensure site protection and/or effective control and monitoring measures.
- 9) Measures to monitor and assess the maintenance and/or recovery of the features within the site.
- 10) Coordination with neighbouring Member States as appropriate.
- 11) Evaluation of possible displacement of fishing effort and impact on new areas.

Finalized conservation objectives for the three Dutch offshore Natura 2000 sites have not yet been legally put in place (designation decree). For the purpose of developing proposals for the fisheries measures the Dutch Ministry of Agriculture Nature and Food Quality requested that the FIMPAS project uses the conservation objectives for Natura 2000 sites (SACs and SPAs) in the Dutch sector of the North Sea proposed by Jak *et al.* (2009, see Tab. 1 and Fig. 1).

The Dutch government submitted four new areas to be protected under the Habitats Directive to the European Commission in December 2008. The European Commission put these areas on the list of Community Importance in December 2009. This means that the requirements and protection under the Habitats Directive apply to these areas. This concerns the North Sea Coastal zone and the Vlakte van de Raan (both within the 12 Nm zone and not part of the FIMPAS) and the Cleaver and Dogger Bank (in the EEZ, focus of FIMPAS).

Furthermore, the Frisian Front will be designated as a Birds Directive area, and therefore does not require prior listing by the European Commission.

## 2.1 Conservation objectives

The relevant natural features to be protected are:

### 2.1.1 Habitats types

Habitat Types H1110 as defined by the Interpretation Manual of European Union Habitats (EC 2002) are *sand banks which are slightly covered by sea water all the time*. This habitat type is for Dutch purposes subdivided into three classes H1110\_A (Tidal zone), H1110\_B (Coastal zone) and H1110\_C (Dogger Bank). Only H1110\_C is relevant for FIMPAS.

H1110\_C Sandbanks which are slightly covered by sea water all the time (Dogger Bank)

H1170 Open-sea reefs

### 2.1.2 Species considered under the Habitats directive

- H1351 Harbour porpoise (*Phocoena phocoena*)
- H1364 Grey seal (*Halichoerus grypus*)
- H1365 Harbour seal (or Common seal) (*Phoca vitulina*)
- H1095\* Sea lamprey (*Petromyzon marinus*)
- H1099\* River lamprey (*Lampetra fluviatilis*)
- H1103\* Twaite shad (*Alosa fallax*)

### 2.1.3 Birds Directive

Two Dutch Natura 2000 sites are designated based on the EU Birds Directive, the Frisian Front and the North Sea Coastal Zone 2 (inside the 12 Nm zone). Their designation is based on the following bird species in the habitat:

- A001 Red-throated diver\* (*Gavia stellata*)
- A002 Black-throated diver\* (*Gavia arctica*)
- A063 Eider\* (*Somateria mollissima*)
- A065 Common scoter\* (*Melanitta nigra*)
- A175 Great skua (*Stercorarius skua*)
- A177 Little gull\* (*Hydrocoloeus minutus*)
- A183 Lesser black-backed gull (*Larus fuscus*)
- A187 Great black-backed gull (*Larus marinus*)
- A199 Common guillemot (*Uria aalge*)

Species and Habitats indicated with \* are only considered in relation to the two coastal Natura 2000 areas, and are not part of the FIMPAS project.

Table 1 summarises the proposed conservation objectives for the three off-shore Natura 2000 sites, which are the focus of the FIMPAS project (from Jak *et al.* 2009, Ch. 7). Based on conservation objectives, human activities that impact conservation objectives should be reduced on Cleaver and Dogger Banks while impact should be managed to maintain the conservation status in the Frisian Front area.

**Table 1. Overview of the various site-specific conservation objectives.**

Natura 2000		Conservation objectives		
Habitats and species	Area	Surface area	Quality	Average numbers of birds to be sustained by the area (period when the birds are vulnerable in the area)
H1170 Open-sea reefs	Cleaver Bank	Maintain	Improve	
H1110_C Sandbanks	Dogger Bank	Maintain	Improve	
Harbour porpoise	Cleaver Bank, Dogger Bank	Maintain	Maintain	
Grey seal	Cleaver Bank, Dogger Bank	Maintain	Maintain	
Harbour seal	Cleaver Bank, Dogger Bank	Maintain	Maintain	
Great skua	Frisian Front	Maintain	Maintain	180 birds (Aug-Sep)
Great black-backed gull	Frisian Front	Maintain	Maintain	80 birds (Oct-Nov)
Common guillemot	Frisian Front	Maintain	Maintain	20,000 birds (Jul-Aug)
Lesser black-backed gull	Frisian Front	Maintain	Maintain	

Meeting the proposed conservation objectives as described in Tab. 1 means that the proposal must include measures to improve the habitat status while additional negative impact on the marine mammals and seabirds is not acceptable.

### 3 Fisheries impact

In general the effects of fishing can be classified as:

- 1) Removal (catch) of target species
- 2) Removal of non-target species (bycatch): fish, benthos, seabirds, marine mammals
- 3) Damage of organisms which are not brought on board, i.e. fish and benthos
- 4) Discard and offal will change the food availability and therewith change scavenging seabirds as well as benthic populations
- 5) Damage or disturbance to substrate and habitat structure
- 6) Damage or disturbance to biodiversity
- 7) Turbidity results in light reduction, which effects the benthic community

- 8 ) Noise mainly effecting marine mammals
- 9 ) Visual disturbance mainly effecting seabirds

In this list, the Natura 2000 sites are concerned with effects on the species/habitats (2, 3, 5, 6, 7) while the seabird concerns include (2, 5, 6, 7, 8, 9).

A non-impacted system is influenced by natural processes including storms, and is in balance with such processes. Therefore, the non-impacted system shows variability but does not show other long term trends than those caused by changes in the natural conditions, e.g. climate changes. Human activities, including fisheries that have impacted the ecosystem for a long term are difficult to distinguish from changes in the natural conditions. The main tool by which to detect human impact is to study trends of ecosystem health indicators and correlate these with impact indicators. These trends shall be measured against a background of natural variability. Examples of such trends include changes in the age composition of long-lived species or changes in the biodiversity towards dominance of short-lived species. Jak *et al.* (2009) assessed the conservation status of the relevant species and habitats objectives taking human pressures and the background variability into consideration.

#### **4 Fishing gear and environmental impact**

---

Different fishing techniques have different impact on habitats, seabirds and marine mammals. Therefore the effects are considered for each gear category. Fishing gears are classified in main categories (Nédélec & Prado 1990):

For the purpose of FIMPAS we are looking at gears with different impact on the habitats and distinguish between

- 1 ) Beam trawl
- 2 ) Otter trawl
- 3 ) Demersal seine nets
- 4 ) Set gillnets
- 5 ) Midwater trawls (pelagic trawls)

Within each broad category there are many subtypes some of which have very different impacts on the ecosystem.

Beam trawls have bottom contact and are fitted with ten to twenty so called tickler chains, which disturb the fish from the seabed, in particular flatfish. On rocky grounds, tickler chains are sometimes replaced with a mat of chains. These heavy chains and mats damage the benthic assemblages. There are beam trawl gears under development which have lower habitat impact (sumwing and pulse trawl/electronic fishing). It is therefore discussed if measures should distinguish between various the beam trawl categories.

Otter trawls are less heavy than the beam trawl but through their bottom contact, esp. of the doors they have major impact on the habitat. For otter trawls as for beam trawls higher horse power allows larger and heavier gears and therefore leads to higher bottom impact.

Demersal seine nets have a lower impact on the habitat than beam and otter trawls, however they have bottom contact.

Gillnets have little impact on the habitat but have a higher bycatch rate of marine mammals and seabirds.

Also midwater trawls present risk to marine mammals and seabirds.

It is discussed if the gillnet category should be further detailed based on the impact on marine mammals and seabirds. In particular, gillnets with large meshes (> 220 mm) have higher bycatch rates of marine mammals than other gillnets with smaller meshes but all gillnets will occasionally take marine mammals even if the catch rate is low. Therefore Council regulation (EC) 812/2004 specifies particular mitigation devices with these gears. Such regulations would remain effective inside a Natura 2000 area. It has also been established that gillnet fishing techniques have an important bearing on the risk presented to marine mammals. There is little quantitative data on bycatch of seabirds in gillnets.

The impact from fishing was classified as being low/medium/high by FIMPAS WK2. The assessed impact is the **potential impact**; the **actual impact** also depends on the fishing effort and increases with increasing effort. Tab. 2 shows the gear impact matrix as the outcome of FIMPAS workshop 2.

**Table 2. Gear impact matrix for the conservation objectives of FIMPAS (ICES FIMPAS WK2 report). Impact levels: *High*: direct disturbance, the continuity of the habitat/species is in danger. *Medium*: the affect is visible and the conservation status will not remain the same without any measures. *Low*: the habitat/species is affected, however the conservation status of the habitat/species is supposed to remain. The judgement is based on majority opinions. In most cells particularly for the Dogger Bank area there were a range of opinions; often industry stakeholders rated the impact lower than scientists and NGO's.**

CONSERVATION OBJECTIVES	Fishing gear				
	Beam trawl	Otter trawl	Demersal seine nets	Gillnets	Midwater trawl
<b>Habitats</b>					
Dogger Bank H1110_C Sandbanks	High	Medium	Low	Low	Not Relevant
Cleaver Bank H1170 Open-sea reefs	High	High	Low	Low	Not Relevant
<b>Marine mammals</b>					
Harbour porpoise	Low	Low	Low	Medium	Low
Harbour seal	Low	Low	Low	Low	Low
Grey seal	Low	Low	Low	Low	Low
<b>Seabirds</b>					
Great skua	Low	Low	Low	Low	Low
Great black-backed gull	Low	Low	Low	Low	Low
Common guillemot	Medium	Medium	Medium	High	Low
Lesser black-backed gull	Low	Low	Low	Low	Low

In particular the impact by beam trawls was discussed at FIMPAS WK2 and the key discussion point concerned the environmental disturbances caused by storms. As explained above the undisturbed system is impacted by natural processes including

storms, etc. However, taking this natural background variability into account the conclusion is that fisheries, in particular beam trawling, negatively impact the quality of the habitats. Standard techniques for estimating trends from time series are focused on separating the trend from the natural variability and measurement errors. Jak *et al.* (2009) assessed the conservation status of the relevant species and habitat objectives by taking this natural variability into consideration.

## 5 Marine Mammals

---

For species listed under the Habitats Directive and appearing in the designated area automatically conservation objectives are set. In the Dutch Natura 2000 sites Harbour porpoise (H1351), Grey seal (H1364), and Harbour seal (H1365) are present and therefore conservation objectives are set (Bos *et al.* 2008). However, marine mammals concerns have not led to the selection of the Natura 2000 areas under the Habitats Directive. Such a selection can only be done, according to article 4.1. of the Habitats Directive, where there are clearly identifiable areas representing physical and biological factors essential to their life and reproduction (e.g. foraging, reproducing). Such factors have not been demonstrated. Nevertheless, these species listed on the relevant annexes of the Habitats Directive are known to be present in the areas. Therefore conservation objectives for these species must be set. They have been phrased in terms of the “maintaining the quality of the living area for that species”.

Conservation of marine mammals should be considered at the relevant ecological scale related to the distribution of the population. Therefore, the approach to the conservation of Harbour porpoise is to establish in a separate process, a Harbour Porpoises Species Conservation Plan (HPSPP). Such a plan would deliver the relevant commitments of ASCOBANS (North Sea Conservation Plan), OSPAR and the Habitats Directive. It would target the appropriate ecological scale, which is not only the Natura 2000 areas, but the entire area relevant for the population. Any measures taken in just the Natura 2000 sites are unlikely to contribute significantly to achieving to the overall conservation status of the population.

Any measures developed in the context of this HPSPP would of course also, but not exclusively, be applicable in the Natura 2000 sites.

In the context of FIMPAS, management measures should assure to maintain the quality of the living areas, i.e., they must avoid risk of worsen the “quality of the living area” by e.g. increasing gillnetting as a consequence of limitations on others forms of fishing.

## 6 Fishing in the Natura 2000 areas

---

The landings from the Dutch and the non-Dutch fleets, as used in the analysis, are given in Tab. 3. Danish fishing for reduction purposes is not included. The fishing effort is summarized in Tab. 4, Figs. 2-5.

**Table 3. Average landings 2006-2008 in tonnes. The coverage for the non-Dutch segment is 80-100% but landings for reduction purposes are not included. Source LEI report by Oostenbrugge *et al.* 2010.**

Natura 2000 area	Landings of Dutch fleet in tonnes	Landing of non-Dutch fleets in tonnes (Industrial fishing not included)	Total landing in tonnes (Industrial fishing not included)
Dogger Bank	296	1142	1438
Cleaver Bank	1198	308	1506
Frisian Front	375	393	768

**Table 4. Summary of fishing effort (KW\*hrs) by gear and for of all countries (B, D, DK, F, NL, UK) in the Natura 2000 areas from 2006-2008, (excl. industrial fishing).**

Dogger Bank				
Gear	2006	2007	2008	Average
Beam trawl	11,669,562	7,592,169	2,608,955	7,290,229
Demersal seine	388,214	167,040	127,454	227,569
Gillnets	471,048	208,544	9,145	229,579
Otter trawl	3,536,054	2,645,765	2,076,931	2,752,917
Pelagic seine		257,521		85,840
Midwater trawl	825,571	244,634	8,111	359,439
Pots	3,308	1,414		1,574
<b>Grand Total</b>	<b>16,893,757</b>	<b>11117,087</b>	<b>4,830,596</b>	<b>10,947,147</b>
Cleaver Bank				
Gear	2006	2007	2008	Average
Beam trawl	6,261,998	5,962,129	1,359,653	4,527,927
Demersal seine	6,503	51,335	102,362	53,400
Gillnets	25,993	8,554	3,212	12,586
Otter trawl	1,529,845	1,918,800	1,115,737	1,521,461
Midwater trawl	90,615	31,444	5,785	42,615
Pots	12,854	2,096	1,038	5,329
<b>Grand Total</b>	<b>7,927,808</b>	<b>7,974,358</b>	<b>2,587,787</b>	<b>6,163,318</b>
Frisian Front				
Gear	2006	2007	2008	Average
Beam trawl	21,010,809	26,053,301	14,153,085	20,405,732
Demersal seine	14,158	29,515	3,054	15,576
Gillnets	82,198	20,078	6,266	36,181
Otter trawl	2,439,028	1,718,090	1,519,029	1,892,049
Midwater trawl	19,394	56,199		25,198
Pots	12,888	5,445	20,685	13,006
Unknown	5,087			1,696
<b>Grand Total</b>	<b>23,583,562</b>	<b>27,882,628</b>	<b>15,702,119</b>	<b>22,389,436</b>

Figure 2. Effort of the Dutch fleet from 2006-2008. The Natura 2000 sites are marked in red (Oostenbrugge *et al.* 2010).

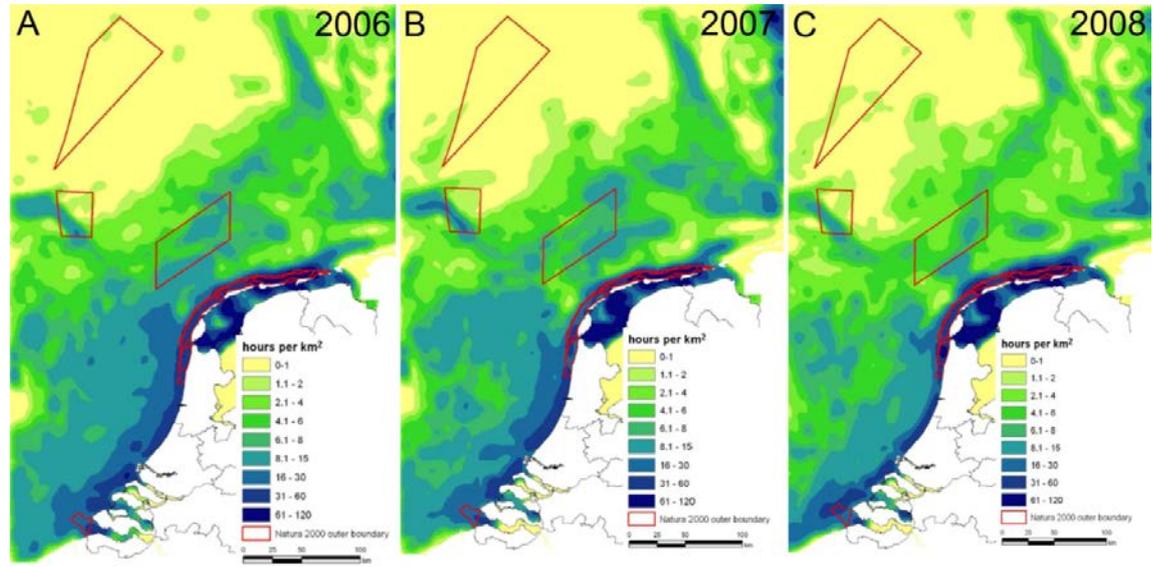


Figure 3. Effort of the non-Dutch fleet from 2006-2008. The Natura 2000 sites are marked in red (Oostenbrugge *et al.* 2010)

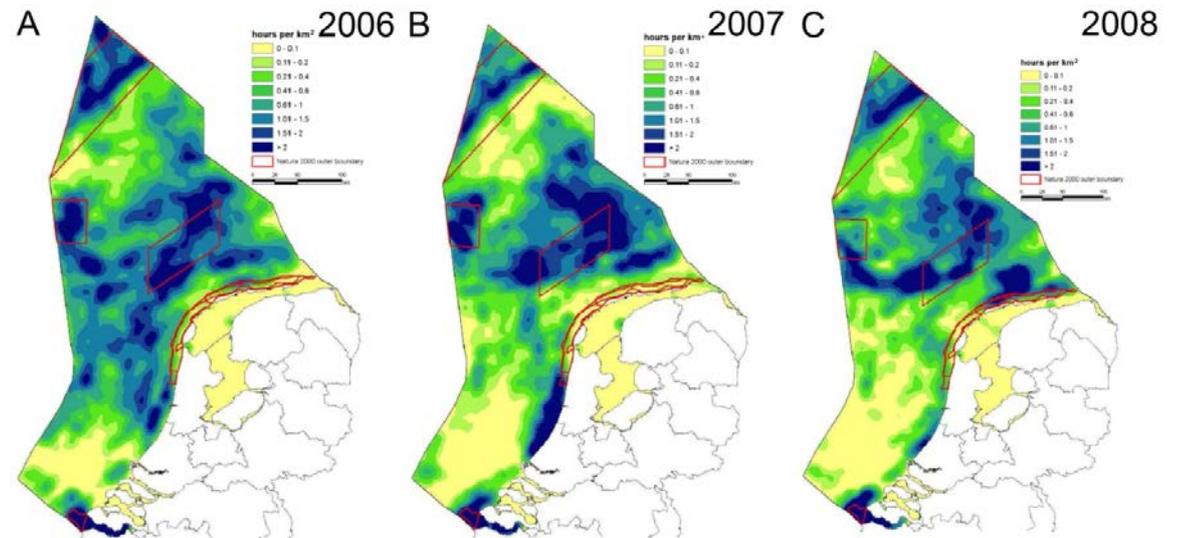


Figure 4a. Total fishing effort (KW\*hrs) for beam and otter trawls combined for all countries (B, D, DK, F, NL, UK) by year. Source IMARES.

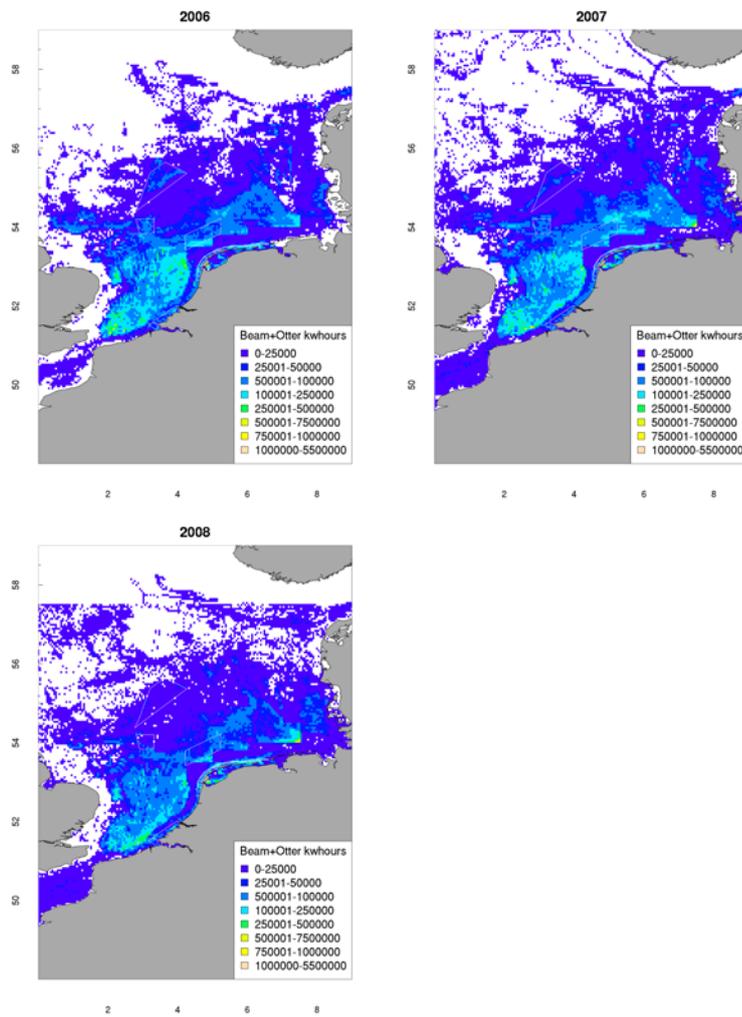


Figure 4b. Total fishing effort (soak time hours) for gillnets and trammel nets combined for all countries (B, D, DK, F, NL, UK) by year. Source IMARES.

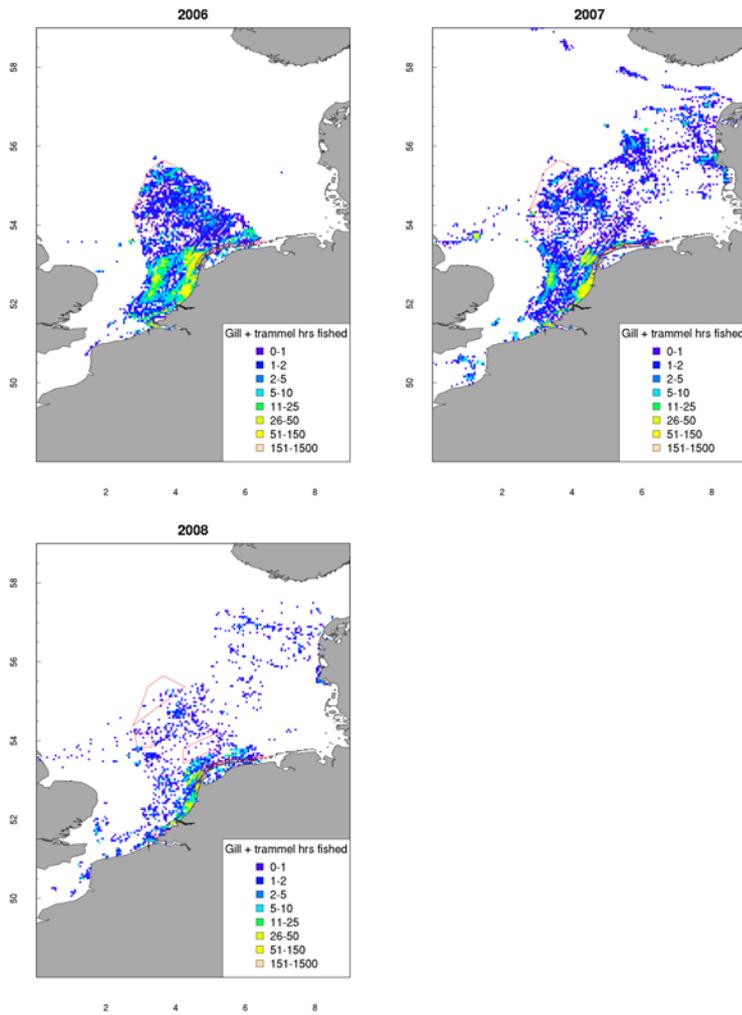
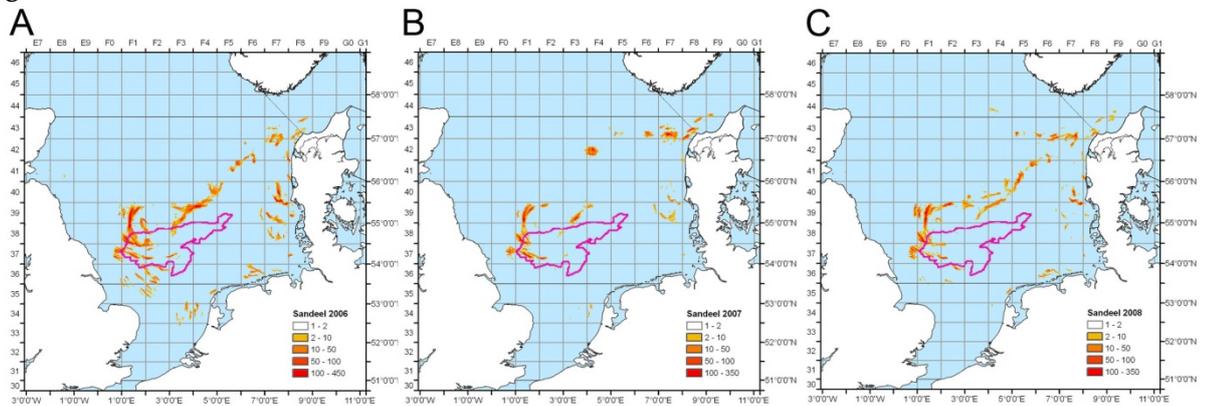


Figure 5a. Danish industrial fisheries. VMS density maps of Sandeel fishery showing the value as the number of VMS points in the grid at a fishing speed of 2-4 knots. Sandeel fishery is defined as 100% of landing. The Dogger Bank is marked in pink (data provided by DTU Aqua, Copenhagen).



**Figure 5b. Danish industrial fisheries. VMS density maps of Sprat fishery showing the value as the number of VMS points in the grid. Sprat fishery is defined by more than 50% sprat in the landing. The Dogger Bank is marked in pink (data provided by DTU Aqua, Copenhagen).**

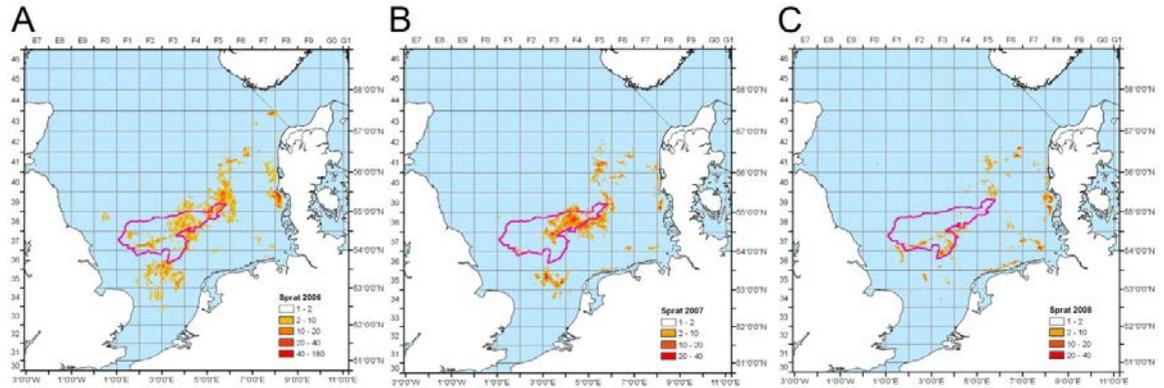


Table. 4 and Figures. 3-5 clearly demonstrate the dynamics of the fisheries there are major differences in catches and in distribution of effort among the 2006-2008 years.

## 6.1 Economic evaluation

An evaluation of the value of catches for the Dutch North Sea and distribution maps has been produced by LEI (Oostenbrugge *et al.* 2010). A brief summary of the report was available for FIMPAS WK2. At a dedicated international economist meeting in Copenhagen on the 6-7<sup>th</sup> December 2010, the experts reviewed the approach to estimating gross value maps (Figs. 6a and 6b) and found that the approach is methodologically acceptable. It is very difficult to calculate the costs to the industry (loss of fishing opportunities, learning costs, costs of re-rigging, etc.) from any proposed measure without the input from the industry.

Figs. 6a and 6b illustrate the overall income from the three Natura 2000 areas. The value of these grounds is higher for the non-Dutch fleets.

Figure 6a. Distribution of the catch value of the Dutch fleet in the North Sea from 2006-2008. The Natura 2000 sites are marked in red (LEI report by Oostenbrugge *et al.* 2010).

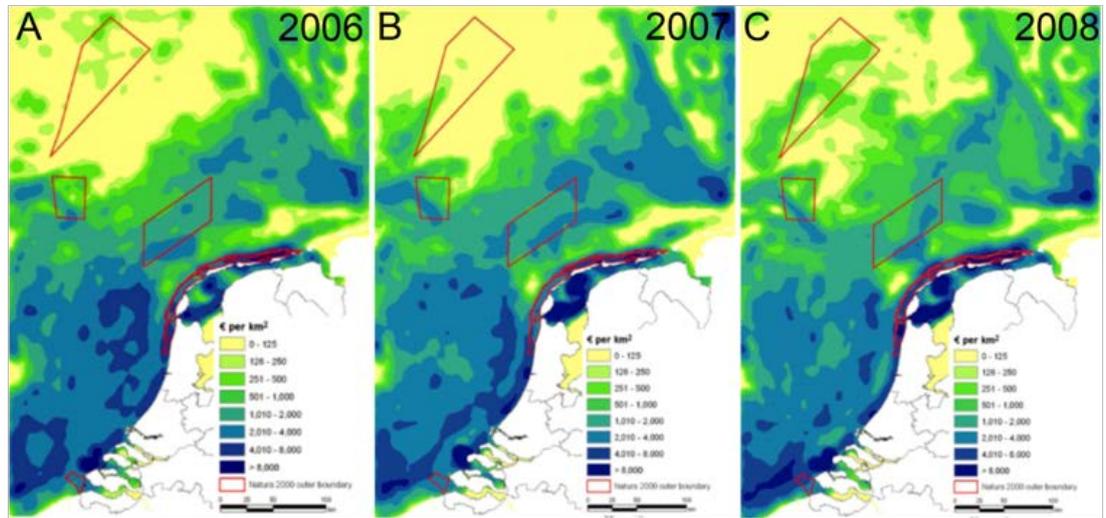
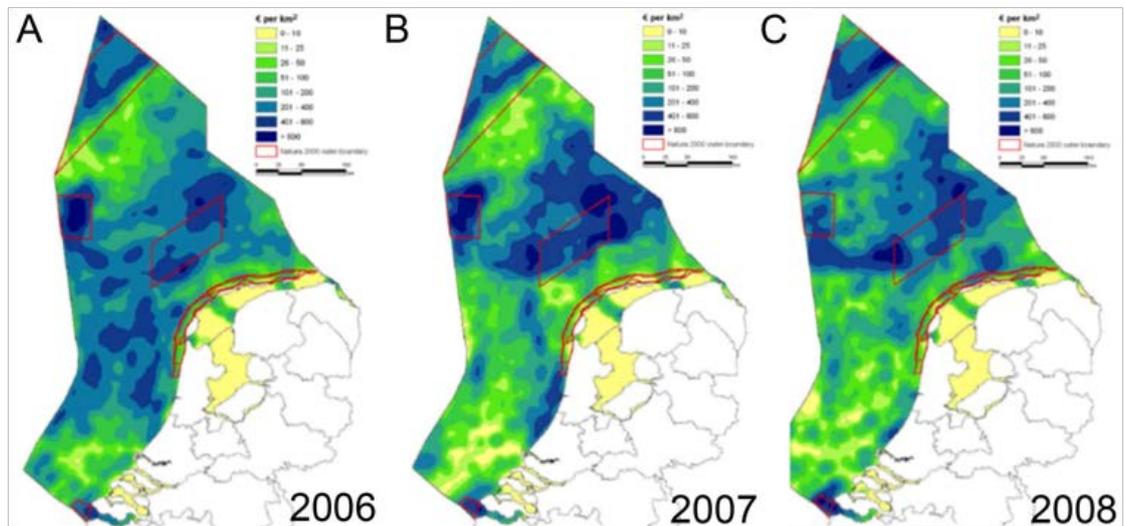


Figure 6b. Distribution of the catch value of the non-Dutch fleets (excl. the Danish industrial fishery) in the North Sea from 2006-2008. The Natura 2000 sites are marked in red (LEI report by Oostenbrugge *et al.* 2010).



## 7 Designing management measures

Conservation objectives for the proposed Natura 2000 sites are consistent with long-term sustainability aims. Management measures shall contribute to the achievement of the long-term sustainability aims as well as to the specific conservation objectives for the designated areas.

The habitat conservation objectives for Dogger and Cleaver Banks are to improve the habitat quality. This requires restriction of fishing on the sites. Therefore, a “Do nothing” option, i.e. leaving the existing management measures unchanged is inconsistent with the conservation objectives and is not further considered.

The conservation objectives for the Frisian Front area are to maintain the current abundance of Common guillemots and Great skua in particular. A “Do nothing” option, i.e. leaving the existing management measures unchanged would not provide the necessary guaranty against an expansion of the fishing effort whether by direct expansion of the effort or by diverging effort from other areas to the Frisian Front. Therefore, the “Do nothing” option is not consistent with the conservation objectives and is not considered further.

The regulation of marine mammals is discussed in the context of a general Harbour Porpoise Species Conservation Plan for the entire North Sea.

It is a general policy aim to reduce discards consistent with the maximum sustainable yield principle. Effects of such discard reduction, e.g. that scavenging birds abundance may decline, are consistent with the conservation objectives to minimise impact of human activities.

Management measures should, if applicable, include incentives to environment friendly fishing and promote innovations and the dissemination of such fishing techniques.

Management measures shall be considered where the gear impact matrix identifies high and medium impact cells and where measures are considered to be required to maintain conservation status.

Management proposals may include mitigating measures or the banning of certain fishing gears.

To reduce the impacts FIMPAS considers the following approaches:

- 1 ) Total/seasonal ban or spatial approach/zoning
- 2 ) Bycatch regulation
- 3 ) Gear restrictions
- 4 ) Mitigating devices (pingers, seabird scares, ...) made mandatory
- 5 ) Freeze of effort

These management approaches are discussed in the sections below on management options for each conservation objective separately.

### **7.1 Low impact fishing (environmental friendly fishing)**

As indicated by the gear impact matrix the habitat effects differ with capture (Tab. 2). There are developments underway with modifying gears to reduce their habitat impacts (e.g. bottom disturbance) and/or bycatch. Such gear should be promoted particularly in Natura 2000 areas, because the basic objective with the Natura 2000 system is to maintained or restore the favourable conservation status of listed species and habitats.

### **7.2 Zoning approach**

A zoning approach was discussed for the coastal zone to achieve undisturbed areas and areas where the most low impact fishing techniques get preferred access. In general Natura 2000 sites should be areas where human activities are consistent with achieving the conservation objectives.

Informed by the discussion of measures in the two coastal areas the following could be considered in the FIMPAS areas:

- 1) Forming several zones with different levels of management measures around the area of interest (e.g. Dogger Bank),
- 2) Excluding specific areas within one site (e.g. Botney Cut in the Cleaver Bank), or
- 3) Applying specific measures to crucial time periods (e.g. Frisian Front).

Zoning is considered for the Cleaver Bank where the Botney Cut represents a different habitat type (muddy bottom) from H1170 (reefs). The entire designated area of the Dogger Bank is of the type H1110\_C. However, since the habitat shows differences with respect to grain size of the sand and with respect to associated benthic communities, zoning may be considered.

### 7.3 Formulating management measure proposals

The general approach to the formulation of the management proposals is outlined in Figure 9. The elements include a legal basis, and a scientific basis, which in some cases is based on expert opinions, a toolbox of possible management measures and a set of considerations including control and enforcement issues that must be considered before formulating the proposal. The socio-economic information is part of the science basis.

FIMPAS distinguishes between 1) specific knowledge for these areas, e.g. on habitats, 2) general knowledge, e.g. impact from fishing gears inferred from other and similar areas, and 3) general expectations, e.g. noise effects, turbidity by trawl fishing, anthropogenic electromagnetic fields.

Specific or general knowledge is considered as “hard science”, while general expectations are “expert judgements” or “soft science”. The FIMPAS WK 2 conclusions includes judgements in this category. The experts involved were those present at the FIMPAS workshops.

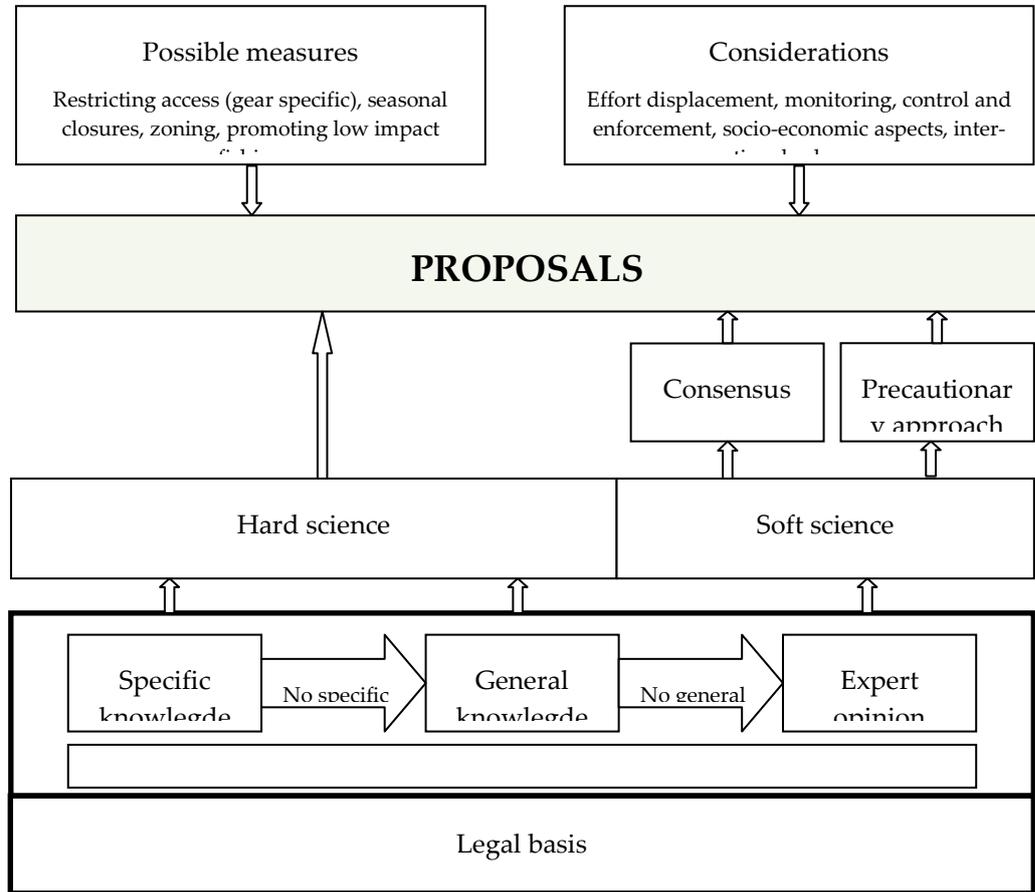
The gear impact matrix reflects both hard and soft science. The gear-impact matrix reflects cells where expert judgement differs.

The principles laid down for formulating the management proposals include (in order of priority)

- Hard science (if available), which will guide the formulations;
- Soft science where there is consensus among the FIMPAS workshop participants and which will guide the formulations;
- Soft science but without consensus among the FIMPAS workshop participants. Formulating the proposals will be based on a precautionary approach. Formulation is based on a risk analysis to judge how critical the cell is to achieve the conservation objective. If no high risks can be demonstrated no measures will be proposed.

In formulating the management proposals hard science takes precedence over soft science. The application of the precautionary approach where there is no agreement will give priority to the conservation concerns.

**Figure 7. The formulation of the management proposal. The basis for the proposal is the legal basis and the analysis done at the FIMPAS workshops, plus the socio-economic study done by LEI.**



#### 7.4 Principles

- 1) Proposals for fisheries measures in the three Natura 2000 sites are inside the legal framework of the Common Fisheries Policy, the Habitats and Birds Directives. However, in general, legal aspects are discussed outside FIMPAS.
- 2) The EU guidelines to be met including 11 points for which information has to be included in request of the fisheries management measures (see Foreword).
- 3) Management proposals should be directly linked to conservation objectives: The nature conservation obligations follow the European jurisdiction according to the requirements of the EU Birds (79/409/EEC) and the Habitats (92/43/EEC) Directives. Proposed conservation objectives have been summarized in Tab. 1.
- 4) Management proposals may include a zoning approach within the designated areas: Zoning should 1) achieve the conservation objective(s), 2) facilitate fishing using best available technology in terms of minimising

impact (environment friendly fishing). There are variations of the habitat type within a designated area and therefore the impact on a specific habitat type may vary within the designated area. Zoning should take account of this.

- 5) Management measures should be directed to the seasonal vulnerability of the species for which conservation objectives have been set. Management proposals for migratory species (marine mammals and seabirds) apply to the season only when the objects (marine mammals and seabirds) are vulnerable in the Natura 2000 area.
- 6) Management proposals for restricting bycatch of marine mammals shall be discussed in relation to bycatch taken from the entire population: As explained in Chapter 2, conservation objectives have been set for mammals. Management measures for marine mammals should be targeted at the ecological scale of their distribution rather than in the Natura 2000 sites alone, since marine mammals are found in, and pressure on their conservation status exists in, a much greater area than just these sites, i.e. propitiate.
- 7) Management proposals should include monitoring of the performance of the measures: to allow evaluation of effects of the measures taken on the conservation status and trends in that status. This will allow an adaptive management.
- 8) Proposals for Management measures should take the following into account
  - a. **Effort displacement:** Possible increased fishing outside the Natura 2000 area should have less impact on the relevant/protected species and the habitat than if the effort is exerted inside the area. Also, based on the economic analysis it should be considered if a proposed measure will be an incentive to increase effort outside the restricted areas and thereby be counterproductive to achieve the conservation objective.
  - b. **Control and enforcement problems and costs in relation to potential benefits of the measures.**
  - c. **Coherence in management measures - International consistency:** Conservation objectives for large water bodies must be coherent. The Dogger Bank extends over the Danish, Dutch, German and British EEZs, the last three countries have proposed it as a Natura 2000 site.
  - d. **Promotion of low impact fishing.** The future will bring new gears and developments in gear technology should be towards lowering of impacts. Permitting the use of such new gear technology within Natura sites should be dependent on verifiable evidence that impacts will be reduced. (Reversing the burden of proof). There is currently development ongoing to adapt the beam trawl to more environmental friendly designs (electric pulse fishing, jets of water instead of chains, the [sumwing](#), a suspended wing with nets, which significantly reduces the resistance of the net, replacing the shoes) (Steenbergen & Marlen, 2009, Marlen *et al.* 2009).

## 7.5 Monitoring

Monitoring of conservation objectives in the Natura 2000 sites is required to allow an evaluation of the effects of the measure. The directives require an assessment of the status every 6 years. The monitoring should survey the habitat conditions and abundance of sea birds where relevant. Also, monitoring should establish if the appropriate boundaries have been set for the Natura sites so that progress towards achieving the conservation objectives is not compromised.

## 7.6 Effort displacement or re-rigging

The objective of a Natura 2000 regulation is to meet conservation objectives. The expected scenarios are 1) displacement of effort to other areas and an increase of impact there, and 2) re-rig to another gear which could increase the pressure caused by this gear and therefore low impact fishing gear should be promoted. The suggested proposals (see Ch. 8) attempt to avoid increased pressure on sensitive habitats and species.

# 8 Proposal for management measures

---

In a systematic assessment different management options which should deliver the conservation objectives in the Natura 2000 areas are discussed below. This chapter provides a rationale for the proposal, based on principles, considerations and options defined above (see chapter 'Designing management measures').

The conclusions from FIMPAS Workshops 1+2 suggest that

- 1) Management attention is focused on
  - a. Dogger Bank: Trawls – beam and otter
  - b. Cleaver Bank: Trawls – beam and otter
  - c. Frisian Front: Gillnets
- 2) Fishing that affects habitat status for Cleaver and Dogger Bank should be restricted to allow improvement of conservation status of the habitat;
- 3) Fishing in the Frisian Front area and which disturbs or takes seabirds as bycatch should be restricted and as a minimum not be allowed to expand;

There are costs associated with the proposed measures. However, it is very difficult to calculate the costs to the industry (loss of fishing opportunities, learning costs, costs of re-rigging, etc.) from the proposed regulations without the input from the industry.

## 8.1 Conservation objective for “Marine mammals”

The conservation objective for marine mammals is to “maintain the extent and quality of habitat in order to maintain the population”.

### Seals

The Natura 2000 sites show no special significance for the North Sea population of the Grey seal and the Harbour seal compared to other parts of the EEZ as reproduction sites, foraging sites or otherwise (Brasseur *et al.* 2008). The future prospects of the Harbour seal is considered to be 'favourable' while the future prospect of the Grey seal is considered 'unfavourable–inadequate' for the Dogger Bank. The conservation status is considered 'favourable' for both species in the Cleaver Bank (Jak *et al.* 2009).

## Harbour porpoises

In contrast to that the conservation status of the Harbour porpoise is considered 'unfavourable–inadequate' in Cleaver and Dogger Bank (Jak *et al.* 2009).

The Dutch Harbour porpoise species protection plan, which will be developed in a parallel process to the FIMPAS project, will aim to achieve a 'favourable' conservation status for the Harbour porpoise in the entire Dutch living area for this species.

### 8.1.1 Effect on seals from fishing

According to the gear impact matrix the conflict between fisheries and the conservation objective for seals is low (see chapter 'Fishing gear and environmental impacts'). Therefore no measures to reduce the impact of fishing in relation to the presence of seals are needed.

### 8.1.2 Effect on Harbour porpoises from fishing

According to the gear impact matrix the conflict between fisheries and the conservation objective for Harbour porpoise is medium. Measures should therefore be designed to deal with this conflict. However, measures in *just* these areas are unlikely to have an overall effect on the conservation status of the entire population, because of the displacement of fishing activities and because of the fast and wide migration of Harbour porpoises. Measures for the Harbour porpoise conservation should appropriately be considered at the ecological scale of the entire population.

Harbour porpoises occur in the Natura 2000 areas and hence fisheries in these areas will have an impact on the occurrence. The change in impact in the site is therefore expected to be proportional to the effort reduction (designed for achieving the conservation objectives for the habitat types H1110 and H1170) that a restriction in these areas represents. The total impact of fisheries is assumed to be by the total fishery in the North Sea. Effect per effort unit is not expected to be higher in these areas than outside.

Bycatch of marine mammals (mainly Harbour porpoises) is known. Fixed and drift gillnets cause the greatest bycatch of small marine mammals while purse seines, midwater and bottom trawl nets show lower bycatch rates.

The Sandeel fisheries may affect marine mammals, i.e. Harbour porpoises and Grey seals, as Sandeel is part of their diet, however no particular food preference dependence could be assigned (Brasseur *et al.* 2008, Jak *et al.* 2009).

The effect of sound produced by fishing vessels on marine mammals, as a consequence of shipping and beam trawling as well as the use of sonar acoustic equipment has not been studied sufficiently (Deerenberg *et al.* 2010).

### 8.1.3 Agreement on the analysis

No general conclusions on the impact on marine mammals could be drawn from the observer programme studying the different types of gillnets (Hal *et al.* 2010). So far, there is too little hard science knowledge to propose any management measures concerning different gillnet types.

### 8.1.4 Conclusion on need for action

The overall aim is to prevent and restrict bycatch of cetaceans. However, there are no particular benefits to be gained from regulations that apply specifically to the three

Natura 2000 areas and therefore actions are sought at the level of the full population (North Sea) and management plans should be developed that are applicable at this scale.

#### 8.1.5 Potential management options

- i) Ban on gillnets - total ban or spatial/temporal zoning: displacement of fishing is expected in the Natura 2000 sites into neighbouring areas, such a ban may therefore be ineffective to reduce the overall bycatch of marine mammals.
- ii) Regulating bycatch, .e.g. after a critical number of marine mammals as bycatch – fishing boats will be taken out of operation or certain areas will be declared as non-fishing zones (possibly for gillnets only).
- iii) Gear restrictions and mitigation measures (use of acoustic pingers esp. in gillnets): acoustic deterrent device are assumed to decrease bycatch, however, too many practical, health and safety problems make the obligation questionable. Gear restrictions such as restricting the size of vessel/engine will not influence the marine mammal populations.
- iv) Freeze of effort to assure maintenance of the populations.

#### 8.1.6 Proposed management measures

**Within the Natura 2000 sites the gillnetting effort is maintained at current levels (2006-2008).**

Additional management response in relation to bycatch will not be developed specifically for the Natura 2000 sites, but at the population level in the Harbour Porpoise Species Conservation Plan (HPSCP), taking into account the ICES advice on the regulation (EC) 812/2004 (2010). The HPSCP will apply to the Natura 2000 sites as well.

## 8.2 Conservation objective for “Dogger Bank” (habitat type H1110, Habitats Directive)

### 8.2.1 Conservation objectives

Conservation objectives for Dogger Bank habitat (**Jak *et al.* 2009**) are to maintain distribution and improve quality:

- Maintenance of the current distribution and surface area, within natural fluctuations is desirable.
- Improve quality in terms of **abiotic conditions**: It is aimed to improve abiotic preconditions. Minimal physical bottom disturbance is seen as a very important aspect to achieve this.
- Improve quality in terms of **other characteristics of good structure and function**: This requires a balanced age distribution for each long living species, and a increase of biomass ratio of benthic long-lived species over short lived species.
- Improve quality in terms of **typical species**; a list of typical species had been proposed. All included species must be present in the area.

The Dogger Bank habitat shows an “unfavourable-inadequate” overall conservation status and also ‘unfavourable–inadequate’ future prospects (2020). The continuous physical disturbance has led to a shift in the composition of the biotic community,

which affects the structure and the function of the habitat negatively. For example, the long-lived and slow reproducing Thornback ray has become very rare. Long-lived suspension-eating bivalved shellfish have declined concurrently with a sharp increase in bristle worms and sediment-eating echinoderms (Wieking & Kröncke, 2003). This suggests regular unnatural disturbance of the sandbank. Although storms disturb the sandbank, their effects on the bottom fauna are assessed as being unable to explain the trends in benthic communities (Jak *et al.* 2009).

The Dogger Bank is an important area for numerous fish species to deposit their eggs, e.g., Atlantic cod deposits its eggs along the southern and eastern edges of the Bank (Jan-Mar; Fox *et al.* 2008), while the European plaice uses a large part of the EEZ as its spawning ground (Ter Hofstede *et al.* 2005). Mackerel, Herring, Whiting, Common sole, Sandeels and Sprat also have spawning grounds around the Dogger Bank (Gubbay *et al.* 2002).

### **8.2.2 Fishing activity**

During the three years period 2006-2008 the landings by the Dutch fleet from the Dogger Bank ranged from 125 to 564 tonnes per year while the non-Dutch catch ranged from 1013 to 1309 tonnes per year (Oostenbrugge *et al.* 2010). The distribution of fishing effort for this period is not uniform in space or time over the Dogger Bank. Different fishing gear is used with different intensity by the international fleets.

The effects of trawl fishing are in particular on the long-lived bottom dwelling species and therefore the effects are similar independent of the season.

### **8.2.3 Effect on habitat from fishing**

Scientific evidence, supplemented with expert judgement, indicated that the most significant threat to the conservation status of the Dogger Bank comes from bottom gear, notably from beam trawling with tickler chains. The main effect is on abiotic conditions, hence on structure and function, which results in reduction of the abundance of typical species. This initial effect is greater in sandy than muddy bottom however this is compensated somewhat by shorter recovery times for sandy bottom. Recovery in sand is probably dominated by migration whereas a slower recruitment driven recovery is more likely in muddy bottoms. This results in a high impact from beam trawling compared to medium, low and unknown impact from otter trawling, seine and gillnetting respectively.

### **8.2.4 Agreement on the analysis**

There are some fishing industry members reluctant to accept that changes have occurred and, in case they accept the changes, they are not convinced that these are results of beam trawling.

Additional information on the structure of benthic communities in a sandbank habitat type undisturbed by fishing could be provided by studies within exclusion zones around oil platforms but the scale is too small to provide meaningful results, and moreover the comparability between these areas and the H1110\_C is questionable.

The scientific available data is not sufficient to establish trends in distribution of some of the typical species (Hal *et al.* 2010).

### 8.2.5 Conclusion on need for action

The 'unfavourable–inadequate' conservation status as a consequence of the disturbance of benthic communities shows a clear need to improve the habitat quality. The need to reduce or remove pressure from trawling, and in particular from beam trawling with tickler chains, to achieve this is generally, but not unanimously, accepted. It is demonstrated that there is significant impact on the benthic communities on the Dogger Bank (Lindeboom & De Groot 1998). Concerns were also expressed that there is a lack of scientific evidence to adequately define how a favourable conservation status would actually look like.

There is debate on the magnitude of the effect of beam trawling on the habitats. Therefore, it is considered that restrictions, such as closure of areas to (beam) trawling, would initially apply for a 6 years period (an assessment period) in which additional scientific evidence on the impact of beam trawling could be obtained and in which a favourable conservation status will be defined. The effects that are expected are related to an improved age composition and improve occurrence of long-lived species. Such recoveries are slow and the expected slow recovery is the rationale for the 5 years proposal.

There is no other human activity than fisheries that seem to be able to explain the decline in the quality of the habitat (Hal *et al* 2010).

### 8.2.6 Potential management options

#### 8.2.6.1 Beam trawls

This fishing practise has most significant impact on the bottom habitats; the impact increases with increasing size and weight of the gear.

- 1) A total ban on beam trawls over the entire Dogger Bank (Dogger Bank: 17,600 km<sup>2</sup>, Dutch part: 4,718 km<sup>2</sup>) would protect the habitat and improve the quality.
- 2) Spatial restriction on beam trawls (zoning approach) within the Dogger Bank site is another option. A compromise solution could fulfil the same objectives as a total ban and would be consistent with an adaptive management approach. The establishment of a closed area to beam trawls within the Dogger Bank, covering water depths from 24 to 40 meters and the range of mud to sand habitats with their associated benthic communities, that is sufficient in size to allow self sustaining communities (through recruitment) of typical species identified by Jak *et al.* (2009).
- 3) Gear restrictions: promote low impact fishing.
- 4) Bycatch regulation and mitigation measures: not applicable.
- 5) Freeze of effort to assure no increase of disturbance of the habitat: not sufficient to improve quality.

#### 8.2.7 Otter trawls

The effects of otter trawls are lower but similar to those of the beam trawls. The options for regulating otter trawls are identical to those of the beam trawl fleet.

### 8.2.8 Proposed management measures

Beam and otter trawls should be banned within the Natura 2000 area. A zoning approach allowing 'environmental friendly trawling' in some zones should be discussed. The no-trawling zone should include representatives of all habitat communities.

Gillnet and demersal seine fisheries should be maintained at the 2006-2008 level.

The "high" effect of beam trawls and a "medium" effect of otter trawls suggest a ban of fishing gear with bottom contact.

There is no information that suggests where effort displacement may take place but it is likely that close neighbouring areas will be more heavily impacted. However, the EMPAS project has established that negative impacts on such neighbouring areas are outweighed by positive impacts within the areas as a consequence of the first trawls having much more impact than subsequently trawls (ICES EMPAS report. 2009). It is, however, an issue of concern that a zoning approach would lead to an increase of fishing efforts within the Dogger Bank site. It is unlikely that there would be a switch to another gear but lighter beam trawls and otter trawls might be promoted. A switch to gillnetting is not desirable in relation to the Harbour porpoise objective.

A shift to deeper waters is not seen as adverse as such areas have a less rich benthic fauna compared to the more shallow areas of the Dogger Bank.

### 8.2.9 Monitoring

The objective is to increase the abundance of in particular long lived benthic species. The programme should sample the area with this in mind.

A monitoring programme in a no-fishing or a no trawling zone could facilitate studies to separate the effects of (beam) trawls from storm events, to evaluate the effects of trawls on the conservation objectives, to establish with more certainty what exactly a favourable conservation status in terms of habitat quality and benthic communities would be and how the progress towards it can be measured. Comparative studies with other parts of the Dogger Bank, outside the Dutch EEZ, would be necessary. The beneficial effects, from increased productivity, and negative effects of displacement, could also be investigated. The ecological niche for long lived species, which is available on in the Dogger Bank, could be applied as a marker for the conservation status.

The Dogger Bank includes also a Danish, German and UK sector and a monitoring programme should be made jointly or coordinated very closely with similar monitoring programmes established for these sectors.

## 8.3 Conservation objective for "Clever Bank" (habitat type H1170, Habitats Directive)

### 8.3.1 Conservation objectives

The conservation objectives are the

- Maintenance of the area and improvement of the quality of the habitat (by e.g. minimization of bottom disturbance);
- Improvement of the habitat quality. This will be delivered when there is no disturbance of the characteristic 3-dimensional structures of Cleaver Bank, thus preventing the associated sessile epifauna and allowing for "cement-

ing together” of the hard substrate into a 3-dimensional mosaic of coarse sediment types.

- Conservation of the benthic community with its characteristic species diversity, such as Dead men’s fingers, coralline red algae, Norway bullhead and Two-spotted clingfish

The conservation objectives for Cleaver bank (reefs habitat) have an unfavourable-inadequate overall conservation status and the future prospects (2020) are also ‘unfavourable-inadequate’. Therefore the Cleaver Bank habitat needs to improve quality. For details see Jak *et al.* (2009). The habitat is unique with a very specific biodiversity for the Netherlands, i.e. 44% of the macrobenthic species, which are present in the Dutch EEZ occur exclusively on the Cleaver Bank. However, the habitat combination is less rare in other parts of the North Sea, although the macrobenthic diversity is one of the highest in the EZZ (Lindeboom *et al.* 2008).

### 8.3.2 Fishing activity

During the three years period 2006-2008 the landings by the Dutch fleet from the Cleaver Bank ranged from 314 to 475 tonnes per year while the non-Dutch catch ranged from 154 to 388 tonnes per year (Oostenbrugge *et al.* 2010). The distribution of fishing effort for this period is not uniform in space or time over the Cleaver Bank. Different fishing gear is used with different intensity by the international fleets. Otter trawl fishing takes place mainly in the Botney Cut, in the Dutch as well as in the UK sector (Hal *et al.* 2010).

#### 8.3.2.1 Effect on habitat from fishing

No trends concerning the biotic communities are available for the Cleaver Bank, since a few stations only have been monitored twice which is not sufficient for any predictions (pers. Comm. A. Goffin, Oostende and G. van Moorsel).

The main threats to the quality of the habitat 1170 on the Cleaver Bank are beam trawls with tickler chains and chain mats, and otter trawls. Any bottom contact gear will disturb the 3-dimensional structure of H1170, and therewith will affect the associated species (see Jak *et al.* 2009). Beam trawling is characterized by high bycatch, which will cause a reduction of abundance of the species. Tracks caused by beam trawls, as well as otter trawls, are long-time visible (Laban 2004). A high availability of discard will favour scavenger species, which could eliminate the key species and long-lived species of the habitat.

### 8.3.3 Agreement on the analysis

Unlike to the Dogger Bank there was little disagreement among participants of the second FIMPAS workshop on the gear impact matrix for the Cleaver Bank. There were some different views to which degree the observed changes in the bottom fauna are due to fishing and to beam trawling in particular, but the overall analysis was supported. The debate focuses mainly on the in- or exclusion of the Botney Cut in the designated area as the habitat type in this area (muddy bottom) differs from that on which the designation is based and hence also the impacts of fisheries (and fishing techniques used) differ in these areas (H1170 reef and stony areas). With the exception of the Botney Cut, the experts agreed in the FIMPAS WK2 that bottom contact gear disturbs the three dimensional structure of the habitat.

### 8.3.4 Conclusion on need for action

The habitat status requires that fishing with bottom contact gear is restricted or banned to allow recovery of the bottom fauna.

### 8.3.5 Potential management options

#### 8.3.5.1 Beam trawls

- 1) A total ban of beam trawls to assure no further habitat disturbance: this may be considered as a too drastic approach.
- 2) A spatial or periodical restriction to get maximum benefit for the conservation objective and minimum economic loss. Such a zoning approach will protect the H1170 part of the site and exclude the Botney Cut which does not contain the habitat type H1170.
- 3) Requirement of gear equipment (restricting the size of vessel/engine) allowing only environmental friendly fishing, e.g. pulse trawl (electric pulse instead of tickler chains) and sunwing (floating wing with nets instead of shoes) may decrease harm, however so far only tested experimentally (Steenbergen & Marlen, 2009, Marlen *et al.* 2009) and both are not likely to be suitable for the rocky area of the Cleaver Bank. Another option could be to restrict the number of tickler chains.
- 4) Freeze of effort to assure no increase in disturbance of the habitat.

#### 8.3.5.2 Otter trawls

- 1) A total ban of otter trawls to assure no further habitat disturbance: this may be considered as a too drastic approach.
- 2) A spatial or periodical restriction that is sufficient to allow measurable recovery. Zoning approach with less restrictions in the Botney Cut
- 3) Freeze of effort to assure no increase in disturbance in the entire area, however displacement should be avoided.

### 8.3.6 Proposed management measures

Banning of beam and otter trawls in areas with H1170 (reefs) and allowing low impact fishing within the Botney Cut.

Maintenance of seining and gillnetting effort at the 2006-2008 fishing effort level.

Based on a "high effect" of beam and otter trawls to the area (Deerenberg *et al.* 2010), gear with bottom contact should be banned, however applying the zoning approach will allow bottom gear fishing in the Botney Cut. Furthermore for the area south west of the Botney Cut a zone allowing low impact fishing bottom gear could be announced.

There is no information that suggests where effort displacement may take place but it is likely that that close neighbouring areas will be more heavily impacted. It is unlikely that there would be a switch to another gear but lighter beam trawls and otter trawls should be promoted (see principle 8d in Ch. 7).

### 8.3.7 Monitoring

The objective is to increase the abundance of, in particular long lived, benthic species, associated with the typical dimensional structures of H1170. The programme should sample the area with this in mind.

Judgement of a relevant temporal recovery period may be based on a recovery time of ½-1 year for gravel habitat and 1-3 years recovery time for biogenetic structures (Collie *et al.* 2000, Kaiser *et al.* 2006).

## 8.4 Conservation objective for four bird species in the “Frisian Front” (Birds Directive)

The conservation objective is to retain quality of the living area, sustaining in average more than 20.000 Common guillemots in July-November, about 180 Great skuas ( $\geq 1\%$  of the European population) from August-September, 80 Great black-backed gulls ( $\geq 0.1\%$  of the biogeographical population) from October-November and more than 0.1% of the biogeographical population of the Lesser black-backed gulls in June-July.

### 8.4.1 Qualifying species

Two bird species occur in the Frisian Front that qualify under the Birds Directive, namely the Common guillemot and the Great skua (Lindeboom *et al.* 2008). More than 20.000 individuals of the Common guillemot reside regularly at that site. One percent of the European population of the Great skua sojourns at the Frisian Front. In addition, based on criteria set by the Ministry of Economic Affairs, Agriculture and Innovation of the Netherlands, 0.1% of the biogeographical population of the Lesser black-backed gull and the Great black-backed gull are regularly present in the area (Tab. 5).

The conservation statuses of the selected birds (under the Birds Directive) in the Frisian Front are “favourable”.

**Table 5. Regularly presence of specific birds in the Frisian Front.**

Bird species	Regularly presence in the period
Common guillemot	July – November
Great skua	August - September
Lesser black-backed gull	(Assumed) June - July
Great black-backed gull	Late October-November

### 8.4.2 Fishing activity

During the three years period 2006-2008 the landings by the Dutch fleet from the Frisian Front ranged from 1019 to 1347 tonnes per year while the Non-Dutch catch ranged from 335 to 451 tonnes per year (Oostenbrugge *et al.* 2010). The main fishing effort in the Frisian Front is beam trawling by the Netherlands, United Kingdom and Germany, followed by the otter trawl fisheries. The Dutch gillnet fishery is negligible; however fleets with other flags use gillnets in the area of the Frisian Front.

#### 8.4.2.1 Effect on seabirds from fishing

Fixed gillnets cause the greatest bycatch of seabirds, esp. Common guillemots in the Frisian Front and are classified as “medium-high”, while the bycatch of Common guillemots with midwater trawl nets and bottom trawl nets is considered to be “medium”. Common guillemots were also caught by purse seines, while the effect on

Great skua, Great black-backed gull and Lesser black-backed gull are classified as low.

Seabirds may suffer from food shortage due to the reduction in fishery activities and the amount of discard (Hal. 2010). Reducing discards is an autonomous policy objective, leading to a more natural food web in the area. Hence this is not seen as a decreasing quality of the habitat as a living for seabirds.

There is indication that shipping disturbs the natural behaviour of the Common guillemot (Hal *et al.* 2010). Seabirds, i.e., the Great black-backed gull and the Common guillemot are vulnerable to oil pollution, an indirect effect from fishing (Hal *et al.* 2010).

#### **8.4.3 Agreement on the analysis**

Discard and offal provide food for scavenging seabirds, however not all birds feed on discards and therefore discard causes interspecific competition.

Most bycatch of seabirds will go unrecorded and therefore “real” bycatch numbers are assumed to be different to observed numbers (Deerenberg *et al.* 2010).

#### **8.4.4 Conclusion on need for action**

The objective is to maintain the present status of a range of seabirds. The minimum regulation is therefore to freeze the present impact. However, Natura 2000 areas should aim for improving the environmental status and restricting gillnet fishing in the area.

#### **8.4.5 Potential management options**

- 1) Ban of specific fishing gear for a critically period (July-November) based on the main presence of the selected birds (Tab. 5). The particular critical period is from July-September when the adult Common guillemots have their moulting period and their fledglings are incapable of flight.
- 2) Ban of fisheries entirely.

#### **8.4.6 Proposed management measures**

Allow gillnetting in seasons when the birds do not occur (December-April).

All vessels (including below 15 m oal vessels) need to register VMS data.

Freeze of gillnetting, trawling and seining effort at the 2006-2008 level.

Displacement of fishing effort is likely to be inside the near coastal zone and is expected mainly to affect neighbouring areas. The occurrence of seabirds is low in these areas.

## 9 References

---

- Bos, O.G., Dijkman, E.M., Cremer, J. 2008. Gegevens voor aanmelding van mariene Habitatrictlijngebieden: Doggersbank, Klaverbank, Noordzeekustzone, vlakte van de Raan. IMARES Report C081/08.
- Brasseur, S.M.J.M., Scheidat, M., Aarts, G.M., Cremer, J.S.M., Bos, O.G. 2008. Distribution of marine mammals in the North Sea for the generic appropriate assessment of future off-shore windfarms. IMARES Report C046/08.
- Collie, J.S., Hall, S.J., Kaiser, M.J., Poiner, I.R. 2000. A quantitative analysis of fishing impacts on shelf-sea benthos. *Journal of Animal Ecology* 69, 785-798.
- Council Regulation (EC) 812/2004 of 26 April 2004 laying down measures concerning incidental catches of cetaceans in fisheries and amending Regulation (EC) No 88/98 (OJ L 185, 24.5.2004, p. 4).
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).
- Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (Birds Directive).
- Deerenberg, C., Teal, L., Beare, D., van der Wal, J.T. 2010. FIMPAS project – Pre-assessment of the impact of fisheries on the conservation objectives of Dutch marine protected areas. Report number C071/10. IMARES.
- EC 2002. Interpretation Manual of European Union Habitats', version EUR 15/2" adopted by the Habitats Committee on 4 October 1999 and 'Amendments to the "Interpretation Manual of European Union Habitats" with a view to EU enlargement' (Hab. 01/11b-rev. 1) adopted by the Habitats Committee on 24 April 2002 after written consultation, European Commission, Directorate General for Environment.
- EC 2008. Fisheries measures for marine Natura 2000 sites. A consistent approach to requests for fisheries management measures under the Common Fisheries Policy. [http://ec.europa.eu/environment/nature/natura2000/marine/docs/fish\\_measures.pdf](http://ec.europa.eu/environment/nature/natura2000/marine/docs/fish_measures.pdf)
- Fox, C.J., Taylor, M., Dickey-Collas, M., Fossum, P., Kraus, G., Rohlf N., Munk, P., Van Damme, C.J.G., Bolle, L.J., Maxwell, D.L., Wright, P.J. 2008. Mapping the spawning ground of North Sea cod (*Gadus morhua*) by direct and indirect means. *Proc. Roy. Soc. B* 275: 1543-1548.
- Gubbay, S., Baker, C.M., Bett, B. J. 2002 The Darwin Mounds and the Dogger Bank. WWF-UK.
- Hal, R., van, Teal, L.R., Asjes, J., Jak, R.G., Scheidat, M., Craeymeersch, J.A.M., Bemmelen, R.S.A., van, Quiriins, F.J., Polanen-Petel, T., van, Deerenberg, C. 2010. Data availability for the assessment within the framework of the FIMPAS project. Draft report. IMARES.
- ICES advice 2010. EC request on cetacean bycatch Regulation 812/2004.
- ICES EMPAS report. 2009. Report of the EMPAS project. Environmentally Sound Fisheries Management in Protected Areas, 2006-2008, an ICES-BfN project.
- ICES FIMPAS WK1 report 2010 (available on the FIMPAS sharepoint site).
- ICES FIMPAS WK2 report, 2010 (available on the FIMPAS sharepoint site).
- ICES WGNSSK report 2009. Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak.
- Jak, R.G., Bos, O.G., Witbaard, R., Lindeboom, H.J. 2009. Conservation objectives for Natura 2000 sites (SACs and SPAs) in the Dutch sector of the North Sea. Report number C065/09 IMARES.

- Kaiser, M.J., Clarke, K.R., Hinz, H., Austen, M.C.V., Somerfield, P.J., Karakassis, I. 2006. Global analysis of response and recovery of benthic biota to fishing. *Mar. Ecol. Prog. Ser.* 311: 1-14.
- Laban, C. 2004. Geologisch onderzoek grindgebied Klaverbank. Samenvattend onderzoek rapport uitgevoerd van 1999 tot en met 2001. TNO-NITG 04-022-C.
- Lindeboom, H.J., De Groot, S.J. 1998. IMPACT-II. The effects of different types of fisheries on the North Sea and Irish Sea benthic ecosystem. NIOZ report 1998-1, RIVO-DLO report C003/98.
- Lindeboom, H.J., Dijkman, E.M., Bos, O.G., Meesters, E.H., Cremer, J.S.M., De Raad, I., Hal, van, R., Bosma, A. 2008. Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES.
- Lokkeborg, S. 2004. Impacts of trawling and scallop dredging on benthic habitats and communities. *FAO Fish. Tech. Pap.* 472: 58 pp.
- Marlen, van, B., Keeken, O.A., van, Dijkman Dulkes, H.J.A., Groeneveld, K., Pasterkamp, T.L., de Vries, M., Westerink, H.J., Wiegerinck, J.A.M. 2009. Vergelijking van vangsten en brandstofverbruik van kotters vissend met conventionele en SumWing+boomkorren. IMARES, IJmuiden.
- Nédélec, C., Prado, J. 1990. Definition and classification of fishing gear categories. *FAO Fisheries Technical Paper*. No. 222. Revision 1. 1990. Rome, Italy.
- Oostenbrugge, J.A.E. van, Bartelings, H., Buisman, F.C. 2010. Distribution maps for the North Sea fisheries; methods and application in Natura 2000 areas. LEI report 2010-067.
- Steenbergen, J., Marlen, van, B. 2009. Landings and discards on the pulse trawler MFV "Vertrouwen" TX68 in 2009. IMARES, IJmuiden.
- Ter Hofstede, R., Heessen, H.J.L., Daan, N. 2005. Systeembeschrijving Noordzee: Natuurwaardenkaarten vis. RIVO Report C090/05.
- Wieking, G., Kröncke, I. 2003. Macrofauna communities of the Dogger Bank (central North Sea) in the late 1990s: spatial distribution, species composition and trophic structure. *Helgol Mar Res.* 57: 34-16.