Annex 1 - General Background Document

General Background document to the proposed Joint Recommendation for Conservation Measures under the Common Fisheries Policy

This document was drafted by the Dutch ministry of Agriculture, Fisheries, Food Security and Nature in collaboration with the following research institutes:

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These institutes provided the scientific information on natural features, activities in the areas, economic value of the areas and the expected effects of the conservation measures. This information has been incorporated in chapters 2 and 4 of the site specific Background Documents and chapters 3, 6 and 7 of the General Background Document.

Contents

List of Acronyms

BD	Birds Directive
BISI	Benthic Indicator Species Index
DTUAqua	Danish Technical University National Institute of Aquatic Resources
CFP	Common Fisheries Policy
EC	European Commission
EEZ	Exclusive Economic Zone
EMODnet	European Marine Observation and Data Network
EP	European Parliament
EU	European Union
FIMPAS	Fisheries Measures in Protected Areas
GBD	General Background Document
GES	Good Environmental Status
GVA	Gross Value Added
HD	Habitats Directive
IBTS	International Beam Trawl Survey
ICES	International Council for Exploration of the Seas
IFREMER	French Research Institute for Exploitation of the Sea
ILVO	Flanders Research Institute for Agriculture, Fisheries and Food
IMO	International Maritime Organisation
JR	Joint Recommendation
LAT	Lowest Astronomical Tide
LNV	Dutch ministry of Agriculture, Nature and Food Quality
MPA	Marine Protected Area
MSFD	Marine Strategy Framework Directive
MWTL	Monitoring Waterstaatkundige Toestand des Lands (National Monitoring for Water Management)
N2000	Natura 2000
NSAC	North Sea Advisory Council
OSPAR	Oslo Paris convention
RWS	Rijkswaterstaat (Department of Waterways and Public Works)
SAC	Special Area of Conservation
SAR	Swept Area Ratios
SCI	Site of Community Importance
SPA	Special Protection Area
SLU	Swedish University of Agricultural Sciences
STECF	Scientific Technical and Economic Committee for Fisheries
TBT	tributyltin (anti-fouling paint on ship hulls)
TSS	Traffic Separation Scheme
TI	Thünen Institute
VIBEG	Covenant on shrimp fisheries in protected areas
VMS	Vessel Monitoring System
WECR	Wageningen Economic Research
WFD	Water Framework Directive
WMR	Wageningen Marine Research
WOT	Wettelijke Onderzoekstaken (Statutory Research Tasks)
WUR	Wageningen University and Research
WWF	World Wildlife Fund

1 Introduction

1.1 General

The initiating member state, the Netherlands, proposes conservation measures in the areas Southern Dogger Bank, Cleaver Bank, Central Oyster Grounds, Frisian Front, Borkum Reef Grounds and Brown Ridge as provided for in article 11 and 18 of Regulation 1380/2013 on the Common Fisheries Policy.

This document needs to be read in conjunction with the proposed Joint Recommendation for conservation measures[1] and the Background Document for the specific areas concerned.

The process for drafting these proposed measures and background documents is based on the following principles in accordance with article 11 and article 18 of Regulation (EU) No. 1380/2013 of the European Parliament and of the Council:

- Sound scientific basis
  The process is centred around a scientific approach and the best scientific information available. Note that a large amount of literature is available on the topic of nature conservation and impact of fishing. The literature reviewed for this process was considered sound and relevant by Wageningen Marine Research and Wageningen Economic Research.

- Stakeholder involvement
  Key stakeholders are involved in the process. From the start of the process, fishing industry and nature conservation organisations were invited to participate in an open and transparent manner on a national as well as European level (through the North Sea Advisory Council).

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

- Proportionality
  The proposed measures are proportionate to the objectives pursued and give due consideration to the social and economic impacts of these measures. The proposed measures are clearly described, demonstrating how they are consistent with the conservation objectives for the site concerned and with the precautionary approach to fisheries management.

- Non-discrimination
  The proposal will need to ensure that measures are applied in a non-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.

1.2 Reading guide

For the readers convenience, this chapter will shortly explain how the proposed measures, general background document and area specific background documents are structured and related to each other.

[1] This document refers to the (current) Joint Recommendation. With this reference the proposed Joint Recommendation for conservation measures is meant.

The proposed conservations measures for six different areas in the Dutch part of the North Sea are written down to support the process of drafting a Joint Recommendation for conservation measures in these areas. The Netherlands recognizes that these proposed conservation measures that comply with Union Environmental legislation affect other Member States having a direct management interest in the fishery on the following areas:

- Southern Dogger Bank (MSFD)
- Frisian Front (MSFD)
- Central Oyster Grounds (MSFD)
- Cleaver Bank (N2000, HD)
- Borkum Reef Grounds (MSFD)
- Brown Ridge (N2000, BD)

These six areas have their own area-specific background documents. However, a substantial part of the background information is not area-specific and applies to all areas. This general information that is applicable to all areas is written down in this general background document. Firstly, a reading guide for the general background document is given. Afterwards, a reading guide that is applicable to all area-specific background documents is given.

Chapter one of the general background document shortly describes the drafting principles of the JR. Chapter two is used to describe the policy context in which the JR for conservation measures is written and also provides guidelines and best practices from the European Commission that have been followed. Chapter 2 also provides the reasoning behind the enforcement measures and elaborates on the monitoring programme of the conservation measures. Chapter three provides general information on the rationale for conservation measures. This chapter mainly focusses on the previously submitted JR's for Dogger Bank, Cleaver Bank, Central Oyster Grounds and Frisian Front and how these relate to the current JR, the North Sea Agreement and its stakeholder process. Chapter four describes the expected effect of the conservation measures on a North Sea scale. It describes the expected impact of the measures on the natural features and how they work towards the conservation goals for the different areas. Subsequently, chapter five describes the expected fisheries displacement effect of the conservation measures, how this will affect the ecology elsewhere and how this can affect the fisheries sector. In addition, this chapter describes the expected effects on other human activities in the Dutch North Sea. Chapter six describes the monitoring programme in the Dutch marine protected areas. Chapter seven describes the expected effects of the conservation measures. Chapter eight provides the discussion part, it describes the process in general and goes into the specific meetings that have taken place over the last years. Lastly, chapter nine provides the overall conclusion.

Chapter one of the area-specific background documents is a brief introduction. Chapter two is a structured site description that contains the legal status, natural features, fishing activities, other human activities including the cumulative effect and monitoring in the area. Chapter three provides the rationale for conservation measures. This chapter is structured slightly different for N2000 and MSFD measures, but essentially covers the reason for conservation measures (and why they are effective) and the policy considerations and trade-offs that have been taken during the process. Chapter four describes the expected effects of the area specific conservation measures and focusses on the expected effects on the natural features, fisheries and other human activities. Chapter five is called discussion and covers the discussions that have taken place on a national scale and regional scale (e.g. discussions with member states and European Commission in the Scheveningen group). Lastly, Chapter seven is the overall conclusion based on the previous chapters and describes why the proposed measures are proportional.

2 EU Legal framework

2.1 Common Fisheries Policy

The European Common Fisheries Policy (CFP) is the key policy framework for the current proposal. Any regulation related to the conservation of marine biological resources in European marine waters must follow the principles, rules and procedures of the CFP. The EU has exclusive competence regarding conservation of marine biological resources under the CFP (Article 3 Treaty of the Functioning of the European Union). The basic rules regarding the CFP are laid down in Regulation EU No 1380/2013 (Basic Regulation.). The CFP aims to ensure that fishing and aquaculture are environmentally, economically and socially sustainable and that they provide a source of healthy food for EU citizens. Its objectives are, amongst others, to foster a dynamic fishing industry, to ensure a fair standard of living for fishing communities and to be coherent with Union environmental legislation, in particular with the objective of achieving a good environmental status by 2020 as set out in Article 1(1) of Directive 2008/56/EC, as well as with other Union policies.

Recital 11 of the Basic Regulation states that 'The CFP should contribute to the protection of the marine environment, to the sustainable management of all commercially exploited species, and in particular to the achievement of good environmental status by 2020, as set out in Article 1(1) of Directive 2008/56/EC of the European Parliament and of the Council'. In addition, recital 25 of the Basic Regulation. refers to the obligations imposed by the Birds Directive (BD) (2009/147/EC), Habitat Directive (HD) (92/43/EEC) and Marine Strategy Framework Directive (MSFD) (2008/56/EC) on special protection areas, special areas of conservation and marine protected areas. It further elaborates on the fact that these obligations might require the adoption of measures falling under the CFP. Article 11 and 18 contain the specifics regarding the procedure of conservation measures necessary for compliance with obligations under Union environmental legislation and empowers the Commission to adopt such measures by means of delegated acts upon a proposed Joint Recommendation submitted by the Member State having a direct management interest (as laid down in article 18(1) of the CFP). The Proposed Joint Recommendation is established according to the rules laid down in article 11.

2.2 Habitats Directive in Marine Environment

The HD, adopted in 1992, aims to conserve (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). SACs and Special Protection Areas (SPA's, under the BD) jointly constitute an ecologically coherent network of conservation areas, the so-called Natura 2000 network. The main objective of the HD is to bring habitats and species listed on Annex I and II of this directive into "favourable conservation status". Article 6 of the HD plays a crucial role in the management of sites that shape the Natura 2000 network. It sets out the framework for area conservation and protection, and includes proactive, preventive and procedural requirements. The proposed Joint Recommendation follows the article 11 procedure of the CFP as a mean to implement the conservation and protection obligations under article 6 of the HD.

The Netherlands proposes to take conservation measures under the HD on the Cleaver Bank.

An evaluation in 2017 showed that the intended nature policy in the Netherlands would only lead to about 65% of the target range of the BD and HD in 2027 (Folkert & Boonstra 2017). In 2019, the Dutch Parliament asked for further exploration of the remaining task in order to achieve a higher target range (Pouwels & Henkens 2020). For the North Sea habitats 1110 and 1170 it is expected that the status will

be unfavourable in 2027 and thus it remains a task to achieve a higher target range (Pouwels & Henkens 2020).

2.3 Birds Directive

The BD, adopted in 1979 is aimed at conserving (the natural habitats of) European wild bird populations. An important element of this directive is the designation and protection of Special Protection Areas (SPAs). SPAs and Special Areas of Conservation (SACs, under the HD) jointly constitute an ecologically coherent network of conservation areas, the so-called Natura 2000 network. The main objective of the BD is the protection of habitats for endangered as well as migratory species listed in Annex I of this directive. Article 4 is crucial in this regard, since it requires Member States to take measures to maintain a sufficient diversity of habitats for all European bird species. In addition, it requires Member States to take special measures to conserve the habitats of certain listed, rare or vulnerable birds and of all regularly occurring migratory species. The Directive includes a list (annex I) of the bird species considered to be endangered. Furthermore, Article 4 specifies that for the species identified special conservation measures are required concerning habitats in order to ensure species reproduction and survival. This includes designation of the most suitable habitats as special protection areas. The Proposed Joint Recommendation is aimed at fulfilling the obligations under article 4 of the BD.

The exploration of the remaining task that has to be done in order to achieve the target of the BD and HD in 2027 identified many birds species for which it is expected that the status will be unfavourable in 2027, among which are greater scaup, common eider and common scoter (Pouwels & Henkens 2020).

The Netherlands proposes to take conservation measures under the BD on the Brown Ridge.

2.4 Marine Strategy Framework Directive

The EU MSFD[2], adopted in 2008 requires Member States (article 1 and 5) to develop a strategy for their marine waters to achieve a good environmental status (GES) by 2020 and to take the necessary measures to actually achieve or maintain that good status. The Directive covers the full environmental and ecosystem policy and the sustainable use. It comprises the themes (descriptors) of biodiversity (D1), non-indigenous species (D2), sea-floor integrity (D6), hydrography (D7), contaminants (D8, D9) and eutrophication (D5), litter (D10) and introduction of energy (D11, including underwater noise). The starting points are the ecosystem approach and the precautionary principle. Article 13 of the MSFD requires Member States to develop a program of measures by 2015, aimed at achieving or maintaining a GES. Article 13.4 states that programs of measures shall include spatial protection measures, contributing to coherent and representative networks of marine protected areas. The GES has not been achieved in 2020. The proposed measures will contribute to achieving GES. Therefore, this Proposed Joint Recommendation is aimed at fulfilling the obligations under article 13 of the MSFD.

The Netherlands proposes to take conservation measures under the MSFD in the areas Southern Dogger Bank, Frisian Front, Central Oyster Grounds and Borkum Reef Grounds.

[2] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy, OJ L 164/19, 26.6.2008.

2.5 Reconciling nature conservation and fisheries policy

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

2.5.1 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.

2.5.2 Guidelines for requesting CFP measures in N2000 sites (2018)

In 2018, the European Commission Services published the "COMMISSION STAFF WORKING DOCUMENT on the establishment of conservation measures under the Common Fisheries Policy for Natura 2000 sites and for Marine Strategy Framework Directive purposes". This document provides guidance on how Member States should prepare and submit a proposal for conservation measures in the CFP framework, for delivering Natura 2000 conservation objectives. The ten elements which the Commission considers they should be part of the proposal. The Proposed Joint Recommendation is prepared according to those ten elements. The elements are shown in box 1 below:

BOX 1: ELEMENTS OF GOOD PRACTICE REGARDING THE INFORMATION TO BE PROVIDED BY THE MEMBER STATES WITH THE SUBMISSION OF THE JOINT RECOMMENDATIONS

1. The conservation status of the protected habitats and/or species and the conservation objectives of the Natura 2000 site should be clearly set out.

2. Scientific advice accompanying the joint recommendations should be reliable and where appropriate include a detailed mapping of the protected habitats.

3. Fishing activities should be adequately described. Examples of information that can be included are: operational fleet statistics such as fleet activity in the area and in the region, distribution of fleets (by nation, gear and species); identification of Member States with a currently active fishing interest in the site; site-specific information on fishing activities/techniques, target and by-catch species, effort, and spatial use; seasonal patterns of fishing activity over recent time periods, e.g. 3-5 years; and likely patterns of fishing activity in the future.

4. The effects of fishing activities on the protected habitats and/or species should be adequately described and assessed. Examples of information that can be included are: identification of threatening fishing activities; known and likely impacts of the different types of fishing gears on the protected habitats and/or species; interaction between fishing activities and protected habitats and/or species; localised or site-specific impacts of the different types of fishing gears on the protected habitats and/or species.

Information on known and likely impacts of other, non-fishing, human activities in the area and the cumulative effects on the protected habitats and/or species should also be provided.

5. The expected conservation benefits of the proposed measures on the protected areas (in terms of favourable conservation status of habitats and/or species or good environmental status under the MSFD) should be described.

6. The expected impacts of the proposed measures on fishing activities, including socio-economic impacts, should be described. For new measures falling under the MSFD programme of measures, the cost-benefit analyses or impact assessment carried out in accordance with Article 13(3) of the MSFD should be included.

7. Adequate monitoring of the implementation of measures, in relation to the fisheries affected and the environmental objectives to be achieved as well as their periodical review should be foreseen, e.g. measures to monitor and assess the maintenance and/or recovery of the habitats and/or species within the site including a timeframe for review of measures.

8. The possible displacement of the fishing effort and its impact on new areas should be evaluated and reported accordingly.

9. The proposed control and enforcement measures should be clearly set out. Examples of information that can be included are: control measures envisaged by the Member State or regional organisations, possible ecological and buffer zones to ensure site protection and/or effective control measures.

10. Information on the coordination with neighbouring Member States should be provided, as appropriate. Information on the consultation of the respective Advisory Council(s) should also be provided.

In addition, the Staff Working Document describes the following criteria (amongst others) which the European Commission will consider in taking the proposal forward in the CFP decision making context:

- Consultation with Member States and stakeholders (notably involvement of the North Sea Advisory Council (NSAC)): "it is considered best practice to ensure early stakeholder involvement and transparency of procedures, including the timeline. It is considered best practice to undertake informal consultations with other Member States and stakeholders concerned before the official 6-month period is triggered. During the preparation of proposed Joint Recommendations, in accordance with Article 18(2) of the CFP, Member States have to consult the Advisory Councils established under the CFP[3]".
- Scientific underpinning: "Member States should ensure their proposed Joint Recommendations are accompanied by the necessary biological, environmental, social, economic, technical and any other information considered relevant for the Commission to undertake its assessments in line with the provisions of Article 11 of the CFP, including relevant scientific advice".
- Proportionality: "Those measures should be proportionate to the objectives pursued and give due consideration to sustainable development and the social and economic impacts of the measures envisaged. The proposed measures should be clearly described, demonstrating how they are consistent with the conservation objectives for the site concerned and with the precautionary approach to fisheries management "according to which the absence of adequate scientific information should not justify postponing or failing to take management measures to conserve target species, associated or dependent species and non-target species and their environment (Article 4(8) of the CFP)".

2.5.3 Article 11 Basic regulation

The basic procedure for proposing measures in the territorial sea and Exclusive Economic Zone (EEZ) is laid down in Article 11 of the Basic reg. Article 11 provides the procedure for conservation measures affecting fisheries in which other Member States have a direct management interest. 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 proposed 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."*

2.5.4 Scheveningen High-Level Group

Following Article 18 of the Basic Regulation, the Fisheries Directors of the North Sea Member States cooperating in the Scheveningen Group since 2004, established a High Level Group (HLG) in December 2013 and agreed on a Memorandum of Understanding setting out the principles and working methods of the Group. Members of the Group are Belgium, Denmark, France, Germany, the Netherlands, and Sweden. The United Kingdom participated until 31 January 2020, the date of withdrawal of the UK from the EU. Members alternate as an annual chair.

2.5.5 Implementation and evaluation

EU Regulations on fisheries do not need to be implemented into national law. In order to enforce the regulation, a provision will be made in the Uitvoeringsregeling Zeevisserij (implementing regulation for

[3] COMMISSION STAFF WORKING DOCUMENT on the establishment of conservation measures under the Common Fisheries Policy for Natura 2000 sites and for Marine Strategy Framework Directive purposes, 2018, paragraph 3.1, page 3.

marine fisheries) under the Visserijwet 1963 (Fisheries Act 1963). Six years after publication of the Regulation, the initiating Member State will assess and evaluate the impact of the conservation measures. See for monitoring chapter 6.

Fishing industry and nature conservation organisations are invited to jointly give guidance to the implementation process, the communication of it, the monitoring of the ecological effects, the evaluation of the measures and to the improvement of compliance and enforcement. In the Netherlands, this takes place in the stakeholder meetings of the North Sea Agreement (NSA). At regional level, the Regional groups and Advisory councils are used for this purpose.

3 General remarks on area description

3.1 General

This chapter contains general remarks regarding protected areas. On the one hand, this chapter elaborates on general national policy regarding marine mammals and birds. On the other hand, this chapter sets out information on spatio-temporal fishing data, the cost-benefit analysis for MSFD areas, and impact of fishing on natural features.

3.2 Natural features North Sea and general nature policy

3.2.1 Marine mammals

The Cleaver Bank and Southern Dogger Bank have conservation objectives for Harbour Porpoise, Grey Seal and Harbour Seal. These marine mammals also occur in other parts of the North Sea and thus in other protected areas. However, other areas have no specific conservation objectives for these species.

In the BD and HD 2019 report, the Netherlands reported the conservation status of common seal, grey seal and harbour porpoise to the European Commission as 'favourable'. For harbour porpoise, it stated that the future prospects were 'unknown', because the impact of the large-scale rollout of wind at sea is not yet well known. Furthermore, there continues to be uncertainty about the development of the population, despite its stability and good level in recent years. The national Red List of Mammals 2020 lists harbour porpoises and the two species of seal in the North Sea as 'not currently endangered'.

It is relevant to highlight that for marine mammals generic protection is provided. For harbour porpoise, FIMPAS (ICES 2011b) and ICES (2012) advice suggest not to develop area 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 Conservation Plan (Camphuysen & Siemensma, 2011) which has been updated in 2020 (Min. LNV, 2020) and is being implemented. This offers the possibility of capping effort on a regional scale. Also for seal species, FIMPAS (ICES 2011b) and the ICES (2012) advice concluded that no area specific measures for fisheries would be needed. The coastal areas of the Dutch North Sea are of more significant importance for seal species as they breed here and use these areas for rest. These coastal areas are not a part of the current Joint Recommendation and therefore no specific measures are proposed.

3.2.2 Birds

In the North Sea Agreement (OFL 2020) an agreement was reached on research on six potential SPA's under the BD: Hollandse Kust, Vlakte van de Raan, Borkum Reef Grounds, Cleaver Bank, Dogger Bank and Central Oyster Grounds. Currently a desk study is taking place to verify which of the areas qualify under the BD. Additional field studies will be carried out in 2022-2025 for those areas with insufficient data availability for verification. Areas that qualify will be designated as SPA's in 2025 at the latest.

3.2.3 H1110

As mentioned in each area-specific background document, the areas in the Dutch North Sea have either been designated under the BD, HD or MSFD. For the HD areas, mainly two habitat types are relevant. One

of these profiles is H1110. In the interpretation manual of EU habitats (EC, 2013) habitat type 1110 (H1110) is defined as *"Sandbanks are elevated, elongated, rounded or irregular topographic features, permanently submerged and predominantly surrounded by deeper water. They consist mainly of sandy sediments, but larger grain sizes, including boulders and cobbles, or smaller grain sizes including mud may also be present on a sandbank. Banks where sandy sediments occur in a layer over hard substrata are classed as sandbanks if the associated biota is dependent on the sand rather than on the underlying hard substrata. "Slightly covered by sea water all the time" means that above a sandbank the water depth is seldom more than 20 m below chart datum. Sandbanks can, however, extend beneath 20 m below chart datum. It can, therefore, be appropriate to include in designations such areas where they are part of the feature and host its biological assemblages."*

In the Netherlands, sandbanks have been further defined in the H1110 profile document (Min LNV, 2014). Three subtypes are discerned: H1110A (sandbank in intertidal areas), H1110b (sandbanks in coastal waters) and H1110c (sandbanks offshore: Dogger Bank).

3.2.4 H1170

The other habitat type relevant under the HD for the Dutch protected areas is H1170. The reef habitat type 1170 is characterized by geomorphological features (Min LNV, 2014a). Essential for H1170 is the occurrence of hard substrate (large rock / shell banks) that rises above the sediment surface. Characteristic of non-biogenic reefs is the presence of stable hard substrate in the form of large boulders and / or a coarse gravel fraction. There may be a mosaic of (coarse) sediment types in which different sediment types alternated occurrence: places with gravel and boulders alternated with coarse sand. On greater depth, stones cannot become due to natural dynamics of position or orientation changed, this is the case for gravel.

3.2.5 MSFD biogenic substrate

The recovery and restoration of biogenic substrates, including native European oyster reefs, is one of the environmental targets (Target D6T5) toward Good Environmental Status, as described in the Dutch Marine Strategy, under descriptor 6 (Sea floor integrity) of the MSFD (Rijksoverheid, 2018). Up to the beginning of the twentieth century, approximately one third of the Dutch North Sea was covered in hard (biogenic) substrates such as oyster and shell reefs, tube worm thickets (Sabellaria), stones and gravel and peat deposits (Rijksoverheid, 2022).

3.3 Fishing activities: spatio-temporal fishing data

The following paragraphs describes the general information on the sourcing, processing of fishing data, calculations, mapping, and gear types in site specific Background Documents. This general information is also described in the reports of Jongbloed et al. (2023), Roskam et al. (2021) and Hamon & Klok (2023) who conducted a spatial and temporal analysis and an economic analysis on the fishing data in the protected areas in the Dutch part of the North Sea.

3.3.1 Data sources and processing

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

A data call to relevant EU member states was sent out in November 2020. Wageningen Research provided the R-script to collect data from the Dutch, Danish, German, Belgian, Swedish and French fleets. No UK fleet data were used, since the UK is not part of the EU anymore. The pre-processing of the data follows the approach developed in Hintzen et al. (2013).

A comprehensive description of the standardised processing of fishing activity data for this study can be found in the report of Roskam et al. (2021) see 3.3 who conducted an economic analysis of the fishery activities in a parallel study to the current study on the fishing effort in the protected areas on the Dutch part of the North Sea. Spatial and temporal effort data for all areas are described in Jongbloed et al. (2021). Economic data are described in Roskam et al. (2021).

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

3.3.2 Data for fishing effort calculations

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

- Year: 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021
- Months: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
- Countries: Netherlands (NLD), Germany (GER), France (FRA), Denmark (DNK), Belgium (BEL), Sweden (SWE). No UK data were used since they are not part of the EU anymore.
- Gear type: TBB, PUL, TBS, TBC, OTB, OTT, SSC, SDN, HMD, DRB, GNS, GN, OTM, PTM, FPO
- Geographical units:
    - Proposed protected areas (Southern Dogger Bank, Cleaver Bank, Central Oyster Grounds, Frisian Front subarea 1, Frisian Front subarea 2, Borkum Reef Grounds and Brown Ridge)
    - 1/16 ICES rectangles covering the whole of the study area.
- Fisheries intensity (minutes). We transformed fishing minutes to fishing days by dividing them by 60 (to get hours) and then by 24 (to get days). The unit used in the site specific Background Documents is thus "fishing days". One fishing day is 24 h of fishing.

3.3.3 Maps

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

- A shapefile with the North Sea Agreement areas (fishery management zones) provided by the ministry of LNV including the Southern Dogger Bank, Cleaver Bank, Central Oyster Grounds, Frisian Front subarea 1, Frisian Front subarea 2 Borkum Reef Grounds and Brown Ridge.

- A shapefile of Europe: Flanders Marine Institute (2020).
- A map of 1/16 ICES sub rectangles provided by Niels Hintzen (WMR).

3.3.4 Fishing gear types and groups

In all protected areas analysed in this background document a total of sixteen gear types have been applied in the period 2014-2021 in one or more of the areas. Gear types and codes are listed in the table below (Table 1), as well as the gear groups they were assigned to. This is relevant for the impact on the conservation objectives.

Table 1: Overview of gear types and gear groups used in this report. TBB (beam trawls) and PUL (pulse trawls) are combined in the effort analysis in this report and indicated as TBB+. Also TBS (shrimp trawls) and TBC (beam trawls Crangon) are combined and indicated as TBS.*

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

3.4 Fishing activities: economic data

3.4.1 Data sources and processing

Wageningen Economic Research analysed the economic fisheries data (Hamon & Klok, 2023). Data sources that were used in this analysis are: Vessel Monitoring System (VMS) data, catch data from logbooks (Fish Registration and Information System), Fleet data from the Netherlands Register of Fishing Vessels (NRV), and Data on landings value and economic performance of all fleets that were obtained from the database of the Annual Economic Report of the EU fishing fleets (STECF, 2022).

Compared to previous calls, the pre-processing steps have been modified. Given that most countries now have their own combined datasets of logbook and VMS data, it is believed that the national labs each have the best knowledge to perform the following steps as described in Hintzen et al. (2013) and used in Hamon et al. (2013), Oostenbrugge et al. (2013), Oostenbrugge and Hamon et al. (2014), Oostenbrugge et al. (2015, Jongbloed et al. (2019), Hamon et al. (2020) and Roskam (2021):

- Cleaning of the logbook and VMS data (for a detailed description of the data pre-processing, see appendix A.1 in Hamon and Klok (2022));
- Linking VMS data and logbook data;
- Defining the speed and which fishing activity occurs depending on gears;
- Assigning effort and landings to VMS pings.

An R-script with a common methodology to perform these steps used to be proposed to all countries in international data calls but this led to differences between data produced this way and data available nationally. To improve quality of the data, it was decided to give the option to all countries to use their own combined VMS-logbook datasets for which 'fishing' pings van be defined using the most appropriate method.

3.4.2 Combine VMS and logbook data

3.4.2.1 Link VMS and log-book data

To further analyse the data, the spatial resolution in the VMS data must be linked to the catch and effort data in the logbooks. To limit the size of the datasets, the VMS and logbook data in the ICES rectangles of interest are selected. All ICES rectangles overlapping with the areas as described in the introduction are selected. VMS and logbook datasets are linked using the vessel identifier and date-time stamp. In other words, records (also called pings) in the VMS dataset that fall within the departure-arrival timeframe of a trip described in the logbook are assigned to the unique trip number from the logbook record and allow for an analysis of the two datasets simultaneously.

3.4.2.2 Define fishing activity

For each gear type, the activity of the vessel (floating, fishing or steaming) is defined based on the instantaneous speed in VMS records (Poos et al., 2013). For each ping, the state of the vessel is identified based on gear and speed. The speed thresholds are defined by each country for their own fleets based on the best available knowledge.

3.4.2.3 Assign effort and landings to pings

Each VMS ping represents a certain amount of time, usually equal to the interval rate at which VMS pings are emitted, ranging from 30 minutes to 2 hours. The total fishing effort per trip and ICES rectangle is defined as the sum of these time steps for those pings where the previous analysis indicated a 'fishing' state. The landings are recorded by trip, per ICES rectangle and day in the logbook. For this analysis, we retained the demersal seine landings of the top ten species (in volume) and the total landings per year and per country for the ICES rectangles and gears of interest. For each trip that could be linked to VMS data, the landings, as registered in the logbooks, are allocated to the VMS pings in a stepwise process:

- If a match in trip, ICES rectangle, and fishing day is found, the registered landings are assigned to the VMS pings, weighted by the average time each VMS ping represents (ranging from 30 minutes to 2 hours).
- If within a matched trip, the fishing day and/or ICES rectangle cannot be matched, landings are assigned to the VMS pings based on the rest of the fishing trip.
- If no link to VMS points could be found for a trip (e.g. small vessels that do not carry VMS transducers on board), the total days at sea and landings in the adjacent ICES rectangle are aggregated. Afterwards data are aggregated by gear and type of vessel and the estimated effort within the area is adjusted for the percentage of landings/effort that cannot be distributed.
- Fishing effort is calculated as the sum of the fishing pings, each being allocated the duration between two consecutive pings (from 30 min to 2 hours).

3.4.2.4 Define pings in the areas of interest

The coordinates of each VMS ping are compared to the location of the area of interest. When a VMS ping is located inside any of the areas, it is selected and assigned to the area of interest. The effort, landings and value assigned to that ping are then assigned to the area of interest.

3.4.2.5 Uncertainty in the analyses

In the analyses a number of assumptions have to be made related to fishing activity and linking catches to VMS pings. Each country participating to this study uses the assumptions that best fit their data based on their local expertise and international consultation. Although these assumptions have been tested thoroughly, consultations with fishers to verify our assumptions and international consultations on these methods have taken place, the final result remains an estimation and changes in assumptions will likely affect the numeric values presented in the results (Oostenbrugge et al., 2010). It is anticipated however that these differences do not alter the conclusions.

In addition, for logbook data that could not be linked to VMS data, the spatial resolution is much lower. As in previous studies, the choice was made to include those in the analysis but as shown in the coverage of VMS data per country (Table 2), the logbook data that are not linked to VMS data represent only a minor part of the effort and landings in the Dutch EEZ.

Table 2: Coverage of logbook data by VMS data in percentage for landings, effort and value of landings for all countries. Note, France only provided data from VMS and a coverage of 100% is assumed

	Country	2014	2015	2016	2017	2018	2019	2020	2021
Landings	BEL	97	89	96	97	87	82	85	86
	DEU	98	98	99	99	100	100	100	100
	DNK	98	99	100	100	98	100	100	98
	NLD	96	94	95	90	99	99	99	99
	SWE	100	96	93	100	100	76	68	100
Effort	BEL	100	100	100	100	100	100	100	100
	DEU	100	100	100	100	100	100	100	100
	DNK	96	98	99	99	96	99	100	97
	NLD	100	100	100	100	100	100	100	100
	SWE	100	100	100	100	100	100	100	100
Value	BEL	97	92	95	97	87	85	85	89
	DEU	97	97	99	99	100	100	100	99
	DNK	99	99	100	99	98	100	100	97
	NLD	96	93	95	88	99	99	100	99
	SWE	100	96	96	100	100	69	69	100

3.4.3 Defining the socio-economic importance

3.4.3.1 Economic value

For each country, the effort, total landings, landings for the main species, value of landings and number of individual vessels active at the ping level is hereafter aggregated by year, subarea, gear type and vessel length category. The logbook records not linked to VMS data are also aggregated by year, ICES rectangle, gear type and vessel length category. The logbook data in the ICES rectangles of interest that were not linked to VMS data are used to estimate the coverage of VMS data and included in the data shown at the ICES rectangle level.

Vessel length is used to link the data to STECF economic data and estimate the gross value added (GVA). The value of landings data was combined with economic information from the database of the Annual Economic Report of 2020 (STECF, 2020). In this database, revenue and costs are available per fleet.

The GVA generated in the different areas by each gear (g), vessel length category (l), country (c) and year (y) ($GVA_{g,l,c,y}$) was estimated using the value of landings in the area of interest for the gear, vessel length category, country and year, $value_{g,l,c,y}$, obtained from the VMS and logbook analyses and the GVA per euro landed for each fleet of the same vessel length category using the gear:

$$gGVA_{g,l,c,y} = value_{g,l,c,y} \cdot \frac{\sum_f GVA_{f,c,y} \sum_f GVA_{f,c,y}}{\sum_f value_{f,c,y} \sum_f value_{f,c,y}} \forall \text{ fleets } f \text{ with vessel length } l \text{ using gear}$$

The GVA calculation is done as follow:

$$GVA_{f,c,y} = \left(value_{f,c,y} + rightIncome_{f,c,y} + otherIncome_{f,c,y}\right) - \left(EnergyCost_{f,c,y} + rightCost_{f,c,y} + VariableCost_{f,c,y} + RepairCost_{f,c,y} + FixedCost_{f,c,y}\right)$$

Where *rightIncome* and *rightCost* represent the income and costs to lease quota out or in, *otherIncome* are all the other income sources apart from value of landings and right income. In addition to right costs, energy costs (*EnergyCost*), repair costs (RepairCost), other variable costs (*VariableCost*) and fixed costs (*FixedCost*) are also considered in the calculation of the GVA.

3.4.3.2 Individual dependency of vessels to the areas

The same method was used in this report as in Roskam et al. (2021). For the reader's convenience, this method is also described in Appendix A.3. The method is applied to the different areas independently, as each area is currently assessed independently. In case a vessel fishes in several of the areas proposed for closure, the cumulative stress level due to the closure of all the areas would be higher than when looked at per area.

Three types of figures are made with the data:

- The number of Dutch vessels active in the area of interest per year and individual revenue dependency percentage category (>0-10%, >10-20%, >20-30%, >30-40%, >40-50%, >50-60%, >60-70%, >70-80%, >80-90% and >90-100%). This figure gives a good overview of the temporal development of the number of vessels dependent on the area of interest.
- The average number of vessels per region and revenue dependency level. This figure allows us to identify the region that are potentially affected by closure of the area of interest. The data in this figure is averaged over the whole time series and temporal development is therefore not analysed.
- The total average revenues per gear type with different dependencies on the area of interest. Some gears are more active than others and also may be more locally dependent on an area.

3.5 Cost-benefit analyses MSFD areas

The Commission Staff working document (on the establishment of conservation measures under the Common Fisheries Policy for Natura 2000 sites and for Marine Strategy Framework Directive purposes)

describes that for measures falling under de MSFD programme of measures a cost-benefit analyses or impact assessment should be carried out in accordance with Article 13 (3) MSFD.

In the area-specific Background Documents the historic values of the fishing activities is described and a prediction is made on the socio-economic impact. Further, in chapter seven of this General Background Document general reflections are provided on the expected effects (displacement) of the measures.

A more detailed cost-benefit analyses cannot be provided at this stage (see Roskam et al. 2021). The predictive capacity of the historic results for future economic effects of the proposed closures is limited due to future changes in the fishing patterns. Changes in fish distribution, fisheries legislation, economic context and gear innovations will affect the fishing behaviour and therefore might change the fishing activities in the various areas. These changes could be of greater impact than the closures itself (Oostenbrugge et al., 2016). More specifically, the extent of access restrictions in waters of other Member States and additional areas reserved for offshore wind farms, nature and mariculture on the Dutch Continental Shelf and beyond will have a large impact on the fishing patterns. These (possible) limitations make it unpredictable how much space will be left for fishing, as a result of which it's impossible to predict future values of the remaining fishing grounds. It is also not possible to estimate whether the areas that remain accessible for fishing will meet the fishing pressure, as it is obvious that the pressure and the relative importance for the Dutch fishing fleet will increase (Deetman et al., 2020).

In addition, the economic consequences of the closures will ultimately depend on the alternative fishing opportunities that will be available after closure. As such the cumulative effects of closures will not be the simple sum of the individual historic values of the areas, but might be higher or lower depending on other developments. The effects of displacement on the overall fishing pressure in the remaining areas and the consequences for the economics of the fisheries is complex and has not been assessed so far for the Dutch fisheries in the North Sea. In this dynamic interaction between nature and fisheries, also other fleets that were not taken into account here will play a role; British flag vessels also fish in the proposed closed areas. These vessels haven't been included in the analysis and as the UK fleet also will be displaced to other areas, this will lead to even more increased fishing pressure. Wageningen Research and the Dutch government are currently working on a research programme on this topic which will start in 2022 and will result in estimations of the effects of closures in the years thereafter.

Furthermore, in addition to the individual value of the areas for the various fisheries as estimated and described in the site specific Background Documents, the fishing grounds also often have a historic, cultural value as well. Fishing practices and family businesses are often passed on to the next generation. These values add to the resistance against this loss of fishing grounds due to closures.[4]
The closures might also cause ecological effects. Because fishermen will need to move their activities to other areas, these remaining areas may therefore face increased fishing pressure, that may negatively impact the benthic communities in or near the seabed as well as vulnerable species that get bycaught at higher rates in the areas open to fisheries than they were before. In addition, vessels may need to take a detour steaming towards their new fishing grounds, leading to increased CO_2 emission and costs.

The prediction of the distribution of all fleets is complex, as in practice fishing behaviour is related to many factors including abundance and distribution of target species, quota allocations (and possibilities for international quota swaps or quota leases amongst fishermen), historic preferences for fishing locations (personal knowledge about fishing grounds) combined with other choices fishermen make at sea.

Besides direct and indirect effects on the fishing sector itself, the changes in the fisheries will also need to take into account the effects on the local communities and economic activities onshore. So far, these are hampered by the lack of available and harmonised socio-economic data. Therefore, a targeted socio-economic assessment on an EU scale that takes into account the entire value chain (landings, jobs, market,

[4] A study providing an overview of the effects of offshore wind farms on fisheries and aquaculture
EASME/EMFF/2018/011 Lot 1: Final Draft Report for Specific Contract No. 03
Lead partner Wageningen Marine Research (including Wageningen Economic Research) in consortium with: MRAG Limited Europe; MRAG Limited; Centre for Environment, Fisheries and Aquaculture Science (Cefas); Research Institute for Agriculture, Fisheries and Food (ILVO); Johann Heinrich von Thünen-Institute: Federal Research Institute of Rural Areas, Forestry and Fisheries (TI), Technical University of Denmark (DTU); National Marine Fisheries Research Institute (NMFRI); Swedish University of Agricultural Sciences (SLU) and Institute of Food Safety, Animal Health and Environment (BIOR).

etc.) and loss & benefits balance should be conducted. An uncertain factor in this process is predicting fishing behaviour (displacement) (Stelzenmüller et al. 2020).

3.6 Impact of fishing activities

Seabed disturbance by fisheries causes direct and indirect effects on benthos (Figure 1). The direct effects of trawl fishing are: fish mortality (sensitivity depending on species), change in food availability and changes in habitat conditions on the benthos which ultimately results in effects on abundance and diversity of the benthic community (Deerenberg et al, 2010, referred to in Slijkerman et al., 2013). Also, significant negative effects on total biomass, secondary production and species richness have been identified (Reiss et al, 2009 and Hinz, 2009, both referred to in Slijkerman et al., 2013). Fisheries have a more severe impact on bigger species than on smaller species (Hiddink, 2006, referred to in Slijkerman et al., 2013).

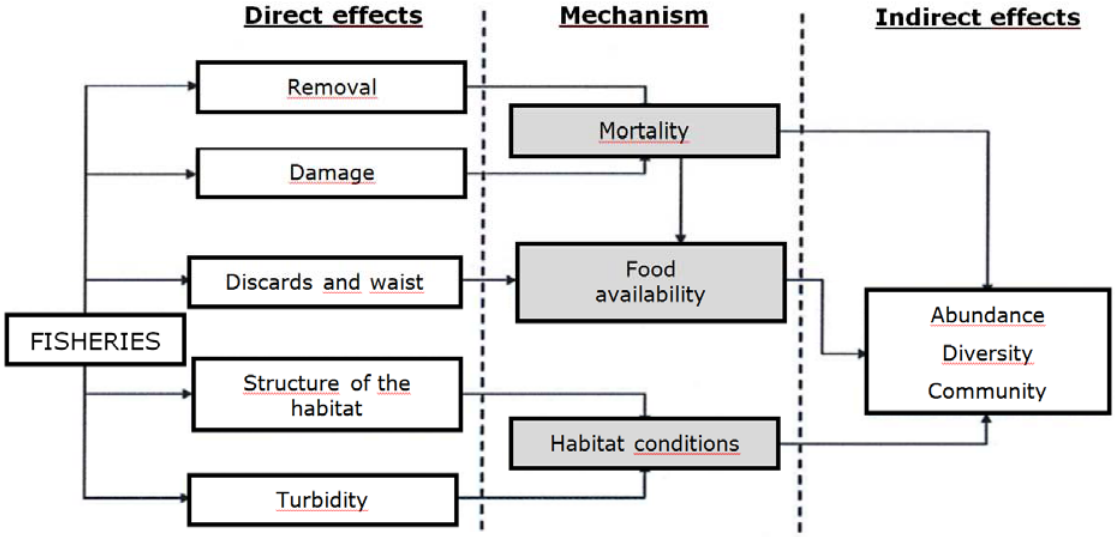

Figure 1: Direct and indirect effects of fisheries on benthos (Deerenberg et al, 2010, referred to in Slijkerman et al., 2013)

Focussing on the sea floor: any gear that aims to catch demersal fish, crustaceans, or shellfish needs to be in contact with the seabed. On soft sediments, heavy components of the gear, such as the doors of an bottom otter trawl or the shoes of a beam trawl, will penetrate in the seabed and create a furrow by pushing aside the sediment (Schwinghamer et al., 1996; Smith et al., 2007; Buhl- Mortensen et al., 2013; Depestele et al., 2016; O'Neill and Ivanovic´, 2016; all referred to in Rijnsdorp 2016). Sediment may be brought into suspension by the turbulence generated in the wake of the gear.

Rakes, or a series of tickler chains running in front of the groundrope, will penetrate and enhance the mixing in the impacted layer, thus damaging the tubes and burrows on infaunal species and homogenizing the texture of the sea bottom.

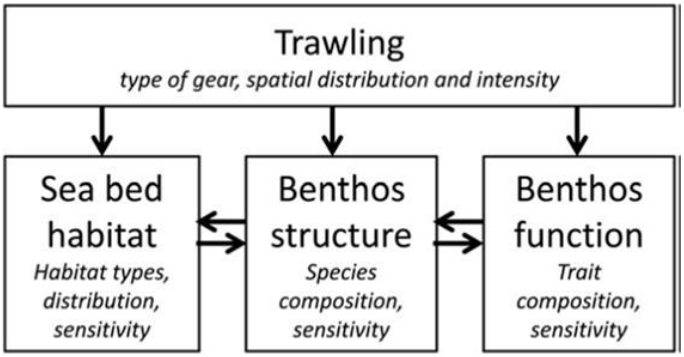

Figure 2: Impact of trawling on the seabed. Source: Rijnsdorp et al. (2016)

The physical impact can therefore be broadly classified into (Rijnsdorp, 2015a and 2015b):

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

As a result, the sea floor may be homogenized, having a 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 et al., 2013). Bottom structure is more important on the depth gradient to the deeper, silt-rich seabed than for shallower sandy parts (Jak et al, 2009, referred to in Slijkerman et al., 2013).

Bottom fishing causes mortality fish, and benthos and may result 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 (Rijnsdorp, 2015a and 2015b).

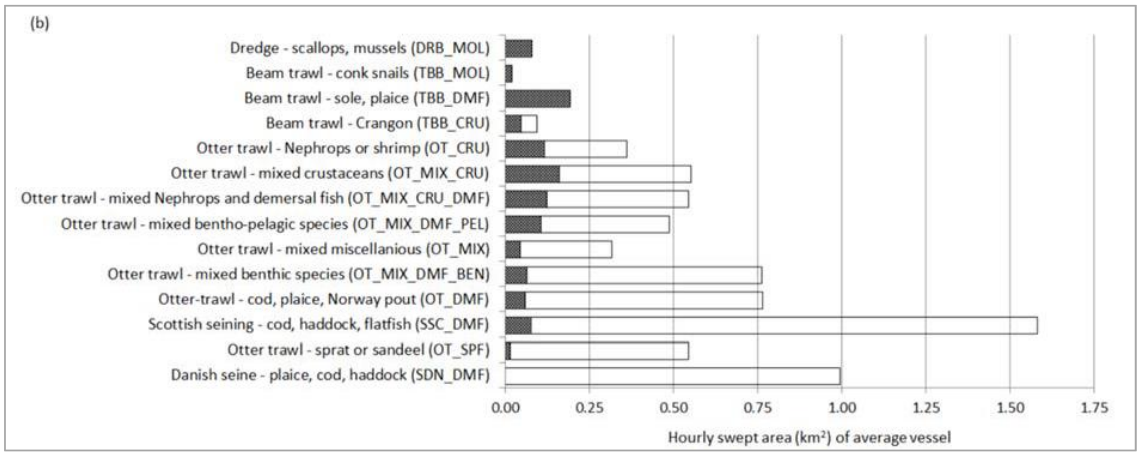

Figure 3: Area of seabed swept in 1 h of fishing with an average-sized vessel with impact at the surface level (sediment penetration up to 2 cm) and at both the surface and the subsurface (> 2 cm) level for 14 BENTHIS métiers. Eigaard et al. (2016).

The sensitivity of the sea bed to disturbance by bottom contacting towed gear depends primarily upon the natural disturbance (shear stress) and the structure of the sea bed (Figure 3). The degree of natural disturbance decreases with water depth. The grain size distribution of the sediment is in most cases a good indicator of the level of natural disturbance, although historic deposits also affects sediment composition.

In general, high dynamic areas are usually characterized by coarse sediments, low dynamic areas by fine sediments.

Eigaard (2016) quantified the surface and the subsurface impact to the seabed area of all bottom contacting towed gear. All bottom contacting towed gear causes abrasion up to a depth of 2 cm. Gears that impact surface over a large swept area include Scottish seines (flyshoot) and Danish seines. In addition, most gears disturb the subsurface (depth over 2 cm) to a certain extent. The annual surface and subsurface disturbance is given in Figure 4.

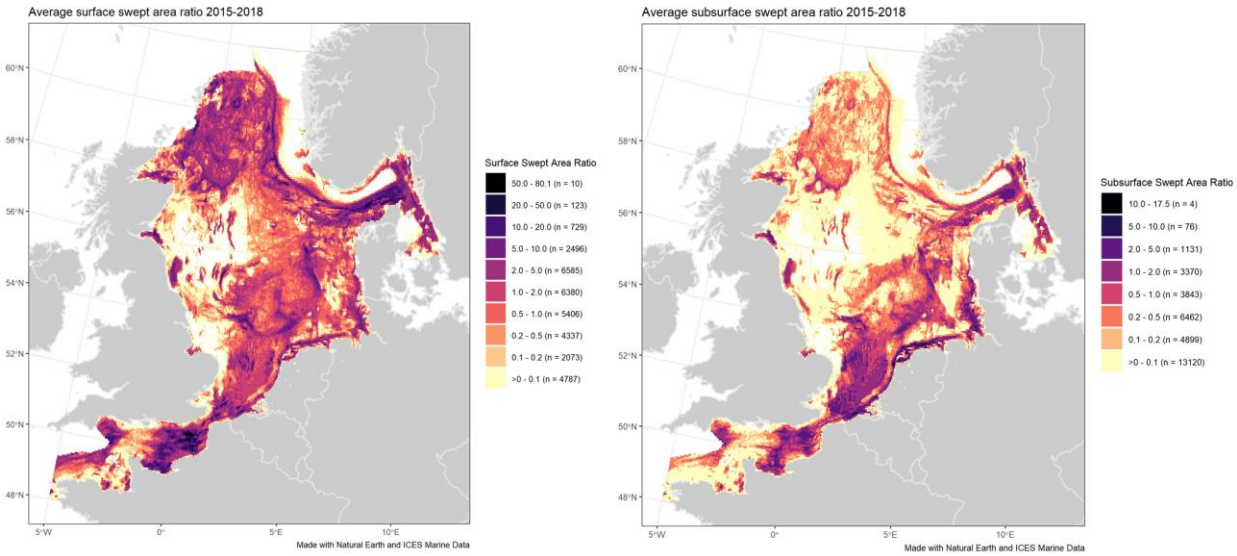

Figure 4: Average annual surface (left) and subsurface (right) disturbance by bottom contacting towed gear (Bottom otter trawls, beam trawls, dredges, and demersal seines) in the Greater North Sea during 2015–2018, expressed as average swept area ratios (SAR). Source: ICES (2020)

The relative impact of bottom contacting fishing activities 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 bottom contacting towed gear 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., 2016; 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 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.

The BENTHIS-project provided information on the surface area impacted by the various bottom contacting towed 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; 2017). Scottish seine (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.

The BENTHIS-project 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., 2017). 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 bottom contacting towed 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., 2015). 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.

Van Loon et al. (2018) analysed the benthic fauna and fishing effort in different regions of the Southern North Sea, including Belgium, German, Dutch and UK waters. Fishing activity in the coastal zone is relatively high compared to offshore regions, with average fishing activity 3-4 and 1-2 sweeps/year, respectively. The regional benthic fauna assessments show that the benthic quality in coastal Southern North Sea areas is the lowest (van Loon et al., 2018).

A study by van der Reijden et al. (2018) provides insight in benthic habitat types that are frequently targeted by fishers in the North Sea. Three dominant Dutch fisheries from 2008 to 2015 were studied: beam-trawlers targeting sole *Solea solea* (Beam-Sole), beam-trawlers targeting plaice *Pleuronectes platessa* (Beam-Plaice), and otter-trawlers targeting Norway lobster *Nephrops norvegicus* and demersal fish (Otter- Mix). Results showed that all three fisheries target highly specific, uncommon habitats on the open North Sea and all other Dutch demersal fisheries were strongly concentrated in the coastal zone (van der Reijden et al., 2018).

The impact of fisheries with gill- and entangling nets is described in the site specific background document for the Brown Ridge, because the Joint Recommendation only proposes conservation measures regarding this type of fishery in this particular area.

4 Rationale for conservation measures

4.1 General

In this chapter the general remarks relevant for the rationale for conservation measures are indicated. Again, this chapter needs to be read in conjunction with the area-specific Background Documents. The elements specifically relevant for the specific areas are included in the area-specific Background Documents. In this chapter the general aspects of the process of the in 2021 submitted Proposed Joint Recommendations for the Cleaver Bank, Frisian Front and Central Oyster Grounds will firstly be discussed. The current Proposed Joint Recommendations builds on the delegated act of March 2023[5] for these sites and it is therefore relevant to elaborate on the policy considerations at the time. Also the Dogger Bank will be elaborated on, since it was part of the FIMPAS. In addition, the general process of the North Sea Agreement is described.

4.2 Proposed Joint Recommendations 2021

The Netherlands started a process which led to a number of proposed Joint Recommendations for conservation measures on the Dogger Bank, Cleaver Bank, Central Oyster Grounds and the Frisian Front in the period between 2008- 2013. The umbrella under which these efforts were taken was referred to as Fisheries Measures in Protected Areas (FIMPAS). The aim of FIMPAS was to introduce fisheries measures in the marine Natura 2000 sites within the Exclusive Economic Zone of the Dutch part of the North Sea.

In the FIMPAS project, a number of management principles were established which were discussed with stakeholders. Also the principles mentioned in Chapters 1 and 2 (legal frameworks of HD and CFP 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. They have also been addressed specifically in the FIMPAS Steering Group proposal to explain the development of the measures.

4.3 North Sea Agreement

The North Sea is one of the most heavily used seas in the world, and the scene of considerable tension between nature, energy and food supply (in particular fishery). The Climate Agreement will result in massive expansion of wind farms on the North Sea over the coming decades. Finding space will be a complex task. At the request of the Minister of Infrastructure and Water Management, the Physical Environment Consultative Council (OFL) examined the opportunities for arriving at a national North Sea Agreement (OFL, 2020) between stakeholders and national government, and issued recommendations on those possibilities. Based on the recommendation, the Minister of Infrastructure and Water Management, jointly on behalf of the Minister of Agriculture, Nature and Food Quality, the Minister of Economic Affairs and Climate Policy and the Minister of the Interior and Kingdom Relations called upon the OFL to launch a 'North Sea Consultation' and to act as an independent chairman for that body. The aim of the North Sea Consultation was to achieve with all relevant Ministries and stakeholders a new equilibrium between food, nature and energy and to translate this into a North Sea Agreement.

[5] Delegated regulation - 2023/340 - EN - EUR-Lex (europa.eu)

All relevant stakeholders were part of the drafting process, such as the Dutch government, fishery organisations, nature organisations, sector organisations for Seaports, energy organisations on the North Sea. The drafting process resulted in The North Sea agreement (OFL, 2020) on the 19th of June 2020. The agreement was reached between the partners in the so-called 'North Sea Consultation' which is essentially a consultation structure in which all relevant parties/stakeholders take a seat. Unfortunately, only a few fishery organisations could support the agreement but they could not sign the agreement, other fishery organisations did not support nor sign the agreement. In January 2021 the House of Representatives of the Netherlands discussed the North Sea Agreement and political support was gained.

The North Sea Agreement (OFL, 2020) contains amongst others agreements with regard to protected areas and fishery restrictions. Some existing areas will be expanded, some management zones in existing areas will be expanded and new areas will be designated. At this moment, the 'North Sea Consultation' is functioning successfully. Various stakeholders collaborate to make informed and supported decisions, and measures resulting from the North Sea Agreement receive support from all stakeholders.

5 Control and enforcement

5.1 Control and enforcement measures

Appropriate control and enforcement is crucial for the effectiveness of conservation measures. Therefore, the proposed control, enforcement and compliance regime for the proposed conservation measures consists of a combination of surface and aerial surveillance, establishment of an alert zone around the management zones and remote monitoring of vessel position, gear activity and catch data.

First of all, the control and enforcement measures stated in article 9 and 50 of the Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy (OJ L 343, 22.12.2009, p. 1) are applicable to this Proposed Joint Recommendation. This are for instance rules on gear and speed during transit. Since these measures are already obligated under EU Union law it is not relevant to discuss the reasoning behind these measures in this document.

The reasoning behind the additional proposed control and enforcement measures will be discussed in the following paragraphs. The control, enforcement and compliance regime is 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), or in line with the proposed revisions of this Council Regulation.

In case of a revision of the existing EU fisheries control system, the amended rules will apply accordingly to the control measures as far as the rules proposed in the Proposed Joint Recommendation do not foresee stricter control rules.

5.1.1 Alert zones

The proposed measures state alert zones of 4 NM width will be established, measured from the outer limits of each management zone. The alert zone is a zone where the same VMS-frequency (10 min) applies as in the management zone, see 5.1.2. The aim of the alert zone is to monitor fishing vessels that approach the management zone more closely before they actually enter the management zone. The conservation measures of the management zone do not apply in the alert zone.

5.1.2 Vessel monitoring system

Under Art. 9 of Regulation (EC) No 1224/2009 vessels are obliged to have a functioning VMS onboard. In line with the revised control regulation, vessels with a length over all (LOA) of less than 12 m, may use a portable, satellite or mobile device as well. Vessels shall have a vessel monitoring system (VMS) to detect and record the vessels' entry into, transit through and exit from the fishing restricted areas. Fishing vessels travelling within the alert zone and management zone shall use their vessel monitoring system for reporting fishing vessel identification, geographical position, date, time, course and speed.

The frequency of data transmissions shall be increased to every 10 minutes in all management areas and alert zones (Art. 50 of Regulation (EC) No 1224/2009). In line with art. 50 the increase from 'at least once every 30 minutes' to 'at least once every 10 minutes', is related to the size and shape of the management and alert zones. This frequency is necessary to ensure that fisheries monitoring authorities can effectively monitor the fishery activities and the speed of the fishing vessels in the protected area. The proposed measures require that fishing activities of all fishing vessels in a management zone or alert zone shall be

controlled by the fisheries monitoring centre of the coastal Member State (Art. 50 of Regulation (EC) No 1224/2009).

5.1.3 Transit

Transit through a management zone is allowed for all fishing vessels provided that a) all gears carried on board are lashed and stowed during the transit; and (b) 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 immediately inform the fisheries monitoring centre of the flag Member State which shall then inform the competent authorities of the coastal Member State (Art. 47 and 50) of Regulation (EC) No 1224/2009)).

5.1.4 Enforcement

The competent authority for enforcement of control measures is delegated to the Dutch Food and Consumer Product Safety Authority (NVWA). The NVWA frequently carries out unannounced checks on (fishing) vessels to indicate whether their activities are carried out in compliance with existing rules and regulations. This is done by both physical presence visits on vessels as well as via aircrafts. Non-compliance is reported and based on the seriousness of the offence appropriate measures are taken. In addition, the control and enforcement documents (part of the management plans) of the Department of Waterways and Public Works (Rijkswaterstaat) for Natura 2000 areas Dogger bank, Cleaver bank and Frisian Front are publicly available online[6].

[6] Documenten | Natura 2000 rws (rwsnatura2000.nl)

6 Monitoring Programme

6.1 Monitoring in Dutch marine protected areas

Monitoring in protected areas in the Dutch North Sea is described in the Natura 2000 and MSFD monitoring programme (Min IenW Min LNV, 2020). The programme describes environmental targets, indicators, research needs, a research strategy, functional measurement needs, a monitoring strategy and a measurement plan. The resulting monitoring data provide insight in:

- the status of the indicators and 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)
- the effectiveness of the programme of measures to be implemented under the MSFD.
- The favourable conservation status under the Habitat and Bird directive.

The Marine Information and Data Centre (Informatiehuis Marien)[7] is the supporting body which plays a central role in implementing the MSFD monitoring cycle, particularly concerning monitoring quality, transparency, availability and cost efficiency. The monitoring agenda can be found at: https://www.informatiehuismarien.nl/uk/products/monitoringagenda/

The MSFD monitoring programme is aligned as much as possible with the existing monitoring programmes for the Birds and Habitats Directives and the Water Framework Directive. International cooperation 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.

Within the North Sea Agreement a monitoring and research program has been set up: 'Nature Strengthening and Species Protection Monitoring Survey'[8]. The monitoring will also provide insight into the effectiveness of the measures for the protected areas (Wijnhoven, S. 2022 and 2022a).

On 1 September 2023 the EU LIFE proposal CIBBRiNA started, which will run for 6 years (Coordinated Development and Implementation of Best Practice in Bycatch Reduction in the North Atlantic, Baltic and Mediterranean Regions). This project has the aim to minimise and, where possible, eliminate the incidental bycatch of threatened marine mammals, birds, turtles and elasmobranchs. One of the most important goals is the cooperation with the fishery industry and between countries with regard to solving the bycatch issues. The project focuses on the one hand on proven and promising mitigating measures and on the other hand improvement of monitoring. The Dutch Ministry of Agriculture, Nature and Food Quality is initiator and coordinator of this project. The consortium consists of 45 partners from 13 countries, including Iceland, Norway and the UK. There is a Stakeholder Advisory Board with 30 organisations, ranging from fisheries advisory councils, Regional Seas Conventions, fisheries organisations, NGO's and governments.

6.1.1 Monitoring of benthos

Benthos sampling stations are shown in Figure 5. A baseline measurement campaign was executed in 2015 with a focus on sampling in Natura 2000 and MSFD areas. The focus is on typical species (Habitats Directive) and selected indicator species for the structure and function of habitats, disturbance of habitats by human activities and habitat recovery. The results have been used for the update of the MSFD Initial

[7] http://www.informatiehuismarien.nl/uk/
[8] https://www.noordzeeloket.nl/omgeving/noordzeeoverleg/mons-onderzoeks-monitoringprogramma/

Assessment in 2018, reporting for the Birds and Habitats Directives in 2019, and evaluation of the MPAs' management plans. The measurement campaigns will be repeated every three years to evaluate the status and effectiveness of measures.

The design of the current benthos monitoring plan for all areas allows for detecting a change of 50% in population distribution based on hit rate of the species within the samples, with a power of 80% (BISI indicator, see 6.1.4). Hit rate is considered to be a good proxy for species distribution and/or abundance. 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 of spatial and temporal distribution of sampling points.

After an update in 2017, 86 sampling stations were added to the original monitoring campaign to be able to make statistically significant assessments on the status and effectivity of measures in all protected areas (Wijnhoven, 2017). Further analysis, updates and modifications of the benthos monitoring programme have been performed in response to the current modifications of the fishery measures (Wijnhoven, S. 2022 and 2022a).

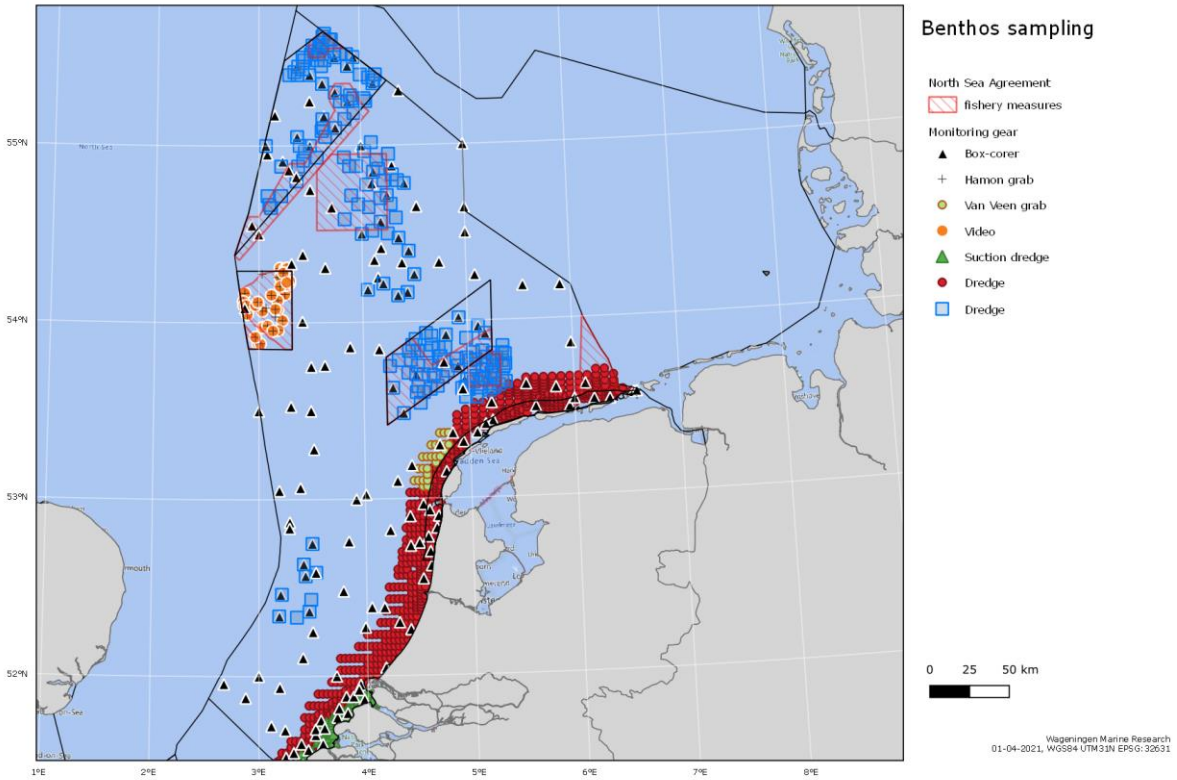

Figure 5: Overview sampling stations of the updated MSFD monitoring programme in the Dutch part of the North Sea (Min IenW Min LNV, 2020)

6.1.2 Monitoring of marine mammals and fish

For marine mammals (harbour porpoise, grey seal, harbour seal) species specific monitoring programmes are in place. In 2020, The Netherlands has updated the Harbour Porpoise Conservation Plan (Min LNV, 2020), which describes the optimization and combination of different types of surveys (aerial surveys, volunteer data). Combining these data will provide information on distribution, (trends in) abundance and seasonal patterns. Furthermore, The Netherlands has taken up a leading role in the three regionally coordinated SCANS surveys so far and is actively promoting a more frequent SCANS effort of once every six years. The Netherlands works together with other contracting parties in OSPAR and ASCOBANS to combine data in order to show seasonal distribution trends.

For the two seal species a well-established aerial monitoring program of seals at haul outs has been in place for decades. Trilateral cooperation and cooperation through OSPAR allows for establishing regional abundance estimates and distribution. There are three common indicators in OSPAR (seal abundance and distribution, grey seal pup production and cetacean abundance and distribution) based on regional marine mammal monitoring where the Netherlands is actively involved in. Furthermore, irregular tagging studies take place showing migration patterns of grey seals and harbour seals. The monitoring of fish communities is carried out through existing monitoring programs under the CFP. Fish monitoring is also included in the video surveys on the Cleaver Bank.

6.1.3 Monitoring of Birds

Since 2014, seabird species have been monitored by airplane (MWTL (Monitoring Waterstaatkundige Toestand des Lands) on the Dutch part of the North Sea with a focus on sampling in the Special Protection Areas (SPA) under the Birds Directive. In the 2022-2023 season, the SPA's Frisian Front and Brown Ridge were monitored in August, November 2022, January, February, April and June 2023. The Dutch Coastal

Zone was also monitored in these months, which includes the SPA's North Sea Coastal Zone and Voordelta (Figure 6) The monitoring programme is adaptive and is evaluated regularly.

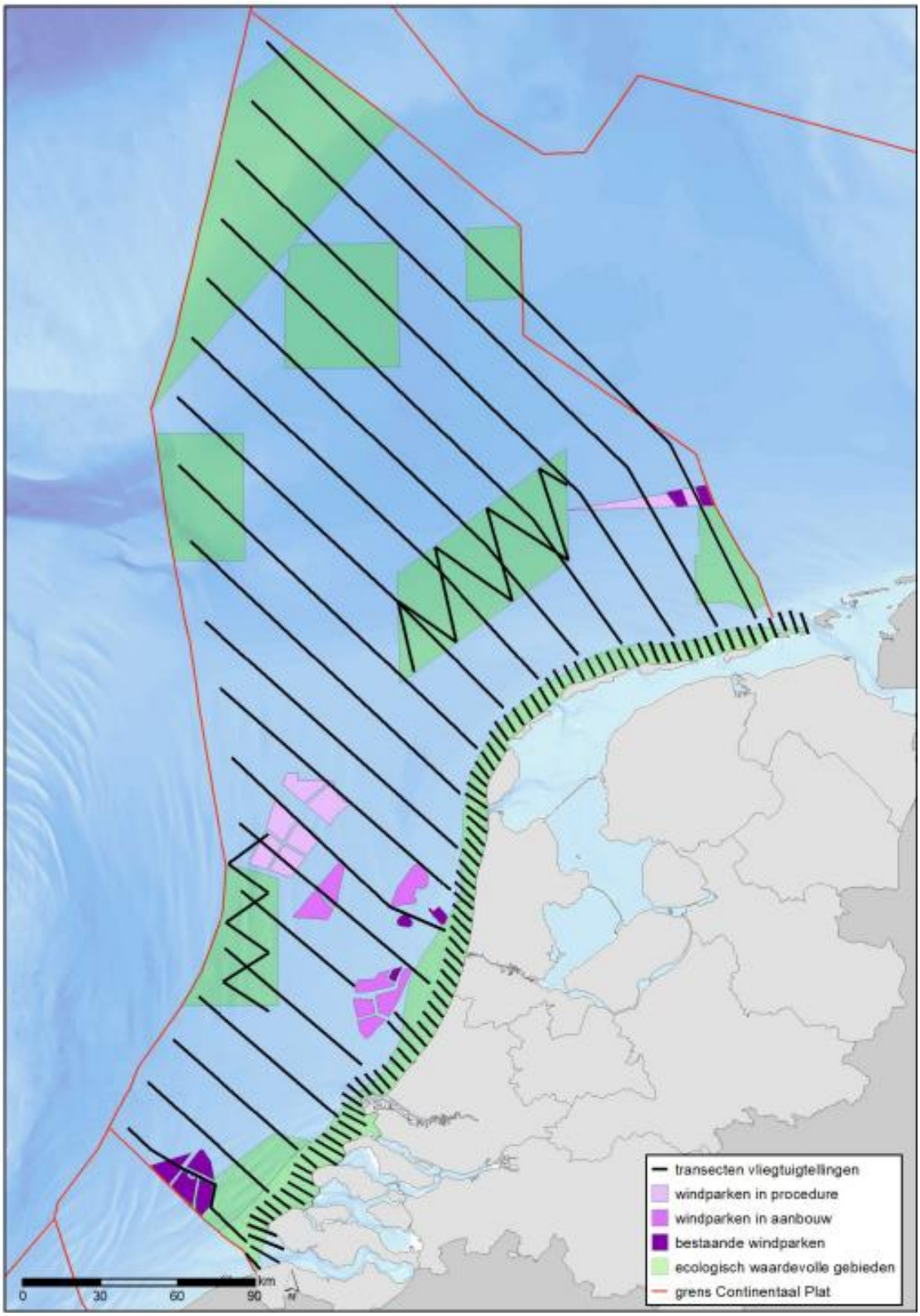

Figure 6: Spatial coverage of the Natura 2000 MSFD (MWTL) bird monitoring programme on the DSC, Brown Ridge, Frisian Front and coastal zone (van Bemmelen et al., 2023).

6.1.4 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 either be a 'positive indication' (indicating quality improvement) or a 'negative indication' (indicating quality deterioration). The MSFD published a new Commission Decision (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 an area, biological indicators aim to indicate the improvement of these quality aspects. 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, the Benthic Indicator Species Index (BISI) (Wijnhoven, 2017), 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 under Natura 2000 and MSFD. This indicator is suitable for assessment following the monitoring campaign.

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[9] (Rijnsdorp, 2017). 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.

In an international context, work is being done on the development of monitoring (mandatory under the CFP) of incidental bycatch of protected species, including seabirds. Indicator D1C1 with regard to bycatch seabirds is under development and this will be linked to the CFP (Min IenW Min LNV, 2020). This is required under Regulation (EU) 2017/1004[10].

6.1.5 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 bottom contacting towed gear.

[9] www.benthis.eu

[10] Monitoring Regulation (EU) 2017/1004 of the European Parliament and of the Council of 17 May 2017 on the establishment of a Union framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the common fisheries policy and repealing Council Regulation (EC) No 199/2008

- The time of reaction of a species on the measure (being reduction or removal of bottom contacting fishing activities) should be considered (preferably after six or, at the latest, twelve 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 per area (Table 3). These are all benthic species (epi- and infauna) 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 samples.

Table 3: Benthic Indicator species per area. DB=Dogger Bank, COG= Central Oyster Grounds, FF=Frisian Front, CB=Cleaver Bank. Source species lists: Wijnhoven (2019).

Species group	DB	COG	FF	CB
ANIMALS				
Annelid worms				
Aonides paucibranchiata				•
Aphrodita aculeata	•	•		
Atherospio guillei			•	
Chaetopterus variopedatus		•		
Chone duneri				•
Goniada maculata	•			
Goniadella bobrezkii				•
Lanice conchilega	•			
Magelona johnstoni	•			
Nephtys assimilis	•			
Nephtys cirrosa	•			
Nephtys hombergii	•			
Nephtys incisa		•	•	
Owenia fusiformis	•			
Oxydromus flexuosus			•	
Podarkeopsis helgolandicus			•	
Protodorvillea kefersteini				•
Sabellaria spinulosa				•
Sigalion mathildae	•			
Spiophanes bombyx	•			
Spiophanes kroyeri				•
Spirobranchus triqueter				•
Sthenelais limicola		•		
Terebellides stroemi		•		•
Arthropods (amphipods, crabs, burrowing shrimps, hermit crabs)				
Bathyporeia elegans	•			
Bathyporeia guilliamsoniana	•			
Callianassa subterranea		•	•	
Corystes cassivelaunus	•		•	
Galathea intermedia				•
Goneplax rhomboides			•	
Iphinoe trispinosa	•			
Liocarcinus				•
Liocarcinus holsatus	•			
Paguridae				•
Pagurus bernhardus	•			

Pagurus cuanensis				•
Pontocrates altamarinus				
Upogebia deltaura		•	•	•
Upogebia stellata		•	•	
Urothoe marina				•
Urothoe poseidonis	•			
Cnidarians (corals and anemones)				
Alcyonium digitatum	•			•
Cerianthus lloydii				•
Urticina				•
Echinoderms (sea urchins, seastars, brittlestars)				
Acrocnida brachiata	•			
Amphiura filiformis		•	•	
Astropecten irregularis	•			
Brissopsis lyrifera		•		
Echinocardium cordatum		•	•	
Echinocardium flavescens		•		
Echinocyamus pusillus	•			•
Leptosynapta inhaerens			•	
Luidia sarsii	•			
Ophiothrix fragilis	•			
Ophiura albida			•	
Ophiura ophiura	•			
Psammechinus miliaris	•			
Molluscs (bivalves and gastropods)				
Abra alba				
Acanthocardia echinata		•		
Aequipecten opercularis				•
Angulus fabula	•			
Aporrhais pespelecani				•
Arcopagia crassa				•
Arctica islandica	•	•		•
Buccinum undatum	•			•
Chamelea striatula		•		
Corbula gibba		•		
Cylichna cylindracea		•		
Donax vittatus				
Dosinia exoleta				•
Dosinia lupinus		•	•	
Ensis ensis	•			
Ensis siliqua	•			
Euspira pulchella	•		•	
Gari fervensis	•			
Kurtiella bidentata	•			
Lutraria lutraria				
Macoma balthica				
Mactra stultorum				
Mytilus edulis				
Neptunea antiqua	•			
Nucula nitidosa		•		
Pododesmus				•

Polititapes rhomboides		•
Simnia patula		•
Spisula subtruncata		
Thracia convexa	•	
Timoclea ovata		•
Turritella communis	•	
Sponges		
Porifera		•
PLANTS		
Rhodophyta		
Lithothamnion sonderi		•

7 Expected effects of the conservation measures

7.1 Expected effects on the natural features in the Dutch North Sea

With the proposed conservation measures in the proposed Joint Recommendation, the Netherlands aims to meet the obligations deriving from EU legislation: HD, BD and MSFD. Currently, approximately 26% of the Dutch North Sea is designated as a protected area (excluding the Waddenzee). When the Proposed Joint Recommendation is adopted as a Delegated Act by the European Commission 13,77% of the Dutch North Sea will be exempted from bottom disturbing fishery activities, and 2,8% of this percentage will be exempted from all forms of fishery. It is expected that with the proposed conservation measures the Netherlands will meet the conservation objectives of the specific areas.

7.2 Expected effects on fisheries in the Dutch North Sea

7.2.1 Displacement

Effort displacement is a complex issue and effects are hard to quantify. When an area is closed for fisheries, fishers have to move to other areas. Displacement in time and space highly depends on the importance of the closed fishing grounds (size and location), the expertise and character of the skipper, distance to the fishing harbours, and the quota for different species. These factors all result in a certain level of specialisation of the fisher/fisheries. The more specialized, the harder it is to displace or to predict where displaced effort will be allocated. Possible effects of displacement of fishing effort in the Dutch North Sea have been studied in the process of developing fishery closures under the MSFD (Slijkerman and Tamis, 2015). An example of different types of displacement is described in Box 2.

Box 2. *Possible displacement for fisheries in the Frisian Front area*

Based on the results of a small workshop with fishermen, different types of displacement were discerned for the Frisian Front area (Slijkerman & Tamis, 2015):

Twinrig *Nephrops* fishers (in the Frisian Front area) would probably first explore fishing grounds near/at the borders of the closed area, nearby their original grounds. Displacement will probably be explorative and heterogeneous in the remaining open areas when fishing grounds are all closed. After exploring, fisheries will concentrate in areas when proper fishing grounds are found.

Scottish seine (Flyshoot) fishers were thought to follow the fish on their route. Displacement probably focusses on the areas nearby the optimum concentration of fish stocks. Displacement also depends on the amount of quotas. In case of enough plaice quota fishers can displace to the Dogger Bank, with sufficient cod quota they will be able to displace to areas like Skagerrak.

Pulse fisheries (not allowed anymore) may displace to the remaining open areas, the case of the Frisian Front to areas of 30 m depth being the border between harder and softer grounds.

7.2.1.1 Ecological effects of displacement

The ecological effects of displacement could be that fishery footprint increases in sensitive and formerly lightly or unfished areas, which will lead to additional benthic invertebrate mortality and a disproportionate impact on the benthic community (Dinmore et al., 2003 and references therein). The effects could also be that fisheries displace to an already heavily fished area, in which case the effects on the benthic community will be relatively small. Closed areas alone appear inefficient at reducing fishing impact on the overall North Sea benthic invertebrate community (Greenstreet et al., 2009). They should be combined with additional management measures, such as total allowable catch (TAC), in order to compensate for the additional fishing pressure in the remaining areas. Another effect could be that fisheries on larger fish within the best fishing grounds could shift to catch of smaller fish in less fishing grounds.

To assess the effects of displacement, conceptual models have been developed such as benthic traits models in which the effect of fisheries or displacement of fisheries depends on the characteristics (traits) of the benthic species present in each habitat (Van Kooten et al., in prep). No real assessments of the effects of displacement have been made yet. However, evaluation the effects on the benthic community actual data on displacement and changes in effort and on the benthic community are needed. These will be collected as part of the overall monitoring programme (see Chapter 6). 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. In addition to regular monitoring (see Chapter 6), further research is planned under the 'Nature Strengthening and Species Protection Monitoring Survey' (MONS) program (2021-2030) of the North Sea Agreement. Future results of this research will increase the knowledge base regarding fisheries displacement.

7.2.1.2 Economic effect of displacement

The economic effect of displacement on the overall fishing pressure in the remaining areas and the consequences for the economics of the fisheries is complex and has not been assessed so far for the Dutch fisheries in the entire North Sea, although calculations of costs and benefits have been made for various earlier proposals for closed areas in the Frisian Front and Central Oyster Grounds area (van Oostenbrugge et al., 2015). In this dynamic interaction between nature and fisheries, also other fleets that were not taken into account here will play a role; British flag vessels also fish in the proposed closed areas and as the UK fleet also will be displaced to other areas, this will lead to even more increased fishing pressure. Wageningen Research and the Dutch government are currently working on a research programme on this topic which will start in 2022 and will result in estimations of the effects of closures in the years thereafter (Roskam et al., 2021).

7.3 Expected effects on other human activities in the Dutch North Sea

Limitations to other activities than fishery activities are not included in the Proposed Joint Recommendation since the article 11 procedure only applies to fishery related activities. The other activities will be regulated through the national management plans. This entails only activities that can be regulated nationally. Excluding for instance shipping routes.

8 Discussion

8.1 General

From July 2022 until June 2023 three Ad Hoc meetings were held where discussions took place on the proposed Joint Recommendation for conservation measures (hereafter Joint Recommendation) with Member States and the European Commission. After reaching 'sufficient information' from all relevant Member States, the Joint Recommendation was sent to the North Sea Advisory Council (NSAC) on 28 July 2023 for advice. The advice was received on 18 September 2023. On 21 March 2024 the documents have been sent to the HLG Scheveningen Group as preparation for approval in the HLG meeting of 17 April 2024. On 23 October 2024, the Danish parliamentary reservation was lifted which means all Member States have approved the Joint Recommendation. On 18 December 2024, the Joint Recommendation, general and site-specific background documents have been sent to the European Commission with the request to draft a delegated act. This chapter describes the steps that have been taken in the past.

8.2 Ad Hoc 6 July 2022

On 6 July 2022, the Netherlands organized a first Ad Hoc technical expert group. An invitation was sent to all members of the Scheveningen Group. Belgium, Denmark, Germany, Sweden and the European Commission attended the meeting. The Netherlands shared the proposed Joint Recommendation and the corresponding background documents with the Member States (MS) a month in advance of the meeting (8th of June 2022). During the Ad Hoc meeting, the Netherlands presented the proposed Joint Recommendation.

Several Member States noted that the distinction between the current Joint Recommendation and the Joint Recommendation the Netherlands proposed in 2019 was not clear to them because both contained some of the same protected areas. Also additional fisheries data and figures for the Southern Dogger Bank were requested to be able to make a better distinction between the Dogger Bank (HD N2000 area) and the Southern Dogger Bank (MSFD area). Furthermore, a detailed overview was requested of all allowed and banned gear types and an update of the most recent fisheries data up to 2021 to indicate the specific effects of the measures for national fishing fleets. The Netherlands agreed with all of the above points and confirmed they would provide more information as soon as possible but pointed out this would require a new data call.

Additionally, questions and comments were made on the control and enforcement of vessels less than 12 meters. Some Member States indicated that they were looking into other ways of controlling these vessels for example with AIS. The Netherlands indicated that this topic is not only a topic relating to this Joint Recommendation, but a broader issue regarding control and enforcement. The Netherlands promised to look further into this matter.

The European Commission asked if the Netherlands had information on whether the UK supported the proposal. The Netherlands answered that article 11 of the CFP only required agreement between Member States and that third countries should be consulted thereafter.

8.3 Ad Hoc 9 March 2023

On 9 March 2023, the second Ad Hoc technical expert group was organized by the Netherlands and was attended by a representation of Belgium, Denmark, Germany, Sweden and the European Commission. The Netherlands provided the updated proposed Joint Recommendation and background documents in advance (20th of February 2023). During the Ad Hoc, the Netherlands provided a presentation with a recap on the proposal and the previous meeting and presented the changes in the documents including the updated fisheries data (both effort and value). Also an overview was provided about the relation with the 2019 Joint Recommendation.

The Netherlands proposed to include a VMS obligation for vessels smaller than 12 meters[11]. Member States indicated that this update needed to be checked with their fishing industries. Some Member States suggested a more flexible wording to leave room for additional control systems such as AIS. The Netherlands promised to look into this alternative and to come back on this the next meeting. It was agreed that the Member States would react (through a written procedure) on sufficient information within 3 weeks.

After that, the Member States and the Netherlands started with first discussions on the proposal. Some Member States stated that there were issues with the proposal of the Borkum Reef Grounds and Central Oyster Grounds. A suggestion was made to amend the proposal allowing bottom contacting fisheries in the Central Oyster Grounds in autumn and winter. However, the Netherlands explained that the proposal is to protect the benthic habitats in the marine protected area from all fishing methods that have a negative effect on the habitat types. Scientific studies show that the first time you fish in an area is the most intrusive. That is why the Netherlands proposed to ban all bottom contacting fisheries the whole year round. Moreover, a proposal was made to exempt the ban on shrimp fisheries in the southern shallow parts of the Borkum Reef Grounds until 20 meters. The Netherlands explained that this area is already deeper than -20 meters. The borders of the Borkum Reef Grounds were changed in the latest version compared to the one shared with the Member States in 2022. Therefore this seems no issue anymore.

Questions were raised by Member States regarding sand extraction in the Borkum Reef Grounds. The Netherlands stated that they are also looking into other activities in MSFD areas besides fisheries, such as sand extraction. This is a separate process that is linked also to the discussion in TG Seabed on threshold values for descriptor 6.

The European Commission mentioned that they would expect a more elaborated rationale, including specific conservation objectives to a particular MPA site. Additionally, the European Commissions stated that consistency is important. Proposals should be as clear as possible.

8.4 Ad Hoc 21 June 2023

On 21 June 2023, the third Ad Hoc technical expert group was organized by the Netherlands. Belgium, Denmark, Germany, Sweden, France and the European Commission attended the meeting. The Netherlands provided information on the bilateral meetings that were held, further comments received from Member States and the changes that were made to the documents. The Netherlands indicated that the adjusted documents would be send to the Member States within two weeks. Member States would have two weeks (24th of July) to send in any final comments on the proposal and background documents. The revised versions would then be send to the North Sea Advisory Council (NSAC) for consultation in the second half of the summer. Member States suggested to have a discussion on the control and enforcement system for vessels less than 12 meters in the next FISH-ENVI group meeting as not to delay the proposal.

[11] In 2024, this obligation is brought in line with the revised Control Regulation in agreement with all Member States that are member of the Scheveningen Group.

8.5 North Sea Advisory Council consultation

On 28 July 2023 the draft Joint Recommendation, general and site-specific background documents were sent to the North Sea Advisory Council. The NSAC advice was received on 18 September 2024. The advice has been split up in a general advice and a country-specific advice.

In the general advice, the NSAC stated the importance of robust scientific monitoring of the proposed measures, recommended strengthening the monitoring efforts, stressed the importance of well-defined control and enforcement provisions, and supported the use of VMS with a 10-minute frequency and alert zones. NSAC also stated that international coordination is essential. Lastly, NSAC advised to seek guidance from STECF, advised to adequately address the impact of pelagic fishing, and reiterated the need for independent scientific reviews.

In the country-specific advice there were three Member States that had additional comments. First, the Belgian industry stated that the impact of Belgian fishing gears is minimal and that a restriction in the proposed areas is not necessary. It was also stated that more sustainable practices should be taken into account and that the negative reputation of the beam trawl fishery can no longer be defended. Secondly, the Danish industry called for further scientific basis and documentation on the effects and monitoring of the effects. The Danish industry also advised further investigation of the concept of multi-use and establishment of pilot projects to test their viability. Lastly, the Dutch industry referred to the North Sea Agreement. The Dutch OIG complimented the Dutch administration for providing a clear scientific basis for the proposed measures. However, the Dutch OIG also recommended to update the general background document with the widespread support of the North Sea Agreement. In addition, the Dutch OIG stated that the proposed measures contribute to international conservation targets, highlighted the impact of bottom contacting fisheries activities, referred to the Total Allowable Catch and Good Environmental Status, recommended to add pulse to the list of excluded gears in case the EU ban is lifted, and emphasize the importance of real and meaningful stakeholder management.

The general and country-specific advice resulted in the addition of one paragraph (paragraph 5.1.4) in the general background document. This paragraph gives a more elaborated explanation of the enforcement of the proposed measures in the concerning marine protected areas. We have also made some small textual adjustments such as the elaboration on the North Sea Agreement in the general background document and updating the paragraph about CIBRINNA bycatch programme.

8.6 High Level Group Scheveningen 17 April 2024

On 21 March 2024 the draft Joint Recommendation, general and site-specific background documents have been send to the HLG Scheveningen Group as preparation for a discussion in the HLG meeting of 17 April 2024. During the HLG Scheveningen Group the Netherlands shortly presented the fisheries measures in six marine protected areas. There were no questions about the content of the Joint Recommendation. All Member States approved the Joint Recommendation during the HLG Scheveningen Group, except for Denmark which made a parliamentary reservation. This reservation was lifted on 23 October 2024.

On 18 December 2024, the Joint Recommendation, general and site-specific background documents have been sent to the European Commission with the request to draft a delegated act.

9 Conclusion

9.1 General

This proposal is expected to deliver a key contribution to the conservation objectives of six marine protected areas on the Dutch EEZ: Southern Dogger Bank (MSFD), Cleaver Bank (HD), Frisian Front (MSFD), Central Oyster Grounds (MSFD), Borkum Reef Grounds (MSFD) and Brown Ridge (BD). The conservation measures allow the ecosystem of the MPA's to recover from the present disturbed state. Economic analysis showed that there is an economic effect on the fishing industry. However, in light of the goals the Netherlands has set out in the site-specific background documents is it believed the effects are not disproportional. The proposed measures are proportionate to the objective pursues and give due consideration to the social and economic impacts of these measures. The proposed measures are consistent with the conservation objectives for the site concerned and with the precautionary approach to fisheries management.

This proposal is based on recent and actual information regarding both ecological and economic aspects of the areas to be closed. The drafting process of the JR was based on a scientific approach and the best scientific information available. Note that a large amount of literature is available on the topic of nature conservation and impact of fishing. The literature reviewed for this process was considered sound and relevant by Wageningen Marine Research and Wageningen Economic Research.

Key stakeholders from fishing industry and nature conservation organizations were involved in the preparation process from the very start in 2020 (and before 2020 during the drafting of the North Sea Agreement). They participated in the joint fact-finding process and presented proposals to be taken into account in the societal cost-benefit analyses. Stakeholders were invited to participate in an open and transparent manner on a national as well as European level (through the North Sea Advisory Council).

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