Conservation objectives for Natura 2000 sites (SACs and SPAs) in the Dutch sector of the North Sea

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Report number C065/09

IMARES Wageningen UR

IMARES – Institute for Marine Resources & Ecosystem Studies

Client: Department of Knowledge,
Ministry of Agriculture, Nature and Food Quality
On behalf of the Marine Ecological Network and Natura 2000 theme
PO Box 482
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BAS code: BO-02-012-006
Publication date: 27 August 2009

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Foreword

This study has been carried out within the scope of the policy-supporting research conducted within the framework of the Marine Ecological Network and Natura 2000 theme of the Ministry of Agriculture, Nature and Food Quality (LNV) programme entitled, National Ecological Network (*Ecologische Hoofdstructuur)*.

This report provides both the scientific basis relevant to the formulation of conservation objectives for the Natura 2000 sites in the North Sea and is an initial attempt at such formulation. The sites concerned are the Dogger Bank, the Cleaver Bank, North Sea Coastal Zone 2 and the Vlakte van de Raan, which will be designated under the Habitat Directive, and the Frisian Front and North Sea Coastal Zone 2, which will be designated under the Birds Directive.[1] Habitat Directive sites are referred to Special Areas of Conservation (SACs) and Birds Directive sites are referred to as Special Protected Areas (SPAs).

The history, aims and approach leading to the conservation objectives are described in the first two chapters of the report. Chapter 3 examines each site in turn, presenting background information about the site's features and the habitat types and species found there that are protected under the Habitat Directive and, where relevant, the species protected under the Birds Directive. In the next three chapters detailed supplementary information is presented concerning each habitat type or species. This has been necessitated by the lack of profile documents available for a number of habitat types and bird species occurring in the Exclusive Economic Zone or, alternatively, by the difficulty of formulating objectives for the offshore sites using the profile documents alone.

In chapter 4 existing information for these habitat types is analysed and presented in the form of building blocks for the profile documents yet to be compiled or amended. Chapter 5 presents an analysis of information for species protected under the Habitat Directive that are relevant to the offshore areas of the EEZ. This is warranted by the fact that all profiles to date have been compiled for application only to the land and coastal sites. Where necessary, proposals are made for the amendment of the existing profile documents. In chapter 6 an initial attempt is made at profile documents for seabirds found in the Frisian Front.

In accordance with the structure of the designation order, in chapter 7 the necessary information is supplied for each site and provisional conservation objectives are formulated. Both scientific arguments (knowledge) and normative choices have a role to play in the formulation of conservation objectives. The latter are expressed in part in the existing policy documents, but further choices need to be made in terms of their details. Such choices are not for researchers to make but are rather matters of policy.

An Appendices Report containing profile documents for the habitat types and species referred to forms an integral part of this report.

[1] For an explanation of the use of the names North Sea Coastal Zone 1 and 2 in this report, see page 47.

Contents

1 Introduction

1.1 Background

It is the intention of the Minister of Agriculture, Nature and Food Quality to protect more than 741,000 hectares of valuable nature in the North Sea under the European Habitat Directive. The European Habitats Directive provides for the designation and protection of sites containing certain habitat types and sites that form the habitat of certain protected species. In 2008 four Special Areas of Conservation (SACs) situated in the North Sea were notified to the European Commission in Brussels as Natura 2000 sites. The sites concerned are the coastal zone to the north of Bergen (expansion of the existing SAC known as North Sea Coastal Zone 1), the Vlakte van de Raan (adjacent to the existing SAC known as the Voordelta), the Dogger Bank and the Cleaver Bank (Figure 1). The sites will be designated in 2010.

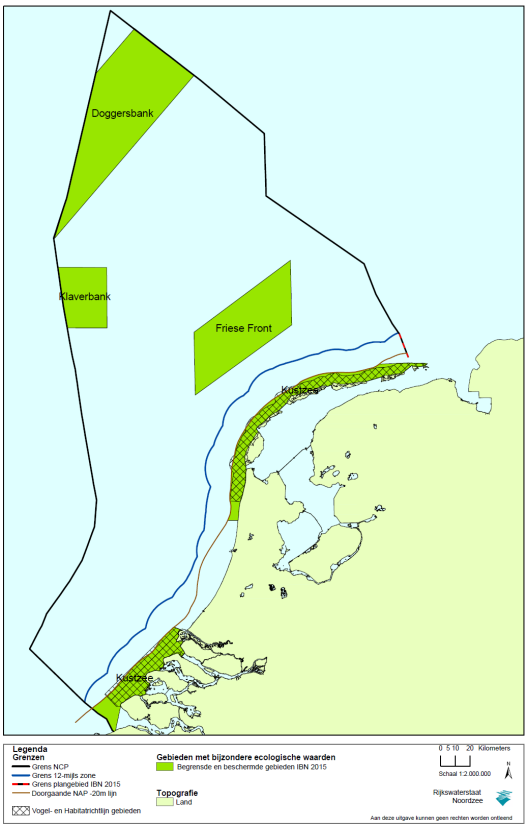

Figure 1 Overview of sites of special ecological value in the Exclusive Economic Zone taken from the Integrated Management Plan for the North Sea 2015 (Anonymous 2005). This subject of this report is the sites to be designated as Special Areas of Conservation (SACs or Habitats Directive sites) of the Dogger Bank, the Cleaver Bank, North Sea Coastal Zone 2 (SAC expansion) and the Vlakte van de Raan, and the Special Protected Areas (SPAs or Bird Directive sites) of the Frisian Front and the North Sea Coastal Zone 2 (SPA expansion). The hatched parts have already been designated. For the correct details, see the maps for each area.

The sites listed above have been notified by the Ministry of Agriculture, Nature and Food Quality for the following habitat types and species that will be protected under the Habitat Directive:

- H1110_B Sandbanks which are slightly covered by sea water all the time (*North Sea Coastal Zone*)
- H1110_C Sandbanks which are slightly covered by sea water all the time (*Dogger Bank*)
- H1170 Open-sea reefs
- H1351 Harbour porpoise (*Phocoena phocoena*)
- H1364 Grey seal (*Halichoerus grypus*)
- H1365 Harbour seal (or common seal) (*Phoca vitulina*)
- H1095 Sea lamprey (*Petromyzon marinus*)
- H1099 River lamprey (*Lampetra fluviatilis*)
- H1103 Twaite shad (*Alosa fallax*)

This report deals only with the habitat types and species already notified by the Ministry of Agriculture, Nature and Food Quality.

In addition, under the European Birds Directive, the Frisian Front and the North Sea Coastal Zone 2 will be designated for the protection of the habitat of a number of bird species. Sites under the Birds Directive (SPAs) are designated directly without any prior notification procedure. In this report species to be protected are selected by applying the criteria compiled for this purpose. These criteria have been compiled by the Ministry of Agriculture, Nature and Food Quality and are consistent with agreements made at the European level. In advance of the selection of bird species, the selected bird species are named below:

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

1.2 Aim

The aim of this report is to compile a proposal for a conservation objective for each species and each habitat type for each of the sites concerned and, where necessary, to compile or add to profile documents for species and habitat types. This undertaking is subject to the following conditions:

- The conservation objective and the underlying profile documents must satisfy the minimum legal requirements of the BD involved in the notification and designation processes for Natura 2000 at sea.
- Conservation objectives that have already been formulated for large water bodies and those for Natura 2000 at sea must be consistent.

- The conservation objectives must be workable, verifiable and attainable in relation to functional uses and future management measures: the conservation objectives to be formed will provide the starting point for a follow-up process in which management measures will be formulated in consultation with stakeholders.

2 Approach

2.1 Methodology

A methodology is applied to the formulation of conservation objectives, as laid down in the Natura 2000 targets document (LNV, 2006). For further explanation of the process of establishing conservation objectives, the reader is strongly recommended to refer to this targets document. For the purposes of the present report, a short description of a number of relevant elements follows below.

To commence, the targets document sets out the Natura 2000 national conservation objectives and provides direction for the conservation objectives at site level. Secondly, for each habitat type and species the Ministry of Agriculture, Nature and Food Quality has compiled a profile document that provides background information and underpins the national conservation objectives. In September and December 2008 the Ministry of Agriculture, Nature and Food Quality rewrote all the profiles for the habitat types; this refers to those profiles for sites already designated. In addition, the conservation objectives for each site are laid down in a designation order. The third step concerns the compilation of a management plan. Based on the conservation objectives formulated in the designation order, in this plan the conservation objective is worked out in greater detail with respect to its scope, space and time (see also Figure 2).

The targets document takes no account of Natura 2000 sites located in the Exclusive Economic Zone (EEZ), only with marine sites in the coastal zone:

- Wadden Sea (1)
- North Sea Coastal Zone (7)
- Voordelta (113)
- Eastern Schelde (118)
- Western Schelde (122)

Designation orders have now been proposed or confirmed for the above areas; for the Voordelta the management plan is also complete. The number in parenthesis is the site number used in Natura 2000.

Owing to the lack of sites further offshore, no profile document has yet been compiled for a number of habitat types and species under the Habitat Directive and species under the Birds Directive. Where such a profile document does exist, no account has yet been taken with the planned designation of the Natura 2000 sites in the EEZ. Thus, for these species, profiles should be compiled and national conservation objectives should be formulated, or profile documents (and possibly the national conservation objectives) should be revised. Subsequently, site-specific conservation objectives should be compiled for each area.

Areas are proposed as Natura 2000 sites based on the presence of certain habitat types, and species, as stated in the Birds Directive and the Habitats Directive (for the EEZ, see Lindeboom et al., 2005). Sites of relevance to the Habitat Directive are first notified to the EU. For the areas in the EEZ, notification recently took place (December 2008) using Standard Data Forms (see Bos et al., 2008). The opportunity for public comment was available. Next, the sites should be designated on the basis of a designation order in which the conservation objectives are worked out in more detail. The present report should provide the ecological substantiation this requires. Sites under the Birds Directive are designated directly without any prior notification procedure. The conservation objectives stated in the designation form the legal basis for the regulation of activities. This

regulation is described in the management plan. The plan states what must be done and by whom to achieve the objectives for the site. It also states which activities on the site are permissible without a permit.

Verwijderd:

If the site qualifies for a certain habitat type (Table 1), the other habitat types or habitat species present within the boundary of the site are included in the designation order. The various Special Areas of Conservation (SACs) to be designated qualify by virtue of the presence of the habitat types stated in Table 1. The Frisian Front qualifies based on the periodic presence of more than 1% of the European population of the great skua and the criterion that more than 20,000 common guillemots regularly reside at the site.

The (marine) mammals and (migratory) birds reported in Table 1 have been selected because they are present in an area that qualifies due to the presence of a certain habitat type. Accordingly, these species are not the reason for the site's protection. In accordance with Article 4.1 of the Habitat Directive the species themselves provides the justification only if the site has special ecological value in relation to the surrounding area, i.e. if it hosts 'the physical and biological factors essential to their life and reproduction'.

Table 1 Overview of the qualifying habitat types for each site (black) and the Habitat Directive species found on these sites (cross). For the purposes of this report the twaite shad has been added for the Vlakte van de Raan.

	Cleaver Bank	Dogger Bank	Vlakte van de Raan	North Sea Coastal Zone 2
Habitat type				
H 1170	■			
H 1110_B			■	■
H 1110_C		■		
Mammals				
Harbour porpoise	X	X	X	X
Grey seal	X	X	X	X
Harbour seal	X	X	X	X
Fishes				
River lamprey			X	X
Sea lamprey			X	X
Twaite shad				X

Presented in this document is information supplementary to the species and habitat types reported in Table 2 for the purposes of the existing profile documents, or those yet to be written. For a number of species it is proposed that the assessment of the conservation status be revised. For the sites, the Natura 2000 target species and habitat types relevant to the compilation of conservation objectives are stated.

Table 2 Overview of the relevant species and habitat types for the Natura 2000 sites in the territorial sea and the Exclusive Economic Zone (EEZ). For all habitat types and species, information has been worked out in detail in the present report in order that profile documents may be compiled/amended and conservation objectives proposed.

Targets species and habitat types				Target sites				
	Code	Description	Profile available?	Cleaver Bank	Dogger Bank	Vlakte van de Raan	North Sea Coastal Zone 2	Frisian Front
Habitat type	H1170	Reefs	No					
	H1110_B	Sandbanks tidal area	Yes					
	H1110_C	Sandbanks offshore	No					
Fishes	H1095	Sea lamprey	Yes					
	H1099	River lamprey	Yes					
	H1103	Twaite shad	Yes					
Mammals	H1351	Harbour porpoise	Yes					
	H1364	Grey seal	Yes					
	H1365	Harbour seal	Yes					
Birds	A001	Red-throated diver	Yes					
	A063	Eider	Yes					
	A065	Black scoter	Yes					
	A175	Great skua	No					
	A183	Lesser black-backed gull	Yes					
	A177	Little gull	Yes					
	A187	Great black-backed gull	No					
	A199	Common guillemot	No					

2.2 Aspects of marine sites

The 'standard' derivation of national conservation objectives takes place as follows.[2] Based on data about a favourable situation in the past (or at another location), a favourable conservation status (CS) is derived for the habitat types and species concerned. Next, the extent to which the current situation at the national level matches the CS is tested. It can be concluded that the national CS is 'favourable', 'unfavourable–inadequate' or 'unfavourable–bad' . Based on this, a conservation objective is formulated at national level for the habitat type or the species. This can consist of the maintenance of the current situation or its improvement. Next, for each Natura 2000 site, how the site will contribute to the achievement of the national conservation objective is stated. This involves assessing the conservation status of the species or the habitat type at the site in question, compared to a reference situation at that site (to be formulated). For each site, this leads ultimately to maintenance or restoration targets for the habitat types and species found there.

With regard to the formulation of the conservation objectives, marine sites are subject to a number of factors that hinder the process. These are described in the following sections.

[2] See: Natura 2000 targets document, LNV, 2006.

2.2.1 Monitoring information

The limited availability of much of the information required to set conservation objectives in accordance with the standards set in the profile documents and site descriptions is an issue that affects the marine sites. This is due to the limited availability of monitoring data, caused by among other things:

- Limited site coverage (e.g. aerial counts of seabirds and marine mammals, monitoring bottom-dwellers (as an aspect of habitat types), rarity (of migratory fish);
- Limited time series, as a result of which trend data are not available;
- Unsuitable methodology (e.g. sampling of bottom-dwellers of gravel banks, seals in open sea).

An analysis of the monitoring both performed and required is in preparation (Bos et al., in prep). No dedicated study is taking place to fill in the gaps in knowledge for the Natura 2000 sites. The supplementary knowledge and information that could lead to an improved substantiation of the conservation objectives is stated concisely in Appendix 2.

In compiling the conservation objectives use was made of the data that, by contrast, is available from the various programmes, such as MWTL[3] (inc. BIOMON benthos samplings). Use was also made of aerial counts of marine mammals, coastal birds and seabirds by *Rijkswaterstaat* (Directorate General for Public Works and Water Management, RWS), ship counts of seabirds (ESAS), shorebird counts by SOVON, fish monitoring and seal counts on the wad (flats) by the Ministry of Agriculture, Nature and Food Quality (performed by IMARES) and data from tagged seals taken from projects (IMARES).

Owing to the lack of specific knowledge in time and space about the distribution and the behaviour of most species, little or nothing is known of the value of sub-sites compared to the rest of the area of distribution. For example, it is not clear whether, and if so where, the harbour porpoise gives birth to its offspring in the Dutch sector of the North Sea. For each Habitat Directive (HD) species and habitat type it is stated for each site which relevant information is known and how this knowledge has been used in the formulation of the proposed conservation objective. Where too little is known, this is indicated and a conservation objective is supplied drawing on 'best professional judgement' (for the methodology, see section 2.7).

Owing to uncertainties arising due to the limited availability of monitoring information, the risk exists that information is lacking about those species of genuine importance to a habitat type; that the favourable conservation status and/or the current conservation status cannot be estimated well or at all, and that as a result the formulation of the (maintenance or restoration) target is insufficiently supported, in a scientific sense, and is contestable.

2.2.2 Reference situation

The conservation status of a habitat type or species at a site is often described in relation to an historical reference situation. A number of factors make the description of suitable reference situations for the marine sites problematical. In the first place, the limitations in knowledge mentioned earlier apply, whereby particularly historical information is very limited. In the second place, it appears that the North Sea ecosystem is characterised by great variability, also due to natural causes (Weijerman et al, 2005; Lindeboom, 2008). Also lacking are suitable uninfluenced

[3] MWTL = Monitoring the National Hydraulic Engineering Status *(Monitoring van de Waterstaatskundige Toestand des Lands)*.

areas that could serve as the reference for an undisturbed situation. In the third place, under the continuous impact of commercial fishing, the bottom ecosystem changed years ago from a system with high biodiversity and relatively many old specimens into a relatively impoverished system (Duineveld et al, 2007) with an unnatural age structure (Lindeboom, 2008). Other anthropogenic effects have also influenced the ecosystem of the North Sea. The eutrophication of the North Sea and its elevation in temperature are relevant developments, as are interventions in the protection of the coast (Deltaworks, Closure Dike) and changing river discharges.

Owing to the natural variation in the marine ecosystem, the increasing anthropogenic use and climate change, references from the past are not representative of current or future situations. On this subject, Karsten Reise has written, 'Each historical reference is no more than an alarming ghost from the past, a misleading light, probably never to be reached again even if all anthropogenic effects were to be fully removed' (Reise et al., 2008). By contrast, reference situations can be used to define target values that can provide guidance when drawing up and assessing conservation objectives.

As the marine sites suffer clear limitations with regard to building an historical (or geographical) reference, in this study supplementary information has also been used about the occurrence of certain anthropogenic impact factors on the ecosystem in question, and scientific information that reveals something about the occurrence of that impact factor and the quality of the site. With this supplementary information about the consequences of anthropogenic use, it is possible nevertheless to form an assessment of the quality of a habitat type in those cases in which there is no information about a reference situation.

The present report brings together objective information to create a picture of nature as it was in the past on the Natura 2000 sites. It also states, where relevant, which disturbance factors have an effect on the Natura 2000 species or habitat types, so that it is possible to indicate in a qualitative sense which changes have occurred as a consequence of activities. Only the removal of the disturbance factors can subsequently return the marine ecosystem as closely as possible to target values (for quality) based on the past, at a time when the disturbing actions had not yet had any or much influence (Lindeboom, 2008).

2.3 Elaboration

2.3.1 Products in this report

To arrive at a proposal for conservation objectives for the sites to be designated, information is required about the features of the sites and the habitat types and species found there. This (supplementary) background information is presented in chapters 3, 4, 5 and 6. This information can be used to draw up or amend profile documents for habitat types, habitat species and bird species. The reader is reminded that the only habitat types and species that have been worked out in detail are those that have been notified to the European Commission for the Habitats Directive sites. In this report, for the Birds Directive sites, a selection of species has been made by reference to existing criteria.

Next, in chapter 7, based on this information, site descriptions are compiled that are consistent with the structure of the designation documents. For each area, these also contain the elaboration of the conservation objectives for species and habitat types.

The site descriptions have been compiled in accordance with the structure of the relevant chapters of the designation orders:

Site description and boundary
- Site description
- Landscape context and boundary features
- Boundary and surface area
- Explanation to the map and excluded parts

Conservation objectives
- Introduction
- General objectives
- Habitat Directive: habitat types
- Habitat Directive: species
- And/or Birds Directive: species

2.3.2 Result

To arrive at the designation of Natura 2000 sites at sea, conservation objectives are proposed in this report that can later serve as part of the notification and designation processes. This is in accordance with the obligations imposed by the Birds Directive and the Habitats Directive and the process already underway of designating 162 Natura 2000 sites on land and in the large water bodies (the coastal zone, Wadden Sea and Zeeuwse Delta).

2.4 Available knowledge

Draft conservation objectives have already been formulated for large water bodies (the coastal zone, Wadden Sea and Zeeuwse Delta). In addition, a number of other documents were recently compiled that are relevant to the compilation of the required documents, namely:

1. Natura 2000 targets document (LNV, 2006).
2. Sites of special ecological value in the Exclusive Economic Zone (Lindeboom et al., 2005).
3. Guidelines for implementing BD in marine sites (Marine Guidelines, 2007, including the Interpretation Manual, 2007).
4. Fisheries measures for marine Natura 2000 Sites: A consistent approach to requests for fisheries management measures under the Common Fisheries Policy (2008).
5. Ecological atlas of sites in the Dutch North Sea warranting protection (Lindeboom et al, 2008).
6. Profile descriptions of relevant habitat types, habitat species and bird species and Designation orders for the Wadden Sea, North Sea Coastal Zone 1 and Voordelta.

In addition, more specific information for the sites is available. This has been used to write the site descriptions and is referred to in the relevant chapter.

2.5 Presentation of the question

The presentation of the question for the present study is as follows: Which conservation objectives are attainable and verifiable for the proposed marine Natura 2000 sites of the Cleaver Bank, the Dogger Bank, the Vlakte van Raan, North Sea Coastal Zone 2 and the Frisian Front and satisfy the following requirements:

- The proposals fit within the statutory Preconditions of the Birds Directive and the Habitats Directive (and describe at least the minimum version requested by the statutory conditions of the BD and the Guidelines)

- Conformity with the Technical guidelines of the European Commission for the implementation of the BD on marine sites
- Conformity with the system applied in the Ministry of Agriculture, Nature and Food Quality Natura 2000 targets document.

The departure point is formed by the relevant (potential) nature values of the relevant sites in and of themselves, together with sources provided by what has already been established with regard to them in earlier documents (in particular targets document, profile documents, Standard Data Forms and (where available) guidelines and the available (scientific) knowledge and understanding.

2.6 Process

Shown in Figure 2 is an overview of the relevant steps in the process of developing Natura 2000 sites in the North Sea. As already mentioned, this report concerns the supply of building blocks required to compile profile documents and conservation objectives for the substantiation of the designation orders. In the management plans to be drawn up subsequently, the conservation objectives will be worked out in space and time in greater detail.

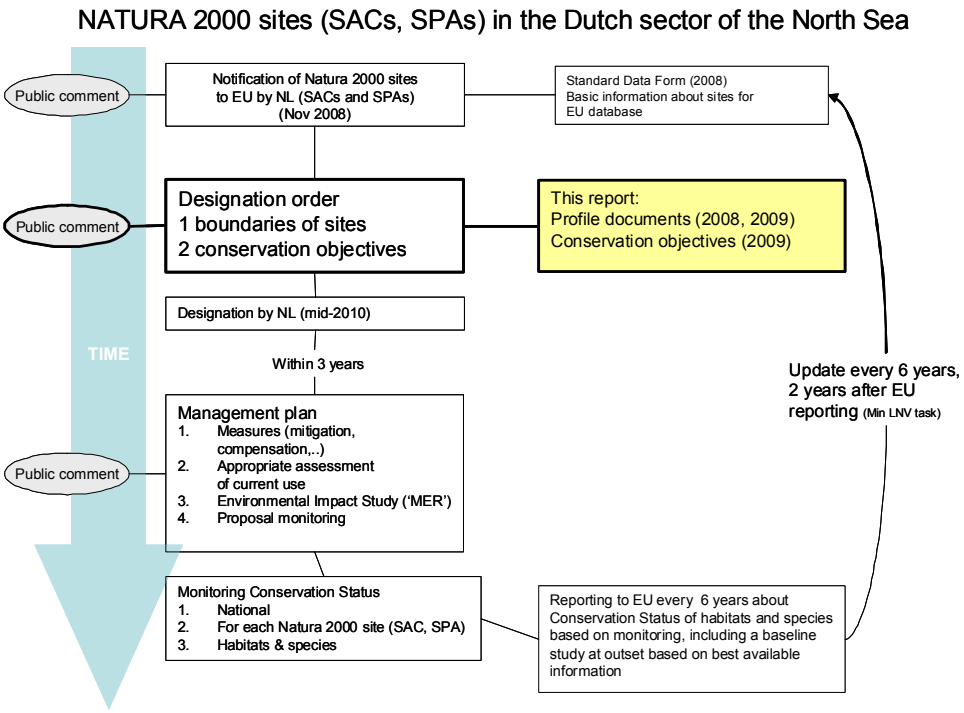

Figure 2 Relevant steps in the development of Natura 2000 sites in the North Sea. This report concerns the compilation of information for the purposes of the profile documents and conservation objectives (yellow block) for the substantiation of the designation orders.

2.7 Dealing with incomplete knowledge when compiling conservation objectives

The aim of this report is to formulate workable, verifiable and attainable conservation objectives in relation to functional uses and future management measures. The question is how conservation objectives can be set given the limited available information. It has been established that the necessary information for the scientific underpinning of conservation objectives is often incomplete. In addition, in advance of writing, a number of principles were established for the elaboration of the conservation objectives presented in this report.

With regard to the incomplete knowledge base, the following principles have been used in the specification of the conservation status (CS) and the advice/proposal for conservation objectives for species and habitat types at each site:

1. In this chapter conservation objectives are formulated for the habitat types and habitat species that were notified using Standard Data Forms in 2008 together with the new Natura 2000 sites. In addition, conservation objectives are formulated for bird species relevant in the Frisian Front (see section 3.5.2) and to North Sea Coastal Zone 2.
    a. Use has been made of the profiles already established and available. Where these do not provide full geographical coverage, they have been amended for use with the current sites;
    b. For those habitat types and bird species not yet described, building blocks have been supplied for the profiles yet to be compiled.
2. The following elements have been used to determine the reference situation underlying a favourable conservation status (CS) of a species or habitat type at a site:
    a. Historical data about the site in question, provided it can be safely assumed that these represent a favourable situation;
    b. Supplementary information from other sites, provided these are ecologically comparable. These may be adjacent sites, or sites elsewhere for which a convincing case can be made that the ecological situation is comparable with that of the site in question.
    c. An estimate based on the current effects of functional uses (provided and in so far as the influence of these impact factors on the quality of the habitat type or habitat has been described in scientific literature);

    In using the above elements, an hierarchical relationship is applied: a>b>c. Documented scientific sources are used. When these are not available, use is made of 'expert judgement' (this is indicated as such in the text of the report).
3. The CS of the species or habitat type within the site itself, as estimated under point 2, is used to support the advice/proposal for the conservation objectives for the species or habitat type.
4. In working though the system presented under points 2 and 3 above it is important, finally, that the following be estimated:
    a. how the formulation of conservation objectives at site level relates in practice to the national CS and the national conservation objective.
    b. how the formulation of the conservation objective relates to conservation objectives at adjacent sites.

    The finding of this assessment is also included in the report for the purposes of point 5.
5. The final choices are made at policy level; one aspect of this process being that the opportunity for public comment is available prior to designation. The above-mentioned knowledge base will be considered in the policy and a conservation objective will be chosen. To accommodate an incomplete knowledge base, the precautionary principle

can be applied at the level of the measures to be taken. Another fundamental element of how policy handles uncertainty is by setting up adaptive management. The choice for a maintenance or restoration target is not a rigid one. The Natura 2000 system offers the scope to make subsequent changes to reflect current or future new insights. For this reason, recommendations for monitoring and research to be set up are made in Appendix 2. Also indicated are those outstanding gaps in knowledge that must be filled to enable better founded objectives. Ultimately, monitoring should also provide insight into how the measures that will finally be taken actually help bring the conservation objectives closer. Under the Bern Convention, a country is supposed to know which species are found on its territory in order that it can conserve and protect their populations.

The network of Natura 2000 sites is intended to realise a favourable conservation status for habitat types and species selected by the EU. The Natura 2000 sites to be designated in the North Sea occupy just a small portion of the EEZ, namely 19%. In view of the great mobility of Habitat Directive species and Birds Directive species, it is entirely possible that any poor status of the surrounding sea has a radiating effect on these species and the sites themselves. A good status in the other parts (within and outside the EEZ) of the North Sea facilitates - or is even a prerequisite for - attaining the set conservation objectives. The EU Marine Strategy Framework Directive (2008) establishes a framework in which the Member States take the necessary measures to achieve or maintain by 2020 at the latest a good environmental status in the marine environment as a whole, thus including marine waters outside the Natura 2000 sites.

2.8 References

Bos OG, EM Dijkman & J Cremer (2008) Gegevens voor aanmelding van mariene Habitatrichtlijngebieden: Doggersbank, Klaverbank, Noordzeekustzone, Vlakte van de Raan. Wageningen IMARES Report C081/08.

Bos OG, R Witbaard, RG Jak & HJ Lindeboom (in prep.) Nulmeting marien: inventarisatie van monitoring in Natura 2000 gebieden op de Noordzee. Wageningen IMARES.

Duineveld CA, MJN Bergman & MSS Lavaleye (2007) Effects of an area closed to fisheries on the composition of the benthic fauna in the southern North Sea. ICES Journal of Marine Science, 64: 899-908.

Interpretation Manual (2007). Interpretation Manual Of European Union Habitats EUR 27 July 2007. Prepared by a Marine Expert Group under the Habitats Committee of the European Commission.

Marine Strategy Framework Directive (2008) 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 (Marine Strategy Framework Directive).

Lindeboom HJ (2008) Gebiedsbescherming Noordzee: discussienota over habitattypen, instandhoudingsdoelen en beheermaatregelen. Wageningen IMARES Report C035/08.

Marine Guidelines (2007) Guidelines for the establishment of the Natura 2000 network in the marine environment. Application of the Habitats and Birds Directives. Prepared by a Marine Expert Group under the Habitats Committee of the European Commission.

Natura 2000 targets document 2006. Ministry of Agriculture, Nature and Food Quality.

Reise K, E Herre & M. Sturm (2008) Mudflat biota since the 1930s: change beyond return. Helgol. Mar. Res. 62: 13-22.

Weijerman W, HJ Lindeboom & A Zuur (2005) Regime shifts in marine ecosystems of the North Sea and Wadden Sea. Mar. Ecol. Progr. Series 298: 21-39.

3 Site background information

3.1 Cleaver Bank and habitat type H1170 (Open-sea reefs)

The notification of the Cleaver Bank concerns habitat type H1170 (Open-sea reefs)[4] and the Habitat Directive species harbour porpoise, grey seal and harbour seal (Bos et al., 2008). As no profile document has yet been compiled for H1170, a detailed description of the site and the habitat type present there follows below. For the habitat type H1170, building blocks are presented in chapter 4 for the profile document yet to be compiled and in chapter 5 background information is worked out in detail for the habitat species.

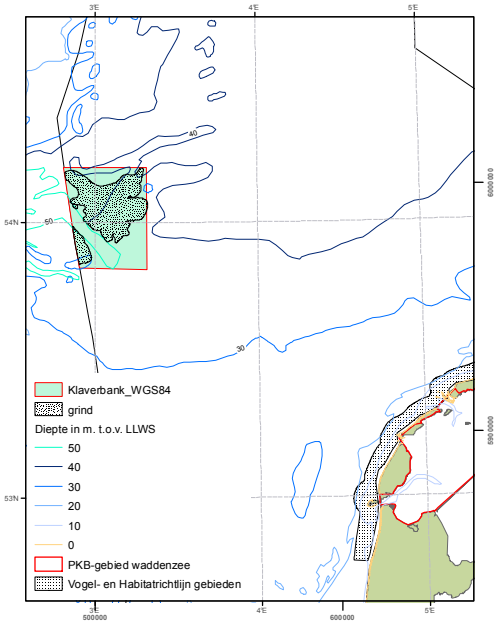

Figure 3 Cleaver Bank with depth lines and the position of the gravel banks.

3.1.1 Site features and boundary

Cleaver Bank lies in the north-western region of the Exclusive Economic Zone (EEZ) and the site's boundary is formed by drawing a triangle around the gravel accumulations shown on the map (Lindeboom et al., 2005; and see Figure 3). Cleaver Bank is an example of habitat type H1170 'Open-sea reefs' and is characterised by geo-morphological features that are considered to be reef structure. Places where large cobbles or coarse gravel occur are a characteristic feature. An additional characteristic is the presence of a mosaic of coarse sediment types that, in addition to cobbles and gravel, consists of various sands (Laban, 2004). Places with gravel (maximum 80%)

4 To distinguish it from reefs of biogenic origin, the habitat type H1170 (Reefs) as referred to here is further specified as 'Open-sea reefs'.

and boulders alternate with coarse sand and places with old shell material. Here and there, boulder clay rises to the surface. Gravel and cobbles originate from the last Ice Age. Gravel with grain sizes larger than 30 mm is already covered with growth, which suggests that the mobility of these bottoms is minimal. Sessile organisms are important because they can cement loose bottom elements, as has been learned from Georges Bank (Collie et al., 1997), and make the bottom less sensitive to the effects of water motion. On the Cleaver Bank the effect of wave action is so frequent that this cementation of smaller fractions gets little chance (pers. comm. Van Moorsel). The site is cut in two by the deep and silt-rich Botney Cut.

Over large areas a thin layer of marine sands has been deposited. Occasionally, under the influence of the dominant water current, these form what are known as 'sand ribbons' that run parallel to the current direction and can be kilometres long (Laban, 2004). Maximum measured current speeds vary between 0.25 and 0.40 m/s. Owing to the great depth (30-50 m) of the Cleaver Bank, the bottom is disturbed by wave action only in very heavy weather. As a consequence of this dynamic, the gravel is relatively poor in silt. The translucency is so great that sufficient light penetrates even to a depth of 40 m to enable the growth of crustose calcareous red algae (van Moorsel, 2003).

Owing to the variety of sediment types, such as the occurrence of coarse sediments and cobbles, the site hosts a great diversity of species. Of all the macrobenthic species present in the EEZ, 44% occur exclusively on the Cleaver Bank (van Moorsel 2003). The biodiversity of the macrobenthos on the Cleaver Bank is among the highest in the EEZ (see Lindeboom et al., 2008).

The common guillemot and razorbill are present here primarily in April/May (Arts & Berrevoets 2005). In summer, concentrations of the harbour porpoise can be found, particularly around the Botney Cut, and the minke whale, white-beaked dolphin and seals are also observed here (Camphuysen & Peet 2006; Brasseur et al., 2008).

3.1.2 Biotic communities

Based on the summarising report on the ecology of the Cleaver Bank by Van Moorsel (2003), a good picture of the fauna of the Cleaver Bank has emerged. It is evident that the characteristic species of the Cleaver Bank are precisely those restricted to the coarse, highly permeable sands and/or species that cling to stable hard subsurface (cobbles).

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

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

Species that occur specifically in coarse sediment are the rayed artemis (*Dosinia exoleta*) and the blunt tellin (*Arcopagia* (=*Tellina*) *crassa*). These species have a thick shell, which makes them well

suited to the incidental movements of the gravel. Precisely these species occur in the well-sorted clean (slit-poor) finer gravel and coarse sand fractions. Ocean quahog (*Arctica islandica*), too, are regularly encountered. In view of the type of substrate, the site is potentially suitable for the occurrence of the horse mussel (*Modiolus modiolus*) (Kenny & Rees, 1996). This long-lived species can form mussel beds. The common whelk (*Buccinum undatum*) can sustain itself well here because there is sufficient fixed substrate for the deposit of egg cases, and moreover the TBT concentration, which along the coast has caused imposex among common whelks, will be too low here to cause effects (OSPAR, 2008). The site has the potential, thus, to host various long-lived shellfish species.

Also found on the Cleaver Bank are various species that are otherwise only common in the deep more northern North Sea. Examples are the red whelk (*Neptunea antiqua*), the slender colus or common spindle (*Colus gracilis*), the hermit crab *Anapagurus laevis* and the purple heart urchin (*Spatangus purpureus*). A number of species new for the Netherlands has been found at the site, for example, the Norway bullhead (*Taurulus lilljeborgi*) and the spiny squat lobster *Galathea strigosa*. Northern species that occur on gravel-rich locations are the worms *Glycera lapidum, Chone duneri* and *Laonice bahusiensis* (Van Moorsel, 2003).

Less specific to the site are the burrowing crustaceans such as *Callianassa subterranea* and *Upogebia deltaura*. At this site, these species are primarily restricted to the sediments in the deep silt-rich Botney Cut that slices through the gravel area. These species are not characteristic of habitat type H1170 'Open-sea reefs'.

Located on the Cleaver Bank are two sampling points for the monitoring of commercial fish stocks (Beam Trawl Survey and the International Bottom Beam Trawl Survey, see Lindeboom et al., 2008). The standard methodology used in this respect is inadequate for monitoring the fish species characteristic of the Cleaver Bank, many of which are small. The species concerned are those such as gobies (*Pomatoschistus* spp.), small flatfishes like the scaldfish (*Arnoglossus laterna*) and solenette (*Buglossidium luteum*) and the common dragonet (*Callionymus lyra*). These species are common throughout the North Sea and also often occur in other areas in the EEZ in large numbers (Van Moorsel, 2003). Two species prefer to live on and between cobbles and as such can be called characteristic. These are the Norway bullhead (*Taurulus liljeborgi*) and the two-spotted clingfish (*Diplecogaster bimaculata*). In the area of the Cleaver Bank various fish species spawn, such as the whiting. In addition, the site is potentially suitable as a spawning ground for herring (summarised in Ter Hofstede et al., 2005). An expansion of the herring population could give rise to the need for new spawning grounds (Schmidt et al., in prep).

The harbour porpoise (*Phocoena phocoena*) is found on the Cleaver Bank (Arts & Berrevoets 2005; Van der Meij & Camphuysen 2006). The white-beaked dolphin (*Lagenorhynchus albirostris*) too is seen at the site (Van der Meij & Camphuysen 2006). Visual sightings of seals are difficult to make but the animals can be tracked with the help of satellite transmitters. Based on data obtained with such transmitters, density maps have been made, from which it can be deduced that both the harbour seal (*Phoca vitulina*) and the grey seal (*Halichoerus grypus*) can occur on the Cleaver Bank (Lindeboom et al. 2008).

3.1.3 Preconditions for good structure and function

A characteristic of the Cleaver Bank is the high level of biodiversity of bottom organisms. This is the consequence of the broad variety in sediment types, one of which is hard substrate, which in turn

creates favourable conditions for the occurrence of sessile epifauna. The clarity of the water also contributes to the occurrence of a number of species at the site.

This habitat type is considered as being in good condition when it consists of a mosaic of coarse sediment types, which typically includes gravel and cobbles. Specific requirements for the occurrence of calcareous red algae are the penetration of sufficient light to the bottom and that the substrate is stable. Thus, sufficient clarity of the water is necessary.

The development of sessile epifauna requires that the larger cobbles and boulders are not moved or tipped up. A characteristic, complex biotic community requires a lengthy period without disturbance to develop. After all, these cobbles and boulders are not turned over by natural processes. If the finer gravel fraction is stably positioned for a sufficient length of time, its parts may become cemented by sessile fauna, further increasing the stability of the seabed, although there are strong indications that heavy storms hinder this (Van Moorsel, pers. comm.).

3.1.4 Reference situation and disturbance factors

No information about the current situation of the biotic communities on the Cleaver Bank has been available since 2002. While the benthos of the EEZ is extensively sampled under the MWTL monitoring programme, just one station is located within the Cleaver Bank site. Moreover, this station is in the silt-rich Botney Cut, which is not representative of the habitat type 'Open-sea reefs'. In view of this, a good, up-to-date assessment specifically of the Cleaver Bank reef site cannot be made. Characteristic of the Cleaver Bank are the gravel areas, within which cobble concentrations are also found (Van Moorsel, 2003). These cobbles form the substrate for sessile epibenthos (Van Moorsel, 2003). In order to chart the current situation in these areas as well as the related fauna, it would be necessary to make side-scan sonar recordings of their entirety. These can be interpreted by relating what is already known about the bottom fauna to certain side-scan sonar patterns. Such a general map could also form the basis for additional samplings and video recordings. At present, our only starting point is the knowledge collected in the past at a limited number of locations.

Based on earlier research, summarised by Van Moorsel (2003), it can be asserted that the Cleaver Bank is a unique area in the Netherlands. It is distinguished from other areas in the EEZ where boulders and coarse sediment occur on the surface by its water depth and large size. The mosaic-like structure gives rise to a varied sessile hard-substrate community clearly distinguishable from the hard-substrate communities on infrastructural works in the coastal zone by its species composition. Owing to the three-dimensional structure of these growth-covered cobbles and gravel, the site offers habitat conditions for a wide range of species that are rare or absent elsewhere in the EEZ. Seabed stability is essential for the habitat. The growth of calcareous red algae on the bottom is enabled by the clear water. As the site lies far offshore, pollution and eutrophication play only a small role.

Bottom fishery has a substantial influence on the site's core values. Side-scan sonar recordings made in the area in 1979 and 1983 show many tracks made by beam trawls (Laban, 2004). Similarly, in the 2002 survey (Van Moorsel 2003) it was noted that the tracks of beam trawls were to be seen on all the trenches studied. In some cases so many that it was not considered worth conducting a sampling; it was expected that no useful data could be collected that would help show the area's ecological values (Van Moorsel, 2003). From the fact that in every period in which the area has been studied (1979, 1983, 2002) clear tracks made by beam trawls were observed, it can be deduced that the site is fished with great regularity. On the stony parts of the Cleaver Bank

the use of chain mats is involved. Based on the above sightings, it can be deduced that the hard substrate has been repeatedly disturbed, certainly as far back as 1979. The moving and tipping up of boulders and the churning of gravel beds can lead to the succession cycle of the hard substrate communities being set back. The gravel on the Cleaver Bank is also set in motion now and then by storms, although the frequency with which this occurs is not known. Recent fisheries data show that beam trawl fishing takes place on the Cleaver Bank, and in the Botney Cut the principle fishing method is otter trawling (see Lindeboom et al., 2008). Based on countless scientific studies (summarised in Kaiser et al., 2006), it can be assumed that as a result of this activity the community no longer has its original structure. Owing to the lack of good references, the original structure cannot be described. The effect of seabed disturbance, however, is to repeatedly set the succession of the sessile community back in time and the community continues to consist of what are known as 'r strategies' (relatively opportunistic species). In particular the development of a sessile epibenthos community with a high structural complexity is inhibited (Watling & Norse, 1998; Collie et al., 1997). Sessile species such as Hydrozoa, Bryozoa and sponges are more vulnerable to the impact of fishing gear than free-living species (Kaiser et al., 2000). Based on research in similar areas abroad, it can be deduced that the production of large benthic organisms in the fished parts has been reduced compared to the unfished parts (Hermsen et al., 2003). This concerns species such as the rayed artemis (*Dosinia exoleta*), the ocean quahog (*Arctica islandica*), the common whelk (*Buccinum undatum*) and other whelks (*Neptunea* and *Colus*). These, or other long-lived large species, could increase in importance if disturbance of the seabed is ruled out. Research can provide a definite answer to this question.

Early in the 1990s a thorough inventory of the site was carried out in connection with the possible commercial extraction of coarse sand and gravel (see references in Van Moorsel, 2003). As part of that project, the effects of an experimental extraction of gravel and sand on the fauna and geology were studied once again (Van Moorsel, 2003, Laban, 2004). After ten years, it turned out that effects on the fauna in the test sections were no longer observable. Similarly, the biodiversity of the extraction strips was comparable with that of the surrounding areas (Van Moorsel, 2003). If, however, the extraction of gravel and coarse sand were to be carried out on such a large scale that it led to a reduction of hard substrate on the surface of the seabed, this would lead to the loss of habitat for epibenthos. In this context, it is important to know that the thickness of the gravel layer is at most a few metres.

3.1.5 References

Arts FA & CM Berrevoets (2005) Monitoring van zeevogels en zeezoogdieren op het Nederlands Continentaal plat 1991-2005: Verspreiding, seizoenspatroon en trend van zeven soorten zeevogels en de bruinvis. Report RIKZ/2005.032. National Institute for Coastal and Marine Management /RIKZ, Middelburg.

Brasseur, S.M.J.M., M. Scheidat, G.M. Aarts, J.S.M. Cremer, O.G. Bos. Distribution of marine mammals in the North Sea for the generic appropriate assessment of future offshore wind farms. IMARES Report C046/08.

Camphuysen K & G Peet (2006) Walvissen en dolfijnen in de Noordzee. Fontaine Uitgevers, 160pp.

Collie JS, GA Escanero & PC Valentine (1997) Effects of bottom fishing on the benthic megafauna of Georges Bank. Mar. Ecol. Prog. Ser. 155; 159-172.

Hermsen LM, JS Collie & PC Valentine (2003) Mobile fishing gear reduces benthic megafaunal production on Georges Bank. Mar. Ecol. Prog. Ser. 260: 97-108.

Kaiser MJ, K Ramsay, CA Richardson, FE Spence & AR Brand (2000). Chronic fishing disturbance has changed shelf sea benthic communities. J Anim Ecol 69:494-503.

Kaiser MJ, KR Clarke, H Hinz, MCV Austen, PJ Somerfield & I Karakassis (2006) Global analyses of response and recovery of benthic biota to fishing. Mar. Ecol. Prog. ser. 311; 1-14.

Kenny AJ & HL Rees (1996) The effects of marine gravel extraction on the Macrobenthos: Results 2 years post-dredging. Marine pollution bulletin 8/9:615-622.

Laban C (2004). Geologisch onderzoek grindgebied Klaverbank. Samenvattend onderzoek rapport uitgevoerd van 1999 tot en met 2001. TNO-NITG 04-022-C. 42pp.

Lindeboom H, J Geurts van Kessel& L. Berkenbosch (2005) Gebieden met bijzondere ecologische waarden op het Nederlands Continentaal Plat. Report RIKZ/2005008, The Hague / Alterra Report 1109, Wageningen: 103 p.

OSPAR (2998) 2007/2008 CEMP Assessment: Trends and concentrations of selected hazardous substances in sediments and trends in TBT-specific biological effects. Assessment and Monitoring Series. OSPAR Publication Number 378/2008.

Schmidt, CJG van Damme, C Röckmannn & M Dickey-Collas (in prep.) Recolonisation of spawning grounds in a recovering fish stock: recent changes in North Sea herring.

Ter Hofstede R, HJL Heessen & N. Daan (2005) Systeembeschrijving Noordzee: natuurwaardenkaarten vis. RIVO Report C090/05.

Van Moorsel GWNM (2003) Ecologie van de Klaverbank. BiotaSurvey 2002. Ecosub, Doorn, 157 pp.

3.2 Dogger Bank and habitat type H1110_C (Sandbanks covered all the time 'Dogger Bank')

The notification of the Dogger Bank concerns habitat type H1110 (Sandbanks which are slightly covered by sea water all the time) and the Habitat Directive species harbour porpoise, grey seal and harbour seal (Bos et al., 2008). As the habitat type H1110 must be expanded to include a new subtype, namely H1110_C, called here 'Dogger Bank', there follows below a detailed description of the site and the habitat type present there. In chapter 4 a proposal is presented for amending the existing profile text. In chapter 5 background information is worked out in detail for the habitat species (harbour porpoise, harbour seal, grey seal).

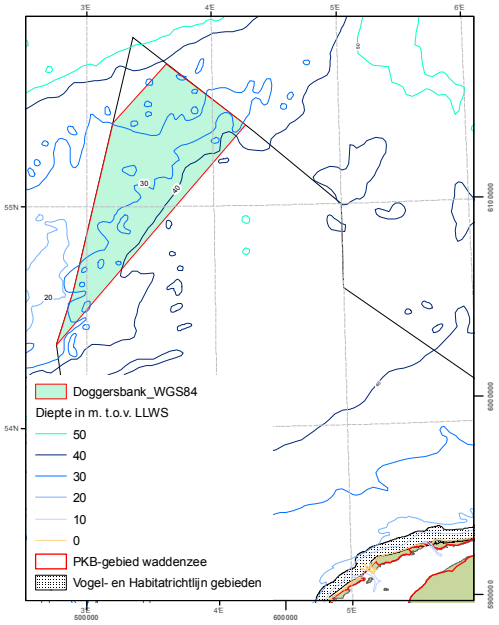

Figure 4 *Dogger Bank with depth lines. In practice, the 40-metre depth line is considered to be the edge of the sandbank and accordingly of habitat type H1110_C.*

3.2.1 Site features and boundary

The notified site 'Dogger Bank' is part of a continuously covered sandbank in the northern part of the Exclusive Economic Zone (EEZ) (Figure 4). The entire Dogger Bank stretches across the UK, Dutch, German and Danish sectors of the North Sea (*Figure 5*). The Netherlands has decided to have the boundary of the nature values to be protected on the Dogger Bank align with the boundary as proposed by the German government. A critical factor in this respect is the criterion applied by Germany of an angle of inclination of the bottom of at least 1 in 10. On this basis, the boundary on the southern edge runs along the 40-metre depth line. On the north side of the bank, by contrast, this boundary lies outside the EEZ. The boundary here has been chosen such that it aligns with both the German sector and the northern boundary of the site expected at that time

to be notified by the United Kingdom.[5] Owing to this boundary choice, the site satisfies the criteria set for this type of habitat within the Habitat Directive and a large international protected site at sea is created. On the international Dogger Bank the water depth ranges from 13 metres to an arbitrary depth of 40 metres; the Dutch sector from 24 m to 40 m. Despite the greater depth than the limit applied by the EU of 20 metres for habitat type H1110, the notified site has the topography typical of a sandbank: a central area covered with shallow water graduating to deeper water on both sides. An additional characteristic is the transition in sediment type and the associated fauna: the shallowest parts of the bank are characterised by fine sands with here and there a high percentage of shell grit, and the edges of the bank are richer in silt (Kröncke, 1992).

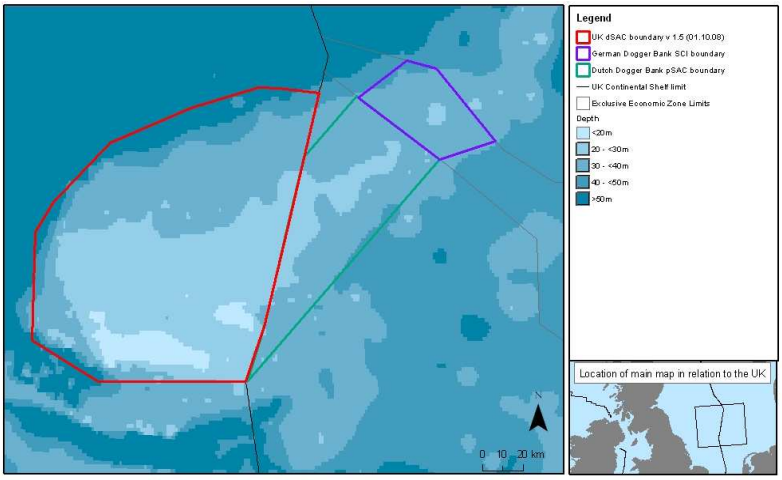

Figure 5 Provisional boundary of the Dogger Bank as Natura 2000 site in an international context.

The site's international context

Dogger Bank stretches across the Continental Shelf of various countries.

The Netherlands has decided to have the boundary of the Dogger Bank's nature values that are to be protected align with the boundary as proposed by the German government (see 3.2.1) and the anticipated northern boundary of the site to be notified by the United Kingdom (UK). If, however, the UK decides to place the boundary of her site a little more to the north, it is recommended that the Dutch boundary be moved correspondingly. Lacking in this (possible) Dutch expansion of the site, however, is a site-wide monitoring programme for the bottom fauna. Accordingly, data for establishing the northern boundary on ecological grounds are limited, but it is probable that this slope of the Dogger Bank also has a relatively elevated biodiversity, as it does on the UK side (see also Figure 6).

Owing to this choice of boundaries, the site satisfies the criteria set for this type of habitat within the Habitat Directive and a large international protected site at sea is created (*Figure 5*).

Both the Netherlands and Germany have notified the Dogger Bank to the EU. The UK has not yet done so. The features for protection reported below are all provisional. For all countries habitat

[5] Recently, however, it has appeared that the United Kingdom is keen to establish a more northerly boundary. As a result of which the northern boundary of the Dutch part no longer aligns with it (see Figure 5).

type H1110 is eligible for protection. The same probably applies to the harbour porpoise (*Phocoena phocoena*). The Netherlands has also notified the Dogger Bank for both the grey seal and the harbour seal. It is unclear whether the UK will also be notifying the site for these species. Germany has notified only the harbour seal. Germany is the only country intending to also notify the site as a Birds Directive site. As yet in Germany and the United Kingdom, no definitive objectives (maintenance or restoration) have been formulated for the Natura 2000 species and habitat types.

Features

In the shallow parts of the Dogger Bank the water column is fully mixed all year round and is characterised by alternating resuspension and sedimentation. The Dogger Bank is so shallow that breakers occur here. There is no net deposit (Reiss et al., 2007). Combined with the low content of suspended material, this ensures great clarity. As a result, primary production takes place all year round (Brockmann & Wegner, 1985; Richardson & Olsen, 1987). The adjacent deeper parts of and around the Dogger Bank are characterised by silt-rich fine sands. The tidal flow here is insufficient to support sediment resuspension (Kröncke, 1992). By contrast, storms and the water motion they cause can lead to the resuspension of fine sediment.

The Dogger Bank is distinguished from more shallowly sandbanks covered all the time (H1110_A and H1110_B) by its great distance from the shore. The site enjoys full marine salinity (34-35‰) and small seasonal variations due to its situation; one relevant factor being the lack of any river influence. The seasonal variation in water temperature is similarly minor. Owing to the offshore situation, the content of suspended material in the water column is less than 2mg/l (Icona North Sea Atlas, 1992). Consequently, the translucency is high and the 1% light limit stands at 40 metres (Weston et al, 2005). This is a very different from habitat types H1110_A and H1110_B.

Owing to the minimal water depth and the low content of suspended material, light penetrates to the seabed in the central part of the site. As a result, epiphytobenthos is present in the form of sessile diatoms (Reiss et al, 2007). This in turn supports the presence of a number of species (*Bathyporeia* spp., *Iphinoe trispinosa*) that are specialised in grazing on these algae (see Reiss et al., 2007).

In addition, methane vents occur here (Schroot et al, 2005, summarised in Witbaard et al, 2008). These are places where methane gas, located approx. 400 metres under the sediment surface, rises to the subsurface and bubbles up through the water. In the EEZ the places this occurs include the mining concession blocks B10, B13, A18 and A11. In block B13 the northern lucina (*Lucinoma boreale*) was found, a species that can be associated with gas seepage from the seabed (Dando et al., 1986). Thus, habitat type H1180 'Submarine structures made by leaking gases' may potentially occur within the notified site of the Dogger Bank (Witbaard et al, 2008). However, the lime sandstone structures associated with a methane source and characteristic of habitat type H1180 are not present. It may be that disturbance of the seabed plays a role in this; multibeam and side-scan sonar records reveal that tracks made by beam trawls run across the methane vents.

3.2.2 Biotic communities

The Dogger Bank forms a fauna boundary for the occurrence of northern and southern species (Ursin, 1960, Kirkegaard, 1969 and Petersen, 1977). In the site notified by the Netherlands a relatively diverse benthic macrofauna is found compared to other areas in the EEZ (Daan & Mulder, 2006). The site is rich in terms of the number of individuals but the total biomass per square metre is considerably lower than in the Frisian Front or the North Sea Coastal Zone.

On the shallow parts of the bank, species occur that are well able to withstand great physical stress such as strong water motion, resuspension, and sediment mobility. These are animals that are themselves mobile (*Bathyporeia*) or able to sustain themselves well in such conditions since they can burrow down well, such as the banded wedge shell (*Donax vittatus*) and the razor shell (*Ensis ensis*) or that have a protective way of life, such as tube-building bristleworms (polychaeta) (Wieking & Kröncke, 2003). Found in the fine sand are the characteristic fish sandeel (*Ammodytes* spp.) and smelt (*Hyperoplus lanceolatus*), an important food source for marine mammals and diving seabirds such as the common guillemot (*Uria aalge*), razorbill (*Alca torda*) and Atlantic puffin (*Fratercula arctica*).

The eastern part of the Dogger Bank, part of which falls within the EEZ, contains three fauna communities (Figure 6): the northern community, the typical Dogger Bank community and the southern Amphiura community (Table 3). These are differentiated for the most part by depth and sediment type (Wieking & Kröncke, 2003).

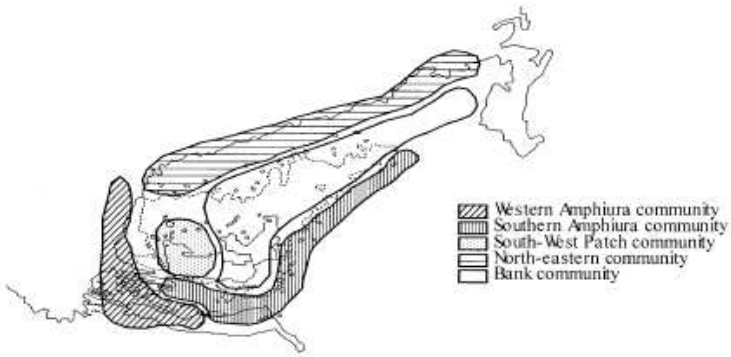

Figure 6 The distribution of macrofauna communities on the Dogger Bank in May 1996-1998, as identified by Wieking & Kröncke (2003). For the part that falls within the EEZ, the three eastern communities only are relevant. The continuous contour line is the 50 m depth line, the dotted contour line is the 30-metre depth line.

The most characteristic 'sandbank' community is found on the middle of the (shallowest part of the) bank and is dominated by species that gather their food on the boundary of the seabed and the water above it and are adapted to a dynamic environment. These are species that are mobile, able to bury themselves quickly or protected by a robust shell. This *Bathyporeia-Fabulina* community, as it is known, is characterised by the amphipods *Bathyporeia elegans* and *B guillliamsoniana* and *Tellina fabula*. Adler's necklace shell (*Polinices pulchellus*) is the most important predator. Other typical species are, for example, *Urothoe poseidonis* (a species of sandhopper) and the polychaeta *Ophelia limacina*, *Aricidea minuta* and *Sigalion mathildae*.

The community situated along the northern edge is a transition community whose important members include *Spiophanes bombyx* and *Bathyporeia elegans*. In the deepest parts, the brittle star (*Amphiura filiformis*) also numbers among these important members. The species occurring in this community are typical of the silt-rich sediments and greater water depths, both of which give rise to calmer conditions. In this community species occur that are characteristic of the northern North Sea (Wieking & Kröncke, 2003). These species (see Table 3) are one aspect in which this community is distinct from the community along the southern edge of the site.

The southern benthic community (deeper than 30 metres) is adjacent to the area of the central Oyster Grounds and accordingly hosts many of the same species. Here, too, the sediment is rich is

silt, which largely determines the species composition. This fauna community is dominated by the brittle stars (*Amphiura filiformis*) with its commensal *Mysella bidentata*, (a bivalve mollusc). Other important species are the polychaete *Pholoe baltica* and the shining nut shell (*Nucula nitidosa*), a shellfish.

Table 3 Species lists for the benthic communities on the Dogger Bank as identified by Kröncke and colleagues

Bank community	**North-eastern community**	**Southern Amphiura community**
Spiophanes bombyx	*Spiophanes bombyx*	*Amphiura filiformis*
Magelona johnstonii	*Bathyporeia elegans*	*Mysella bidentata*
Ampiura brachiata	*Scoloplos armiger*	*Spiophanes bombyx*
Bathyporeia elegans	*Polinices pulchellus*	*Pholoe baltica*
Tellina fabula	*Perioculodes longimanus*	*Magelona filiformis*
Bathyporeia guillamsoniana	*Chaetozone sp f group*	*Polinices pulchellus*
Polinices pulchella	*Edwardsia spp*	*Nemertini*
Magelona filiformis	*Dosinia lupinus*	*Nucula nitidosa*
Perioculodes longimanus	*Nepthys assimillis*	*Echinocardium cordatum*
Phoronis muelleri	*Cerianthus lloydii*	*Phaxas pellucidus*
Owenia fusiformis	*Gari fervensis*	*Bathyporeia tenuipes*
Nepthys assimillis	*Ophelia borealis*	*Harpinia antennaria*
Bathyporeia tenuipes	*Abra prismatica*	*Tellimya ferruginosa*
Spio cf. decorata	*Magelona johnstoni*	*Cylichna cylindracea*
Chaetozone sp.	*Amphiura filiformis*	*Thyasira flexuosa*
Iphinoe trispinosa	*Echinocyamus pusillus*	*Nepthys hombergii*
Urothoe poseidonis	*Goniada maculata*	*Diplocirrus glaucus*
Nepthys cirrosa	*Phoronis muelleri*	*Phoronis muelleri*
Edwardsia spp	*Hippomedon denticulatus*	*Scoloplos armiger*
Goniada maculata	*Magelona filiformis*	*Abra alba.*

Other sources (inc. synoptic mapping 1986 (see Rees et al., 2007) and sledge tows (NIOZ, unpublished)) name a large number of additional species that are found as being typical low-density epibenthic species at the Dogger bank site (Table 4).

Table 4 Epibenthic species that have been found on the Dogger Bank with benthos sledges, trawls and dredges as part of project research

English name	**Scientific name**	**Group**
Sea mouse	*Aphrodite aculeata*	Bristleworms
Masked crab	*Corystes cassivelaunus*	Crustaceans
	Ebalia spp	Crustaceans
Flying crab or swimming crab	*Liocarcinus holsatus*	Crustaceans
Common hermit crab	*Pagurus bernhardus*	Crustaceans
White furrow shell	*Abra alba*	Molluscs
	Acanthocardium echinatum	Molluscs
Pelican's foot	*Aporrhais pespelecani*	Molluscs
Ocean quahog	*Arctica islandica*	Molluscs
Common whelk	*Buccinum undatum*	Molluscs
Striped venus	*Chamelea striatula*	Molluscs
Smooth artemis	*Dosinia lupinus*	Molluscs
Razor shell	*Ensis ensis*	Molluscs
	Gari fervensis	Molluscs

English name	Scientific name	Group
Transparent razor shell	*Phaxas pellucidus*	Molluscs
Moon snail	*Polinices catena*	Molluscs
Bean-like tellin	*Tellina fabula*	Molluscs
Sand-burrowing brittle star	*Acrocnida brachiata*	Echinoderms
Common starfish	*Asterias rubens*	Echinoderms
Sand star	*Astropecten irregularis*	Echinoderms
Heart urchin	*Brissopsis lyrifera*	Echinoderms
Sea potato	*Echinocardium cordatum*	Echinoderms
Sea star	*Luidia sarsii*	Echinoderms
Brittle star	*Ophiura albida*	Echinoderms
Pea urchin	*Psammechinus miliaris*	Echinoderms
Purple heart urchin	*Spatangus purpureus*	Echinoderms
Solenette	*Buglossidium luteum*	Fishes
Scaldfish	*Arnoglossus laterna*	Fishes
Dab	*Limanda limanda*	Fishes
Snake pipefish	*Entelurus aequoreus*	Fishes
Sandeel	*Ammodytes spp.*	Fishes

Under the MWTL, the infauna is being sampled in the BIOMON programme using a box core. Species whose greatest density in numbers in the EEZ occurs on the Dogger Bank are shown in Table 5.

Table 5 Infauna of the Dogger Bank based on the BIOMON (MWTL) samplings in the EEZ taken using a box core

English name	Scientific naam	Group
	Urothoe poseidonis	Crustaceans
	Bathyporeia guillamsoniana	Crustaceans
Common necklace shell	*Euspira nitida*	Molluscs
Rayed trough shell	*Mactra corrallina*	Molluscs
Bean-like tellin	*Tellina fabula*	Molluscs
Sand-burrowing brittle star	*Acrocnida brachiata*	Echinoderms
Pea urchin	*Echinocyamus pusillus*	Echinoderms
	Goniada maculata	Bristleworms
	Harmothoe spp	Bristleworms
Sand mason worm	*Lanice conchilega*	Bristleworms
	Magelona johnstoni	Bristleworms
	*Magelona mirabilis**	Bristleworms
	Nepthys cirrosa	Bristleworms
	Ophelia limacina	Bristleworms
	Owenia fusiformis	Bristleworms
	Scolelepis bonnieri	Bristleworms
	Sigalion mathildae	Bristleworms
	Spiophanes bombyx	Bristleworms

* according to the latest insights actually *M. filiformis* (Van Dalfsen et al., 2007)

Important fishes on the Dogger Bank are the sandeels (*Ammodytes* spp.). This species occurs in high densities, especially along the edges of a depth of 20-30 metre (summarised in JNCC, 2008). This is related to the hydrographic conditions and the related high densities of plankton; sandeels feed on plankton. During the day sandeels live buried in the sand and at night they forage above

the deeper parts of the bank (Van der Kooij et al., 2008). In so doing, they cover distances of 5-10 km. Sandeels are an important food source for many species, including seabirds (Parsons et al., 2008), marine mammals (such as the harbour porpoise, (MacLeod et al., 2007)) and predatory fish species. As a staple food for birds and marine mammals, sandeels are important to the Dogger Bank site (Mackinson, 2007). The fish species that occur in high densities include whiting (*Merlangius merlangus*), plaice (*Pleuronectes platessa*), Atlantic mackerel (*Scomber scombrus*) and Atlantic cod (*Gadus morhua*). Also found at the site are high densities of dab (*Limanda limanda*) and grey gurnard (*Eutrigla gurnardus*) (Callaway et al., 2002).

Another species that occurs on the Dogger Bank in relatively high densities is the lesser weever fish (*Echiichthys vipera*) (see Lindeboom et al., 2008). Found within this site are fish species that are nowadays rare and are long-lived and have slow reproduction. Of these species, the most regularly encountered is the thornback ray (*Raja clavata*) (Ter Hofstede et al., 2005). Furthermore, various species of fish deposit their eggs within the site, including the Atlantic cod along the southern and eastern edges of the site in the period January-March (Fox et al., 2008) and the plaice, which uses a large part of the EEZ as its spawning ground (Ter Hofstede et al., 2005).

Various marine mammals occur on the Dogger Bank, such as the harbour porpoise (*Phocoena phocoena*) (Arts & Berrevoets 2005; Van der Meij & Camphuysen 2006) and the white-beaked dolphin (*Lagenorhynchus albirostris*) (Van der Meij & Camphuysen 2006). In addition, in summer (May-August) minke whales (*Balaenoptera acutorostrata*) are sighted (Camphuysen & Peet 2006; Leopold pers. com.). Visual sightings at sea of the harbour seal (*Phoca vitulina*) and the grey seal (*Halichoerus grypus*) are difficult to make, but the animals can be tracked with the help of satellite transmitters. Based on data obtained with satellite transmitters, density maps have been produced, from which it is evident that both species can occur on the Dogger Bank (Lindeboom et al. 2008).

3.2.3 Preconditions for good structure and function

The biodiversity of the bottom-dwellers on the Dogger Bank is higher than in the surrounding areas due to the diversity of water depths and sediment types, the latter consisting of mixed sands (of only coarse to very silt-rich in the deepest parts). These factors form the preconditions for a good structure and function.

Essential to the current structure and function of the notified Dogger Bank site are the gradual transitions of sediment types that run parallel to the change in depth. Another important aspect is the hydrographic conditions. Both north and south of the shallow parts of the Dogger Bank the water becomes stratified during calm weather conditions (in the summer), with a warmer nutrient-poor top layer and a colder, relatively nutrient-rich bottom layer. This gives rise to front systems, during which the water is mixed, that are characterised by raised primary production. Moreover, the water on the Dogger Bank is very clear, enabling the continuation of primary production throughout the year (Brockman & Wegner, 1985). These relatively raised productions also strongly affect higher trophic levels. The water column above the central shallow part of the Dogger Bank easily becomes fully mixed due to the minimal depth. As a result, the wave action often penetrates right to the bottom, causing the finer silt to be rinsed away and clean sands containing a great deal of shell grit to be left behind. Owing to the low levels of silt with attached organic material, relatively little food is available for deposit feeders. Owing to the offshore situation, the water is clear and benthic diatoms occur that form the food source of a number of specialist grazing species. Owing to the low silt content of the sediments, the effect of storms on resuspension is brief. The stirred-up sand sinks quickly to the seabed.

3.2.4 Reference situation and disturbance factors

Kröncke (1992) has compared historical datasets with recent fauna data concerning the Dogger Bank. The changes found over this long term show that compared to the period 1950-1954 the numbers of opportunistic species have increased. The species in question are deposit-feeding polychaeta, such as *Nephtys cirrosa*, *Spiophanes bombyx* and *Scoloplos armiger* (a bristleworm), which have increased at the expense of long-lived bivalves such as the razor shell (*Ensis ensis*), the rayed trough shell (*Mactra corallina cinerea*) and the cut trough shell (*Spisula subtruncata*). According to the older studies (Ursin, 1960), the Dogger Bank community at that time was dominated by suspension-eating polychaeta (including *Owenia fusiliformis*), bivalves (*Spisula subtruncata* and *S. eliptica*) and brittle stars (*Acrocnida brachiata*, *Ophiura albida*). Characteristic long-lived, filtering shellfish included *Mactra corallina cinerea* and *Spisula subtruncata* and these are the very species that have declined. Kröncke (1992) attributed this change to eutrophication. However, eutrophication caused by anthropogenic activity plays barely any role in the central North Sea (Baretta-Bekker et al., 2008) due to the great distance to the influx of nutrients from the rivers. A possible connection with other causes such as commercial fishing (Frid et al., 2000), increased temperature or changing sea currents (Kröncke & Reiss, 2008) would therefore seem more probable.

Between 1996 and 1998 Wieking & Kröncke (2003) carried out another inventory. At that time, the highest numbers of species per bottom sample were found along the northern slope. The lowest number of species was found at the top of the bank. Here, too, on the top of the Dogger Bank were found the lowest number of individuals. The findings of the various samplings are summarised in Table 6. An overview of the dominant species of the Dogger Bank is presented in Table 7

The Dogger Bank once hosted a large ray population (De Vooys and Van der Meer, 1998). In the early 1900s, the thornback ray was the most common species of ray in the Southern Bight (Redeke, 1935). According to the landing statistics, in the 1950s every year roughly 400 tonnes of ray were landed in England from this area. Since the mid 1970s, there has been a drastic fall in these figures. Although no exact numbers can be stated, the ray population on the Dogger Bank used to be much larger than it is now (see also Olsen, 1883). Nevertheless, the Dogger Bank today is one of the few areas in the EEZ where thornback rays are still caught. As the limiting factor (in particular, commercial fishing) for the numbers of this population diminishes, their number shall probably increase once more. The vulnerability of ray populations to fishing is a consequence of the biology of these elasmobranch fishes (Walker & Heessen, 1996), including their low fecundity (reproductive capacity), and the relatively advanced age and long length that should be reached before reproduction can take place. That likelihood of the fish being caught before maturity is therefore great. Based on landing data and samplings in the southern part of the EEZ, it has become clear that the thornback ray has virtually disappeared from Dutch waters since 1958 (Walker & Heessen, 1996). The average length and the proportion of adults in Dutch coastal waters also declined in the 1950s, a development characteristic of the effects of commercial fishing.

Another important fish species for the Dogger Bank is the sandeel (*Ammodytes* spp.). This species is fished on an industrial scale, particularly around the Dogger Bank. In this south-western (UK) sector of the Dogger Bank this fishery is so extensive that it may potentially create a situation of scarcity for higher trophic levels (Engelhard et al, 2008). More will soon be known about the size of the sandeel fishery in the Dutch sector of the Dogger Bank. Since the sandeel is caught only under the current fish monitoring programmes, little is known of its distribution trends, past and current. The data concerning the sandeel have become available from research programmes (see, for example, Engelhard et al., 2008). Further research focusing specifically on this species is required to establish the importance of sandeel on the Dutch sector of the Dogger Bank.

Table 6 Comparison of features of the benthos based on the various publications of Kröncke and colleagues

Parameter	**1952-1954**	**1985-1987**	**1996-1998**
Number of individuals			1225 per m²
Average number of species	12-14 per m²	23-29 per m²	47 highest numbers along northern slope
Diversity	2.5-2.7	3.2-3.4	
Mean evenness	0.8	0.7	
Long-lived bivalves		Decrease (beds of *Spisula* and *Mactra*)	
Biomass		2.5-8 times higher than in the period 1950-1954	
Bristleworms		Doubling of biomass	
Echinoderms		Biomass 3-5 times higher	

Table 7 Dominant species of the Dogger Bank Proper (according to Kröncke, 1992, Wieking & Kröncke, 2003)

Group	**Scientific name**	**1951-1952**	**1953-1954**	**1985-1987**	**1996-1998**
Anemones	*Edwardsiidae*				X
Bristleworms	*Chaetozone setosa*		X		X
Bristleworms	*Goniada maculata*	X			X
Bristleworms	*Magelona filiformis*		X	X	X
Bristleworms	*Magelona johnstoni*				X
Bristleworms	*Nephtys assimilis*		X		X
Bristleworms	*Nephtys cirrosa*				X
Bristleworms	*Owenia fusiformis*	X			X
Bristleworms	*Spio f. decorata*				X
Bristleworms	*Spiophanes bombyx*			X	X
Bristleworms	*Anaitides subulifera*		X		
Bristleworms	*Anaitides maculata*		X		
Bristleworms	*Amphiura filiformis*			X	
Bristleworms	*Eteone lactea*		X		
Bristleworms	*Glycinde nordmanni*		X		
Bristleworms	*Myriochele oculata*	X	X		
Bristleworms	*Ophelia limacina*	X	X		
Bristleworms	*Paronis fulgens*			X	
Bristleworms	*Scoloplos armiger*			X	
Bristleworms	*Scolelepis ciliata*		X		
Horseshoe worms	*Phoronis muelleri*			X	X
Crustaceans*	*Bathyporeia elegans*				X
Crustaceans*	*Bathyporeia guilliamsoniana*				X
Crustaceans*	*Bathyporeia tenuipes*				X
Crustaceans*	*Perioculodes longimanus*				X
Crustaceans*	*Urothoe poseidonis*				X
Crustaceans	*Iphinoe trispinosa*				X
Echinoderms	*Acrocnida brachiata*	X			X
Echinoderms	*Echinocyamus*	X			

Group	Scientific name	1951-1952	1953-1954	1985-1987	1996-1998
	pusillus				
Echinoderms	*Ophiura albida*	X		X	
Molluscs	*Tellina (=Fabulina) fabula*	X		X	X
Molluscs	*Polinices pulchellus*				X
Molluscs	*Donax vittatus*			X	
Molluscs	*Nucula tenuis*			X	
Molluscs	*Spisula elliptica*	X			
Molluscs	*Spisula subtruncata*	X			

* until 1987 these species were not reported.

Based on the species described in the tables above, in chapter 4.1 a list of typical species is proposed for H1110_C. This has been compiled using the criteria intended for this purpose.

3.2.5 References

Baretta-Bekker H, P Bot, T Prins & W Zevenboom (2008) Report on the second application of the OSPAR Comprehensive Procedure to the Dutch marine waters. Version 10 May 2008.

Brockmann U & G Wegner (1985) Hydrography, nutrient and chlorophyll distribution in the North Sea in February 1984. Arch. Fisch Wiss 36 27-45.

Callaway R, J Alsvag, I de Boois, J Cotter, A Ford, H Hinz S Jennings I Kroncke, J Lancaster, G Piet, P Prince & S Ehrich (2002). Diversity and community structure of epibenthic invertebrates and fish in the North Sea. – ICES Journal of Marine Science, 59: 1199–1214.

Dando PR, AJ Southward & EC Southward (1986) Chemoautotrophic symbionts in the gills of the Bivalve mollusc Lucinoma borealis and the sediment chemistry of its habitat. Proceedings of the Royal Society of London Series B. Biological sciences. 227(1247); 227-247.

De Vooys CGN & J Van der Meer (1998) Changes between 1931 and 1990 in by-catches of 27 animal species from the southern North Sea. J Sea Res 39:291-298.

Engelhard GH, J van der Kooij, ED Bell, JK Pinnegar, JL Blanchard, S Mackinson & DA Righton (2008) Fishing mortality versus natural predation on diurnally migrating sandeels Ammodytes marinus. Mar.Ecol. Prog. Ser. 369:213-227.

Frid CLJ, KG Harwood, SJ Hall& JA Hall (2000) Long-term changes in the benthic communities on North Sea fishing grounds. ICES Journal of Marine Science, 57: 1303–1309.

ICONA (1992) Noordzee-atlas voor het Nederlands beleid en beheer. ISBN-90 5366-046-1.

Kirkegaard JB (1969) A quantitative investigation of the central North Sea polychaeta. Spolia, 29, p. 285.

Krönke I (1992) Macrofauna standing stock of the Dogger Bank. A comparison: III, 1950-54 versus 1985-87. A final summary. Helgoländer Meeresuntersuchungen 46:137-169.

Kröncke I & C Bergfeld (2003) North Sea benthos: A Review. Senckenbergiana Maritima 33:205-268.

Kröncke I & H Reiss (2007) Changes in community structure (1986-2000) and causal influences. In: Structure and Dynamics of the North Sea Benthos. HL Rees, JD Eggleton, E Rachor & E Vanden Berghe (eds.) ICES Cooperative Report No. 288. September 2007.

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES Texel office.

Mackinson D (2007) Multi-species Fisheries Management: A Comprehensive Impact Assessment of the Sandeel Fishery Along the English East Coast. CEFAS Contract report M0323/02.

MacLeod CD, M Begona Santos, RJ Reid, BE Scott & Graham Price (2007) Linking sandeel consumption and the likelihood of starvation in harbour porpoises in the Scottish North Sea: could climate change mean more starving porpoises? Biol. Lett. 2007 3:185-188.

Olsen, O.T. (1883) The Piscatorial Atlas of the North Sea, English and St. George's Channels. Taylor and Francis, London. 50 Maps.

Parsons M.,I Mitchell, A Butler, N Ratcliffe, M Frederiksen, S Foster, & JB Reid (2008) Seabirds as indicators of the marine environment. – ICES Journal of Marine Science, 65: 1520–1526.

Petersen GH (1977) The density, biomass and origin of the bivalves of the central North Sea. Meddr. Danm. Fisk. - Og Havunders, 7, pp. 221-273.

Redeke HC (1935) De Noordzeevisserij. N.V. de Arbeiderspers, Amsterdam.

Rees HL, JD Eggleton, E Rachor & E Vanden Berghe (eds.) (2007) ICES Cooperative Report No. 288. September 2007.

Reiss H, G Wieking & I Kröncke (2007) Microphytobenthos of the Dogger Bank: A comparison between shallow and deep areas using phytopigment composition of the sediment Mar Biol 105:1061-1071.

Richardson K & OV Olsen (1987) Winter nutrient concentration and primary production in the eastern North Sea. ICES CM1987/C23:15.

Schroot BM, GT Klaver. & TE Schüttenhelm (2005) Surface and subsurface expression of gas seepage to the seabed - examples from the Southern North Sea. Marine and Petroleum Geology, 22: 499-515.

Ter Hofstede R, HJL Heessen & N Daan (2005) Systeembeschrijving Noordzee: Natuurwaardenkaarten vis. RIVO Report C090/05.

Ursin E (1960) A quantitative investigation of the echinoderm fauna of the central North Sea. Meddr. Danm. Fisk. - Og Havunders, 2 (24), pp. 1-204.

Van Dalfsen J, M de Kluijver, W Lewis, G van Moorsel, D Tempelman & JT van der Wal (2007) The macrobenthic fauna in the Dutch sector of the North Sea in 2006 and a comparison with previous data. Grontmij | AquaSense, Ecosub & TNO.

Van der Kooij J, BE Scott & S Mackinson (2008) The effects of environmental factors on daytime sandeel distribution and abundance on the Dogger Bank. J. Sea Res. 60:201-209.

Walker PA & HJL Heessen (1996) Long-term changes in ray populations in the North Sea. ICES Journal of Marine Science 53:1085-1093.

Weston K, L Fernand, DK Mills, R Delahunty & J Brown (2005) Primary production in the deep chlorophyll maximum of the central North Sea. Journal of Plankton Research 27 (9):909-922.

Wieking, G. & I Kröncke (2003) Macrofauna communities of the Dogger Bank (central North Sea) in the late 1990s: spatial distribution, species composition and trophic structure.

Witbaard, R, O Bos & H Lindeboom (2008) Basisinformatie Borkumer Stenen, Bruine Bank en Gasfonteinen. Wageningen IMARES Report No. C026/08.

3.3 Vlakte van de Raan and habitat type H1110_B (Sandbanks covered all the time 'North Sea Coastal Zone')

The Vlakte van de Raan has been notified for habitat type H1110_B (Sandbanks covered all the time, North Sea Coastal Zone), the harbour porpoise, harbour seal, grey seal, river lamprey and sea lamprey. The twaite shad still needs to be added to the Standard Data Form for the Vlakte van de Raan. No tidal flats occur within the site (Figure 7). As a profile document is already available for habitat type H1110_B, there follows below only a concise description of the site and the habitat type found there. The text in the profile document is included in the Appendices Report to this report and is available at: http://www.synbiosys.alterra.nl/natura2000/documenten/profielen_/habitat_types/profiel_habitat type_1110.pdf
In chapter 5 background information is worked out in detail for the habitat species.

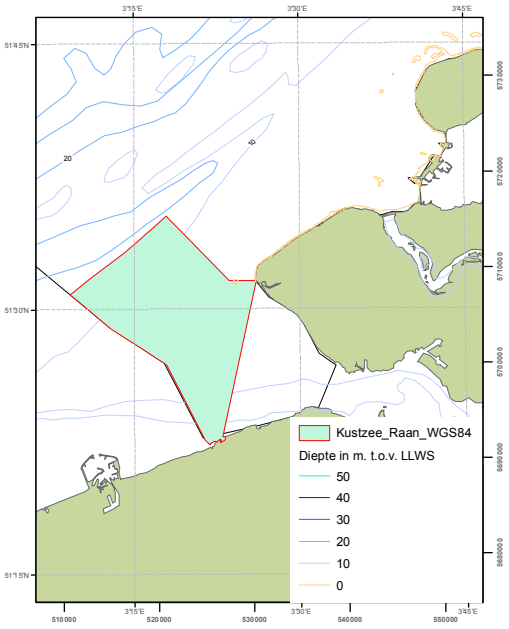

Figure 7 Vlakte van de Raan with depth lines.

3.3.1 Reference situation for habitat type H1110_B on the Vlakte van de Raan

The Vlakte van de Raan consists of habitat type H1110_B (Sandbanks covered all the time (North Sea Coastal Zone). The profile document (version 18 December 2008) establishes the quality requirements imposed on the abiotic features and the biotic community occurring there. The abiotic preconditions consist of a good water quality in relation to the occurrence of harmful chemicals, the water clarity, the discharge of freshwater and the degree of seabed disturbance. A major influential factor is the continuous alternation of ebb and flood currents. The factors related to this such as fluctuations in the non-saline–saline balance, hydrodynamics, temperature dynamics (summer – winter) and water clarity determine the biodiversity of H1110_B.

The quality of the biotic community is defined by reference to its structure and function and the presence of typical species. In total, the list of typical species (Table 8) in the profile for H1110_B includes 9 species of fish and 11 species of invertebrates. The structure and function relate primarily to the occurrence of high densities of shellfish that are a source of food for birds.

Table 8 List of typical species in H1110_B (source: profile document H1110, 18 December 2008)

Sand mason worm	*Lanice conchilega*	Bristleworms
	Nephtys cirrosa	Bristleworms
	Ophelia borealis	Bristleworms
Sand digger shrimp	*Bathyporeia elegans*	Crustaceans
Bee spionid	*Spiophanes bombyx*	Bristleworms
	Urothoe poseidonis	Crustaceans
Sea potato	*Echinocardium cordatum*	Echinoderms
Solenette	*Buglossidium luteum*	Fishes
Herring	*Clupea harengus*	Fishes
Lesser weever	*Echiichthys vipera*	Fishes
Lesser sandeel	*Ammodytes tobianus*	Fishes
Raitt's sandeel	*Ammodytes marinus*	Fishes
Plaice	*Pleuronectes platessa*	Fishes
Common sole	*Solea vulgaris*	Fishes
Whiting	*Merlangius merlangus*	Fishes
Common dragonet	*Callionymus lyra*	Fishes
Alder's necklace shell	*Lunatia alderi*	Molluscs
Cut trough shell	*Spisula subtruncata*	Molluscs
Baltic tellin	*Macoma balthica*	Molluscs
Bean-like tellin	*Tellina fabula*	Molluscs

In the Netherlands no monitoring data are available specifically for this site. The benthos is not sampled under BIOMON. A limited number of samplings within the site was carried out in the period 1984-1986 (Craeymeersch et al., 2006). For adjacent areas, by contrast, monitoring information is available. These areas are the Voordelta on the northern side of the Vlakte van de Raan and a Belgian sector of the Vlakte van de Raan.

Based on monitoring data made available by the Belgian Institute for Agricultural and Fisheries Research[6] (ILVO, Dr Kris Hostens), it has been ascertained which typical species currently occur on the Vlakte van de Raan. The samples were taken in both the Belgian and Dutch sectors of the Vlakte van de Raan (see Figure 8). A number of samples in the Belgian sector were taken at the level of dredge disposal wharves, as a result of which they are not representative of a natural situation. Moreover, the Belgian sector of the Vlakte van de Raan consists of finer sediment (Figure 9). The macrobenthos was sampled using a Van Veen grabber and the epibenthos and the fishes with an 8 m beam trawl and a fine-mesh shrimp net (22 mm in the cod-end and a weighted footrope). The data concerning the period 2004-2008 were made available for this analysis.

[6] Institute for Agricultural and Fisheries Research, Animal Unit, Fisheries research field, Organic Environmental Research group, Ankerstraat 1, 8400 Ostend, Belgium. Contact person Dr Kris Hostens, kris.hostens@ilvo.vlaanderen.be. Dataset ILVO-Biolmon.

With historical data lacking, it is difficult to make a quantitative estimate of the presence of typical species in the past and present. For this reason, attention has focused on their presence or absence.

Two typical species that have been included in the profile document were not sighted in the period 2004-2008 on the Vlakte van de Raan. These are the bristleworm *Ophelia borealis* and Raitt's sandeel (*Ammodytes marinus*). The absence of Raitt's sandeel may be attributable to the low catch efficiency of the sampling gear used. Lesser sandeels (*Ammodytes tobianus*), by contrast, are caught each year, albeit in low numbers. A number of other species also occur in low densities, or are missing from the catch in one or more years. The lesser weever *Echiichthys vipera* is not caught each year, and is never found in the nets in large numbers. This is due to the extremely limited samplings (pers. comm. Heessen, IMARES). In the Dutch sector of the Vlakte van de Raan the species has never been found; the same applies to the solenette *Buglossidium luteum*. However, this is based on just one sampling point in the Dutch sector of the Vlakte, which is hardly conclusive. As in the Voordelta (Heinis and Vertegaal, 2008), the densities of the sand mason worm *Lanice conchilega* and the cut trough shell (*Spisula substruncata*) are always very low. The crustacean *Urothoe poseidonis* and the bean-like tellin (*Tellina fabula*) were not present in the samples in the last two years (2007 and 2008). In the Dutch sector of the site no individuals were found of Adler's necklace shell *(Lunatia alderi (=Polinices pulchellus))*. The other species named in Table 8, by contrast, were encountered regularly.

The extent to which the above data for the Belgian sector of the Vlakte van de Raan and the Voordelta can rightly be applied to a description of the occurrence of typical species on the Vlakte van de Raan is unclear. Supplementary research and/or monitoring is required to build a correct picture of the occurrence of these species in the Dutch sector of the Vlakte van de Raan. In addition, there is no reason to amend the list of typical species for H1110_B.

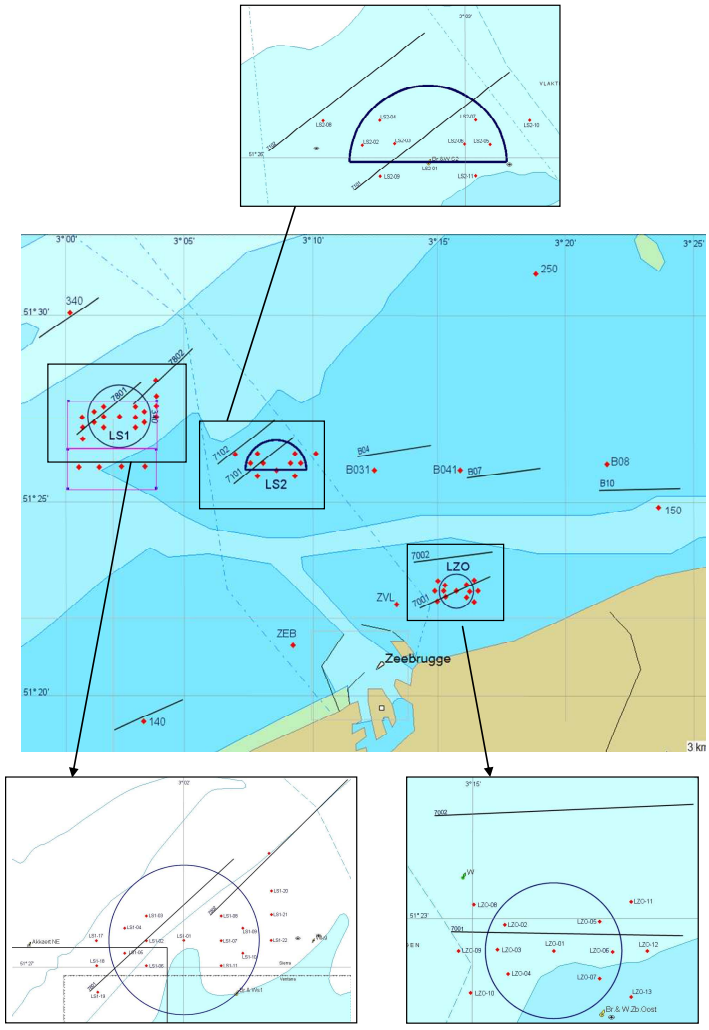

Figure 8 Overview of the samples collected by the ILVO on the Belgian and Dutch sector s of the Vlakte van de Raan. The areas LS1 and LS2 are dredge disposal wharves. Data on the period 2004-2008 were made available for this report.

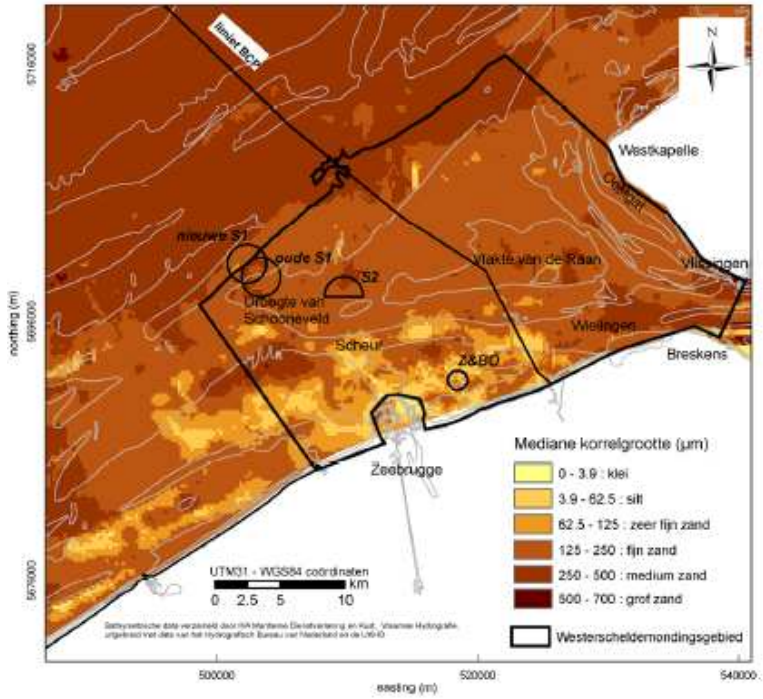

Figure 9 Median grain size in the Western Schelde estuarine area (Verfaillie et al, from Du Four et al 2006).

3.3.2 Conclusions

Based on the limited information that is available concerning the (Dutch) sector of the Vlakte van de Raan, no hard and fast conclusions can be drawn about the conservation status based on the presence or absence of typical species. For the time being, it is assumed that the quality of the habitat type matches that of the Voordelta. This assumption is based on the morphology, the seabed characteristics and other abiotic factors within the site. A further assumption is that the types and intensity of use occurring within the site match those in the Voordelta. Given this, the conservation objective drawn up for the Voordelta concerning habitat type H1110_B could also be used for the Vlakte van de Raan. A scientific underpinning for this is lacking, however, and the decision whether to do this is therefore a policy choice. This subject is revisited in chapter 7. To achieve a well-substantiated assessment of the conservation status, and thus also the definition of the conservation objective, an expansion of monitoring is required compared to the current MWTL programme in which no stations have been included within the Vlakte van de Raan site.

3.3.3 Disturbance factors

The most important disturbance factor for habitat type 1110_B on the Vlakte van de Raan is fishing that disturbs the seabed. Bottom fishing is a disturbance influence on the benthos (see section 3.4). On the Vlakte van de Raan shrimp fishery, beam trawl fishery, otter trawling and shellfish fishery take place (De Mesel et al. 2009). In the Voordelta, where fishing occurs with similar intensity, various subsectors have been closed off for a number of years to beam trawl fishery and shellfish fishery. In these closed-off areas an increase in the biomass of bottom fauna has been

observed in contrast to that of the fished areas. There has also been an increase in the numbers of a couple of shellfish species (De Mesel et al. 2009).

3.3.4 References

Craymeersch JA, V Escaravage, J Steenbergen, J Wijsman, S Wijnhoven & B Kater (2006) De bodemfauna in het Nederlandse deel van de Scheldemonding.

De Mesel I, Smit C, Craeymeersch J, Wijsman J (2009) Evaluatie effectiviteit gesloten gebieden in de Oosterschelde, Westerschelde en Voordelta. Report No. C015/09, IMARES.

Du Four I, Schelfaut K, Vanheteren S, Van Dijk T, Van Lancker V (2006) Geologie en sedimentologie van het Westerscheldemondingsgebied. In: Coosen J, Mees J, Seys J, Fockedey N (Eds) Studiedag Valkte van de Raan van onder het stof gehaald. VLIZ special publication 35.

Heinis F, Vertegaal CTM (2008) Kwaliteitskenmerken habitattype 1110. Uitwerking voor en toepassing in de Voordelta.

Van den Eynde D (2004) Interpretation of tracer experiments with fine-grained dredging material at the Belgian Continental Shelf by the use of numerical models. Journal of Marine Systems 48: 171-189.

Designation order for the Voordelta, http://www2.minlnv.nl/thema/groen/natuur/Natura2000_2006/aanwijzingsbesluiten/besluit_voordelta.pdf

3.4 North Sea Coastal Zone 2 and habitat type H1110_B and coastal birds

For the North Sea Coastal Zone 2 site, habitat type H1110_B (Sandbanks covered all the time (tidal zone)) has been notified as well as the Habitat Directive species harbour porpoise, grey seal, harbour seal, river lamprey, sea lamprey and twaite shad (Bos et al., 2008). As a profile document is already available for habitat type H1110_B, there follows below only a concise description of the site and the habitat type found there. The text in the profile document is included in the Appendices Report to this report and is available at:
http://www.synbiosys.alterra.nl/natura2000/documenten/profielen_/habitat types/profiel_habitat type_1110.pdf
In chapter 5 background information is worked out in detail for the habitat species.

The site will be notified both as a Habitats Directive site and as Birds Directive site. The expansion is taking place mainly because large concentrations of black scoters have been sighted at times within this site (Lindeboom et al., 2005). These ducks forage here for shellfish that can occur here in high densities. In the past the shellfish in question was the *Spisula* (cut trough shell). The other bird species for which the site is also important are ascertained below. Also ascertained is the information on which the objectives can be formulated. Profile documents are already available for these bird species.

Box 1. Definitions of concepts for North Sea Coastal Zones 1 and 2

In this report the names North Sea Coastal Zone 1 and North Sea Coastal Zone 2 are used as follows:

Concerning the Habitat Directive (HD):

- North Sea Coastal Zone 1 (NSCZ1): the existing SAC of 25,816 ha (Figure 11)
- North Sea Coastal Zone 2 (NSCZ2): the expansion of approx. 123,800 ha (to the -20 m depth line and the expansion to Bergen and on the northern side) (Figure 10).

Concerning the Birds Directive (BD)

- North Sea Coastal Zone 1 (NSCS1): the existing SPA of 123,985 ha (Figure 11). The SPA North Sea Coastal Zone 1 forms part of this site.
- North Sea Coastal Zone 2 (NSCS2): the expansion of approx. 25,631 ha (to Bergen and on the north-eastern side).

Shown in Table 9 are the surface areas of North Sea Coastal Zones 1 and 2. The boundary of North Sea Coastal Zone 1 is shown in Figure 11 and that of North Sea Coastal Zone 2 (SAC) in Figure 10). Detailed maps of existing Natura 2000 sites can be downloaded from:
http://www.synbiosys.alterra.nl/natura2000/gebiedendatabase.aspx?subj=n2k&groep=1&id=n2k7&topic=documenten.

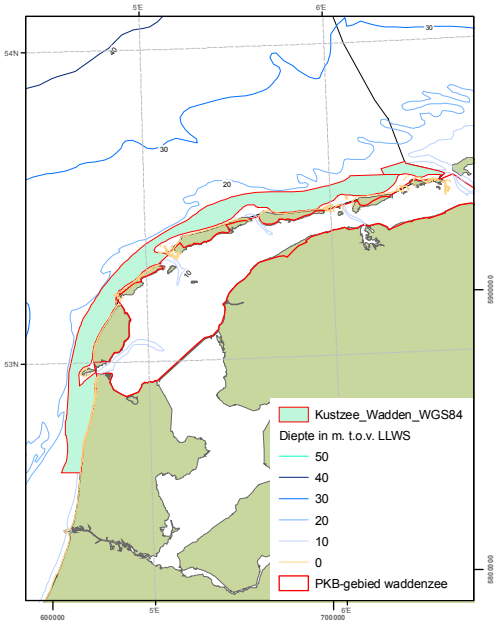

Figure 10 Map of the North Sea Coastal Zone 2 (SAC).

Table 9 Overview of the surface areas (in ha) of North Sea Coastal Zone 1 (see Figure 11) and North Sea Coastal Zone 2 (indicative)

North Sea Coastal Zone **Surface area**	**North Sea Coastal Zone 1**	**North Sea Coastal Zone 2**	**Total****
Birds Directive	123985	25631*	149616*
Habitat Directive	25237+579=25816	123800	149616**
Total Natura 2000 site	123985		149616**

* Figure is the sum of expansion and correction of parts of the existing SPA that fall outside the new Natura 2000 boundary (-20 m depth line). The surface area is indicative.

** Totals are indicative.

Broadly speaking, the outcome is that the Habitats Directive site will have the same boundaries as Birds Directive site and that an expansion of the site as a whole will take place between Petten and Bergen and in the north-east and seawards towards to the continuous 20-metre depth line. It can be concluded that this will greatly expand the Habitats Directive site (an enlargement of almost 5x) and that the Birds Directive site will be expanded by more than 20%.

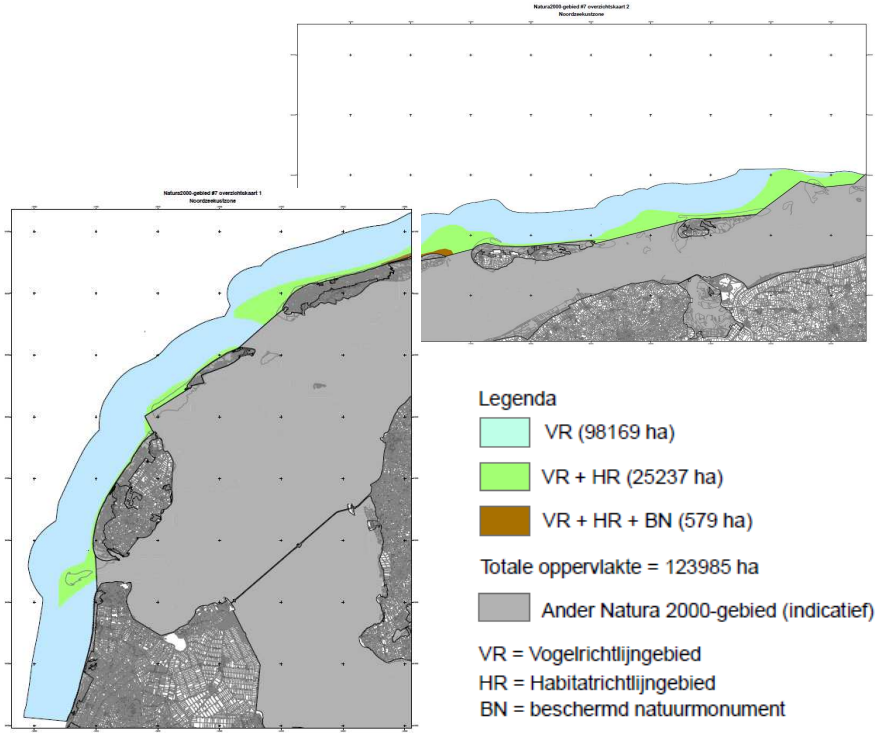

Figure 11 Boundary of the already designated Natura 2000 site North Sea Coastal Zone (North Sea Coastal Zone 1) (source: http://www.synbiosys.alterra.nl/natura2000/gebiedendatabase.aspx ?subj=n2k&groep=1&id=n2k7&topic=documenten. The SPA consists of the total site, including SACs and the sites of protected natural features.

3.4.1 North Sea Coastal Zone 2 (SAC)

The expansion of the SAC (North Sea Coastal Zone 2) concerns an expansion of the southern and seaward boundaries of the existing Natura 2000 site North Sea Coastal Zone 1. The expansion to the south of the SAC concerns the coastal area between Petten and Bergen; seawards it concerns an expansion from the 5 m depth line to the continuous 20 m depth line. In the expansion area the habitat type in question is habitat (sub)type H1110_B (Sandbanks which are slightly covered by sea water all the time; North Sea Coastal Zone). The characteristics of this area form part of the characteristics as described in the profile document for habitat (sub)type H1110_B, which apply to the entire coastal zone.

3.4.2 Disturbance factors

Major causes of the disturbance of the quality of habitat type 1110_B are the commercial fishing that disturbs the seabed and sand nourishments. The intensity of commercial fishing in the coastal zone is relatively high (see Lindeboom et al. 2008). Other anthropogenic influences such as underwater noise, recreation, cables and pipelines have less influence on the quality of habitat type 1110_B. Surface mineral extraction takes place outside the site. Natural disturbances such as storms can stir up the bottom but they have been doing this for as long as the system has existed and nature has adapted. This form of natural disturbance has a much lesser influence on the bottom and the benthos than the commercial fishing that disturbs the seabed. Storms have a far lesser effect than fishery that disturbs the seabed (Lindeboom, pers. com.). Beam trawl fishery, which has increased greatly since the 1960s and is now in decline, has an effect on the bottom comparable to that of ploughing on land. The bottom is continuously ploughed with approx. 15 heavy tickler chains, which disturbs the sediment to a depth of 2 to 6 cm. This pulls away, kills or distributes the fauna both on and in the seabed (Lindeboom, 2008). A single tow of a beam trawl can lead to the direct mortality of bottom-dwellers varying from 5% to 65% depending on the species (Bergman & Van Santbrink, 2000). Scavengers descend on these dead animals, causing their numbers to rise. Shrimp fishery has an effect similar to 'hoeing' , whereby the bottom is less severely disturbed than in beam trawl fishing. As far as bottom-dwellers are concerned, as a rule commercial fishing that disturbs the seabed causes a shift from long-lived large, to short-lived small opportunistic benthic species adapted to the impact of commercial fisheries (e.g., De Vooys et al. 2004, Philippart 1998). Similarly, on the fish themselves, commercial fishing has a great influence: the larger predatory fishes disappear and fishes reach ever smaller maximum lengths and reproduce at younger ages and at shorter lengths (e.g. Van Rijnsdorp et al. 1996). Thus nature adapts to commercial fishing, but this is not a natural situation.

Sand nourishments cause the immediate mortality of the bottom-dwellers on site. Following the nourishment, opportunistic species colonise the habitat. Only after a number of years is the original bottom-dwelling community restored (Van Dalfsen & Essink, 2001).

Regarding the current presence of typical species, it can be established that all species are present (*Table 10*).

Table 10 Presence of typical species in the North Sea Coastal Zone 2 (SAC)

English name	Scientific name	Species group	Present? Sources: Lindeboom et al. (2005), Tulp et al. (2008) and Witbaard (pers. comm.)
Sand mason worm	*Lanice conchilega*	Bristleworms	X
	Nephtys cirrosa	Bristleworms	X
	Ophelia borealis	Bristleworms	X
Sand digger shrimp	*Bathyporeia elegans*	Crustaceans	X
Bee spionid	*Spiophanes bombyx*	Bristleworms	X
	Urothoe poseidonis	Crustaceans	X
Sea potato	*Echinocardium cordatum*	Echinoderms	X
Solenette	*Buglossidium luteum*	Fishes	X
Herring	*Clupea harengus*	Fishes	X
Lesser weever	*Echiichthys vipera*	Fishes	X
Lesser sandeel	*Ammodytes tobianus*	Fishes	X
Raitt's sandeel	*Ammodytes marinus*	Fishes	X
Plaice	*Pleuronectes platessa*	Fishes	X
Common sole	*Solea vulgaris*	Fishes	X
Whiting	*Merlangius merlangus*	Fishes	X
Common dragonet	*Callionymus lyra*	Fishes	X
Alder's necklace shell	*Lunatia alderi*	Molluscs	X
Cut trough shell	*Spisula subtruncata*	Molluscs	X
Baltic tellin	*Macoma balthica*	Molluscs	X
Bean-like tellin	*Tellina fabula*	Molluscs	X

3.4.3 Birds

Guiding principles

The species and conservation objectives of the designation order for the existing site 'North Sea Coastal Zone' (also referred to as North Sea Coastal Zone 1 or NSCS 1) have been taken as the basis for selecting species and establishing the conservation objectives. In so doing, the following guiding principles have been applied:

- In view of the boundary of the site – along the North Holland coast the boundary aligns with the low tide line – the site is not relevant as a breeding ground;
- The seaward boundary is set along the continuous depth line of 20 metres. As a result, the boundary of the Birds Directive site will be brought to align with that of the Habitats Directive site (see Appendix C, section 3.2 of the Designation Order for the North Sea Coastal Zone);
- As the candidate list, the designation order for the North Sea Coastal Zone (NSCS 1) has been used (see Appendix). Relevant species have been taken from here and irrelevant species have been excluded (with supporting arguments, see below);
- Although the North Sea Coastal Zone 1 has not been designated for the common tern and the sandwich tern, it will be ascertained whether the current expansion of the site from Petten to Bergen and the 20-metre depth line (hereinafter referred to as North Sea Coastal Zone 2, see *Box 1*) is relevant as a foraging site for breeding colonies elsewhere.

The little gull breeds in the dunes in the Bergen-Petten zone. For these species, too, it will be ascertained whether addition is relevant. For these species the conservation objectives for the Wadden Sea were also consulted in order to ascertain whether North Sea Coastal Zone 2 can be important for the conservation of the species designated there in another way than the existing Natura 2000 site North Sea Coastal Zone 1.

- For the selection of non-qualifying waterbirds, the Ministry of Agriculture, Nature and Food Quality has drawn up principles (Memorandum of Reply Birds Directive, LNV 2000). Migratory birds are subject to the rule that at least 1% of the biogeographical population must be present regularly within the site.[7]

Ad.1 Breeding ground
For the North Sea Coastal Zone 1 the birds in question are the Kentish plover, the ringed plover and the little tern. No breeding can take place within the boundaries of the expansion area.

Ad. 2 Seawards boundary
Consequences are limited and the necessary information (bird counts) is not available specifically for this zone.

Point 3. Non-breeding birds of no relevance
As the land boundary lies along the low tide line, conservation objectives for the following North Sea Coastal Zone 1 species are considered irrelevant: oystercatcher, grey plover, red knot, sanderling, red-backed sandpiper, curlew, turnstone, avocet, bar-tailed godwit.

[7] Memorandum of Reply Birds Directive, Annex I, Selection criteria and boundary method.

Points 3. and 4.
The remaining species possibly of relevance are:

Code	Species	Guiding principles	Supplementary information
A001	Red-throated diver	Take from NSCS 1	
A002	Black-throated diver	Take from NSCS 1	
A017	Cormorant	Take from NSCS 1	
A062	Scaup	Take from NSCS 1	No good data
A063	Eider	Take from NSCS 1	Ascertain potential for the occurrence of shellfish concentrations in expansion area
A065	Black scoter	Take from NSCS 1	Ascertain potential for the occurrence of shellfish concentrations in expansion area
A177	Little gull	Take from NSCS 1	Recent aerial count data
A183	Lesser black-backed gull	Not included in NSCS 1	Breeds along the coast between Bergen and Petten and on the Wadden Islands.
A193	Common tern	Not included in NSCS 1	Possibly relevant as foraging site for breeding birds in 'Abtskolk & De Putten'. Also breeding bird of the Wadden Sea.
A191	Sandwich tern	Not included in NSCS 1	Breeding bird of the Wadden area, possibly relevant as foraging site for breeding birds Schiermonnikoog and Rottum.

Point 5.
For the above-mentioned species numerical values are given for the 1% in the Memorandum of Reply Birds Directive, Annex I, Selection criteria and boundary method. For the above-mentioned species, the following numbers are involved:

- Red-throated diver 750
- Black-throated diver 1200
- Cormorant 2000
- Scaup 3100
- Eider 15000
- Black scoter 16000
- Little gull 750
- Lesser black-backed gull no statement
- Common tern no statement
- Sandwich tern no statement

The above-listed species are explored in more detail below based on data from Arts & Berrevoets (2006), SOVON & CBS (2007), Van Roomen et al. (2007) and Arts (2008).

Elaboration
Comment on monitoring:
The aerial counts of sea ducks (eider, black scoter) by RWS are carried out in the Wadden Sea and along the beaches of the Wadden Islands (see e.g. Arts, 2008, and Figure 12). Moreover, flights (and reporting) extend along the entire Dutch coast, see area 10 in Figure 13. The seawards expansion of the site 'North Sea Coastal Zone 2' is not counted. In view of this, the reported

numbers of birds in the coastal zone are not entirely representative since the reported area does not coincide fully with the Natura 2000 sites North Sea Coastal Zone (1 and 2). As well as eider and black scoter, scaup and velvet scoter are also counted.

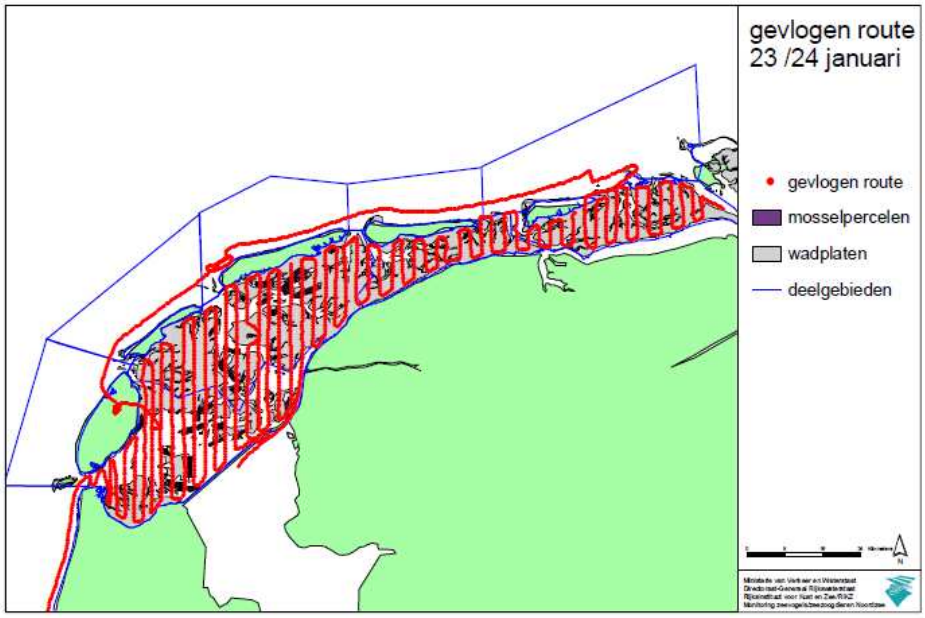

Figure 12 Route flown for the midwinter count of sea ducks in the Wadden Sea and the North Sea Coastal Zone (Arts, 2007).

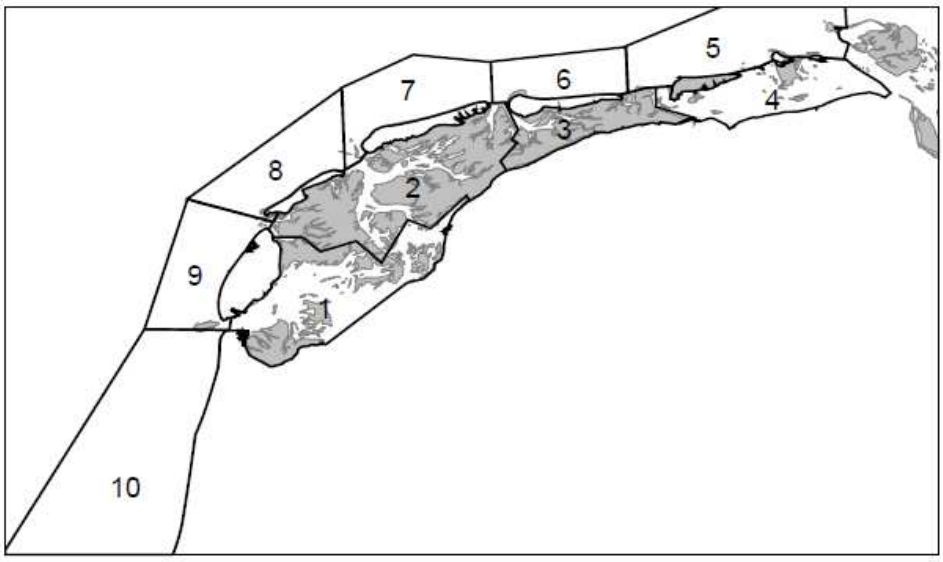

Figure 13 Division into sub-areas in the Wadden Sea and North Sea Coastal Zone (Arts, 2008); area 10 extends all the way to IJmuiden.

The entire coastal zone is also covered when conducting the aerial counts of seabirds (see Figure 14). The main species sighted in the coastal zone are:

- Divers (red-throated diver/ black-throated diver)
- Little gull
- Common gull
- Great black-backed gull (also offshore)
- Common tern/Arctic tern

Birds counted from the shore are also reported by SOVON (van Roomen et al., 2007).

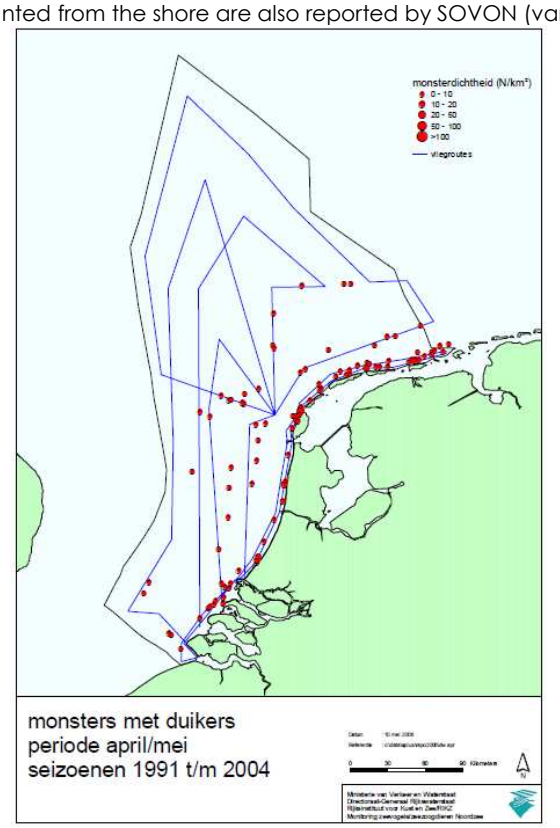

Figure 14 Route flown for the sighting of seabirds and marine mammals in the EEZ. For the purposes of illustration, the data for red-throated diver and black-throated diver have been added (Arts & Berrevoets, 2006).

Further handling per species

Red-throated diver/Black-throated diver

Conservation objective proposal: Take from NSCS 1.

Comment: In the designation order for NSCS 1 it is stated that the species occurs primarily in the outer deltas between the Wadden Islands, where fishing occurs on the boundary between the various water masses. It is therefore improbable that many birds make use of the supplementary

site of NSCS 2. The Waterbird Monitoring Network does not provide good data with which recent numbers for this species and the trend can be established (SOVON & CBS, 2005).

In view of the fact that the species have also been included in the existing Natura 2000 site North Sea Coastal Zone, it is proposed that the conservation objective be adopted, in spite of insufficient information about numbers present.

Cormorant
Conservation objective proposal: Do not include

Comment: The most important sites have already been designated and the shore counts do not show that concentrations of cormorants are found in the expansion of the site (Bergen-Petten).

Alternative: Take from NSCS 1. Stated in the designation order for NSCS 1 is the maintenance of the extent and quality of habitat with a carrying capacity for a population averaging 1,900 birds (seasonal maximum), based on the data from SOVON & CBS, 2005). Nationally, the numbers of cormorants are stabilising (website SOVON). The shore counts reported by SOVON are suitable only for the site's expansion in a southerly direction (Bergen-Petten). No concentrations of cormorants are found here.

It is proposed that the cormorant not be included as a target species for NSCS 2, because the most important sites have already been designated (Lake IJsselmeer (72), Wadden Sea (1), Marker & IJmeer (73).

Scaup
Conservation objective proposal: Do not include in NSCS 2.

From the counts conducted by Arts (2008), it is evident that the scaup occurs primarily along the Closure Dike and only incidentally in the North Sea Coastal Zone and then near the Wadden Islands and not in the expansion of NSCS 2. The species is not found within the site and it is proposed therefore that the scaup not be included as a target species.

Eider
Conservation objective proposal: Take from NSCS 1, with an increase in the carrying capacity from 26,200 birds in NSCS 1 with 5400 individuals for NSCS 2 to 31,600 individuals for NSCS 1 + 2.

Stated in the designation order for NSCS 1 are bird numbers of 26,200 (at the midwinter counts as the site's carrying capacity).

Relevant for NSCS 2 are the numbers reported by Arts (2008) occurring along the entire length of the North Holland coast. These numbers fluctuate enormously and could be 40,000 but could just as well be zero. Over the period 1993 to end 2007, the average was 7,110. Following the peak year of 2002, however, no more than approx. 400 birds were ever encountered. Neither has SOVON (website) reported any concentrations of eiders along the Bergen-Petten coastal strip. No counts are made specially along the seaward boundary of the Natura 2000 site the North Sea Coastal Zone.

It is probable that the birds occurring in NSCS 2 are the same as those that use NSCS 1. In this case, it can be decided to use these same numbers for the entire site (i.e. NSCS 1 and NSCS 2). As the numbers have been formulated as 'carrying capacity of the site', the number can also be

increased by including (the expansion of) the surface area of the Birds Directive site in the calculation of the carrying capacity of the entire site. In this case, the guiding principle is that there is no difference between the carrying capacity (in terms of number per km^2) of the existing site and of the expansion. This brings the number to 31,616. It is proposed that this number, rounded off to 31,600, be used as the carrying capacity for the entire site of the North Sea Coastal Zone (NSCS 1 + 2) following expansion.

Black scoter
Conservation objective proposal: Take from NSCS 1, with an increase in the carrying capacity from 5,900 birds in NSCS 1 with 10,700 individuals for NSCS 2 to 62,600 individuals for NSCS 1 + 2.
The numbers stated in the designation order (51,900 birds at the midwinter counts as the site's carrying capacity) will need to be revised for NSCS 2, but only some of the count data this requires is available. Numbers along the North Holland coastal strip show that the presence of the black scoter is episodic and thus can vary widely from year to year. This is probably related to the availability of suitable food. Peak years were 1996 and 1997 with hard winters when numbers of 10,008 and 25,131 respectively were counted. In 2001, too, the number was relatively high (3270), but in other years since 1995 few or no black scoters have been counted in the North Holland coastal area. Neither has SOVON (website) reported any concentrations of black scoter along the Bergen-Petten coastal strip. No counts are made specially along the seaward boundary of the Natura 2000 site the North Sea Coastal Zone.

It is probable that the birds occurring in NSCS 2 are the same as those that use NSCS 1. In this case, it can be decided to use these same numbers for the entire site (i.e. NSCS 1 and NSCS 2). As the numbers have been formulated as 'carrying capacity of the site', the number can also be increased by including (the expansion of) the surface area of the site in the calculation of the carrying capacity of the entire site. In this case, the guiding principle is that there is no difference between the carrying capacity (in terms of number per km^2) of the existing site and of the expansion. This brings the number to 62,629. It is proposed that this number, rounded off to 62,600, be used as the carrying capacity for the entire site of the North Sea Coastal Zone (NSCS 1 + 2) following expansion.

Little gull
Conservation objective proposal: Take from NSCS 1.

No numbers are stated regarding the conservation objective for the little gull. The species is primarily present in the period April/May and October/November as a foraging migratory bird.

In view of the importance of the little gull assigned for the existing Natura 2000 site, it is proposed that this be adopted for the expansion of the site.

Lesser black-backed gull
Conservation objective proposal: Do not include in NSCS 2.

The lesser black-backed gull has not been designated for NSCS 1 (nor for the Wadden Sea). This is in spite of the fact that many breeding grounds are situated on the Wadden Islands and the area is of relevance as a foraging site. Protection of the species relates to the maintenance of breeding ground rather than any foraging site.

Common tern
Conservation objective proposal: Do not include in NSCS 2.

The common tern has not been designated for NSCS 1. This is in spite of the fact that many breeding grounds are situated on the Wadden Islands and the area is of relevance as a foraging site. Protection of the species relates to the maintenance of breeding ground rather than any foraging site.

Sandwich tern
Conservation objective proposal: Do not include in NSCS 2.

The sandwich tern has not been designated for NSCS 1. This is in spite of the fact that many breeding grounds are situated on the Wadden Islands and the area is of relevance as a foraging site. Protection of the species relates to the maintenance of breeding ground rather than any foraging site.

Selected species
It can be concluded that the conservation objectives for the following bird species should be elaborated for the purposes of the designation order:

- Red-throated diver/Black-throated diver
- Eider
- Black scoter
- Little gull.

3.4.4 References

Arts F. A. (2008) Midwintertelling van zee-eenden in de Waddenzee en de Nederlandse kustwateren, februari 2008. Report RWS Water Service 2008.030.

Arts F.A. & C.M. Berrevoets (2006) Monitoring van zeevogels en zeezoogdieren op het Nederlands Continentaal Plat 1991 – 2006. Verspreiding, seizoenspatroon en trend van vijf minder algemene soorten zeevogels. Report RIKZ/2006.018.

Bergman MJN, Van Santbrink JW (2000) Mortality in megafaunal benthic populations caused by trawl fisheries on the Dutch continental shelf in the North Sea in 1994. ICES J Mar Sci 57:1321-1331.

Bos OG, EM Dijkman & J Cremer (2008) Gegevens voor aanmelding van mariene Habitatrichtlijngebieden: Doggersbank, Klaverbank, Noordzeekustzone, Vlakte van de Raan. Wageningen IMARES Report C081/08.

De Vooys CGN, Dapper R, Van der Meer J, Lavaleye MSS, Lindeboom HJ (2004) Het macrobenthos op het Nederlands Continentale Plat in de Noordzee in de periode 1870-1914 en een poging tot vergelijking met de situatie in de periode 1970-2000. Report No. 2004-2, NIOZ, Texel.

Lindeboom HJ (2008) Gebiedsbescherming Noordzee: discussienota over habitattypen, instandhoudingdoelen en beheermaatregelen. Report No. C035/08, Wageningen IMARES, Texel.

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES.

Rijnsdorp AD, Van Leeuwen PI, Daan N, Heessen HJL (1996) Changes in abundance of demersal fish species in the North Sea between 1906–1909 and 1990–1995. ICES Journal of Marine Science 53:1054-1062.

Philippart CJM (1998) Long-term impact of bottom fisheries on several by-catch species of demersal fish and benthic invertebrates in the south-eastern North Sea. ICES J Mar Sci 55:342-352.

SOVON & CBS (2005). Trends van vogels in het Nederlandse Natura 2000 netwerk. SOVON information report 2005/09. SOVON Bird Research in the Netherlands, Beek-Ubbergen.

Tulp I, Bolle LJ, Rijnsdorp A (2008) Signals from the shallows: In search of common patterns in long-term trends in Dutch estuarine and coastal fish. J Sea Res 60:54-73.

Van Dalfsen JA, Essink K (2001) Benthic Community Response to Sand Dredging and Shoreface Nourishment in Dutch Coastal Waters. Senckenbergiana Maritima 31:329-332.

Van Roomen M., E. van Winden, K. Koffijberg, L. van den Bremer, B. Ens, R. Kleefstra, J. Schoppers, J-W. Vergeer, SOVON Geese and Swan Working Group & L. Soldaat (2007). Watervogels in Nederland in 2005/2006.

3.5 Frisian Front and seabirds

The Frisian Front is relevant for birds under the Birds Directive (BD). Sites under the Birds Directive are designated directly without any prior notification procedure to the EC. For the situation of the site in the EEZ, the reader is referred to Figure 1.

3.5.1 Qualifying species

It has been stated by Lindeboom et al. (2005) that two bird species occur in the Frisian Front that qualify under the Birds Directive, namely the common guillemot and the great skua. These species qualify on the grounds of the Ramsar criteria for concentration areas. In the late summer and autumn the great skua (*Stercorarius* (= *Catharacta*) *skua*) satisfies the standard that 1% of the European population of this bird species sojourns at this site. The common guillemot (*Uria aalge*) satisfies the criterion that more than 20,000 individuals regularly reside at the site.

3.5.2 Non-qualifying species

For the selection of non-qualifying waterbirds, the Ministry of Agriculture, Nature and Food Quality has drawn up principles (Memorandum of Reply Birds Directive, LNV 2000). Migratory waterbirds are subject to the rule that at least 1% of the biogeographical population must be present regularly within the site. Those bird species for which at least 1% of the biogeographical population is present are shown in Table 11.

Based on this criterion (>0.1%), the following are selected:

- Lesser black-backed gull
- Great black-backed gull.

Insufficient data are available for the razorbill. This is because the species cannot be distinguished from the common guillemot in aerial counts. However, it is known that razorbill numbers are much lower than common guillemot numbers. In the summer period the site is host to few, if any, razorbills (Leopold, pers. comm).

Profiles
A profile document is available for the lesser black-backed gull: (http://www.synbiosys.alterra.nl/natura2000/documenten/profielen/vogels/profiel_vogel_A183.pdf). Supplementary information has been supplied about numbers of lesser black-backed gulls in open sea.

Presented in chapter 6 are supplementary proposals for the following profiles:

- Common guillemot
- Great black-backed gull
- Great skua.

Table 11 Selection of other bird species in the Frisian Front (>0.1 % biogeographical population regularly present) for which conservation objectives must be formulated. A detailed description of the origin of the numbers is given in section 3.5.3. Bold: value > 0.1%.

NAME			SOURCE					BIOGEOGR. POPULATION			MEETS 0,1% SELECTION CRITERIUM			
UK	Scientic name	Synonym	Ecol. Atlas North Sea		ESAS 1987-2006, square		Frisian Front Survey (July 2006)*	Biogeogr. Pop. (ind.)	Threshold value LNV of 0,1% (ind.)	Ref.**	Perc. Biogeogr. Pop. ATLAS	ESAS 1987-2006 groot vierkant	Perc. Biogeogr. Pop. FF-survey (only in July)	i sele
Fulmar	Fulmarus glacialis	Fulmaris glacialis	4944	Aug-Sept	1279	aug	1995	5400000	5400	1	0.09%	0.02%	0.04%	n
Gannet	Sula bassana	Morus bassanus	242	Oct-Nov	401	sept	95	780000	780	1	0.03%	0.05%	0.01%	n
Arctic skua	Stercorarius parasiticus		39	Aug-Sept	25	sept	0	500000	500	2	0.01%	0.01%	0.00%	n
Great Skua	Stercorarius skua	Catharacta skua	179	Aug-Sept	61	sept	0	48000	48	2	**0.37%**	**0.13%**	0.00%	n
Lesser black-backed gull	Larus fuscus		2384	Jun-Jul	2944	jul	34772	325000	325	3	**0.73%**	**0.91%**	**10.70%**	ys
Great black-backed gull	Larus marinus		77	Oct-Nov	607	nov	3919	330000	330	3	0.02%	**0.18%**	**1.19%**	ys
Kittiwake	Rissa tridactyla		6773	Oct-Nov	684	dec	665	8400000	8400	3	0.08%	0.01%	0.01%	n
Guillemot	Uria aalge		6879	Aug-Sept	2822	jul	49188	5600000	5600	1	**0.12%**	0.05%	**0.88%**	ys
Razorbill	Alca torda		none	none	364	dec	0	1060000	1060	1	geen	0.03%	0.00%	n

* survey only in July so not suitable for all species. Suitable for Zeekoet.
**References
1. Mitchell et al. (2004)
2. Birdlife International (2009)
3. Wetlands International (2006)

3.5.3 Origin of bird data for the selection of other bird species present (>0.1%)

Bird numbers can be determined in various ways using the data at our disposal. The most recent data were collected by Leopold & Camphuysen (2006). They carried out a bird count in the Frisian Front and on the Cleaver Bank that had a reasonably high spatial resolution. However, these data originate from a one-time survey and are not usable for all bird species because the survey took place in July and certain species are numerous precisely in other seasons of the year. The other data are taken from aerial counts (RWS) and ship counts (ESAS) that did not focus in particular on the Frisian Front, but do have greater temporal resolution.

Data from the Ecological Atlas of the North Sea (Figure 15, Figure 16 and Figure 17)
For a number of species maps have been produced in the Ecological Atlas of the North Sea (*Ecologische Atlas Noordzee*) (Lindeboom et al. 2008). In addition, two maps have been produced in the same way for the black-legged kittiwake and the northern gannet. The numbers they show are the averages of two datasets held by RIKZ and ESAS, reached using the method described below.

The seabird sightings by the RIKZ (1991-2002; aerial counts) and those from the ESAS database (1987-2002; ship counts) were grouped per 5 x 5 km block and actually counted seabird densities were converted into densities per 25 km^2. This calculation was carried out separately for each dataset, broken down by species and by season. For a number of species counted from ships a correction factor for missed observations was calculated. No such factor was applied to clearly visible species. Observations may be missed when the count has to be conducted from too great a distance. The correction factor was calculated by comparing counts in pre-set subzones close by and those farther from the ship. Aerial counts were not corrected because in those counts no use was made of subzones. The distribution maps ultimately became averages of the RIKZ and ESAS datasets. For the calculation of the average number of birds in the Frisian Front, GIS was used to determine how many birds are located within the boundary of the Frisian Front. This involved taking the numbers for each species in the two-month period in which the density of the species in the EEZ is at its highest.

Data from the ESAS database (1987-2006)
For this calculation all ESAS data up to 2006 were used. The pure count data were divided by the surface area counted (number per km^2) and multiplied by 2881 km^2, the surface area of the Frisian Front. The selected area is a square on the map, having as its vertices the farthest corners of the Frisian Front (53.4N; 4.2E and 54.2N; 5.2E). The site is therefore roughly twice as large as the Frisian Front. As a result, densities are lower than those obtained with the other calculations, precisely because birds occur in the Front in concentrations.

Frisian Front and Cleaver Bank survey 2006 (24-28 July 2006; Leopold & Camphuysen 2006) (Figure 18).
In July 2006 a special bird survey was carried out in only the Frisian Front and on the Cleaver Bank. Bird numbers were calculated by dividing the number of birds counted for each of the transects in the Frisian Front by the surface area and multiplying the result by 2881 km2, the surface area of the Frisian Front (see Figure 18). It would be a little more accurate to take only the birds within the boundaries of the Frisian Front, but this does not have much effect on the densities of the various species.

3.5.4 References

Arts F. A. (2008) Midwintertelling van zee-eenden in de Waddenzee en de Nederlandse kustwateren, februari 2008. Report RWS Water Service 2008.030.

BirdLife International (2009) Species factsheet: Catharacta skua. Downloaded from http://www.birdlife.org on 8/4/2009.

Leopold MF, EM Dijkman, G Gonzales & C Berrevoets (in prep.) Marine Protected Areas in the Dutch sector of the North Sea: a bird's eye view.

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES Texel office.

Leopold MF, Camphuysen CJ (2006) SC41 Osterems survey Klaverbank en Friese Front, 24-28 juli 2006. Unpubl. Report to the Ministry of Agriculture, Nature and Food Quality, August 2006. Wageningen IMARES, p 10.

Ministry of Agriculture, Nature and Food Quality (2000) Memorandum of Reply Birds Directive.

Mitchell PI, Newton SF, Ratcliffe N, Dunn TE (2004) Seabird populations of Britain and Ireland. Christopher Helm, London.

Wetlands International (2006) Waterbird Population Estimates - Fourth Edition, Wageningen, The Netherlands.

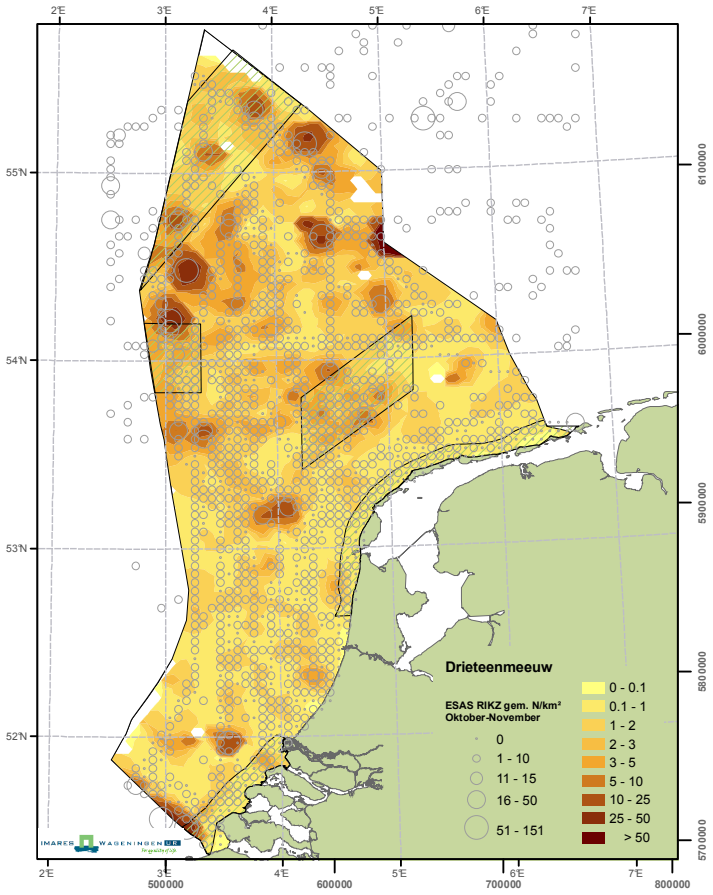

Figure 15 Distribution of the black-legged kittiwake (combined RWS and ESAS data). Map produced according to the Ecological Atlas of the North Sea method (Lindeboom et al. 2008).

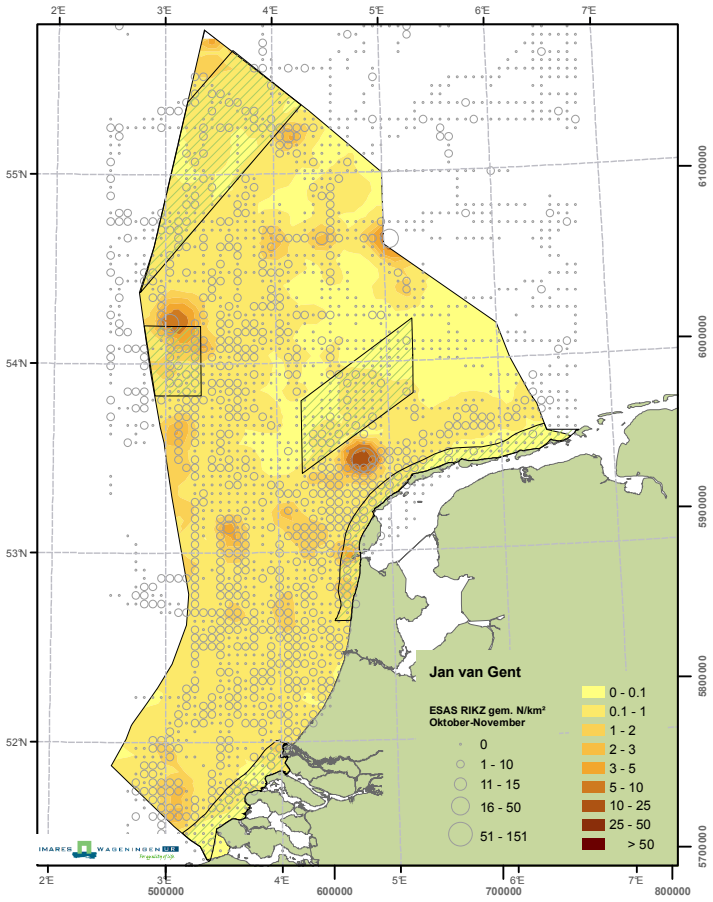

Figure 16 Distribution of the northern gannet (combined RWS and ESAS data). Map produced according to the Ecological Atlas of the North Sea method (Lindeboom et al. 2008).

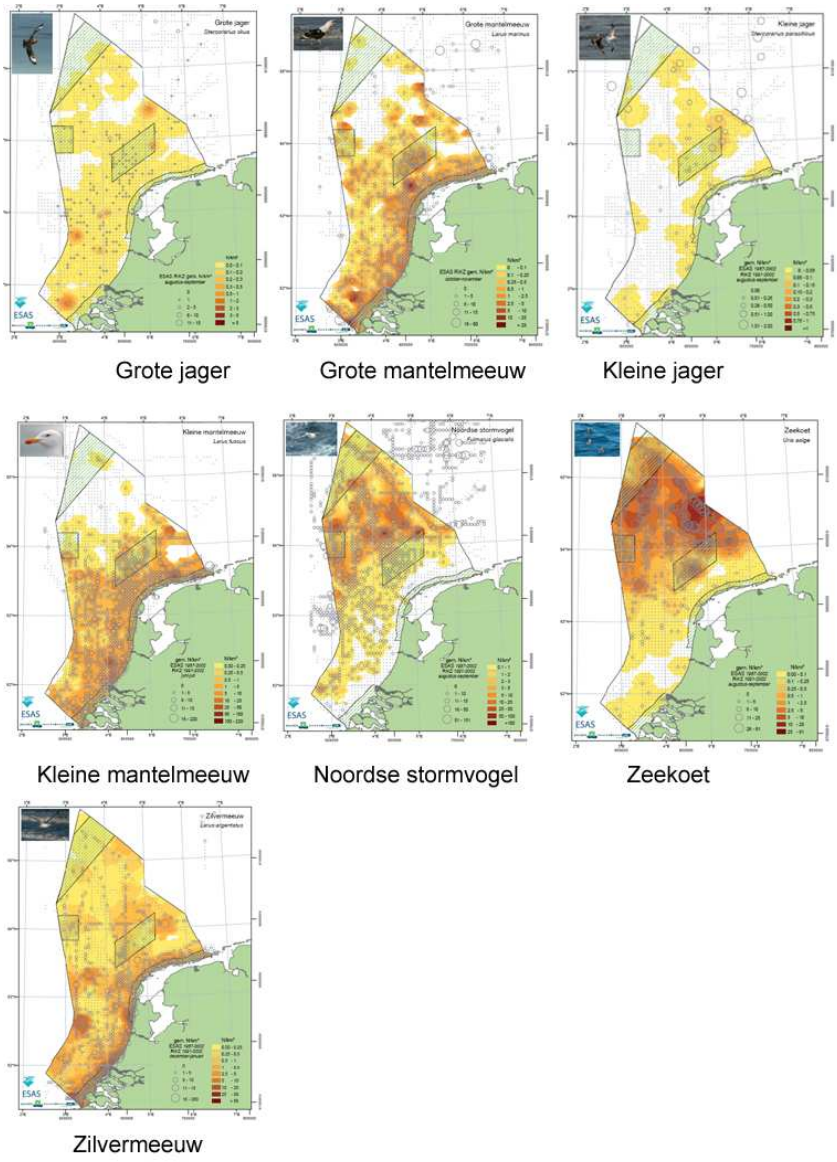

Figure 17 Maps from the Ecological Atlas of the North Sea (Lindeboom et al. 2008). For translation of names, see next figure.

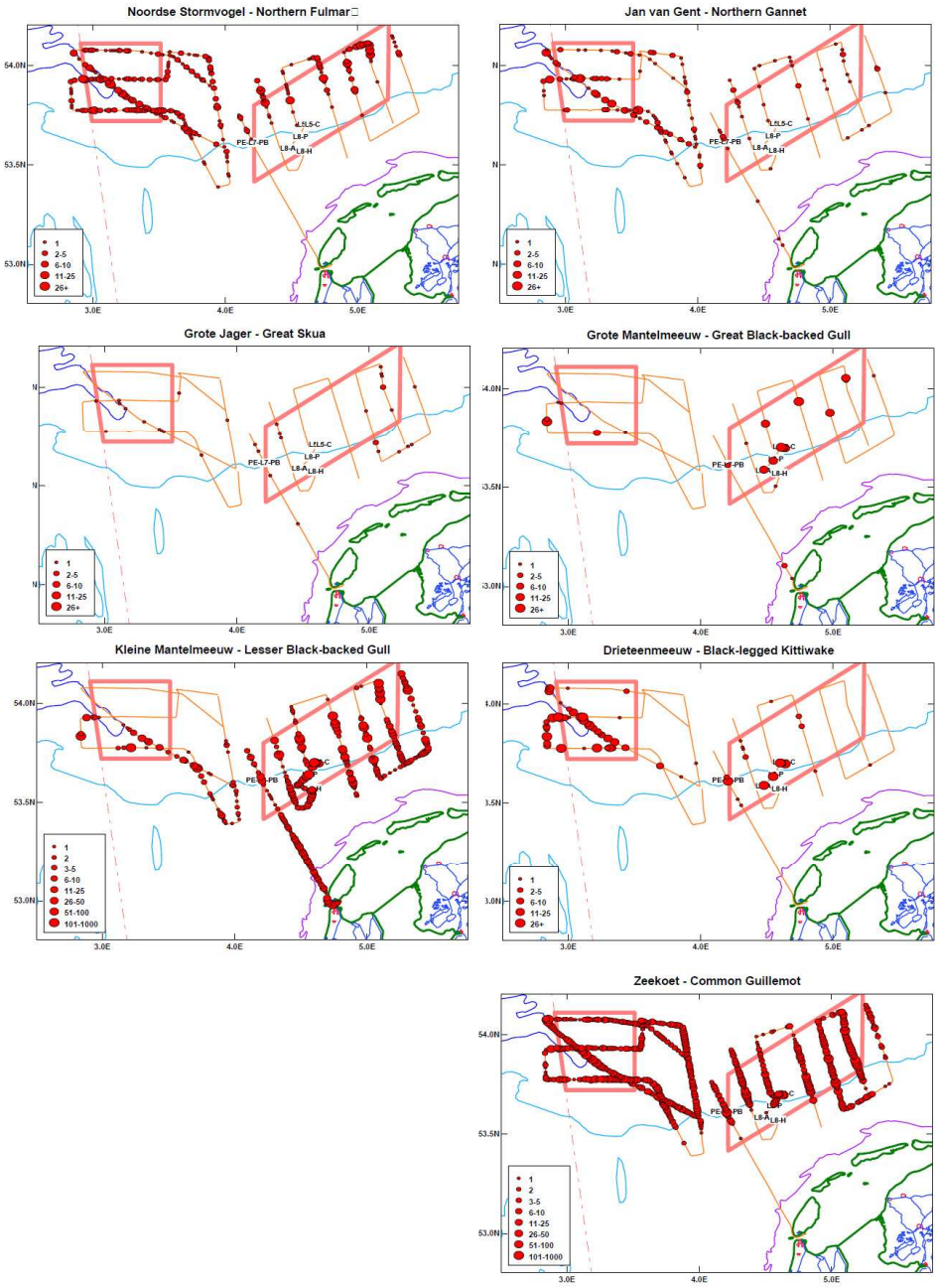

Figure 18 Results of bird survey in the Frisian Front and on the Cleaver Bank (Leopold & Camphuysen 2006). The large numbers of common guillemots and lesser black-backed gulls are striking.

4 Building blocks for profile documents for habitat types

Within the sites addressed in this report two habitat types are relevant, namely:

- Habitat type H1170 Open-sea reefs
- Habitat type H1110 Sandbanks which are slightly covered by sea water all the time

A profile document is available for habitat type H1110. This has been published by the Ministry of Agriculture, Nature and Food Quality (http://www.synbiosys.alterra.nl/Natura 2000/gebieden database.aspx?subj=profielen) and pertains to the sub types H1110_A (Tidal Area) and H1110_B (North Sea Coastal Zone). These descriptions are complete for the habitat type as it occurs in the North Sea Coastal Zone and on the Vlakte van de Raan.

For the Dogger Bank a new habitat subtype has been recognised as part of H1110 'Sandbanks covered all the time', namely H1110_C 'Sandbanks which are slightly covered by sea water all the time (*Dogger Bank*)', hereinafter called H1110_C 'Dogger Bank'. Included in this chapter are texts that can serve as building blocks for supplementing the existing profile for habitat type H1110 with the required texts about H1110_C.

Similarly, no profile document has yet been compiled for habitat type H1170 'Open-sea reefs' occurring on the Cleaver Bank. For this habitat type, too, building blocks are presented in this chapter that can be used when drawing up the profile document.

As soon as an official profile document has been established, that document becomes leading with respect to assessment and the granting of licences.

In developing the building blocks use has been made of the texts in chapter 3.1 and 3.2. This involves the inevitable repetition of parts of this document. Whereas the subject of the preceding chapter was a general description of the site, this chapter is concerned ultimately with the compilation of information required for the habitat profiles, such as the (pre)selection of typical species and a derivation from the current conservation status.

In order to structure in a clear manner the derivation from the assessment criteria for habitat type H1110_C and H1170, this derivation differs somewhat from the standard elaboration of the profile documents for habitat types.

As the distribution and the surface area of the habitat type, and of habitats at sea in general, are almost never subject to any major change, the assessment of the conservation status is based primarily on the criteria 'quality' and 'future prospects'. This has involved basing the criterion 'quality' on the presence of what are known as typical species and the features of good structure and function (*Table 12*).

For the further elaboration of the features representative of quality the following guiding principles have been used:

- Good structure and function are determined by abiotic and biotic preconditions;
- Typical species are regarded as an indicator (at species level) of good (ecological) structure and function;

- The choice of typical species is based on, among other things, criteria related to the abiotic and biotic preconditions for good structure and function (as well as the applicable standard criteria).

Table 12 System for the assessment of the conservation status of a habitat type in Annex I of the Habitat Directive as established by the Comité Habitat (from: targets document)

Aspect	Favourable	Unfavourable–inadequate	Unfavourable–bad	Unknown
Distribution	area stable or increasing AND no smaller than the 'favourable reference'	between 'favourable' and 'unfavourable'	area loss exceeds 1% per year OR area more than 10% less than favourable reference'	no or insufficient reliable information
Surface area	surface area stable or increasing AND no smaller than the 'favourable reference' AND no fundamental change in the distribution pattern within the area	between 'favourable' and 'unfavourable'	loss of surface area exceeds 1% per year and surface area less than the favourable reference OR fundamental change in the distribution pattern within the area OR surface area more than 10% less than the favourable reference'	no or insufficient reliable information
Quality	structure and function (including typical species) in good condition AND no fundamental deterioration	between 'favourable' and 'unfavourable'	in more than 25% of the surface area structure and function are unfavourable	no or insufficient reliable information
Future prospects	the prospects are excellent or good. The most significant threats are not fundamental; the habitat type will be viable in the future	between 'favourable' and 'unfavourable'	strong negative influence of threats on the habitat type; poor prospects, long-term viability in jeopardy	no or insufficient reliable information
Total CS assessment	everything 'green' or three 'green' and one unknown	one or more orange, but no red	one or more 'red'	Two or more 'unknown' combined only with 'green'

4.1 Open-sea reefs H1170

The description of this habitat type in the 'Interpretation Manual' is reproduced in Appendix 1.

Guiding principles
The habitat type H1170 'Reefs' is defined as follows in the 'Interpretation Manual of European Union Habitats (European Commission, 2007):
'Hard, compact substrata on solid and soft bottoms, which arise from the sea floor in the sublittoral and littoral zone. Reefs may support a zonation of benthic communities of algae and animal species as well as concretions and corallogenic concretions.'

This concerns 'rocks [...], boulders and cobbles' as well as 'biogenic concretions'. The latter are 'biogenic hard bottoms which supply habitats for epibiotic species'. They originate from dead or living animals. Mussel beds are one example.

Subtypes
In the Netherlands two types of reef can be distinguished:

- reefs formed by hard bottoms in the form of boulders and cobbles;
- reefs of hard bottoms that are biogenic in origin.

No natural rocky bottoms occur in the Netherlands, with the possible exception of the Dutch part of the Borkum Reef Ground (Dutch: Borkumse Stenen) where a stone slab can occur at the surface (Bergman, 1988, 1991 and 1992). In the past, oyster banks and peat beds were also present in the North Sea; they had accretion comparable in some respects to that of cobbles and gravel. Conversely hard substrata are present in the form of dikes, shipwrecks and offshore structures such as oil and gas installations and windmills, which form no part of the habitat type.

The current description of the habitat type H1170 concerns only reefs of hard substrate. The habitat type occurs in the notified Natura 2000 site of the Cleaver Bank. It may be that in the area of the Borkum Reef Ground (Dutch part), situated in the south-east of the EEZ, hard substrate also exists that satisfies the definition of H1170. If this is the case, further research should take place into the features and quality of that area so that supplements to the texts proposed in this report for use in the profile document for H1170 can be written.

The reef type of biogenic origin has been included as part of other habitat types, including H1110 (Sandbanks covered all the time) and H1140 (Mudflats and sandflats not covered by seawater at low tide). Biogenic structures are hard bottoms of biogenic origin, such as mussel beds, originating from dead or living animals; thus biogenic hard bottoms that form a habitat for epibenthic species.

Although, strictly speaking, reefs in the Netherlands have no plant communities, there are occurrences of various species of algae, including red, brown and green algae. On the Cleaver Bank some of the hard bottom consists of crustose calcareous red algae.

To distinguish from reefs of biogenic origin (as included in H1110 and H1140), the name 'Open-sea reefs' is used to refer to the reef site of the Cleaver Bank and may be used at a later date to refer to the Dutch part of the Borkum Reef Ground (Borkumer Stenen).

4.1.1 Definition

The text in this section has been contributed by LNV (D. Bal), based on the other text in section 4.1.

H1170 Open-sea reefs

Vegetation type code	English name vegetation type	Scientific name vegetation type	Good/ Moderate	Limiting criteria	Only in mosaic
-	non-vegetated	-	G	provided in the parts of FGR North Sea covered with hard compact substrata (whether or not covered with a thin, mobile layer of sediment), on which organisms live that are dependent on these substrata.	
-	non-vegetated	-	M	provided in the parts of FGR North Sea covered with hard compact substrata with a cross-section of at least 64 mm, without a thin layer of sediment and without organisms dependent on hard compact substrata.	
-	non-vegetated	-	M	provided in the parts of FGR North Sea not covered with hard compact substrata.	only in mosaic with independently qualifying sub-sections of H1110_C.

The criteria stated in the table for good and moderate forms flesh out the criteria stated in the European definition of H1170 (Interpretation Manual of European Union Habitats. EUR 27. July 2007). The minimum requirement for reefs of geogenic origin is that they consist of rocks, boulders or cobbles of 'generally >64 mm'. Reefs 'may support a zonation of benthic communities of algae and animal species' – thus this is not a part of the minimum requirement but should be regarded as the good quality – without these benthic communities the quality becomes moderate.

The characteristic of the benthic communities of hard compact substrata is that they are sessile. It is evident that sessile species also occur on gravel and cobbles measuring 8 to 64 mm. Small cobbles and gravel of this size are only included in the habitat type if sessile organisms do actually live on them. The same applies to places with shells. In both cases, it is also necessary, however, that these places form part of an area containing cobbles larger than 64 mm. Thus, the situations in question are those in which the biotic community of sessile organisms extends from the cobbles to surrounding smaller cobbles, coarse gravel and shells.

Gravel smaller than 8 mm, sand and even finer sediments do not form part of the habitat type. There are two exceptions to this rule: if these sediments form only a thin, mobile layer over cobbles and coarse gravel on which organisms live that are dependent on hard compact substrata, or if they occur in mosaic with the good or moderate forms of the habitat type. The first is intended to prevent reef structures ceasing to qualify due to their being covered temporarily by a thin layer of sediment (this exception is mentioned explicitly in the European definition). The second is consistent with the Dutch elaboration of many other habitat types, whereby easily mapped, rounded-off units are aimed for, whereby as well as the qualifying structures other structures may also be included where they occur naturally in the form of a finely woven mosaic with the

qualifying structures or are surrounded by them. In the case of H1170, fine gravel and coarse sand are primarily concerned.

According to the European definition, the habitat type also includes reefs of biogenic origin. In the Netherlands this concerns mussel banks. These mussel banks occur only in the middle of habitat types H1110 and H1140, not in open sea. It has been agreed with the European Commission, therefore, that biogenic reefs be included in the named habitat types (as discrete elements within them). It is for this reason, too, that the Netherlands has adopted 'Open-sea reefs' as the name of H1170.

4.1.2 Features

At landscape level, the habitat type H1170 'Open-sea reefs' is defined based on forms on the Earth's surface (geomorphological features). Reefs are hard, compact substrata on solid or soft bottoms, which arise from the sea floor in the sublittoral and littoral zone. This concerns rocks and boulders as well as biogenic structures.

Habitat type H1170 'Open-sea reefs' is characterised by geomorphological features and occurs in the Exclusive Economic Zone (EEZ) within the Cleaver Bank site in the north-west and possibly also at the site of the Borkum Reef Ground (Dutch part) in the south-east of the EEZ. In addition, there are other small, isolated potential reef areas such as, for example, the Texel Stones. Essential to habitat type H1170 is the occurrence of a hard substratum (large cobble-shell banks) that arise from the sediment surface. It may be that a mosaic of (coarse) sediment types occurs in which various sediment types occur alternately. The gravel and the cobbles were deposited in the Pleistocene as part of glacial terminal moraines. These Pleistocene sediments may be partially covered with marine sediments (Schwarzer & Diesing, 2003). The presence of coarse sediments in the form of gravel and boulders offers sessile epifauna a habitat. These sessile organisms are important because they can continue to cement loose bottom elements, making the bottom even less sensitive to any disturbance by water motion. The accretion of these sessile organisms is responsible in turn for a radical development of the three-dimensional structure of the habitat type, giving it complexity. This complex, three-dimensional structure creates new niches that become occupied by specialised organisms. As a consequence of this, the diversity increases compared to non-reef structures'.

In those parts where a thin layer of marine sands has been deposited over a large surface area, sand ribbons are able to form (Laban, 2002). High water current speeds can generate blowholes behind large cobbles (Schwarzer & Diesing, 2003).

Relative importance in Europe: considerable
Compared to the extensive reefs in the form of large gravel and cobble concentrations that occur elsewhere in the North Sea, the Dutch reef is of no great significance by virtue of its size (<0.5%). For the Netherlands, by contrast, the habitat type 'Open-sea reefs' is a unique habitat type with a very specific biodiversity (Lavaleye, 2000; Van Moorsel, 2003; Rachor, 2006). Owing to the difference in light, temperature regime and energy input (wave action), the regions termed as 'reef', notably those in the offshore area, are distinguished yet more clearly from anthropogenic hard substrata such as dikes and breakwaters.

4.1.3 Abiotic preconditions

The maintenance of hard substrates that more of less arise from the bottom is essential to satisfying the features of the habitat type 'Open-sea reefs'. Characteristic of non-biogenic reefs is the

presence of stable hard substratum in the form of large erratic boulders and/or a coarse gravel fraction. At greater depths, the position or orientation of cobbles cannot be changed by natural dynamics; this does not apply to gravel. In theory, with prolonged calm, the smaller gravel fraction, too, can be colonised and cemented together by sessile organisms (see also Collie et al, 1997). This makes this fraction less sensitive to natural disturbance by water motion (waves and current). However, in the EEZ storms can now and then cause the wave action to penetrate to depths of at least 40 metres and move the gravel.

In the case of the Cleaver Bank, the water is clear due to the combination of coarse sediment and great water depth. The concentrations of suspended material are low offshore, measuring 1-4 mg/m^3. For the Cleaver Bank it is essential that the load of suspended material is low so that light can penetrate right to the bottom, enabling the growth of calcareous red algae, which themselves are reef-building organisms.

Too little is known to be able to determine the effect of eutrophication on the reef habitat. For this reason, for the time being, the limit values used by OSPAR are reported; all the more sensible given that in the future they may also be adopted for the (European) Framework Directive Marine Strategy. For the assessment of eutrophication status, the Cleaver Bank is regarded as part of the Oyster Grounds (Baretta-Bekker et al., 2008). For the site, natural background concentrations in the winter are derived from 10 µmol dissolved inorganic nitrogen/l and 0.6 µmol dissolved inorganic phosphate/l in the winter. Eutrophication is said to occur when values of 15 µmol/l and 0.8 µmol/l respectively are exceeded. As the background level for chlorophyll-a, a value of 3 µg/l (90th percentile) is used and as the threshold value for eutrophication phenomena 4.5 µg/l. For both nutrients and chlorophyll, in the last ten years, however, concentrations less than the natural background values have been measured (estimates of the 'natural' background values are thus high). Risks of eutrophication for the Cleaver Bank reef habitat are minor.

For the assessment of eutrophication status, the area of the Borkum Reef Ground (Dutch part) is regarded as part of the coastal waters (Baretta-Bekker et al., 2008). For the area, natural background concentrations in the winter are derived from 20 µmol dissolved inorganic nitrogen/l and 0.6 µmol dissolved inorganic phosphate/l in the winter. Eutrophication is said to occur when values of 30 µmol/l and 0.8 µmol/l respectively are exceeded. As the background level for chlorophyll-a a value of 10 µg/l (90th percentile) is used and as the threshold value for eutrophication phenomena 15 µg/l. The levels in 2005 of nitrogen and phosphate were roughly 1.5 times higher than the limit values whereby eutrophication is said to occur. Chlorophyll levels were measured between 1995 and 2005 of approx. 25 up/l to ca 15 µg/l and are now, thus, roughly equal to the threshold value.

4.1.4 Other features of good structure and function

Characteristic of the habitat type is the very high biodiversity. This is the consequence of the presence of stable hard substrata and the variety in sediment types, namely sand and gravel of various grain size distributions. The high biodiversity is caused by the presence of sessile epifauna and the occurrence of species typical of coarse sediments, in addition to the occurrence of less specific, general species. The water should be clear to enable the growth of calcareous red algae on the sea bottom. These calcareous algae form a crust on the (gravel) bottom and form a biogenic reef structure. With the cementing of the surface, the possibility arises that sessile epibenthic species may become established, while the scope for specific infauna (which are able to withstand the movement of the gravel) to become established disappears.

Owing to the three-dimensional structure and the stable subsurface, the reef can offer space to a well-developed sessile hard-substrate community. For such a community to develop well, seabed stability is required (Watling and Norse, 1998). This structure can also offer space to the larval or juvenile stadia of, for example, fish. The natural development and succession of a complex sessile biotic community is possible only if the position and orientation of the cobbles on which it grows do not change (Watling & Norse, 1998). Owing to the development of a sessile community, a habitat is created on which other species can find a habitat and/or food source.

4.1.5 Typical species

In accordance with the Habitat Directive, for all habitat types what are known as 'typical species' are selected, which together form a good indicator of the quality of the (completeness of the) biotic community of the habitat type. The set of typical species is an indicator of the quality (and as such helps determine the conservation status) of the habitat type. It is emphatically pointed out at this point that typical species do not have the same status as species listed in Annex II of the Habitat Directive. Accordingly, typical species are not species to be protected in and of themselves but serve only for the purposes of assessing the quality of a habitat type.

Species are selected as typical species for H1170 based on the following general criteria:

1. the species can be used as an indicator of good abiotic conditions or good biotic structure (this criterion applies only to constant species (Ca, Cb, Cab; see below)) or is characteristic of the habitat (sub)type (E and K-species; see below);
2. the species is measurable and can be detected in existing monitoring programmes;
3. the species has been so regularly encountered since the Habitat Directive (1994) came into force or in the period 1960-1994 that it is possible to establish trends and/or distribution;
4. the species is not an exotic (an exotic is one that has been introduced since 1900 by anthropogenic activity).

Verwijderd:

It should be noted that the gravel areas (and cobbles) of the Cleaver Bank form no part of the monitoring programme of the macrobenthos in the EEZ (the BIOMON programme that is part of the MWTL). The sampling method used in that programme is not suitable for the H1170 bottom type. The species named below have been collected in research programmes using various (alternative) methods, including Hamon grab samples, beam trawl, bottom sledge, research diving and video recordings (Van Moorsel, 2003).

In accordance with the standard methodology, the typical species include:

- Constant species indicative of good abiotic conditions (Ca);
- Constant species indicative of good biotic structure (Cb);
- Constant species indicative of good abiotic conditions and good biotic structure (Cab);
- Characteristic species (K), species whose ecological requirements occur primarily in the habitat (sub)type concerned;
- Exclusive species (E), species whose ecological requirements occur only in the habitat (sub)type concerned.

Indicators of good abiotic conditions and/or good biotic structure in habitat type H1170 should satisfy one or more of the following specific criteria:

a. The species is long-lived
b. The species is indicative of gravel accumulations with weak natural dynamics

c. The species is sessile and/or contributes to a complex biogenic structure (some of these species are also K-species);
d. The species is dependent on stably positioned cobbles (and some of these species are also K-species);
e. The species is indicative of the great clarity of the habitat type;
f. The species is important to the trophic structure of the habitat type.

Characteristic and exclusive species are species that (in any event within the Netherlands) are restricted to and cling to a natural stable hard subsurface (cobbles or gravel larger than 8 mm. For the sessile organisms these are dead men's fingers (*Alcyonium digitatum*) and a limited number of species of crustose calcareous red algae (*Lithothamnion sonderi* and *Phymatolithon* spp.) and, for example, the keel worm (*Pomatoceros triqueter*), *Sabellaria spinulosa* and the ribbed saddle oyster (*Pododesmus patelliformis*) (Van Moorsel, 2003). The tubes of the above-named worms and the shells of the ribbed saddle oyster give the structure and texture of the substrate an added dimension, which draws many other species. The accretions of sea anemones (Anthozoa), moss animalcules or bryozoans (Bryozoa) and sea squirts (Tunicata) also occur on the hard substrate.

Other species occurring specifically in coarse sediments are the rayed artemis (*Dosinia exoleta*) and the blunt tellin (*Arcopagia* (*=Tellina*) *crassa*) (Van Moorsel, 2003). These species have a thick shell, which makes them well suited to the occasional movements of the gravel (Tebble, 1966). The ocean quahog (*Arctica islandica*) is also encountered regularly on the Cleaver Bank (Van Moorsel, 2003).

The common whelk (*Buccinum undatum*) is a long-lived snail and can sustain itself well on reefs because sufficient fixed substrate is present for the deposit of egg cases. Away from reefs the common whelk can find another hard substrate, such as large shells, on which to deposit its eggs. The common whelk is also an important key species of the marine ecosystem (Mensink, 1999). As predatory snails and scavengers they are high in the food chain. The large snail's shells are important to other organisms. They serve as residences for, for example, anemones, polyps and barnacles. Once the snail is dead, the shells are used by hermit crabs (*Anapagurus laevis*, *Pagurus* spp.) as a protective casing. The lack (in places) of common whelks due to bottom fishery or pollution (TBT) also has a negative influence on the occurrence or size of species dependent on the common whelk. However, the TBT load of this offshore area is currently low, as a result of which the harm done to the reproductive potential here is probably low (Mensink, 1999).

Also found in the reef habitat of the Cleaver Bank are various species that used to occur commonly only in the deep northern North Sea (outside the Dutch EEZ). Examples are the red whelk (*Neptunea antiqua*), the slender colus or common spindle (*Colus gracilis*), the hermit crab *Anapagurus laevis* and the purple heart urchin (*Spatangus purpureus*). These species are not, however, characteristic of, or dependent on, the hard substrate of reefs.

The research carried out by Van Moorsel (2003) in the Cleaver Bank area resulted in many species new to the Netherlands, for example, the Norway bullhead (*Taurulus lilljeborgi*), the two-spotted clingfish (*Diplecogaster bimaculata*) and the spiny squat lobster *Galathea strigosa*. Probably as a result of the unsuitability of earlier fishing techniques, these species had never before been encountered. Species with a specific preference for gravel-rich locations are the worms *Chone duneri*, which occur very commonly, *Glycera lapidum and Leonice bahusiensis*. In addition, various (mobile) fish species also occur on the Cleaver Bank, the most dominant of which, however, reach their highest densities outside the Cleaver Bank site.

Based on the above-mentioned specific selection criteria for habitat type H1170 Open-sea reefs the species are characterised in Table 13.

Table 13 Proposal for a list of typical species for habitat type H1170 Open-sea reefs. The letters stated under 'criteria' refer to the specific criteria mentioned earlier (see text).

English name	***Scientific name***	**Species group**	**Cat.[8]**	**Criteria**	**Description of occurrence**
	Lithothamnion sonderi	calcareous red alga	K	a, b, c, d, e	Occurs on hard substratum where light reaches the bottom
Dead men's fingers	*Alcyonium digitatum*	Anemones	Cab	a, b, c, d	Sessile long-lived species, present where there is strong water movement
Keel worm	*Pomatoceros triqueter*	Bristleworms	Ca	c, d	Sessile species that contributes to a complex biogenic structure
	Sabellaria spinulosa	Bristleworms	K, Ca	c, d	Occurs in sandy substratum, contributes to complex biogenic structure as it is itself a reef-building organism
	Chone duneri	Bristleworms	K	b	Characteristic species for gravel communities
Squat lobster	*Galathea intermedia*	Crustaceans	E	c	Exclusive species of rocks and cobbles
Blunt tellin	*Arcopagia (=Tellina) crassa*	Molluscs	Cab	b, c	Long-lived species of coarse sandy and gravel bottoms
Common whelk	*Buccinum undatum*	Molluscs	Cab	a, c, f	Long-lived species, cobbles form a deposit substratum for eggs
Rayed artemis	*Dosinia exoleta*	Molluscs	Cab	a, b	Long-lived species of coarse sandy and gravel bottoms
Ribbed saddle oyster	*Pododesmus patelliformis*	Molluscs	K, Ca	c, d	Sessile species that contributes to a complex biogenic structure
Norway bullhead	*Taurulus lilljeborgi*	Fishes	E	d, f	Exclusive species of rocks and cobbles
Two-spotted clingfish	*Diplecogaster bimaculata*	Fishes	E	d, f	Exclusive species of rocks and cobbles

[8] Ca = constant species indicative of good abiotic conditions; Cb = constant species indicative of good biotic structure; Cab = constant species indicative of good abiotic conditions and good biotic structure; K = characteristic species (within the Netherlands); E = exclusive species (within the Netherlands).

4.1.6 Assessment of national conservation status

Abiotics

There are no indications for the site that eutrophication or elevated silt concentrations are occurring. In the last available measurements in the area (2002), side-scan sonar recordings showed the tracks of dragged fishing gear in the structure of the gravel, as well as in areas of coarse sand where large cobbles were found. Older side-scan sonar recordings, too, show the tracks of dragged fishing gear. In view of this, it can be said that disturbance of the constellation of the gravel and thus an unnatural dynamic is occurring. Owing to this, long-lived species are being harmed and the development of complex structures with slow reproduction is being disturbed. Storms, too, can cause smaller cobbles and gravel to roll and turn to some extent. The effects of this are not comparable, however, with those of the scraping action of the tickler chains used in beam trawl fishery. No detailed data are known of concerning bottom fishery in areas with cobbles. In the North Sea as a whole shipping and commercial fishing increased throughout the last century. In the past ten years, commercial fishing in the North Sea as a whole has decreased.

Biodiversity

Biodiversity is understood to mean here the biotic features of good structure and function and the typical species.

There is too little information to be able to state with certainty whether changes have occurred in the aspects related to biodiversity (structure and function, typical species). Based on observed fishery tracks (Van Moorsel, 2003), however, it is assumed that long-lived species and/or structures suffer adverse effects and that these tracks have led to a fundamental deterioration of the structure and function. This is because the repeated disturbance of the bottom repeatedly interrupts the development of a complex, sessile biotic community (Collie et al., 1997). Sessile species have proven to be more vulnerable to the impact of fishing gear than free-living species (Kaiser et al., 2000). In addition, large, long-lived, free-living species that occur in and on gravel and other hard substrates are reduced by commercial fishing. The species in question are shellfish species such as the common whelk, the rayed artemis, the blunt tellin and the ocean quahog. Taking into account the number of trenches in which fishing tracks have been found and the surface area taken up by these tracks in a trench, it is estimated that the quality of the structure and function of the habitat type is unfavourable on less than 25% of the surface area.

National conservation objective

H1170 ' Open-sea reefs': maintain distribution, maintain surface area and improve quality.

Target scenario accompanying the national conservation objective

Parts of the generic text have been used in the profile of H1110. For the national conservation objective, the maintenance of the current distribution and surface area, within natural fluctuations, is desirable. The typical species should be stable over the medium and long term to ensure that extinction is prevented. A large part of the surface area occupied by the habitat type should have good structure and function.

Assessment aspect (natural) area of distribution: 'favourable'

Assessment aspect surface area: 'favourable'

Assessment aspect quality: 'unfavourable–inadequate'.
The assessment is made with reference to structure and function (the abiotic preconditions and other features of good structure and function as described in the profile document) and the typical species.

1. Structure and function:
Side-scan sonar recordings show that in parts of the site the tracks of bottom fishery are present and that as a result there is an elevated dynamic that disturbs the biotic communities present. With the exception of the remains of accretion on the underside of (turned) cobbles, there are no direct indications that the biotic communities present have actually been harmed. Suitable data of sufficient detail concerning this are lacking. Owing to the sensitivity of sessile biotic communities and of long-lived species to seabed disturbance, it is assumed that a fundamental deterioration of the structure and function is occurring.

On larger cobbles, too, the remains of accretion were found on the undersides, for example the calcified tubes of the keel worm. This indicates that cobbles, too, are exposed to disturbance, because natural dynamics do not change the position and orientation of these cobbles. For the sessile biotic communities that include long-lived large species, which are characteristic of reefs, it is essential that the position remain unchanged for a long period. The degree to which this disturbance is occurring is not known.

It can be concluded that the structure and function have fundamentally deteriorated due to repeated disturbance of the bottom compared to an undisturbed situation, and therefore are considered to be unfavourable–inadequate.

2. Typical species:

The following generic text has also been used for other marine habitat profiles: For a favourable conservation status it is desirable that at national level over the medium and long term the selected typical species of the habitat type have stable populations related to the surface area of the habitat type. For a typical species, the trend and the current occurrence together determine whether it is stable over the medium and long term or will become extinct (that is the assessment criterion). Whether a species runs a genuine risk of extinction can be determined by reference to the Red List(s) or by comparing the current population size with the minimum for a stable population (FRV). The principle has been applied that a habitat type scores unfavourable–bad (red) when at least 25% of the typical species is under serious threat (or has already disappeared). A habitat type scores unfavourable–inadequate (orange) when at least one typical species is very rare. In all other cases, the habitat type scores favourable (green).

The selected typical species were encountered quite recently (2002) (Van Moorsel, 2003). It is unknown whether other species occurred in the past that could perhaps be designated as typical species. Data on this is lacking. By contrast, it is plausible that the density of the typical sessile species has decreased due to disturbance.

Assessment aspect future prospects: 'unfavourable–inadequate'.

The following generic text has also been used for other marine habitat profiles: The decrease in fisheries intensity that has occurred throughout the North Sea in the last decade is likely to continue, but this is uncertain. In view of this and all sorts of other uncertainties in this system or developments not yet taken into account in policy, a favourable conservation status in the short

term (2020) would not be logical. For this reason, the future prospects for H1170 are considered to be 'unfavourable–inadequate'.

Subtype H1170: Open-sea reefs

Aspect	2009
Distribution	Favourable
Population	Favourable
Habitat	Unfavourable–inadequate
Future prospects	Unfavourable–inadequate
CS assessment	**Unfavourable–inadequate**

4.1.7 Sources

Baretta-Bekker H, P Bot, T Prins & W Zevenboom (2008) Report on the second application of the OSPAR Comprehensive Procedure to the Dutch marine waters. Version 10 May 2008.

Kenny AJ & HL Rees (1996) The effects of marine gravel extraction on the Macrobenthos: Results 2 years post-dredging. Marine pollution bulletin 8/9:615-622.

Laban, C. 2002. Geologisch onderzoek grindgebied Klaverbank, samenvattend onderzoek rapport uitgevoerd van 1979 tot en met 2001. TNO report NITG 01-003-A.

Lavaleye, M.S.S., 2000. Karakteristieke macrobenthos levens gemeenschappen van het EEZ & trendanalyse van de macrobenthos diversiteit van de Oestergronden en het Friese Front (1991-1998). Ecosystem targets for the North Sea Report 2009-9. NIOZ.

Lindeboom, H., J. Geurts van Kessel & L. Berkenbosch (2005). Gebieden met bijzondere waarden op het Nederlands Continentaal Plat. Report RIKZ/2005.008. Alterra Report 1109. RIKZ, The Hague / Alterra, Wageningen.

Lindeboom , H.J., E.M. Dijkman, O.G. Bos, E.H. Meesters, J.S.M. Cremer, I. de Raad, R. van Hal, A. Bosma, 2008. Ecologische Atlas Noordzee ten behoeve van Gebiedsbescherming. Wageningen IMARES, 289 pp.

Mackie, A.S.Y, P.G. Oliver, E.I.S. Rees, 1995. Biomor 1. Benthic biodiversity in the southern Irish Sea. Biomor reports in marine biodiversity and systematics. 1; 263pp.

Mensink, B., 1999. Imposex in the common whelk *Buccinum undatum*. Thesis Wageningen University, 125pp.

Moorsel, G.W.N.M. van, 2003. Ecologie van de Klaverbank. Biotasurvey 2002. Ecosub, Doorn, 157pp.

Rachor, E., 2006. Search for particularly valuable benthic areas within the German North Sea EEZ. In; Von Nordheim, H. Boedeker, D. Krause, 2006. Progress in Marine Conservation in Europe: Natura 2000 sites in German Offshore waters. Springer, Verlag Berlin, Heidelberg.

Tebble, N., 1966. British bivalve seashells. A handbook for identification. British Museum (Natural History) London.

Schwarzer, K und M. Diesing, 2003. Erforschung der FFH-Lebensraumtypen Sandbank und Riff in der AWZ der deutchen Nord- und Ostsee. FKZ-Nr 802 85 270 Institute of Geosciences Christian Albrechts Universit□t, Kiel.

Watling, L. & Norse, E. A., 1998. Disturbance of the seabed by mobile fishing gear: A comparison to forest clearcutting. Conservation Biology 12 (6).1180-1197.

4.2 Sandbanks covered all the time (*Dogger Bank*) H1110_C

4.2.1 Definition

The text in this section has been contributed by LNV (D. Bal), based on the other text in section 4.2.

H1110_C Sandbanks covered all the time (*Dogger Bank*)

Vegetation type code	English name vegetation type	Scientific name vegetation type	Good/ Moderate	Limiting criteria
	non-vegetated	-	G	provided in FGR North Sea, in so far as situated above the 40-metre depth line and in so far as part of the sandbank that arise in the UK sector of the North Sea above the 20-metre depth line.

The criterion presented in the table elaborates upon the exception that is named in the European definition of H1110 (Interpretation Manual of European Union Habitats. EUR 27. July 2007): sandbanks may extend beyond the -20-metre depth line. The condition for including deeper parts is that they form a (geomorphological) part of the sandbank and are host to the biotic community characteristic of sandbanks. Dogger Bank in the Dutch sector of the North Sea satisfies these requirements: it has the topography and biotic community characteristic of sandbanks. This sandbank extends to where the angle of inclination is at least 1:10; in the Netherlands sector this aligns with the -40-metre depth line. Only in the UK sector is this sandbank in places less deep than -20 m. Neither of the other subtypes can be said to have a clearly recognisable topographical boundary characteristic of sandbanks. For this reason, the -20-metre depth line stated in the European definition has been adhered to for both these subtypes.

4.2.2 Features

Subtype H1110_C concerns the Dogger Bank situated in the most northerly region of the Dutch North Sea. Dogger Bank is a sandbank in the central North Sea that extends across the Danish, German, Dutch and UK sectors. The area came into being when it was pushed up in the last Ice Age and was submerged by water with the subsequent rise in sea level. The shallowest part of the sandbank is located in the UK sector. Here the water is less than 15 metres deep. Although the Dutch sector is deeper than 20 metres, the site nevertheless falls within the international agreements on the definitions of the habitat type since these definitions take into account the angle of inclination of the sea bottom. Dogger Bank has the topography typical of a sandbank due to the transition to deeper water on both sides of the shallow area. In practice, the boundary aligns with the 40-metre depth line (see Lindeboom et al., 2008).

The composition of the sediment varies across the various parts of the bank. It includes fine sand with numerous shell fragments on the shallow parts and silt-rich sand on deeper parts (Kröncke & Knust, 1995). Both the adjacent deeper parts of the Dogger Bank and the adjacent deeper parts surrounding the Dogger Bank are characterised by silt-rich fine sands. Characteristic of this transition in sediment types is the transition of the associated macrofanua communities.

Habitat subtype H1110_C (Sandbanks covered all the time (*Dogger Bank*)) has no vegetation of higher plants, but consists of species of bottom-dwelling algae (microphytobenthos) in the form of diatoms (Reiss et al., 2007), which form a food source for certain bottom-dwellers. The growth of bottom-dwelling algae is made possible by the water clarity, which is a consequence of the

hydrographic conditions described below. In the shallow parts of the subtype the water column is fully mixed all year round while along the deeper slopes and in the deeper surrounding water, the water column becomes stratified in summer. No net deposit of material occurs. Tidal flow is insufficient to support sediment resuspension. Only storms and the currents they give rise to (which may even include surf) can lead to the resuspension of fine sediment. These factors explain the high level of water clarity and that light is able to penetrate to a great depth, enabling algae growth right down to the bottom.

The high productivity of the subtype is also related to the presence of a front on the northern side, formed by the collision of cool Atlantic water from the north and the shallow, unmixed and often warmer water above the Dogger Bank itself (Kröncke, 1992). Owing to the mixing with nutrient-rich water and the shallowness of the bank, as a result of which algae live relatively long in the light, the primary production is also high in winter compared to surrounding parts of the North Sea.

The biodiversity and biomass of the subtype's community of bottom-dwellers are higher than in the surrounding area (see Lindeboom et al., 2008). The abundant organisms living in and on the sea bottom are a food source for various species of fishes, birds and marine mammals.

The subtype H1110_C is distinguished from the shallower subtypes of the sandbanks covered all the time (H1110_A and H1110_B) by its situation far from the coast and the (related) relatively weak (tidal) dynamic and water clarity. As there is almost no influence of major rivers, the salt content is fully within marine range (34-35‰) and seasonal variations are minor (North Sea Atlas, 2004). The same is true of the water temperature, which varies throughout the year much less than it does at the coast.

Owing to the offshore situation (tidal) dynamic is weak and the content of suspended material in the water column is relatively low (1-4 g/m^3, North Sea Atlas, 2004). As a result, the depth of visibility is substantial and the depth at which incident light has decreased to 1% is roughly 40 metres (Weston et al, 2005), which coincides with the depth boundary applied to the subtype. The 1% value is roughly the minimum quantity of light necessary for algae to grow.

When the environmental condition is good, the concentrations of nutrients are low because the rivers have little influence. Too little is known to establish the effect of eutrophication on the habitat subtype and to distinguish this from the effects of other disturbances and natural factors. For this reason, for the time being, the limit values used by OSPAR are reported; all the more sensible given that in the future they may also be adopted for the (European) Framework Directive Marine Strategy. OSPAR employs natural background (winter) concentrations of 10 µmol/l dissolved inorganic nitrogen (nitrate, ammonium) and 0.6 µmol/l dissolved inorganic phosphate, while eutrophication is said to occur at concentrations higher than 15 and 0.8 µmol/l respectively (Baretta-Bekker et al., 2008). In the period 1995-2005 the concentrations were actually less than the natural background concentrations used by OSPAR. The N/P ratio (the proportion of dissolved inorganic nitrogen to phosphate) is slightly lower than 16, which is the average ratio necessary for algae, and far below the value of 25, which is employed by OSPAR as the limit value.

Owing to the low nutrient concentrations, the chlorophyll concentrations in the water column are also low. They were seen to decrease in the measuring period 1995-2005 from 5.5 to 1.3 µg/l (90th percentile) (Baretta-Bekker et al., 2008). The subtype's productivity is higher than that of the surrounding area, however, due to the presence of a front and because production can take place all year round (see Reiss et al, 2007 including references).

4.2.3 Other features of good structure and function

Owing to the diversity of water depths and sediment types, consisting of mixed sands (of clean, silt-poor sediment to silt-rich in the deepest parts), the biodiversity of bottom-dwellers of subtype H1110_C is higher than in the surrounding areas (Lindeboom et al., 2008). In the Dutch sector of the Dogger Bank three biotic communities of bottom-dwellers can be distinguished (Wieking & Kröncke, 2003). The most typical sandbank community is found on the crest of the bank and is dominated by species that live at the sediment surface and are adapted to a relatively dynamic environment, owing to the fact that in this shallow part the influence of wave action is greater than in the deeper parts. The fauna consists of species that are relatively short-lived. The southern community also includes species that occur in the Oyster Grounds and are characteristic of the greater depths and high silt levels. Along the north-east edge of the Dogger Bank live species rare in the Netherlands that also occur in the northern North Sea.

Owing to the water's high level of translucency, within the depth boundary of the subtype light can penetrate to the bottom. As a result epiphytobenthos occurs in the form of diatoms (Reiss et al., 2007). These form an important food source for some of the fauna, namely for small crustaceans (such as *Bathyporeia guillamsoniana*, *B. elegans* and *Iphinoe trispinosa*) that scrape them off the sand grains.

The fine-sand substrate on the shallowest parts of the subtype is an essential habitat for sandeel (*Ammodytes* spp.) and accordingly, in certain periods of the year, for the occurrence of seabirds and marine mammals.

4.2.4 Typical species

In accordance with the Habitat Directive, for all habitat types what are known as 'typical species' are selected, which together form a good indicator of the quality of the (completeness of the) biotic community of the habitat type. The set of typical species is an indicator of the quality (and as such helps determine the conservation status) of the habitat type. It is emphatically pointed out at this point that typical species do not have the same status as species listed in Annex II of the Habitat Directive. Accordingly, typical species are not species to be protected in and of themselves but serve only for the purposes of assessing the quality of a habitat type.

In the profile documents of other (coastal) marine habitat types, the following general criteria have been used to select typical species:

1. the species can be used as an indicator of good abiotic conditions or good biotic structure (this criterion applies only to constant species (Ca, Cb, Cab; see below)) or is characteristic of the habitat (sub)type (E and K-species; see below);
2. the species is measurable and can be detected in existing monitoring programmes;
3. the species has been so regularly encountered since the Habitat Directive (1994) came into force or in the period 1960-1994 that it is possible to establish trends and/or distribution;
4. the species is not an exotic (an exotic is one that has been introduced since 1900 by anthropogenic activity).

In practice it turns out that the first criteria in particular is important, while the second criteria stated above often cannot be satisfied in the sites at sea (see chapter 2.2).

In accordance with the standard methodology, the typical species include:

- Constant species indicative of good abiotic conditions (Ca);
- Constant species indicative of good biotic structure (Cb);

- Constant species indicative of good abiotic conditions and good biotic structure (Cab);
- Characteristic species (K), species whose ecological requirements occur primarily in the habitat (sub)type concerned;
- Exclusive species (E), species whose ecological requirements occur only in the habitat (sub)type concerned.

Indicators of good abiotic conditions or good abiotic conditions and/or good biotic structure in habitat type H1110_C should satisfy one or more of the following specific criteria:

a. The species is characteristic of a clean sandy substrate (species from the crest of the bank);
b. The species is relatively long-lived due to the low natural dynamics of the sediment (and is thus sensitive to disturbance of the sediment) (species from the slopes of the bank);
c. The species is important to the trophic structure of the habitat type, i.e., forms an important food source for other species occurring in the habitat type.

Indicative of a deteriorated quality of the habitat type are relatively short-lived species able to tolerate a high degree of unnatural dynamics of the sediment and sediment-eating organisms that are adapted to an unnaturally enriched sea bottom (Kröncke, 1992). These species have *not* been selected as typical species.

The set of typical species should include representatives of the various bottom-dwelling biotic communities that are characteristic of the subtype and to consist of species from various taxonomic groups. In this way, justice is done to the biodiversity of the bottom-dwelling communities of the subtype.

A proposal for a list of species to be regarded as typical of subtype H1110_C for the sandbank of the Dogger Bank to a depth of 40 metres is presented in Table 14. In the table the species are characterised based on the above-mentioned selection criteria specific to habitat type H1110_C.

Table 14 Proposal for a list of typical species for habitat type habitat type H1110_C (Dogger Bank). The letters stated under 'criteria 'refer to the specific criteria mentioned earlier (see text).

English name	***Scientific name***	**Species group**	**Cat.**[9]	**Criteria**	**Description of occurrence**
Sand mason worm	*Lanice conchilega*	Bristleworms	K, Ca	a	Occurs on sand substratum
	Sigalion mathildae	Bristleworms	K, Ca	a	Primarily occurs in clean sandy substrata, Dogger Bank one of the sites where the species commonly occurs
	Bathyporeia guillamsoniana	Crustaceans	K, Cab	a	Benefits from epiphyton on sand grains, in clean sand in Southern Bight and Dogger Bank
	Bathyporeia elegans	Crustaceans	K, Cab	a	Occurs in coarse, clean silt-poor sediments. Benefits from epiphyton that live on sand grains
	Iphinoe trispinosa	Crustaceans	K, Cab	a	Specific to sand of Southern Bight and Dogger Bank
Sand-burrowing brittle star	*Acrocnida brachiata*	Echinoderms	E	a	Occurs in high densities in clean sand tot depth of 40 m

[9] Included among the typical species are: Ca = constant species indicative of good abiotic conditions; Cb = constant species indicative of good biotic structure; Cab = constant species indicative of good abiotic conditions and good biotic structure; K = characteristic species; E = exclusive species.

English name	*Scientific name*	Species group	Cat.[9]	Criteria	Description of occurrence
Pea urchin	*Echinocyamus pusillus*	Echinoderms	Ca	a	Occurs in coarse sand and fine gravel enriched with detritus
Ocean quahog	*Arctica islandica*	Molluscs	Ca	b	Occurs on the edges of the Dogger Bank, long-lived species
Common whelk	*Buccinum undatum*	Molluscs	Cab	b, c	Occurs on various substrata, long-lived species
Rayed trough shell	*Mactra corralina*	Molluscs	Ca	a, b	Long-lived species that feeds on particles in the water column. Occurs in fine to moderately fine coarse sand
Raitt's sandeel	*Ammodytes marinus*	Fishes	Cab	a, c	Occurs in fine sand, important food source for birds, fishes and marine mammals
Lesser weever	*Echiichthys vipera*	Fishes	Cab	a	Specific to sand, into which the animal burrows
Thornback ray*	*Raja clavata*	Fishes	Cab	b	Residual population; long-lived species
Plaice	*Pleuronectes platessa*	Fishes	Cab	c	Common species occurring on sandy substrates

* Data insufficient to establish trends

4.2.5 Assessment of national conservation status

In developing this section, account has been taken of the categories used in the profile documents for other habitat types compiled by the Ministry of Agriculture, Nature and Food Quality.

Abiotics

The situation of subtype H1110_C is not subject to measurable change. In the period 1960-1990 the supply of nutrients to the North Sea increased; this was followed by a decrease.

Biodiversity

Biodiversity is understood to mean here the biotic features of good structure and function and the typical species.

For habitat type H1110_C research has established that both the number of opportunistic species and the number of individuals have increased sharply compared to a reference situation dating from 1952-54; this has occurred at the expense of long-lived species (Kröncke, 1992). This is attributable to various factors, including eutrophication, climate change and commercial fishery.

National conservation objective

H1110 Subtype C. 'Sandbanks covered all the time (Dogger Bank)': maintain distribution and improve quality.

Target scenario accompanying the national objective

The following generic text has been used for the entire profile of H1110: For the national conservation objective, the maintenance of the current distribution and surface area, within natural fluctuations and in balance with habitat type H1140, is desirable. The typical species should be stable over the medium and long term to ensure that extinction is prevented. A large part of the surface area occupied by the habitat type should have good structure and function. The requirements

concerning structure and function differ from site to site, so that further elaboration on this is required in management plans.

Assessment aspect (natural) area of distribution: for subtype H1110_C 'favourable'

Assessment aspect surface area: for subtype H1110_C 'favourable'

Assessment aspect quality: for subtype H1110_C 'unfavourable–inadequate'.

Based on the ascertained shift in the composition of the biotic community and the character of the disappeared species and those that have emerged, it is concluded that a fundamental deterioration of the aspect 'quality' has occurred.

1. Features of good structure and function
H1110_C Sandbanks covered all the time (Dogger Bank)

Subtype H1110_C has a high biodiversity due to the diversity of depths and the composition of the sandy sediment. Information from the past shows that the species composition has changed over time, whereby a shift has occurred in the species composition of the bottom-dwelling community (Kröncke, 1992; Wieking & Kröncke, 2003). Long-lived suspension-eating bivalved shellfish have declined, which probably indicates a regular unnatural disturbance of the sediment (Frid et al., 2000). In addition, an increase of detritus-eating bristleworms has been ascertained. These are characteristic of a disturbed situation (Kröncke, 1992; Wieking & Kröncke, 2003). The biomass of bristleworms and sediment-eating echinoderms has increased sharply. Although storms are cause a certain stirring-up of the sediment of the habitat type, their effects on the bottom fauna are not comparable with those brought about by the force exerted on sediment and fauna by tickler chains. The presence of small periphyton-eating crustaceans demonstrates that the clarity of the water is sufficient (Reiss et al., 2007). These small crustaceans are short-lived, mobile and relatively insensitive to seabed disturbance. In addition, trends concerning mobile species, including fishes, are occurring within the site that are consistent with those seen throughout the North Sea.

In view of the shift in the species composition of the bottom-dwelling community caused by disturbance, the structure and function are assessed as 'unfavourable–inadequate'.

2. Typical species

The following generic text has been used for the entire profile of H1110: For a favourable conservation status it is desirable that at national level over the medium and long term the selected typical species of the habitat type have stable populations related to the surface area of the habitat type. For a typical species, the trend and the current occurrence together determine whether it is stable over the medium and long term or will become extinct (that is the assessment criterion). Whether a species runs a genuine risk of extinction can be determined by reference to the Red List(s) or by comparing the current population size with the minimum for a stable population (FRV). The principle has been applied that a habitat type scores unfavourable–bad (red) when at least 25% of the typical species is under serious threat (or has already disappeared). A habitat type scores unfavourable–inadequate (orange) when at least one typical species is very rare. In all other cases, the habitat type scores favourable (green).

Among the typical species, the long-lived species are present in lower densities than in the past. The thornback ray, for example, has even become very rare. For this reason, the habitat type scores unfavourable–inadequate.

Assessment aspect future prospects: 'unfavourable–inadequate'.
In assessing the future prospects, account is taken of the expected effects of adopted national policy and the implementation of European regulations and legislation.

The following generic text has been used for the entire profile of H1110: The decrease in fisheries intensity that has occurred throughout the North Sea in the last decade is likely to continue, but this is uncertain. In view of this and all sorts of other uncertainties in this system or developments not yet taken into account in policy, a favourable conservation status in the short term (2020) would not be logical. For this reason, the future prospects for H1170 are considered to be 'unfavourable–inadequate'.

Subtype H1110_C: Sandbanks covered all the time (Dogger Bank)

Aspect	2009
Distribution	Favourable
Population	Favourable
Habitat	Unfavourable–inadequate
Future prospects	Unfavourable–inadequate
CS assessment	**Unfavourable–inadequate**

4.2.6 Sources

Baretta-Bekker H, P Bot, T Prins & W Zevenboom (2008) Report on the second application of the OSPAR Comprehensive Procedure to the Dutch marine waters. Version 10 May 2008.

European Commission (2007). Update of "Interpretation Manual of European Union Habitats. Annex I Marine Habitat type definitions.

Frid CLJ, KG Harwood, SJ Hall & JA Hall (2000) Long-term changes in the benthic communities on North Sea fishing grounds. ICES Journal of Marine Science, 57: 1303–1309.

Kröncke I (1992) Macrofauna standing stock of the Dogger Bank. A comparison: III, 1950-54 versus 1985-87. A final summary. Helgoländer Meeresuntersuchungen 46:137-169.

Kröncke I (1992) Macrofauna standing stock of the Dogger Bank. A comparison: III, 1950-54 versus 1985-87. A final summary. Helgoländer Meeresuntersuchungen 46:137-169.

Kröncke I & R Knust (1995) The Dogger Bank: A special ecological region in the central North Sea. Helgoländer Meeresuntersuchungen, 49 (1-4), pp. 335-353.

Lindeboom, H., J. Geurts van Kessel & L. Berkenbosch (2005). Gebieden met bijzondere waarden op het Nederlands Continentaal Plat. Report RIKZ/2005.008. Alterra Report 1109. RIKZ, The Hague / Alterra, Wageningen.

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES Texel office.

Noordzee-atlas (2004) IDON, Ministry of Transport, Public Works and Water Management /RWS North Sea department. 77 p.

Reiss H, G Wieking & I Kröncke (2007) Microphytobenthos of the Dogger Bank: A comparison between shallow and deep areas using phytopigment composition of the sediment Mar Biol 105:1061-1071.

Riegman R, H Malschaert & F Colijn (1990) Primary production of phytoplankton at a frontal zone located at the northern slope of the Dogger Bank (North Sea) Marine Biology, 105 (2), pp. 329-336.

Weston K, L Fernand, DK Mills, R Delahunty & J Brown (2005) Primary production in the deep chlorophyll maximum of the central North Sea. Journal of Plankton Research 27: 909–922.

Wieking, G. & I Kröncke (2003) Macrofauna communities of the Dogger Bank (central North Sea) in the late 1990s: spatial distribution, species composition and trophic structure.

Witbaard, R, O Bos & H Lindeboom (2008) Basisinformatie Borkumer Stenen, Bruine Bank en Gasfonteinen. Wageningen IMARES Report No. C026/08.

http://www.synbiosys.alterra.nl/Natura 2000/documenten/profielen/soorten/profiel_soort_H1095.pdf

5 Background information Habitat Directive species

The following Habitat Directive species occur within the sites addressed in this report:

- Sea lamprey
- River lamprey
- Twaite shad
- Harbour porpoise
- Grey seal
- Harbour seal.

While profile documents for these species are available, it has been examined whether supplementary information exists for sites farther from the coast. This supplementary information is presented in this chapter for each species. On occasion the existing information in the profiles is out of date. However, the complete revision of the existing profiles lies outside the scope of this report and will have to be done at a later stage.

The profile documents are available at:
http://www.synbiosys.alterra.nl/natura2000/gebiedendatabase.aspx?subj=profielen

Accompanying the description of the harbour porpoise is a proposal for revising the assessment of the conservation status in the profile document. For the other species proposals are made for substantive amendments to the profile documents. It is recommended that the profiles be consulted alongside this report.

The current national conservation status in 2007 of the species in the Habitat Directive, as established in the profile documents, is summarised in Table 15.

Table 15 Assessment of the conservation status of Habitat Directive species, as already established in the existing profile documents for these species

Conservation status						
	Sea lamprey	**River lamprey**	**Twaite shad**	**Harbour porpoise**	**Grey seal**	**Harbour seal**
Aspect	**2007**	**2007**	**2007**	**2007**	**2007**	**2007**
Distribution	Favourable	Favourable	Favourable	Favourable	Favourable	Favourable
Population	Unfavourable–inadequate	Unfavourable–inadequate	Unfavourable–bad	Unfavourable–bad	Favourable	Favourable
Habitat	Unfavourable–inadequate	Unfavourable–inadequate	Unfavourable–bad	Unfavourable–inadequate	Unfavourable–inadequate	Favourable
Future prospects	Favourable	Favourable	Unfavourable–inadequate	Unfavourable–inadequate	Favourable	Favourable
CS assessment	**Unfavourable–inadequate**	**Unfavourable–inadequate**	**Unfavourable–bad**	**Unfavourable–bad**	**Unfavourable–inadequate**	**Favourable**

The assessment of the conservation status is based on the criteria in *Table 16*.

Table 16 System for assessing the conservation status of a species listed in Annex II of the Habitat Directive as laid down by the Comité Habitat; this method has also been used for the assessment of the conservation status of birds (from: targets document). The system is applied internationally and, therefore, cannot be changed.

Aspect	Favourable	Unfavourable–inadequate	Unfavourable–bad	Unknown
Distribution	area stable or increasing AND no smaller than the 'favourable reference'	between 'favourable' and 'unfavourable'	area loss exceeds 1% per year OR area more than 10% less than favourable reference'	no or insufficient reliable information
Population	population greater than or equal to the 'favourable reference' AND reproduction, mortality and age structure no worse than normal	between 'favourable' and 'unfavourable'	population decrease exceeds 1% per year AND lower than the favourable reference OR population more than 25% lower than the 'favourable reference' OR reproduction, mortality and age structure much worse than normal	no or insufficient reliable information
Habitat	habitat is sufficiently large (and stable or increasing) AND the quality is suitable for the species' long-term survival	between 'favourable' and 'unfavourable'	habitat is clearly insufficiently large for the species' long-term survival OR the quality is clearly unsuitable for the species' long-term survival	no or insufficient reliable information
Future prospects	the most significant threats are not fundamental; the species will be viable in the future	between 'favourable' and 'unfavourable'	strong negative influence of threats on the species; very poor prospects, long-term viability in jeopardy	no or insufficient reliable information
Total CS assessment	everything 'green' or three 'green' and one unknown	one or more orange, but no red	one or more 'red'	Two or more 'unknown' combined only with 'green'

5.1 Sea lamprey (*Petromyzon marinus*) H1095

The text below provides supplementary information for the profile document for the sea lamprey (LNV 2008) and for this reason does not contain a complete description of the sea lamprey. No improvements to existing texts in the profile document are suggested because this is outside the scope of the instructions of the Ministry of Agriculture, Nature and Food Quality to IMARES. The text in the profile document is included in the Appendices Report to this report and is available at: http://www.synbiosys.alterra.nl/Natura 2000/documenten/profielen/soorten/profiel_soort_H1095.pdf

In addition, the final paragraph provides a short overview of existing monitoring.

This species has been included in the registration form for the following areas addressed in this report:

- Vlakte van de Raan
- (Expansion of) North Sea Coastal Zone.

5.1.1 Supplements to profile document

Supplementary information for section '1. Status' Profile document (LNV 2008)
None

Supplementary information for section '2. Characterisation' of the profile document (LNV 2008)
None

Supplementary information for section '3. Ecological requirements' of the profile document (LNV 2008)
None

Supplementary information for section '4. Current occurrence' of the profile document

In the North Sea sea lamprey are caught only occasionally (Ter Hofstede *et al*., 2005, 2008). Most sightings are made in the south-eastern North Sea and the Kattegat. It is probable that the relatively large number of sightings in the coastal zone of the EEZ has been influenced by the large number of tows worked here in comparison with the rest of the North Sea. Although sea lamprey, like river lamprey, are caught only occasionally at sea, the catches in gill nets at the transition from saltwater to freshwater are much bigger (Hartgers *et al*., 1998); here the numbers of river lamprey are much greater than those of sea lamprey. In both cases, the specimens involved are sea lamprey migrating upriver in order to go and spawn.

Verwijderd:

Supplementary information for section '5. Assessment of national conservation status' of the profile document

Trends in Nederland: not changed

Recent developments: not changed

Assessment aspect natural area of distribution: not changed

Assessment aspect population: not changed

Assessment aspect habitat: not changed

Assessment aspect future prospects: not changed

National conservation objective: not changed
'Increase extent and improve quality of habitat for the purposes of expanding the population'

Target scenario accompanying the national conservation objective
It may be necessary to revise the distribution map.

Assessment: not changed
In the profile document the assessments are compiled up to and including 2007, and in this report a proposal is made for the following supplement:

Conservation status				
Aspect	**1994**	**2004**	**2007**	**2009**
Distribution	favourable	unfavourable–inadequate	Favourable	favourable
Population	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate
Habitat	favourable	favourable	unfavourable–inadequate	unfavourable–inadequate
Future prospects	unfavourable–inadequate	favourable	Favourable	favourable
CS assessment	**unfavourable–inadequate**	**unfavourable–inadequate**	**unfavourable–inadequate**	**unfavourable–inadequate**

5.1.2 Monitoring and trends in the North Sea

The sea lamprey is seldom caught in the monitoring programmes at sea in the Netherlands and Germany (*Figure 19* and Figure 20). The current monitoring of the species in freshwater suffices for spotting trends concerning this species (see Profile document: http://www.synbiosys.alterra.nl/Natura 2000/documenten/profielen/soorten/profiel_soort_H1095.pdf).

An overview of fish monitoring in the North Sea is presented in Table 17.

For sea lamprey in the North Sea it is possible only to produce maps showing presence/absence. The existing surveys in the North Sea are not suitable for catching lamprey and thus no statements can be made about trends on the scale of Natura 2000 sites. Owing to the low densities in which the sea lamprey occurs, it is not practical to set up special surveys in the North Sea. For spotting trends, better use can be made of the existing monitoring on land.

Verwijderd:

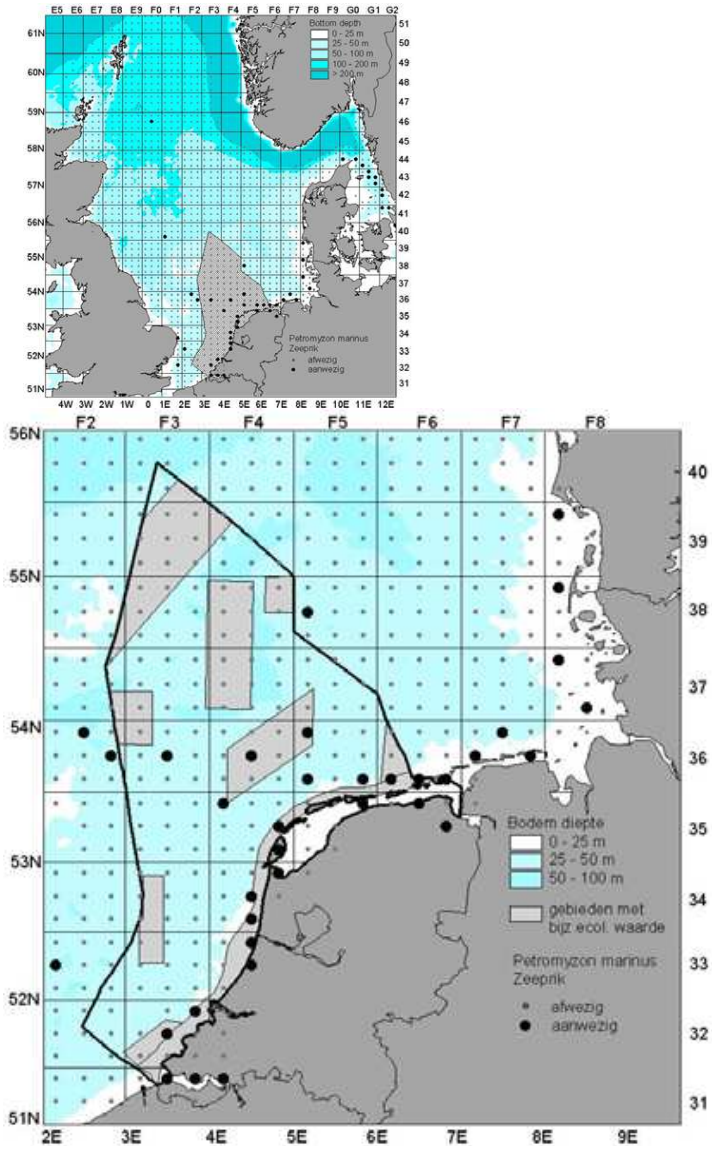

Figure 19 Sightings of the sea lamprey in the period 1965-2005 (from: Ter Hofstede et al., 2005).

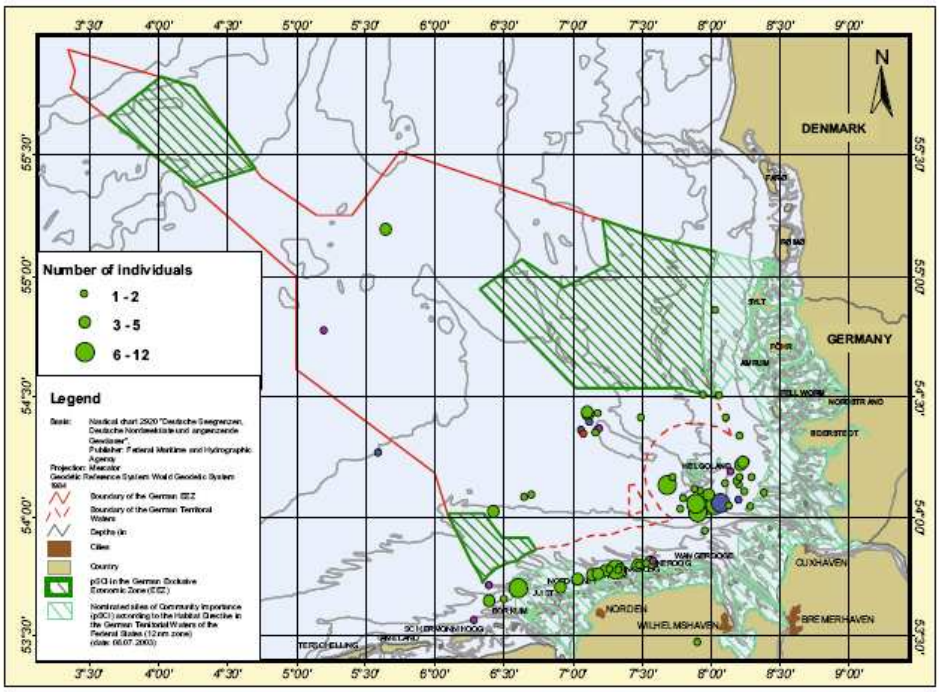

Figure 20 Sightings over a period of 24 years of sea lampreys and river lampreys in the German EEZ (period 1978-2002) (Thiel & Backhausen 2006). Purple=1st quarter, red = 2nd quarter, blue = 3rd quarter, green = 4rd quarter.

5.1.3 References

Hartgers, E.M., A.D. Buijse, W. Dekker. 1998. Salmonids and other migratory fish in Lake IJsselmeer. HER publication 76-1998. Netherlands Institute for Fisheries Research RIVO-DLO, IJmuiden and Institute for Integral Water Management and Waste Water Treatment RIZA, Lelystad. 44 pp.

Sea lamprey profile document. Profiles for habitat species, version 1 September 2008. http://www.synbiosys.alterra.nl/Natura 2000/documenten/profielen/soorten/profiel_soort_H1095.pdf

Ter Hofstede R, HJL Heessen & N Daan (2005). Systeembeschrijving Noordzee: Natuurwaardenkaarten vis. RIVO Report C090/05.

Ter Hofstede R, Winter HV, Bos OG (2008) Distribution of fish species for the generic appropriate assessment for the construction of offshore wind farms. Report No. C050/08, Wageningen IMARES.

Thiel R, Backhausen I (2006) Survey of NATURA 2000 fish species in the German North and Baltic Seas. In: Von Nordheim H, Boedeker D, Krause JC (eds) Progress in Marine Conservation in Europe. Springer-Verlag, Berlin, Heidelberg, p 157-178.

5.2 River lamprey (*Lampetra fluviatilis*) H1099

The text below provides supplementary information for the profile document for the river lamprey (LNV 2008) and for this reason does not contain a complete description of the river lamprey. No improvements to existing texts in the profile document are suggested because this is outside the scope of the instructions of the Ministry of Agriculture, Nature and Food Quality to IMARES. The text in the profile document is included in the Appendices Report to this report and is available at: http://www.synbiosys.alterra.nl/natura2000/documenten/profielen/soorten/profiel_soort_H1099.pdf

In addition, a short overview of existing monitoring is provided.

This species has been included in the registration form for the following areas addressed in this report:

- Vlakte van de Raan
- (Expansion of) North Sea Coastal Zone

5.2.1 Supplements to profile document

Supplementary information for section '1. Status' Profile document (LNV 2008)
None

Supplementary information for section '2. Characterisation' of the profile document (LNV 2008)
None

Supplementary information for section '3. Ecological requirements' of the profile document (LNV 2008)
None

Supplementary information for section '4. Current occurrence' of the profile document

River lamprey are caught only occasionally in the North Sea (Ter Hofstede et al. 2005, 2008). Most sightings are made in the south-eastern North Sea, the Wadden Sea and the Schelde estuary, and the Kattegat. At the transition from saltwater to freshwater the catches are much larger (Hartgers et al. 1998, Jansen et al. 2007).

Supplementary information for section '5. Assessment of national conservation status' of the profile document

Trends in the Netherlands: not changed

Recent developments: not changed

Assessment aspect natural area of distribution: not changed

Assessment aspect population: not changed

Assessment aspect habitat: not changed

Assessment aspect future prospects: not changed

National conservation objective: not changed
'Expand distribution of spawning sites, increase extent and improve quality of habitat for the purposes of expanding the population'.

Target scenario accompanying the national conservation objective
No changes.

Assessment: not changed
In the profile document the assessments are compiled up to and including 2007, and in this report a proposal is made for the following supplement:

Conservation status				
Aspect	**1994**	**2004**	**2007**	**2009**
Distribution	unfavourable–inadequate	favourable	favourable	favourable
Population	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate
Habitat	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate
Future prospects	unfavourable–inadequate	favourable	favourable	favourable
CS assessment	**unfavourable–inadequate**	**unfavourable–inadequate**	**unfavourable–inadequate**	**unfavourable–inadequate**

5.2.2 Monitoring and trends in the North Sea

River lamprey are caught only occasionally in the North Sea (Ter Hofstede et al. 2005, 2008). Most sightings are made in the south-eastern North Sea, the Wadden Sea and the Schelde estuary, and the Kattegat. At the transition from saltwater to freshwater the catches are much larger (Hartgers et al. 1998, Jansen et al. 2007). An overview of fish monitoring in the North Sea is presented in Table 17.

For river lamprey in the North Sea it is possible only to produce maps showing presence/absence. The existing surveys in the North Sea are not suitable for catching lamprey and thus no statements can be made about trends on the scale of Natura 2000 sites. Owing to the low densities in which the river lamprey occurs, it is not practical to set up special surveys in the North Sea. For spotting trends, better use can be made of the existing monitoring on or near land. The current conservation status (CS) has been based on this monitoring and for this reason no change has been made to the CS.

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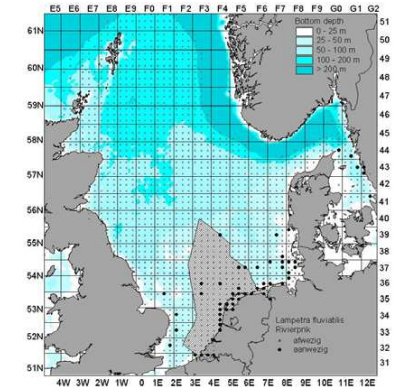

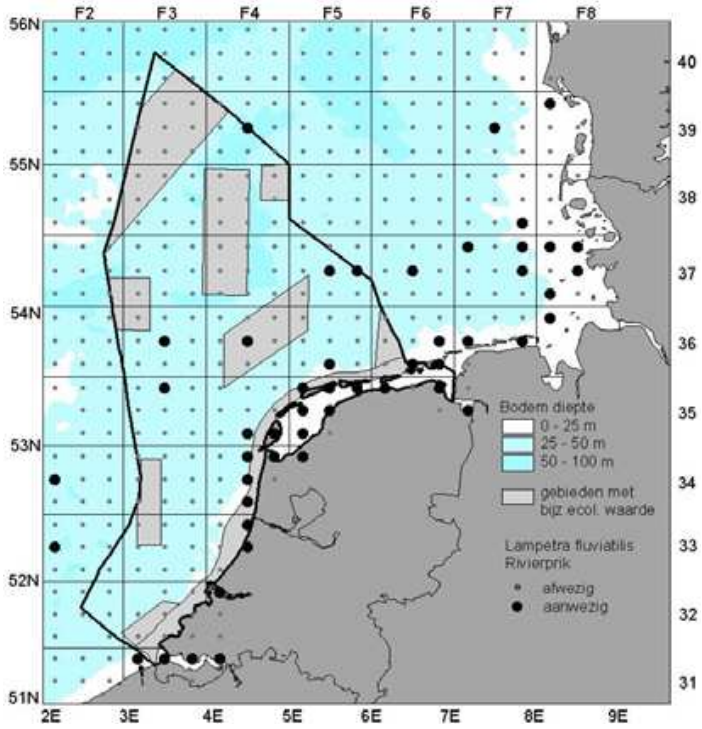

Figure 21 Sightings of river lamprey at sea in the period 1965-2005 (from: Ter Hofstede et al 2005).

5.2.3 References

Hartgers, E.M., A.D. Buijse, W. Dekker. 1998. Salmonids and other migratory fish in Lake IJsselmeer. HER publication 76-1998. Netherlands Institute for Fisheries Research RIVO-DLO, IJmuiden and Institute for Integral Water Management and Waste Water Treatment RIZA, Lelystad. 44 pp.

Jansen HM, Winter HV, Bult TP (2007) Bijvangst van trekvissen in de Nederlandse fuikenvisserij. Report No. C048/07, Wageningen IMARES, Ijmuiden.

River lamprey profile document. Profiles for habitat species, version 1 September 2008.

http://www.synbiosys.alterra.nl/Natura 2000/documenten/profielen/soorten/profiel_soort_H1099.pdf

Ter Hofstede R, HJL Heessen & N Daan (2005). Systeembeschrijving Noordzee: Natuurwaardenkaarten vis. RIVO Report C090/05.

Ter Hofstede R, Winter HV, Bos OG (2008) Distribution of fish species for the generic appropriate assessment for the construction of offshore wind farms. Report No. C050/08, Wageningen IMARES.

5.3 Twaite shad (*Alosa fallax*) H1103

This species is relevant to the North Sea Coastal Zone 2 (Bos et al., 2008).
The text below provides supplementary information for the profile document for the twaite shad (LNV 2008) and for this reason does not contain a complete description of the twaite shad. No improvements to existing texts in the profile document are suggested because this is outside the scope of the instructions of the Ministry of Agriculture, Nature and Food Quality to IMARES. The text in the profile document is included in the Appendices Report to this report and is available at: http://www.synbiosys.alterra.nl/Natura2000/documenten/profielen/soorten/profiel_soort_H1103.pdf

In addition, a short overview of existing monitoring is provided.

This species has been included in the registration form for the following area addressed in this report:

- (Expansion of) North Sea Coastal Zone.

It has previously been recommended that the species be included for the Vlakte van de Raan (Bos et al., 2008). The species has not been registered on the Standard Data Form, however, because it was considered to be too rare. During one of the consultation rounds it became evident that the site does in fact fulfil an important function for the twaite shad. For this reason it is proposed that the twaite shad now be included in the designation order for the Vlakte van de Raan.

5.3.1 Supplements to profile document

Supplementary information for section '1. Status' Profile document (LNV 2008)
None

Supplementary information for section '2. Characterisation' of the profile document (LNV 2008)
None

Supplementary information for section '3. Ecological requirements' of the profile document (LNV 2008)

Supplementary information for section '4. Current occurrence' of the profile document

With the exception of the central North Sea, Twaite shade have been reported in a large part of the North Sea (Ter Hofstede et al., 2005), principally in the German Bight and the Southern Bight. It is probable that the catches relate (almost) exclusively to the twaite shad (*Alosa fallax*). Most specimens are small and belong to the 0- or 1-group. In the EEZ the sightings are made mainly in a broad coastal zone that includes the Wadden Sea and the Schelde estuary (Ter Hofstede et al., 2005).

Supplementary information for section '5. Assessment of national conservation status' of the profile document

Supplementary information for trends in the Netherlands:
Every year between 1910 and 1920 between 200 and 900 tonnes of twaite shad were caught in the North Sea (De Laak, 2009).

Recent developments: not changed

Assessment aspect natural area of distribution: not changed

Assessment aspect population: not changed

Assessment aspect habitat: not changed

Assessment aspect future prospects: not changed

National conservation objective: not changed
'Maintain the distribution of spawning sites, maintain the extent and quality of habitat for the purposes of expanding the population'

Target scenario accompanying the national conservation objective
No changes.

Assessment: not changed
In the profile document the assessments are compiled up to and including 2007, and in this report a proposal is made for the following supplement:

Conservation status				
Aspect	**1994**	**2004**	**2007**	**2009**
Distribution	unfavourable–inadequate	unfavourable–inadequate	favourable	favourable
Population	unfavourable–bad	unfavourable–bad	unfavourable–bad	unfavourable–bad
Habitat	unfavourable–bad	unfavourable–bad	unfavourable–bad	unfavourable–bad
Future prospects	unfavourable–bad	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate
CS assessment	unfavourable–bad	unfavourable–bad	unfavourable–bad	unfavourable–bad

5.3.2 Monitoring and trends in the North Sea

With the exception of the central North Sea, Twaite shade have been reported together with allis shad in a large part of the North Sea (Ter Hofstede et al., 2005), principally in the German Bight and the Southern Bight. It is probable that the catches relate (almost) exclusively to the twaite shad (*Alosa fallax*). Most specimens are small and belong to the 0- or 1-group. In the EEZ the sightings are made mainly in a broad coastal zone that includes the Wadden Sea and the Schelde estuary. For example, near the mouth of the Schelde twaite shad are encountered in fish traps with great regularity (Maes et al. 2008). Since the 1990s, the twaite shad has been showing a positive trend in the North Sea (*Figure 23*) (Heessen & Ter Hofstede, 2005).

Twaite shad is caught in the North Sea in fish monitoring carried out by IMARES on the instructions of the Ministry of Agriculture, Nature and Food Quality (Table 17). Statements can be made only about trends on the scale of the North Sea (EEZ) with the help of the BTS/IBTS surveys. The SNS and DFS surveys are concerned with flatfish and shrimps and catch very little twaite shad. No statements can be made on the scale of Natura 2000 sites.

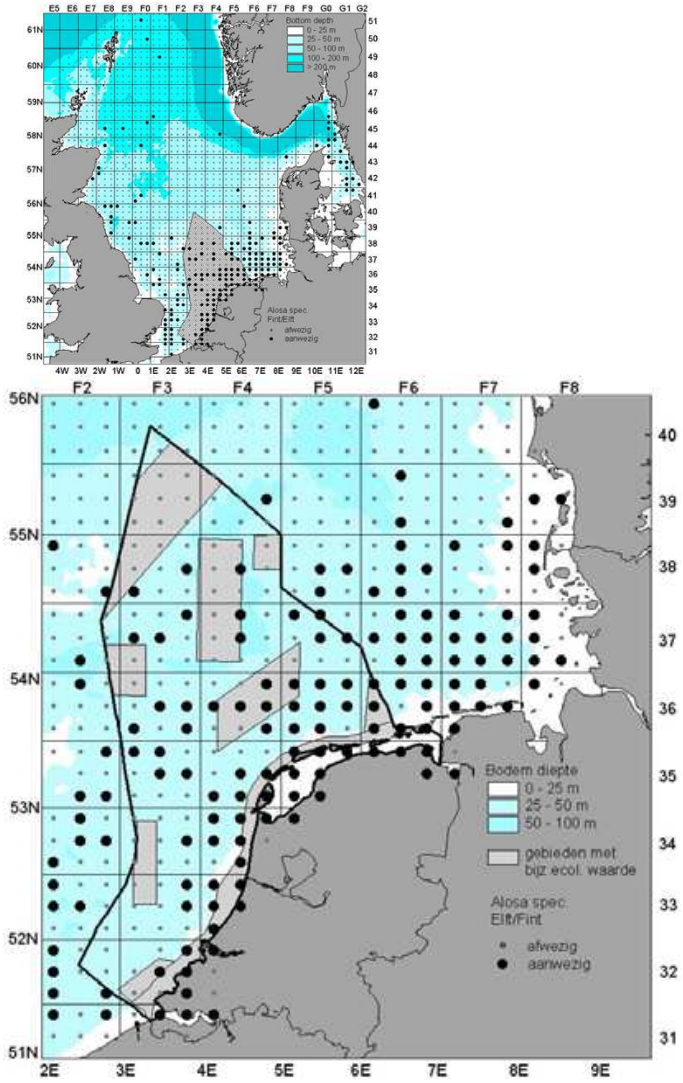

*Figure 22 Sighting of twaite shad/allis shad in the period 1965-2005. It is probable that the catches relate (almost) exclusively to the twaite shad (*Alosa fallax*) (from: Ter Hofstede et al., 2005).*

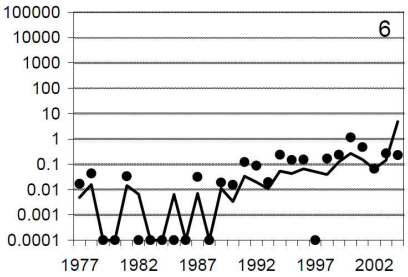

*Figure 23 Trend for the average number of twaite shad/allis shad caught per hour in area 6, which encompasses the Dutch EEZ. It is probable that the catches relate (almost) exclusively to the twaite shad (*Alosa fallax*) (from: Ter Hofstede et al., 2005).*

5.3.3 References

De Laak GAJ (2009) Kennisdocument fint, *Alosa fallax* (Lacépede, 1803). Kennisdocument 26 Sportvisserij Nederland, Bilthoven.

Heessen, H.J.L., R. Ter Hofstede. 2005. Time series of 60 North Sea species based on data from the ICES coordinated International Bottom Trawl Survey IBTS. RIVO Report C013.05. 69 pp.

Maes J, Stevens M, Breine J (2008) Poor water quality constrains the distribution and movements of twaite shad *Alosa fallax fallax* (Lacepede, 1803) in the watershed of the River Scheldt. Hydrobiologia 602:129-143.

Twaite shad profile document. Profiles for habitat species, version 1 September 2008. http://www.synbiosys.alterra.nl/Natura 2000/documenten/profielen/soorten/profiel_soort_H1103.pdf

Ter Hofstede R, HJL Heessen & N Daan (2005). Systeembeschrijving Noordzee: Natuurwaardenkaarten vis. RIVO Report C090/05.

5.4 Overview of fish monitoring in the North Sea

As part of various programmes, fishes are monitored in the Natura 2000 sites of the North Sea addressed in this report (Table 17). In *Figure 24*, Figure 25 and Figure 26 an overview is presented of these programmes' stations.

Table 17 Overview of various fish monitoring programmes on the Dutch Continental Shelf and their coverage of the future Natura 2000 sites (see Figures)

Type of study	**Implement-ing body**	**Dogger Bank**	**Cleaver Bank**	**Vlakte vd Raan**	**Coastal Zone**	**Frisian Front**
Beam Trawl Survey (BTS)	IMARES	1 station	no	no	no	no
Sole Net Survey (SNS)	IMARES	no	no	no	yes	no
Demersal Fish Survey (DFS)	IMARES	no	no	no	yes	no
North Sea International Bottom Trawl Survey (NS-IBTS)	IMARES	1-4 stations	?	no	0-4 stations	0-3 stations

yes	data present and sufficient coverage at level of Natura 2000 sites for bottom-dwelling fish (not for twaite shad or the lampreys)
yes	data present, insufficient coverage at site level. Suitable for twaite shad, not for the lampreys.
no	data not present

5.4.1 References

Van Damme C, H Heessen, L Bolle, I De Boois, B Couperus, W Dekker, M Dickey-Collas, G Eltink, R Grift, M Pastoors, G Piet, J Poos, L Schaap, H Wiegerinck, J Van Willigen & S Ybema (2005) Handboek bestandsopnamen en routinematige bemonsteringen op het water, Versie 3. Report No. CVO, Wageningen IMARES.

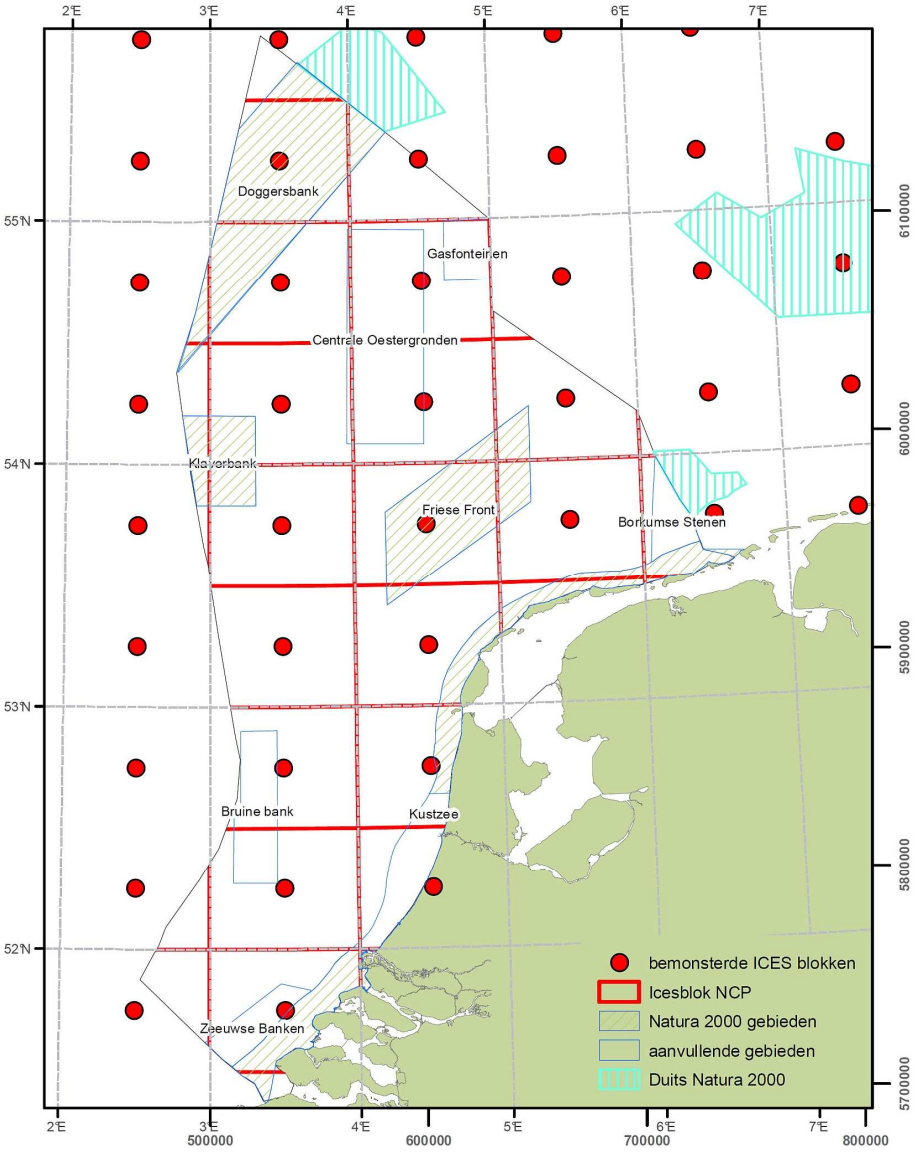

Figure 24 Diagrammatic representation of BTS/IBTS (Bottom Trawl Survey/International Beam Trawl Survey) station network with one sampling per ICES quadrant (based on Van Damme et al. 2005). Also shown are the future Natura 2000 sites. Suitable for twaite shad but not for lampreys.

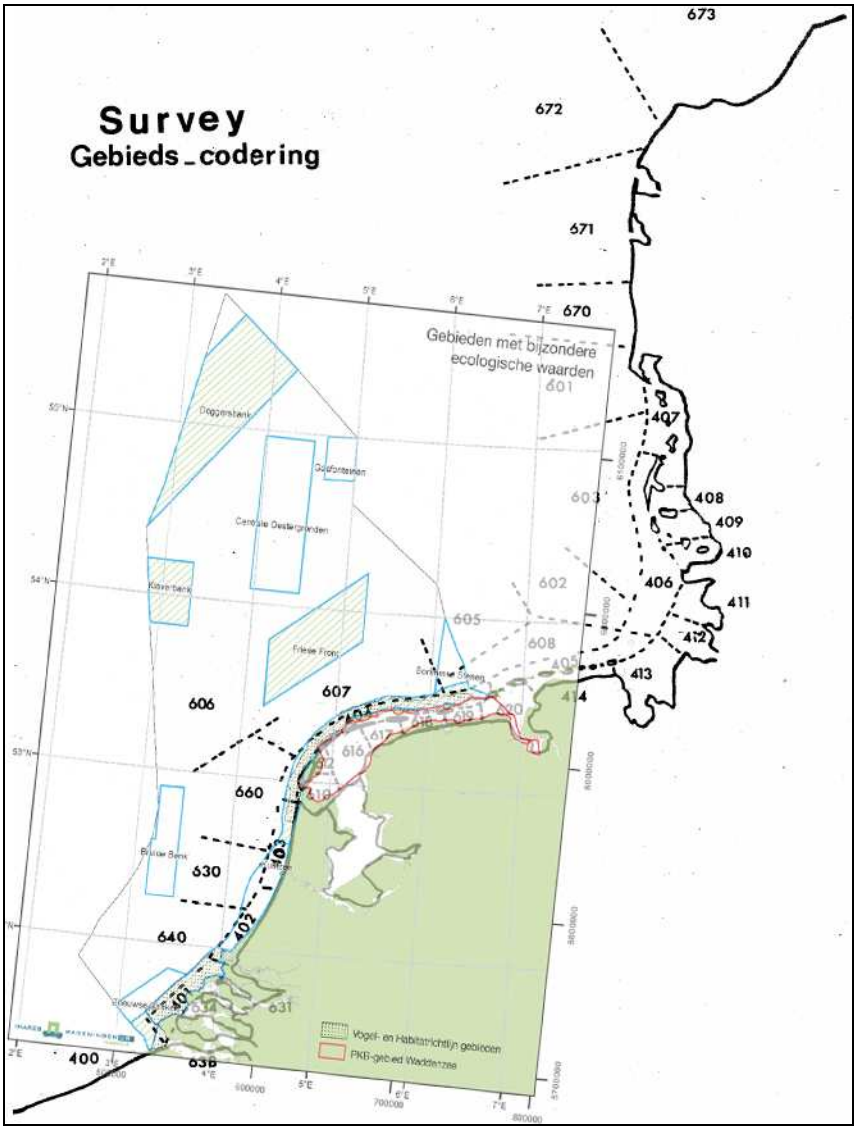

Figure 25 Sole Net Survey (SNS survey) station network (Van Damme et al. 2005), roughly plotted within it are the protected sites. Target species are 1-4 year-old common sole and plaice. Suitable for neither twaite shad nor lampreys.

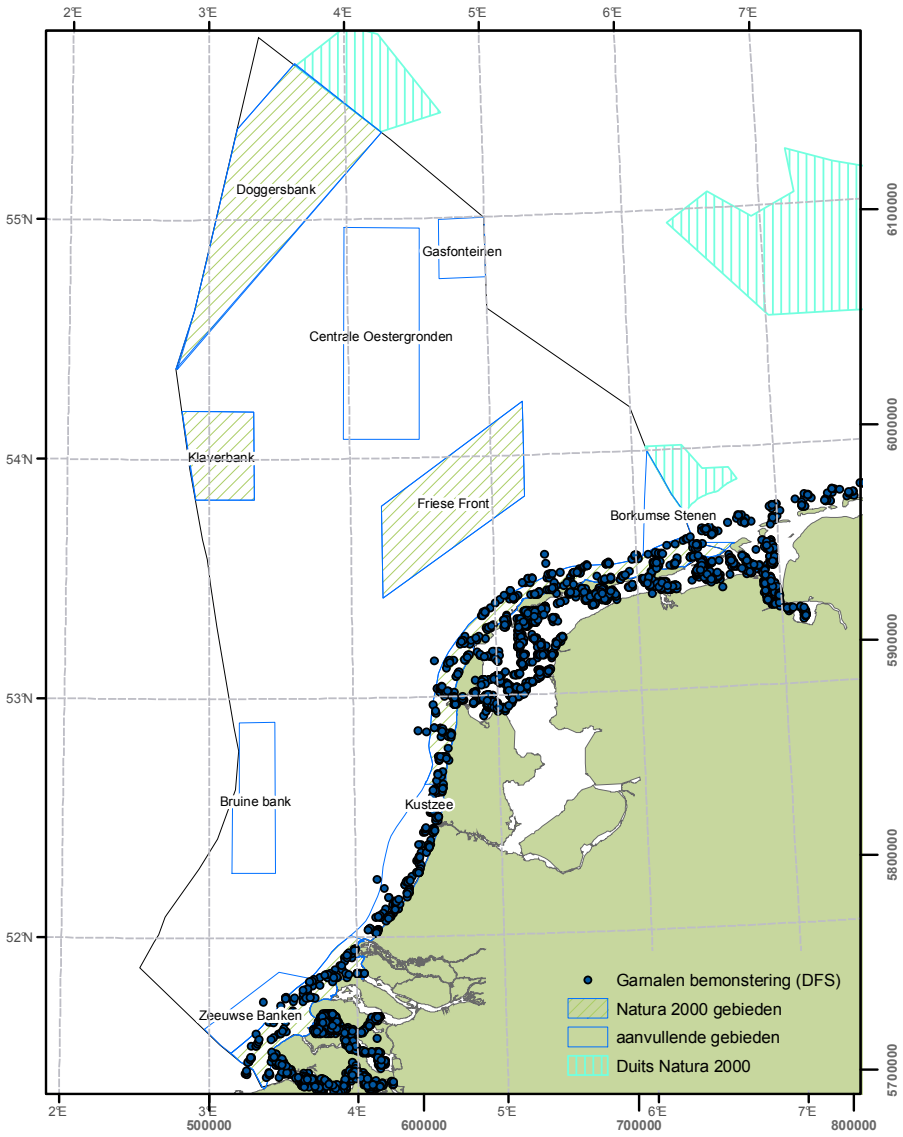

Figure 26 Demersal Fish Survey (DFS survey) station network (based on Van Damme et al. 2005), shown within the network are the future Natura 2000 sites. Suitable for neither twaite shad nor lampreys.

5.5 Harbour porpoise (*Phocoena phocoena*) H1351

The text below provides supplementary information for the profile document for the harbour porpoise (LNV 2008) and for this reason does not contain a complete description of the harbour porpoise. No improvements to existing texts in the profile document are suggested because this is outside the scope of the instructions of the Ministry of Agriculture, Nature and Food Quality to IMARES. The text in the profile document is included in the Appendices Report to this report and is available at:
http://www.synbiosys.alterra.nl/natura2000/documenten/profielen/soorten/profiel_soort_H1351.pdf

In addition, a short overview of existing monitoring is provided and a proposal is made for a text for the conservation objectives for each site.

This species has been included in the registration form for the following areas addressed in this report:

- Cleaver Bank
- Dogger Bank
- Vlakte van de Raan
- (Expansion of) North Sea Coastal Zone.

5.5.1 Supplements to profile document

Supplementary information for section '1. Status' Profile document Harbour porpoise (LNV 2008)
None.

Supplementary information for section '2. Characterisation' of the profile document Harbour porpoise (LNV 2008)

Supplementary information for the subsection 'Relative importance within Europe':
The limited current data provides an insufficient basis for identifying special breeding grounds or birthing grounds in the Dutch sector of the southern North Sea (Brasseur et al. 2008). In Germany, by contrast, areas of special significance have been identified, namely the *Sylter-Außenriff* and the *Borkum-Riffgrund* (Special Areas of Conservation, SACs) (Gilles & Siebert 2008, Gilles et al. 2009). Consistently high densities of harbour porpoise with their young are found here in the spring. In summer there is a clear north-south gradient in density, and in autumn densities are lower and the occurrence is more widely distributed (Gilles & Siebert 2008, Gilles et al. 2009). The recent expansion of the monitoring in Dutch waters may well provide in future a better picture of the distribution and important areas in the EEZ.

It seems that harbour porpoises from outside the German North Sea migrate in spring to the northern sector of the German North Sea and subsequently leave the area in autumn (Gilles et al. 2009). This pattern corresponds with the lower numbers of harbour porpoises in summer in the Dutch North Sea Coastal Zone. It remains to be seen, however, whether the animals migrate from the Netherlands to Germany.

Supplementary information for section '3. Ecological requirements' of the profile document

Supplementary information for the subsection 'Habitat'

It is known that locations close to the coast are suitable only as birthing grounds if they are not subject to a shoreward residual current (R. Witte, pers. comm.). Such a residual current makes it too likely that newborn offspring will be beached. As Sylt does not have this residual current, the warm shallow water just off the coast there is suitable as a birthing ground (R. Witte, pers. comm.).

Disturbing underwater noise levels can arise as a consequence of shipping, beam trawl fishing, seismic research, the construction of offshore structures (windmills, gas platforms), industrial activity and the use of sonar and acoustic equipment intended to chase away marine mammals (such as the instruments known as 'pingers' used in the fishery). A range of effects can arise if the frequencies of the noise overlap with the animal's hearing range, such as – in decreasing intensity - death, injury, a disturbance response, the masking of the animal's own sound, and the awareness of noise (Richardson et al., 1995). Thus it can be seen that disturbance occurs all at levels, not just when a certain noise level is exceeded. During the construction of windmills it has been observed that shortly after the commencement of pile-driving the acoustic activity of harbour porpoises at a distance up to at least 15 km decreased and recovered after 3-4 hours (Tougard et al., 2003 and 2005; Carstensen et al., 2006). It was also observed that densities decreased significantly and animals swam more deliberately in one direction than was evident in more arbitrary swimming behaviour outside the period in which pile-driving occurred (Tougard et al., 2003). For other species of whales effects of dredging and drilling have also been demonstrated (OSPAR, 2008).

Supplementary information for the subsection 'Food':
As Harbour porpoises have a fast metabolism, they need to eat several times a day. Harbour porpoises swallow their prey whole. This may explain why almost all their prey fish are smaller than 25 cm (M. Leopold pers. comm.).

Harbour porpoises have a wide choice of prey (Santos & Pierce, 2003). In the Dutch North Sea no special foraging sites can be identified based on the limited current knowledge about distribution and diet (Brasseur et al,. 2008). Perhaps knowledge of the distribution of prey fish species can be used in the future to help identify the important areas for harbour porpoises.

Supplementary information for section '4. Current occurrence' of the profile document
Data from counts conducted from the coast over the last couple of decades show clearly that these days more animals are sighted in the early spring and in autumn. The migration patterns from the coast to open sea and vice versa and on a larger scale are no clear (Brasseur et al. 2008).

Supplementary information for section '5. Assessment of national conservation status' of the profile document

Trends in the Netherlands
The SCANS II study from 2005 shows that the distribution of the harbour porpoise has changed compared to the first SCANS survey. The population in the North Sea and adjacent waters (SCANS II survey area) is estimated at 335,000 animals. Densities in the northern North Sea, north of 56°N have roughly halved, while they have doubled in the southern North Sea (SCANS II, 2008). Sightings from the coast show a sharp increase between 1994 and 2006, after which a decline occurred (*Figure 19*). These counts were both performed in the summer months, a period in which probably the fewest harbour porpoises occur in the North Sea.

Recent developments

According to an estimate based on counts in the autumn of 2008 and the spring of 2009 of the number of harbour porpoises in the coastal zone up to 100 km offshore, there are approx 37,000 individuals present in the observed area, which occupies roughly half of the EEZ. This is basically just over one animal per square kilometre. During these counts, a number of mothers with calves was sighted (Scheidat & Verdaat, in prep.).

Assessment aspect natural area of distribution: not changed

Assessment aspect population ('unfavourable–bad' -> 'unfavourable–inadequate'):
A population is assessed as 'favourable' according to the Natura 2000 system (see Table 16) if the population is greater than or equal to the 'favourable reference' and reproduction, mortality and the age structure of the population is no worse than normal.
The estimated number of approx 37,000 harbour porpoises in the coastal zone (Scheidat & Verdaat, in prep.) is higher than the 'favourable reference' of 25,000 individuals. The favourable reference has been based on counts carried out in the summer months. Generally speaking, within the Natura 2000 system the best quality knowledge is used to draw comparisons with the favourable reference and this approach has been applied here. The fact that it is uncertain whether reproduction takes place in the Dutch EEZ (see below) means, likewise, that summer numbers are not by definition the best.

For a favourable assessment of the aspect 'population', reproduction, mortality and the age structure of the population should be no worse than normal. Although it is uncertain whether reproduction used to take place (Verwey, 1975), it is assumed that under more favourable conditions, reproduction would occur. Insufficient data are available to substantiate the position that reproduction is once more occurring. For this reason, the situation still cannot be called 'favourable'. However, it is proposed that the aspect 'population' be revised from 'unfavourable–bad' to 'unfavourable–inadequate'.

Assessment aspect habitat: not changed

Assessment aspect future prospects: 'unfavourable–inadequate' (not changed)
In the current profile document it is reported that each year many hundreds of dead harbour porpoises wash shore, many of whom have drowned in tangled nets. This situation has not changed.

National conservation objective: not changed
"Maintain the distribution, extent and quality of habitat for the purposes of maintaining the population."

Target scenario accompanying the national conservation objective
No changes.

Assessment ('unfavourable–bad' -> 'unfavourable–inadequate')
The assessment of the conservation status changes from 'unfavourable–bad' to 'unfavourable–inadequate' based on the changed assessment of the aspect 'population' from 'unfavourable–bad' to 'unfavourable–inadequate'. As it is proposed that the aspect 'population' be revised for the reasons mentioned above, the total assessment of the conservation status also changes. This is determined by the assessed aspect that achieves the lowest score.

Conservation status				
Aspect	**1994**	**2004**	**2007**	**2009**
Distribution	unfavourable–bad	unfavourable–bad	favourable	favourable
Population	unfavourable–bad	unfavourable–bad	unfavourable–bad	unfavourable–inadequate
Habitat	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate
Future prospects	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate
CS assessment	**unfavourable–bad**	**unfavourable–bad**	**unfavourable–bad**	**unfavourable–inadequate**

5.5.2 Proposed conservation objectives per site (see chapter 7)

The Standard Data Forms have been used to register the harbour porpoise as occurring in all newly notified Habitats Directive sites in the EEZ (Bos et al., 2008). This is because the species occurs throughout the EEZ. We propose that the text below be used as the conservation objective for each of the sites.

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population.

Explanation: Dogger Bank, Cleaver Bank, Vlakte van de Raan and North Sea Coastal Zone-2 are all part of the area of distribution in the North Sea. Insofar as is known, these sites have no special significance as reproduction sites, foraging sites or otherwise.

Monitoring harbour porpoise

Monitoring in Dutch waters is insufficient to enable an indication of the significance of the separate Natura 2000 sites to the harbour porpoise (see Table 18, and the figures below). However, a suitable count was performed recently in the southern part of the EEZ by IMARES on an instruction from the Ministry of Agriculture, Nature and Food Quality and RWS (Scheidat & Verdaat, in prep.) that runs up to and including 2010.

Table 18 Overview of various monitoring programmes on the Dutch Continental Shelf and their coverage of the future Natura 2000 sites. Green/yes = data present and sufficient coverage at level of Natura 2000 sites; orange/yes = data present, insufficient coverage at site level; red/no = data not present.

Type of study	**Implementing body**	**Dogger Bank**	**Cleaver Bank**	**Vlakte van de Raan**	**Coastal Zone**	**Frisian Front**
Distribution and densities of marine mammals in the North Sea (SCANS project). Performed in 1994 and 2005. Poor coverage, in summer.	IMARES (NL), other countries	yes	yes	no	yes	yes
Distribution and densities of marine mammals in the North Sea (aerial counts). Bimonthly, concerned primarily with seabirds.	RWS	yes	yes	yes	yes	yes
Abundance trends of marine mammals in the North Sea and coastal waters (from the coast).	ESAS	yes	yes	yes	yes	yes

Counts from ships and from the coast.						
Harbour porpoise surveys LNV and RWS (Scheidat & Verdaat, in prep). For the time being this concerns a limited number of surveys.	IMARES	no	no	yes	yes	yes
Abundance trends of marine mammals the North Sea and coastal waters (findings).	CVZ, Naturalis	no	no	no	yes	no

Monitoring and trends in the North Sea

Based on years of aerial surveys (*Figure 32*, Gilles et al. 2009), areas have been identified in the German sector of the North Sea that are important for the reproduction of the harbour porpoise. Recently, too, surveys have been carried out in 100 km strip along the Dutch coast, on which basis it is estimated that approx. 37,000 harbour porpoises were located in the survey area in the spring of 2009. Owing to the limited number of counts carried out, no definitive statement can yet be made about the function of the site as regards reproduction (Scheidat & Verdaat, in prep.).

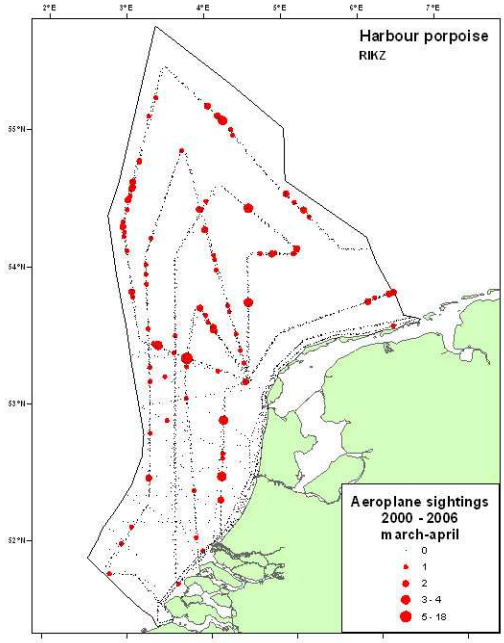

Figure 27 Harbour porpoise sightings made from the RIKZ aircraft; combined data from 2002-2006 for the months March and April. The data presented have not been corrected for the varying likelihood of a sighting between the surveys. The observation effort and the sightings have been combined for a six-year period. The effort was not distributed evenly across the years and throughout the area studied. This map provides insight into the distribution of the harbour porpoise in the EEZ in the spring (March-April). It cannot be used to derive differences in the distribution of the density (e.g. to determine suitable sites for offshore structures) or to make density estimates of harbour porpoises (Brasseur et al. 2008).

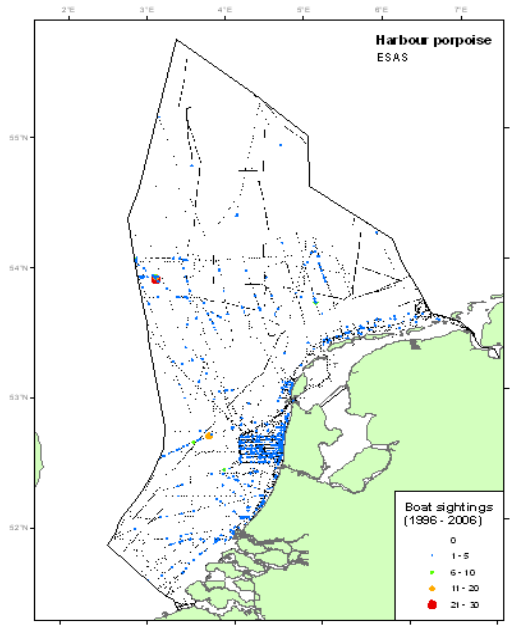

Figure 28 Harbour porpoise sightings made from ships from 1996 to 2006, based on the European Seabirds at Sea database. The data presented have not been corrected for any variance in the likelihood of a sighting between the surveys caused by, e.g. weather conditions. The effort and the sightings have been combined for a ten-year period. The effort varies between years and between areas. This map shows the information about the presence of harbour porposies throughout the year. It cannot be used to derive differences in the distribution of the density (e.g. to determine suitable sites for offshore structures) or to make density estimates of harbour porpoises (Brasseur et al. 2008).

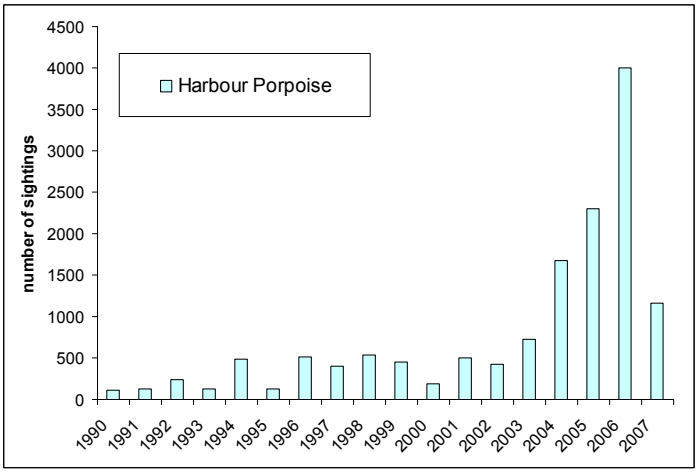

Figure 29 Harbour porpoise sightings in the Dutch North Sea (51-56°N, 2-8°O) since 1990. Adapted from Camphuysen (http://home.wxs.nl/~camphuys/NLflippers.html). The table shows the observed increase in harbour porpoises in Dutch waters over the last ten years (Brasseur et al. 2008).

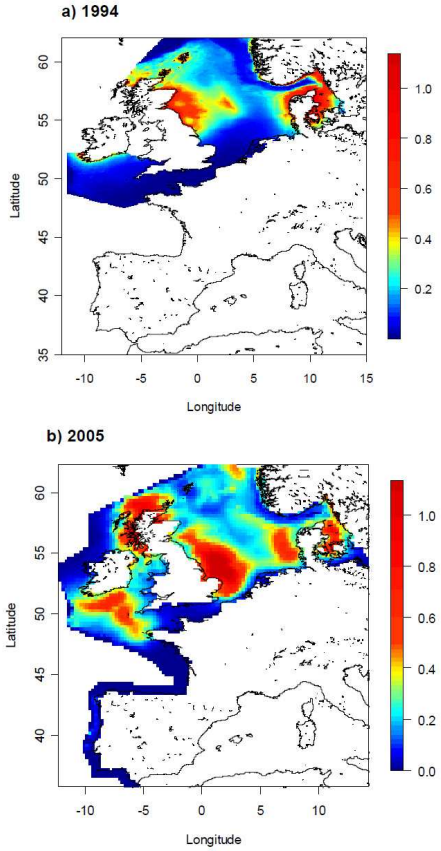

Figure 30 Estimated population density of the harbour porpoise (animals per km2) in (a) 1994 and (b) 2005. These maps are based on data collected as part of SCANS I and SCANS II research. The resolution of the predication shown is not high enough to differentiate between high and low densities at the Dutch subsectors (SCANS 2006; Brasseur et al. 2008).

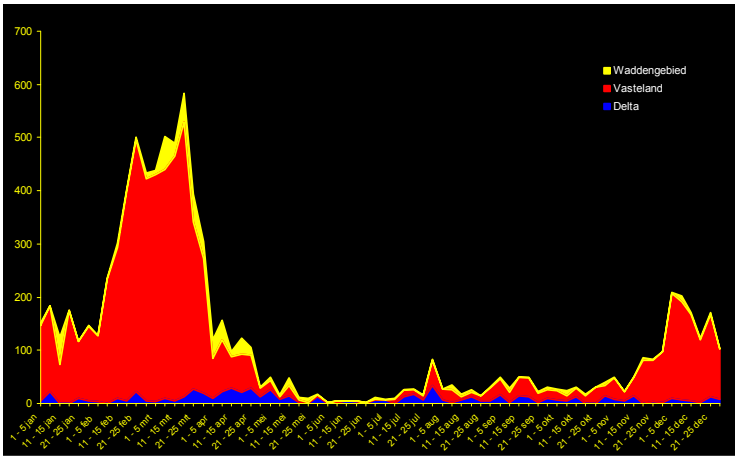

Figure 31 Seasonal pattern in coastal sightings of the harbour porpoise along the Dutch coast since 1970 (Marine Mammal Database, updated 3/1/2004, http://home.planet.nl/~camphuys/harbour porpoise.html). (Brasseur et al. 2008).

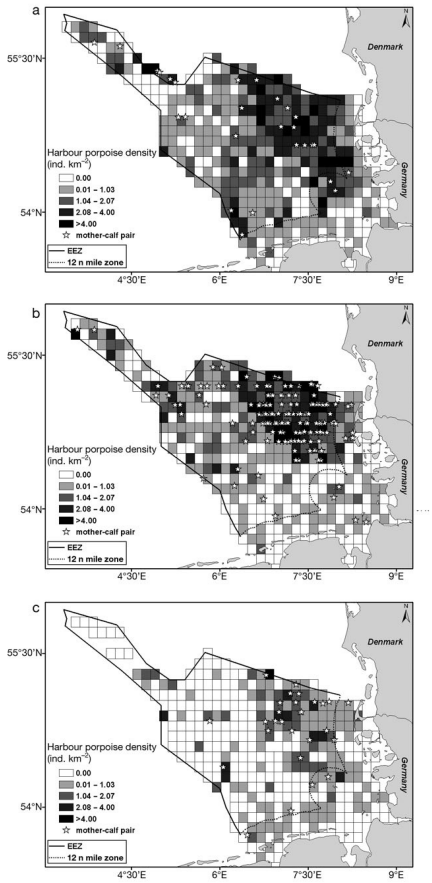

*Figure 32 Harbour porpoise distribution in the German sector of the North Sea (*Phocoena phocoena*). Density (animals per km2) in (a) spring (March-May), (b) summer (June-August) and (c) autumn (September–November) from 2002 to 2006. Grid cell dimensions: 10 × 10 km (Gilles et al. 2009).*

5.5.3 References

Brasseur, S.M.J.M., M. Scheidat, G.M. Aarts, J.S.M. Cremer, O.G. Bos. Distribution of marine mammals in the North Sea for the generic appropriate assessment of future offshore wind farms. IMARES Report C046/08.

Camphuysen K, Peet G (2006) Walvissen en dolfijnen in de Noordzee / Whales and dolphins in the North Sea, Fontaine Uitgevers BV, 's Graveland / Stichting De Noordzee, Utrecht.

Carstensen J, Henriksen OD, Teilmann J (2006) Impacts of offshore wind farm construction on harbour porpoises: acoustic monitoring of echolocation activity using porpoise detectors (T-PODs). Mar Ecol Prog Ser 321:295-308.

Gilles & Siebert, 2008. How to estimate the abundance of marine mammals?

Gilles A, Scheidat M, Siebert U (2009) Seasonal distribution of harbour porpoises and possible interference of offshore wind farms in the German North Sea. Mar Ecol Prog Ser 383:295-307.

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES.

Ministry of Agriculture, Nature and Food Quality (2008) Harbour porpoise profile document (http://www.synbiosys.alterra.nl/natura2000/documenten/profielen/soorten/profiel_soort_H1351.pdf).

OSPAR (2008) Draft Preliminary Comprehensive Overview of the Impacts of Anthropogenic Underwater Sound in the Marine Environment, Module 4: Marine Construction and Industrial Activities. Prepared by the United Kingdom, March 2008.

Reid JB, Evans PGH, Northridge SP (2003) Atlas of Cetacean Distribution in North-west European Waters. Joint Nature Conservation Committee, Peterborough.

Santos MB & GJ Pierce (2003) The diet of Harbour porpoise (*Phocoena phocoena*) in the northeast Atlantic. Oceanography and Marine Biology: an Annual Review 2003, 41, 355–390.

SCANS (2006) The Quarterly newsletter for project SCANS-II: Small Cetaceans in the European Atlantic and North Sea. Issue 9: December 2006. http:/biologyst-andrewsacuk/scans2/

SCANS II (2008) LIFE PROJECT Small Cetaceans in the European Atlantic and North Sea, FINAL REPORT Covering the project activities from 01.04.2004 to 31.12.2006, LIFE Project Number LIFE04NAT/GB/000245. European Commission, Brussels.

Richardson WJ, CI Malme, CR Green Jr. & DH Thomson (1995) Marine mammals and Noise, Academic Press, San Diego, CA, 576 pp.

Scheidat M , Verdaat H. (in prep.) Distribution and density of harbour porpoises in the Dutch EEZ, Wageningen IMARES.

Tougard J, J Carstensen, OH Henriksen, H Skov & J Teilmann (2003) Short-term effects of the construction of wind turbines on harbour porpoises at Horn Reef. Technical report to Techwise A/S. Hedelskabet.

Verwey J (1975) The cetaceans *Phocoena phocoena* and *Tursiops truncatus* in the Marsdiep area (Dutch Wadden Sea) in the years 1931-1973, part 1 and 2. Publications & Reports, Royal Netherlands Institute for Sea Research (NOIZ) 17a: 1-98; 17b: 99-153.

Thompson D, M Sjoberg, EB Bryant, P Lovell & A Bjorge (1998) Behavioural and physiological responses of harbour (*Phoca vitulina*) and grey (*Halichoerus grypus*) seals to sesmic surveys. Abstract from the World Marine Mammal Science Conference, Monaco, 20-24 January 1998.

5.6 Grey seal (*Halichoerus grypus*) H1364

The text below provides supplementary information for the profile document for the grey seal (LNV 2008) and for this reason does not contain a complete description of the grey seal. No improvements to existing texts in the profile document are suggested because this is outside the scope of the instructions of the Ministry of Agriculture, Nature and Food Quality to IMARES. The text in the profile document is included in the Appendices Report to this report and is available at: http://www.synbiosys.alterra.nl/natura2000/documenten/profielen/soorten/profiel_soort_H1364.pdf

In addition, a short overview of existing monitoring is provided and a proposal is made for a text for the conservation objectives for each site.

This species has been included in the registration form for the following areas addressed in this report:

- Cleaver Bank
- Dogger Bank
- Vlakte van de Raan
- (Expansion of) North Sea Coastal Zone.

5.6.1 Supplements to profile document

Supplementary information for section '1. Status' Profile document Grey seal (LNV 2008)
None

Supplementary information for section '2. Characterisation' of the profile document Grey seal (LNV 2008)
None

Supplementary information for section '3. Ecological requirements' of the profile document Grey seal (LNV 2008)
The maximum number of newborn pups in the Wadden Sea is seen at the end of December. Most pups are born on Richel, a relatively high sandbank between Terschelling and Vlieland. During the moult (March/April) maximum numbers are encountered. At that time, more than 90% of all the animals of the western Wadden Sea are found in the Engelschhoek, to the east of Texel and Vlieland, (Brasseur et al. 2008). It is still unclear whether the changes in numbers are a direct result of the local births or of emigration or migration from other areas.

Supplementary information for the subsection ' Habitat'
Disturbing underwater noise levels can arise as a consequence of shipping, beam trawl fishing, seismic research, the construction of offshore structures (windmills, gas platforms), industrial activity and the use of sonar and acoustic equipment intended to chase away marine mammals (such as the instruments known as 'pingers' used in the fishery). A range of effects can arise if the frequencies of the noise overlap with the animal's hearing range, such as – in decreasing intensity - death, injury, a disturbance response, the masking of the animal's own sound, and the awareness of noise (Richardson et al., 1995). Thus it can be seen that disturbance occurs all at levels, not just when a certain noise level is exceeded. Little is known about the effects of underwater noise on seals. Tourgard et al. (2003, in OSPAR 2008) have demonstrated that during pile-driving activities for windmills the number of harbour seals on a sandbank at a distance of 10 km decreased by 10-60%. Little research has been done into the immediate flight behaviour of animals in the water. Thompson et al. (1998) studied the reaction of seals during air-gun explosions

for seismic research and were able to demonstrate that animals moved away from the source of the noise. Once wind farms are in use, their noise nuisance is limited.

Supplementary information for the subsection 'Food':
A recent study (Aarts et al. unpublished) shows that grey seals seem to have a preference for areas of coarse sand. Dietary research based on faeces found on the resting places reveals that this species of seal is able to eat a large number of demersal species. Depth is not a limiting factor because grey seals can dive to depths far deeper than the Dutch North Sea. Compared to the harbour seal, some grey seals make longer trips. It may be that, as for the harbour seal, the moult and reproduction periods are followed by a period of increased foraging (Brasseur et al. 2008). For the grey seal this period falls at the end of spring and start of summer. Individual variation among grey seals is substantial. It is known that they can forage up to hundreds of kilometres off the coast (Brasseur, pers. com).

Supplementary information for section '4. Current occurrence' of the profile document
Migration from UK colonies was probably the initial source of the Dutch population of grey seals. Exchanges between these colonies is evident from satellite transmitter data collected from just a few tagged animals; trips of over 1000 km to UK colonies have been recorded. Migration to the Delta, Denmark and Germany have also been described. It seems that the animals know these colonies and swim right to them. If young seals have to discover these colonies during solitary wanderings and these journeys are disturbed by offshore developments such as the construction of wind farms or other structures, such genetic exchange could be hindered (Brasseur et al. 2008).

Supplementary information for section '5. Assessment of national conservation status' of the profile document

Trends in the Netherlands: not changed

Recent developments
The population has continued to expand since 2004. In contrast to expectations, grey seals numbers have not increased since 2006 (Figure 33). This may be due to an increase in abundance outside the monitoring area, to the east of the Wadden Sea. In 2009 the expansion of the monitored area should reveal whether this is indeed the case.

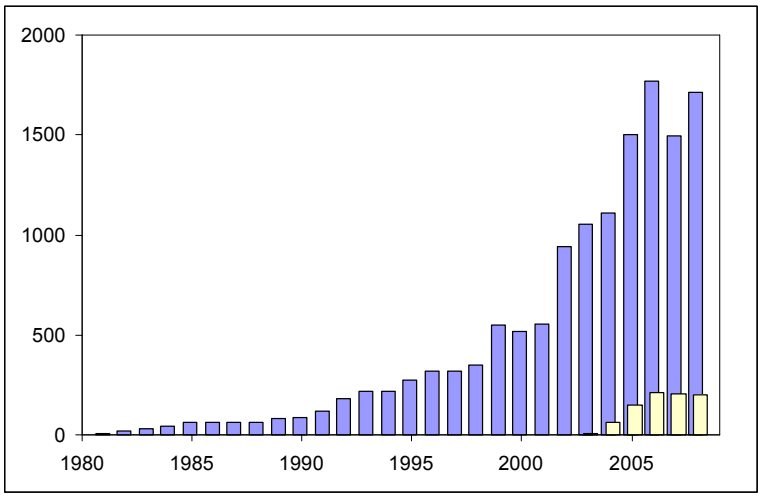

Figure 33 Grey seal numbers counted in Dutch waters; the Wadden Sea (blue) and the Delta area (yellow) source: IMARES/RWS/Province of Zeeland in http://www.milieuennatuur compendium.nl/indicatoren/nl1231. Blue is the Wadden Sea, yellow is the Delta area.

Assessment aspect natural area of distribution: not changed

Assessment aspect population: not changed

Assessment aspect habitat: not changed
The national assessment of the habitat continues to be 'unfavourable–inadequate'. This is because many resting places that are in principle suitable for grey seals on the islands and the mainland are not currently in use due to their being subject to disturbance.

In addition, the possibly harmful effects of underwater noise on the grey seal and its habitat is currently the topic of much discussion. The various suspected causes include the pile-driving of offshore windmill poles. As shown in Table 16, the habitat is considered to be 'favourable' if it is sufficiently large (and stable or increasing) and the quality of the habitat is suitable for the species' continued survival over the long term. The habitat is unfavourable if it is insufficiently large for the species' continued survival over the long term or if the quality is clearly unsuitable for the species' continued survival over the long term. The construction of wind farms and the intensification of other use could cause the habitat of the grey seal to decline in extent in the future. However, this section is concerned with the current status.

Assessment aspect future prospects: not changed
The possibly harmful effects of noise on the grey seal and its habitat is currently the topic of much discussion. The various suspected causes include the pile-driving of windmill poles. As shown in Table 16, the Natura 2000 system applies the term 'unfavourable' to the situation when the threat exerts a strong negative influence on the species or when the species is not viable over the long term. A species has 'favourable' future prospects when the threats are not fundamental and the species is viable over the long term.

While the species could be disturbed by pile-driving activities, these activities are not likely to lead to a strong decline in the species' abundance. For this reason, the future prospects can be considered to be 'favourable' for the time being.

National conservation objective: not changed

Target scenario accompanying the national conservation objective
No changes.

Assessment: 'unfavourable–inadequate': not changed
In the profile document the assessments are compiled up to and including 2007, and in this report a proposal is made for the following supplement for 2009:

Conservation status				
Aspect	**1994**	**2004**	**2007**	**2009**
Distribution	favourable	favourable	favourable	Favourable
Population	unfavourable–inadequate	favourable	favourable	Favourable
Habitat	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate	unfavourable–inadequate
Future prospects	unfavourable–inadequate	favourable	favourable	Favourable
CS assessment	**unfavourable–inadequate**	**unfavourable–inadequate**	**unfavourable–inadequate**	**unfavourable–inadequate**

5.6.2 Proposed conservation objectives per site

The Standard Data Forms have been used to register the grey seal for all new Habitats Directive sites in the EEZ (Bos et al., 2008). This is because the species can be found at all these sites. No data are available to be able to assess whether the Natura 2000 sites in the EEZ outside the coastal zone are of special significance to grey seals compared to the rest of the EEZ (Brasseur et al. 2008). As there is no change in the national conservation status compared to 2008, we propose that the conservation objective in the designation order for the North Sea Coastal Zone also be applied to the future Natura 2000 sites at sea.

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population (see North Sea Coastal Zone designation order and the profile document (LNV 2008).

Explanation: The grey seal can range all over the North Sea. Dogger Bank, Cleaver Bank and the Vlakte van de Raan probably have no special significance for the North Sea population compared to other parts of the EEZ as reproduction sites, foraging sites or otherwise. North Sea Coastal Zone 2 is of great importance as a foraging site.

5.6.3 Monitoring and trends in the North Sea

Table 19 Overview of various monitoring programmes and one-time studies in the EEZ and their coverage of the future Natura 2000 sites. Green/yes = data present and sufficient coverage at level of Natura 2000 sites; orange/yes - data present, insufficient coverage at site level; red/no = data not present.

Type of study	**Implement-ing body**	**Dogger Bank**	**Cleaver Bank**	**Vlakte vd Raan**	**Coastal Zone**	**Frisian Front**
Distribution, numbers and population dynamics of common and grey seals (Wadden Sea)	IMARES	no	no	no	no	no
Distribution, numbers and population dynamics of common and grey seals (Delta)	RWS	no	no	no	no	no
Migration research using satellite and GSM transmitters (Wadden Sea, Delta). Satellite transmitters are used to chart the spatial use of the North Sea by grey and harbour seals in relation to specific intended activities.	IMARES	Yes	Yes	Yes	Yes	yes

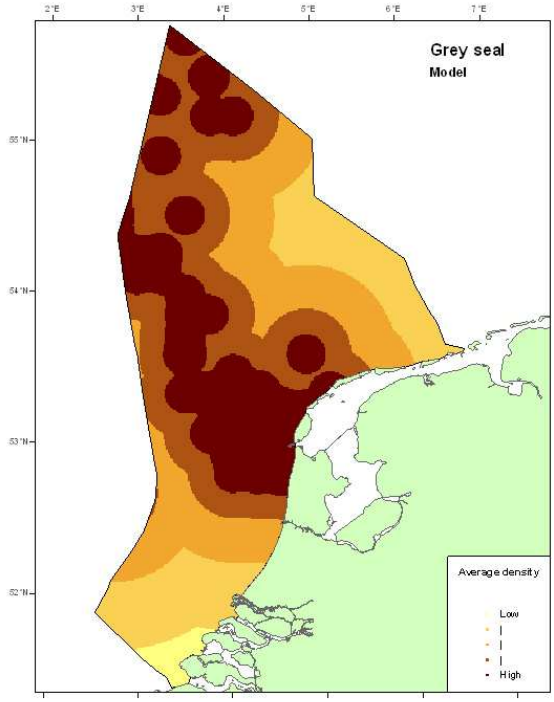

Figure 34. The estimated distribution of grey seals in the Dutch sector of the North Sea with the aid of kernel smoothing (Matthiopoulos 2003). NB: This map is based on telemetric data for a limited number of animals (6) that were tagged in the Texel area. Consequently, a few individuals can obscure the overall picture (Lindeboom et al. 2008). For example, the estimated use to the north-west of the Wadden Sea is determined by just two individuals (from: Brasseur et al. 2008).

5.6.4 References

Bos OG, Dijkman E, Cremer J (2008) Basisgegevens voor EU standaardformulieren t.b.v. de aanmelding van mariene Habitatrichtlijngebieden: Doggersbank, Klaverbank, Noordzeekustzone, Vlakte van de Raan. Report No. C081/08, Wageningen IMARES.

Brasseur SMJM, Scheidat M, Aarts GM, Cremer JSM, Bos OG (2008) Distribution of marine mammals in the North Sea for the generic appropriate assessment of future offshore wind farms. Report No. C046/08, Wageningen IMARES, Den Burg, Texel.

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES.

Ministry of Agriculture, Nature and Food Quality (2008). Grey seal profile document, version 1 September 2008. http://www.synbiosys.alterra.nl/Natura2000/documenten/profielen/soorten/profiel_soort_H1364.pdf

Matthiopoulos J (2003) Model-supervised kernel smoothing for the estimation of spatial usage. Oikos 102:367-377.

Milieu- en NatuurCompendium: Gewone en grijze zeehond in Waddenzee en Deltagebied
http://www.milieuennatuurcompendium.nl/indicatoren/nl1231

Nedwell J, Howell D (2004) A review of offshore windfarm related underwater noise sources. In: Cowrie Report. p 1-57.

OSPAR (2008) Draft Preliminary Comprehensive Overview of the Impacts of Anthropogenic Underwater Sound in the Marine Environment, Module 4: Marine Construction and Industrial Activities. Prepared by the United Kingdom, March 2008.

Richardson WJ, CI Malme, CR Green Jr. & DH Thomson (1995) Marine mammals and Noise, Academic Press, San Diego, CA, 576 pp.

Thompson D, M Sjoberg, EB Bryant, P Lovell & A Bjorge (1998) Behavioural and physiological responses of harbour (Phoca vitulina) and grey (Halichoerus grypus) seals to sesmic surveys. Abstract from the World Marine Mammal Science Conference, Monaco, 20-24 January 1998.

Tougaard J., I Ebbesen, S Tougard, T Jensen & J Teilmann (2003) Satellite tracking of Harbour Seals on Horn Reef. Use of Horn Reef wind farm area and the North Sea. Report request. Commissioned by Tech-wise A/S. Fisheries and Maritime Museum, Esbjerg. 42 p. (cited in OSPAR , 2008).

5.7 Harbour seal (*Phoca vitulina*) H1365

The text below provides supplementary information for the profile document for the harbour seal (LNV 2008) and for this reason does not contain a complete description of the harbour seal. No improvements to existing texts in the profile document are suggested because this is outside the scope of the instructions of the Ministry of Agriculture, Nature and Food Quality to IMARES. The text in the profile document is included in the Appendices Report to this report and is available at: http://www.synbiosys.alterra.nl/natura2000/documenten/profielen/soorten/profiel_soort_H1365.pdf

In addition, a short overview of existing monitoring is provided and a proposal is made for a text for the conservation objectives for each site.

This species has been included in the registration form for the following areas addressed in this report:

- Cleaver Bank
- Dogger Bank
- Vlakte van de Raan
- North Sea Coastal Zone 2.

5.7.1 Supplements to profile document

Supplementary information for section '1. Status' Profile document Harbour seal (LNV 2008)
None

Supplementary information for section '2. Characterisation' of the profile document Harbour seal (LNV 2008)
None

Supplementary information for section '3. Ecological requirements' of the profile document Harbour seal (LNV 2008)

Supplementary information for the subsection 'Habitat':
The offshore areas are significant to harbour seals as a foraging site. In their search for food, the water depth throughout the EEZ is not a limiting factor since harbour seals can dive to depths deeper than 150 m (Frost et al. 2001). It is unknown whether the notified offshore areas are of special significance for foraging compared to the rest of the EEZ.

Recent satellite transmitter data from harbour seals in the Netherlands have shown that animals can migrate over distances of hundreds of kilometres. Seals tagged in Zeeland migrated to the Wadden Sea and back and to the coast of northern France (Reijnders et al. 2000, Brasseur & Reijnders 2001). Seals tagged in the Wadden Sea swam to Germany and Denmark. The more than 100 individuals tagged show strong individual variation in migratory behaviour and range in open sea. Some individuals return repeatedly to the same places in open sea, others do no more than make daytrips, while yet others tend to make trips lasting several days (Brasseur et al. 2007). Anthropological disturbance influences the distribution of seals: in the Delta area seal numbers are low and more seals die than are born. The stabilisation or growth of seal colonies in that area can occur only if there is sufficient exchange with other areas such as the Wadden Sea (Brasseur et al. 2008).

Disturbing noise levels can arise as a consequence of shipping , beam trawl fishing, seismic research, the construction of offshore structures (windmills, gas platforms), industrial activity and the use of sonar and acoustic equipment intended to chase away marine mammals (such as the instruments known as 'pingers' used in the fishery). A range of effects can arise if the frequencies of the noise overlap with the animal's hearing range, such as – in decreasing intensity - death, injury, a disturbance response, the masking of the animal's own sound, and the awareness of noise (Richardson et al., 1995). Little is known about the effects of noise on harbour seals. Tourgard et al. (2003, in OSPAR 2008) have demonstrated that during pile-driving activities for windmills the number of harbour seals on a sandbank at a distance of 10 km decreased by 10-60%. Little research has been done into the immediate flight behaviour of animals in the water. Thompson et al. (1998) studied the reaction of seals during air-gun explosions for seismic research and were able to demonstrate that animals moved away from the source of the noise. Once wind farms are in use, their noise nuisance is limited.

Supplementary information for section '4. Current occurrence' of the profile document Harbour seal (LNV 2008)
None.

Supplementary information for section '5. Assessment of national conservation status' of the profile document Harbour seal (LNV 2008)

Trends in the Netherlands (not changed)

Recent developments
In 2008 the number of harbour seals was estimated at 9000 in the Dutch Wadden Sea and 200 in the Delta area (Trilateral Seal Expert Group 2009; http://www.milieuennatuurcompendium.nl/indicatoren/nl1231).

Assessment aspect natural area of distribution: not changed

Assessment aspect population: not changed

Assessment aspect habitat: not changed

The possibly harmful effects of underwater noise on the harbour seal and its habitat is currently the topic of much discussion. The various suspected causes include the pile-driving of offshore windmill poles. As shown in Table 16, the habitat is considered to be 'favourable' if it is sufficiently large (and stable or increasing) and the quality of the habitat is suitable for the species' continued survival over the long term. The habitat is assessed as unfavourable if it is insufficiently large for the species' continued survival over the long term or if the quality is clearly unsuitable for the species' continued survival over the long term. The construction of wind farms and the intensification of other use could cause the habitat of the harbour seal to decline in extent. However, this section is concerned with the current status. As the seal population is continuing to increase at present, it must be concluded that the habitat is currently sufficiently large and is thus 'favourable' .

Assessment aspect future prospects: not changed
The possibly harmful effects of noise on the harbour seal and its future prospects is currently the topic of much discussion. The various suspected causes include the pile-driving of windmill poles. As shown in Table 16, the Natura 2000 system applies the term 'unfavourable' to the situation when the threat exerts a strong negative influence on the species or when the species is not viable

over the long term. A species has 'favourable' future prospects when the threats are not fundamental and the species is viable over the long term.

While the species could be disturbed by pile-driving activities, these activities are not likely to lead to a strong decline in the species' abundance. For this reason, the future prospects can be considered to be 'favourable' for the time being.

National conservation objective: not changed

Target scenario accompanying the national conservation objective
No changes.

Assessment: 'favourable' (not changed)

Conservation status				
Aspect	**1994**	**2004**	**2007**	**2009**
Distribution	favourable	favourable	favourable	favourable
Population	unfavourable–inadequate	favourable	favourable	favourable
Habitat	favourable	favourable	favourable	favourable
Future prospects	favourable	favourable	favourable	favourable
CS assessment	**unfavourable–inadequate**	**favourable**	**favourable**	**favourable**

5.7.2 Proposed conservation objectives per site

The Standard Data Forms have been used to register the harbour seal for all Habitats Directive sites in the EEZ (Bos et al., 2008). This is because the species occurs within all these sites, although the likelihood decreases as the distance to the coast increases. No data are available to be able to accord the Natura 2000 sites offshore in the EEZ a special significance for the harbour seal compared to the rest of the EEZ (Brasseur et al. 2008).

Little is known about the distribution of seals in open sea. The entire North Sea lies within the habitat range of the seals who forage there. Based on telemetric data it is evident that the presence of the common within the site is limited. The national conservation status is 'favourable'. In spite of this, the national objective has been formulated as an improvement target: 'Maintain distribution, increase extent and improve quality of habitat for the purposes of expanding the population'. The extent to which disturbances within the Natura 2000 sites have a negative influence on occurrence is unclear, but it is in all probability limited. In any case, they are not hindering the observed increase in the population in the Wadden area. Based on the favourable CS and the increase in the population size, it may be decided to opt for a maintenance target. Supplementary sightings using telemetry can provide a better insight into the significance of Natura 2000 sites for harbour seals.

Conservation objective	Maintain the extent and quality of habitat in order to maintain the population.
Explanation	The harbour seal can range all over the North Sea. North Sea Coastal Zone 2 is one of the most important foraging sites of the harbour seal. Dogger Bank, Cleaver Bank, and Vlakte van de Raan probably have no special significance for the North Sea population compared to other parts of the EEZ as reproduction sites, foraging sites or otherwise.

5.7.3 Monitoring and trends in the North Sea

Shown in Table 20 is an overview of the coverage of information about the occurrence of the harbour seal within the Natura 2000 sites in the North Sea. The following figures present an overview of the available data concerning the distribution of the harbour seal in the EEZ.

Table 20 Overview of various monitoring programmes and one-time studies in the EEZ and their coverage of the future Natura 2000 sites. Green/yes = data present and sufficient coverage at level of Natura 2000 sites; orange/yes = data present, but insufficient coverage at site level; red/no = data not present.

Type of study	Implement-ing body	Dogger Bank	Cleaver Bank	Vlakte vd Raan	Coastal Zone	Frisian Front
Distribution, numbers and population dynamics of common and grey seals (Wadden Sea)	IMARES	no	no	no	no	no
Distribution, numbers and population dynamics of common and grey seals (Delta)	RWS	no	no	no	no	no
Migration research using satellite and GSM transmitters (Wadden Sea, Eems area, Delta). Satellite transmitters are used to chart the spatial use of the North Sea by grey and harbour seals in relation to specific intended activities.	IMARES	yes	yes	yes	yes	yes

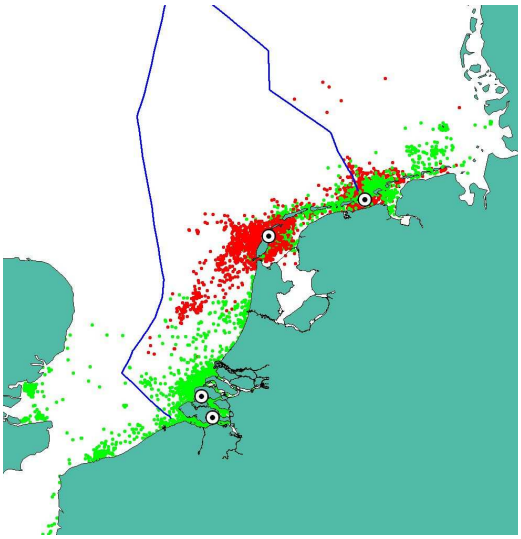

Figure 35 Unfiltered locations of telemetric data concerning the harbour seal in the EEZ collected between 1997 and 2006. It is evident that the sightings depend greatly on the location at which the animals were tagged, the number of tagged animals and the method used. Locations at which transmitters were attached are shown in white, locations of sighted animals tagged in the Delta area in green, locations of animals tagged in the Wadden Sea in red. (Brasseur et al. 2008).

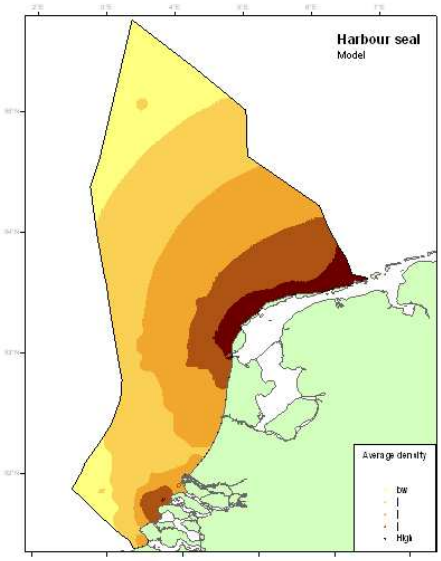

Figure 36 Modelled distribution of the harbour seal, using model-supervised kernel smoothing (Matthiopoulos 2003). For more details, see Brasseur et al. 2008).

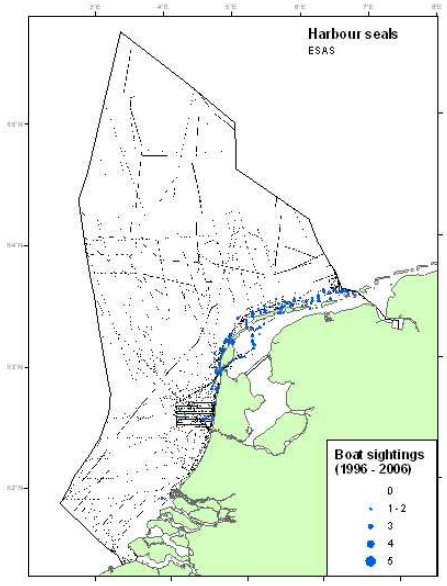

Figure 37 Harbour seal sightings made from ships (European Seabirds at Sea database). The data presented have not been corrected for any variance in the likelihood of a sighting between the surveys caused by, e.g. weather conditions. The effort and the sightings have been combined for a ten-year period. The effort varies between years and between areas. This map shows the information about the presence of harbour seals throughout the year. It cannot be used to derive differences in the distribution of the density (e.g. to determine suitable sites for offshore structures) or to make density estimates of harbour porpoises (Brasseur et al. 2008).

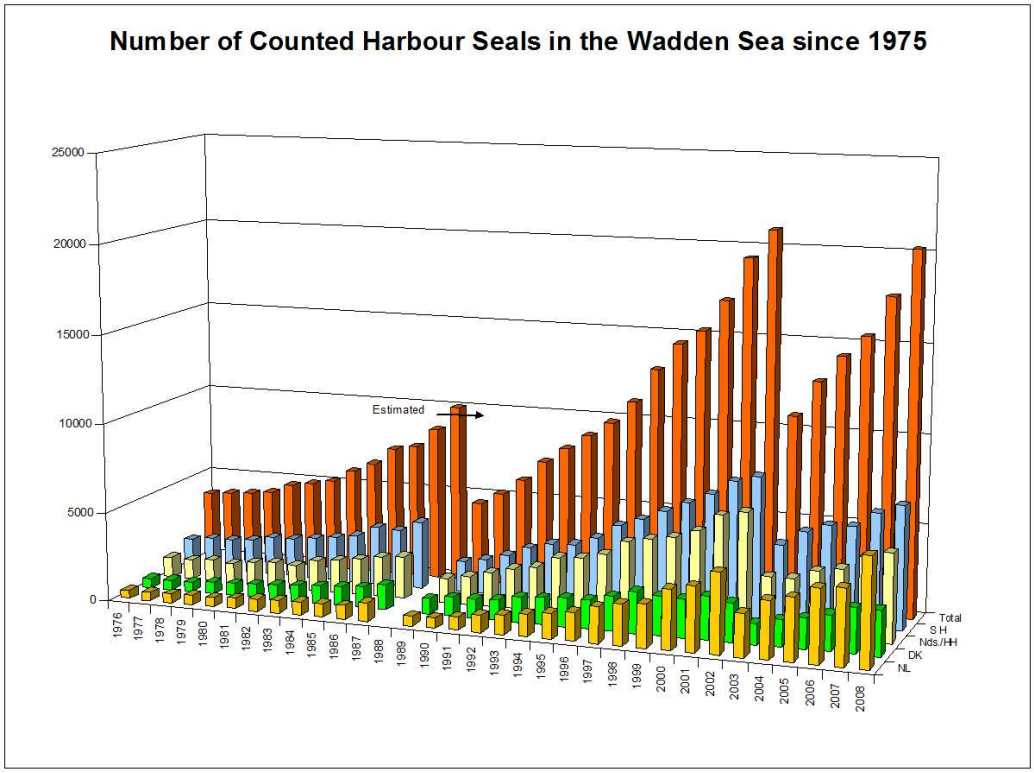

Figure 38 Harbour seal numbers counted in the Wadden Sea since 1975 for the various countries and sub-sectors (Trilateral Seal Expert Group, 2008).

5.7.4 References

Bos OG, Dijkman E, Cremer J (2008) Basisgegevens voor EU standaardformulieren t.b.v. de aanmelding van mariene Habitatrichtlijngebieden: Doggersbank, Klaverbank, Noordzeekustzone, Vlakte van de Raan. Report No. C081/08, Wageningen IMARES.

Brasseur SMM, Reijnders PJH (2001) Zeehonden in de Oosterschelde, fase 2: Effecten van extra doorvaart door de Oliegeul. Report No. 353, Alterra, Wageningen, The Netherlands.

Brasseur SMJM, Tulp I, Reijnders PJH, Smit CJ, Dijkman EM, Cremer JSM, Kotterman MJJ, Meesters HWG (2004) Voedselecologie van de Gewone en Grijze zeehond in de Nederlandse kustwateren. Report No. 905, Alterra, Wageningen.

Brasseur S, Reijnders P, Meesters E (2007) Individual variation in Dutch harbour seals. Presentation at the 17th Biennial Conference 2007 - Cape Town, South Africa - 29 November - 3 December.

Brasseur SMJM, Scheidat M, Aarts GM, Cremer JSM, Bos OG (2008) Distribution of marine mammals in the North Sea for the generic appropriate assessment of future offshore wind farms. Report No. C046/08, Wageningen IMARES, Den Burg, Texel.

Frost KJ, Simpkins MA, Lowry LF (2001) Diving behavior of subadult and adult harbor seals in Prince William Sound, Alaska. Marine Mammal Science 17:813-834.

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES.

Ministry of Agriculture, Nature, and Food Quality (2008). Harbour seal profile document, version 1 September 2008. http://www.synbiosys.alterra.nl/Natura2000/documenten/profielen/soorten/profiel_soort_H1365.pdf

Matthiopoulos J (2003) Model-supervised kernel smoothing for the estimation of spatial usage. Oikos 102:367-377.

Milieu- en NatuurCompendium: Gewone en grijze zeehond in Waddenzee en Deltagebied
http://www.milieuennatuurcompendium.nl/indicatoren/nl1231

Nedwell J, Howell D (2004) A review of offshore windfarm related underwater noise sources. In: Cowrie Report. p 1-57.

OSPAR (2008) Draft Preliminary Comprehensive Overview of the Impacts of Anthropogenic Underwater Sound in the Marine Environment, Module 4: Marine Construction and Industrial Activities. Prepared by the United Kingdom, March 2008.

Reijnders PJH, Brasseur SMJM, Brinkman AG (2000) Habitatgebruik en aantalsontwikkelingen van gewone zeehonden in de Oosterschelde en het overige Deltagebied. Report No. 078, Alterra, Wageningen, The Netherlands.

Richardson WJ, CI Malme, CR Green Jr. & DH Thomson (1995) Marine mammals and Noise, Academic Press, San Diego, CA, 576 pp.

Thompson D, M Sjoberg, EB Bryant, P Lovell & A Bjorge (1998) Behavioural and physiological responses of harbour (Phoca vitulina) and grey (Halichoerus grypus) seals to sesmic surveys. Abstract from the World Marine Mammal Science Conference, Monaco, 20-24 January 1998.

Tougaard J., I Ebbesen, S Tougard, T Jensen & J Teilmann (203) Satellite tracking of Harbour Seals on Horn Reef. Use of Horn Reef wind farm area and the North Sea. Report request. Commissioned by Tech-wise A/S. Fisheries and Maritime Museum, Esbjerg. 42 p. (cited in OSPAR , 2008).

Trilateral Seal Expert Group (2008) Aerial Surveys of Harbour Seals in the Wadden Sea in 2008: Back to Pre-epizootic Level, and Still Growing: Wadden Sea Harbour Seal Population in 2008 CWSS.

6 Preparatory texts for profile documents for seabirds

The text delivered in this chapter can be used by the Ministry of Agriculture, Nature and Food Quality to structure new profiles for a number of seabird species. The texts concern the great skua, the great black-backed gull, and the common guillemot. Also included is supplementary text for the lesser black-backed gull. Thus, in this chapter only new texts or supplements are delivered. No changes to existing texts are proposed since this would be outside the scope of the instructions.

The process of selecting these bird species is described in chapter 3.5 (Frisian Front).

Profile documents are already available for all species occurring in the North Sea Coastal Zone.

Table 21 System for assessing the conservation status of birds. This method matches the assessment of the conservation status of a species described in Annex II of the Habitat Directive as established by the Comité Habitat (from: targets document).

Aspect	Favourable	Unfavourable–inadequate	Unfavourable–bad	Unknown
Distribution	area stable or increasing AND no smaller than the 'favourable reference'	between 'favourable' and 'unfavourable'	area loss exceeds 1% per year OR area more than 10% less than favourable reference'	no or insufficient reliable information
Population	population greater than or equal to the 'favourable reference' AND reproduction, mortality and age structure no worse than normal	between 'favourable' and 'unfavourable'	population decrease exceeds 1% per year AND lower than the favourable reference OR population more than 25% lower than the 'favourable reference' OR reproduction, mortality and age structure much worse than normal	no or insufficient reliable information
Habitat	habitat is sufficiently large (and stable or increasing) AND the quality is suitable for the species' long-term survival	between 'favourable' and 'unfavourable'	habitat is clearly insufficiently large for the species' long-term survival OR the quality is clearly unsuitable for the species' long-term survival	no or insufficient reliable information
Future prospects	the most significant threats are not fundamental; the species will be viable in the future	between 'favourable' and 'unfavourable'	strong negative influence of threats on the species; very poor prospects, long-term viability in jeopardy	no or insufficient reliable information
Total CS assessment	everything 'green' or three 'green' and one unknown	one or more orange, but no red	one or more 'red'	Two or more 'unknown' combined only with 'green'

6.1 Great skua (*Stercorarius skua/Catharacta skua*) A175

6.1.1 Status:

A regularly occurring migratory bird not listed in Annex I but within the meaning of Article 4.2 of the Birds Directive. Relevant for Natura 2000 as a non-breeding bird.

6.1.2 Characterisation

Description:
The great skua is a fast, powerful seabird with a short tail and broad wings. Its plumage is dark brown. It prefers to steal the prey of other seabirds such as gulls, terns and northern gannets. It pursues its victims until they release their prey or regurgitate it. In contrast to the Arctic skua, the great skua often resides in open sea throughout a large part of the year. The great skua uses the Dutch Continental Shelf (EEZ) to forage and migrates in autumn via Dutch coastal waters towards south-west European and north-west African open sea areas (Leopold et al. in prep; Jonsson 1993).

Relative importance within Europe:
The world population of the great skua is estimated at 16,000 breeding pairs (Mitchell et al. 2004), which is consistent with 48,000 birds (BirdLife International 2009). The species occurs only in Europe and has increased greatly in abundance over the past century (BirdLife International 2009). This has been the consequence of its protection against human persecution and the increase in fishery discards.

In the EEZ peak numbers of 1500 (RIKZ) to 2900 (ESAS; Leopold & Camphuysen) birds are counted in August/September, which means that a significant proportion of the world population occurs in the EEZ. In August/September 5.5% of the biographical population occurs in the EEZ. In the Frisian Front it appears that a concentration of 350 birds can occur in August/September, which means that this area is of international importance to this reasonably rare species. The species breeds in northern Europe and overwinters in open sea in south-west Europe and north-west Africa (refs. in Leopold et al. in prep, Camphuysen & Leopold 1994, BirdLife International 2009).

According to BirdLife International (2009) the species is growing in abundance and the conservation status is 'favourable' ('least concern' , IUCN Red List category).

6.1.3 Ecological requirements

Habitat:
The great skua is a bird of the open sea. It forages in open sea and in coastal waters (Leopold et al. in prep). Its breeding grounds are outside the Netherlands in northern Europe (BirdLife International 2009).

Food:
The great skua eats mainly fish that it robs from gulls, terns and even northern gannets. In addition, it catches fish, eats eggs, amphibians, other birds and rodents (Jonsson 1993, Votier 2004, Jones et al. 2008). It benefits indirectly from fishery, by robbing gulls and other birds of discards and waste and by eating other birds. When discards become less available, the great skua's predation on other seabirds increases. A reduction in the sandeel stock due to fishery has the same effect (Votier 2004).

Refuge:
Oil pollution near its breeding colonies can pose a problem for great skuas. In addition, the great skua suffers indirectly from fishery-reduction measures: when fishery activity reduces and the sandeel stock declines due to fishery, there is less food available (fish waste, discards) and the population of seabirds from which the great skua, as a kleptoparasite, scavenges declines. The great skua can switch to eating other seabirds and their chicks (Votier et al. 2004).

6.1.4 Current occurrence

The great skua occurs everywhere on the Dutch Continental Shelf (EEZ) and in autumn in an elevated concentration along the coast.

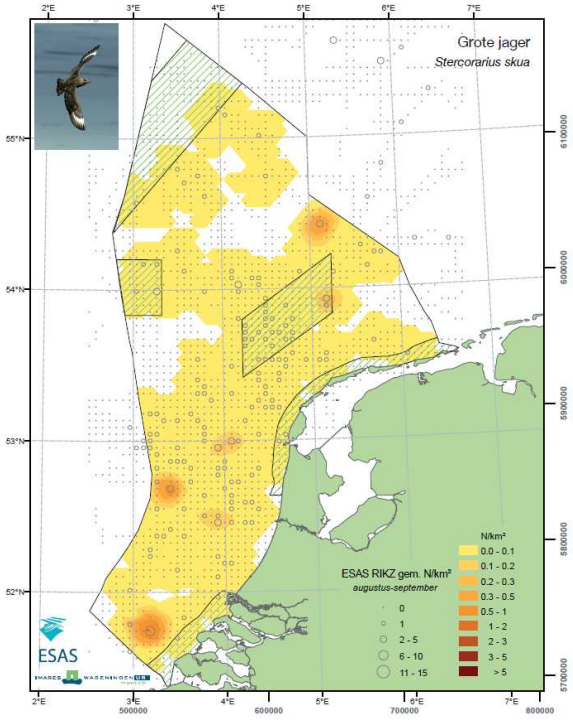

Figure 39 Distribution map for the great skua in August/September (Lindeboom et al. 2008).

6.1.5 Assessment of national conservation status

Trends in the Netherlands:
No trends for the Netherlands have been published because the species occurs in too small a number and there are few sightings.

Recent developments:
At a European level, the overall number of the species increased in the period 1970-1990, as it did in most places in the period 1990-2000. More recent figures are not known for Iceland (BirdLife International 2009; data 2004).

Assessment aspect natural area of distribution: 'favourable'
The great skua occurs commonly in the skies of the Dutch sector of the North Sea. For this reason, the area of distribution of the great skua is assessed as 'favourable'.

Assessment aspect population: 'favourable'
At a European level, the overall number of the species increased in the period 1970-1990, as it did in most places in the period 1990-2000. More recent figures are not known for Iceland. The population size is regarded, therefore, as being 'secure' (BirdLife International 2009).

Assessment aspect habitat: 'favourable'
In the Netherlands the great skua spends its time at sea, where its habitat is sufficiently large given that it is the entire EEZ.

Assessment aspect future prospects: 'favourable'
Should discards become less available as fisheries activity declines, and particularly if combined with a reduction in the sandeel stock due to fishery, the great skua will switch to other sources of food, thereby increasing the predation on other seabirds (Votier 2004).

National conservation objective: To maintain the extent and quality of habitat with the capacity to carry a population averaging 1527 birds (rounded off to 1500 birds) (Lindeboom et al. 2008, period August-September, 1987-2002).

The rounded-off number of 1500 birds is based on the maps in the Ecological Atlas of the North Sea (Lindeboom et al. 2008) and has been reached using averages of ESAS (ship) counts in the period 1987-2002 and RIKZ (aerial) counts in 1991-2002 in August/September. The numbers stated below are the numbers within the boundaries of the Frisian Front on the map in the Atlas. A detailed description of the calculation of the figures is given in the Atlas (Lindeboom et al. 2008).

Target scenario accompanying the national conservation objective:
For this species, it is sufficient to maintain the current situation. In the pursuit of a more natural situation in the North Sea, measures may well be taken to reduce fisheries activity. This may cause bird species that benefit directly or indirectly from fishery by eating fish waste and discards to decline in numbers over time. Any decline in bird populations as a result of fishery-reduction measures is a natural process and fits within the target scenario.

Assessment:
'favourable'

Conservation status	
Aspect	**2009**
Distribution	Favourable
Population	Favourable
Habitat	Favourable
Future prospects	Favourable
CS assessment	**Favourable**

6.1.6 Sources

BirdLife International (2009) Species factsheet: *Catharacta skua* and additional data; Downloaded from http://www.birdlife.org on 8/4/2009.

Jones T, Smith C, Williams E, Ramsay A (2008) Breeding performance and diet of Great Skuas *Stercorarius skua* and Parasitic Jaegers (Arctic Skuas) *S. parasiticus* on the west coast of Scotland. Bird Study 55:257-266.

Jonsson L (1993) Vogels van Europa, Noord-Afrika en het Midden-Oosten. Tirion, Baarn.

Leopold MF, Dijkman EM, Gonzales G, Berrevoets C (in prep.) Marine Protected Areas in the Dutch sector of the North Sea: a bird's eye view.

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES.

Votier SC, Furness RW, Bearhop S, Crane JE, Caldow RWG, Catry P, Ensor K, Hamer KC, Hudson AV, Kalmbach E, Klomp NI, Pfeiffer S, Phillips RA, Prieto I, Thompson DR (2004) Changes in fisheries discard rates and seabird communities. Nature 427:727-730.

6.2 Great black-backed gull (*Larus marinus*) A187

6.2.1 Status:

A regularly occurring migratory bird not listed in Annex I but within the meaning of Article 4.2 of the Birds Directive. Relevant for Natura 2000 as a non-breeding bird.

6.2.2 Characterisation

Description: The great black-backed gull is the largest gull in northern Europe. The species is considerably larger than the lesser black-backed gull. Adult animals are white with a black back, have a large yellow beak with a red dot and grey-pink legs. Great black-backed gulls can live to be over 25-years-old and occur both close to land and far out in open sea (Jonsson 1993, Mendel 2008).

Relative importance within Europe:
The European breeding population is estimated at 110,000-180,000 pairs of 330,000-540,000 individuals (this is the biographical population) (Wetlands International 2006). The Dutch Continental Shelf (or EEZ) in winter hosts 7.7% of the biographical population (refs in Leopold et al. In prep).
The European breeding population was stable between 1970 and 1990. The populations of Iceland and Ireland declined between 1990 and 2000 but the populations in the rest of Europe were either stable or increasing in this period, in particular in Norway (Mendel et al. 2008).

According to Birdlife (2008) worldwide trends are not clear but the conservation status seems to be 'favourable' ('least concern', IUCN Red List category).

6.2.3 Ecological requirements

Habitat:
The great black-backed gull breeds on islands, rocky coasts, in dunes and on heathlands. The bird forages mainly in open sea, but also on rubbish dumps and in harbours. Outside the breeding season great black-backed gulls are seen on beaches (BirdLife International 2009).

Food:
The great black-backed gull is an opportunistic feeder and has a varied diet. It is able to forage at the water's surface, dive from a metre high, rob other birds, eat fish waste and discards in the wake of fishing vessels and drop shellfish on the ground to break them open. It also eats rubbish (refs in Arts & Berrevoets 2006; refs in Mendel et al. 2008).

Refuge:
Most human activities and threats at sea are of no consequence to great black-backed gulls. However, although they can fly well, in conditions of poor visibility they can fly into structures such as windmills. They may also become entangled in floating nets because they are attracted to the caught fish. These birds are also vulnerable to oil discharges because they often swim at sea. Since they do not often gather in large groups, except behind fishing boots, there is little risk of large numbers dying simultaneously due to oil pollution. By contrast, they can swallow oil when it has been ingested by their prey. Great black-backed gulls may suffer a food shortage due to the reduction in fishery activities and the amount of discard (Mendel et al. 2008).

6.2.4 Current occurrence

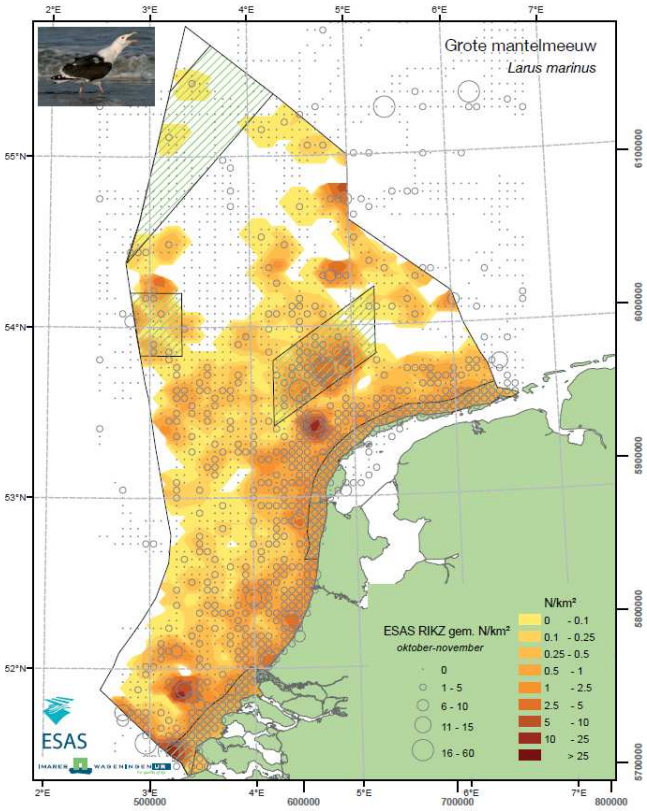

Figure 40 Distribution map for the great black-backed gull (Lindeboom et al. 2008).

6.2.5 Assessment of national conservation status

Trends in the Netherlands:

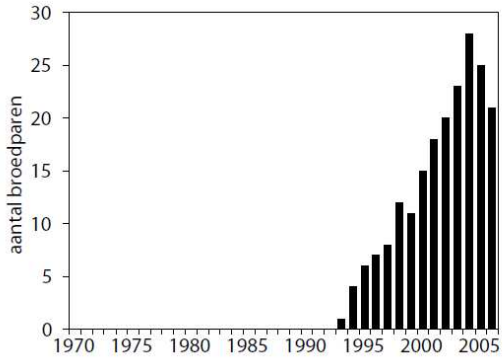

Figure 41 Great black-backed gull. Trend in the breeding population (number of breeding pairs) since 1970 (Van Dijk et al. 2008). Note that the number of breeding pairs is low.

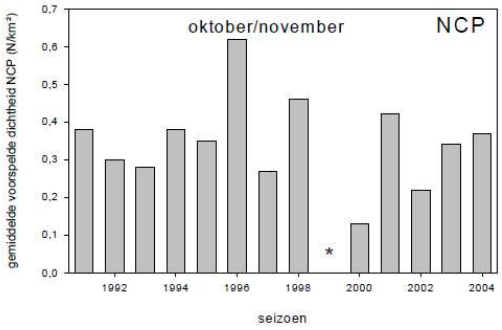

*Figure 42 Great black-backed gull at sea. Average density in October/November in the EEZ (number per km². *= no count (Arts & Berrevoets 2006).*

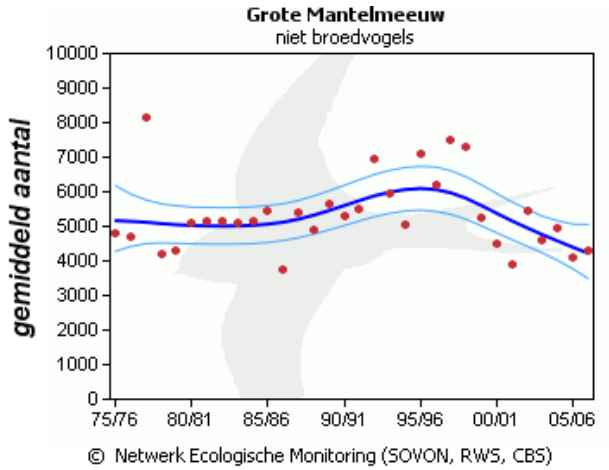

Figure 43 Trend in great black-backed gulls sighted from the coast (source: SOVON).

Recent developments:
While the various populations in Europe show various trends, in general the European population is not declining (BirdLife International 2009). In the years 1991-2004, the densities in the EEZ fluctuated and there was no trend in the predicted densities for October/November. Following a number of years' growth, the small breeding population in the Netherlands is once more in decline (Van Dijk et al. 2008).

Assessment aspect natural area of distribution: 'favourable'
The natural area of distribution extends over a broad strip of approx. 100 km along the Dutch coast, an area that will not change in size.

Assessment aspect population: 'favourable'
In some places the European population is expanding, in others it is declining. The Dutch breeding population, consisting of roughly 100 birds, is contributing minimally towards the numbers encountered in the EEZ. Sightings from the coast show no significant change in abundance since

1980, while in the period 1997-2007 a significant decline was evident of less than 5% per year (SOVON).

Assessment aspect habitat: 'favourable'
The great black-backed gull occurs in the EEZ mainly in winter. The habitat is not expanding or decreasing in size.

Assessment aspect future prospects: 'favourable'
The European population fluctuates. Similarly, the numbers present in the EEZ show a fluctuation without any trend in October/November, period 1991-2004 (Arts & Berrevoets 2006).

National conservation objective:
To maintain the extent and quality of habitat with the capacity to carry a population averaging 17.793 birds in winter (rounded off to 18,000 birds) (assuming a surface area of the EEZ of 59,310 km^2 and average density in the EEZ of 0.3 birds per km^2 in October-November, years 1991-2004, data: Arts & Berrevoets 2006).

Target scenario accompanying the national conservation objective:
For this species, it is sufficient to maintain the current situation. In the pursuit of a more natural situation in the North Sea, measures may well be taken to reduce fisheries activity. This may cause bird species that benefit from fishery by eating fish waste and discards to decline in numbers over time. Any decline in bird populations as a result of fishery-reduction measures is a natural process and fits within the target scenario.

Assessment:
'favourable'

Conservation status	
Aspect	**2009**
Distribution	Favourable
Population	Favourable
Habitat	Favourable
Future prospects	Favourable
CS assessment	**Favourable**

6.2.6 Sources

Arts FA, Berrevoets CM (2006) Monitoring van zeevogels en zeezoogdieren op het Nederlands Continentaal Plat 1991 – 2006. Verspreiding, seizoenspatroon en trend van vijf minder algemene soorten zeevogels. Report No. RIKZ/2006.018.

Leopold MF, Dijkman EM, Gonzales G, Berrevoets C (in prep.) Marine Protected Areas in the Dutch sector of the North Sea: a bird's eye view.

BirdLife International (2009) Species factsheet: *Larus marinus*. Downloaded from http://www.birdlife.org on 15/4/2009.

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES.

Jonsson L (1993) Vogels van Europa, Noord-Afrika en het Midden-Oosten. Tirion, Baarn.

Mendel B, Sonntag N, Wahl J, Schwemmer P, Dries H, Guse N, Müller S, Garthe S (2008) Profiles of seabirds and waterbirds of the German North and Baltic Seas: distribution, ecology and sensitivities to human activities within the marine environment. Bundesamt für Naturschutz, Münster.

SOVON http://www.sovon.nl/soorten.asp?euring=6000&lang=nl

Van Dijk A, Boele A, Hustings F, Koffijberg K, Plate C (2008) Broedvogels in Nederland in 2008. Report No. 2008/01, SOVON.

Wetlands International (2006) Waterbird Population Estimates - Fourth Edition, Wageningen, The Netherlands.

6.3 Common guillemot (*Uria aalge*) A199

6.3.1 Status:

A regularly occurring migratory bird not listed in Annex I but within the meaning of Article 4.2 of the Birds Directive. Relevant for Natura 2000 as a non-breeding bird.

6.3.2 Characterisation

Description:
The common guillemot is a seabird with a white stomach and a black back and head. With these markings, it strongly resembles the razorbill, but its more slender and pointed beak sets it apart. Like penguins, common guillemots hunt under water for food, at depths averaging between 20 and 50 metres, using their wings to generate propulsion. Common guillemots eat mainly fish, in addition to squid and worms. They breed in colonies on cliffs.
The common guillemot is the most abundant overwintering bird on the Dutch Continental Shelf (or EEZ). They occur throughout the North Sea, but the densities in a narrow strip along the Dutch coast are lower. The Netherlands is not within the breeding area, which is located mainly in the north of the North Sea.
After the breeding season, common guillemot males swim with their young, mostly from the Scottish breeding colonies, to remote places such as the Frisian Front to forage. The young cannot yet fly at this stage and the adults use this time to moult.
The relationship and similarity with the razorbill hamper counts of this species, at least any aerial counts. The common guillemot is present on the Dutch Continental Shelf (or EEZ) all year round (Leopold et al. In prep, refs. in Mendel et al. 2008).

Relative importance within Europe:
The world population of the common guillemot is estimated at 18 million individuals (del Hoyo et al. 1996) or 7.3 million breeding pairs (Mitchell et al. 2004). Two subspecies occur in the Pacific Ocean, and three in the Atlantic Ocean. In Europe *Uria aalge aalge* and *U. a. albionis* occur.
The North Atlantic population is estimated at 2.8 to 2.9 million pairs or 5.6 to 5.8 million individuals (Mitchel et al. 2004). This is also the estimate of the biographical population (Mitchell et al. 2004). The largest numbers within the European Union breed in Great Britain and Ireland. The British population has more than doubled since 1969/1970. In addition, the species breeds in the north-eastern Atlantic area on the Faroe Islands, Iceland and Norway. The common guillemot is only ever found on land during the breeding season, at all other times specimens are dispersed and the species truly a seabird.
Maximum densities in the EEZ are observed in the winter months. The highest density in December/January in the period 2002-2007 was 10.3 per km^2 in 2004/2005, the lowest in 2003/2004 (2.5 per km^2). In these figures no distinction is made between the common guillemot and the must less abundant razorbill (Arts 2008).
The number of common guillemot in the EEZ in December/January averages around 300,000 individuals (2001-2007; Arts 2008), a small proportion of which are razorbills since these cannot be distinguished from common guillemots in aerial counts.
Approx 5% of the North Atlantic population occurs in the EEZ (Arts 2008) and maximum 1.7% of the biographical population (Leopold et al. In prep).
According to BirdLife International (2008) the conservation status is 'favourable' (least concern).

6.3.3 Ecological requirements

Habitat:

The common guillemot breeds on steep, almost inaccessible cliffs with narrow ridges or on small isolated flat islands that have no predators. Colonies of the subspecies *U.a. aalge* are located in Scotland, Island, Norway as well as on the coast of the Baltic Sea. The subspecies *U.a. albionis* breeds in south-west Scotland, Ireland, England and on Helgoland. The male common guillemots take their young with them to quiet places to forage, such as the Frisian Front, where a number of them stays with their young into August. The rest of the year they reside on open sea and in coastal waters (refs in Mendel et al. 2008).

Food:
The common guillemot eats mainly fish, which are caught by diving. Important prey fish species are sandeel and Clupeidae in summer and the gobies, pipefish and Gadidae in winter. Prey for the chicks consists mainly of sandeel and Clupeidae (refs. in Mendel et al. 2008).

Refuge:
As common guillemots swim a great deal and often gather in large groups, they are highly vulnerable to oil pollution. They may also be indirectly affected when their prey animals ingest oil. In addition, common guillemots are disturbed by shipping movements. They often react to approaching ships by diving or on occasion by flying away. They also show other signs of stress. In all, this indicates that ships disturb the natural behaviour of common guillemots. The consequence of this disturbance is that the time the birds need to eat and rest is reduced, which can cause the birds' condition to deteriorate. (refs in Mendel et al. 2008).

6.3.4 Current occurrence

The common guillemot occurs throughout the entire Dutch Continental Shelf (EEZ), especially in autumn and winter.

The common guillemot is present in large numbers in the North Sea mainly in winter. In late winter (February-March) small numbers remain in the northern half of the EEZ while large numbers occur in the southern half, with high densities extending into Belgian waters. The majority of common guillemots who overwinter in the southern North Sea come from the Scottish colonies; others come from neighbouring countries (Leopold et al. In prep).
The common guillemot breeds in spring on the rocky coasts of the northern North Sea, especially the coasts of Scotland (Offringa et al. 1996, Jonsson 1993, Arts 2008, refs in Mendel et al. 2008).

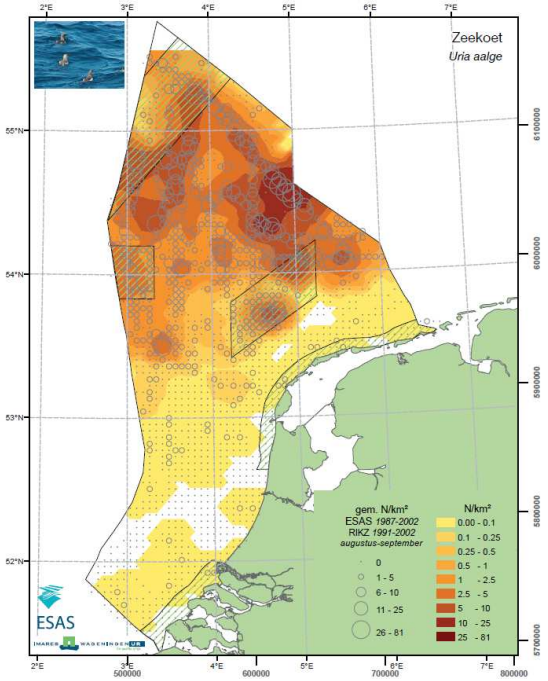

Figure 44 Distribution map for the common guillemot in August/September (Lindeboom et al. 2008).

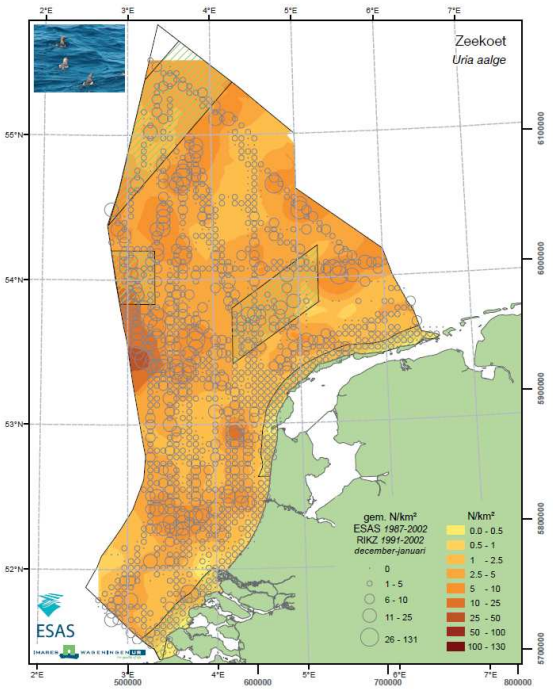

Figure 45 Distribution map for the common guillemot in December/January (Lindeboom et al. 2008).

6.3.5 Assessment of national conservation status

Trends in the Netherlands:

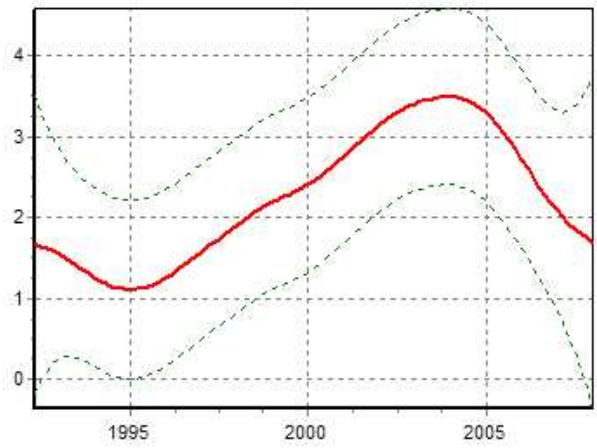

Figure 46 Trend in the seasonal average and 95% reliability interval for the common guillemot/razorbill in the EEZ during the seasons 1991 – 2007. A season runs from August up to end July of the following year and has six bimonthly counts. Shown here are average numbers per km² (Arts 2008).

Recent developments:
In the period 1995-2004 the trend was positive. This positive trend can be explained by an earlier arrival in autumn and a longer sojourn in winter. Thereafter the trend reversed and became negative (Arts 2008).

Verwijderd:

Assessment aspect natural area of distribution: 'favourable'
The area of distribution of the common guillemot in the Netherlands is the entire EEZ. The area of distribution is sufficiently large.

Assessment aspect population: 'favourable'
While it is true that the population is declining, the decline is not yet more than the increase since 1995.

Assessment aspect habitat: 'favourable'
The habitat is sufficiently large for the species maintain its numbers.

Assessment aspect future prospects: 'favourable'
While oil pollution in the North Sea has decreased, it must be noted that even a single oil discharge in the future can have dramatic consequences, including the death of many birds. This is a potential problem mainly in summer when common guillemots are in moult. During this period they cannot fly and thus cannot flee. Furthermore, since the species often occurs in large groups, many individuals may die in the same event.
In spite of this, the future prospects look no worse than the current situation and the species will be viable in the future. Based on this, the assessment is 'favourable'.

National conservation objective:

To maintain the extent and quality of habitat with the capacity to carry a population averaging 332,136 birds (rounded off to 330,000 birds) (razorbill + common guillemot) in the EEZ in winter (assuming a surface area of the EEZ of 59,310 km^2 and an average density in the EEZ van 5.6 birds per km^2 in December-January, years 2002-2007, data: Arts 2008).

Target scenario accompanying the national conservation objective:
For this species, it is sufficient to maintain the current situation. The protection of the rearing grounds for young common guillemots, such as the Frisian Front, will help maintain the population. In particular, this concerns the summer period (July-August), when the birds moult and forage. During this period they cannot fly and are highly vulnerable to oil slicks.

Assessment:
'favourable'

Conservation status	
Aspect	**2009**
Distribution	Favourable
Population	Favourable
Habitat	Favourable
Future prospects	Favourable
CS assessment	**Favourable**

6.3.6 Sources

Arts FA (2008) Trends en verspreiding van zeevogels en zeezoogdieren op het Nederlands Continentaal Plat 1991 – 2007. Report No. 2008.058, RWS Water Service.

BirdLife International (2008) Species factsheet: *Uria aalge*. Downloaded from http://www.birdlife.org on 9/4/2009.

del Hoyo J, Elliott A, Sargatal J (1996) Handbook of the birds of the world, Vol 3: Hoatzin to Auks. Lynx Edicions, Barcelona, Spain.

Leopold MF, Dijkman EM, Gonzales G, Berrevoets C (in prep.) Marine Protected Areas in the Dutch sector of the North Sea: a bird's eye view.

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES.

Mendel B, Sonntag N, Wahl J, Schwemmer P, Dries H, Guse N, Müller S, Garthe S (2008) Profiles of seabirds and waterbirds of the German North and Baltic Seas: distribution, ecology and sensitivities to human activities within the marine environment. Bundesamt für Naturschutz, Münster.

Mitchell PI, Newton SF, Ratcliffe N, Dunn TE (2004) Seabird populations of Britain and Ireland. Christopher Helm, London.

Offringa H, Seys J, Van den Bossche W, Meire P (1996) Seabirds on the Channel doormat. Le Gerfaut 86:3-71.

6.4 Lesser black-backed gull (*Larus fuscus intermedius*) A183

The text below provides supplementary information for the profile document for the lesser black-backed gull (LNV 2008) and for this reason does not contain a complete description of the species. No improvements to existing texts in the profile document are suggested because this is outside the scope of the instructions of the Ministry of Agriculture, Nature and Food Quality to IMARES. The text in the profile document is included in the Appendices Report to this report and is available at:
http://www.synbiosys.alterra.nl/natura2000/documenten/profielen/vogels/profiel_vogel_A183.pdf

In addition, a short overview of existing monitoring is provided and a proposal is made for a text for the conservation objectives for each site.

6.4.1 Supplements to profile document

Title:
According to Wetlands International (2006), the scientific name of the species found in the Netherlands is no longer *Larus fuscus graellsii* but *Larus fuscus intermedius*.

Supplementary information for section '1. Status' Profile document (LNV 2008)
A regularly occurring migratory bird not listed in Annex I but within the meaning of Article 4.2 of the Birds Directive. Also relevant to for Natura 2000 as a non-breeding bird.

Supplementary information for section '2. Characterisation' of the profile document (LNV 2008)
None

Supplementary information for section '3. Ecological requirements' of the profile document

Supplementary information for section '4. Current occurrence' of the profile document

The lesser black-backed gull's range in the North Sea extends to several dozen kilometres from the coast.

Supplementary information for section '5. Assessment of national conservation status' of the profile document
Trends in the Netherlands (not changed)

Recent developments
The breeding bird population has stabilised/is declining (Wetlands International 2006) and at sea too numbers are declining (Arts 2006).

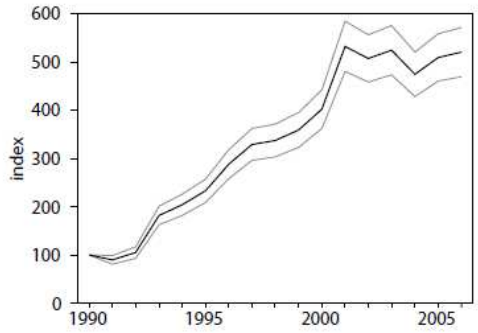

Figure 47 Trends in numbers of breeding pairs of the lesser black-backed gull in the Netherlands, SOVON (Van Dijk et al. 2008).

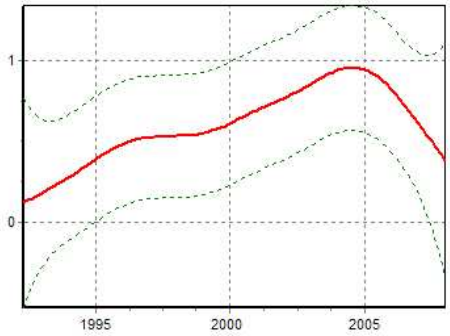

Figure 48 Trend in the population of the lesser black-backed gull in the EEZ (Arts 2008).

Assessment aspect natural area of distribution: not changed

Assessment aspect population: not changed

While it is true that a negative trend is evident in the breeding population, the breeding population is still larger than or equal to the favourable reference as described in the profile as: 'maintain breeding population of at least 43,000 breeding pairs'.

Assessment aspect habitat: not changed

Assessment aspect future prospects: not changed

National conservation objective: not changed

Target scenario accompanying the national conservation objective
No changes.

Assessment: not changed

In the profile document the assessments are compiled up to and including 2004, and in this report a proposal is made for the following supplement:

Conservation status			
Aspect	**1994**	**2004**	**2009**
Distribution	favourable	favourable	favourable
Population	favourable	favourable	favourable
Habitat	favourable	favourable	favourable
Future prospects	favourable	favourable	favourable
CS assessment	**favourable**	**favourable**	**favourable**

Proposed conservation objectives per site

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population (see the North Sea Coastal Zone designation order and the profile document (LNV 2008).

Explanation: The lesser black-backed gull can range all over the North Sea. The Frisian Front is a foraging site for the breeding populations along the coast.

6.4.2 Monitoring and trends in the North Sea

Information about the distribution of the lesser black-backed gull in the EEZ is presented in *Figure 49*, Figure 50 and *Figure 51*.

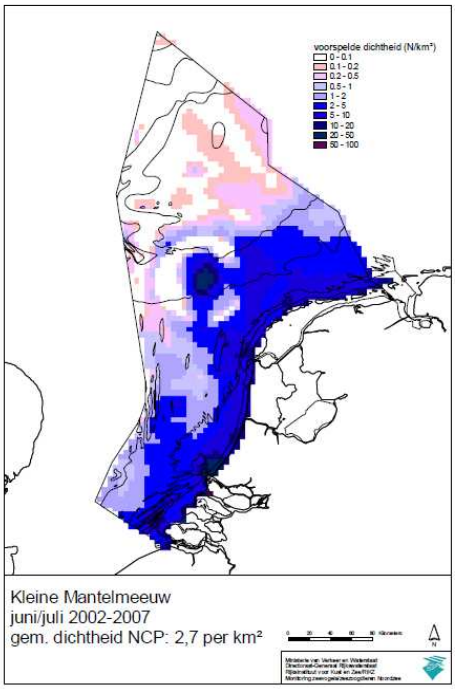

Figure 49 Distribution of the lesser black-backed gull in the EEZ (Arts 2008).

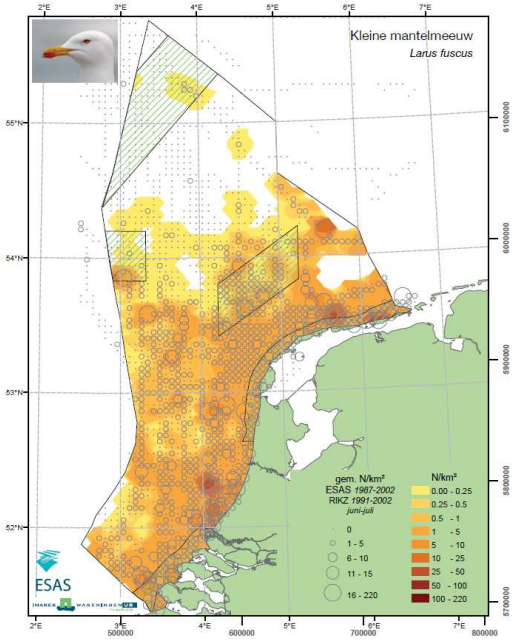

Figure 50 Distribution of the lesser black-backed gull in the EEZ according to the Ecological Atlas of the North Sea (Lindeboom 2008).

Figure 51 Lesser black-backed gull with satellite transmitter: current research by SOVON (www.sovon.nl\default.asp?id=408).

6.4.3 References

Van Dijk A, Boele A, Hustings F, Koffijberg K, Plate C (2008) Broedvogels in Nederland in 2008. Report No. 2008/01, SOVON.

Wetlands International (2006) Waterbird Population Estimates - Fourth Edition, Wageningen, The Netherlands.

7 Proposed conservation objectives

The guiding principles for the proposals made in this chapter are included in section 2.7.

7.1 Cleaver Bank

The following site description has been compiled following the example of others in existing designation orders. In compiling the conservation objectives use has been made of the building blocks for the profile for habitat type H1170 and the background information on habitat species as described in the preceding chapters. The methodology for compiling the proposals for conservation objectives is described in section 2.7.

7.1.1 Site description and boundary

Site description

Cleaver Bank is the only site in the EEZ where significant quantities of gravel lie on the surface and larger cobbles with a specific covering of calcareous red algae (among other species) also occur. It is the site with the greatest diversity of bottom-dwellers in the EEZ. Cleaver Bank is split in two from north-west to south-east by a 60-metre deep channel called the Botney Cut. Large gravel and cobble concentrations also occur on the UK Continental Shelf; these have a surface area many times that of the Cleaver Bank. The area came into being as the terminal moraine of a glacier dating from the last Ice Age (Weichselian).

Landscape context and boundary features

Cleaver Bank is part of the Natura 2000 landscape 'North Sea, Wadden Sea and Delta '. The area with cobbles and coarse gravel (> 6 cm), with specific covering, qualifies as 'reef' (habitat type H1170) under the Habitat Directive. The gravel area and the adjacent channel of the Botney Cut both have an elevated benthos diversity (Lindeboom et al. 2005).

Boundary and surface area

The boundary of the Natura 2000 site is shown on the map accompanying the site notification. The site is bounded by straight lines. The Natura 2000 site has a surface area of 123,764 ha and is exclusively a Habitats Directive site.

7.1.2 Conservation objectives

General objectives

The maintenance and if applicable restoration of:

1. the contribution of the Natura 2000 site to the ecological coherence of Natura 2000 within both the Netherlands and the European Union;
2. the contribution of the Natura 2000 site to the biological diversity and to the favourable conservation status of natural habitat types and species within the European Union and as included in Annex I or Annex II of the Habitat Directive. This includes the site's necessary contribution to the pursuit of a favourable conservation status at national level for the habitat types and the species for which the site has been designated;

3. the natural features of the Natura 2000 site, including the coherence of the structure and functions of the habitat types and of the species for which the site has been designated;
4. the ecological requirements of the habitat types and species for which the site has been designated as they apply to the site.

Habitat Directive: habitat types

H1170 Open-sea reefs

Considerations (see diagram in chapter 2.7):

(2a) Insufficient historical data are available to establish a favourable reference situation based on typical species.

(2b) Supplementary information about the Georges Bank, among other topics, indicates that sessile organisms are able to cement loose bottom elements, which can give rise to three-dimensional structures that make the bottom less sensitive to disturbance and on which sessile biotic communities can subsequently come into being (see section 3.1).

(2c) The tracks of fishery activity found repeatedly indicate that the hard substrate, including its biotic communities, is exposed to a stronger than natural dynamic. Consequently, the characteristic long-lived sessile biotic communities are unable to develop since the position of cobbles to which they attached keeps changing.

(3) Based on the points under (2), the site's CS is assessed as 'unfavourable–inadequate' (see section 3.1). For this reason, a restoration target is proposed for this habitat type.

(4a) As the national objective, an improvement in the aspect of quality is proposed (see section 3.1).

(4b) There are no adjacent sites to be taken into consideration.

Conservation objective: Maintain the surface area and improve quality of reefs.

Explanation: Good quality is characterised by the presence of sessile biotic communities of long-lived species. These communities are attached to the hard substrate. An improvement of the quality can be achieved if the disturbance of hard compact substrates and their biotic communities is prevented, i.e. firmly touched or their position changed.

Habitat Directive: species

Harbour porpoise

Considerations (see diagram in chapter 2.7):

(2a) There is no historical data at site level with which to build a favourable reference situation. The extent is unclear to which the Cleaver Bank is of special significance to the normal reproduction, mortality and age structure (in accordance with the assessment system devised by the Comité Habitat) of the harbour porpoise and the extent to which the site is of special significance to the North Sea population (e.g. as foraging site or reproduction site).

(2b) At EEZ level, limited information is available; it is not known whether there are any areas of special significance to harbour porpoises. However, counts have recently been made that indicate a larger number of harbour porpoises present than the favourable reference (see section 5.5).

(2c) The effects of disturbances are probably limited within the Cleaver Bank site but little is known about them.
(3) Based on the points under 2 the CS of the harbour porpoise within the site is assessed as 'unknown'. A maintenance target is advised.
(4a) In this report a proposal is made for amendments to the profile document, which is already available. One of the amendments concerns changing the assessment of the aspect 'population' from 'unfavourable–bad' to 'unfavourable–inadequate' because recently more harbour porpoises have been sighted in the EEZ. As a result of this change, the national CS too is now assessed as 'unfavourable–inadequate' instead of 'unfavourable–bad' (see section 5.5). The national conservation objective is to maintain the extent and quality of habitat in order to maintain the population, due to the favourable trend in the size of the population. It is recommended that this conservation objective be adopted for the Cleaver Bank. It may be worth opting for a restoration task in view of the unfavourable–inadequate CS, but this is not recommended because in so far as is known the site serves no special function for the harbour porpoise. Accordingly, a site-oriented approach is of limited value and measures concerning the harbour porpoise must be taken on a larger scale (EEZ or preferably the entire North Sea).
(4b) There are no adjacent sites to be taken into consideration.

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population.

Explanation: Cleaver Bank and the other Natura 2000 sites are part of the area of distribution of the harbour porpoise in the North Sea. In so far as is known, Cleaver Bank has no special significance as a reproduction site, foraging site or otherwise compared to other parts of the Dutch sector of the North Sea. Owing to the animals' wide range, there is no sense in protecting a specific area, rather a North Sea-wide approach is recommended.

Grey seal

Considerations (see diagram in chapter 2.7):

(2a,b) The entire North Sea is part of the habitat of the grey seals who forage there. At site level there is no historical data. By contrast, historical data are present about the population of grey seals in the Wadden Sea; these show that the population has increased sharply. Based on telemetric data it is clear that the grey seal is present within the site, probably during migration from and to UK colonies and to search for food (see section 5.6).
(2c) The effects of disturbances are probably limited within the Cleaver Bank site but little is known about them. In any case, they are not hindering the observed increase in the population in the Wadden area.
(3) Based on the points under (2), the CS of the grey seal is assessed as 'favourable' and a maintenance target is recommended.
(4a) The national conservation status of the grey seal is 'unfavourable–inadequate' due to the disturbance of tidal flats. This aspect is not of importance on the Cleaver Bank. The national conservation objective is to maintain the distribution, extent and quality of habitat for the purposes of maintaining the population. It is recommended that this conservation objective be adopted for the Cleaver Bank.
(4b) There are no adjacent sites to be taken into consideration.

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population.

Explanation The national conservation status of the grey seal is 'unfavourable–inadequate' due to the disturbance of tidal flats. This aspect is not of importance on the Cleaver Bank. However, the drowning of grey seals must be prevented, similarly their disturbance or being chased away by undersea noise produced by human activities. The entire North Sea is part of the habitat of the grey seal and, like other parts of the EEZ, the Cleaver Bank is of significance as a foraging site. The Cleaver Bank as such has no special significance compared to other parts of the EEZ. It has been established that animals migrate between the Dutch and UK colonies; during these trips grey seals pass by the Cleaver Bank.

Harbour seal

Considerations (see diagram in chapter 2.7):

(2a,b) Little is still known about the distribution of seals in open sea. The entire North Sea is part of the habitat of the harbour seals who forage there. Based on telemetric data it is evident that the presence of the harbour seal within the site is limited. At site level there is no historical data. By contrast, historical data are present about the population of harbour seals in the Wadden Sea; these show that the population is growing (see section 5.7).

(2c) The effects of disturbances are probably limited within the Cleaver Bank site but little is known about them. In any case, they are not hindering the observed increase in the population in the Wadden area.

(3) Based on the points under (2), the CS of the harbour seal on the Cleaver Bank is assessed as 'favourable' and a maintenance target is proposed.

(4a) The national CS of the harbour seal is 'favourable'. Despite this assessment, the national objective has been formulated as an improvement target: 'Maintain distribution, increase extent and improve quality of habitat for the purposes of expanding the population'. As the improvement tasks must be realised elsewhere (namely on the tidal flats of the Voordelta), a maintenance target is recommended for the Cleaver bank in view of the favourable CS and the increase in the size of the population.

(4b) There are no adjacent sites to be taken into consideration.

Conservation objective Maintain the distribution, extent and quality of habitat for the purposes of maintaining the population.

Explanation The national conservation status of the harbour seal is 'favourable'. The species occurs primarily along the coast, but can cover distances of hundreds of kilometres. The entire EEZ forms a habitat for the harbour seal and, like the rest of the EEZ, the Cleaver Bank is used as a foraging site. Cleaver Bank as such has no special significance compared to other parts of the EEZ.

7.2 Dogger Bank

The following site description has been compiled following the example of others in existing designation orders. In compiling the conservation objectives use has been made of the building blocks for the profile to be compiled for habitat type H1110_C as described in chapter 4 and the background information on habitat species as described in chapter 5. The methodology for compiling the proposals for conservation objectives is described in section 2.7.

7.2.1 Site description and boundary

Site description

The Dogger Bank as a whole, thus including the UK, German and Danish sectors, forms a sandbank in accordance with the definition of the Habitat Directive. The top (in the UK sector) lies 13 m below low-water spring and is thus shallower than -20 m; the bank slopes away on all sides. Sand is found everywhere on the bank. The diversity of the macrobenthos on the west side of the part of the bank situated in the EEZ is elevated; important nature values occur on these slopes. Fronts are encountered regularly along the slope of the bank in summer (zones in which water masses collide). These may give rise to elevated concentrations of fishes and birds (Lindeboom et al. 2005). Owing to its shallowness, orientation and large size, the bank has a sizable effect on processes in the North Sea. Dogger Bank came into being in the Pleistocene. Cobbles found here appear to have come from Scandinavia, transported in the Salian period by ice masses that extended from Scandinavia and covered the North Sea. The sediments in the south-west part of the Dogger Bank appear to be mainly English in origin (R. Witbaard, pers. com.).

Shallow parts of the Dogger Bank are highly dynamic, with resuspension and sedimentation caused by waves. At depths exceeding -40 m sufficient light penetrates to the seabed to enable benthic primary production (Reiss et al. 2007). Dogger Bank hosts several habitat types differentiated by depth and sediment type. Three different fauna communities occur on the Dutch part of the bank: the north-east fauna community, with northern North Sea species; the Dogger Bank community, in the middle of the bank; and the southern Amphiura community, which belongs to the community of the central Oyster Grounds (Wieking & Kröncke, 2003). The composition of these bottom-dweller communities is determined largely by the combination of depth, TOC (total organic carbon), TN (total nitrogen) and the fine sediment fraction (Kröncke 1992). Compared to the early 1950s, opportunistic, short-lived species (certain species of worm) have increased greatly (Kröncke 1992) and large fishes, such as rays, have declined sharply (De Vooys & Van der Meer 1998).

Many species found on the Dogger Bank also occur in the sandy sediments of the southern North Sea and along the Dutch coast.

Landscape context and boundary features

Dogger Bank is part of the Natura 2000 landscape 'North Sea, Wadden Sea and Delta '. The boundary of the Habitats Directive site of Dogger Bank has been established based on the boundary of the sandbank and the boundary of the German Natura 2000 site of Dogger Bank. In addition, where possible alignment has also been sought with the UK sector (see Lindeboom 2005). The UK sector has not yet been formally established as a Natura 2000 site, however, and for this reason its boundaries have not yet been finalised.

Boundary and surface area

The boundary of the Natura 2000 site is shown on the map accompanying the site notification. The site consists of the Dutch sector of the international Dogger Bank, and is bounded by straight lines. On the north-east side, the edge of the EEZ forms the boundary and the boundary aligns with that of the German Natura 2000 site of Dogger Bank. On the UK side, the edge of the EEZ forms the boundary, starting at the 30 m depth line on the north side and finishing at the 30 m depth line on the south side of the Dogger Bank.

The Natura 2000 site has a surface area of 471,772 ha and is exclusively a Habitats Directive site.

7.2.2 Conservation objectives

General objectives

The maintenance and if applicable restoration of:

1. the contribution of the Natura 2000 site to the ecological coherence of Natura 2000 within both the Netherlands and the European Union;
2. the contribution of the Natura 2000 site to the biological diversity and to the favourable conservation status of natural habitat types and species within the European Union and as included in Annex I or Annex II of the Habitat Directive. This includes the site's necessary contribution to the pursuit of a favourable conservation status at national level for the habitat types and the species for which the site has been designated;
3. the natural features of the Natura 2000 site, including the coherence of the structure and functions of the habitat types and of the species for which the site has been designated;
4. the ecological requirements of the habitat types and species for which the site has been designated as they apply to the site.

Habitat Directive: habitat types

H1110_C Sandbanks which are slightly covered by sea water all the time (subtype 'Dogger Bank')

Considerations (see diagram in section 2.7):

(2a) Historical information shows that the species composition has changed, whereby long-lived species have declined and short-lived opportunistic species have increased. Factors playing a role in this are seabed disturbance and climate change (see elsewhere in this report).

(3) Based on the points under (2), the CS of habitat type 1110_C within the Dogger Bank site is assessed as 'unfavourable–inadequate' and a restoration target is proposed.

(4a) The national CS is assessed as 'unfavourable–inadequate' and an improvement of the aspect 'quality' is proposed as the national objective (see section 3.2).

(4b) The following conservation objective has been proposed for the German sector: restore (well-preserved) H1110 structures and maintain the quality, structure and surface area of H1110. The objective for the UK sector is not yet entirely clear.

Conservation objective: Maintain the surface area and improve the quality of sandbanks covered all the time, tidal area (subtype C).

Explanation: The conservation status of this habitat subtype has been assessed as 'unfavourable–inadequate'. Good quality can be said to be present if long-lived species of bottom-dwellers are present, which can be achieved by restoring the natural dynamic of the bottom and preventing seabed disturbance.

Habitat Directive: species

Harbour porpoise

Considerations (see diagram in chapter 2.7):

(2a) There is no historical data at site level with which to build a favourable reference situation. The extent is unclear to which the Dogger Bank is of special

significance to the normal reproduction, mortality and age structure (in accordance with the assessment system devised by the Comité Habitat) of the harbour porpoise and the extent to which the site is of special significance to the North Sea population. Based on limited data, it has been ascertained that relatively many harbour porpoises are sighted on the Dogger Bank compared to the surrounding area, which may be related to the presence of suitable prey fish on which they forage.
(2b) At EEZ level, limited information is available; it is not known whether there are any areas of special significance to harbour porpoises. However, counts have recently been made that indicate a larger number of harbour porpoises present than the favourable reference (see section 5.5).
(2c) The effects of disturbances are probably limited within the Dogger Bank site but little is known about them.
(3) Based on the points under (2), the CS of the harbour porpoise within the site of the Dogger Bank is assessed as 'unknown' and a maintenance target is proposed.
(4a) In this report a proposal is made for amendments to the profile document, which is already available. One of the amendments concerns changing the assessment of the aspect 'population' from 'unfavourable–bad' to 'unfavourable–inadequate' because recently more harbour porpoises have been sighted in the EEZ. As a result of this change, the national CS too is now assessed as 'unfavourable–inadequate' instead of 'unfavourable–bad' (see section 5.5). The national conservation objective is to maintain the extent and quality of habitat in order to maintain the population, due to the favourable trend in the size of the population. It is recommended that this conservation objective be adopted for the Dogger Bank. It may be worth opting for a restoration task in view of the unfavourable–inadequate CS, but this is not recommended because in so far as is known the site serves no special function for the harbour porpoise. Accordingly, a site-oriented approach is of limited value and measures concerning the harbour porpoise must be taken on a larger scale (EEZ or preferably the entire North Sea).
(4b) A maintenance target (BfN 2008) has been formulated for the harbour porpoise in the German sector.

Verwijderd:

Conservation objective	Maintain the extent and quality of habitat in order to maintain the population.
Explanation	Based on recent data on the numbers in the Dutch sector of the North Sea, the conservation status of the harbour porpoise can be revised from 'unfavourable–bad' to 'unfavourable–inadequate'. Specific data about the animal's occurrence on the Dogger Bank are limited and insufficient for estimating densities, or stating the site's ecological importance for the harbour porpoise. Dogger Bank and the other Natura 2000 sites are part of the area of distribution of the harbour porpoise in the North Sea. Relatively many harbour porpoises are sighted on the Dogger Bank compared to the surrounding area, which may be related to the presence of suitable prey fish on which they forage. In so far as is known, the Dutch sector of the Dogger Bank has no special significance as a reproduction site compared to other parts of the Dutch sector of the North Sea. Owing to the animals' wide range, there is no sense in protecting a specific area, rather a North Sea-wide approach is recommended.

Grey seal
Considerations (see diagram in chapter 2.7):

(2a,b) The entire North Sea is part of the habitat of the grey seals who forage there. At site level there is no historical data. By contrast, historical data are present about the population of grey seals in the Wadden Sea; these show that the population has increased sharply. Based on telemetric data it is clear that the grey seal is present within the site, probably during migration from and to UK colonies and to search for food (see section 5.6).
(2c) The effects of disturbances are probably limited within the Dogger Bank site but little is known about them. In any case, they are not hindering the observed increase in the population in the Wadden area.
(3) Based on the points under (2), the CS of the grey seal on the Dogger Bank is assessed as 'favourable' and a maintenance target is proposed.
(4a) The national CS of the grey seal is 'unfavourable–inadequate' due to the disturbance of tidal flats. This aspect is not of importance on the Dogger Bank. The national conservation objective is to maintain the distribution, extent and quality of habitat for the purposes of maintaining the population. It is recommended that this conservation objective be adopted for the Dogger Bank.
(4b) There are no adjacent sites to be taken into consideration.

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population.

Explanation: The national conservation status of the grey seal is 'unfavourable–inadequate' due to the disturbance of tidal flats. This aspect is not of importance on the Dogger Bank. However, the drowning of grey seals must be prevented, similarly their disturbance or being chased away by undersea noise produced by human activities. The entire North Sea is part of the habitat of the grey seal and, like other parts of the EEZ, the Dogger Bank is of significance as a foraging site. It has been established that animals migrate between the Dutch and UK colonies; during these trips grey seals pass by the Dogger Bank

Harbour seal

Considerations (see diagram in chapter 2.7):

(2a,b) Little is still known about the distribution of harbour seals in open sea. The entire North Sea is part of the habitat of the seals who forage there. Based on telemetric data it is evident that the presence of the harbour seal within the site is limited. At site level there is no historical data. By contrast, historical data are present about the population of harbour seals in the Wadden Sea; these show that the population is growing (see section 5.7).
(2c) The effects of disturbances are probably limited within the Dogger Bank site but little is known about them. In any case, they are not hindering the observed increase in the population in the Wadden area.
(3) Based on the points under (2), the CS of the harbour seal on the Dogger Bank is assessed as 'favourable' and a maintenance target is recommended.
(4a) The national CS of the harbour seal is 'favourable'. Despite a favourable CS, the national objective has been formulated as an improvement target: 'Maintain distribution, increase extent and improve quality of habitat for the purposes of expanding the population'. As the improvement tasks must be realised elsewhere (namely on the tidal flats of the Voordelta), a maintenance target is recommended for the Dogger bank in view of the favourable CS and the increase in the size of the population.
(4b) A maintenance target (BfN 2008) has been formulated for the German sector of the Dogger Bank.

Conservation objective	Maintain the distribution, extent and quality of habitat for the purposes of maintaining the population.
Explanation	The national conservation status of the harbour seal is 'favourable'. The species occurs primarily along the coast, but can cover distances of hundreds of kilometres. The entire EEZ forms a habitat for the harbour seal and, like the rest of the EEZ, the Dogger Bank is used as a foraging site. Dogger Bank as such has no special significance compared to other parts of the EEZ.

7.2.3 References

Bundesamt für Naturschutz (2008) Erhaltungsziele für das FFH-Gebiet „Doggerbank" (DE 1003-301) in der deutschen AWZ der Nordsee.

De Vooys CGN, Van der Meer J (1998) Changes between 1931 and 1990 in by-catches of 27 animal species from the southern North Sea. J Sea Res 39:291-298.

Kröncke I (1992) Macrofauna standing stock of the Dogger Bank. A comparison: III, 1950-54 versus 1985-87. A final summary. Helgoländer Meeresuntersuchungen 46:137-169.

Kröncke I, Bergfeld C (2003) North Sea benthos: A Review. Senckenbergiana Maritima 33:205-268.

Lindeboom HJ, Geurts van Kessel AJM, Berkenbosch A (2005) Gebieden met bijzondere ecologische waarden op het Nederlands Continentaal Plat. Report RIKZ/2005008, The Hague / Alterra Report 1109, Wageningen:103 p.

Reiss H, Wieking G, Kröncke I (2007) Microphytobenthos of the Dogger Bank: A comparison between shallow and deep areas using phytopigment composition of the sediment Mar Biol 105:1061-1071.

7.3 Vlakte van de Raan

The following site description has been compiled following the example of others in existing designation orders. In compiling the conservation objectives use has been made of the existing profile for habitat type H1110 (in particular H1110_B) and the background information on habitat species as described in chapter 5. The methodology for compiling the proposals for conservation objectives is described in section 2.7.

7.3.1 Site description and boundary

Site description

The Vlakte van de Raan is a sandbank situated in the mouth of the Western Schelde, on the border between Belgium and the Netherlands. The Western Schelde estuary is the only estuary in the Delta area that remains since the Deltaworks were constructed. The Vlakte van de Raan is situated at the transition from estuary to open sea. The composition of the bottom sediments in this transition region between the mouth of the Western Schelde and the North Sea is very heterogeneous. Both sandy sediments and silt occur here (Du Four et al. 2006).

Landscape context and boundary features

The Vlakte van de Raan is part of the Natura 2000 landscape 'North Sea, Wadden Sea and Delta'. The boundary of the Habitats Directive site of Vlakte van de Raan has been established by reference to the geographical position of the natural abiotic features and the habitats of the species for which the site has been designated (see section 4.4). In addition, the bounded area also contains nature values that are integral to the ecosystems to which the habitat types and species' habitats concerned belong, as well as new nature, where applicable, considered necessary to restore threatened and scarce habitat types and species' habitats.

Boundary and surface area

The boundary of the Natura 2000 site is shown on the map accompanying the site notification. The site is bounded by straight lines. The Vlakte van de Raan is bounded by the -20 NAP line on the seaward side, the Special Protection Zone of the Voordelta, the Special Protection Zone of the Western Schelde and the border with Belgium. The Natura 2000 site has a surface area of 22,639 ha and is exclusively a Habitats Directive site.

7.3.2 Conservation objectives

General objectives

The maintenance and if applicable restoration of:

1. the contribution of the Natura 2000 site to the ecological coherence of Natura 2000 within both the Netherlands and the European Union;
2. the contribution of the Natura 2000 site to the biological diversity and to the favourable conservation status of natural habitat types and species within the European Union and as included in Annex I or Annex II of the Habitat Directive. This includes the site's necessary contribution to the pursuit of a favourable conservation status at national level for the habitat types and the species for which the site has been designated;
3. the natural features of the Natura 2000 site, including the coherence of the structure and functions of the habitat types and of the species for which the site has been designated;
4. the ecological requirements of the habitat types and species for which the site has been designated as they apply to the site.

Habitat Directive: habitat types

H1110_B Sandbanks which are slightly covered by sea water all the time (subtype 'North Sea Coastal Zone')

Considerations (see diagram in chapter 2.7):

(2a) There are insufficient historical data from the site to establish a favourable reference situation based on typical species (see section 3.3).

(2b) Supplementary information about the Belgian sector of the Vlakte van de Raan is not usable because it is not clear whether the sites are ecologically comparable (see section 3.3.1). Based on the morphology and other abiotic factors, it is assumed that the site's ecology is the same as that of the Voordelta (see section 3.3).
(2c) It is assumed that the intensity and uses made of the site are the same as those of the Voordelta. In particular fishery that disturbs the seabed influences the quality of the habitat type (section 3.3).
(3) Based on the points under (2), the CS of habitat type 1110_B on the Vlakte van de Raan has been assessed as 'unfavourable–inadequate' (see section 3.3) and an improvement target is proposed.
(4a) The (existing) profile document provides an unclear basis for the assessment 'unfavourable–inadequate' for the national CS of habitat type 1110_B. It is based on the quality of the habitat type having been assessed as 'unfavourable–inadequate' with regard to structure and function, and with regard to future prospects. A national conservation objective has been formulated: maintain distribution, maintain surface area and maintain quality. In view of this, it is unclear how the EU requirement that Natura 2000 target species and habitat types should be in favourable conservation status can be satisfied. To achieve a favourable CS, the aspect 'quality' would need to be improved.
(4b) The Voordelta is contiguous to the Vlakte van de Raan and also shows ecological similarities. A maintenance target has been formulated for this site in the Designation Order for the Voordelta (p.16), which is explained as follows:

> *'The conservation objective for sandbanks covered all the time, North Sea Coastal Zone (subtype B) has been set at maintaining quality. New insights about the conservation status of subtype B give cause for introducing for subtype B a subtle distinction into the qualification 'unfavourable–inadequate' that has been set for habitat type 1110 in the Natura 2000 targets document 2006 at a national level. While it is true that there is currently insufficient cause for changing this qualification already, there is equally little cause for coupling an improvement target to it for this site (as well). Partly in connection with the precautionary principle, a package of measures will, however, be laid down in the management plan with which, in any event, it will be ensured that this maintenance target is safeguarded in the entire Voordelta. During the term of the management plan research and monitoring will take place in this context.'*

(5) Were the profile document to be clarified with regard to the assessment of the conservation status and the national objective derived from it, this would provide more guidance for the policy-level choice of the conservation objectives for H1110_B on the Vlakte van de Raan.

Conservation objective	Maintain the surface area and improve the quality of sandbanks covered all the time, North Sea-coastal zone (subtype B).
Explanation	The subtype sandbanks covered all the time, North Sea-coastal zone (subtype B) occurs throughout the site of the North Sea Coastal Zone. Nationally, this subtype has a unfavourable–inadequate conservation status.

Habitat Directive: species

Harbour porpoise
Considerations (see diagram in chapter 2.7):

(2a) There is no historical data at site level with which to build a favourable reference situation. The extent is unclear to which the Vlakte van de Raan is of special significance to the normal reproduction, mortality and age structure (in accordance with the assessment system devised by the Comité Habitat) of the harbour porpoise and the extent to which the site is of special significance to the North Sea population as, for example, a foraging site or reproduction site.
(2b) At EEZ level, limited information is available; it is not known whether there are any areas of special significance to harbour porpoises. However, counts have recently been made that indicate a larger number of harbour porpoises present than the favourable reference., The number of sightings and the number of beachings of dead harbour porpoises along the Dutch coast as a whole increased up to 2006 (see section 5.5).
(2c) The effects of disturbances are probably limited within the Vlakte van de Raan site but little is known about them.
(3) Based on the points under (2), the CS of the harbour porpoise on the Vlakte van de Raan has been assessed as 'unknown'. A maintenance target is proposed.
(4a) In this report a proposal is made for amendments to the profile document, which is already available. One of the amendments concerns changing the assessment of the aspect 'population' from 'unfavourable–bad' to 'unfavourable–inadequate' because recently more harbour porpoises have been sighted in the EEZ. As a result of this change, the national CS too is now assessed as 'unfavourable–inadequate' instead of 'unfavourable–bad' (see section 5.5).

The national conservation objective is to maintain the extent and quality of habitat in order to maintain the population, due to the favourable trend in the size of the population. It is recommended that this conservation objective be adopted for the Vlakte van de Raan. It may be worth opting for a restoration task in view of the unfavourable–inadequate CS, but this is not recommended because in so far as is known the site serves no special function for the harbour porpoise. Accordingly, a site-oriented approach is of limited value and measures concerning the harbour porpoise must be taken on a larger scale (EEZ or preferably the entire North Sea).
(4b) No conservation objectives for harbour porpoises have been set for adjacent sites.

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population.

Explanation: Based on recent data on the numbers in the Dutch sector of the North Sea, the conservation status of the harbour porpoise can be revised from 'unfavourable–bad' to 'unfavourable–inadequate'. Specific data about the animal's occurrence on the Vlakte van de Raan are limited and insufficient for estimating densities, or stating the site's ecological importance for the harbour porpoise. The Vlakte van de Raan and the other Natura 2000 sites are part of the area of distribution of the harbour porpoise in the North Sea. In so far as is known, the Vlakte van de Raan has no special significance as a reproduction site compared to other parts of the Dutch sector of the North Sea. Drowned harbour porpoises are found regularly on the beaches of the Dutch coast. It is unclear whether this has consequences for the sustainable conservation of the population. A reduction in the deaths caused by drowning and disturbance by underwater noise, produced by human activities, would constitute an improvement of the habitat. Owing to the animals' wide range, there is no sense in protecting a specific area, rather a North Sea-wide approach is recommended.

Grey seal

Considerations (see diagram in chapter 2.7):

(2a,b) The entire North Sea is part of the habitat of the grey seals who forage there. At site level there is no historical data. By contrast, historical data are present about the population of grey seals in the Wadden Sea and the Delta; these show that the population has increased sharply. The densities in which grey seals occur within the site are not known. It is probable that the grey seals who forage here have their refuge areas elsewhere or are migrating through the site (see section 5.6).

(2c) The effects of disturbances are probably limited within the Vlakte van de Raan site but little is known about them. Recently, activities that produce noise have increased in the coastal zone. These are not hindering the observed increase in the population in the Delta area and the Wadden Sea.

(3) Based on the points under (2), the CS of the grey seal on the Vlakte van de Raan is assessed as 'favourable' and a maintenance target is proposed.

(4a) The national CS of the grey seal is 'unfavourable–inadequate' due to the disturbance of tidal flats. This aspect is not of importance on the Vlakte van de Raan. The national conservation objective is to maintain the distribution, extent and quality of habitat for the purposes of maintaining the population. It is recommended that this conservation objective be adopted.

(4b) In the Voordelta the conservation objective for the grey seal is to maintain the extent and quality of habitat in order to maintain the population.

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population.

Explanation: The grey seal's habitat extends throughout the North Sea. On the Vlakte van de Raan no tidal flats occur that can be used as reproduction sites. However, the site can serve as a foraging site for animals who reproduce nearby or migrate through the site.

Harbour seal

Considerations (see diagram in chapter 2.7):

(2a,b) Based on telemetric data it is evident that the presence of the harbour seal within the site is limited. As there are no tidal flats, the site is not used as a reproduction site. The animals can, however, forage here. At site level there is no historical data. By contrast, historical data are present about the population of harbour seals in the Wadden Sea and Delta; these show that the population is growing (see section 5.7). In the Delta area the population of harbour seals is under threat from disturbance, limited habitat and pollution (see profile document). Numbers are barely increasing, small increases are only the consequence of migration from other areas.

(2c) The effects of disturbances are probably limited within the site but little is known about them. In any case, they are not hindering the observed increase in the population in the Wadden area.

(3) Based on the points under (2), the CS of the harbour seal on the Vlakte van de Raan is considered to be 'favourable' and a maintenance target is recommended.

(4a) The national CS of the harbour seal is 'favourable'. Nevertheless, the national objective has been formulated as an improvement target: 'Maintain the distribution, increase the extent and improve the quality of habitat for the purposes of expanding the population'. As the improvement tasks must be realised elsewhere

(namely on the tidal flats of the Voordelta), a maintenance target is recommended in view of the favourable CS and the increase in the size of the population. On the Vlakte van de Raan there aren't any of these tidal flats.
(4b) In the Voordelta the conservation objective for the harbour seal is to maintain the extent and improve the quality of habitat in order to expand the population for the purposes of a regional population of at least 200 specimens in the Delta area.

Conservation objective: Maintain the distribution, extent and quality of habitat for the purposes of maintaining the population.

Explanation: Harbour seals are under pressure in the delta area. Numbers are barely increasing, small increases are only the consequence of migration from other areas. Within the site of the Vlakte van de Raan there are no tidal flats and so the site has no significance as a reproduction site for the North Sea population. By contrast, this is the case in the adjacent site of the Voordelta, where measures have been taken to increase the suitability of the flats as a reproduction site for the harbour seal. Grey seals forage here who have their refuge areas elsewhere in the Delta area or are migrating through the site. The significance as a foraging site may increase if the population in the Voordelta expands. An increase in disturbing activities within the site could disturb the migration of harbour seals between the breeding sites in the Netherlands (Delta, Wadden Sea) and France. In addition, there has recently been an increase in the coastal zone in activities that produce noise capable of disturbing harbour seals or chasing them away. The drowning of grey seals must be prevented, similarly their being chased away by undersea noise produced by human activities.

River lamprey

Considerations (see diagram in chapter 2.7):
(2a,b) Hardly any recent data and no historical data are known of concerning the river lamprey for the Vlakte van de Raan site. The species is caught only occasionally in the North Sea (see section 5.2).
(2c) The presence of barriers hampers the migration from and to the sea. The number of river lampreys migrating upstream is below the favourable reference.
(3) Based on the points under (2), the CS of the river lamprey on the Vlakte van de Raan is assessed as 'unknown' and a maintenance target is recommended.
(4a) The national CS of the river lamprey is 'unfavourable–inadequate' due to the aspects of population and habitat and has been based on the distribution in freshwaters. The national objective is as follows: Increase distribution of spawning sites, increase the extent and improve the quality of habitat for the purposes of expanding the population.
As the improvement tasks must be realised elsewhere, a maintenance target is recommended, in line with those of the other Natura 2000 sites along the coast.
(4b) In the Voordelta the conservation objective for the river lamprey is to maintain the extent and quality of habitat in order to expand the population.

Conservation objective: Maintain the extent and quality of habitat in order to expand the population.

Explanation: As a habitat for the river lamprey, the Vlakte van de Raan is probably of great importance. No restoration measures are necessary within this site. The expansion of the population can be brought about by improving the migration route upstream from the estuary, improving the quality of spawning grounds and rearing grounds and improving the freshwater-saltwater transitions.

Sea lamprey

Considerations (see diagram in chapter 2.7):

(2a,b) Hardly any recent data and no historical data are known of concerning the sea lamprey for this site. The species is caught only occasionally in the North Sea (see section 5.1).

(2c) The presence of barriers hampers the migration from and to the sea (see section 5.1).

(3) Based on the points under (2), the CS of the sea lamprey on the Vlakte van de Raan assessed as 'unknown' and a maintenance target is recommended.

(4a) The national CS has been assessed as 'unfavourable–inadequate' based on de aspects of population and habitat. The respective issues concerned are the number of sea lampreys migrating upstream in the rivers and the presence of barriers that could make (potential) spawning grounds inaccessible. This last point is not the case in the River Schelde. Applying the national conservation objective (increase extent and improve quality of habitat for the purposes of expanding the population) would not be appropriate. As the improvement tasks must be realised elsewhere, a maintenance target is recommended, in line with those of the other Natura 2000 sites along the coast.

(4b) In the Voordelta the conservation objective for the sea lamprey is to maintain the extent and quality of habitat in order to expand the population.

Conservation objective: Maintain the extent and quality of habitat in order to expand the population.

Explanation: As a habitat for the sea lamprey, the Vlakte van de Raan is probably of great importance. No restoration measures are necessary within this site. The expansion of the population can be brought about by improving the migration route upstream from the estuary, improving the quality of spawning grounds and rearing grounds and improving the freshwater-saltwater transitions.

Twaite shad

Considerations (see diagram in chapter 2.7):

(2a,b) The North Sea is part of the habitat of the twaite shad but has no special significance for its reproduction. Sightings at sea are rare. Near the mouth of the Schelde twaite shad are encountered in fish traps with great regularity (see section 5.3).

(2c) The presence of barriers hampers the migration from and to the sea.

(3) Based on the points under (2), the CS of the twaite shad in the Vlakte van de Raan site is assessed as 'unknown' and a maintenance target is advised.

(4a) The national CS of the twaite shad has been assessed as 'unfavourable–bad' based on the aspects of 'population' and 'habitat', as a consequence of the loss of spawning sites in freshwater tidal areas. The national conservation objective for the twaite shad is to maintain the distribution of spawning sites and to maintain the extent and quality of habitat for the purposes of expanding the population.

(4b) In the Western Schelde & Saeftinghe Natura 2000 site the conservation objective is to maintain the extent and quality of habitat in order to expand the population. It is recommended that this maintenance target be adopted.

Conservation objective: Maintain the extent and quality of habitat in order to expand the population.

Explanation: As a habitat for the twaite shad, the Vlakte van de Raan is of great (potential) importance. In view of the site's importance for the potential spawning population in

the Belgian sector of the River Schelde, a conservation objective has been formulated for the site. No restoration measures are necessary within this site; population expansion depends on measures implemented in Belgium.

7.4 North Sea Coastal Zone 2

The following site description has been compiled following the example of others in existing designation orders. In compiling the conservation objectives use has been made of the existing profile for habitat type H1110 (in particular H1110_B) and the background information on Habitat Directive species as described in chapter 5 and bird species as described in chapter 6. The methodology for compiling the proposals for conservation objectives is described in section 2.7.

7.4.1 Site description and boundary

Site description

The sandy coastal area along the North Sea consists of coastal waters, shallows, a couple of sandbanks (inc. Noorderhaaks) and the beaches of northern North Holland and the Wadden Islands. The coastal waters consist of sandbanks which are continuously covered with sea water that is at most 20 metres deep. On land, 'green beaches' occur here and there. The most well-developed examples of these are found on Schiermonnikoog where salt marshes alternate with damp dune valleys' (text from the Designation Order for the North Sea Coastal Zone).

Landscape context and boundary features

The North Sea Coastal Zone site is part of the Natura 2000 landscape 'North Sea, Wadden Sea and Delta'. The geographical position of the habitat types and of the habitats of the species (section 4.4) for which this site has been designated, forms the starting point for the boundary of the Habitats Directive sites. This includes parts of the site that have deteriorated or degenerated. In addition, the bounded area includes nature values that are an integral part of the ecosystems to which the habitat types and species' habitats concerned belong, and areas (inc. new nature) considered necessary to maintain and restore the habitat types and species' habitat concerned. In choosing sites and determining their boundaries no account has been taken of requirements other than those connected to the conservation of the natural habitats and the wild flora and fauna.

The boundaries of a Birds Directive site are determined by the use made of the site by the species in Annex I and/or migrating waterbirds and/or other migrating birds present at the site, whereby landscape ecological units and the biotopic requirements of the bird species concerned are used as guiding principles. The North Sea Coastal Zone site has been designated under the Birds Directive due to the presence of coastal water, sand beaches and flats that, as a whole, form the habitat of a number of bird species as referred to in Article 4 van the Directive. It is a water area that forms the habitat of species in Annex I of the Birds Directive (Art. 4.1). Furthermore, the North Sea Coastal Zone functions as a site for breeding, moulting and overwintering and as a refuge sites in the migratory zone of other migratory bird species (Art. 4.2). The boundary of the protection zone has been chosen such that a coherent whole (in terms of its landscape and ornithology) is created that – in conjunction with the Wadden Sea site dating from 1991 under the Birds Directive – meets the need for protection concerning the survival and/or reproduction of the intended bird species.

Boundary and surface area

The boundary of the Natura 2000 site of the North Sea Coastal Zone 2 is shown on the map accompanying the site notification (for an explanation of the naming, see p. 47). The site is an expansion of the existing Natura 2000 site of the North Sea Coastal Zone 1. The expansion brings into alignment the Habitats Directive site and the existing Birds Directive site and also shifts the site up to the continuous 20-metre depth line north of the Wadden Islands. In addition, the southern boundary is moved from Petten to Bergen, as a result of which the area between Bergen and Petten, from the beach to the 20-metre depth line, is added.
Together with the existing Natura 2000 site of the North Sea Coastal Zone, the expansion has a surface area of approx. 149,616 ha and is in its entirety a Habitats Directive site and Birds Directive site.

7.4.2 Conservation objectives

General objectives

The maintenance and if applicable restoration of:

1. the contribution of the Natura 2000 site to the ecological coherence of Natura 2000 within both the Netherlands and the European Union;
2. the contribution of the Natura 2000 site to the biological diversity and to the favourable conservation status of natural habitat types and species within the European Union and as included in Annex I or Annex II of the Habitat Directive. This includes the site's necessary contribution to the pursuit of a favourable conservation status at national level for the habitat types and the species for which the site has been designated;
3. the natural features of the Natura 2000 site, including the coherence of the structure and functions of the habitat types and of the species for which the site has been designated;
4. the ecological requirements of the habitat types and species for which the site has been designated as they apply to the site.

Habitat Directive: habitat types

H1110_B Sandbanks which are slightly covered by sea water all the time (subtype 'North Sea Coastal Zone')

Considerations (see diagram in chapter 2.7):

(2a) The site is contiguous to the already designated North Sea Coastal Zone site (SAC). The most important historical developments are mentioned in the existing profile document: Since 1993 sand nourishments have been carried out, since 2000 the impact of fisheries has declined, the biodiversity has changed, shark and ray species have disappeared as have a number of other fish species. Southern fish species have increased in abundance. A couple of exotics, such as the American razor shell (*Ensis americanus*), now fulfil an important ecological role.

(2b) Part of the North Sea Coastal Zone site has already been designated as a Habitats Directive site, namely the sea gates between the Wadden Islands. The guiding principle is that the area of expansion is ecologically comparable with the site already designated and as it is described in the current profile document for H1110 (subtype B).

(2c) Fishery activity that disturbs the seabed and sand nourishments in particular have a negative effect on the quality of H1110_B (see section 3.4)

(3) Based on the points under (2), the CS of the habitat type 1110_B is assessed as 'unfavourable–inadequate' and an improvement target is recommended.

(4a) The (existing) profile document provides an unclear basis for the assessment 'unfavourable–inadequate' for the national CS of habitat type 1110_B. It is based on the quality of the habitat type having been assessed as 'unfavourable–inadequate' with regard to structure and function, and with regard to future prospects. In spite of this assessment, a maintenance target has been formulated: maintain distribution, maintain surface area and maintain quality. In view of this, it is unclear how the EU requirement that Natura 2000 target species and habitat types should be in favourable conservation status can be satisfied. To achieve a favourable CS, the aspect 'quality' would need to be improved. It is recommended that an improvement target for the aspect 'quality' be adopted as the target for the North Sea Coastal Zone 2.

(4b) In the designation order for the part of the North Sea Coastal Zone already designated a maintenance target has been formulated: 'Maintain surface area and quality of sandbanks covered all the time, North Sea Coastal Zone (subtype B)'. The order includes the following explanation:

'The national conservation status of this habitat type has been assessed with regard to the aspects 'surface area' and 'quality' as 'favourable' and 'unfavourable–inadequate' respectively. The national objective is consistent with this. The site conservation objectives for all sites differ from the national conservation objective with respect to the aspect 'quality'. In the North Sea Coastal Zone (007) this will be reviewed when the area is expanded as part of the designation of the marine sites.'

(5) Were the profile document to be clarified with regard to the assessment of the conservation status and the national objective derived from it, this would provide more guidance for the policy-level choice of the conservation objective for H1110_B in the North Sea Coastal Zone.

Conservation objective: Maintain surface area and improve quality of sandbanks covered all the time, North Sea Coastal Zone (subtype B).

Explanation: The subtype sandbanks covered all the time, North Sea Coastal Zone (subtype B) occurs throughout the North Sea Coastal Zone. Nationally, this subtype has a 'unfavourable–inadequate' conservation status. For this reason, a restoration target is proposed. This differs from the conservation objective for the adjacent site of the North Sea Coastal Zone 1, which has already been designated.

Habitat Directive: species

Harbour porpoise

Considerations (see diagram in chapter 2.7):

(2a) There is no historical data at site level with which to build a favourable reference situation. The extent is unclear to which the North Sea Coastal Zone is of special significance to the normal reproduction, mortality and age structure (in accordance with the assessment system devised by the Comité Habitat) of the harbour porpoise and the extent to which the site is of special significance to the North Sea population, for example as a foraging site or reproduction site.

(2b) At EEZ level, limited information is available; it is not known whether there are any areas of special significance to harbour porpoises. However, counts have recently been made that indicate a larger number of harbour porpoises present than the favourable reference. The number of sightings and the number of beachings of dead harbour porpoises along the Dutch coast as a whole increased up to 2006 (see section 5.5).

(2c) The effects of disturbances are probably limited within the North Sea Coastal Zone site but little is known about them.
(3) Based on the points under (2), the CS of the harbour porpoise within the site is assessed as 'favourable'; a maintenance target is proposed.
(4a) In this report a proposal is made for amendments to the profile document, which is already available. One of the amendments concerns changing the assessment of the aspect 'population' from 'unfavourable–bad' to 'unfavourable–inadequate' because recently more harbour porpoises have been sighted in the EEZ. As a result of this change, the national CS too is now assessed as 'unfavourable–inadequate' instead of 'unfavourable–bad' (see section 5.5).
The national conservation objective is to maintain the extent and quality of habitat in order to maintain the population, due to the favourable trend in the size of the population. It is recommended that this conservation objective be adopted for the North Sea Coastal Zone 2. It may be worth opting for a restoration task in view of the unfavourable–inadequate CS, but this is not recommended because in so far as is known the site serves no special function for the harbour porpoise. Accordingly, a site-oriented approach is of limited value and measures concerning the harbour porpoise must be taken on a larger scale (EEZ or preferably the entire North Sea).
(4b) In the existing North Sea Coastal Zone the conservation objective is to maintain the extent and quality of habitat in order to maintain the population.

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population.

Explanation: The North Sea Coastal Zone is the site at which the harbour porpoise has best been counted. Recently, harbour porpoises with young have also been seen again. The increase in Dutch waters may be the consequence of there being a different distribution over the North Sea.

Drowned harbour porpoises are found regularly on the beaches of the Dutch coast. It is unclear whether this has consequences for the sustainable conservation of the population. A reduction in the deaths caused by drowning and flight from underwater noise, produced by human activities, would constitute an improvement of the habitat. Owing to the animals' wide range, there is no sense in protecting a specific area, rather a North Sea-wide approach is recommended

Grey seal

Considerations (see diagram in chapter 2.7):

(2a,b) Besides the Wadden Sea, the North Sea Coastal Zone is the most important habitat of the grey seal in the Netherlands. Historical data about the population of grey seals in the Wadden Sea show that the population has grown sharply. No reproduction takes place on the flats of the North Sea Coastal Zone 1. The Engelschhoek, by contrast, which is part of the already designated part of North Sea Coastal Zone 1, is the refuge sites of the large majority of the population of the Wadden area (including the North Sea Coastal Zone) (see section 5.6). There are no tidal flats in the North Sea Coastal Zone 2.
(2c). The recent increase in the coastal zone in activities producing noise has not stopped the population in the Wadden area from increasing.
(3a) Based on the points under (2), the CS of the grey seal in the expansion of the SAC of the North Sea Coastal Zone is assessed as 'favourable'.
(4a) The national CS of the grey seal has been assessed as 'unfavourable–inadequate' due to the disturbance of tidal flats. The national conservation

objective is to maintain the distribution, extent and quality of habitat for the purposes of maintaining the population. A restoration target has not been chosen because the population is growing. It is recommended that the maintenance target as formulated for the existing North Sea Coastal Zone 1 be adopted for the North Sea Coastal Zone 2 (SAC).

(4b) In the North Sea Coastal Zone 1 the conservation objective for the grey seal is to maintain the extent and quality of habitat in order to maintain the population.

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population.

Explanation: Besides the Wadden Sea, the North Sea Coastal Zone is the most important site for grey seals in the Netherlands. The site fulfils an important function as a foraging site, especially in winter.

Harbour seal

Considerations (see diagram in chapter 2.7):

(2a,b) Reproduction takes place on the tidal flats in the Wadden Sea. The (tidal) flats in the North Sea Coastal Zone 1 are not used for this purpose. However, the site does have an important function as a foraging site. At site level there is no historical data. By contrast, historical data are present about the population of harbour seals in the Wadden Sea and Delta; these show that the population is growing (see section 5.7). There are no tidal flats in the North Sea Coastal Zone 2.

(2c) The extent to which disturbances in the North Sea Coastal Zone 2 have a negative influence on the population trend is unclear. For the time being, in any event, the population in the Wadden Sea is increasing steadily.

(3) Based on the points under (2), the CS of the harbour seal in the North Sea Coastal Zone 2 is considered to be 'favourable' and a maintenance target is recommended.

(4a) In spite of this, the national objective has been formulated as an improvement target: 'Maintain distribution, increase extent and improve quality of habitat for the purposes of expanding the population'. As the improvement tasks must be realised elsewhere (namely on the tidal flats of the Voordelta), a maintenance target is recommended for the North Sea Coastal Zone 2 (SAC) in view of the favourable CS and the increase in the size of the population.

(4b) In the North Sea Coastal Zone 1 the conservation objective for the harbour seal is to maintain the extent and quality of habitat in order to maintain the population.

Conservation objective: Maintain the extent and quality of habitat in order to maintain the population.

Explanation: This is one of the most important sites for the harbour seal. The site fulfils an important function as a foraging site for the seals who reproduce on the tidal flats in the Wadden Sea.

River lamprey

Considerations (see diagram in chapter 2.7):

(2a,b) Hardly any recent data and no historical data are known of concerning the river lamprey for the North Sea Coastal Zone 2. The species is caught only occasionally in the North Sea (see section 5.2).

(2c) The presence of barriers hampers the migration from and to the sea. The number of river lampreys migrating upstream is below the favourable reference.

(3) Based on the points under (2), the CS in the North Sea Coastal Zone 2 is assessed as 'unknown' and a maintenance target is recommended.

(4a) The national CS of the river lamprey is 'unfavourable–inadequate' due to the aspects of population and habitat and has been based on the distribution in freshwaters. The national objective is as follows: Increase distribution of spawning sites, increase the extent and improve the quality of habitat for the purposes of expanding the population.
As the improvement tasks must be realised elsewhere, a maintenance target is recommended, in line with those of the other Natura 2000 sites along the coast.
(4b) In the North Sea Coastal Zone 1 the conservation objective for the river lamprey is to maintain the extent and quality of habitat in order to expand the population.

Conservation objective: Maintain the extent and quality of habitat in order to expand the population.

Explanation: As a habitat for the river lamprey, the North Sea Coastal Zone is probably of great importance. No restoration measures are necessary within this site. The expansion of the population can be brought about by improving the migration route elsewhere, improving spawning grounds and rearing grounds and improving the freshwater-saltwater transitions.

Sea lamprey

Considerations (see diagram in chapter 2.7):

(2a,b) Hardly any recent data and no historical data are known of concerning the sea lamprey for the North Sea Coastal Zone 2. The species is caught only occasionally in the North Sea (see elsewhere in this report).
(2c) The presence of barriers hampers the migration from and to the sea.
(3) Based on the points under (2), the CS of the sea lamprey in the North Sea Coastal Zone 2 (SAC) is assessed as 'unknown'. A maintenance target is recommended.
(4a) The national CS has been assessed as 'unfavourable–inadequate' based on de aspects of population and habitat. The respective issues concerned are the number of sea lampreys migrating upstream in the rivers and the presence of barriers that could make (potential) spawning grounds inaccessible. Applying the national conservation objective (increase extent and improve quality of habitat for the purposes of expanding the population) would not be appropriate. As the improvement tasks must be realised elsewhere, a maintenance target is recommended, in line with those of the other Natura 2000 sites along the coast.
(4b) In the North Sea Coastal Zone 1 (SAC) the conservation objective for the sea lamprey is to maintain the extent and quality of habitat in order to expand the population.

Conservation objective: Maintain the extent and quality of habitat in order to expand the population.

Explanation: As a habitat for the sea lamprey, the North Sea Coastal Zone is probably of great importance. No restoration measures are necessary within this site. The expansion of the population can be brought about by improving the migration route elsewhere, improving spawning grounds and rearing grounds and improving the freshwater-saltwater transitions.

Twaite shad

Considerations (see diagram in chapter 2.7):

(2a,b) The North Sea is part of the habitat of the twaite shad but has no special significance for its reproduction. Sightings at sea are rare (see elsewhere in this report).

(2c) The presence of barriers hampers the migration from and to the sea.
(3) Based on the points under (2), the CS of the twaite shad in the North Sea Coastal Zone 2 (SAC) is assessed as 'unknown'. A maintenance target is recommended.
(4a) The national CS of the twaite shad has been assessed as 'unfavourable–bad' based on the aspects of 'population' and 'habitat', as a consequence of the loss of spawning sites in freshwater tidal areas. The national conservation objective for the twaite shad is to maintain the distribution of spawning sites and to maintain the extent and quality of habitat for the purposes of expanding the population. It is recommended that a maintenance target been formulated in line with those of the other Natura 2000 sites along the coast.
(4b) In the North Sea Coastal Zone 1 (SAC) the conservation objective for the twaite shad is to maintain the extent and quality of habitat in order to expand the population.

Conservation objective: Maintain the extent and quality of habitat in order to expand the population.[10]

Explanation: As a habitat for the twaite shad, the North Sea Coastal Zone is of great importance. In all likelihood, this concerns mainly twaite shad that spawn in the German sector of the River Eems. No restoration measures are necessary within the site. Expansion depends on measures implemented in Germany.

Birds Directive: non-breeding birds

Red-throated diver

Considerations (see diagram in chapter 2.7):
(2a,b) For the North Sea Coastal Zone no good data are available that could be used to determine recent numbers and trends. This is due to the species' poor representation in regular counts.
(3a) Based on the points under (2), the CS of the red-throated diver in the North Sea Coastal Zone 2 (SPA) is assessed as 'unknown'. A maintenance target is recommended.
(4a) The national CS of the red-throated diver has been assessed as 'unfavourable–inadequate' due to its unfavourable–inadequate future prospects. The national objective is a maintenance target because it appears that numbers have increased recently. For this reason, it is recommended that for the North Sea Coastal Zone 2 (SPA) a maintenance target be formulated in line with those of the other Natura 2000 sites along the coast.
(4b) In the North Sea Coastal Zone 1 (SPA) the conservation objective for the red-throated diver is: to maintain the extent and quality of habitat.

Conservation objective: Maintain the extent and quality of habitat.

Explanation: Red-throated divers numbers are of great significance both nationally and internationally. For the species, the site serves mainly as a foraging site. The distribution of the red-throated diver in the Netherlands is limited largely to the coastal areas of the North Sea. In the North Sea Coastal Zone high densities are seen on occasion in the outer deltas between the Wadden Islands, where fishing occurs on the boundary between the various water masses. This species has been poorly represented in the regular counts, but recently it appears that the numbers have

[10] The English text of this sentence differs from the original Dutch. The English text is correct. For details, please see Erratum Report C065_09.

increased nationally. It is sufficient that the current situation be maintained; no restoration task has been formulated at national level.

Black-throated diver

Considerations (see diagram in chapter 2.7):

(2a,b) In practice it is very difficult to distinguish the black-throated diver from the red-throated diver and as a result good information is lacking with which to estimate the CS.

(3) Based on the point under (2), the CS of the black-throated diver in the North Sea Coastal Zone 2 (SPA) is assessed as 'unknown' and a maintenance target is recommended.

(4a) The national CS of the black-throated diver has also been assessed as 'unknown'. The national conservation objective is: to maintain the extent and quality of habitat. It is recommended that this conservation objective be adopted.

(4b) In the North Sea Coastal Zone 1 (SPA) the conservation objective for the black-throated diver is: to maintain the extent and quality of habitat.

Conservation objective: Maintain the extent and quality of habitat.

Explanation: Black-throated diver numbers are of great national significance. For the species, the site serves mainly as a foraging site. The distribution of the black-throated diver in the Netherlands has its focal point in the coastal areas of the North Sea. The absolute numbers and the trend are unknown (and, consequently, the conservation status) due to a combination of low numbers and confusion with the much more numerous red-throated diver. It is sufficient that the current situation be maintained; no restoration task has been formulated at national level.

Eider

Considerations (see diagram in chapter 2.7):

(2a,b) While count data is available for the area along the Dutch coast, these data show very great annual variation. No counts are carried out specifically along the seaward boundary of the North Sea Coastal Zone 1.

(3) Based on the points under (2), the CS of the eider in the North Sea Coastal Zone 2 (SPA) is assessed as 'unknown'; a maintenance target is recommended.

(4a) The national CS of the eider has been assessed as 'unfavourable–bad' based on the aspect 'habitat' (it is now being ascertained whether this should be changed to 'unfavourable–inadequate'), due to mortality in the Wadden area and because birds are leaving the Wadden Sea for the North Sea Coastal Zone. The national conservation objective for eiders (non-breeding birds) is: to increase the extent and quality of habitat with the capacity to carry a population varying from 115,000 to 140,000 birds (January numbers).

If it is assumed that the quality /carrying capacity of the North Sea Coastal Zone 2 (SPA) per unit of surface area is equal to that of the North Sea Coastal Zone 1, the favourable reference (the site's carrying capacity) can be increased from 26,200 eiders to 31,600 for the site following expansion. It is recommended that a maintenance target be formulated for the carrying capacity with this number rounded off to 31,600 for North Sea Coastal Zone 1+2 or 5400 for North Sea Coastal Zone 2.

(4b) In the site already designated of North Sea Coastal Zone 1 (SPA) the conservation objective for the eider is: to maintain the extent and quality of habitat with the capacity to carry a population averaging 26,200 birds (midwinter numbers).

Conservation

objective Maintain the extent and quality of habitat with the capacity to carry a population averaging 5400 birds (midwinter numbers). This figure applies to the North Sea Coastal Zone 2 site.

Explanation Eider numbers are of great significance both nationally and internationally. For the species, the site serves mainly as a foraging site. The North Sea Coastal Zone became important in the early 1990s, when the numbers here increased while the numbers in the Wadden Sea were decreasing. Particularly in years in which a reduced food supply in the Wadden Sea coincides with the abundance of other shellfish (e.g. *Spisula*) in the North Sea Coastal Zone, a relative high number of eider forage here. The recent decrease of the eider population in the North Sea Coastal Zone may be a sign that a restoration in the food situation in the Wadden Sea is starting, but such a restoration is not yet evident in the population trend. As the presence of eiders in the North Sea Coastal Zone is probably tied to poor conditions in the Wadden Sea, the restoration task is imposed there and in the North Sea Coastal Zone the maintenance of the capacity to accommodate a temporary influx of birds will suffice. It is sufficient that the current situation be maintained, the probable cause of the national conservation status of 'unfavourable–bad' does not lie within this site.

Black scoter

Considerations (see diagram in chapter 2.7):

(2a,b) Numbers in the Dutch coastal strip show that the presence of black scoters is episodic and, accordingly, numbers can vary greatly from year to year. No counts are carried out specifically along the seaward expansion of the Natura 2000 site of the North Sea Coastal Zone 1 (already designated). With the decline of the trough shell, the black scoter's primary food source, the question arises whether the habitat is still suitable enough (see profile document Black scoter). The North Sea Coastal Zone 2 is part of the species' habitat.

(3) Based on the points under (2), the CS in the North Sea Coastal Zone 2 (SPA) is assessed as 'unfavourable–inadequate' and a maintenance target is recommended.

(4a) The national CS of the black scoter has been assessed as 'unfavourable–inadequate' due to the aspect 'habitat'. This is related to the decrease in trough shells within the site; this is the black scoter's primary food source.

The national conservation objective for black scoters is: to maintain the extent and quality of habitat with the capacity to carry a population averaging 68.500 birds (January numbers).

If it is assumed that the quality/carrying capacity of the North Sea Coastal Zone 2 (per unit of surface area) is equal to that of the North Sea Coastal Zone 1, the number can be revised proportionally in line with the expansion of the Natura 2000 site. This comes down to an increase in the current favourable reference of 51,900 to 62,600 black scoters for the entire North Sea Coastal Zone site following expansion. It is recommended that a maintenance target be formulated for the carrying capacity with this number rounded off to 62,600 for North Sea Coastal Zone 1 + 2 or 10,700 for North Sea Coastal Zone 2.

(4b) In the North Sea Coastal Zone 1 site the conservation objective is: to maintain the extent and quality of habitat with the capacity to carry a population averaging 51,900 birds (midwinter numbers).

Conservation

objective Maintain the extent and quality of habitat with the capacity to carry a population averaging 10.700 birds (midwinter numbers). This number applies to the North Sea Coastal Zone 2 site.

Explanation Black scoters numbers are of very great significance both nationally and internationally. For the species, the site serves mainly as a foraging site; this is by far the most important foraging site in the Netherlands for the black scoter. The species is a winter visitor. Owing to large fluctuations, caused in part by only January counts being available, there is no clear trend. However, the numbers may actually fluctuate from year to year due to the varying supply of shellfish (including Spisula). Nationally, the species has a unfavourable–inadequate conservation status.

Little gull

Considerations (see diagram in chapter 2.7):

(2a,b) No count data is available for the coastal zone.

(3) Based on the point under (2), the CS of the little gull in the North Sea Coastal Zone 2 (SPA) is assessed as 'unknown' and a maintenance target is recommended.

(4) The national conservation status of the little gull is 'unfavourable–inadequate' due to the aspects 'population', 'habitat' and 'future prospects'. These relate primarily to the most important habitat, Lake IJsselmeer. The national conservation objective for the little gull is: to maintain the extent and quality of habitat. It is recommended that the conservation objective and explanation in the designation order for the Natura 2000 site of the North Sea Coastal Zone 1 (already designated) be adopted.

(4b) In the North Sea Coastal Zone 1 site the conservation objective is: to maintain the extent and quality of habitat.

Conservation objective Maintain the extent and quality of habitat.

Explanation Little gull numbers are of (great) national significance. The site serves mainly as a foraging site. This is one of the most important areas in the Netherlands. It is sufficient that the current situation be maintained, the probable cause of the national conservation status of 'unfavourable–inadequate' does not lie within this site.

7.5 Frisian Front

The following site description has been compiled following the example of others in existing designation orders. In compiling the conservation objectives use has been made of background information on bird species as described in chapter 6. The methodology for compiling the proposals for conservation objectives is described in section 2.7.

7.5.1 Site description and boundary

Site description

The Frisian Front is the name given to an area of sea to the north of the Wadden Islands some 80 km from the coast. The site has a surface area comparable with that of the Dutch Wadden Sea and forms a transition zone between the shallow southern and the deep central North Sea. Various water masses come together in this transition zone, causing a front with elevated biological production and elevated benthos biodiversity. As a result of this, the Frisian Front is an important foraging site for birds.

Landscape context and boundary features

The North Sea Coastal Zone site is part of the Natura 2000 landscape 'North Sea, Wadden Sea and Delta'.

The boundary of the Birds Directive site has been established on the basis of high bird values, seabed sampling points with an elevated biodiversity and the presence of the ocean quahog (OSPAR list). It has been decided to give the site straight boundaries. The observed shift in the location of the area with the maximum silt has also been taken into account in setting the boundaries.

The boundaries of a Birds Directive site are determined by the use made of the site by the species in Annex I and/or migrating waterbirds and/or other migrating birds present at the site, whereby landscape ecological units and the biotopic requirements of the bird species concerned are used as guiding principles. The Frisian Front site has been designated under the Birds Directive due to the presence of the great skua (which satisfies the 1% criterion and is listed in Annex I of the Birds Directive, Art. 4.1) and the presence of large numbers of common guillemots with young in the period July-November, a peculiarity in the southern North Sea (and satisfies the abundance criterion of >20,000 specimens, Art. 4.2). For the common guillemots, a special function is involved here during an important part of the life cycle of the population: moulting parents migrate with their as yet flightless young from Great Britain to the Frisian Front. These birds are particularly vulnerable to oil slicks, for example, and are less able than others to migrate to other areas. For birds, the Frisian Front is important as a foraging site.

There is a combined action between fish and bird species that hunt and eat at this site. The most important prey fish species in the Frisian Front are probably sprat and young horse mackerel. The diving common guillemots hunt small fish and drive them to the surface. Mackerel and the larger horse mackerel also hunt fish, which enables the lesser black-backed gull, too, to benefit from the food supply this generates. The lesser black-backed gull comes from coastal areas to the Frisian Front to forage. Finally, the great skua and Arctic skua steal the prey of other foraging birds, especially gulls.

Boundary and surface area

The boundary of the Natura 2000 site of the Frisian Front is shown on the map accompanying the designation. The site has been designated exclusively as a Birds Directive site and is situated in open sea at the transition between the shallow southern and the deeper central North Sea. The site has straight boundaries. Roughly speaking, the southern edge of the site is bounded by the 30-metre depth line. The Natura 2000 site has a surface area of 288,084 ha.

7.5.2 Conservation objectives

General objectives

The maintenance and if applicable restoration of:

1. the contribution of the Natura 2000 site to the ecological coherence of Natura 2000 within both the Netherlands and the European Union;
2. the contribution of the Natura 2000 site to the biological diversity and to the favourable conservation status of natural habitat types and species within the European Union and as included in Annex I or Annex II of the Habitat Directive. This includes the site's necessary contribution to the pursuit of a favourable conservation status at national level for the habitat types and the species for which the site has been designated;

3. the natural features of the Natura 2000 site, including the coherence of the structure and functions of the habitat types and of the species for which the site has been designated;
4. the ecological requirements of the habitat types and species for which the site has been designated as they apply to the site.

Birds Directive: species

Great skua

Considerations (see diagram in chapter 2.7):

(2a,b) Historical data do not relate specifically to this site. Most counts have been carried out for the North Sea as a whole, or have been conducted in a small part of the Frisian Front. The great skua uses the Frisian Front as a foraging site during its migration.

(3) Based on the point under (2), the CS of the great skua in the Frisian Front is assessed as 'unknown'. A maintenance target is proposed.

(4a) The national CS of the great skua has been assessed in this report as 'favourable' (see section 6.1). The proposal for the national conservation objective for great skuas is: to maintain the extent and quality of habitat with the capacity to carry a population averaging 1527 birds, rounded off to 1500 birds (see section 6.1).

The proposal for the site's conservation objective is: to maintain the extent and quality of habitat for an average of 180 birds (average numbers in August/September). Data presented in the Ecological Atlas of the North Sea (Lindeboom et al. 2008) has been used to arrive at the bird numbers (see section 6.1).

(5) In the pursuit of a more natural situation in the North Sea, measures may well be taken to reduce fisheries activity. This may cause bird species that benefit directly or indirectly from fishery by eating fish waste and discards to decline in numbers over time. Any decline in bird populations as a result of fishery-reduction measures is a natural process and fits within the target scenario.

Conservation objective: Maintain the extent and quality of habitat with the capacity to carry a population averaging 180 birds (August-September).

Explanation: In the period August-September approx. 5.5% of the biographical population occurs in the EEZ and more than 1% in the Frisian Front. The national conservation status has been assessed as 'favourable'.

Great black-backed gull

Considerations (see diagram in chapter 2.7):

(2a,b) Historical data do not relate specifically to this site. Most counts have been carried out for the North Sea as a whole, or have been conducted in a small part of the Frisian Front. The great black-backed gull uses the area as a foraging site in winter.

(3) Based on the point under (2), the CS of the great black-backed gull in the Frisian Front is assessed as 'unknown'. A maintenance target is recommended.

(4a) The national CS of the great black-backed gull has been assessed in this report as 'favourable' (see section 6.2).

The advice for the national conservation objective in this report reads as follows: maintain the extent and quality of habitat with the capacity to carry a population averaging 17,793 birds, rounded off to 18,000 birds (average in the period October-November) (see section 6.2).

The advice for the site's conservation objective is: to maintain the extent and quality of habitat with the capacity to carry a population averaging 77 birds, rounded off to 80 birds (average in the period October-November, calculated using the method presented in the Ecological Atlas, as described above for the great skua).
(4b) There are no adjacent sites.
(5) In the pursuit of a more natural situation in the North Sea, measures may well be taken to reduce fisheries activity. This may cause bird species that benefit directly or indirectly from fishery by eating fish waste and discards to decline in numbers over time. Any decline in bird populations as a result of fishery-reduction measures is a natural process and fits within the target scenario.

Conservation objective: Maintain the extent and quality of habitat with the capacity to carry a population averaging 80 birds (October-November).

Explanation: The great black-backed gull occurs primarily in autumn and winter in the EEZ (October-November), but since the early 1990s there has also been a small but growing breeding population in the Netherlands. The numbers in the EEZ fluctuate. The national conservation status has been assessed as 'favourable'.

Common guillemot

(2a,b) Historical data do not relate specifically to this site. Most counts have been carried out for the North Sea as a whole, or have been conducted in a small part of the Frisian Front. In 2006, during a one-time survey focusing on the Frisian Front, almost 50,000 common guillemots (roughly estimated) were encountered within the site (Leopold & Camphuysen 2006). Numbers in the EEZ in the period 1991-2007 fluctuated and the current trend is negative (Arts 2008). This is due to the decline in the number of breeding birds in Scotland. The decline is not as great as the increase that preceded it. After the breeding season, the common guillemot uses the site with its young as a foraging site.
(3) Based on the points under (2), the CS for the common guillemot in the Frisian Front has been assessed as 'favourable'. A maintenance target is advised.
(4a) The national conservation status of the common guillemot has been assessed in this report as 'favourable' (see section 6.3). This is because the decline is not as great as the increase that preceded it. The proposed advice for the national conservation objective is: to maintain the extent and quality of habitat for a population averaging 330,000 birds (332,136 rounded off, see section 6.3).
The advice for the site's conservation objective is: to maintain the habitat's capacity to carry a population averaging 20,000 birds in July-August. The Frisian Front is being designated as a Birds Directive site in part because the common guillemot occurs here in numbers exceeding 20,000 individuals. The good quality of the habitat is determined by the water quality (absence of oil pollution) and the limited scale of disturbances.
(4b) There are no adjacent sites.

Conservation objective: Maintain the extent and quality of habitat with the capacity to carry a population averaging 20,000 individuals in July-August.

Explanation: The common guillemot is the most abundant overwintering bird in the EEZ. Highest densities are reached in summer once the birds from the breeding colonies in Scotland have spread out over the North Sea to forage. The national conservation status has been assessed as 'favourable'. However, the species is vulnerable to oil pollution and shipping. Incidents can have a major effect on the population.

Lesser black-backed gull

Considerations (see diagram in section 2.7):

(2a,b) Historical data do not relate specifically to this site. Most counts have been carried out for the North Sea as a whole, or have been conducted in a small part of the Frisian Front. The lesser black-backed gull uses the site as, among other things, a foraging site while based at its breeding grounds (see section 6.4).

(3) Based on the point under (2), the CS of the lesser black-backed gull in the Frisian Front has been assessed as 'favourable'. A maintenance target is advised.

(4a) The national conservation status of the lesser black-backed gull has been assessed in this report as 'favourable' (see section 6.4). The national conservation objective is: to maintain the extent and quality of habitat in order to maintain a population of 43,000 breeding pairs. This figure has been based on the average for the period 1993-1997. This period has been used in the system for selecting Birds Directive sites.[11]

The advice for the site's conservation objective is: to maintain the extent and quality of habitat in order to maintain the population.

(4b) There are no adjacent sites, but breeding birds come here to forage from the Natura 2000 site of the Wadden Sea. The objective there is as follows: maintain the extent and quality of habitat with the capacity to carry a population of at least 19,000 pairs.

(5) In the pursuit of a more natural situation in the North Sea, measures may well be taken to reduce fisheries activity. This may cause bird species that benefit directly or indirectly from fishery by eating fish waste and discards to decline in numbers over time. Any decline in bird populations as a result of fishery-reduction measures is a natural process and fits within the target scenario.

Conservation objective	Maintain the extent and quality of habitat in order to maintain the population.
Explanation	The Frisian Front is important for breeding lesser black-backed gulls that come here to forage from the breeding colonies. Maintaining the function as a foraging site contributes to the national conservation objective.

7.5.3 References

Lindeboom HJ, Dijkman EM, Bos OG, Meesters EH, Cremer JSM, De Raad I, Van Hal R, Bosma A (2008) Ecologische Atlas Noordzee ten behoeve van gebiedsbescherming, Wageningen IMARES.

Arts FA (2008) Trends en verspreiding van zeevogels en zeezoogdieren op het Nederlands Continentaal Plat 1991 – 2007. Report No. 2008.058, RWS Water Service.

Leopold MF, Camphuysen CJ (2006) SC41 Osterems survey Klaverbank en Friese Front, 24-28 juli 2006. Unpubl. Report to the Ministry of Agriculture, Nature and Food Quality, August 2006. Wageningen IMARES, p 10.

[11] This national conservation objective is missing in the original Dutch. The English text is correct. For details, please see Erratum Report C065_09.

8 Quality assurance

IMARES has an ISO 9001:2000 certified quality management system (certificate number: 08602-2004-AQ-ROT-RvA). This certificate is valid until 15 December 2009. The organisation has been certified since 27 February 2001. The certification was performed by DNV Certification B.V. The most recent inspection visit took place on 22-24 April 2009. In addition, the chemistry laboratory of the Environment department holds NEN-EN-ISO/IEC 17025:2005 accreditation for test laboratories with number L097. This accreditation is valid until 27 March 2013 and was first granted on 27 March 1997; this accreditation was granted by the Accreditation Council. The most recent inspection visit took place on 15 December 2008.

In addition to the authors, many individuals have been involved in the development of this report; they have provided information, corrected texts and made additions to them and contributed to discussions during workshops.

With IMARES the experts were involved in this way:

- Sophie Brasseur
- Henk Heessen
- Mardik Leopold
- Ilse de Mesel
- Meike Scheidat.

In addition, external experts have also been involved in the reporting (in particular the habitat descriptions):

- Floor Heinis (HWE)
- Godfried van Moorsel (Ecosub)
- Dick Bal (LNV).

During a workshop held on 19 May 2009 in The Hague, a draft version of this report was discussed. In addition to the project supervisors and IMARES employees, the following external experts were present at this event:

- Gerard Duineveld (NIOZ)
- Floor Heinis (HWE)
- Herman Hummel (NIOO_CEME)
- Ron Kastelein (Seamarco)
- Mark Lavaleye (NIOZ)
- Godfried van Moorsel (Ecosub)
- Sharon Tatman (Deltares)
- Steven Degrear (MUMM, Brussels).

At the Ministry of Agriculture, Nature and Food Quality the following individuals have been involved in the project's supervision:

- Marissa Giesen
- Vincent van der Meij
- Hans Nieuwenhuis
- Ton IJlstra
- Frank Roozen.

At the Ministry of Transport, Public Works and Water Management, RWS North Sea, the following individuals have been involved:

- Waldo Broeksma
- Peter Heslenfeld.

Accountability

Report C065/09
Project number: 430.62010.01

Accountability

Great care has been taken in producing this report. The scientific quality has been checked internally by a colleague researcher and the relevant head of department at IMARES.

Approval: Drs. J. Asjes
Head of Department Ecology

Signature:

Date: 27 August 2009

Approval: Drs. F.C. Groenendijk
Head of Department Ecology

Signature:

Date: 27 August 2009

Appendix 1 Description of H1170 in Interpretation Manual

Source: EU (2007) Interpretation Manual of European Union Habitats EUR 27, European Commission DG Environment, Nature and Biodiversity.

1170 Reefs

PAL.CLASS.: 11.24, 11.25

1) Reefs can be either biogenic concretions or of geogenic origin. They are hard compact substrata on solid and soft bottoms, which arise from the sea floor in the sublittoral and littoral zone. Reefs may support a zonation of benthic communities of algae and animal species as well as concretions and corallogenic concretions.

Clarifications:
- '*Hard compact substrata*' are: rocks (including soft rock, e.g. chalk), boulders and cobbles (generally >64 mm in diameter).
- '*Biogenic concretions*' are defined as: concretions, encrustations, corallogenic concretions and bivalve mussel beds originating from dead or living animals, i.e. biogenic hard bottoms which supply habitats for epibiotic species.
- '*Geogenic origin*' means: reefs formed by non biogenic substrata.
- '*Arise from the sea floor*' means: the reef is topographically distinct from the surrounding seafloor.
- '*Sublittoral and littoral zone*' means: the reefs may extend from the sublittoral uninterrupted into the intertidal (littoral) zone or may only occur in the sublittoral zone, including deep water areas such as the bathyal.
- Such hard substrata that are covered by a thin and mobile veneer of sediment are classed as reefs if the associated biota are dependent on the hard substratum rather than the overlying sediment.
- Where an uninterrupted zonation of sublittoral and littoral communities exist, the integrity of the ecological unit should be respected in the selection of sites.
- A variety of subtidal topographic features are included in this habitat complex such as:
Hydrothermal vent habitats, sea mounts, vertical rock walls, horizontal ledges, overhangs, pinnacles, gullies, ridges, sloping or flat bed rock, broken rock and boulder and cobble fields.

2) Plants:
North Atlantic including North Sea and Baltic Sea: - A large variety of red, brown and green algae (some living on the leaves of other algae).

Atlantic (Cantabric Sea, Bay of Biscay): - *Gelidium sesquipedale* communities associated with brown algae (*Fucus*, *Laminaria*, *Cystoseira*), and red algae (Corallinaceae, Ceramiceae, Rhodomelaceae).
Central Atlantic Islands (Macaronesian Islands) and Mediterranean: - *Cystoseira/Sargassum* beds with a mixture of other red algae (*Gelidiales, Ceramiales*), brown algae (*Dictyotales*) and green algae (*Siphonales, Siphonacladales*).

Animals - reef forming species:
North Atlantic including North Sea: - Polychaeta (*e.g. Sabellaria spinulosa*, *Sabellaria alveolata*, *Serpula vermicularis*), bivalves (e.g. *Modiolus modiolus, Mytilus sp.*) and cold water corals (e.g. *Lophelia pertusa*).

Atlantic (Gulf of Cádiz): - Madreporarians communities: *Dendrophyllia ramea* community (banks), *Dendrophyllia cornigera* community (banks); white corals communities (banks), (*Madrepora oculata* and *Lophelia pertusa* community (banks). *Solenosmilia variabilis* community (banks). Gorgonians communities: Facies of *Isidella elongata* and *Callogorgia verticillata* and *Viminella flagellum*; Facies of *Leptogorgia* spp.; Facies of *Elisella paraplexauroides*; Facies of *Acanthogorgia* spp. and *Paramuricea* spp. *Filigrana implexa* formations.
Central Atlantic Islands (Macaronesian Islands): - Warm water corals (*Dendrophilia, Anthiphates*), serpulids, polychaeta, sponges, hydrozoan and briozoan species together with bivalve mollusks (*Sphondillus, Pinna*).
Baltic Sea: - Bivalves (e.g. *Modiolus modiolus, Mytilus* sp*., Dreissena polymorpha)*.
Mediterranean: - Serpulid polychaeta, bivalve molluscs (e.g. *Modiolus sp. Mytilus sp.* and oysters) Polychaeta (*e.g. Sabellaria alveolata)*.
South-West Mediterranean: - Dendropoma *petraeum* reefs (forming boulders) or in relation with the red calcareous algae *Spongites* spp or *Litophyllum lichenoides*. *Filigrana implexa* formations. Gorgonians communities: Facies of holoaxonia gorgonians (*Paramuricea clavata* 'forest', *Eunicella singularis* 'forest'), mixed facies of gorgonians (*Eunicella* spp, *P. clavata*, *E. paraplexauroides*, *Leptogorgia* spp). Facies of *Isidella elongata* and *Callogorgia verticillata*; Facies of scleroaxonia gorgonians (*Corallium rubrum*). Madreporarians communities: *Cladocora caespitosa* reefs, *Astroides calycularis* facies. Madreporarians communities: *Dendrophyllia ramea* community (banks); *Dendrophyllia cornigera* community (banks); white corals communities (banks): *Madrepora oculata* and *Lophelia pertusa* community (banks).
West Mediterranean: - Polychaeta (exclusively *Sabellaria alveolata)*.

Animals - non reef forming:
North Atlantic including North Sea: - In general sessile invertebrates specialized on hard marine substrates such as sponges, anthozoa or cnidaria, bryozoans, polychaeta, hydroids, ascidians, molluscs and cirripedia (barnacles) as well as diverse mobile species of crustaceans and fish.
Central Atlantic Islands (Macaronesian Islands): - Gorgonians, hydrozoans, bryozoan and sponges, as well as diverse mobile species of crustacean, molluscs (cephalopoda) and fish.
Baltic Sea: - Distribution and abundance of invertebrate species settling on hard substrates are limited by the salinity gradient from west to east. Typical groups are: hydroids, ascidians, cirripedia (barnacles), bryozoans and molluscs as well as diverse mobile species of crustaceans and fish.
Mediterranean: - Cirripedia (barnacles), hydroids, bryozoans, ascidians, sponges, gorgonians and polychaeta as well as diverse mobile species of crustaceans and fish.

3) Corresponding categories
German classification : 'Benthal der Nordsee mit Hartsubstrat (010204)', 'Riffe der Nordsee (010204a)', 'Benthal der Flachwasserzone der Nordsee mit Hartsubstrat, makrophytenarm (030204)', 'Benthal der Flachwasserzone der Nordsee mit Hartsubstrat, makrophytenreich (030206)', 'Miesmuschelbank des Sublitorals der Nordsee (030207)', 'Austernbank des Sublitorals der Nordsee (030208)', 'Sabellaria-Riff des Sublitorals der Nordsee (030209)', 'Felswatt der Nordsee (050104)', 'Miesmuschelbank des Eulitorals der Nordsee (050107)'; 'Benthal der Ostsee mit Hartsubstrat (020204)', 'Riffe der Ostsee (020204a)', 'Benthal der Flachwasserzone der Ostsee mit Hartsubstrat, makrophytenarm (040204)', 'Benthal der Flachwasserzone der Ostsee mit Kies- und Hartsubstrat, makrophytenreich (040206)', 'Miesmuschelbank des Sublitorals der Ostsee (040207)', 'Vegetationsreiches Windwatt mit Hartsubstrat (060203) (Ostsee)'.

Barcelona Convention: 'Biocenosis of supralittoral rock (I.4.1.)', 'Biocenosis of the upper mediolittoral rock (II.4.1.)', 'Biocenosis of the lower mediolittoral rock (II.4.2.)', 'Biocenosis of

infralittoral algae (III.6.1.)', 'Coralligenous (IV.3.1.)', 'Biocenosis of shelf-edge rock (IV.3.3)', 'Biocenosis of deep sea corals present in the Mediterranean bathyal (V.3.1.)'.

The National Marine Habitat Classification for Britain and Ireland (Version 03.02): 'Littoral rock and other hard substrata (biotopes beginning with LR)', 'Infralittoral rock and other hard substrata (biotopes beginning with IR)', 'Circalittoral rock and other hard substrata (biotopes beginning with CR)', 'Littoral biogenic reefs (biotopes beginning with LBR)' and 'Sublittoral biogenic reefs (biotopes beginning with SBR)'.

EUNIS classification: Relevant types within 'A1.1, A1.1/B-ELR.MB, A1.2, A1.2/B-MLR.MF, A1.3, A1.3/B-SLR, A1.4, A1.5, A1.6, A2.8, A3.1, A3.2, A3.2/M-III.6.1.(p), A3.2/H- 02.01.01.02.03, A3.2/H-02.01.02.02.03, A3.3, A3.4, A3.5, A3.6, A3.6/B-MCR.M, A3.7, A3.8, A3.9, A3.A, A3.B, A3.C, A4.6, A5.1, A5.6', A6.2, A6.3.

HELCOM classification: 'Sublittoral soft rock reefs of the photic zone with little or no macrophyte vegetation (2.1.1.2.3)', 'Hydrolittoral soft rock reefs with or without macrophyte vegetation (2.1.1.3.3)', 'Sublittoral solid rock reefs of the photic zone with or without macrophyte vegetation (2.1.2.2.3)', 'Hydrolittoral solid rock reefs with or without macrophyte vegetation (2.1.2.3.3)', 'Sublittoral stony reefs of the photic zone with or without macrophyte vegetation (2.2.2.3)', 'Stony reefs of the hydrolittoral zone with or without macrophyte vegetation (2.2.3.3)'.

Trilateral Wadden Sea Classification (von Nordheim et al. 1996): 'Sublittoral (old) blue mussel beds (03.02.07)', 'Sublittoral oyster reefs (03.02.08)', 'Sublittoral sabellaria reefs (03.02.09)', 'Eulittoral (old) blue mussel beds (05.01.07)', 'Benthic zone, stony and hard bottoms, rich in macrophytes, incl. artificial substrates (03.02.06)', 'Benthic zone, stony and hard bottoms, few macrophytes (03.02.04)'.

Nordic classification (Kustbiotoper i Norden, Nordiska Ministerrådet 2001): 'Klippbottnar (7.7.1.3; 7.7.2.3; 7.7.3.3; 7.7.4.3; 7.7.5.3; 7.8.1.3; 7.8.2.3; 7.8.3.4; 7.8.4.3; 7.8.5.3; 7.8.6.13; 7.8.7.16)', 'Sublittorale samfund på sten- och klippebund (7.9.1.2)', 'Sublittorale samfund på stenbund (7.9.2.2; 7.9.3.2)'.

4) Reefs can be found in association with 'vegetated sea cliffs' (habitats 1230, 1240 and 1250) 'sandbanks which are covered by sea water all the time' (1110) and 'sea caves' (habitat 8830). Reefs may also be a component part of habitat 1130 'estuaries' and habitat 1160 'large shallow inlets and bays'

5)

Augier H. (1982). Inventaire et classification des biocénoses marines benthiques de la Méditerranée. Publication du Conseil de l' Europe, Coll. Sauvegarde de la Nature, 25, 59 pages.

Ballesteros E. (1988). Estructura de la comunitad de *Cystoseira mediterranea* Sauvageau and el Mediterraneo noroccidental. *Inv. Pesq*. 52 (3): 313-334.

Ballesteros E. (1990). Structure and dynamics of the *Cystoseira caespitosa* (Fucales, Phaeophyceae) community in the North-Western Mediterranean. *Scient. Mar*. 54 (2): 155-168.

Bellan-Santini D. (1985). The Mediterranean benthos: reflections and problems raised by a classification of the benthic assemblages. In: J.E. Treherne (Ed.) 'Mediterranean Marine Ecosystems' pp. 19-48.

Bianchi, C.N., Haroun, R., Morri, C. & Wirtz, P. (2000). The subtidal epibenthic communities off Puerto del Carmen (Lanzarote, Canary Islands). *Arquipélago, Sup.2 (Part A)*: 145-155.

Borja, A., Aguirrezabalaga, F., Martínez, J., Sola, J.C., García- Arberas, L., & Gorostiaga (2003). Benthic communities, biogeography and resources management. In: Borja, A. & Collins, M. (Ed.). *Ocenaography and Marine Environment of the Basque Country*, Elsevier Oceanography Series n. 70: 27-50.

Boudouresque C.F. (1969). Etude qualitative et quantitative d'un peuplement algal à *Cystoseira mediterranea* dans la région de Banyuls sur Mer. *Vie Milieu* 20: 437-452.

Connor, D.W., Allen, J.H., Golding, N., Lieberknecht, L.M., Northen, K.O. & Reker, J.B. (2003). *The National Marine Habitat Classification for Britain and Ireland Version 03.02. Internet version.* Joint Nature Conservation Committee, Peterborough. (www.jncc.gov.uk/marine/biotopes/default.htm)

European Environment Agency (2002). *EUNIS habitat classification. Version 2.3*. Copenhagen,

EEA (Internet publication: http://mrw.wallonie.be/dgrne/sibw/EUNIS/home.html)

Giaccone G. & Bruni A. (1972-1973). Le Cistoseire e la vegetazione sommersa del Mediterraneo. *Atti dell' Instituto Veneto de Scienze* 81: 59-103.

Gil-Rodríguez, M.C. & Haroun R.J. (2004). Litoral y Fondos Marinos del Parque Nacional de Timanfaya. En: *Parques Nacionales Españoles.* MMA/Ed. Canseco, Madrid (en prensa).

Haroun, R. Y Herrera R. (2001). '*Diversidad Taxonómica Marina*' En: J.M. Fernández-Palacios y J.L. Martín Esquivel (Eds.), *Naturaleza de las Islas Canarias. Ecología y Conservación*, Ed. Turquesa, S/C de Tenerife, pp. 127-131.

Helcom (1998). Red List of Biotopes and Biotope Complexes of the Baltic Sea, the Belt Sea and the Kattegat. *Baltic Sea Environment Proceedings* No. 75.: 126pp.

Holt, T.J., Rees, E.I., Hawkins, S.J. & Seed, R. (1998). Biogenic Reefs (volume IX). An overview of dynamic and sensitivity characteristics for conservation management of marine SACs. Scottish Association for Marine Science (UK Marine SACs Project), 170 pp. (www.ukmarinesac.org.uk/biogenic-reefs.htm)

Kautsky, N. (1974). Quantitative investigations of the red algae belt in the Askö area, Northern Baltic proper. *Contrib. Askö Lab. Univ. Stockholm* 3: 1-29.

Montesanto B. & Panayotidis P. (2000). The *Cystoseira* spp. communities from the upper the Aegean Sea. J. mar. biol. Ass., U.K. 80:357-358.

Von Nordheim, H., Norden Andersen, O. & Thissen, J. (Eds.) (1996). Red Lists of Biotopes, Flora and Fauna of the Trilateral Wadden Sea Area 1995. Helgol. Meeresuntersuchungen. 50 (suppl.): 136 pp.

Nordiska Ministerrådet (2001). Kustbiotoper i Norden. Hotade och representativa biotoper. TemaNord 2001: 536. 345 pp.

Medina, M., Haroun, R.J. Y Wildpret, W., (1995). Phytosociological study of the Cystoseira abies-marina community in the Canarian Archipelago. *Bull. Museu Mun. Funchal, Sup.* 4: 433-439.

Panayotidis P., Diapoulis A., Varkitzi I. & Montesanto B. (2001). *Cystoseira spp.* used for the typology of the NATURA-2000 code 1170 ('reefs') at the Aegean Sea (NE Mediterranean). Proceedings of the first Mediterranean Symposium on Marine Vegetation. Ajaccio 3-4 October 2000, pages 168-172.

Perès J. M. & Picard J. (1964). Nouveau manuel de bionomie benthique de la mer Méditerranée. *Rec. Trav. St. Mar. Endoume* 31 (47): 5-137.

Ravanko, O. (1968). Macroscopic green, brown and red algae in the south-western archipelago of Finland. *Acta Bot. Fennica* 79: 1-50.

Riecken, U., Ries, U. & Ssymank, A. (1994). Rote Liste Der Gefährdeten Biotoptypen Der Bundesrepublik Deutschland - Schriftenreihe für Landschaftspflege und Naturschutz. 41: 184 pp

Appendix 2 Recommendations for monitoring and research

Habitat Directive: habitat types

H1110_B Sandbanks which are slightly covered by sea water all the time (subtype 'North Sea Coastal Zone')
With respect to the sites addressed in this report, the habitat type occurs on the Vlakte van de Raan and the North Sea Coastal Zone.
It is recommended that the profile document for the habitat type H1110 be amended, by introducing a subtle distinction into the qualification 'unfavourable–inadequate' applied to the subtype H1110_B.
For the Vlakte van de Raan it is recommended that monitoring stations for bottom-dwellers be included in the MWTL programme, so that the quality of the habitat type can be assessed with regard to this aspect.

H1110_C Sandbanks which are slightly covered by sea water all the time (subtype 'Dogger Bank')
It is recommended that the monitoring of the bottom fauna be expanded to include locations on the north side of the Dogger Bank.

H1170 Open-sea reefs
The question of what undisturbed biotic communities of the habitat type may look like on the Cleaver Bank can be answered if all disturbance of the seabed is prevented for a long period (in the order of ten years) within (part of) the site.

Habitat Directive: species

Harbour porpoise
With respect to the sites addressed in this report, the harbour porpoise is relevant to all the Habitats Directive sites (Cleaver Bank, Dogger Bank, Vlakte van de Raan, North Sea Coastal Zone 2). Supplementary information about the distribution in space and time and about the age structure of the population is necessary to gain an understanding of the significance of the individual sites and the EEZ as a whole.

Grey seal
With respect to the sites addressed in this report, the grey seal is relevant to all the Habitats Directive sites (Cleaver Bank, Dogger Bank, Vlakte van de Raan, North Sea Coastal Zone 2). Additional sightings made with telemetrics can provide a better understanding of the significance to the grey seal of the individual sites compared to the EEZ as a whole.

Harbour seal
With respect to the sites addressed in this report, the harbour seal is relevant to all the Habitats Directive sites (Cleaver Bank, Dogger Bank, Vlakte van de Raan, North Sea Coastal Zone 2). Additional sightings made with telemetrics can provide a better understanding of the significance to the harbour seal of the individual sites compared to the EEZ as a whole.