



Offshore Special Area of Conservation: Dogger Bank

Draft Conservation Objectives and Advice on Operations



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Version 5.0 (27th April 2010)

* Cover photo shows whiting (*Merlangius merlangus*) and sand eels (*Ammodytes* spp.) on the Dogger Bank.

Document Version Control

Version and date	Amendments made	Issued to and date
DoggerBank_Conservation Objectives+Advice on Operations_5.0.doc (27 th April 2010)	- Updated information on exposure to pressures - Amended site boundary (v 1.6) March 2010 - Conservation Objectives for harbour porpoise removed due to re-grading of species at site	Defra and UKMBPSG 30 th April 2010
DoggerBank_Conservation Objectives+Advice on Operations_4.1.doc (10 th November 2008)	Typical species criteria moved to new appendix Reformatted explanatory text	UKMBPSG and UK MPA Policy Group, 14th Nov 08
DoggerBank_Conservation Objectives+Advice on Operations_4.0.doc (21 st Oct 2008)	Updated Conservation Objectives explanatory text Added typical species criteria	Defra (7 th Nov 2008)
DoggerBank_Conservation Objectives+Advice on Operations_3.0.doc (10 th January 2008)	Advice on Operations updated to reflect Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 coming in to force. Stand alone COs and AoOs Sensitivity, exposure and vulnerability assessments modified; exposure data from Eastwood <i>et al.</i> (2007) Summary of AoOs moved to front of document	JNCC Committee and UK Marine Biodiversity Policy Steering Group
DoggerBankDossier_2.0_Draft.doc (26 th August 2006)	Document structure modified: Conservation objectives and Advice on Operations combined with SAC selection assessment. Sensitivity/exposure/vulnerability assessments revised Advice on Operations amended	Defra (25 th September 2006)
Dogger Bank draft conservation objectives and management actions: JNCC 05 P10 (September 2005)	Sensitivity/exposure/vulnerability assessments added (former document contained provisional management statements only) Advice on Operations amended	JNCC Committee (September 2005)
DoggerDraftManagementActions1204.doc (15 th December 2004)		Defra (14 th Dec 2004)

Further information

This document is available as a pdf file on JNCC's website for download if required (www.jncc.gov.uk).

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Summary of Draft Advice on Operations for Dogger Bank Special Area of Conservation (SAC)

This advice is based on information on the SAC presented in JNCC's 'Dogger Bank: SAC Selection Assessment' (v 6.0 July 2010). JNCC's Conservation Objectives and Advice on Operations is site and feature specific, and has been developed using best available scientific information and expert interpretation as at April 2010. The advice is generated through a coarse grading of sensitivity and exposure of site interest features to physical, chemical and biological pressures associated with human activity. Sensitivity and exposure have been combined to give a measure of the vulnerability of an interest feature to operations which may cause damage or deterioration, and which may therefore require management action.

The exact impact of any operation will be dependent upon the nature, scale, location and timing of events. This Advice on Operations for the Dogger Bank site will be kept under review and will be periodically updated to reflect new evidence that suggests changes in both sensitivity and exposure.

Management actions should enable the biological communities associated with the Dogger Bank 'Sandbanks which are slightly covered by seawater all the time' to achieve Favourable Condition. This will require assessment and management of human activities likely to affect the feature adversely, and of activities likely to impact natural environmental quality and environmental processes upon which the features are dependent.

The Dogger Bank sandbank is currently moderately or highly vulnerable to the following pressures. Therefore, to fulfil the conservation objectives for the **Annex I sandbanks which are slightly covered by seawater all the time**, the competent authorities for this area are advised to manage human activities within their remit such that they do not result in deterioration or disturbance of this feature through any of the following:

- i) **Physical loss** by obstruction (installation of petroleum and renewable energy industry infrastructure and cables);
- ii) **Physical damage** by physical disturbance or abrasion (demersal trawling);
- iii) **Biological disturbance** by selective extraction of species (demersal trawling).

In addition, the feature is sensitive to the following pressures. However, exposure is unknown at this time and without further information it is impossible to quantify vulnerability:

- iv) **Toxic contamination** by introduction of synthetic and/or non-synthetic compounds (pollution from oil and gas industry);
- v) **Non-toxic contamination** by changes in nutrient loading (sewage from oil and gas rigs).

Dogger Bank SAC: Draft Conservation Objectives and Advice on Operations

1. Introduction

1.1. JNCC's role

The Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended in 2010) transpose the Habitats Directive into law for UK offshore waters (from 12-200 nm from the coast or the UK Continental Shelf). These Regulations give JNCC a statutory responsibility to i) establish conservation objectives for SACs, ii) inform Competent Authorities of these conservation objectives and iii) advise Competent Authorities of any operations which may adversely affect the integrity of the site. This draft document for Dogger Bank SAC is therefore prepared by JNCC in fulfilment of requirements under Regulation 18 of the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended in 2010).

This advice is also required under the Offshore Petroleum Activities (Conservation of Habitats) Regulations (as amended in 2007); and the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) Regulations 2007.

For offshore SACs, JNCC are required to provide conservation objectives and advice on operations once a site has been submitted by Government to the European Commission (i.e. becomes a candidate SAC).

1.2. Offshore (12-200 nautical miles): The role of competent authorities

Regulations 22 and 23 of the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended in 2010) require competent authorities to ensure compliance with the Habitats Directive. Competent authorities must, within their jurisdiction, have regard to both direct and indirect effects on interest features of the site. This may include consideration of issues outside the boundary of the SAC.

1.3. Activity outside the role of competent authorities

Nothing within this document will require competent authorities to undertake any action if it is shown that any changes result wholly from natural causes. Having issued Advice on Operations for SACs, JNCC will work with competent authorities and others to agree, within a defined time frame, a protocol for evaluating all observed changes to baselines and to develop an understanding of natural change and provide further guidance as appropriate and possible. This does not, however, preclude competent authorities from taking action to prevent deterioration to the interest features, and indeed such actions should be taken when required.

1.4. Role of conservation objectives

The conservation objectives set out what is needed to ensure Favourable Condition of the Annex I feature. The UK conservation agencies use the term 'favourable condition' to represent the concept of Favourable Conservation Status for the interest features of an individual SAC (Davies, 2001). For an Annex I habitat, Favourable Conservation Status under the Habitats Directive occurs when: i) its natural range and area it covers within that range are stable or increasing; and ii) the specific structure and functions, which are necessary for its long-term maintenance, exist

and are likely to continue to exist for the foreseeable future; and iii) the conservation status of its typical species is favourable¹ (Article 1e).

Conservation objectives are the starting point from which management measures and monitoring programmes may be developed as they provide the basis for determining what currently, or may in the future, impact the site. The SAC Conservation Objectives will also inform appropriate assessment under the Habitats Regulations.

1.5. Role of advice on operations

Under the Habitats Directive, Member States are required to take appropriate steps to avoid the deterioration or disturbance of interest features within SACs (Article 6.2). The advice on operations set out in Section 3 provides the basis for discussion about the nature and extent of the operations taking place within or close to the site and which may have an impact on its interest features. The advice should also be used to identify the extent to which existing measures of control, management and forms of use are, or can be made, consistent with the conservation objectives, and thereby focus the attention of competent authorities on areas that may need management measures. This operations advice may need to be supplemented through further discussions with the competent authorities and any advisory groups formed for the SAC.

This document will also inform the scope and nature of any appropriate assessments which the Directive requires to be undertaken for plans and projects (Regulation 25 of the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended in 2010)) that:

either alone or in-combination with other plans or projects would be likely to have a significant effect on a European Site; and
is not directly connected with the management of the site for nature conservation.

Where a project is likely to undermine the site's conservation objectives, it is anticipated to have a significant effect on the site and therefore require an appropriate assessment. The scope and content of any appropriate assessment will depend upon the location, size and significance of the proposed project and JNCC will advise on a case by case basis.

Through an appropriate assessment, competent authorities are required to ascertain the effect on the integrity of the site in view of the site's conservation objectives (Article 6.3). The integrity of the site is defined as 'the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified'².

Although closely linked, the judgement of effect upon site integrity is subtly different to determination of favourable condition of a specific feature. An assessment of favourable condition determines the current status of a feature. Any evaluation of effects on site integrity needs to consider whether the plan or project in question is compatible with the long-term maintenance of the site's features. For example, there may be a time-lag between a plan or project being initiated and a consequent adverse effect upon integrity becoming manifest in the condition assessment. In such cases, a plan or project may have an adverse effect upon long-term site integrity even though the features remain in favourable condition in the short term.

¹ The term Favourable Conservation Status relates to the individual habitats and species over their natural range within the European Union. However, because the selection of the European network of SACs is seen as fundamental to achieving Favourable Conservation Status, the European Commission considers that the concept should also be applied at the site level.

² Institute of Ecology and Environmental Management (2006) Guidelines for the Ecological Impact Assessment in the United Kingdom.

1.6. Dogger Bank SAC conservation objectives

Conservation objectives for the Dogger Bank SAC interest features are provided below. These are high level objectives for site features, and JNCC may refine them in future as our understanding of the features improves. They should be read in the context of (and in conjunction with) other advice given, particularly the site Selection Assessment document which provides more detailed information about the site and evaluates its interest features according to the Habitats Directive selection criteria and guiding principles.

Within the objectives below superscript letters refer to explanatory text provided subsequently in section 2.3.

The Conservation Objectives for the Dogger Bank sandbanks which are slightly covered by seawater all the time are:

Subject to natural change, restore^a the *sandbanks which are slightly covered by seawater all the time* to favourable condition, such that the:

- The natural environmental quality^b is maintained
- The natural environmental processes^c are maintained
- The extent^d, physical structure^e, diversity^f, community structure^g and typical species^h representative of *sandbanks which are slightly covered by seawater all the time* in the southern North Sea are restored.

In the case of the Dogger Bank site, there is some evidence to date that, due to damage caused by bottom trawling and possibly infrastructure development, the Annex I feature may not be in favourable condition and might require restoration where possible. As outlined, further information will be required to assess and monitor favourable condition of the interest feature at this offshore SAC.

1.7. Explanation of terms used in the Conservation Objectives

a) **Maintain or restore**

Maintain implies that, based on our existing understanding, the feature is regarded as being in **favourable condition** and will, subject to natural change, remain at its condition at designation.

Restore implies that the feature is likely to have been degraded to some degree and that activities may have to be managed to reduce or eliminate potential negative impact(s). Restoration in the marine environment generally refers to natural recovery to favourable condition through the reduction or removal of impacts.

JNCC consider that maintenance or restoration of the following parameters (b - h) meets the requirements of the Habitats Directive to achieve favourable conservation status of the natural habitat through favourable “distribution, structure and functions”.

- b) **Natural environmental quality** e.g. chemical quality parameters of water, suspended sediment levels, radionuclide levels etc should not deviate from baseline at designation (if available) or reference conditions.
- c) **Natural environmental processes** e.g. circulation, sediment deposition and erosion etc. should not deviate from baseline at designation (if available) or reference conditions.
- d) **Extent** - the area covered by the habitat and communities
- e) **Physical structure** - the shape, form and composition of the habitat and its substrata.
- f) **Diversity** - the number of different biological communities or number of species within a given community.
- g) **Community structure** e.g. age classes, sex ratios, distribution of species, abundance, biomass, reproductive capacity, recruitment, range and mobility.
- h) **Typical species** – see Appendix V for criteria for identifying typical species.

1.8. Favourable condition

Conservation objectives for inshore SACs have been provided in association with a 'favourable condition' table, which outlines how to recognise favourable condition status for the interest features in question. However, understanding the functioning and condition of complex and dynamic offshore marine sites, which experience a variety of pressures resulting from historic and current activities, is difficult. For offshore sites, there is presently insufficiently detailed information on i) the existing condition of qualifying interest features and ii) the preferred or target condition of interest features. This currently limits identification of measures and associated targets for condition monitoring. It is anticipated that further information on the condition of interest features will be obtained through baseline surveys and monitoring.

2. Advice on Operations

2.1. Purpose of advice

The aim of this advice is to enable all competent authorities to prioritise management of activities that pose a threat to the interest features of the Dogger Bank site. The advice is linked to the conservation objectives outlined in the section above, and will help provide the basis for detailed discussions on management of activities that may affect the features of the site.

2.2. Methods of assessment

Six broad Pressure Categories which may cause i) deterioration of natural habitats or the habitats of species, or ii) disturbance of species, (either alone or in combination), are considered in JNCC's Advice on Operations:

- Physical loss
- Physical damage
- Non-physical disturbance
- Toxic contamination
- Non-toxic contamination
- Biological disturbance

Example sources of pressures are provided (See Table 1), although these examples are not inclusive of all potentially detrimental activities.

A three-step process is used to assess the vulnerability of the site's features (*sandbanks which are slightly covered by seawater all the time*) to the above pressures (see flow diagram in Appendix I):

- An assessment of the **sensitivity** of the interest feature to the listed pressures (Appendix II);
- An assessment of the current **exposure** of the interest feature to the pressures (Appendix III); and
- An assessment of the **vulnerability** of the interest feature to the pressures. Vulnerability occurs where sensitivity to a given pressure is combined with exposure to that pressure.

This approach is sufficiently robust to take into account the effects of new activities or changes in patterns of usage. By assessing sensitivity, exposure and vulnerability independently, the reasoning behind current (and any future) advice is made clear. If an interest feature is known or thought to be sensitive to a particular pressure category, new activities or changes in patterns of activities which result in that pressure are likely to cause deterioration or disturbance.

All the scores of relative **sensitivity**, **exposure** and **vulnerability** are derived using best available scientific data and expert judgement. This method uses a coarse categorisation system, reflecting the current state of our understanding of the marine environment. It should be recognised that data for offshore habitats are sparse and assessments are likely to need revision in light of new research.

2.3. Vulnerability assessment

The vulnerability of the interest feature to external pressures is determined by integrating the sensitivity evaluation with that of exposure. Only if a feature is both sensitive *and* exposed to a human activity is it considered vulnerable. In this context, therefore, **vulnerability** has been defined as the **exposure** of the habitat, community or individual (or individual colony) of a species to an external factor to which it is **sensitive** (Hiscock, 1996). An assessment of interest features' vulnerability (Table 1) helps to guide site management decisions by highlighting potentially detrimental activities that may need to be managed (or continue to be managed) by the competent authorities.

The **Dogger Banks'** *sandbanks which are slightly covered by seawater all the time* and associated biological communities are:

- Highly vulnerable to **physical disturbance or abrasion** (demersal trawling), and **selective extraction of species** (demersal trawling).
- Moderately vulnerable to **obstruction** (oil, gas and renewables industry infrastructure, wrecks and cables)

Vulnerability of the interest feature to the **introduction of synthetic compounds, introduction of non-synthetic compounds** and **changes in nutrient loading** (all due to onsite oil and gas industry activities) has been identified, but this cannot be quantified at present.

Vulnerability to **noise (acoustic)**, **introduction of radionuclides**, **introduction of microbial pathogens** and **introduction of non-native species** remains unknown for this interest feature.

2.4. Risk assessment

JNCC considers 'risk' to be the likelihood of deterioration of the feature due to an activity. It is the vulnerability of the feature to an activity, assessed against the level of management of that activity.

High risk activities will be those to which the feature is highly or moderately vulnerable, and for which there is insufficient management. For example, industries which are not location specific and not subject to prior consent procedures or reliable enforcement are more likely to cause damage/disturbance to the interest feature. These industries include fishing and shipping. However, clearly not all activities associated with these industries are detrimental to interest features.

Low risk activities will be those where there is no feature vulnerability (i.e. the activity does not interact with the feature) or where the high vulnerability is mitigated for by management. For example, for industries which are location specific, are always subject to prior consent and have clear reliable methods of enforcement, there is generally a lower likelihood of causing damage or disturbance to interest features. This includes the activities of the oil and gas, aggregates and renewable energy industry sectors. Only high or medium-high risk activities are noted here.

Within the Dogger Bank SAC, the following offshore activity is currently considered to pose a high risk to the interest features:

- **Demersal fishing**

Competent Authorities are advised to consider management actions that might need to be taken to reduce the risk of damage associated with this activity to the SAC features.

The vulnerability of the SAC to climate change is not considered in the tables below, given the uncertainties surrounding the effects of global change on the oceans.

Table 1. Sensitivity, exposure and vulnerability of Dogger Bank to physical, chemical and biological pressures

Sensitivity key: ●●● = High sensitivity; ●● = Moderate sensitivity; ● = Low sensitivity; ○ = No known sensitivity; ? = Insufficient information to make an assessment

Exposure key: High = High exposure; Medium = Medium exposure; Low = Low exposure; None = No known exposure; Unknown level = Exposure of an unknown level; ? = Insufficient information to make an assessment

List of pressures which may cause deterioration or disturbance (with example activities)		Dogger Bank: Sandbanks which are slightly covered by seawater all the time		
		Sensitivity	Exposure	Vulnerability
Physical Loss	Removal (e.g. aggregate dredging, isolated rock dump, infrastructure development)	●●	Low	Low
	Obstruction (e.g. Permanent constructions [oil & gas infrastructure, windfarms, cables] & wrecks)	●●●	Low	Moderate
	Smothering (e.g. drill cuttings)	●	Low	Low
Physical Damage	Changes in suspended sediment (e.g. screening plumes from aggregate dredging)	●	Low	Low
	Physical disturbance or abrasion (e.g. mobile benthic fishing, anchoring, windfarm scour pits, pipeline burial, potting)	●●	High	High
Non-physical disturbance	Noise (e.g. boat activity, seismic)	○	?	No known vulnerability
	Visual presence (e.g. recreational activity)	○	None	No known vulnerability
Toxic contamination	Introduction of synthetic compounds (e.g. TBT, PCBs, industrial chemical discharge, produced water, fuel oils)	●●	Unknown level	Vulnerability (not quantifiable)
	Introduction of non-synthetic compounds (e.g. heavy metals, crude oil spills)	●●	Unknown level	Vulnerability (not quantifiable)
	Introduction of radionuclides (e.g. nuclear energy industry)	?	?	Insufficient information
Non-toxic contamination	Changes in nutrient loading (e.g. outfalls)	●●	Unknown level	Vulnerability (not quantifiable)
	Changes in thermal regime (e.g. cooling water discharges)	●	None	No known vulnerability
	Changes in turbidity (e.g. laying of pipelines, aggregate dredging)	●	Low	Low
	Changes in salinity (e.g. outfalls from rigs, ships)	●●	None	No known vulnerability
Biological disturbance	Introduction of microbial pathogens (e.g. outfalls)	?	?	Insufficient information
	Introduction of non-native species and translocation (e.g. ballast water, hull fouling)	?	?	Insufficient information
	Selective extraction of species (e.g. bioprospecting, scientific research, demersal fishing)	●●	High	High

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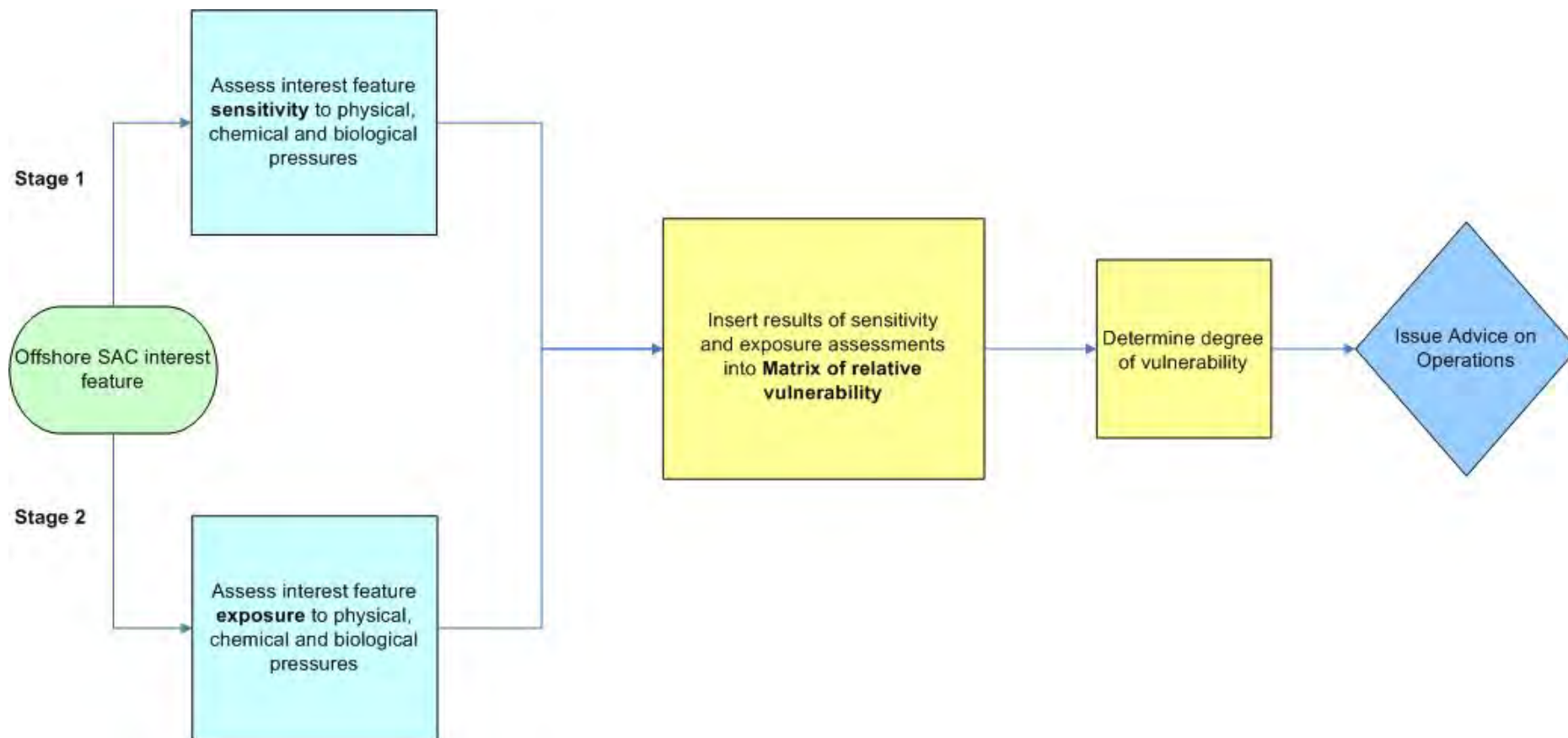
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Appendix I: Flow diagram indicating process of determining vulnerability of interest features



Appendix II: Sensitivity assessment

This assessment evaluates the relative sensitivity of the features of the Dogger Bank SAC to the effects of physical, chemical and biological pressures. Sensitivity is defined here as 'intolerance of a habitat, community or individual (or individual colony) of a species to damage, or death, from an external factor and the time taken for its subsequent recovery' (MarLIN, 2006). For example, a very sensitive species or habitat is one that is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, high intolerance) and is expected to recover over a very long period of time, i.e. >10 or up to 25 years ('low' recoverability) (MarLIN, 2006). The sensitivity of interest features (and scientific understanding of sensitivity) may change over time. Hence, an operation which is not currently deemed to have a negative effect may do so in the future.

Table 1 (column 3) shows the sensitivity assessments for the features of the Dogger Bank SAC. They are drawn principally from MarLIN's (2000) evaluation of the sensitivity of the following biotope (which is comparable to that present within the SAC):

- ***Fabulina fabula* and *Magelona mirabilis* with venerid bivalves in infralittoral compacted fine sand (IGS.FabMag)**

The applicability of the MarLIN assessments of sensitivity is dependent on the quality of available scientific information on these biotopes and their characterising species. In addition, both the biotope classification system and the MarLIN sensitivity assessments primarily rely on inshore biological data, so although they are applicable to habitats in offshore waters, confidence in these assessments in an offshore context is necessarily lower. JNCC have in some cases, therefore, adjusted the assessments of sensitivity to be more precautionary. Further detail on our approach to evaluating sensitivity can be provided on request.

Interest feature sensitivity to physical, chemical and biological pressures:

The interest features and associated biological communities of the Dogger Bank site are sensitive to: **physical loss**, **physical damage**, **toxic** and **non-toxic contamination**, and **biological disturbance**. Further detail on sensitivities of the sandbanks slightly covered by seawater all the time is provided in Table 1.

The interest feature and associated biological communities of the Dogger Bank site are sensitive to:

a) **Physical loss**

Removal of the sandbank feature would result in loss of its ecological communities. The structure and diversity of sandbank communities are determined by environmental characteristics such as sediment particle size distribution, seabed slope, and water depth. Any change in these environmental parameters (by removing or smothering part of the feature) would result in a loss of habitat and a possible shift in community organisation.

Any construction over the feature would lead to their (partial) removal, and permanent infrastructure may prevent their natural recovery through obstruction.

b) **Physical damage**

Physical abrasion (for example, by mobile fishing gear) can directly damage the interest feature and its typical species. In particular, larger, fragile, sessile species are likely to be selectively removed from the community (Sewell & Hiscock 2005).

Disturbance of the soft sediments surrounding the feature could also indirectly affect the features by causing the suspension of fine sediment (studies have shown mobile fishing gear can double the suspended matter content of the water, an effect that is likely to persist for several days). Whilst the increase in suspended particulates may benefit filter feeders, many species are adversely affected by increases in suspended sediment (Hartnoll 1998). Even on sandbanks, a shift from predominately sand and gravel to finer sediments may result in a dramatic drop in species richness, abundance and biomass (Desprez 2000).

c) **Toxic and non-toxic contamination**

The feature and associated communities are considered sensitive to various types of chemical disturbance, though there is currently no information available to quantify this disturbance.

d) **Biological disturbance**

The biological effects of fisheries include:

- Removal of target species
- Mortality of non-target species

These effects lead to shifts in community structure (e.g. if predators are removed from the system) which then lead to indirect effects on the food web as a whole.

It has not been possible to determine whether the interest feature is sensitive to noise (acoustic), introduction of radionuclides, introduction of microbial pathogens or introduction of non-native species.

Appendix III: Exposure assessment

Table 1 (column 4) shows the relative exposure of the Dogger Banks' interest features to physical, chemical and biological pressures. This assessment is based on known human activities operating in or adjacent to the site, and the anticipated pressures associated with these activities.

As offshore sites cover a relatively large geographical area and precise information on operations within SAC boundaries is not yet available, assigning scores for exposure carries certain assumptions about the spatial extent, frequency and intensity of the pressures associated with offshore activities. Expert judgement was used to determine where onsite activities are likely to affect interest features physically, chemically and/or biologically. Spatial data on offshore industry activities has been provided by the Crown Estate for aggregate extraction and windfarm development, UK Deal for oil and gas industry activities and the United Kingdom Cable Protection Committee for submarine cable distribution. UK-wide fisheries data for offshore waters are not yet available to JNCC at sufficient resolution to enable a full assessment of exposure to different types of fishing activities. Availability of Vessel Monitoring System (VMS) data combined with logbook and/or vessel registration data for all European vessels across UK waters on an annual basis would allow the spatial extent and intensity of physical and biological pressures associated with demersal fishing to be evaluated more thoroughly. Here, fishing exposure was evaluated using data supplied through a contract with Cefas to produce maps of human pressures (MB106). This generated data layers of fishing effort for UK and non-UK vessels on a 2 x 2 nm scale for 2006-7 based on the number of active hours fishing attained from logbooks and VMS data. We are not aware of an adequate methodology to assess the distribution of static/set demersal gear use, or the intensity of its physical and biological impacts. Interest feature exposure and vulnerability to static/set demersal gears have therefore not been assessed.

The exposure assessment is based on best available information on the levels of pressures associated with activities at the Dogger Banks site. If new information becomes available this may lead to modification of the advice on operations presented herein. In addition, an activity may not currently be occurring on the site but may do in future. As such, **competent authorities will need to take into account both the sensitivity of the feature and the conservation objectives outlined in section 1.6 whenever a new activity is proposed.**

Interest feature exposure to physical, chemical and biological pressures

The interest features and associated biological communities of the Dogger Banks site are exposed to the following pressures:

a) **Physical damage**

The sandbanks which are slightly covered by seawater all the time are exposed to **changes in suspended sediment** at low levels (demersal fishing) and **physical disturbance or abrasion** at high levels (demersal fishing).

Landings data from MMO (formerly MFA) (2008) indicate that this area is heavily fished by a number of UK-registered vessels that predominately target plaice and sand eels and land their catch in various Dutch ports. Non-UK registered vessels, from Denmark, the Netherlands, Norway and France also fish in the region, though to varying degrees.

Most fishing in the area involves the towing of mobile demersal gear (beam, otter and nephrops trawls) and although a few Danish seine nets are also used, these still drag along the seabed in a similar manner to a small trawl.

b) **Toxic contamination**

The sandbank is likely to be exposed to both **synthetic** and **non-synthetic compounds** at unknown levels (due to onsite gas industry activities).

There are a number of platforms, wellheads and pipes within the site boundary associated with gas activities. There is a requirement to carry out routine inspections, and preventative and remedial maintenance (emergency and routine) on the wells and sub-sea infrastructure plus permitted discharges. Routine activities include intermittent requirement to carry out well intervention operations which requires location of a drilling rig to gain access to the wellhead for well maintenance.

c) **Non-toxic contamination**

The sandbank is likely to be exposed to **changes in nutrient loading** at unknown levels (sewage from oil and gas industry onsite); the sandbanks are also exposed to low levels of **changes in turbidity** (demersal trawling);

d) **Biological disturbance**

The sandbank is exposed to moderate levels of **selective extraction of species** (demersal trawling).

It has not been possible to determine whether the interest features are exposed to **noise (acoustic), introduction of radionuclides, introduction of microbial pathogens** or **introduction of non-native species**.

Appendix IV: Matrix of relative vulnerability

The relative vulnerability of an interest feature is determined by combining the sensitivity and exposure assessments according to the table below.

		Relative sensitivity of the interest feature			
		High ●●●	Moderate ●●	Low ●	None ○
Relative exposure of the interest feature	High (3)	9	6	3	0
	Medium (2)	6	4	2	0
	Low (1)	3	2	1	0
	Unknown				0
	None (0)	0	0	0	0

Note: if there is insufficient information to assess either exposure **or** sensitivity of a given interest feature, vulnerability will always be categorised 'insufficient information to make any assessment'.

Categories of relative vulnerability

High vulnerability	6 to 9
Moderate vulnerability	3 to 5
Low vulnerability	1 to 2
Vulnerability identified, but not quantified as level of exposure unknown	
No known vulnerability	0
Insufficient information to make any assessment	

Appendix V: Typical species criteria

Identification of a species as typical is not in itself sufficient to indicate the importance of the species or any need for management. The importance of the species should be judged on the contribution made by the species to ecological integrity of the feature. These criteria are intended to help identify or classify typical species and are not limited to the benthos. They are relevant to the Annex I habitat feature and its component parts at the *site* level.

A typical species should meet one or more of the following criteria a – e below:

- a) Consistently associated with, but not necessarily restricted to, the feature
For example
 - Can be predicted to occur at certain seasons/times (e.g. seasonal & temporal)
 - Stages of life cycle associated with the feature (e.g. spawning)
 - Species is dependent upon feature (for food, shelter, nest)
- b) A species on which identification of the habitat is founded
This criterion is unlikely to apply to complex physiographic features which may be composed include other Annex 1 features (e.g. H1130 Estuaries, H1160 Large Shallow Inlets and Bays which may include H1170 Reefs, H1110 Sandbanks which are slightly covered by seawater all the time etc.)
- c) Characteristic of the habitat
For example
 - *Ammodytes tobianus*, *Zostera marina* for 'H1110 Sandbanks which are slightly covered by seawater all the time'
- d) An integral part of the structure of the habitat
For example
 - Any species that gives the habitat structural complexity (e.g. kelp)
 - Any species that forms the habitat (e.g. biogenic reef species, maerl)
- e) A species which influences the habitat's structure and function
For example:
 - Bioturbators
 - Grazers
 - Animals which bore into the substratum
 - Predators
 - Keystone species (i.e. a species that influences the ecological composition, structure, or functioning of its community far more than its abundance would suggest (EEA, 2008))

Note: The above criteria should not be used to describe non-native species as typical. A non-native species is one that has been introduced directly or indirectly by human agency (deliberately or otherwise) to an area where it has not occurred in historical times and which is separate from and lies outside the area where natural range extension could be expected (Eno, Clark, & Sanderson, 1997). Non-native species cannot be representative of the UK's biodiversity and therefore would not be considered as typical species of Annex I features.