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|---|---|
| Title: Dogger Bank Special Area of Conservation. Lead department or agency: Defra Marine Biodiversity Policy Other departments or agencies: Joint Nature Conservation Committee (JNCC) | Impact Assessment (IA) |
| | IA No: |
| | Date: 12/07/2010 |
| | Stage: Consultation |
| | Source of intervention: EU |
| | Type of measure: Secondary legislation |
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SUMMARY: INTERVENTION AND OPTIONS

What is the problem under consideration? Why is government intervention necessary?

Due to pressures of anthropogenic activities on habitats and species in the marine environment many are currently in decline. Although regulation is in place for some activities, it is not necessarily designed to achieve nature conservation objectives. Intervention is needed in order to manage activities in key areas for important species and habitats and to promote a healthy and resilient marine environment. JNCC have assessed this site against the Habitats Directive Annex III selection criteria, and advised the Secretary of State that it is eligible for identification as a 'Site of Community Importance' and should therefore be transmitted to the European Commission as required under Regulation 7 of the Offshore Marine Conservation Regulations 2007 (as amended).

What are the policy objectives and the intended effects?

The EC Directive 92/43/EEC on the conservation of natural habitats and wild flora and fauna (the Habitats Directive, 1992) aims to promote biodiversity maintainance. This Directive requires the UK (as a Member State) to propose sites hosting habitat types and species in need of conservation listed in the Directive, which are eligible for identification as SCIs and designation as Special Areas of Conservation (SAC). The UK is required to establish conservation measures for sites designated as SACs which is achieved by managing potentially damaging activities where the habitats and species are present and in their vicinity. 'Sandbanks which are slightly covered by seawater all the time' (Habitat 1110 in Annex I) are habitats of European importance and are the qualifying feature of Dogger Bank SAC.

What policy options have been considered? Please justify preferred option (further details in Evidence Base)

Baseline: Do nothing, that is do not designate the site.

Option 1: Propose the site to the European Commission for designation. This is the preferred option as it will contribute towards conserving habitat of European importance located in UK waters along with its typical species.

The option to search for an alternative site is not been considered further here as there are no known alternative sites. If this site is not designated there is a significant risk that the EC will judge the UK's contribution to the network of SACs for sandbank to be insufficient, which could lead to infraction proceedings. Alternative sites of similar quality and extent are not currently known to exist (known alternatives were considered in the scoping stage but not recommended on scientific grounds). Though the site could be conserved under voluntary agreements or a national designation this would not contribute to fulfilling the requirements of the Habitats Directive.

When will the policy be reviewed to establish its impact and the extent to which the policy objectives have been achieved?

It will be reviewed
01/2020

Are there arrangements in place that will allow a systematic collection of monitoring information for future policy review?

Yes

Ministerial Sign-off For consultation stage Impact Assessments:

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister: Date:

SUMMARY: ANALYSIS AND EVIDENCE

POLICY OPTION 1

Description:

The assessment considers the minimum and maximum plausible management scenarios to achieve conservation objectives.

| Price Base Year 2010 | PV Base Year 2010 | Time Period Years 10 | Net Benefit (Present Value (PV)) (£m) | | |
|-------------------------|----------------------|-------------------------|---------------------------------------|-----------|--------------------|
| | | | Low: n/a | High: n/a | Best Estimate: n/a |

| COSTS (£m) | Total Transition (Constant Price) Years | Average Annual (excl. Transition) (Constant Price) | Total Cost (Present Value) |
|---------------|---|--|-------------------------------|
| Low | £10.30m | £0.18m | £11.79m |
| High | £100.76m | £362.14m | £2,760.53m |
| Best Estimate | £10.30m | £0.18m | £11.754m |

Description and scale of key monetised costs by 'main affected groups'

For the minimum scenario: increased monitoring for oil and gas (£48k pa); loss of revenue for fisheries (£98.5k pa from 2011); increased assessment for aggregates (£115k one-off); increased assessment for renewables (£10m one-off); and enforcement costs (£181k one-off and £38k pa)

Max scenario: increased monitoring for oil and gas (£240k pa for assessment and £52k pa for monitoring); loss of revenue for fisheries (£656.4k pa from 2011); increased assessment in aggregates sector (£574k one-off); renewables (£100m increased assessment and £3.6bn pa from 2019); and enforcement and monitoring costs to authorities (£181k one-off and £1.26m pa).

Other key non-monetised costs by 'main affected groups'

For the maximum scenario: some fishermen exit sector, knock-on effect to local economy of costs to fishermen. Costs if proposals for consent are refused; increased assessment for renewables (unquantifiable but highly significant (>£50bn over ten years)); of assessment and vessel changes in gas sector; long term loss of assets to Crown Estate; increased aggregates screening costs.

| BENEFITS (£m) | Total Transition (Constant Price) Years | Average Annual (excl. Transition) (Constant Price) | Total Benefit (Present Value) |
|---------------|---|--|----------------------------------|
| Low | Optional | Optional | Optional |
| High | Optional | Optional | Optional |
| Best Estimate | unquantified | unquantified | unquantified |

Description and scale of key monetised benefits by 'main affected groups'

It has not been possible to monetise the benefits because the benefits cannot be readily quantified and most of the benefits are not traded so cannot be easily valued.

Details of the qualitative assessment of the benefits are provided in the evidence base.

Other key non-monetised benefits by 'main affected groups'

Moderate beneficial impacts on non-use values of natural environment; benefits to fish; intrinsic value; role of feature in the wider ecosystem; possible increased commercial stocks with designation of site; and benefits to ecosystem services beyond next 10 yrs.

Key assumptions/sensitivities/risks

Discount rate (%) 3.5%

Management measures for the site will not be known until after designation so a realistic range of measures is used for the analysis. If the site is not designated condition of the habitats may be maintained but could be at risk to further deterioration. Formal mechanisms to avoid damage to the habitats are weaker if the site is not designated. Risk of infraction if the suite of proposed SACs is not designated. Benefits could be jeopardised if appropriate fisheries management measures are not agreed through the Common Fisheries Policy, or if they are not enforced effectively. Displacement of activities could increase environmental degradation in other areas. Risk of cumulative economic impacts of marine protected areas.

| | | | | |
|-----------------------------------|-------------|-------------------------------------|----------------------|----------|
| Impact on admin burden (AB) (£m): | | Impact on policy cost savings (£m): | | In scope |
| New AB: | AB savings: | Net: 0 | Policy cost savings: | No |

ENFORCEMENT, IMPLEMENTATION AND WIDER IMPACTS

| | | | | | |
|---|-----------------|------|--------------------|--------|-------|
| What is the geographic coverage of the policy/option? | United Kingdom | | | | |
| From what date will the policy be implemented? | 01/11/2010 | | | | |
| Which organisation(s) will enforce the policy? | MMO, DECC, JNCC | | | | |
| What is the annual change in enforcement cost (£m)? | £0.038m | | | | |
| Does enforcement comply with Hampton principles? | Yes | | | | |
| Does implementation go beyond minimum EU requirements? | No | | | | |
| What is the CO ₂ equivalent change in greenhouse gas emissions? (Million tonnes CO ₂ equivalent) | Traded: n/a | | Non-traded: n/a | | |
| Does the proposal have an impact on competition? | No | | | | |
| What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable? | Costs: 100 | | Benefits: 100 | | |
| Annual cost (£m) per organisation (excl. Transition) (Constant Price) | Micro | < 20 | Small | Medium | Large |
| Are any of these organisations exempt? | No | No | No | No | No |

SPECIFIC IMPACT TESTS: CHECKLIST

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

Please note this checklist is not intended to list each and every statutory consideration that departments should take into account when deciding which policy option to follow. It is the responsibility of departments to make sure that their duties are complied with.

| Does your policy option/proposal have an impact on...? | Impact | Page ref within IA |
|---|--------|--------------------|
| Statutory equality duties ¹ Statutory Equality Duties Impact Test guidance | No | |
| Economic impacts | | |
| Competition Competition Assessment Impact Test guidance | No | |
| Small firms Small Firms Impact Test guidance | No | |
| Environmental impacts | | |
| Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance | No | |
| Wider environmental issues Wider Environmental Issues Impact Test guidance | Yes | All |
| Social impacts | | |
| Health and well-being Health and Well-being Impact Test guidance | Yes | |
| Human rights Human Rights Impact Test guidance | No | |
| Justice system Justice Impact Test guidance | No | |
| Rural proofing Rural Proofing Impact Test guidance | No | |
| Sustainable development Sustainable Development Impact Test guidance | Yes | All |

¹ Race, disability and gender Impact assessments are statutory requirements for relevant policies. Equality statutory requirements will be expanded 2011, once the Equality Bill comes into force. Statutory equality duties part of the Equality Bill apply to GB only. The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

EVIDENCE BASE (FOR SUMMARY SHEETS) – NOTES

Use this space to set out the relevant references, evidence, analysis and detailed narrative from which you have generated your policy options or proposal. Please fill in **References** section.

References

Include the links to relevant legislation and publications, such as public impact assessment of earlier stages (e.g. Consultation, Final, Enactment).

| No. | Legislation or publication |
|-----|--|
| 1 | Dogger Bank SAC Selection Assessment, v5.0, JNCC |
| 2 | Dogger Bank draft Conservation Objectives and Advice on Operations v5.0, JNCC |
| 3 | Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) |
| 4 | |

+
See attached evidence base and break down of present value of costs by sector in Appendix G. Details of the impact tests are provided in Appendix I.

Evidence Base

Ensure that the information in this section provides clear evidence of the information provided in the summary pages of this form (recommended maximum of 30 pages). Complete the **Annual profile of monetised costs and benefits** (transition and recurring) below over the life of the preferred policy (use the spreadsheet attached if the period is longer than 10 years).

The spreadsheet also contains an emission changes table that you will need to fill in if your measure has an impact on greenhouse gas emissions.

Annual profile of monetised costs and benefits* - (£m) constant prices

| | Y ₀ | Y ₁ | Y ₂ | Y ₃ | Y ₄ | Y ₅ | Y ₆ | Y ₇ | Y ₈ | Y ₉ |
|----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Transition costs | 10.296 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Annual recurring cost | 0.171 | 0.342 | 0.513 | 0.684 | 0.855 | 1.026 | 1.197 | 1.368 | 1.539 | 1.710 |
| Total annual costs | 10.467 | 10.638 | 10.809 | 10.980 | 11.151 | 11.322 | 11.493 | 11.664 | 11.835 | 12.006 |
| Transition benefits | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Annual recurring benefits | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Total annual benefits | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |

* For non-monetised benefits please see summary pages and main evidence base section

The annual profile of monetised costs and benefits was calculated using the midpoint as a measure of best estimate. Benefits were not quantifiable.



Microsoft Office
Excel Worksheet

EVIDENCE BASE (FOR SUMMARY SHEETS)

There is discretion for departments and regulators as to how to set out the evidence base. However, it is desirable that the following points are covered:

- Problem under consideration;
- Rationale for intervention;
- Policy objective;
- Description of options considered (including do nothing);
- Costs and benefits of each option;
- Risks and assumptions;
- Administrative burden and policy savings calculations;
- Wider impacts;
- Summary and preferred option with description of implementation plan.

Inserting text for this section:

Select the notes here and either type section text, or use **Paste Without Format** toolbar button to paste in the standard EBBodyPara Style. Format text by applying EB styles from the toolbar.

ANNEXES

Annex 1 should be used to set out the Post Implementation Review Plan as detailed below. Further annexes may be added to provide further information about non-monetary costs and benefits from Specific Impact Tests, if relevant to an overall understanding of policy options.

ANNEX 1: POST IMPLEMENTATION REVIEW (PIR) PLAN

A PIR should be undertaken, usually three to five years after implementation of the policy, but exceptionally a longer period may be more appropriate. A PIR should examine the extent to which the implemented regulations have achieved their objectives, assess their costs and benefits and identify whether they are having any unintended consequences. Please set out the PIR Plan as detailed below. If there is no plan to do a PIR please provide reasons below.

| |
|--|
| <p>Basis of the review: [The basis of the review could be statutory (forming part of the legislation), it could be to review existing policy or there could be a political commitment to review];</p> <p>PIR consists of two elements:</p> <ol style="list-style-type: none">1. Assessment of any additional management needed to fulfil conservation objectives for the site, accompanied by assessment of likely socio-economic effects of any such management proposals.2. Statutory monitoring of the condition of interest features in the site, six yearly report to Euro Commission required, next report due 2013. |
| <p>Review objective: [Is it intended as a proportionate check that regulation is operating as expected to tackle the problem of concern?; or as a wider exploration of the policy approach taken?; or as a link from policy objective to outcome?]</p> <ol style="list-style-type: none">1. Implementation of any management of marine activities required post-designation to fulfil conservation objectives for the features at the site.2. The statutory monitoring of condition of the features aims to assess whether the conservation objectives for the site are being achieved. If conservation objectives are not being achieved, management of activities affecting the site will need to be reviewed. |
| <p>Review approach and rationale: [e.g. describe here the review approach (in-depth evaluation, scope review of monitoring data, scan of stakeholder views, etc.) and the rationale that made choosing such an approach]</p> <p>Review of existing industry activities at or affecting the site, based on information from regulators and stakeholders.</p> <p>Conduct survey to monitor condition of features of the site, and activities which may affect those features, within 6 year reporting framework set by Euro Commission.</p> |
| <p>Baseline: [The current (baseline) position against which the change introduced by the legislation can be measured]</p> <p>Baseline data on the condition of interest features in the site and baseline data collected for the impact assessment on human activities in or affecting the site.</p> |
| <p>Success criteria: [Criteria showing achievement of the policy objectives as set out in the final impact assessment; criteria for modifying or replacing the policy if it does not achieve its objectives]</p> <p>Achievement of the conservation objectives for the site.</p> |
| <p>Monitoring information arrangements: [Provide further details of the planned/existing arrangements in place that will allow a systematic collection systematic collection of monitoring information for future policy review]</p> <p>Statutory monitoring of the condition of interest features in the site following designation. Ongoing collation of socio-economic information from regulators and stakeholders on activities on or affecting the site.</p> |
| <p>Reasons for not planning a PIR: [If there is no plan to do a PIR please provide reasons here]</p> |

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1 INTRODUCTION

1.1 Purpose

Within Europe natural habitats are continuing to deteriorate and an increasing number of wild species are seriously threatened. The main aim of the European Habitats Directive² is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species at a favourable conservation status, introducing robust protection for those habitats and species of European importance.

This impact assessment addresses the recommendation by the Joint Nature Conservation Committee (JNCC) for designation of an offshore Special Area of Conservation (SAC) of the UK part of Dogger Bank. The part of the sandbank in UK waters is being recommended for SAC designation due to its Annex I sandbank (habitat 1110).

Human activities can adversely affect our marine environment. Many of our marine habitats have been altered or damaged by activities such as fishing, windfarm development, dredge disposal and oil and gas extraction (Eastwood 2007). Direct harvesting of fish has caused dramatic decreases in populations of target species including cod, herring, plaice and sole (Hall 1999) and even localised extinctions in parts of UK waters, for example the common skate (Dulvy & Reynolds 2002). Species that are not the target of harvesting are also damaged, particularly through inadvertent bycatch, and damage to habitats, for example through the use of destructive bottom fishing gear.

Currently little of the UK's offshore marine environment is protected for conservation purposes. Consequently, protection is not being provided to examples of the variety of habitats found in UK offshore waters. Given the overlap between anthropogenic activities and habitats of conservation importance, it is evident that additional management is needed to maintain and restore the healthy structure and function of marine ecosystems whilst supporting sustainable industries.

1.2 Policy drivers

a) Habitats Directive

Member States of the Council of Europe are committed to the Convention on the Conservation of European Wildlife and Natural Habitats³. The Wild Birds Directive⁴ and Habitats Directive provide the framework within which the provisions of the Bern Convention are applied in the European Union. The Habitats Directive aims to conserve natural habitats and species that are considered to be most in need of conservation at a European level (which are listed in Annex I and Annex II of the Directive respectively). Habitats have been included on Annex I because they are either in danger of disappearance within their natural range, have a small natural range, or they present outstanding examples of typical characteristics of the biogeographical regions listed in the Directive. The Habitats Directive not only aims to conserve the habitats but also their typical species. The UK (as a Member State) is required to take measures to maintain or restore favourable conservation status⁵ of these natural habitats and to introduce robust protection for them.

Under the Habitats Directive, habitats and species are to be protected by a coherent European ecological network of sites (called Natura 2000) identified by the European Commission from lists of national sites proposed by each Member State. The network of sites will enable habitat types to be maintained at, or restored to, favourable conservation status within their natural range. Once adopted in

² Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna.

³ The Bern Convention, Bern, 1979,

⁴ Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds

⁵ Favourable conservation status is defined for a feature as the 'natural range and area it covers is increasing, and the specific structure and functions which are necessary for its long term maintenance exist and are likely to exist for the foreseeable future, and the conservation status of its typical species is favourable'.

the Natura 2000 network, the sites are designated by Member States as Special Areas of Conservation (SACs).

The Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007 (as amended) (the "Offshore Habitats Regulations") transpose the Habitats Directive (92/43/EEC) and Wild Birds Directive (2009/147/EC) into national law. These regulations apply to the UK's offshore marine area which covers waters beyond 12 nautical miles, within British Fishery Limits and the seabed within the UK Continental Shelf Designated Area. The Offshore Habitats Regulations enable the UK to comply with European law beyond inshore waters and ensure that activities regulated by the UK that have an effect on important species and habitats in the offshore marine environment can be managed. Under the Regulations, competent authorities which have functions relevant to marine conservation in the offshore marine area, have a general duty, to secure compliance with the EC Habitats and Wild Birds Directives.

The Habitats Directive provides site selection criteria within Annex III. Site selection criteria comprise:

- the degree of representativeness of the natural habitat at the site in question (the area of the site in relation to the area of that habitat type within the national territory);
- the degree of conservation of the structure and functions of the habitat type (including restoration possibilities); and
- a global assessment of the conservation value of the site for that habitat type.

JNCC are responsible for providing scientific advice to Government on nature conservation matters, including on the selection of SAC sites in the UK offshore marine area under the Offshore Habitats Regulations⁶.

The European Commission will assess whether the list of SACs submitted by UK Government to them is sufficient or not. JNCC have worked to provide the best estimate of whether the UK's sites submitted so far will be sufficient or not in terms of both representing the habitat across its natural range, and also in proportion to the amount of that habitat type within UK waters⁷.

JNCC concluded that if at least one example of each Annex I habitat sub-type in each of the UK's Regional Seas⁸ were included in the SAC network that would ensure minimum representation of each Annex I habitat within its natural range in the UK (JNCC 2003).

b) UK identification of Annex I sandbank sites

Twenty five SACs with marine components have already been designated for sandbank features. None of these sites are located in UK offshore waters (i.e. outside of 12 nm). One offshore site (North Norfolk Sandbanks and Saturn Reef), was consulted on in 2007-8, and three (Inner Dowsing, Race Bank and North Ridge; Haisborough, Hammond and Winterton; and Bassurelle Sandbank) have just been subject to formal consultation in 2009-10, along with two inshore sites for sandbanks. Two of these sites (Inner Dowsing, Race Bank and North Ridge, and Haisborough, Hammond and Winterton) cross the 12 nm boundary and are being progressed jointly with Natural England. It is anticipated all four of these sites will be submitted to the European Commission by August 2010.

In the Southern North Sea Regional Sea where Dogger Bank is located, there are inshore SACs that have been designated for sandbanks which are slightly covered by seawater all of the time comprising the Wash and North Norfolk Coast, Essex Estuaries, and Humber Estuary. All are estuarine or coastal sandbank and are subsequently exposed to significant freshwater or coastal influence.

⁶ The Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended) apply to UK offshore waters within British Fishery Limits and the seabed and the subsoil of the UK Continental Shelf.

⁷ JNCC 08 P14a December 2008 Progress towards completing the UK network of marine special areas of conservation (SACs) for Annex I habitats and site proposals for Hatton Bank and Bassurelle Bank

⁸ Regional Seas: www.jncc.gov.uk/page-161.

Other candidate SACs for sandbanks which are slightly covered by seawater all of the time in the same regional sea include: North Norfolk Sandbanks and Saturn Reef; Inner Dowsing, Race Bank and North Ridge; and Haisborough, Hammond and Winterton. These sites represent different sub-types of the habitat to that present at Dogger Bank, which is a sandy mound, formed by glacial processes and submergence through sea level rise. Therefore, Dogger Bank is needed within the network to represent that subtype of sandbank and also to ensure sufficient UK resource of sandbank habitat is represented within the network. The UK part of the site adjoins German and Dutch sites already designated for Annex I sandbank habitat.

c) Conservation objectives and management of sites

JNCC are responsible for establishing conservation objectives for the site, and advice on operations that could cause deterioration of the habitat and/or decline in the populations of its typical species. These conservation objectives and advice on operations are presented in a document⁹ and inform the management of activities within the site. Special provisions are made for the consideration of current and future plans and projects that impact on the site (but are not directly connected with management of the site for conservation purposes). The goal of these is to ensure that carrying out plans and projects does not adversely affect the integrity of the site. Management activities are intended to ensure marine habitats and species are maintained at or restored to favourable condition.

To fulfil conservation objectives for Annex I sandbanks which are slightly covered by seawater all the time, it will be necessary for the competent authority to manage human activities where possible to ensure that the feature is not impacted through: 1) physical loss through obstruction or smothering; 2) physical damage by physical disturbance or abrasion; and/or 3) biological disturbance by selective extraction of species.

1.3 Background information on the impact assessment

This report sets out the evidence base that supports the IA summary page for the policy options for the Dogger Bank Special Area of Conservation Impact Assessment. Two options were initially considered for this site:

- Baseline: do nothing
- Option 1: designate the site

No other options are considered as Dogger Bank, along with existing SACs and the other sandbank sites currently proposed, has been identified as an example of sandbank habitat to contribute towards the Natura network of sites for conservation. Other areas of similar habitat sub-type, where they exist, have been considered for selection as SACs but have been rejected for scientific reasons during earlier scoping.

This IA presents JNCC's quantitative assessment of the potential costs and benefits of the policy option (designate the site). This IA accompanies the recommendation to conduct a public consultation about the designation of the site. It will be developed by including information and data that becomes available through the public consultation.

Impacts have been assessed over a timescale of approximately ten years. The decision to use this timeframe was based on various factors. It provides a sufficiently long period over which conservation benefits may arise and fisheries control measures may be implemented. Assessment of the impacts beyond ten years becomes more uncertain. For example, businesses have greater scope to adjust their activities in the long-term (for example through purchasing new equipment) and may therefore avoid costs that arise in the short-term. Costs are calculated over the 10-year period using a discount rate of 3.5%, based on Green Book recommendations¹⁰.

⁹ Dogger Bank SAC: Draft Conservation Objectives and Advice on Operations v5.0 JNCC
http://www.jncc.gov.uk/pdf/DoggerBank_ConsevationObjectivesAdviceonOperations_5.0.pdf

¹⁰ HM Treasury, The Green Book: http://www.hm-treasury.gov.uk/data_greenbook_index.htm

The overall approach to assessing potential costs and benefits is based on the approach adopted by JNCC for their previous offshore SAC IAs (eftec 2008) and the joint consultation in 2009-10 on 12 inshore and offshore SACs and SPAs. A framework is used to combine and assess cost and benefit information from different sources on the likely impacts of the potential management measures for the sites.

This framework involves a description of:

- What the current situation at the site is (the baseline), such as the site's ecological characteristics, the economic activities taking place, their value, and their environmental impacts;
- What changes to these, relative to baseline, are expected to result from potential management measures that may be required to meet the site's conservation objectives;
- What the direct and indirect economic costs of those changes are to operators, enforcement authorities and wider society;
- The likely benefits of achieving the conservation objectives; and
- The different data that can be used to estimate costs and benefits, including: impacts on goods and services that are bought and sold in commercial markets that can be valued in monetary units; impacts on goods and services that are not traded in commercial markets (that are less easy to value); and other impacts (such as change to non-use value).

This IA was prepared using information that was publicly available and information provided by government departments, regulators¹¹ and stakeholders, from Jan 2009 to May 2010.

Information from stakeholders is requested during formal consultation on the scientific justification for the site and the impact assessment. Additional information and comments from the formal consultation process will be used to update the IA.

2 BACKGROUND INFORMATION ON THE SITE

2.1 Baseline

Information about the current condition of the site forms a baseline scenario against which the potential impacts of the policy options are assessed. This section assesses the current activities at the site, and what is likely to happen over the assessment period if the site is not designated. This is the baseline against which the potential costs and benefits of Option 1 are compared in Section 4. By definition the costs and benefits of the baseline are zero since no additional actions will be taken.

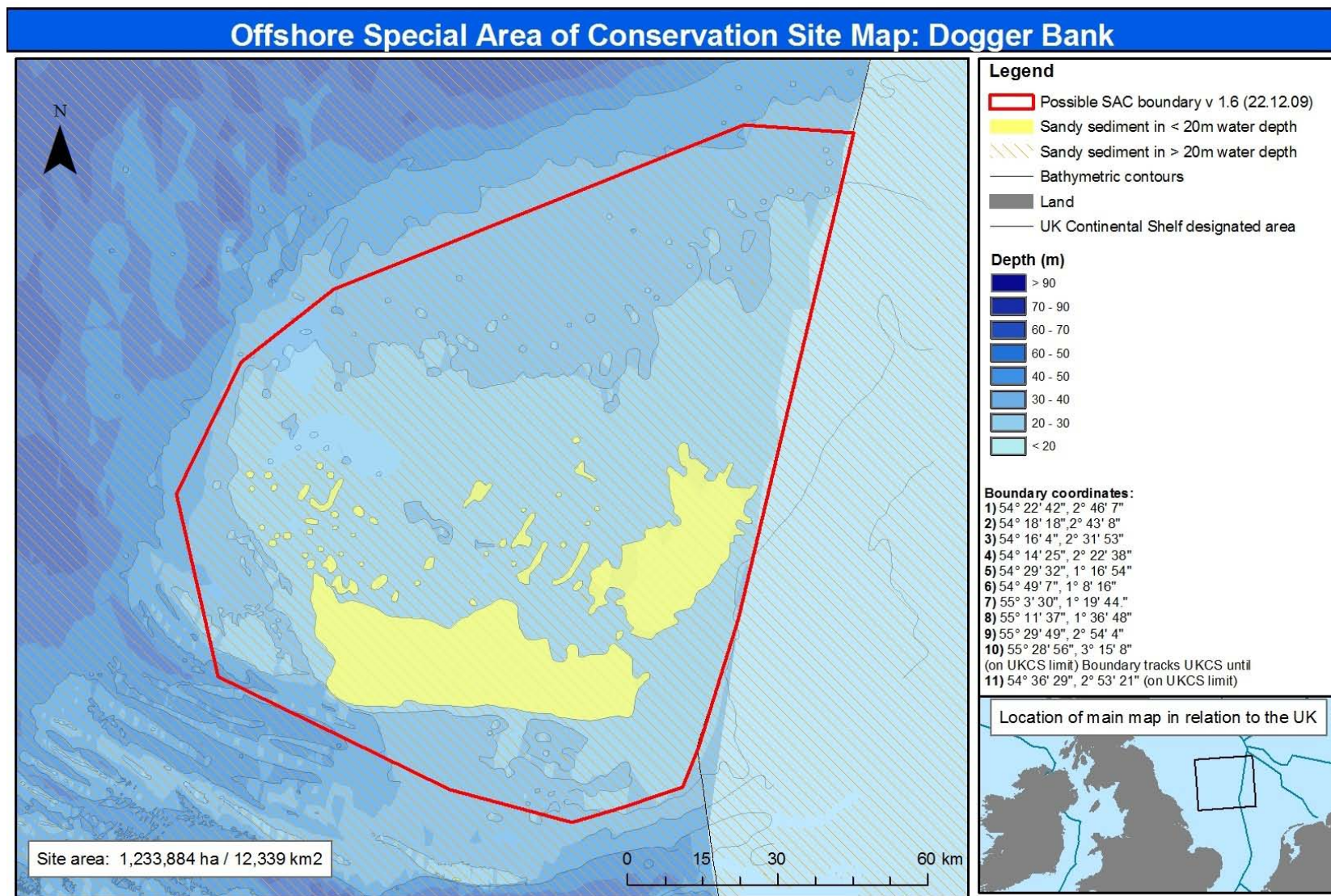
2.2 Characteristics of the site

The Dogger Bank is the largest single continuous expanse of shallow sandbank in UK waters (Figure 2.1). It is located in the southern North Sea, approximately 150km north east of the Humber Estuary, and was formed by glacial processes before being submerged through sea level rise. The southern area of the bank is covered by water seldom deeper than 20m and extends within the pSAC in UK waters down to 35-40m deep. The bank structure slopes down further in UK and also in Dutch and German waters to greater than 50m deep outside the SAC boundary (Figure 2.2). Its location in open sea exposes the bank to substantial wave energy and prevents the colonisation of the sand by vegetation. Sediments range from fine sands containing many shell fragments on top of the bank to muddy sands at greater depths (Kröncke & Knust, 1995) supporting invertebrate communities typical of such sediments, characterised by polychaete worms, amphipods and small clams within the sediments, and hermit crabs, flatfish, starfish and brittlestars on the seabed (Wieking & Kröncke, 2001). Sand eels are an important prey resource found at the bank supporting a variety of species including fish, seabirds, seals and cetaceans (Cefas, 2007). Discrete areas of coarser sediments (including pebbles) are recorded on the

¹¹ Department of Energy and Climate (DECC); Department for Environment, Food and Rural Affairs (Defra); and Marine Scotland.

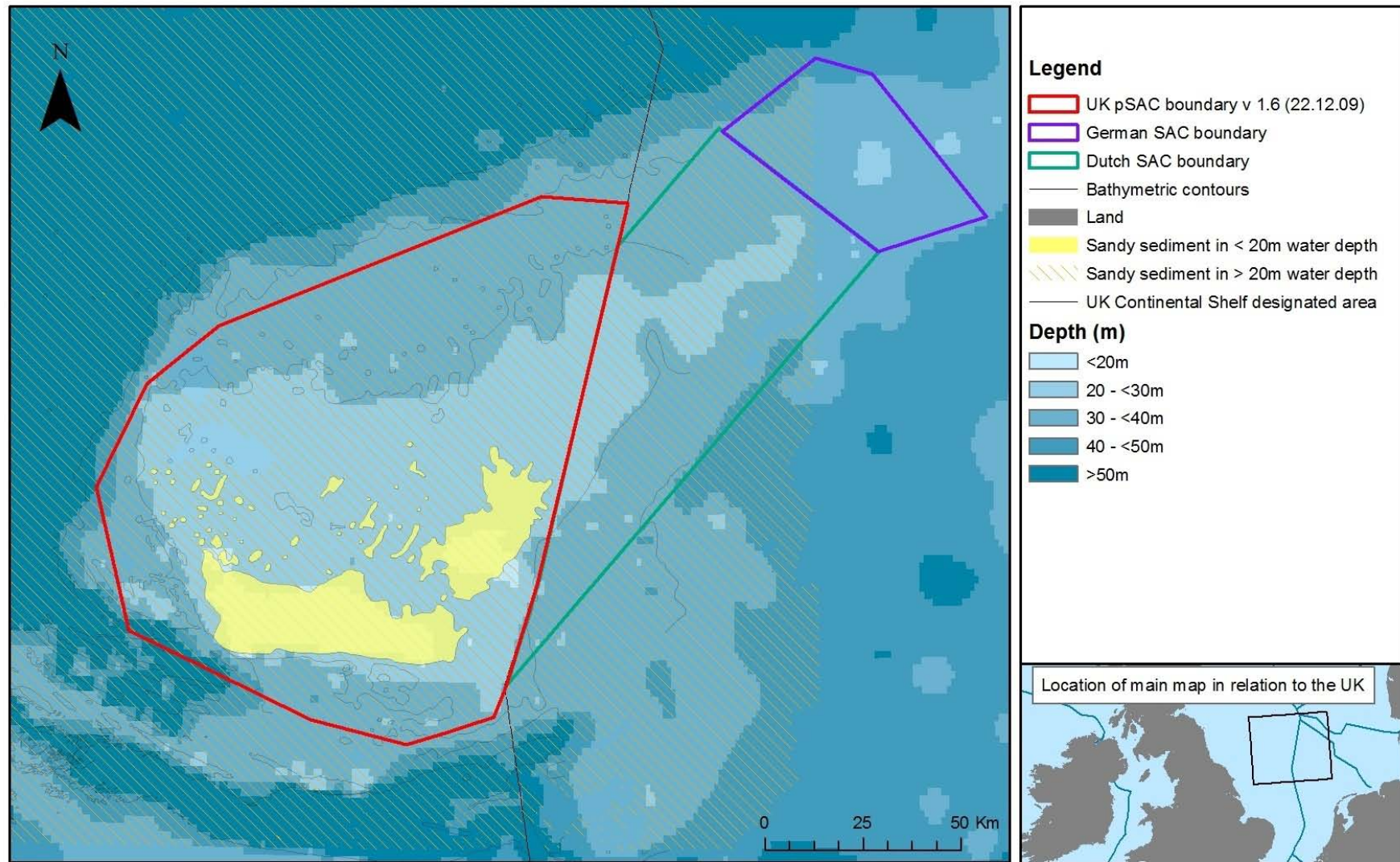
bank, dominated by the soft coral *Alcyonium digitatum*, the bryozoan *Alcyonidium diaphanum* and serpulid worms (Diesing *et al.*, 2009). These do not form part of the Annex I habitat.

Figure 2.1 Map of Dogger Bank possible SAC site boundary showing surrounding bathymetry and distribution of sandbank habitat



Map projected in WGS84 (Zone 31N). World Vector Shoreline © US Defense Mapping Agency. Seabed habitat derived from BGS 1:250,000 seabed sediment maps © NERC and SeaZone bathymetry © British Crown and SeaZone Solutions Limited. All rights reserved. Products Licence No. PGA042006.003. Bathymetry © The GEBCO Digital Atlas published by the British Oceanographic Data Centre on behalf of IOC and IHO, 2003. NOT TO BE USED FOR NAVIGATION. The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown Copyright). Map copyright JNCC

Figure 2.2 UK Dogger Bank possible SAC site boundary in relation to neighbouring Member State's SAC site boundaries



Map projected in WGS84 (Zone 31N). World Vector Shoreline © US Defense Mapping Agency. Seabed habitat derived from BGS 1:250,000 seabed sediment maps © NERC and SeaZone bathymetry © British Crown and SeaZone Solutions Limited. All rights reserved. Products Licence No. PGA042006.003. Bathymetry © The GEBCO Digital Atlas published by the British Oceanographic Data Centre on behalf of IOC and IHO, 2003. NOT TO BE USED FOR NAVIGATION. The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown Copyright). Map copyright JNCC

2.3 Baseline condition of the site

The condition of the site into the future if it is not designated forms the baseline against which to judge the value of potential improvements as a result of designating the site and achieving its conservation objectives.

Table 2.1 below summarises initial assessment of the site's vulnerability to pressures which was undertaken for the draft conservation objectives and advice on operations for the site¹². It will be updated and revised as necessary to reflect new evidence. The advice on operations assesses the vulnerability of the site's sandbanks to current activities on the site. The vulnerability is determined by a combination of the sensitivity of the sandbank to the specified pressures and current exposure to those pressures. Only if a feature is both sensitive and exposed to a human activity is it considered vulnerable. The scores of relative sensitivity, exposure and vulnerability have been derived using best available scientific information and informed scientific interpretation and judgement (sources of the information are noted in the conservation objectives and advice on operations document itself).

The process uses sufficiently coarse categorisation to minimise uncertainty in information and reflects the current state of our knowledge and understanding of the marine environment. Sensitivity, defined as the intolerance of a habitat, community or individual (or individual colony) of a species to damage, or death, from an external factor has been assessed for the effects of broad categories of human activities. Current exposure of the sandbanks to the effects of these categories of activities was assessed on best available advice (as of March 2010).

Key:

Sensitivity key: ●●● = High sensitivity ●● = Moderate sensitivity ● = Low sensitivity, ○ = No known sensitivity* and ? = Insufficient information to make assessment (*Meaning: 'Sensitivity of the feature has been researched and no evidence of sensitivity to this pressure has been found')

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

¹² JNCC 2007 Dogger Bank: Draft Conservation Objectives and Advice on Operations v3.1, JNCC
<http://www.jncc.gov.uk/page-4537>

Table 2.1 Sensitivity, exposure and vulnerability of the Dogger Banks' sandbanks which are slightly covered by seawater all the time to physical, chemical and biological pressures

| 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: 2 |
| | Obstruction (e.g. permanent constructions [oil & gas infrastructure, windfarms, cables] & wrecks) | ••• | Low | Moderate: 3 |
| | Smothering (e.g. drill cuttings) | • | Low | Low: 1 |
| Physical damage | Changes in suspended sediment (e.g. screening plumes from aggregate dredging) | • | Low | Low: 1 |
| | Physical disturbance or abrasion (e.g. mobile benthic fishing, anchoring, windfarm scour pits, pipeline burial, potting) | •• | High | High: 6 |
| Non-physical disturbance | Noise (e.g. boat activity, seismic) | ○ | ? | No known vulnerability: 0 |
| | Visual presence (e.g. recreational activity) | ○ | None | No known vulnerability: 0 |
| 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: 0 |
| | Changes in turbidity (e.g. laying of pipelines, aggregate dredging) | • | Low | Low: 1 |
| | Changes in salinity (e.g. outfalls from rigs, ships) | •• | None | No known vulnerability: 0 |
| 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: 6 |

Table 2.1 shows that Dogger Bank and associated biological communities are:

- Highly vulnerable to physical disturbance or abrasion (e.g. by pipeline burial, demersal fishing) and selective extraction of species (e.g. by demersal fishing)
- Moderately vulnerable to obstruction (e.g. by oil and gas infrastructure; wrecks; and cables)
- Vulnerable at low levels to removal (e.g. by oil and gas; aggregates; and cables), smothering (oil and gas), changes in suspended sediment (e.g. by demersal trawling) and changes in turbidity (e.g. by demersal trawling).

It has not been possible to determine whether the interest feature is vulnerable to introduction of radionuclides, introduction of microbial pathogens and introduction of non-native species.

The exposure of the interest feature to the introduction of synthetic and non-synthetic compounds or to changes in nutrient loading is unknown.

The sandbank is at risk of deterioration under the baseline as a result of the potential impacts of demersal fishing and infrastructure development. Some activities that take place at the site are already subject to regulations and conditions that are likely to prevent significant damage occurring to the features. These activities include the oil and gas installations, aggregates industry operations and laying of submarine cables and pipelines. However, demersal fishing would be difficult to control if the site is not designated and this is likely to contribute to some level of decline of the features over the assessment period. Deterioration of the habitats would not achieve the aims of the EC Habitats Directive to maintain or restore Annex I habitats.

The conservation objective, based on current evidence, for the management of Dogger Bank is to restore the sandbank to favourable condition. Activities that do not result in pressures to which the feature is sensitive may continue at current levels of spatial and temporal intensity. The management of other activities to which the feature is vulnerable may need to be reviewed by competent authorities responsible. If new information suggests that the condition of the feature at the site is not significantly affected by current activities and assessment indicates the site is in favourable condition, then the conservation objective for the sandbank will be changed to “maintain” the features in favourable condition.

In its current condition a range of non-monetised benefits are obtained from the site. The possible degradation of the site if not designated would potentially decrease each of these values. The baseline levels of activity in relation to the benefits of fisheries and recreation are described below. Other benefits include option and non-use value: benefits from values associated with potential future use, existence and others' use of the site.

2.4 Human activity and regulation of activity at the site

Current and proposed economic activity at Dogger Bank is described below under the following sectors:

- Oil and gas – many fields, pipelines and wells outlined below
- Renewables – proposal for substantial windfarm development
- Aggregate extraction – two small areas licensed for extraction
- Shipping – low activity due to the shallow sandbanks
- Cables – one operational cable runs through the site
- Fisheries – fishing across the site

There are no other significant current or planned economic activities at the site.

Designation of the site would mean that under regulation 25 of the Offshore Habitats Regulations, before a Competent Authority undertakes or authorises a plan or project which may have a significant effect on the site, it is required to carry out an Appropriate Assessment to assess the implications for the site in

view of its conservation objectives. The Competent Authority can only agree to the plan or project if it has ascertained that it will not adversely affect the integrity of the site. Under regulation 26, a Competent Authority can agree to a plan or project for imperative reasons of overriding public interest (IROPI), notwithstanding its adverse effect, if there are no alternative solutions. This effectively places the burden of proof on developers and Competent Authorities to show the absence of an adverse effect, rather than requiring those opposing a plan or project to show that there would be an adverse effect.

If consent has already been granted by a Competent Authority for a plan or project at the time a site becomes a European Offshore Marine Site, under the Offshore Habitats Regulations that consent will need to be reviewed against the conservation objectives for the site, and either affirmed, modified or revoked.

Not all activities that may affect the sandbank for which the site is designated are considered plans or projects under Regulation 25 of the Offshore Habitats Regulations. Ongoing activities at the site which may be affecting the habitat of interest and preventing it from reaching or being maintained at favourable conservation status, may need to be managed through the development of specific management measures (e.g. certain fishing methods, which may be controlled through measures taken under the European Common Fisheries Policy).

a) Oil and gas

Description of known current and future activity relevant to the site

Only natural gas production (extraction) occurs in the Dogger Bank pSAC area due to the nature of the hydrocarbon reservoirs in the southern North Sea. Gas extraction activities can be further separated into three main phases: 1) exploration, 2) development, and 3) production. Following the cessation of production operations there will also be decommissioning activities.

Specific operations relating to each phase are well described as part of the SEA (Strategic Environmental Assessment) process¹³ initiated by DECC's¹⁴ predecessor, BERR¹⁵.

Using the web-based service DEAL¹⁶ a review of the drilling activity within the proposed site boundary was made by Oil & Gas UK in December 2008. DEAL provided a list of the different wells and their history status within the area of the proposed site (Table 2.2). These data will be updated in the final IA after further consultation with DECC.

Table 2.2 Summary of drilling activity within the Dogger Bank area

| Well intent | Drilled before 1980 | Drilled from 1980 to 1989 | Drilled from 1990 to 1999 | Drilled after 2000 | Unknown | TOTAL |
|--------------|---------------------|---------------------------|---------------------------|--------------------|---------|-------|
| Exploration | 21 | 19 | 40 | 17 | | 97 |
| Appraisal | 0 | 13 | 10 | 4 | | 27 |
| Development | 0 | 8 | 19 | 32 | 2 | 61 |
| Not Released | 0 | 0 | 0 | 7 | | 7 |
| TOTAL | 21 | 40 | 69 | 60 | 2 | 192 |

Out of the 192 wells in total, Oil & Gas UK report that:

- 117 are currently plugged and abandoned (about 61%);

¹³ see www.offshore-sea.org.uk

¹⁴ Department of Energy and Climate Change (DECC)

¹⁵ Department for Business Enterprise and Regulatory Reform (BERR)

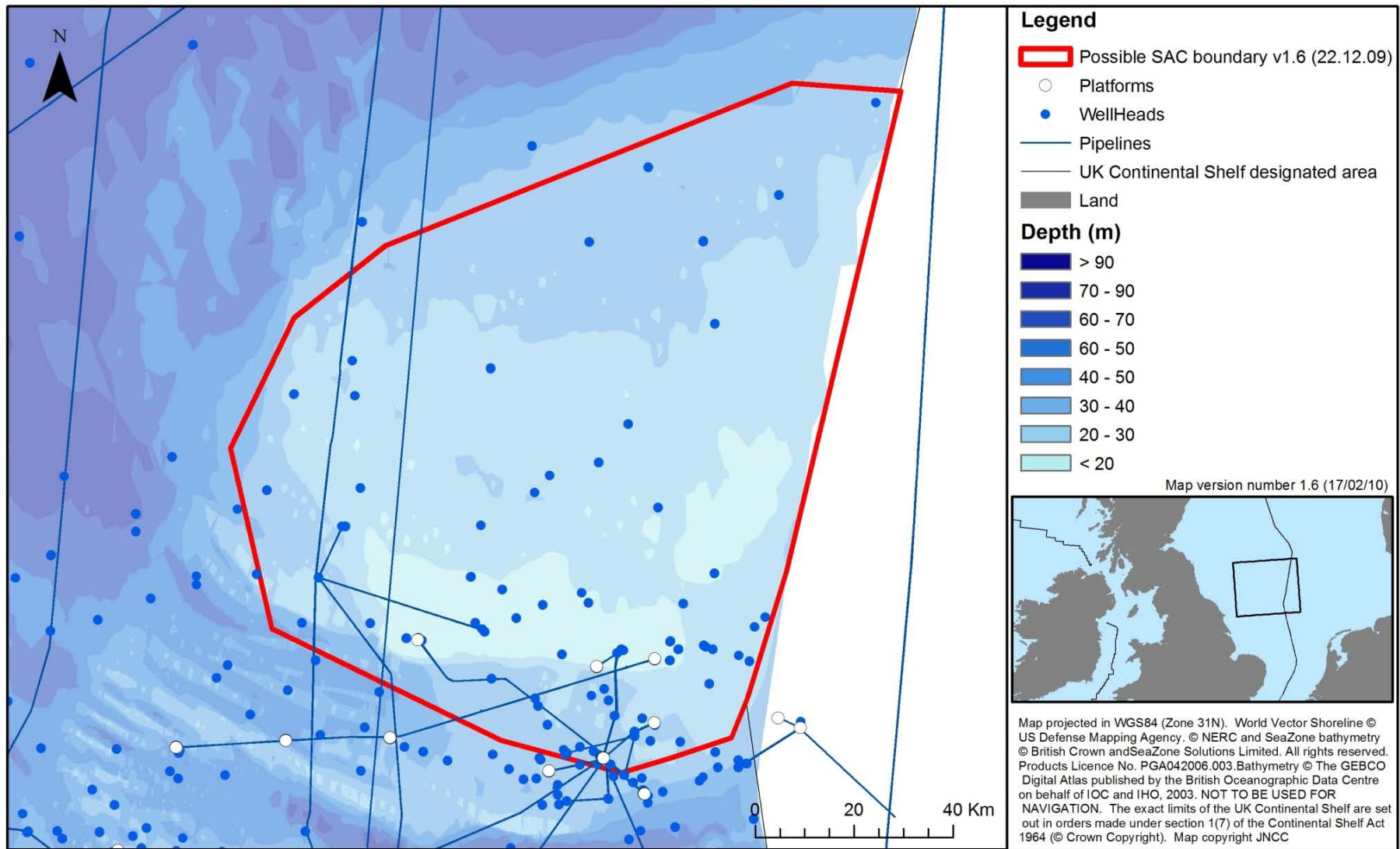
¹⁶ www.ukdeal.co.uk

Disclaimer: The proposed Dogger Bank SAC boundaries could only be plotted approximately using DEAL according to the coordinates mentioned above. However, this should not affect the assessment of the oil and gas industry extent within that area.

- 45 are completed (about 23%); and
- 25 are suspended (13%).

Figure 2.3 shows the distribution of known gas activity (major pipelines, wellheads and platforms only) within the proposed site boundary. It shows the location of the infrastructure described below (Oil and Gas UK).

Figure 2.3 Gas infrastructure around the Dogger Bank SAC proposal (from SeaZone 2008)



A list of the different blocks¹⁷ currently under license within the area of the proposed site and those on offer in the 26th Seaward Licensing Round was also provided using DEAL. In the site boundary there are 109 blocks currently under license, and 47 blocks were offered in the 25th Seaward Licensing Round. Overall, there were over 200 blocks under offer in this Round. Therefore, the proposed Dogger Bank site involved a significant minority (approximately a quarter) of the blocks on offer. However, this may not be an accurate measure of the scale of resources involved, because blocks may be split, will contain different resources and will be exploited in different ways. In addition, blocks may not be awarded (for example if no one applies for a license or the Government does not accept proposals). For example, no new licences were awarded in the Dogger Bank area in the 25th Seaward Licensing Round.

From DEAL, Oil & Gas UK provided a list of the different fields included in the area of the proposed site. The gross cumulative gas production of these fields to 2007¹⁸ was 52.4 million cubic meters of gas. Annual UK production is 70 billion cubic meters of gas¹⁹. Therefore, the current production from Dogger is less than one percent of UK production.

There has been approximately £500 million invested in gas infrastructure within the proposed site boundary. Oil and Gas UK report that there are currently 5 active platforms within the proposed site. There are also seven subsurface infrastructures including three templates, two wellheads, one pipe-junction, and 49 pipes/umbilical connections have been recorded using DEAL's web-based service, which corresponds to a total length of approximately 1,500km of pipes. These are linked to either Bacton or Theddlethorpe terminals on the East coast of England. DECC²⁰ estimate that there are 12 - 13 different fields, seven installations, and around 60 surface well locations in the area.

These represent a significant amount of infrastructure and are operated by three different commercial companies. Remaining reserves are estimated by DECC at 9.9 billion cubic meters (m³) of gas (3.8 bm³ proven or probable reserves; approximately 3.8 bm³ possible reserves; and another 2.3 bm³ in Potential Additional Resources (PARS)). Based on current prices of gas reserves in the Southern North Sea Basin²¹, these reserves are estimated to have a value of £1.24 billion, of which £0.48 billion relates to proven reserves. However, values are variable depending on exploitation potential.

None of the blocks on offer in the 25th Seaward Licensing Round within the proposed site were awarded. However, the 26th Licensing Round has commenced and offers 60 blocks within the Dogger Bank SAC boundary, though over half of these were blocks that were relinquished after the 25th Round²². In addition, there are 15 blocks from the 25th Round within the site that were applied for and warrant further assessment.

A medium size gas development project (Phase 1 of the Cygnus Field) is currently underway within the site, operated by GDF SUEZ E&P UK Ltd (GaS UK). The proposal consists of four new wells, platform and pipeline within the southern portion of the SAC boundary. An ES has been produced and submitted to DECC²³ and DECC have already undertaken an Appropriate Assessment (AA). Following the consultation period and the appropriate assessment exercise

¹⁷ The UKCS is divided into quadrants of 1 degree latitude by one degree longitude. Each quadrant is subdivided into 30 blocks measuring 10 minutes latitude and 12 minutes longitude.

¹⁸ Oil and Gas UK, Nov 2008, from DECC website.

¹⁹ Oil and Gas UK, 2008 Economic Report.

²⁰ Information previously received from BERR (Department for Business Enterprise and Regulatory Reform), but now responsibility of Department of Energy and Climate Change (DECC) which came into existence on 3 October 2008

²¹ Using a short-term price of £0.35p per therm, or £125.5k per million cubic meters (Oil & Gas UK, pers comm. 15/03/10). It should be noted that long-term prices can be 50-100% higher than this, reflecting their link to the oil-indexed price for gas on the European continent

²² https://www.og.decc.gov.uk/information/maps_offshore.htm

²³ http://www.metoc.co.uk/uploaded_files/GaS%20UK-Cygnus%20ES.pdf

undertaken by the Department, DECC and its consultees are satisfied that the development is not likely to have a significant impact on the receiving environment, including any sites or species protected under the Offshore Habitats Regulations.

In addition to gas extraction, the possibility exists that Dogger Bank would be used as a natural gas storage site. A number of commercial gas storage projects are currently under consideration in the North Sea, including the Encore Esmond development²⁴ which is on the Dogger Bank. Other projects such as the Centrica Baird and ENI Hewitt are closer to shore and therefore would be cheaper to exploit and hence likely to be chosen as locations in preference to Dogger Bank. Therefore, it is assumed that there will be no gas storage at the site in the next 10 years.

There are several areas with potential for carbon capture and storage (CCS) developments within the proposed SAC. A typical scheme would be expected to store around 5m tonnes of CO₂ per annum²⁵. CCS development in the UK is at an early stage. CCS will probably use spent fields of the type likely to be available at Dogger Bank (and an application has already been submitted in relation to development at Dogger Bank), and may also use existing gas extraction infrastructure where possible.²⁶ Because of the uncertainties surrounding CCS development, for this impact assessment it is assumed that it will not take place at Dogger Bank within the 10 year assessment period, and hence is not considered in more detail in this IA. However, the area of the proposed SAC could in the long term represent a strategic resource for the UK for CCS and a significant contribution to the achievement of UK carbon reduction targets. This is dependent upon the scale of other carbon mitigation options available to the UK and global agreements to tackle climate change.

Regulation and consents (baseline)

The environmental impacts of oil and gas activities are regulated by DECC. An EIA is required under the Offshore Petroleum Production and Pipe-lines (Assessment of Environmental Effects) (Amendment) Regulations 2007 and an Environmental Statement will be submitted by the operator to DECC prior to consent for the activity under the Petroleum Act 1998. A full Environmental Statement may not be required for certain proposals²⁷ where it is thought that an activity will not have a significant effect on the environment, based on information provided in a Petroleum Operations Notice (PON) 15 submission.

Requirements of the Birds and Habitats Directive in relation to oil and gas plans or projects within UK waters and the UK continental shelf are implemented through The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (as amended 2007). Regulation 5 of the regulations requires DECC to consider whether an AA should be undertaken prior to granting any consent under the Petroleum Act 1998. The regulations also require consent to be obtained for geological surveys and for the testing of equipment to be used in geological surveys related to oil and gas activities undertaken in UK waters and the UKCS. Offshore installations are required by the Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Convention) Regulations 1998 and the Offshore Installation (Emergency Pollution Control) Regulations 2002 to prepare Oil Pollution Emergency Plans outlining response and mitigation procedures for oil pollution incidents occurring from and around the installation and service vessels. These plans are submitted for consultation to a number of departments and agencies, including the statutory nature conservation advisers to ensure that environmental concerns have been considered and addressed appropriately. In relation to toxic contamination, all chemicals used and discharged

²⁴ <http://www.encoreoil.co.uk/pages/content/index.asp?PageID=89>

²⁵ Dermot Grimson, Crown Estate, (pers comm.) November 2008.

²⁶ This may not be possible as to transport CO₂ pipelines need to be designed to specific standards.

²⁷ Certain projects such as pipelines of 800 mm diameter and 40 kilometres or more in length must have an Environmental Statement.

offshore require a permit²⁸ and their potential environmental impacts are assessed through the use of chemical risk assessment models, including Chemical Hazard Assessment and Risk Management (CHARM).

A range of other consents and licences, for instance in relation to the discharge of chemicals, deposits in the sea, control of pollution etc, may be necessary depending on the precise nature of the activity. Information about the full range of environmental consents that may be applicable may be found at: https://www.og.berr.gov.uk/environment/environ_leg_index.htm

DECC's Offshore Inspectorate Team inspects installations and expect maintenance to be undertaken to prevent environmental discharges (for example from drains and binding, hoses and diesel tanks). Inspectors also have the powers to investigate whether requirements or restrictions imposed on the operator by DECC are complied with and to monitor any permitted or unplanned discharge of oil and chemicals. During an inspection, the Inspectorate can ask to see any reports of inspections undertaken by operators and review them with respect to environmental concerns (such as corrosion) and ask for a timeline for continued monitoring or remediation works. If the Inspectorate Team identifies any potential environmental issues they can make a condition under the International Convention on Oil Pollution Preparedness, Response and Co-operation²⁹, for example, that maintenance is undertaken.

The decommissioning of disused offshore installations and pipelines is governed by national and international regulations and overseen by DECC's Offshore Decommissioning Unit. Decommissioning includes the preparation and submission of a Decommission Programme supported by an EIA. Relevant regulations include: Petroleum Act 1998, Energy Act 2008, Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 as amended, and OSPAR Decision 98/3 (this normally requires the removal of the whole installation but there are possible exceptions for larger structures).

Likely future regulation of activity following designation

Any oil and gas plan or project would be subject to screening to assess if it were likely to have a significant effect on the sandbanks at Dogger Bank. If effects are likely to be significant, an AA would be conducted by DECC, with information provided by the developer, including environmental information such as that normally provided for Environmental Impact Assessment (EIA) outside a Natura site. It is normally possible to put in place mitigation measures which ensure that a plan or project will not have an adverse effect on site integrity. If such mitigation measures are not possible, the proposed development should be refused, unless the competent authority considers that there are imperative reasons of overriding public interest (IROPI) for the development to proceed, and no alternative solutions.

Examples of oil and gas activities that could have a significant effect on the integrity of the site are rock dumping, to protect pipelines, and the practice of 'shaving' sand crests (physically removing the tops of the sand waves) because the crests inhibit adequate pipeline burial or increase the risk of free spans. The Competent Authority is likely to be required to show that such activities will not adversely affect the integrity of the site before issuing consent. They may also apply stricter rules on decommissioning, for example they may require removal of all infrastructure (including concrete mattresses) once a project has been completed.

For a Natura 2000 site, the Environmental Impact Assessment should include robust and transparent modelling of the amount of drill cuttings and their distribution under certain conditions. It will also discuss and report the impacts that these drill cuttings have on the site. The modelling should be detailed enough to demonstrate the impacts that the drill cuttings will have on the

²⁸ Through the Offshore Chemicals Regulations (2002) and Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005

²⁹ OPRC, 1990

conservation objectives of that site. The modelling should also be appropriate to enable/indicate the requirement for future modelling.

b) Renewables

Description of known current and future activity relevant to the site

The Dogger Bank site has limited wave and tidal stream resources. However, the wind resource is strong and hence the area is attractive to wind farm developments. Therefore, this analysis of renewable resources looks solely at wind power.

In 2009 the Government concluded on the basis of the Offshore Energy Strategic Environmental Assessment that at a strategic level, there are no overriding environmental considerations to prevent the achievement of up to 33GW of offshore wind in UK waters. Much of the Dogger Bank SAC includes a portion of this area that has been identified as a development zone through the Marine Resource System (MaRS) by The Crown Estate. This was followed by an announcement in January 2010 by The Crown Estate of those developers granted Zone Development Agreements (ZDAs) through the Round 3 offshore wind competition. The ZDA for the Dogger Bank zone has been granted to the Forewind consortium which, subject to further zonal assessment and the planning process, hopes to build up to 9GW of installed capacity by 2020. Forewind have also identified a possible further 4GW of potential within the zone. This is the largest generation potential identified out of all the Round 3 zones. JNCC has met with the Crown Estate's selected developer (Forewind) for the Dogger Bank Round 3 zone. The proposed development may consist of >2000 turbines and associated infrastructure (for example, inter-array cabling, sub-stations, and accommodation platforms).

For the analysis in this IA, a figure of 9GW is taken as the maximum possible development for the site within the 10 year assessment period. A figure of up to 13GW is taken to represent the maximum long term potential development.

Using a 35% capacity factor³⁰ and a current public domain basket price (wholesale, including ROC's and LEC's³¹) of 'green' electricity of £120/MWh gives a total value of potential power generated from the estimated 9GW capacity at Dogger Bank of £2.8bn per annum. Figure 2.4 shows the location of the proposed Round 3 development zone that overlaps with the boundary for the Dogger Bank SAC proposal.

Regulation of activity (baseline)

An Offshore Energy SEA was concluded in June 2009 which assessed the environmental implications of the installation of 25GW of offshore wind in the UK Renewable Energy Zone of England and Wales (to meet the UK government targets of 15 percent of electricity from renewable sources by 2020), as well as further licensing for oil and gas, and gas storage in depleted reservoirs. The Crown Estate concurrently initiated the leasing process for Round 3, based on areas it had determined as suitable for wind farm development, subject to the outcomes of the SEA. The zonal approach to round 3 allows for some flexibility regarding the location of development(s) within the zone. This means that it may be possible to locate development in areas of the zone that are less likely to impact on features in any overlapping Natura 2000 sites. Assessment of the impacts of further developments both alone and in combination will be required following the submission of applications and accompanying data. It is highly likely that there will be further leasing rounds for wind farm development in the future. Leases for wave and tidal devices have currently been considered on an individual basis.

Following on from the Strategic Environmental Assessment (SEA), the Crown Estate, using the information from the SEA and the information from developers, has determined which areas of

³⁰ This assumes that wind farms are operating to capacity for 35% of the time.

³¹ ROCs (Renewables Obligation Certificates) and renewables LECs (Levy Exemption Certificates, relating to the Climate Change Levy) are Government regulations that influence the wholesale price of different forms of electricity.

the seabed are suitable for leasing, and nine Zone Development Agreements were awarded in January 2010. The wind farm developers will now need to gain consent to install a wind farm and also to connect to the UK electricity grid.

Any application for a wave or tidal power project offshore will require an Environmental Statement that identifies the likely significant effects of the device, array or farm on the environment and proposes suitable mitigation measures.

Prior to construction, surveys are conducted to inform the EIA and provide baseline data on the site. These involve the developer undertaking bathymetric, geophysical and benthic surveys to determine the nature of the seabed and its associated plants and animals (which includes removal of material from the seabed through grab sampling and coring) as well as studies to investigate bird, fish and marine mammal use of the site. Meteorological masts, wave buoys and current meters are also installed to investigate the wind resources and hydrodynamic conditions at the site.

Likely future regulation of activity following designation

JNCC provided advice to The Crown Estate (TCE) on their Habitats Regulations Assessment (HRA) for the Round 3 Plan. TCE concluded, based on advice and the assumption that Dogger Bank will become an SAC, that there should be consideration of the impact of development on the different biotopes that together represent the sandbank qualifying feature of the dSAC. [JNCC Report 429](#)³² provides some information on the known biotope distribution on Dogger Bank.

In order to ensure the regulator has a robust audit trail to inform appropriate assessment of projects for Round 3 on Dogger Bank SAC, it is likely that that additional information on the biotope distribution will be needed. Whilst not pre-judging individual appropriate assessments carried out by the Regulator, it is likely that the survey information that would be provided by the developer for Environmental Impact Assessment should be sufficient to characterise the biotope distribution of the Zone and conduct appropriate assessment (AA), therefore survey in addition to that which would be required for EIA in the absence of the SAC is unlikely to be needed.

In terms of assessing impacts against the conservation objectives in order to establish the effect on site integrity, a key objective for AA is likely to be to consider the extent of loss of sandbank habitat as a consequence of wind farm installation (including, for example, turbines, cabling, scour protection, and sub-stations), and also impacts on sediment processes, scouring effects and alteration of habitat. Whilst not pre-judging individual appropriate assessments carried out by the Regulator, it is likely that a loss of 1% or greater of the qualifying habitat would constitute an adverse impact on site integrity. It is expected that construction of Round 3 combined with other oil & gas development and aggregate extraction on the site (which may result in the same pressures on the habitat) is likely to amount to less than 1% for the following reasons:

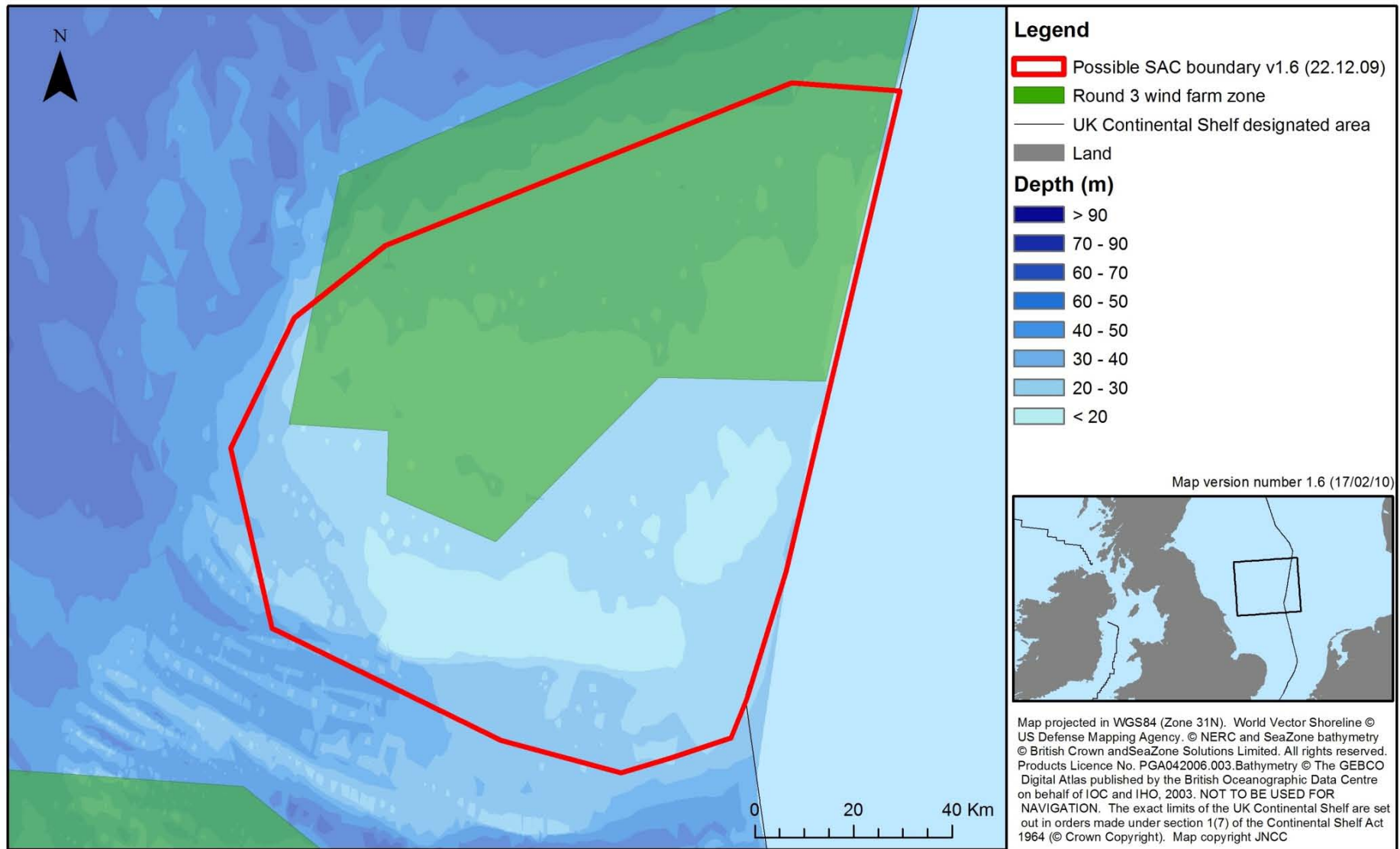
- To optimise use of wind resource, turbines are placed at significant distances apart (>1km), therefore the proportion of seabed lost or affected through installation or local scour is likely to be minimal;
- Cabling is not likely to result in habitat loss except for instances when rock-dumping and/or concrete mattresses is used to protect cables, changing the benthic habitat to hard substrate. Use of these techniques is likely to be localised compared to the overall extent of wind farm infrastructure;
- The amount of habitat loss at the site from oil & gas development and aggregate extraction is currently very small, so the risks associated with in-combination impacts are low.

³² Diesing, M., Ware, S., Foster-Smith, B., Stewart, H., Long, D., Vanstaen, K., Forster, R. & Morando, A, (2009), Understanding the marine environment - seabed habitat investigations of the Dogger Bank offshore draft SAC, [JNCC Report 429](#), ISSN 0963 8901.

A better understanding of biotope distribution will enable developers to demonstrate that they are not having a disproportionate impact on any particular biotope and that rare and sensitive biotopes are avoided.

Widespread development across sandbanks can disrupt natural processes in a manner that would significantly change the way a habitat functions. Some sandbank habitats are more active than others and the developer would need to evaluate available baseline information to consider the risks. Dogger Bank is not a tidally generated sandbank, having been formed through periglacial processes followed by submergence during post-glacial sea level rise. Taking into consideration the known sediment movement that occurs on this relict glacial feature, it is thought that the sandbank is a relatively stable habitat. Whilst not pre-judging individual appropriate assessments carried out by the Regulator, the risk of disruption of dynamic processes acting on the sandbank as a result of turbine installation is likely to be negligible.

Figure 2.4 Round 3 windfarm licensing around the Dogger Bank SAC (from SeaZone)



c) Aggregates

Description of known current and future activity relevant to the site

Licenses for aggregate extraction have been applied for within the proposed site boundary (Figure 2.5):

- **Licence Area 466:** Maximum of 3 million tonnes over 15 years with a maximum annual off-take of 600,000 tonnes; extraction will be limited to 200,000 tonnes per year for the first five years of dredging. An official application was submitted to the MFA (now MMO) in August 2009.
- **Licence Area 485:** 7.5 million tonnes over 15 years with a maximum annual extraction rate of 1 million tonnes and an expected average of 500,000 tonnes per annum). An application is expected in 2010.

The Crown Estate estimates these assets to be worth approximately £5m. The value to the operators in landing the product is many times (possibly around 10 times) that. As this area has also been the subject of failed tender bids in the past, it is possible that these licences will not be granted. However, each application for permission to the MMO will be subject to EIA and likely significant test and subsequent Appropriate Assessment (if the proposed dredging activities are likely to significantly affect the Dogger Bank pSAC). Thus, if the operator obtains a permission to dredge then it seems likely that the Crown Estate will issue a licence.

Regulation of activity (baseline)

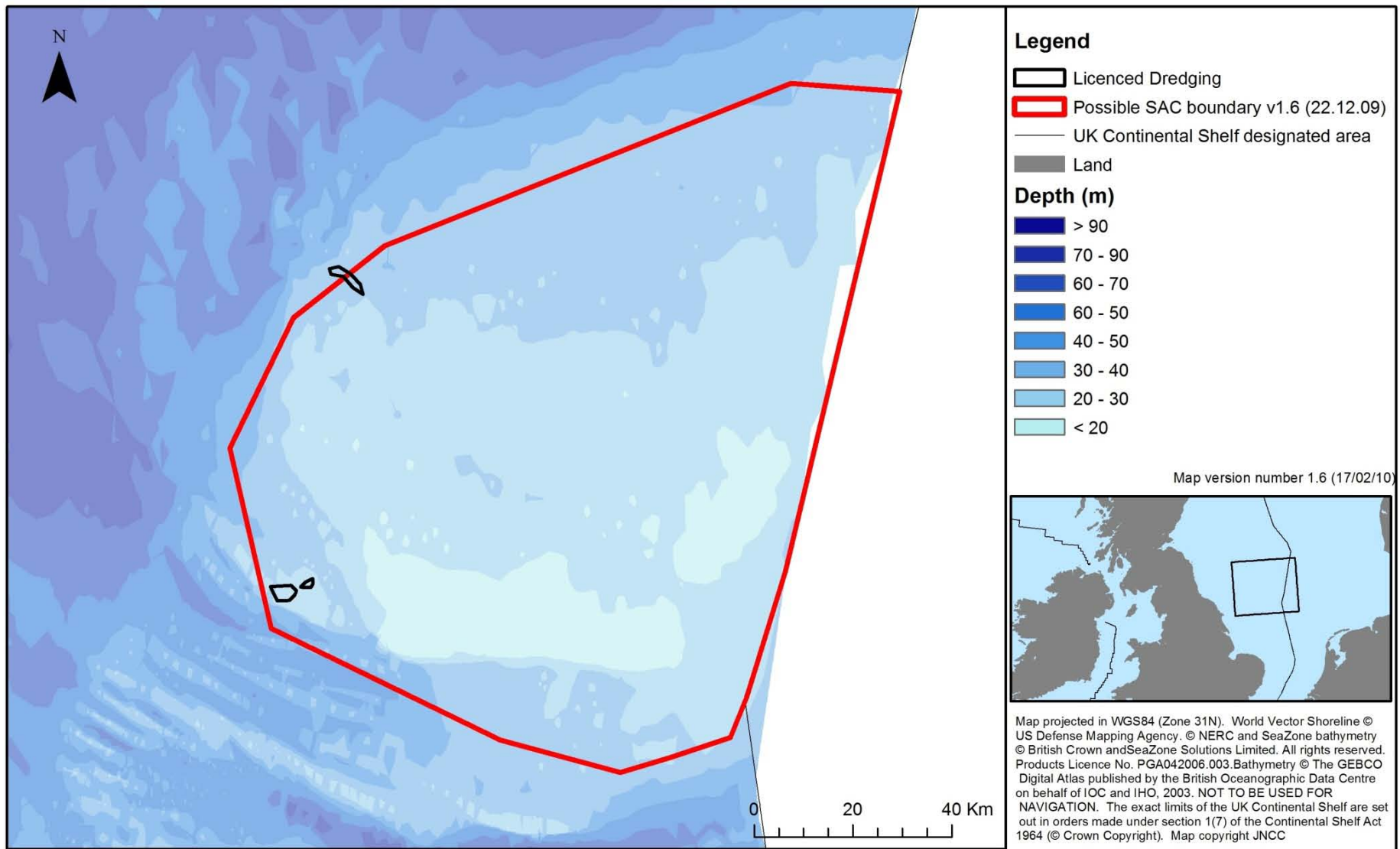
The Crown Estate (TCE) owns the seabed to the 12-mile territorial limit and the rights to non-energy minerals out to the edge of the UK continental shelf and, as such, grants commercial production licences to the aggregate industry. Such a licence will only be issued if the dredging company has obtained a dredging permission from the regulator. In UK offshore waters, new applications for aggregate extraction are regulated by the MMO predominantly through the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland) Regulations 2007 ("Marine Mineral Regulations 2007"). The Secretary of State is likely to determine that marine minerals dredging of more than 10,000 tonnes will require an EIA³³. JNCC provide MMO with advice on such EIAs for offshore waters (and any screening exercises or appropriate assessments carried out in relation to Natura 2000 sites in offshore waters).

Once an EIA has been approved and consent for dredging granted, the dredging permission will be accompanied by a detailed "schedule of condition" including definition of the working area, the term of the dredging permission, and the permitted extraction tonnage. The conditions also cover management, mitigation and monitoring requirements on a site-specific basis.

The management measures set out permitted working practices such as whether trailing or static dredging is permitted, whether screening is allowed, and defined access routes to and from the licence. Mitigation measures stipulate steps to be taken to minimise or reduce the potential effects of dredging, such as minimising the area available to be dredged at any time and seasonal restrictions. Monitoring measures include bathymetric and side scan sonar surveys, benthic surveys, and fisheries studies, as well as the use of electronic monitoring systems (EMS) – 'black boxes' that record the time and location of all dredging activities using GPS satellite positioning. All vessel records are audited by the MMO and the managing agents for The Crown Estate on a monthly basis.

³³ See www.marinemangement.org.uk/works/minerals/documents/mmg2.pdf

Figure 2.5 Aggregate extraction within the Dogger Bank pSAC



Likely future regulation of activity following designation

Under the Review of Consent procedure detailed in the Marine Mineral Regulations 2007, regulation 24 and Schedule 3, the Secretary of State is required to review marine minerals dredging permissions³⁴ as soon as is practicable following the date on which a site becomes a European site (which includes sites transmitted to the European Commission).

In general, management measures for aggregate extraction are already such that the sector should not prevent the delivery of favourable conservation status of the Annex I sandbank in the Dogger Bank pSAC, in the event of a dredging permission being subject to a review. There is a small risk that applications for dredging within the Dogger Bank pSAC will be turned down on the basis of the conclusions of AAs or review of consent being incompatible with the site's Conservation Objectives.

d) Shipping

Description of known current and future activity relevant to the site

There are busy shipping lanes between the Dogger Bank site and the coast, but, given the shallow depth of some parts of Dogger Bank (less than ~18m), shipping is expected to already avoid parts of the site (Figure 2.6). There are no major shipping or ferry routes that cross the site boundary and no anchorages within or near to the boundary. Parts of the site are crossed by regular shipping traffic though this isn't heavy (<240 passes pa).

Regulation of activity (baseline)

The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The MARPOL Convention, which was adopted by the International Maritime Organisation in 1973, covered pollution by oil, chemicals, harmful substances in packaged form, sewage and garbage. Measures relating to tanker design and operation (arising from the Convention on the Safety of Life at Sea, 1974) were also incorporated into the MARPOL Protocol. As the 1973 MARPOL Convention had not yet entered into force, it was absorbed into the 1978 MARPOL Protocol. The Convention includes regulations aimed at preventing and minimizing pollution from ships, both accidental pollution and that from routine operations. It now includes six technical Annexes which came into force in 1983:

| | |
|-----------|---|
| Annex I | Regulations for the Prevention of Pollution by Oil |
| Annex II | Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk |
| Annex III | Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form |
| Annex IV | Prevention of Pollution by Sewage from Ships |
| Annex V | Prevention of Pollution by Garbage from Ships |
| Annex VI | Prevention of Air Pollution from Ships (entry into force 19 May 2005) |

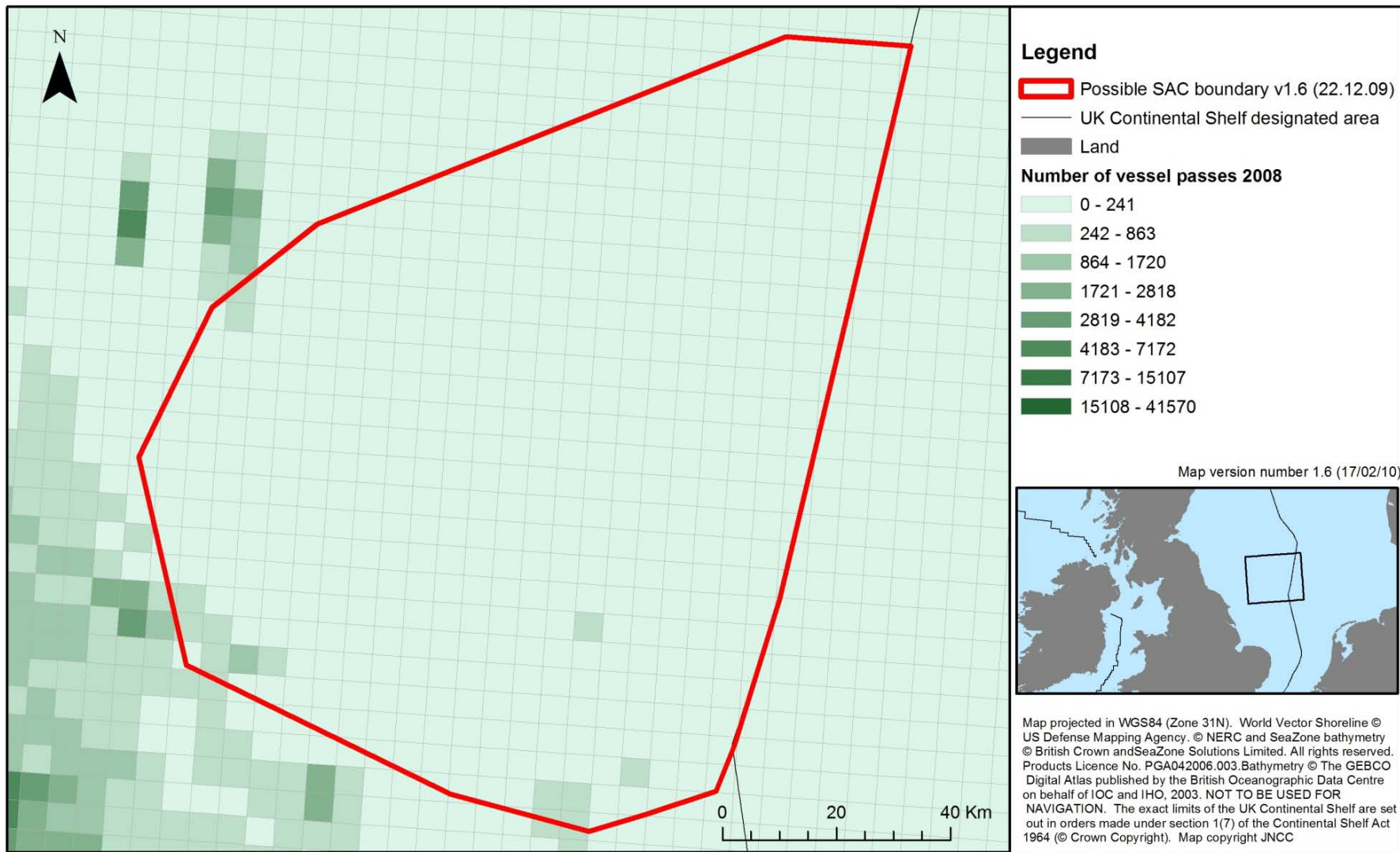
Signatories to the Convention, which include the UK, must accept Annexes I and II, but the other Annexes are voluntary.

Likely future regulation of activity following designation

The site is proposed for its sandbank habitat, which is unlikely to be affected by shipping passing above it, therefore under the designate option, no change to current practices is likely to be required to fulfil the conservation objectives for the sandbank at the Dogger Bank.

³⁴ These functions are carried out by the Marine Management Organisation (MMO)

Figure 2.6 Shipping activity around the Dogger Bank SAC from the Cefas data contract (MB106). Data was derived from Automatic Identification Systems (AIS), a collision-avoidance system for ships over 300GT that travel in international waters. Data are provided by MCA. Data for 2008 are represented as the total number of vessels passing through each 5km by 5km grid cell. Data are represented on a scale of 'low' to 'high'



e) Cables

Description of known current and future activity relevant to the site

There are four submarine telecommunications cables that cross the site and two cables that run parallel to the site boundary to the north.

Regulation of activity (baseline)

Most sub-sea cables are exempt from licence control under the Food & Environment Protection Act (FEPA) though associated works such as rock armouring and mattressing, the construction of facilities at the shore landing, and pre-sweep and trenching may require a FEPA licence. A 'pre-sweep' licence is required where activities are to be undertaken that will result in the re-deposition of material other than at an existing designated disposal site. Where a cable is an integral component of a larger scheme, such as the construction of an offshore energy generation project, any FEPA licence issued for the project will need to include the laying of the cable.

Following enactments of the Marine and Coastal Access Bill electricity cables require a Marine Licence.

Likely future regulation of activity following designation

There are no plans to install any new cables unless associated with wind farms (discussed in renewables section). As such, the regulations are not expected to change following designation.

f) Fisheries

Description of known current and future activity relevant to the site

Note that fishing is carried out on a European level, by UK vessels, European and non-European vessels by agreement. Data on location and type of fishing is difficult to obtain comprehensively due to various issues.

It is possible to obtain information on the distribution of fishing effort within the region for UK vessels ($\geq 15\text{m}$) that have vessel monitoring systems (VMS). These provide a vessels position, speed and heading either hourly or every two hours. Such information can be analysed spatially in relation to the site boundary. As vessels fish at characteristic speeds, VMS data can be processed to provide proxy patterns of 'active fishing'. The European Commission has passed a regulation requiring all member states to assure that VMS terminals in use on fishing vessels ($\geq 15\text{m}$) of its national fleet are secure³⁵.

There are no landings data available specifically for the area which is proposed for designation. The Marine Management Organisation's Fisheries Activity Database (hereafter, FAD) compiles various data at the level of ICES rectangle. Catch data encompasses information for UK-registered vessels landing in UK and non-UK ports, and for non-UK registered vessels landing in UK ports. Data includes:

- year
- size of vessel
- type of gear
- species caught
- port of landing
- vessel nationality
- value of landing
- tonnage of landing

Note, the exception is for non-UK vessels that fish within territorial waters, but that land at non-UK ports; it is not possible to obtain weights and values of landings for these vessels. This impact assessment is concerned with the impacts of the UK's potential designation of Dogger Bank on UK businesses. However for fisheries, designations of other areas of the marine environment by other Member States are also relevant as there will also be effects on businesses in other countries. The Dogger Bank habitat feature extends into Dutch and German waters, and therefore the costs or benefits of a closed zone in UK waters are impacted by whether or not these countries also designate their areas of Dogger Bank, and the management options they choose. Germany has already designated the site and Netherlands

³⁵ http://ec.europa.eu/fisheries/index_en.htm

are in the process of preparing a designation. Work to develop coordinated management measures has already commenced.

Within the LOT 7 EU funded project “Joint data collection between the fishing sector and the scientific community in the North Sea” a collaborative study of VMS data was agreed with the North Sea Regional Advisory Council (NSRAC). Dogger Bank SAC was considered to be a suitable case study and was subsequently the focus of a NSRAC workshop (though this was for the larger 2008 boundary). It was found that, in 2006, there were 30 UK vessels active in the SAC area (21 beam trawlers, 6 otter trawlers and 3 Danish seine netters). In 2007, numbers were similar, with 23 beam trawlers, 8 otter trawlers and 2 Danish seine netters fishing in the area. Fishing effort within the site was greatest between April and September.

Current fishing practices at Dogger Bank were assessed using two years (2006 and 2007) of recent VMS and landings data from 2008 for the ICES rectangles³⁶ within which the draft SAC is sited (Table 2.4). Figure 2.7 shows average fishing effort within the Dogger Bank SAC area for 2006/7 based on VMS data³⁷. Note that VMS data only cover vessels of over 15m in length, but it is considered unlikely that vessels under 15m in length fish as far offshore as Dogger Bank³⁸.

Table 2.3 Country of registration and destination of catch for vessels fishing in the ICES rectangles overlapped by Dogger Bank, 2008 (for UK data)

| ICES | UK to UK | | Non-UK to UK | | UK to non-UK | |
|------|-----------|--|--------------|--|--------------|--|
| | Value (£) | % of catch from rectangle attributable to UK to UK | Value (£) | % of catch from rectangle attributable to non-UK to UK | Value (£) | % of catch from rectangle attributable to UK to non-UK |
| 37F1 | 599,643 | 54.8 | 134,820 | 12.3 | 360,027 | 32.9 |
| 37F2 | 1,077,326 | 58.7 | - | - | 759,449 | 41.3 |
| 38F1 | 170,004 | 36.9 | 126,006 | 27.4 | 164,460 | 35.7 |
| 38F2 | 45,335 | 6.2 | 65,726 | 9.0 | 617,898 | 84.8 |
| 39F1 | 52,371 | 22.1 | 7,630 | 3.2 | 176,890 | 74.7 |
| 39F2 | 13,612 | 2.4 | - | - | 544,348 | 97.6 |
| 39F3 | 2,028 | 0.1 | - | - | 1,949,689 | 99.9 |

The proposed UK SAC overlaps seven ICES rectangles (39F1-3, 38F1-2, 37F1-2) (Figure 2.7) to varying degrees. Rectangle 38F3 is not included here as less than 1% is covered by the SAC. In order to estimate the value of landings within the SAC boundary the total landings from within each relevant ICES rectangle were divided by the percentage of the area of that rectangle covered by the SAC boundary (as shown as ‘area method’ in Table 2.5). For 2008, the value of landings from within the site for all vessels was approximately £2.550m³⁹. For UK vessels, the figure is £2.366m or 92.8% of total landings. This is clearly a very rough indication as we do not currently know whether activity within the ICES rectangles is representative of activity within the pSAC.

³⁶ The International Council for the Exploration of the Sea (ICES) divides seas into rectangles and this system is used to assist monitoring and enforcement of marine activities.

³⁷ MB106 data contract with Cefas - Provision of geo-data on human activities and pressures to support the selection of MCZ sites.

³⁸ Juliette Hatchman, MFA, pers comm., 19/12/09.

³⁹ It is recognised that this figure is derived from a methodology which does not isolate the value of fishing from within the SAC itself. This figure is a proportion of an average value from an activity which is not evenly distributed across the given area assessed. This methodology places significant limitations on the estimated cost of fishing from within the site. Stakeholders are invited to submit in their consultation responses information on gear types used within the site, landings of different species within the site and fluctuations in these over time. This will enable a more accurate description of fisheries within the site in the revised IA that is submitted to government.

As an alternative, an 'effort method', shown in the right hand columns of Table 2.5, utilises effort data generated by Cefas to estimate landings from within the Dogger Bank SAC boundary. The effort method assumes that catch is directly proportionate to effort. The percentage of the effort in a given rectangle that occurs within the proposed site boundary was used to estimate the value of the landings from the area of the site in that rectangle. This gave similar values to the area method used above: £2.774m for all countries and £2.575m for the UK for 2008.

This value is higher than previous estimates made in earlier iterations of this Dogger Bank IA (in 2009), which only considered ICES rectangles that were covered over 50% by the SAC. Those estimates used average landings data over 2000-2008, and resulted in a much lower estimate of the value of catch to UK vessels (£0.58m). However, this estimate only included landings of UK-registered vessels to UK ports and we are confident that the new methods give a more realistic estimate of costs to the UK economy. Much of the landings from Dogger Bank are made by the Anglo-Dutch fleet and were not considered in previous costs.

As with the other marine Natura 2000 sites proposed for designation during 2010, the value calculated from the area method (£2.366m) is used to calculate values in subsequent sections of this IA. As this figure is from 2008, the value is recalculated to 2010 prices (£2.467m).

Figure 2.7 Average fishing activity around the Dogger Bank SAC in 2006/7 from the Cefas data contract (MB106). Generated by Cefas from VMS, log-book and EU vessel register data for 2006 and 2007. All vessels (UK & non-UK) are included and fishing is estimated using a simple speed rule of 1-6 knots to represent fishing activity.

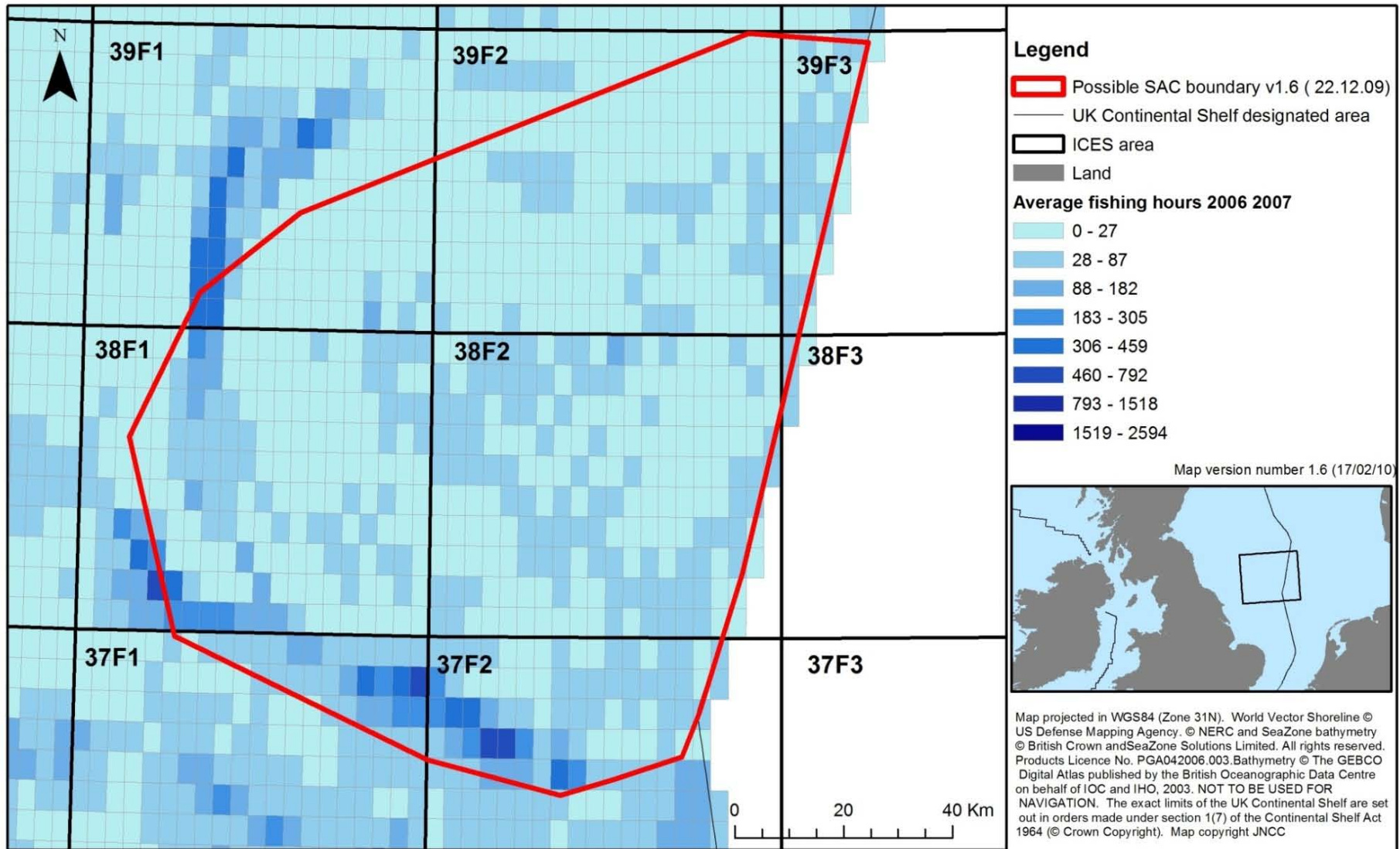


Table 2.4 Fisheries landings in 2008 by ICES rectangle in the region of the Dogger Bank SAC

| ICES rectangle | | Landings (tonnes) | Value of landings (£) | % area covered by SAC | Catch from within SAC (area method) (£) | % of rectangle effort in SAC boundary | Catch from within SAC (effort method) (£) |
|----------------|---------------------------|-------------------|-----------------------|-----------------------|---|---------------------------------------|---|
| | | | A | B | C = A x B | D | E = A x D |
| 39F1 | Total landings | 2,450 | 236,891 | 0.25 | 59,223 | 0.15 | 35,534 |
| | UK landings ⁴⁰ | | 229,261 | | 57,315 | | 34,389 |
| 39F2 | Total landings | 1,135 | 557,960 | 0.82 | 457,527 | 0.77 | 429,629 |
| | UK landings | | 557,960 | | 457,527 | | 429,629 |
| 39F3 | Total landings | 1,310 | 1,951,717 | 0.14 | 273,240 | - | ⁴¹ 273,240 |
| | UK landings | | 1,951,717 | | 273,240 | | 273,240 |
| 38F1 | Total landings | 578 | 460,469 | 0.79 | 363,771 | 0.65 | 299,305 |
| | UK landings | | 334,463 | | 264,226 | | 217,401 |
| 38F2 | Total landings | 622 | 728,959 | 0.96 | 699,801 | 0.98 | 714,380 |
| | UK landings | | 663,233 | | 636,704 | | 649,968 |
| 37F1 | Total landings | 556 | 1,094,489 | 0.15 | 164,173 | 0.38 | 415,906 |
| | UK landings | | 959,669 | | 143,950 | | 364,674 |
| 37F2 | Total landings | 1,833 | 1,836,775 | 0.29 | 532,665 | 0.33 | 606,136 |
| | UK landings | | 1,836,775 | | 532,665 | | 606,136 |
| TOTAL | Total landings | | | | 2,550,400 | | 2,774,129 |
| | UK landings | | | | 2,365,627 | | 2,575,438 |

⁴⁰ Landings made by UK-registered vessels to UK ports and non-UK ports.

⁴¹ It was not appropriate to use effort data from within 39F3 as the majority of the rectangle by area is outside of the UK EEZ and we only have effort data for UK waters. In the calculation of landings by effort, the area value (£0.273m) was used for this rectangle.

The majority of fishing (by value) in the area is undertaken by boats registered in the UK and landed in the Netherlands (**Table 2.6**).

Table 2.5 Fisheries landings by country of registration in the region of the Dogger Bank SAC (2008)

| Country of registration ⁴² | Country of landing | Landings (tonnes) | % of landings (tonnes) | Value of Landings (£) | % of landings by value |
|---------------------------------------|--------------------|-------------------|------------------------|-----------------------|------------------------|
| GBE | NLD | 1752.4 | 20.65 | 2,597,277 | 37.82 |
| GBS | NLD | 1056.0 | 12.45 | 1,659,413 | 24.16 |
| GBE | GBE | 831.8 | 9.80 | 1,585,138 | 23.08 |
| GBS | GBE | 127.5 | 1.50 | 236,152 | 3.44 |
| GBS | DNK | 3031.7 | 35.73 | 190,378 | 2.77 |
| DNK | GBE | 97.3 | 1.15 | 128,760 | 1.87 |
| NLD | GBE | 42.1 | 0.50 | 114,557 | 1.67 |
| GBN | GBE | 44.2 | 0.52 | 79,323 | 1.16 |
| GBS | NOR | 1223.0 | 14.41 | 73,810 | 1.07 |
| NOR | GBS | 220.7 | 2.60 | 62,972 | 0.92 |
| GBE | DNK | 3.1 | 0.04 | 51,883 | 0.76 |
| GBS | GBS | 27.8 | 0.33 | 46,722 | 0.68 |
| FRA | GBE | 20.4 | 0.24 | 27,893 | 0.41 |
| GBN | GBS | 7.0 | 0.08 | 12,985 | 0.19 |

More specifically, the vast majority of the catch (by value) is landed in the port of Harlingen (NLD) (52.29%), followed by Grimsby (9.31%), Scarborough (8.90%) and Whitby (4.77%) (**Table 2.7**). The landings at Harlingen represent a mix of species including plaice (the greatest catch by value) brill, cod, dab, hake, halibut, lemon sole, megrim, monkfish, sole and turbot. Note, that this data are only for UK registered vessels landing in foreign ports.

Table 2.6 Destination of fish caught in the Dogger Bank region in 2008 (landings to ports comprising less than 1% of the total landings are not included).

| Landing Port | Where | Landings (tonnes) | % of landings (tonnes) | Value of landings (£) | % of landings by value |
|----------------------------|-------|-------------------|------------------------|-----------------------|------------------------|
| Harlingen | NLD | 2324.82 | 27.40 | 3,591,026 | 52.29 |
| Grimsby | GBE | 412.52 | 4.86 | 639,474 | 9.31 |
| Scarborough | GBE | 320.00 | 3.77 | 611,118 | 8.90 |
| Whitby | GBE | 183.31 | 2.16 | 327,404 | 4.77 |
| North Shields | GBE | 161.55 | 1.90 | 315,386 | 4.59 |
| Den Helder | NLD | 234.56 | 2.76 | 298,863 | 4.35 |
| Scheveningen | NLD | 148.34 | 1.75 | 228,548 | 3.33 |
| Bridlington | GBE | 33.31 | 0.39 | 139,908 | 2.04 |
| Hartlepool | GBE | 49.62 | 0.58 | 133,580 | 1.95 |
| Unspecified Danish Port | DNK | 1867.63 | 22.01 | 120,124 | 1.75 |
| Peterhead | GBS | 229.71 | 2.71 | 78,930 | 1.15 |
| Unspecified Norwegian Port | NOR | 1223.00 | 14.41 | 73,810 | 1.07 |

⁴² Countries: (DNK) Denmark, (Fra) France, (GBE) England, (GBN) Northern Ireland, (GBS) Scotland, (NLD) The Netherlands, and (NOR) Norway

| | | | | | |
|---------|-----|---------|-------|--------|------|
| Skaagen | DNK | 1164.08 | 13.72 | 70,254 | 1.02 |
|---------|-----|---------|-------|--------|------|

The majority of the catch by weight is caught by unspecified otter trawls, but this is largely low value catch (e.g. sandeels) (Table 2.8). Beam trawls land the most catch by value, indicating the vessels target more high-value species (e.g. turbot, sole and plaice).

Table 2.7 Types of fishing gear used in the Dogger Bank SAC region in 2008

| Gear | Landings (tonnes) | % of landings (tonnes) | Value of landings (£) | % of landings by value |
|------------------------------|-------------------|------------------------|-----------------------|------------------------|
| Beam trawls | 1876.02 | 22.11 | 3,035,934 | 44.21 |
| Otter trawls (not specified) | 989.13 | 11.66 | 1,432,726 | 20.86 |
| Nephrops trawls | 396.47 | 4.67 | 738,543 | 10.75 |
| Otter trawls - bottom | 4479.43 | 52.79 | 645,045 | 9.39 |
| Danish seines | 303.22 | 3.57 | 481,049 | 7.00 |
| Otter twin trawls | 141.25 | 1.66 | 235,563 | 3.43 |
| Pots | 58.04 | 0.68 | 197,671 | 2.88 |
| Otter trawls - midwater | 220.69 | 2.60 | 62,972 | 0.92 |
| Set gillnets (anchored) | 9.22 | 0.11 | 23,848 | 0.35 |
| Pair trawls - bottom | 10.40 | 0.12 | 12,846 | 0.19 |

Of the landings, the vast majority came from towed bottom gear (beam, otter and *Nephrops* trawls). Of the estimated £2.366m of UK landings from within the SAC boundary, £2.098m (88.7%) came from towed bottom gear. Note that unspecified otter trawls were also included in these calculations (£2.188m in 2010 costs).

| ICES rectangle | Demersal landings from UK vessels using towed bottom gear (tonnes) ⁴³ | Value of demersal landings (£) | % area covered by SAC | Demersal catch from within SAC (area) (£) |
|----------------|--|--------------------------------|-----------------------|---|
| | | A | B | C = A x B |
| 39F1 | 2436 | 215,374 | 0.25 | 53,844 |
| 39F2 | 1129 | 548,086 | 0.82 | 449,431 |
| 39F3 | 1,303 | 1,932,034 | 0.14 | 270,485 |
| 38F1 | 210 | 190,317 | 0.79 | 150,350 |
| 38F2 | 529 | 580,919 | 0.96 | 557,682 |
| 37F1 | 436 | 756,131 | 0.15 | 113,420 |
| 37F2 | 1787 | 1,735,346 | 0.29 | 503,250 |
| TOTAL | 7,830 | 5,958,207 | | 2,098,461 |

The most valuable catch in the region is plaice (55.55%), followed by *Nephrops* (13.62%), turbot (6.36%) and lemon sole (4.48%) (Table 2.9). Sand eels caught primarily with otter trawls represent by far the largest catch by weight (50%), but are a low value catch.

⁴³ For UK to UK and UK to non-UK landings

Table 2.8 Dominant target species in the Dogger Bank region in 2008

| Species | Landings (tonnes) | % of landings (tonnes) | Value of landings (£) | % of landings (£) |
|---------------------------|-------------------|------------------------|-----------------------|-------------------|
| Plaice | 2823.07 | 33.28 | 3,813,563 | 55.55 |
| Nephrops (Norway Lobster) | 454.33 | 5.36 | 934,773 | 13.62 |
| Turbot | 66.01 | 0.78 | 436,674 | 6.36 |
| Lemon Sole | 116.92 | 1.38 | 307,459 | 4.48 |
| Cod | 146.37 | 1.73 | 289,719 | 4.22 |
| Sand Eels | 4249.08 | 50.09 | 256,438 | 3.74 |
| Sole | 27.97 | 0.33 | 235,522 | 3.43 |
| Lobsters | 15.96 | 0.19 | 154,254 | 2.25 |
| Dabs | 144.35 | 1.70 | 99,921 | 1.46 |
| Herring | 220.69 | 2.60 | 62,972 | 0.92 |
| Crabs (C.P.Mixed Sexes) | 50.19 | 0.59 | 52,706 | 0.77 |

Regulation of activity (baseline)

The European Common Fisheries Policy (CFP) sets the framework for almost all regulation of fisheries in UK waters. European competence and specific regulations vary in their application pending exact geography. In the UK, all waters beyond 12nm fall under the jurisdiction of the European Commission through the CFP. It is transposed through the Control Regulation (which sets quotas each year in December under separate EC legislation), and Technical Conservation Regulation (covering issues like sizes of nets, fishing areas, etc.).

Fishing for pressured stocks beyond 12nm is managed at the European level with each Member State receiving an annual allocation (quota) of each stock at each December Fisheries Council (with a small amount of the total quota allocated to 0–12nm)⁴⁴. Non-pressured stocks such as bass, scallops and cuttlefish still have no applicable quotas. This means that when quota levels are reached vessels tend to move into the inshore zone to catch those species for which there is a market but in effect no restrictions on what can be landed.

Fisheries Regulations apply to anyone fishing from a powered boat and selling their catch, including trawling, netting or potting. Vessels used to catch fish for sale must be licensed as a fishing vessel (subject to exceptions⁴⁵). As well as setting limits on pressured stock (total allowable catches) the CFP puts in place a series of regulations including minimum landing sizes for certain fish as well as seasonal measures needed for stock management. These may take the form of spatial closures that prevent the use of particular fishing techniques in certain areas either permanently or on a time-limited basis. The CFP can also place limits on the amount of fishing that can take place either by limiting the amount of fishing gear or by limiting the power of the fishing vessels that can take part in the fishery. Further, the more recent “Registered Sellers and Buyers Regulation” has greatly helped manage the issue of ‘black’ fish by preventing those fish caught by illegal means entering the market. By denying a market for such fish it is hoped that fishermen will more generally comply with the regulations.

Fisheries regulations and policy are enforced, in English Waters, through the MMO sea fisheries enforcement programme, which includes the inspection of fishing vessels and fishing industry premises in the major fishing ports, fish markets and other locations around the coast by Marine Management

⁴⁴ Quotas are informed by annual scientific stock assessment advice formulated by ICES (the International Council for the Exploration of the Seas) although adherence to this advice is not mandatory.

⁴⁵ A licence is not required if a vessel is not powered by an engine or if it is fishing for common eels. If a vessel is only fishing for salmon and migratory trout it does not require a licence but must be registered with the Environment Agency.

Organisation officers. Fishing vessels are also inspected at sea by the Royal Navy's Fishery Protection Squadron operating under a Defra/Ministry of Defence agreement. There is also a program of aerial surveillance⁴⁶.

Likely future regulation of activity following designation

The UK must seek management measures for an MPA in offshore waters through the proposal of fisheries management measures under the CFP by the European Commission.

The CFP is currently undergoing reform and a revised regulation will come into effect in January 2013. The Green Paper⁴⁷ currently (October 2009) sets out some of the areas that the Commission would like to review; at this stage it is however impossible to predict which, if any, of those proposed measures will come into effect.

The UK will consider, in collaboration with the Dutch and German authorities, applying to the EC for controls to close parts or all of the Dogger Bank (across UK, Dutch and German SACs) to some forms of fishing in order to reduce the impacts of fishing on benthic communities and target and non-target fish and shellfish species. Experimental closures may be considered, to inform future management measures based on their relative success.

3 APPROACH TO ANALYSIS OF COSTS AND BENEFITS

3.1 Approach

This consultation IA presents a quantitative assessment of the potential costs and benefits to the UK of the policy option to designate the site. Impacts have been assessed in the IA over a time scale of approximately ten years. Section 2 has outlined the current situation at the site (the baseline) in terms of economic activities. It should be remembered that the baseline may not be static (it may be subject to ongoing change), and the assessments try to take account of this (for example, where a benefit is identified as preventing continuing decline).

The same method has been adopted to develop impact assessments for a suite of marine Natura 2000 sites consulted on in 2009-2010. However, different sites have different baselines, activities and circumstances. Therefore even with a consistent methodology, different assumptions may be made, different impacts may be identified and even the same type of impact may have different monetary cost or benefit estimates associated with it for different sites.

Section 4 examines the potential costs and benefits of the policy option. The costs and benefits are subject to significant uncertainty. The main causes for this uncertainty are that:

- it is difficult to predict what management measures will be implemented at the site;
- it is difficult to know how operators will respond to them and what costs they will incur in doing so; insofar as they can predict this there may be reasons in some cases for not supplying this information, for example: commercial sensitivities;
- it is difficult to predict how the condition of the protected features and surrounding environment would change under Option 1; and
- there is currently very little evidence which can be used to monetise values for environmental changes in the marine environment.

Therefore the approach to the assessment has:

⁴⁶ www.marinemanagement.org.uk/fisheries/monitoring/regulations.htm

⁴⁷ <http://ec.europa.eu/fisheries/reform/>

- used techniques to obtain the best available information on these areas of uncertainty. This is done firstly by developing scenarios on likely potential maximum and minimum management measures; and secondly by drawing on sources most likely to be able to predict the impacts of these potential management measures and provide relevant information. Regrettably, information could not be collected widely from stakeholders to inform this IA;
- used a framework of factors likely to determine the benefits to society of achieving the conservation objective of the site;
- identified the possible minimum and maximum impact on economic sectors rather than the actual expected impact; and
- not assessed the precise direct or indirect impacts on businesses, employees or elements of the supply chain potentially affected. This is because there is not sufficient evidence available to accurately predict the distribution of net changes in activity within the regional economy.

The analysis in this document is based on the methods that are judged to be the best practicable option to address the issues considered. Further work is planned following public consultation to fill gaps in, and improve the accuracy of, the analysis.

3.2 Costs

a) Policy costs to the private sector

The policy costs arising from designation of the site are the costs of changes to existing and planned human activities taking place within or in the vicinity of the site in order to comply with the policy objectives. The costs considered include the direct and indirect economic costs of those changes to operators, enforcement authorities and wider society. The costs are expected to result from the potential range of management measures that may be required to meet the site's objectives. The costs are considered relative to the baseline of not designating the site.

The costs borne by each of the key sectors will depend on the extent to which their activity impacts on the site and the management measures deemed necessary to restore the sandbanks and their typical species to favourable condition, if that is deemed necessary. These are not yet known. It has therefore been necessary to make assumptions about what measures might be required for this site. It is assumed that the site will be transmitted to the European Commission in 2010, and that some costs (for example, of more detailed EIA requirements) would arise immediately. The timing of some one-off costs is unpredictable within the ten year assessment period, so are assumed to fall in 2015. Assume fisheries management measures may take at least a year to be developed and implemented.

Policy costs to the private sector may arise if:

- Consent for a plan/project is granted, it may be subject to restrictions on the timing or manner in which the plan/project can be implemented which result in costs to businesses. Restrictions are determined by the competent authority in its assessment under the Habs Regs, and
- Consent for proposed plans or projects may be refused by the competent authority. The cost to businesses is assumed for this analysis to be the additional cost of undertaking the plan or project elsewhere.

b) Administration costs to the private sector

Administration costs include time and expenditure necessary for the private sector to provide information and documentation required to comply within the administration requirements of a regulation. They exclude 'policy costs' which are the time and expenditure necessary to adjust activities (e.g. to reduce pollution) to comply with regulatory standards. Potential administration costs to the private sector are:

- The costs to businesses of finding out about the designation and the management measures that may be needed;

- For ongoing or new plans and projects, the cost to businesses of providing more detailed information than that which would be required if the site was not designated. This is required to inform the Competent Authority's⁴⁸ assessment of the plan or project under the Habitat Regulations, and
- Undertaking more detailed analysis (such as EIA) and reporting in some cases.

c) Costs to the public sector

Potential administration costs to the public sector are:

- i. costs of monitoring the site and maintaining information on its conservation status; and
- ii. costs of regulating and enforcing human activities that might impact on the conservation status of the site.

3.3 Benefits

The potential benefits of site designation primarily arise from the increase in the area protected for nature conservation purposes⁴⁹. The benefits are assessed in terms of the impact on ecosystem services provided by the natural environment that benefit humans⁵⁰. The following overarching categories of ecosystem services are used⁵¹:

- Provisioning services (e.g. provision of food);
- Regulating services (e.g. absorbing waste); and
- Cultural services (e.g. the role of marine species in culture and the artistic inspiration they provide).

Here, and following Defra's guidance on the valuation of ecosystem services, the relevant benefits gained from supporting services⁵² (such as cycling of nutrients and photosynthesis) are viewed as essentially being captured by the other benefits listed and so are not examined separately⁵³. The analysis in Section 4 is based on a list of ecosystem service categories that are relevant to the site. *Relevant* means that the designation of the SAC would have a noticeable impact on the benefits derived from the service. The categories currently included are those known to be relevant at this stage, but may be subject to change should new information arise during public consultation.

The impacts of designation on these ecosystem services are analysed further in Section 4.3 below. In addition to these categories it is recognised by many that biodiversity has an intrinsic value. This value is viewed as an inherent characteristic of biodiversity that gives rise to other benefits. Therefore, intrinsic value cannot be assessed using economic valuation techniques⁵⁴ and is not analysed further here. However, this does not mean that intrinsic value is regarded as unimportant.

⁴⁸ Competent Authorities include statutory undertakers, as well as regulators which grant consents for regulated activities in the marine area. For example, DECC is a competent authority which regulates certain activities for wind farm, and oil and gas development. If a Competent Authority undertakes a plan or project itself, it may need to do its own Appropriate Assessment

⁴⁹ Heritage benefits, such as conservation of archaeological site, are the only benefits discussed that arguably sit outside the scope of nature conservation. Such benefits are still included.

⁵⁰ As described in Parliamentary Office of Science and Technology (2007).

⁵¹ These are the categories used in the Millennium Ecosystem Assessment (MEA 2005), <http://www.millenniumassessment.org>

⁵² Supporting services described as "those that are necessary for the production of all other ecosystem services" in the MEA

⁵³ For example, small marine organisms called phytoplankton form the basis of the food chain, ultimately ending in caught fish species. Valuing phytoplankton on its own in addition to these services they support would lead to double counting.

⁵⁴ For example, in MEA (page 7, Section 2) : <<http://www.millenniumassessment.org/documents/document.354.aspx.pdf>>.

4 COSTS AND BENEFITS OF OPTION 1: DESIGNATE THE SITE

4.1 Implications of designation

Once sites have been submitted to the EC, Competent Authorities have obligations to consider the likely significant effect of plans or projects they undertake or consent on the integrity of the site. Consequently, effects of the site on offshore industries operating near the site are not yet known.

In order to be able to assess the range within which the true costs and benefits are likely to fall, scenarios have been developed to identify the minimum and maximum potential management measures that might be required at the site. Development of these was informed by Table 2.1 and the potential environmental impacts of activities if the site was not designated.

The minimum scenario requires the smallest change in activities that may be needed compared with the baseline and therefore presents the minimum potential effect on activities.

The maximum scenario is at the other end of the scale: it involves the maximum change in activities that may be needed. This is in line with maximum costs. Table 4.1 outlines these scenarios for the site. This is an estimate of the measures that may be required for the site to achieve the conservation objective of 'restore' the sandbank feature to favourable condition.

Table 4.1 Summary of the "minimum" and "maximum" management scenarios that may be required for Dogger Bank SAC

| <i>"Minimum" scenario:</i> | <i>"Maximum" scenario</i> |
|---|--|
| <p><u>Existing activities</u> Experimental closures of ecologically representative areas of sandbanks. Closures may be to all activity and some to a selection (e.g. just towed gear). Closures should be sufficiently large, and kept in place for adequate time, to be able to clearly demonstrate effects of such closures.</p> <p><u>Proposed activities</u> Plans or projects which are likely to have a significant effect on the offshore SAC will be subject to Appropriate Assessment (AA).</p> <p>In response to a perception of more rigorous consideration of proposals – and on the advice of authorities and statutory advisers - businesses may make adjustments to projects proposed relative to baseline to ensure no significant effects. Businesses are also likely to invest more in assessment (+10%).</p> <p>It is possible that there may be some wind farm and/or aggregates applications that will not be consented if it cannot be ascertained that there will be no adverse effect on the integrity of the site.</p> | <p><u>Existing activities</u> Ban on all forms of towed, demersal fishing over the whole site</p> <p><u>Proposed activities</u> Offshore industry plans or projects which are likely to have a significant effect on the offshore SAC will be subject to AA</p> <p>More adjustments to project proposals are made to minimise interference with features e.g. prohibition of rock dumping on features, detours in pipelines to avoid feature, reduction of scour protection or cable armouring where windfarms are on sandbanks. Businesses are also likely to invest more in assessment (+50%).</p> <p>It is possible that some applications will not be consented if it cannot be ascertained that there will be no adverse effect on site integrity. Under a stricter set of management measures, it is likely that more projects would not pass the test of 'no adverse effect'.</p> |

4.2 Costs

In line with the purposes of this IA, this section deals only with costs to the UK economy. Fishing activities from other Member States are considered within the fisheries section, but are not included in the costs calculated below and presented in the summary sheets.

a) Oil and gas

In summary, whilst not pre-judging individual EIAs or Appropriate Assessments (AAs), JNCC believe, taking into account past experience, that designating the Dogger Bank sandbank feature will impact upon the gas industry/ regulator in the following manner:

- Operators proposing new developments (pipelines, platforms and exploration wells) are likely to be advised by the regulators to conduct an environmental baseline survey. There are likely to be additional costs incurred for preparation of an AA and during the EIA process in terms of processing and interpretation of the significance of the survey information and operations on the conservation objectives of the sandbank feature.
- Activities that cause permanent and physical damage to the seabed such as rock dumping are likely to be subject to a higher degree of scrutiny in the EIA process by the regulators and their environmental advisors. Operators will be expected to justify proposals for rock dumping and demonstrate that no satisfactory alternatives exist. This could result in the regulators not permitting rock dumping in certain circumstances.

Oil and Gas UK were of the view that the requirement for AA was likely to mean going about assessments in a slightly different way rather than adding to costs significantly. Existing assessments have typically cost between £107k and £376k (for deeper waters) (average £240k).

Oil and Gas UK have previously estimated the costs of time series monitoring in an SAC. Their estimates, in 2010 prices, are around £5.2k-£10.4k per station per year over multiple stations in an area. Whether or not monitoring is necessary throughout the period would depend on the initial results.

Table 4.2 Summary of “minimum” and “maximum” management scenarios and assumptions made in estimating costs for the oil and gas industry of designating the pSAC compared with not designating the site

| <i>“Minimum” scenario</i> | <i>Assumptions</i> | <i>Change in costs</i> |
|--|--|------------------------|
| Increased costs related to appropriate assessments for new proposals | Average costs of around £240k could increase by 10%. Number of new proposals difficult to predict (assumed to be 2 pa based on 2009) | £48k per year |
| <i>“Maximum” scenario</i> | <i>Assumptions</i> | <i>Change in costs</i> |
| Increased costs related to appropriate assessments for new proposals | Average costs of around £240k could increase by 50%. Number of new proposals difficult to predict (assumed to be 2 pa based on 2009) | £240k per year |
| Time series monitoring | For five platforms in the site. Increased monitoring costs of up to £10.4k pa each | £52k per yr |

There is a small chance that a development will be refused if it cannot be ascertained that there will be no adverse effect on the integrity of the site. The scales of such an impact are unknown, but the costs are potentially significant.

b) Renewables

The Crown Estate has identified a development zone in the current (3rd) offshore wind power licensing round in the northern half of the Dogger Bank with predicted generating capacity of 9GW. Out of a total of 25GW from all Round 3 zones, Zone 3 (Dogger Bank) has the largest potential capacity.

The impacts of designating Dogger Bank on delivery of offshore wind power are difficult to predict. The impacts depend on the actual level of development that would have occurred had the site not been designated. The actual level of development at Dogger will depend on its characteristics relative to other sites - it is further offshore than most making it more expensive, but is in shallow water making it potentially more attractive.

Dogger Bank could potentially support 13GW of wind power⁵⁵, but a maximum of 9GW by 2020 has been allocated under Round 3. Therefore, the maximum *expected* development at Dogger in the current planning round and over the next 10 years is estimated as 9GW of wind farm capacity.

It is difficult to predict the impacts of the Dogger Bank SAC on the offshore renewables industry as it is at a stage of development where there is great uncertainty over individual project locations, numbers of turbines in a location/project and grid connections. Whilst not pre-judging individual EIAs or AAs, JNCC believe, taking into account past experience, that designating the Dogger Bank sandbank feature is expected to impact upon the renewable industry in the following manner:

- Developers will need to provide the Competent Authority with enough information to undertake an AA;
- The level of information required on both environmental description and justifying conclusions on impact assessment is likely to be higher than at non-designated sites due to the need for the Competent Authority to be confident in any decision that the development will have no adverse effect on site integrity;
- More intensive surveying may be required to ensure that the resulting habitat distribution mapping is suitable for determining the significance of impacts in appropriate assessment, appropriate to the conservation objectives of the site;
- Micrositing to avoid sensitive habitats is likely to be required;
- Designation may restrict the level of development at the site, and present a risk to consenting which may deter investors, both resulting in loss of revenue to developers (this is difficult to calculate). It will be necessary for the Competent Authority to carry out an AA which will need additional resources possibly both in staff time and resources for extra work. This is considered under the 'costs to Government of administering the regime', below;
- Whilst individual turbines are 'not likely to significantly affect' the Dogger Bank SAC, there is the possibility that in combination, cumulative impacts from wind farm turbines and cables will adversely affect the integrity of a site. If the Competent Authority considered this to be the case, there is a possibility that projects could not go ahead, unless for reasons of over-riding public interest and where there are no alternatives. This is very much dependent upon the scale of wind farm proposals alongside what infrastructure (cabling and offshore transformers or substations) is required.

Micrositing and post-construction monitoring are likely to be required whether or not the SAC designation is in place. It is therefore predicted that the likely increase in costs to the overall development budget (derived from higher resolution survey requirements, an increased proportion of consultant reporting time and additional consultation activities) are likely to exceed £10m for 12.8GW⁵⁶. Here, a figure of £10m is used as an estimate of costs to the initial development of 9GW. This figure assumes that prescriptive requirements for foundation types will not be necessary. If this assumption is not correct then there could be significant additional costs.

⁵⁵ Phil Bloor, DECC pers comm. 18/12/08.

⁵⁶ Forewind, July 2010

There is also the potential for cumulative effects on offshore renewables capacity if further marine areas are designated following the proposed designation of Dogger Bank. Further inshore, marine sites have been proposed by Natural England and JNCC, and include areas of sandbanks that are potentially suitable for wind farms. However, other than overlap with Dogger Bank SAC proposal, there is only overlap of potential wind farm development areas from Round 3 with one other Natura 2000 site (Haisborough, Hammond and Winterton, which is currently being considered for designation by Natural England and JNCC). Therefore, the potential for major cumulative effects of SAC designations within the current round of wind farm development is judged to be small. However, the risk may increase when considered in relation to past, current and future rounds of wind farm development.

Here, we assume that all 9GW are developed for both minimum and maximum potential management scenarios. In reality, however, it is possible that not all 9GW of potential wind energy capacity at Dogger will actually be developed over the next 10 years⁵⁷. Therefore, the minimum impacts actually relate to the proportion (between 0% and 100%) of the 9GW of maximum expected development that would be developed. This proportion is difficult to predict, the 9GW of maximum expected capacity at Dogger Bank is equivalent to the total expected capacity of offshore wind farm developments in the UK through Rounds 1 and 2⁵⁸, but a significant increase in the speed of development is needed to meet targets⁵⁹.

There is also a possibility that a wind farm may be refused permission or that development would be restricted. This would cause delay (resulting in a cost of continuing to employ a project team) and any costs incurred (e.g. assessment costs and royalties paid to the The Crown Estate) would be sunk. It would also lead to a loss of potential revenue to The Crown Estate.

Alternatively, the maximum scenario could be that spatio-temporal restrictions imposed on the construction of the offshore wind farms would make the development economically unfeasible.

If development was unable to proceed because of the SAC designation costs could be derived from the following sources:

- Sunk development costs - estimated to approximately £100m
- Sunk Grid Connection Agreement Costs
- Lost opportunity costs
- Long term costs driven from the need to develop elsewhere
- Impacts to the supply chain

Sunk Development Costs

Should the SAC designation prohibit delivery of the 9GW of offshore wind farm projects that Forewind are proposing to deliver before 2020 then there is potential for all this money to be lost.

Sunk Grid Connection Agreement Costs

Whilst sunk grid connection agreement costs are discussed here, they are not included in the total cost estimate as they do not represent a cost to the UK economy, rather a transfer from the developer to the NGET and OFTO.

Forewind would have signed Bilateral Connection Agreements with NGET for connection to the UK transmission network. Should the projects not achieve the expected consents, the developer would have to pay cancellation Final Sums to NGET to cover work to date on the required onshore grid

⁵⁷ Forewind estimate construction to last from 2015-23 with first grid connection in 2016.

www.forewind.co.uk/files/stakeholder-fact-sheet.pdf

⁵⁸ DECC expect 8GW from offshore wind farms from Rounds 1 & 2 when complete (Phil Bloor, pers com., 18/12/08).

⁵⁹ "Having consented approximately 3GW in the seven years since 2001, ten times that amount must pass through the system in ten years time for Government and the industry to meet and construct its objective."
http://www.bwea.com/pdf/publications/33GW_08.pdf - page 5.

reinforcements to facilitate these connections. Depending on the set of transmission network reinforcements identified by National Grid as required to connect Dogger Bank, these cancellation securities could reach as high as hundreds of millions of pounds by the time of Tranche A consent being secured (late 2013).

Due to the proposed structure of the enduring Offshore Transmission Regime, developers are required to appoint an OFTO to design, procure, construct and build the connection assets for wind-farms. This tendering process carries a fee to the developer of £50,000, with a cancellation security per project tender of £500,000 (per OFTO which is a maximum 13 for Forewind). If the failure to obtain consent caused Forewind to have to pull out of this mid-process, both these amounts would be at risk.

Lost Opportunity Costs

Using a predicted generating capacity of 9GW and assuming a 38% capacity factor and a current public domain basket (wholesale including ROC's and LEC's) price of green electricity of £120/MWh (Ref: Carbon Trust Paper "Offshore wind power: big challenge, big opportunity - Maximising the environmental, economic and security benefits" which quotes a central energy price of £45/MWh a 2008 ROC price of £47/MWh and a LEC price of £5.4/MWh) Dogger Bank has the potential to generate a total value of power of £3.60bn per annum. Accordingly to Forewind's projections, they hope to have 9GW in operation by 2020, so we assume here that the windfarm comes online in 2019 for the entirety of that year. In addition, this assumes that the entire value of power is lost when it is probable that the power will be generated elsewhere at a higher cost.

Long-Term Costs

Inability to develop on Dogger Bank would necessitate development in other areas in order to ensure that the Government's renewable energy targets could be achieved. Zones that have been identified through Round 3 represent the "best" available sites based on the available wind resource and water depths around the UK. Any replacement sites identified to fill in the gap generated by a prohibition on development at Dogger Bank can therefore be expected to be less suited to offshore wind farm developments and have a higher cost of development and construction associated with them (e.g. due to higher cost of foundations in deeper water) and lower rate of return (e.g. due to lower wind speeds).

Impacts to the Supply Chain

The OWF industry has experienced a recent and sharp increase in capital costs (due in part to a reduction in supply chain competition and the devaluing of the sterling) which has resulted in economic viability being considered a significant barrier to the delivery of projects.

A recent study commissioned by Renewable UK (formerly BWEA) (Ref: "UK Offshore Wind: Charting the Right Course – Scenarios for offshore capital costs for the next five years") concludes that the success of the offshore wind farm industry is dependent on increased supply chain confidence which could bring about a reduction in capital costs of between 15 to 20%.

Dogger Bank represents 28% of the Crown Estates Round 3 delivery plan (9 of 32 GW) and hence represents a significant proportion of the market to a developing supplier. Its loss would be a significant blow to suppliers and could dramatically affect the confidence in the wider OWF industry decreasing the potential for other developers to realise reductions in capital costs.

Decreased confidence could also lead to decreased inward investment and fewer jobs created in anticipation of the developing industry.

Due to the number of unknowns associated with estimating this figure, it was not considered appropriate to try and monetise it.

Table 4.3 Summary of “minimum” and “maximum” management scenarios and assumptions made in estimating costs for the offshore wind farm sector of designating the pSAC compared to not designating the site⁶⁰

| <i>“Minimum” scenario</i> | <i>Assumptions</i> | <i>Change in costs</i> |
|--|---------------------|------------------------|
| Higher resolution survey requirements, an increased proportion of consultant reporting time and additional consultation activities | | £10m |
| <i>“Maximum” scenario</i> | <i>Assumptions</i> | <i>Change in costs</i> |
| Sunk development costs | | £100m |
| Loss of generating power | £3.6bn pa from 2019 | £3.6bn pa from 2019 |

The impact of this loss on the UK economy is dependent on other factors influencing the development of renewable energy, such as the availability of other renewable technologies, the cumulative effects of marine conservation and other marine planning constraints. If this wind farm capacity can be constructed elsewhere and is not delayed, there is no loss to the UK economy. If due to other marine planning constraints, alternative wind capacity cannot be found, it is unlikely that other types of technologies could achieve comparable renewable energy capacity.

c) Aggregates

No aggregates extraction licences have yet been approved at the site, but two licences have been applied for with an expected average annual extraction of 700,000 tonnes pa from 2010.

In exploiting these extraction licenses it is likely that screening of material would be undertaken on or near the site. The practice of screening arises from the fact that sand and gravel is required in particular ratios – roughly 50:50. Seabed deposits do not necessarily provide the ratio required and material is therefore sometimes returned to the seabed to avoid unnecessary transport and disposal on land. In the event that screening was restricted, it may be possible to balance out the proportions of materials extracted from the two areas using other sources. If this is not the case, then additional costs will arise⁶¹.

Whilst not pre-judging individual EIAs or AAs, based on past experience, designating the Dogger Bank sandbank feature is expected to impact upon the aggregates dredging industry/regulator in the following manner:

- For applications within the Dogger Bank area, it is likely that a more in-depth knowledge of the area will be required for EIA purposes. BMAPA have previously suggested that the current costs of EIA are around £300k - £800k per application (giving a mid-point of £550k). In 2010 prices, this midpoint in £574k. Designation may raise costs faced by the industry in terms of environmental survey work and appropriate assessments by 10 - 50%. It is especially important that for EIA purposes, industry is able to put any area of a Natura 2000 site in context of both the wider site and the wider marine environment.
- For applications within the Dogger Bank, MMO will be responsible for undertaking the AA process. This will increase resources required by the MMO in terms of time and effort to process applications. This impact on MMO is assessed under ‘costs to government of administering the regime’ below).
- Restriction on screening could increase the operating costs of extracting the aggregates. Not being able to screen would in certain cases make dredging significantly more costly and

⁶⁰ Costs were provided by developers, Forewind, July 2010.

⁶¹ Mark Russell, BMAPA, pers comm.

possibly unviable (increased costs are estimated at approximately £1m per year). There may be additional steaming time as a result of any prohibition of screening on or adjacent to the site. However, it is considered unlikely that management of the site would allow aggregates dredging to continue but ban screening. Therefore, the costs of a ban on screening alone are not included in the costs in this assessment because screening would either be allowed or the whole operation would be disallowed.

- There is a risk that applications for dredging operations on the Dogger Bank will be turned down by MMO on the basis of the conclusions of AA..

Table 4.4 Summary of “minimum” and “maximum” management scenarios and assumptions made in estimating costs for the aggregates extraction industry of designating the pSAC compared with not designating the site

| <i>“Minimum” scenario</i> | <i>Assumptions</i> | <i>Change in costs</i> |
|---------------------------|---|------------------------|
| Increased cost of EIA | Costs of two current application areas (on average £574k) increase by 10% | £115k one-off |
| <i>“Maximum” scenario</i> | <i>Assumptions</i> | <i>Change in costs</i> |
| Increased cost of EIA | Costs of two current application areas (on average £574k) increase by 50% | £574k one-off |

If extraction applications are turned down or companies perceive that the relevant authority will judge that future dredging will adversely affect the integrity of the SAC and are less likely to bring forward applications to exploit reserves within it, this would lead to a failure to exploit potential resources. It is difficult to judge the likelihood of this happening, but it would mean that companies would not realise the value of the specific natural assets and the Crown Estate would not receive royalties from the assets. It would normally be expected that companies would seek alternative extraction areas or that market demand would be met by other companies exploiting sources of sand and gravel such as from other areas of the seabed or from terrestrial sources. This would be considered a transfer in the economy rather than a cost. If, however, total resources are constrained in the longer term then it may mean less income to UKPLC. Should this happen it is assumed to be beyond the timescale of the assessment. For these reasons any risk of not being able to realise assets is not quantified in this assessment.

d) Shipping

Current shipping activity within the site is relatively light and is not thought to be impeding conservation objectives for the site. Prevention of pollution by contaminants from ships is already well regulated. Therefore, shipping activity is unlikely to be affected by site designation and impacts under minimum and maximum management scenarios are expected to be zero.

e) Cables

There are no plans to install new cables apart from those associated with wind farms (included above) or for any upgrade activity in the near or medium term. Therefore, cable activity is unlikely to be affected by the designation and impacts under both the minimum and maximum scenarios are assumed to be zero.

f) Fisheries

The impact on fishermen of closing areas to certain types of fishing is complex and difficult to predict. It will depend on what individual fishermen do as a result of restrictions and the cost implications of changes. Current fishing practice at Dogger Bank is assessed here using 2006-7 Vessel Monitoring System (VMS)⁶² and landings data for the ICES rectangles⁶³ within which the possible SAC is sited.

⁶² VMS records the location of vessels over 15 metres by satellite.

⁶³ The International Council for the Exploration of the Sea divides seas into rectangles and this system is used to assist monitoring and enforcement of marine activities.

Potential UK economic impact of foregoing landings

Without further analysis, it is uncertain whether the fishing activity within areas closed to fishing will be partly or wholly displaced to other fishing grounds or whether there will simply be less fishing in global terms. To provide an indication of the maximum direct effect of designation, the impact on the UK economy of foregoing the landings from towed demersal gear from within the entire SAC is considered. As discussed above (see Section 2), the value of annual landings from UK vessels using towed demersal gear - at UK and non-UK ports - within the boundaries of the proposed Dogger Bank SAC has been estimated at approximately £2.188m in 2010 prices.

Using input-output multipliers based on this data allows analysis of the impact on the UK economy. However, it should be noted that multipliers are limited to a static reflection of economic linkages and will change over time and with differences in the economic structure of different areas. The multipliers used to determine these effects were recommended by Sea Fish Industry Authority (SeaFish, 2007) as the best available and account for landings in UK ports by UK- and foreign-registered vessels. Loss of £2.188m of landings could lead to a reduction in:

- UK Employment by 149 FTE jobs; and
- UK GDP by £4.24 million.

Although it does not yet take account of some of the potential indirect effects, these estimates give an indication of the scale of the potential maximum economic impact from changes in fishing activity as a result of designation. The ‘further analysis’ section below discusses the data needed to undertake a fuller analysis. The necessary data to understand the employment and profit impacts from landings in foreign ports on the UK economy is complex and has not been scrutinised for this IA. An estimate of the value of other Member States fishing effort on the site was not available in time for completion of this IA, and will be sought during the consultation process.

The economic impacts of the potential closure of Dogger Bank are estimated as the loss of profitability of fishing effort at the site. This is informed by data from the Marine Management Organisation on potential activity within the area and from the 2005 survey⁶⁴ on the profitability of fishing, which show that the net profit ratio does not exceed around 30% for any segments of the industry with most segments having much lower ratios.

Table 4.5 Summary of “minimum” and “maximum” management scenarios and assumptions made in estimating costs for the fisheries sector of designating the pSAC compared with not designating

| <i>“Minimum” scenario</i> | <i>Assumptions</i> | <i>Change in costs</i> |
|---|--|------------------------|
| Experimental closure of up to 15% of site to towed demersal fishing ⁶⁵ | Loss of 15% of total net profit (profit estimated at 30% of UK landings (£2.188m)) | £98.5kpa from 2011 |
| <i>“Maximum” scenario</i> | <i>Assumptions</i> | <i>Change in costs</i> |
| Closure of the whole site to towed demersal fishing | Loss of total net profit (at 30% of landings from UK vessels (£2.188m)) | £656.4kpa from 2011 |

Further analysis

The analysis carried out to inform this consultation IA was intended to provide an indication of economic impacts and their scale resulting from changes in fishing activity within the draft SAC. Further analysis would be needed to understand more precisely how vessels would respond to measures and the impacts of responses. The majority of the necessary data for the desired level of detail were not

⁶⁴ 2006 Economic Survey of the UK fishing fleet. Seafish Industry Authority.

⁶⁵ This is an arbitrary figure; the estimate depends on which areas are selected for the experimental closures, and whether alternative fishing grounds within or outside the SAC can be found.

available to include in the consultation IA. Information that would be desirable to add to this analysis for presentation in the final IA, and therefore requested through consultation, includes:

- Identification of the number and types of UK vessel businesses that fish at Dogger Bank, including home port and fishing days within the SAC;
- How changes in landings at foreign ports might impact the UK economy;
- Views on how fishermen will respond to closure;
- Where activity is displaced, difference in steam time, fuel costs, fishing levels and any other cost/profit information associated with displacement alternatives;
- Costs to not fish if site was designated and there were no suitable alternative sites such that site designation made some vessels unprofitable;
- Potential seasonal effects of designation;
- Any other data that would improve comparison of costs, earnings and profits for vessel businesses under the different scenarios; and
- Other sites for plaice catch, as well as level of catch at those sites and their sensitivity and importance for overall plaice stocks.

Whether fishermen are able to fish at alternative sites will depend on a number of considerations, a key factor being the availability of suitable grounds. There may also be weather and other seasonal constraints to moving to alternative areas.

Where fishermen do find alternative grounds there may be implications on costs and profitability such as increased fuel and labour costs and potentially a higher proportion of time spent steaming rather than fishing and therefore reduced profitability. Alternative grounds may also be less productive and mean that fishing days are less productive and therefore less profitable.

In some cases, particularly where moving to an alternative ground would become unprofitable, individual fishermen may stop fishing. This may not necessarily mean that total income to the sector will reduce, given fixed quotas for many stocks and if other vessels are able to draw on quota foregone, for example through co-operative arrangements. However, in many cases this will not happen. Quotas are often not fully used in any case and some stocks are not subject to quota. Where individual fishermen stop fishing then there may also be implications to the fishermen themselves wider than foregone revenue, such as: the need to dispose of a vessel, potential decline in the market value of vessels and potential decline in the value of quotas.

Given the issues above, it is very difficult to predict how individual fishermen will respond to closures and the cost implications. At this stage the best that can be done for most of the closures is to provide an indication of the profitability of fishing within the area and suggest that the direct effect of a closure would be to reduce the profitability of the area by some margin.

A further important issue is that any closures, even if undertaken unilaterally by the UK, would have to be agreed with other Member States of the European Union through the CFP. It is assumed that this process may take a minimum of a year to carry out and therefore that closures would not be in place until 2011. Although it may take longer than this to actually put measures in place, by using the minimum timeframe it ensures that the costs are not underestimated.

g) Administration costs to Government

Competent Authorities will incur costs in enforcing the regime as a result of:

- i. *Requirements to review existing activities that may have impacts on the habitats for which sites have been designated.* It is assumed that no further work is necessary to assess the impacts of activities, but further work is necessary to develop, implement and communicate site specific management measures. MMO estimate that this may require 2 person-years of officer time plus

related expenses⁶⁶. Based on the costs of staff time in Defra this is estimated to cost £90.5k per FTE year, giving a total estimated cost as a one-off £181k⁶⁷.

- ii. *Requirements to assess the implications of any activity they consent.* As discussed above, the number of proposals the authorities will receive each year is predicted to involve over the next 10 years: gas – 2 surveys pa for new developments; aggregates – survey costs for two current application areas; and renewables – increased survey costs to inform AA⁶⁸. Assessing proposals will generally require input from other advisory bodies as well as the Competent Authority. Some inputs from them may have been required under existing arrangements such as the EIA process, but SAC management is likely to lead to a greater work load. Each AA for an activity within the SAC is estimated to require 2 months of staff time to write and review. Overall this is likely to require at least 1 additional FTE member of staff DECC, and one additional FTE member of staff at the MMO. This is estimated (see i) to cost £90.5k per FTE year, or £181k per year in total. In addition to this, DECC estimate that additional costs of commissioning and managing survey work to monitor favourable conservation status for the energy sector as a result of the designation will be approximately £1.04m per annum⁶⁹. This cost is assumed to commence from 2010.
- iii. *Monitoring and enforcement.* The MFA (now MMO) assessed that an additional 3 days boat time and 6 hours air surveillance might be necessary per site to enforce measures effectively. This would cost £37.5k per annum⁷⁰. It is assumed that administration of records and other activities is carried out as part of existing duties.

There are currently no estimates of how much monitoring and surveillance will be required to fulfil the assessment of the site for the Habitats Directive and no estimate of the costs.

This impact assessment assumes that the costs of Government enforcement are constant for both the min and max scenarios. Under the two scenarios the effectiveness of enforcement is varied to estimate impacts that represent the likely range of impacts from designating the site. The Government administration costs (other than enforcement, such as completing AAs) vary under the scenarios as they are dependent on the level of development (the numbers of applications by different sectors) brought forward at the site. The minimum impacts are the costs under i) and iii) above: one-off costs of £181k and annual costs of £37.5k from 2011. The maximum impacts are one-off costs of £181k, and annual costs of up to £1.26m.

4.3 Benefits of designating the site

Discussion is provided below of the impact of designating the site based on specific ecosystem services. The site feature 'Sandbanks which are slightly covered by seawater all the time' has been graded as II for 'Degree of conservation of structure' which indicates that the feature is not in pristine condition. As outlined, further information will be required to assess and monitor the condition of the interest feature on the pSAC⁷¹.

a) Provisioning services

Fish, shellfish and other crustaceans for human consumption

A habitat to a wide variety of marine species, the Dogger Bank is also important as a spawning ground for a number of species, including plaice. Plaice spawn on these (and other) shallow water sandbanks

⁶⁶ Juliette Hatchman, MFA, pers comm., 19/12/09.

⁶⁷ This is based on the full costs (includes e.g. overheads and pensions contributions) of a Senior Executive Officer for 6 months from Defra's 2007-08 Ready Reckoner of staff costs and £10k for communication and other costs (inflated to 2010 prices).

⁶⁸ Juliette Hatchman, MFA, pers comm., 19/12/09.

⁶⁹ Phil Bloor, pers comm. 18/12/08, inflated to 2010 prices.

⁷⁰ This is based on costings provided by the MFA (now MMO) (pers comm., Dec 2008) of £8k per boat day and £2k for an hour of air surveillance, updated to £8.34k and £2.09k respectively at 2010 prices.

⁷¹ JNCC (2009)

and the eggs then drift and hatch as larvae that are 'seeded' to shallow water juvenile areas (e.g. major estuaries and the Wadden Sea)⁷². Later the fish migrate into deeper water where they are exploited generally over much of the North Sea. Reduction of demersal fishing would protect breeding fish stocks particularly during the spawning season. The UK portion of this site is particularly important as it is the south-western portion of Dogger Bank where large concentrations of plaice (and cod) eggs are located (Munka et al 2002). The region around Dogger Bank supports a number of fisheries targeting cod, haddock, plaice, sole, dab and sand-eel (Table 2.9).

The process through which fish recruit to fisheries is complex and, with many other variables to be taken into consideration, it is impossible to predict whether reduction in demersal fish catches on Dogger Bank would result in increased recruitment to stocks as a whole. Thus, while the possibility of increased catches must be considered, it is not possible to predict the scale of any economic benefits that may accrue.

Extraction of fish that are both targeted by fisheries and caught as bycatch may be affected by designation, with the potential for both positive and negative effects. On the one hand, if fisheries are controlled within the site to conserve the sandbanks and their typical species then this could reduce the amount of fish caught from the site. These controls could contribute to sustainable management of some fish stocks at the site and as a result the abundance of fish may increase. On the other hand, controls could cause fishing effort to be displaced to other areas outside of the site, increasing pressure on the stocks in these areas, but not overall.

The control of commercial fishing on the site may extend the longevity of shellfish, and there may be greater numbers of larger individuals that can produce more young. This may contribute to a potentially larger population of fish in the future.

b) Regulating services

Regulating services are not mentioned further here as their value is considered to be minimal at a site level.

c) Cultural services

Archaeology

During the last ice age, Dogger Bank ("Doggerland") connected Britain, The Netherlands, Germany and Denmark⁷³. Bottom trawlers have recovered important archaeological pieces from the area in the past, including a barbed fish harpoon, as well as other prehistoric tools and weapons and lion and mammoth remains (Coles 1998).

However, bottom trawlers also dislodge *in situ* records which makes subsequent interpretation more difficult. Management of demersal fishing may provide a benefit to cultural services, but it is not possible to quantify this benefit.

d) Types of value

Option Values

Some people will gain from having the option to benefit in future from conservation of a good example of sandbank habitat, even if they do not currently plan to benefit from it (option value). This arises because if the site is not protected now there may not be good examples of sandbank habitat still available to conserve in future. Also, some will gain from knowing that it is conserved in case future information reveals that the sandbank habitat provides important benefits that we are not currently aware of (quasi-option value).

⁷² International Council for the Exploration of the Seas (ICES), *ICES-Fishmap Plaice*.

<http://www.ices.dk/marinenewworld/fishmap/ices/default.asp?id=Plaice>

⁷³ <http://huss.exeter.ac.uk/archaeology/research/rdoggerland.shtml>

Non-use Values

Most people who benefit from knowing the site is being conserved are unlikely to use it or get tangible benefits from it. This is known as the existence value of conserving the site. Some people will also gain satisfaction from knowing that the sandbank habitat is being conserved for others in the current generation (altruistic value) and for future generations (bequest value).

There is reliable evidence in the UK and elsewhere that the general population has significant positive non-use values associated with rare species (see for example Christie et al, 2004 for general discussion or White, et al, 2001 for examples of value of conservation of specific mammal species). Additionally, Beaumont et al (2006) estimate the non-use value of biodiversity of the UK marine environment at £0.5-1.1 billion per year across the UK population.

The effects of designation of the Dogger Bank for the provision of each of the ecosystem services described above is summarised in Table 4.6 below as the difference due to site designation in comparison to the baseline (no designation). There are four additional columns of information in the table to clarify our understanding of the qualitative changes in ecosystem services arising from (non-) designation:

- **Relevance** Relating to the amount of ecosystem good or function arising from site
- **Value weighting** Categorisation of how valuable the amount of ecosystem good or function from the site is in providing benefits to human population
- **Scale of benefits** Consideration of actual potential to deliver benefits (for example considering leakage, delivery to human population, etc)
- **Confidence** Level of confidence in our current knowledge of all other categories (in other words, scale of benefit, level of improvement, etc.)

Based on the above categories, an overall level of each ecosystem service is defined with its own confidence level. Following, an overall level of total benefits is also defined.

The parameters are assigned a level for each service from a menu, defined as:

- **Nil** Not present/none.
- **Minimal** Present at a very low level, unlikely to be large enough to make a noticeable impact on ecosystem services.
- **Low** Present/detectable, may have a small noticeable impact on ecosystem services, but unlikely to cause a meaningful change to site's condition.
- **Moderate** Present/detectable, noticeable incremental change to site's condition.
- **High** Present/detectable order of magnitude impact on sites condition.

Table 4.6 Potential significance of ecosystem services improvements for Dogger Bank pSAC

| Services | Relevance to site | Option 1 Decline | Option 2 Min improvement | Option 2 Max improvement | Value weighting | Scale of benefits | Confidence |
|---|---|--|--|---|--|---|--|
| <i>Fish for human consumption</i> | High. Spawning and nursery ground for commercially significant fish species including North Sea plaice. Important for shellfish. | Mod. Interruption of lifecycle processes could mean significant decline. | Low. Improvement on site likely to support species of human interest. Limited by fewer management measures and risk enforcement does not succeed. | Mod. Improvement on site likely to support species of human interest, especially plaice stocks in North Sea. | Mod. Sandbanks are of high value for N Sea fish, but relative importance of Dogger Bank is hard to judge. | Low - Mod Increase in stocks likely to be offset by declines elsewhere, but conservation of this spawning ground could improve plaice stocks throughout N Sea. | Moderate. Possible that taking same catch level outside site is not neutral on stocks overall |
| <i>Fish for non-human consumption</i> | | Low. Probably not demersal spp, but could experience indirect decline. | | | | | |
| <i>Aggregates</i> | Moderate. Large potential resource, but little exploited. | Nil. No effect. | Nil. No effect | Nil. No effect. | Moderate. Significant value of resources. | Nil | High |
| <i>Carbon sequestration</i> | Minimal. Features are likely to have low effect and small area | Minimal. Unlikely to affect biological pump. | Minimal. Unlikely to affect biological pump | Minimal. Unlikely to affect biological pump | Mod. High value but site plays minimal role | Minimal | Mod. Biological pump not well understood |
| <i>Waste assimilation</i> | Minimal. The features are likely to have a low effect and small area. | Minimal. Unlikely to affect assimilation functions. | Minimal. Unlikely to affect assimilation functions and processes. | Minimal. Unlikely to affect assimilation functions and processes. | Minimal. Site plays minimal role. | Nil. | Moderate. Assimilation not well understood. |
| <i>Non-use value of natural environment</i> | Low- Mod. Public has preference for rare and visually appealing features but uncertain if will regenerate. | Low. Continuing degradation, but may not have further adverse effect on sandbank value. | Low. Some recovery of biodiversity and community composition possible but enforcement may not succeed. | Moderate. Some recovery of biodiversity and community composition possible. | Moderate. All UK population is relevant but relatively low value per capita. | Low - Moderate | Low. Presence of charismatic marine mammals which may have higher non-use values. |

| | | | | | | | |
|---|---|---|---|---|---|--|--|
| <i>Scientific research</i> | Low. Some basic scientific value, but level of uniqueness is unclear. | Low. Continuing degradation removes scientific value. | Low. Some recovery but enforcement may not succeed. | Moderate. Some recovery of biodiversity and community composition. | Moderate. For sediment management & biological resources | Low - Moderate | Moderate. |
| <i>Archaeology</i> | High. Many sites on submerged Mesolithic landscape that some fisherman recover artefacts from. | Low. Fisherman continue to recover artefacts, decreasing the historical interest of site | Low. Fisherman deterred from recovering artefacts, slowing decrease in historical interest of site and disturbance of fauna. | Moderate. Fisherman prohibited from recovering artefacts, halting decrease in historical interest of site. | High. A lot of sites and of interest to public. | Moderate. Designation could allow management plan that does not permit informal recovery of historical artefacts. | High. Paleoarchaeology is well understood and sites are mapped. |
| Total value of changes in ecosystem services | | | Low for min scenario, moderate for max scenarios | | | | Moderate-High |

e) Benefits to economic activity

Designation of sites may assist the different sectors that make use of the marine environment in the context of marine spatial planning and a more strategic consideration of available resources. This would mean that sectors can undertake future plans and applications for their operations (for example applications for licenses) with the better knowledge of a) the nature conservation significance of different parts of the marine environment, and b) the added costs of these applications within or adjacent to a site boundary, as opposed to outside it. This may result in a focus of activity away from a site. This will be dependent upon appropriate marine resources being available within the region but outside of any site(s).

4.4 Summary of costs and benefits

Table 4.7 below summarises the potential costs and benefits of the site analysed in this section. The costs are analysed over a period of 10 years from designation in 2010, and are discounted at 3.5%. There are uncertainties in the assessment of costs, and some costs have not been quantified.

Table 4.7 Summary costs and benefits table for Option 1: Designate the site

| | Minimum management scenario | | Maximum management scenario | |
|-----------------------------|--|---|--|---|
| | Costs | Benefits | Costs | Benefits |
| <i>Assessed</i> | Sectors | Low: possible impacts on archaeological, scientific and non-use values. | Sectors | Moderate: beneficial impacts on values of archaeological, scientific and non-use natural environment. |
| | Gas: £48k pa increased assessment costs | | Gas: £240k pa increased assessment costs and £52k pa for time series monitoring | |
| | Fisheries: direct costs of £98.5k pa. after 2011 | | Fisheries: direct costs of £656.4k pa after 2011 | |
| | Aggregates: £115k increased assessment costs | | Aggregates: £574k increased assessment | |
| | Renewables: £10m increased assessment costs | | Renewables: £100m increased assessment costs and £3.6bn pa from 2019 | |
| | Government: Enforcement £181k one-off, up to £38k pa. | | Government: Enforcement £181k one-off and up to £219k pa, survey costs up to £1.04m pa. | |
| <i>Total average annual</i> | £0.175m | Low | £362.142m | Moderate |
| <i>Total one-off</i> | £10.296m | 0 | £100.755m | 0 |
| <i>Total (PV)</i> | £11.786m | Low | £2,760.531m | Moderate |
| <i>Not assessed</i> | <ul style="list-style-type: none"> - Costs if any projects are refused - Costs of vessel changes in gas sector - Costs from cumulative MPA impacts and beyond next 10 years | <ul style="list-style-type: none"> - Role of feature in wider ecosystem - Intrinsic value of biodiversity improvements - Ecosystem recovery beyond next 10 years | <ul style="list-style-type: none"> - Costs if any projects are refused - Costs of vessel changes in gas sector - Increased screening costs in aggregates sector - Costs from cumulative MPA impacts and beyond next 10 years - Possible loss of up to 13GW of renewable energy capacity in long term - Loss of asset to The Crown Estate | <ul style="list-style-type: none"> - Role of feature in wider ecosystem, including increase in plaice stocks - Possible benefits to fish stocks from protection of breeding grounds (e.g. plaice). - Intrinsic value of biodiversity improvements - Ecosystem recovery beyond next 10 years |

a) Risk of unintended consequences

The main risks of unintended consequences are assessed to be the following:

- Designation might prevent further investment from oil and gas industry into area and prevent maximum returns on existing investment.
- Strategic impact on the UK's energy security and response to climate change, both in relation to development of renewables capacity and carbon and capture and storage.
- In the long term, the designation could prevent the implementation of gas storage, or Carbon Capture and Storage, at the site. However, both these technologies would be cheaper, and therefore more likely, to be implemented at available sites closer to the shore.
- Fishermen may seek compensation for moving grounds.
- Displacement of fishing effort to alternative grounds may intensify fishing at those grounds to unsustainable levels, causing net damage to fish stocks overall.
- Increased requirements for assessment may potentially slow down development of offshore wind farms and hinder the delivery of UK targets on climate change.
- The proposed designation may significantly affect several important sources of income to the UK economy, the Treasury and The Crown Estate. It is assumed that revenues to the Treasury are displaced to alternative sources (e.g. of energy) with very low marginal impact. If the Crown Estate do not receive royalties from the specific natural assets, it would normally be expected that companies would seek alternative exploitation areas or that market demand would be met by other sources. This would be considered a transfer in the economy rather than a cost, and this is presumed to be the case over the next 10 years. If, however, total resources are constrained in the longer term then it may mean less income to the Crown Estate and UK plc. Should this happen it is assumed to be beyond the 10 year timescale of the assessment. For these reasons any risk of not being able to realise assets is not quantified in this assessment.

Each of these risks is greater under the maximum scenario, and when considered cumulatively with other SAC designations and marine planning restrictions (e.g. MoD activity, shipping, fishing). Some of these risks can be mitigated by involving stakeholders in the process of designation through public consultation, and by early and thorough consideration of the cumulative effects of designations on the scale appropriate to the industry concerned. The cumulative effects of marine Natura 2000 sites proposed for designation during 2010 are considered in a separate paper⁷⁴.

Under the Offshore Habitats Regulations (which transpose the Habitats Directive), and following an AA, a Competent Authority can agree to a plan or project for imperative reasons of overriding public interest (IROPI), notwithstanding its adverse effect on site integrity, if there are no alternative solutions. It would be for the Competent Authority to decide whether to agree to a plan or project on IROPI grounds using guidance from the EU. The more strategically important the risks above are, the greater the likelihood of plans or projects being consented on IROPI grounds. Assessing such grounds would entail additional costs.

⁷⁴ This paper was annexed to the recent consultation by Natural England, CCW and JNCC (<http://www.naturalengland.org.uk/ourwork/marine/sacconsultation/default.aspx>) and will be updated once the impact assessments for the tranche of sites have been updated.

5 CONCLUSIONS

The purpose of this impact assessment is to provide information about the impacts of the designation of Dogger Bank SAC and is carried out in order to inform stakeholders and government about the options for the site. This is done by considering the impacts of Option 1 (designating the site) relative to the baseline (to not designate the site). The requirement for the UK to designate sufficient sandbank habitat to comply with the Habitats Directive makes pursuit of the baseline unlikely.

As the potential management measures for the site will only be known in detail after the site has been designated, it is necessary to make assumptions about what measures might be required for this site. This assessment analysed a range of impacts, relative to the baseline, defined through minimum and maximum management scenarios. Not designating the site would risk infraction proceedings, and potentially total fines in the region of £9.4m - £17.1m.

The minimum scenario involves the smallest change in activities that may be needed compared with the baseline and therefore presents the minimum potential effect on activities. The maximum scenario is at the other end of the scale: it entails the largest change in activities that may be needed compared with the baseline and thereby presents the maximum potential effect on activities.

As Table 4.3 above shows, under Option 1 (for the 10 years of impact assessment framework):

- For the minimum management scenario costs are relatively low (one-off costs of £10.30m and average annual costs of £0.175m) for such a large site, but expected benefits are also low; and
- There are potentially significant costs under the maximum management scenario (one-off costs of £100.76m and average annual costs of up to £362.14m), but this scenario also brings moderate expected benefits in relation to: conservation of fish spawning grounds; non-use values of the environment, such as in relation to charismatic marine mammals (e.g. cetaceans); scientific research and knowledge; and archaeological interests.

In addition, a range of costs and benefits are possible through wider network and strategic effects. In terms of network benefits, designation of the proposed site will prevent degradation of areas of the marine environment and enable restoration where damage has occurred over the next ten years and beyond, which could potentially be of benefit to the wider ecosystem and enable increases in fish stocks. It has not been possible to assess these benefits. It should be noted that establishment of a network of protected sites is a key purpose of the policy (the Habitats Directive) stimulating the possible designation. This makes it important to consider the benefits of this site in the context of the value of the network of sites.

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| Fisheries | | | | | | |
|--------------|---------------|---------------|--------------|------------------|-------------|-----------------|
| Description | | | One-off Cost | | Annual Cost | |
| Scenario | Cost Item | Type | Cost £k | Year Experienced | Cost £k | Year Commencing |
| MINIMUM | Reduced catch | Policy | | | 98.5 | 2011 |
| | | | | | | 88.65 |
| | | | | | | - |
| | | | | | | - |
| | | | | | | - |
| | | | | | | - |
| Total | | Admin | 0 | | 0 | - |
| | | Policy | 0 | | 98.5 | 88.65 |
| | | Both | 0 | | 98.5 | 88.65 |

| | | | | | | |
|--------------|---------------|---------------|---|--|-------|--------|
| MAXIMUM | Reduced catch | Policy | | | 656.4 | 2011 |
| | | | | | | 590.76 |
| | | | | | | - |
| | | | | | | - |
| | | | | | | - |
| | | | | | | - |
| Total | | Admin | 0 | | 0 | - |
| | | Policy | 0 | | 656.4 | 590.76 |
| | | Both | 0 | | 656.4 | 590.76 |

| Discount | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% | |
|----------------|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| Cost £k | Present Value | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| | 749.36 | 0.00 | 95.17 | 91.95 | 88.84 | 85.84 | 82.93 | 80.13 | 77.42 | 74.80 | 72.27 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Admin | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Policy | 749.36 | 0.00 | 95.17 | 91.95 | 88.84 | 85.84 | 82.93 | 80.13 | 77.42 | 74.80 | 72.27 |
| Both | 749.36 | 0.00 | 95.17 | 91.95 | 88.84 | 85.84 | 82.93 | 80.13 | 77.42 | 74.80 | 72.27 |

| Discount | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% | |
|----------------|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| Cost £k | Present Value | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| | 4993.69 | 0.00 | 634.20 | 612.76 | 592.04 | 572.01 | 552.67 | 533.98 | 515.92 | 498.48 | 481.62 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Admin | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Policy | 4993.69 | 0.00 | 634.20 | 612.76 | 592.04 | 572.01 | 552.67 | 533.98 | 515.92 | 498.48 | 481.62 |
| Both | 4993.69 | 0.00 | 634.20 | 612.76 | 592.04 | 572.01 | 552.67 | 533.98 | 515.92 | 498.48 | 481.62 |

| Enforcement | | | | | | | |
|--------------|-----------------------------|---------------|--------------|------------------|-------------|-----------------|---------|
| Description | | | One-off Cost | | Annual Cost | | |
| Scenario | Cost Item | Type | Cost £k | Year Experienced | Cost £k | Year Commencing | Average |
| MINIMUM | Develop management measures | Policy | 181 | 2010 | | | - |
| | Surveillance and monitoring | Policy | | | 38.0 | 2010 | 38.00 |
| | | Policy | | | | | - |
| | | | | | | | - |
| Total | | Admin | 0 | | 0.0 | | - |
| | | Policy | 181 | | 38.0 | | 38.00 |
| | | Both | 181 | | 38.0 | | 38.00 |

| | | | | | | | |
|--------------|-----------------------------|---------------|-----|------|-------|------|----------|
| MAXIMUM | Develop management measures | Policy | 181 | 2010 | | | - |
| | Surveillance and monitoring | Policy | | | 219.0 | 2010 | 219.00 |
| | Survey to monitor FCS | Policy | | | 1040 | 2010 | 1,040.00 |
| | | | | | | | - |
| | | | | | | | - |
| Total | | Admin | 0 | | 0 | | - |
| | | Policy | 181 | | 1259 | | 1,259.00 |

| | | Discount | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% |
|---------------|---------------|----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Cost £k | Present Value | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
| | 181.00 | 181.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 327.09 | 38.00 | 36.71 | 35.47 | 34.27 | 33.11 | 31.99 | 30.91 | 29.87 | 28.86 | 27.88 | |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Admin | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Policy | 508.09 | 219.00 | 36.71 | 35.47 | 34.27 | 33.11 | 31.99 | 30.91 | 29.87 | 28.86 | 27.88 | |
| Both | 508.09 | 219.00 | 36.71 | 35.47 | 34.27 | 33.11 | 31.99 | 30.91 | 29.87 | 28.86 | 27.88 | |

| Cost £k | Present Value | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------------|---------------|---------|---------|---------|---------|---------|---------|---------|--------|--------|--------|
| | 181.00 | 181.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1885.08 | 219.00 | 211.59 | 204.44 | 197.53 | 190.85 | 184.39 | 178.16 | 172.13 | 166.31 | 160.69 |
| | 8951.99 | 1040.00 | 1004.83 | 970.85 | 938.02 | 906.30 | 875.65 | 846.04 | 817.43 | 789.79 | 763.08 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Admin | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Policy | 11018.08 | 1440.00 | 1216.43 | 1175.29 | 1135.55 | 1097.15 | 1060.04 | 1024.20 | 989.56 | 956.10 | 923.77 |

| Oil and Gas Exploration and Storage | | | | | | | |
|-------------------------------------|--|---------------|--------------|------------------|-------------|-----------------|-------|
| Description | | | One-off Cost | | Annual Cost | | |
| Scenario | Cost Item | Type | Cost £k | Year Experienced | Cost £k | Year Commencing | |
| | | | | | | Average | |
| MINIMUM | Increased costs to appropriate assessments | Admin Policy | | | 48 | 2010 | 48.00 |
| | | | - | | | | |
| | | | - | | | | |
| | | | - | | | | |
| | | | - | | | | |
| Total | | Admin | 0 | | 48 | | 48.00 |
| | | Policy | 0 | | 0 | | - |
| | | Both | 0 | | 48 | | 48.00 |

| | | | | | | | |
|--------------|--|---------------|---|------|-----|------|--------|
| MAXIMUM | Increased costs to appropriate assessments | Admin Admin | | 2010 | 292 | 2010 | 292.00 |
| | | | - | 2011 | | | - |
| | | | - | | | | - |
| | | | - | | | | - |
| | | | - | | | | - |
| Total | | Admin | 0 | 292 | | | 292.00 |
| | | Policy | 0 | 0 | | | - |
| | | Both | 0 | 292 | | | 292.00 |

| | | Discount | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% |
|---------------|---------------|----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Cost £k | Present Value | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
| | 413.17 | 48.00 | 46.38 | 44.81 | 43.29 | 41.83 | 40.41 | 39.05 | 37.73 | 36.45 | 35.22 | |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Admin | 413.17 | 48.00 | 46.38 | 44.81 | 43.29 | 41.83 | 40.41 | 39.05 | 37.73 | 36.45 | 35.22 | |
| Policy | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Both | 413.17 | 48.00 | 46.38 | 44.81 | 43.29 | 41.83 | 40.41 | 39.05 | 37.73 | 36.45 | 35.22 | |

| Cost £k | Present Value | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------------|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 2513.44 | 292.00 | 282.13 | 272.59 | 263.37 | 254.46 | 245.86 | 237.54 | 229.51 | 221.75 | 214.25 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Admin | 2513.44 | 292.00 | 282.13 | 272.59 | 263.37 | 254.46 | 245.86 | 237.54 | 229.51 | 221.75 | 214.25 |
| Policy | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Both | 2513.44 | 292.00 | 282.13 | 272.59 | 263.37 | 254.46 | 245.86 | 237.54 | 229.51 | 221.75 | 214.25 |

| Aggregates | | | | | | | |
|--------------|-----------------------|---------------|--------------|---------------------|-------------|--------------------|---------|
| Description | | | One-off Cost | | Annual Cost | | |
| Scenario | Cost Item | Type | Cost £k | Year Experienced | Cost £k | Year Commencing | Average |
| MINIMUM | Increased cost of EIA | Admin | 115 | 2010 | | | - |
| | | | | | | | - |
| | | | | | | | - |
| | | | | | | | - |
| | | | | | | | - |
| Total | | Admin | 115 | | 0 | | - |
| | | Policy | 0 | | 0 | | - |
| | | Both | 115 | | 0 | | - |

| | | | | | | | |
|--------------|-----------------------|---------------|-----|------|---|--|---|
| MAXIMUM | Increased cost of EIA | Admin | 574 | 2010 | | | - |
| | | | | | | | - |
| | | | | | | | - |
| | | | | | | | - |
| | | | | | | | - |
| Total | | Admin | 574 | | 0 | | - |
| | | Policy | 0 | | 0 | | - |
| | | Both | 574 | | 0 | | - |

| Cost £k | Present Value | Discount | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% |
|---------------|---------------|----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
| | 115.00 | 115.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Admin | 115.00 | 115.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Policy | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Both | 115.00 | 115.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Cost £k | Present Value | Discount | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% |
|---------------|---------------|----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
| | 574.00 | 574.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Admin | 574.00 | 574.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Policy | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Both | 574.00 | 574.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Renewables - Wind | | | | | | | |
|-------------------|------------------------------|---------------|--------------|------------------|-------------|-----------------|---------|
| Description | | | One-off Cost | | Annual Cost | | |
| Scenario | Cost Item | Type | Cost £k | Year Experienced | Cost £k | Year Commencing | Average |
| MINIMUM | Increase in assessment costs | Policy | 10000 | 2010 | | | - |
| | | | | | | | - |
| | | | | | | | - |
| | | | | | | | - |
| | | | | | | | - |
| Total | | Admin | 0 | | 0 | | - |
| | | Policy | 10000 | | 0 | | - |
| | | Both | 10000 | | 0 | | - |

| | | | | | | | | |
|--------------|------------------------------|---------------|--------|------|---------|---------|---------|---------|
| MAXIMUM | Increase in assessment costs | Policy | 100000 | 2010 | | | - | |
| | | | | | | | - | |
| | Loss of generating power | Policy | | | 2019 | 3600000 | | 360,000 |
| | | | | | | | | - |
| | | | | | | | | - |
| Total | | Admin | 0 | | 0 | | - | |
| | | Policy | 100000 | | 3600000 | | 360,000 | |
| | | Both | 100000 | | 3600000 | | 360,000 | |

| Cost £k | Present Value | Discount | 100.0% | 96.6% | 93.4% | 90.2% | 87.1% | 84.2% | 81.4% | 78.6% | 75.9% | 73.4% |
|---------------|---------------|----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
| 10000.00 | 10000.00 | 10000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Admin | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Policy | 10000.00 | 10000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Both | 10000.00 | 10000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Cost £k | Present Value | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------------|---------------|-----------|-----------|------|------|------|------|------|------|------|------------|
| | | 100000.00 | 100000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2641431.50 | 2641431.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2641431.50 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Admin | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Policy | 2741431.50 | 100000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2641431.50 |
| Both | 2741431.50 | 100000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2641431.50 |