

Title: Wyville Thomson Ridge 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: 16/07/10
	Stage: Final
	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 of wild flora and fauna (the Habitats Directive, 1992) aims to promote the maintenance of biodiversity. The Habitats Directive requires the UK (as a Member State) to propose sites hosting the 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 and this is achieved through management of potentially damaging activities where the habitats and species are present and in their vicinity. 'Reefs' (Habitat 1170 in Annex I) are habitats of European importance and are the qualifying feature of the Wyville Thomson Ridge.

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.

Option 2: Search for an alternative site. This option is not 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 reef 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

SELECT SIGNATORY 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 SELECT SIGNATORY:..... Date:.....

Description:

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	£0.0446m	£0.153m	£1.34m
High	£0.0446m	£0.307m	£2.64m
Best Estimate	£0.0446m	£0.229m	£1.99m

Description and scale of key monetised costs by ‘main affected groups’

For minimum management scenario: fisheries (£0.127m) and enforcement (£0.0446m one-off and £0.0387m pa)

For maximum management scenario: fisheries (£0.298m pa from 2011) and enforcement (£0.0446m one-off and £0.0387m pa)

Other key non-monetised costs by ‘main affected groups’

Wider economic effects resulting from direct costs to fishermen.

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: 0	AB savings:	Policy cost savings:	Net: 0	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				
What is the annual change in enforcement cost (£m)?	£38.7k				
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	Wyville Thomson Ridge SAC Selection Assessment v4.0, JNCC
2	Wyville Thomson Ridge Conservation Objectives and Advice on Operations v3.0, JNCC
3	Wyville Thomson Ridge SAC Impact Assessment, V1.0, JNCC
4	Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended)

+
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	0.045	0	0	0	0	0	0	0	0	0
Annual recurring cost	0.229	0.458	0.687	0.916	1.145	1.374	1.603	1.832	2.061	2.290
Total annual costs	0.274	0.503	0.732	0.961	1.190	1.419	1.648	1.877	2.106	2.335
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>

Add annexes here.

Contents

1	INTRODUCTION	1
1.1	Purpose.....	1
1.2	Policy drivers	1
	<i>UK identification of Annex I reef sites.....</i>	<i>2</i>
	<i>Conservation objectives and management of sites</i>	<i>3</i>
1.3	Background information on the impact assessment.....	3
2	BACKGROUND INFORMATION ON THE SITE.....	4
2.1	Baseline	4
2.2	Characteristics of the site	4
2.3	Human activity at the site.....	7
	<i>Fishing.....</i>	<i>7</i>
	<i>Defence activities.....</i>	<i>12</i>
	<i>Wrecks.....</i>	<i>12</i>
	<i>Telecommunications.....</i>	<i>12</i>
2.4	Baseline condition of the site	12
3	APPROACH TO ANALYSIS OF COSTS AND BENEFITS	16
3.1	Approach.....	16
3.2	Costs.....	17
	<i>Policy costs to the private sector.....</i>	<i>17</i>
	<i>Administration costs to the private sector.....</i>	<i>17</i>
	<i>Costs to the public sector.....</i>	<i>18</i>
3.3	Benefits	18
4	COSTS AND BENEFITS OF OPTION 1: DESIGNATE THE SITE	19
4.1	Implications of designation	19
4.2	Costs to business	20
	<i>Fisheries</i>	<i>20</i>
	<i>Administration costs to business.....</i>	<i>22</i>
	<i>Administration costs to Government.....</i>	<i>22</i>
4.3	Benefits of designating the site	22
	<i>Provisioning services</i>	<i>23</i>
	<i>Regulating services.....</i>	<i>23</i>
	<i>Types of value</i>	<i>23</i>
	<i>Benefits to economic activity.....</i>	<i>26</i>
4.3	Summary of costs and benefits.....	26
	<i>Risk of unintended consequences</i>	<i>26</i>
4.4	Impact tests.....	27
	<i>Competition assessment.....</i>	<i>27</i>
	<i>Small firms impact test.....</i>	<i>27</i>
	<i>Legal aid.....</i>	<i>28</i>
	<i>Carbon assessment.....</i>	<i>28</i>
	<i>Rural proofing</i>	<i>28</i>
	<i>Other impact tests.....</i>	<i>28</i>
5	CONCLUSIONS	29
6	REFERENCES	30

APPENDIX A - Summary of cost calculations

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 EC Habitats Directive 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 recommended designation by JNCC of a Special Area of Conservation (SAC) at Wyville Thompson Ridge. Wyville Thompson Ridge is situated within two regional seas: the Scottish Continental Shelf Regional Sea and the Faroe-Shetland Channel Regional Sea. It is being recommended for SAC designation due to its Annex 1 reef (habitat 1170).

The UK is responsible for a sea area that is over three times larger than its land mass and which contains a rich diversity of habitats and associated species. The diverse range of habitats in Britain's seas supports over 10,000 species, ranging from whales and dolphins to sponges, corals and seaweeds (Hiscock *et al* 2005). This estimate was generated predominately from records from shallow waters and it is understood that there may be many more species that are still undiscovered in deeper UK waters. Britains' marine habitats are at risk of deterioration and a number of species are threatened.

Human activities can adversely affect our marine environment. Many UK marine habitats have already been altered 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

Member States of the Council of Europe are committed to the Convention on the Conservation of European Wildlife and Natural Habitats (Bern 1979). The European Community has made this legally binding through the Habitats Directive (92/43/EEC) which aims to conserve natural habitats and species that have been prioritised for conservation at a European level (respectively listed in Annex I and II of the Directive). Habitats included in Annex I 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 Article I of the Directive¹.

Under the Habitats Directive, habitats and their typical species are to be protected by identifying 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 the habitat types to be maintained (or restored where appropriate) at a favourable conservation status within their natural range. Once adopted in the Natura 2000 network, the sites are designated by the Member State as Special Areas of Conservation (SACs).

¹ EC biogeographic regions: <http://www.jncc.gov.uk/page-1470>.

The Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007 (as amended) transpose the Habitats Directive (92/43/EEC) and Wild Birds Directive (79/409/EEC) 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 fulfill the UK's duty 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 have a general duty, in the exercise of any of their functions, to have regard to the EC Habitats and 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.

The Joint Nature Conservation Committee (JNCC) is responsible for providing scientific advice to Government on nature conservation matters, including identification of SAC sites under the Habitats Regulations², for UK offshore waters.

The European Commission provides guidelines on the degree of national representation for each habitat type that might be considered sufficient (EC 2007). These were not derived specifically for use in the marine environment and do not explicitly provide national targets for contribution to the network, but instead offer broad guidance for Member States. The guidelines indicate that 20% of the national resource of a particular habitat would likely be considered insufficient and more than 60% would likely be considered a sufficient national contribution to the Natura network (CEC 2007). Failure to identify SACs for what the EC judges to be a sufficient proportion of the UK resource of Annex I habitat could potentially result in infraction proceedings against the UK Government.

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 waters.

JNCC concluded that for offshore waters if at least one example of each Annex I habitat sub-type in each of the UK's area Regional Seas³ were included in the SAC network, this would ensure minimum representation of each Annex I habitat within its natural range in the UK (JNCC 2003). For some Annex I habitats, their distribution in UK is concentrated in a few regions, so it is likely that to ensure sufficient of the UK resource of such habitats is included within the site network, more than one site in some Regional Seas is likely to be needed.

UK identification of Annex I reef sites

Thirty-seven SACs with marine components have already been designated or submitted to the European Commission for Annex I reef features. Thirty four of these are in coastal or inshore waters, and three are in UK offshore waters (Haig Fras, Stanton Banks and Darwin Mounds).

As well as this site at Wyville Thomson Ridge, a further four possible offshore SACs for reefs (NW Rockall, North Norfolk Sandbanks and Saturn Reef, Haisborough Hammond and Winterton, Inner Dowsing Race Bank and North Ridge) plus five inshore SACs for reefs, have been subject to formal consultation, and are planned to be submitted to the European Commission by 1st October 2010.

² The Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 apply to UK offshore waters from 12-200 nm or the UK Continental Shelf.

³ Regional Seas: <http://www.jncc.gov.uk/page-161>.

The European Commission will assess whether the list of SACs submitted by UK Government to them is sufficient or not. JNCC have worked with the other conservation agencies, to best estimate whether the UK's sites submitted so far will be sufficient in terms of both representing the habitat sub-types across their natural range, and also in proportion to the amount of the variety of habitat types within UK waters.

The bedrock and stony reef at Wyville Thomson Ridge is very different in character to reefs in all the other existing SACs or those subject to consultation, due to the depth and location of the ridge and the unique oceanic conditions which influence the biological communities found there. The site is therefore recommended by JNCC for designation as an SAC, to contribute to completion of the UK's network of SACs for Annex I reefs.

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. Draft Conservation Objectives and Advice on Operations are presented in a document⁴ and will inform the management of activities within the site. Special provisions are made for the consideration of current and future plans and projects that may 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. An Appropriate Assessment of such plans or projects may need to be carried out by the Competent Authority if there is a likely significant effect on the integrity of the site. Management of ongoing activities is intended to ensure marine habitats and species are maintained at or restored to favourable condition.

To fulfil conservation objectives for Annex I reefs at Wyville Thomson Ridge, it will be necessary for the competent authorities to manage human activities where possible to ensure that the feature is not impacted through: 1) physical loss due to 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 Wyville Thomson Ridge Special Area of Conservation Impact Assessment. Two options were initially considered for this site:

Baseline: do nothing
Option 1: designate the site
Option 2: consider alternative site

Earlier scoping studies considered all known areas of Annex I reef habitat against the principles of the SAC network, and narrowed down the selection of sites according to the principles outlined in the Directive⁵. Wyville Thomson Ridge is considered to be the best example of its particular reef subtype (iceberg ploughmark variant of stoney reef) in the Scottish Continental Shelf Regional Sea and the Faro-Shetland Channel Regional Sea. Due to the uniqueness of Wyville Thomson Option 2 is not considered further.

This initial IA presents JNCC's quantitative assessment of the potential costs and benefits of the policy option. 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

⁴ Offshore Special Area of Conservation: North West Rockall Bank: Draft Conservation Objectives and Advice on Operations, version 2.2, Nov 2008, JNCC

⁵ JNCC P14a Feb 2009

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 recommendations⁶.

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). A framework is used to combine and assess cost and benefit information from different sources on the likely impacts of the different policy options in the evidence base.

This framework involves a description of:

- What the current situation at the site (the baseline) is, 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 originally prepared using information that was publicly available and information provided by government departments, and regulators⁷ in January 2009. It has been revised in May 2010 by updating key information on economic activities at the site, expressing monetary values in 2010 prices⁸, and taking into account comments from the formal public consultation.

2 BACKGROUND INFORMATION ON THE SITE

2.1 Baseline

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 Wyville Thomson Ridge is a rock ridge situated in the Atlantic Ocean at the northern end of the Rockall Trough. It is approximately 20km wide and 70km long and rises from over 1000m depth to less than 400m at the summit. The Ridge is composed of extensive areas of stony reef interspersed with gravel areas and bedrock reef along the flanks. The stony reef is thought to have been formed by the ploughing movement of icebergs through the seabed at the end of the last ice age. These iceberg 'ploughmarks' consist of ridges of boulders, cobbles and gravel where finer sediments have been winnowed away by high energy currents at the site, interspersed with finer sediment troughs up to 5m-10m deep (Masson *et al.*, 2000). The rock and stony reef areas support diverse biological communities

⁶ HM Treasury, The Green Book: http://www.hm-treasury.gov.uk/data_greenbook_index.htm

⁷ Department of Energy and Climate (DECC); Department for Environment, Food and Rural Affairs (Defra); and Marine Scotland.

⁸ Using HM Treasury predicted Annual GDP deflators: http://www.hm-treasury.gov.uk/data_gdp_fig.htm

representative of hard substratum in deep water, including a range of sponges; stylasterid, cup and soft corals; brachiopods; cyclostome bryozoans; dense beds of featherstars and brittlestars; sea urchins, sea cucumbers and sea spiders (Masson *et al.*, 2000; Henry & Roberts, 2004; Howell *et al.*, 2007; and Brian Bett, pers. comm., 2004). Communities on the bedrock reef vary in species composition between the two sides of the ridge due to the influences of different water masses (Howell *et al.*, 2007). This combination of water masses in one area is unique in UK waters.

Across the summit of the ridge, at depths of c.350-550m the seabed is mainly composed of sand with exposed lag gravel, and expressions of iceberg ploughmarks, indicated by presence of mixed gravel, cobbles and boulders. The distribution of cobbles and boulders is variable, and in some locations these larger particles are surrounded by a gravel-cobble pavement, whereas in other areas the surrounding sediment is sandier. In general, the hard substrata support encrusting fauna, including a variety of sponges (encrusting, branching, massive and cup sponges such as *Phakellia sp.* and *Axinella sp.*), and in some locations stylasterid corals (lace corals), cup corals and cyclostome bryozoans. Typical mobile epifauna include urchins (*Cidaris cidaris* and *Echinus acutus*), holothurians (*Stichopus tremulus*), squat lobsters (*Munida rugosa*) and fish such as rabbit fish (*Chimaera monstrosa*), bluemouth (*Helicolenus*) and ling (*Molva sp.*) (Howell *et al.*, 2007 and Masson *et al.*, 2000). Approximately 10 – 15 km south east of the UK Continental Shelf limit, the iceberg ploughmarks are strongly expressed and in some places rock outcrops. Encrusting fauna in this location is more developed with sponges being the dominant fauna on the rocky ground. To the south-east of the ridge, in a possible overflow channel, gravel areas have sparse fauna (sea urchins and fish) (Masson *et al.*, 2000).

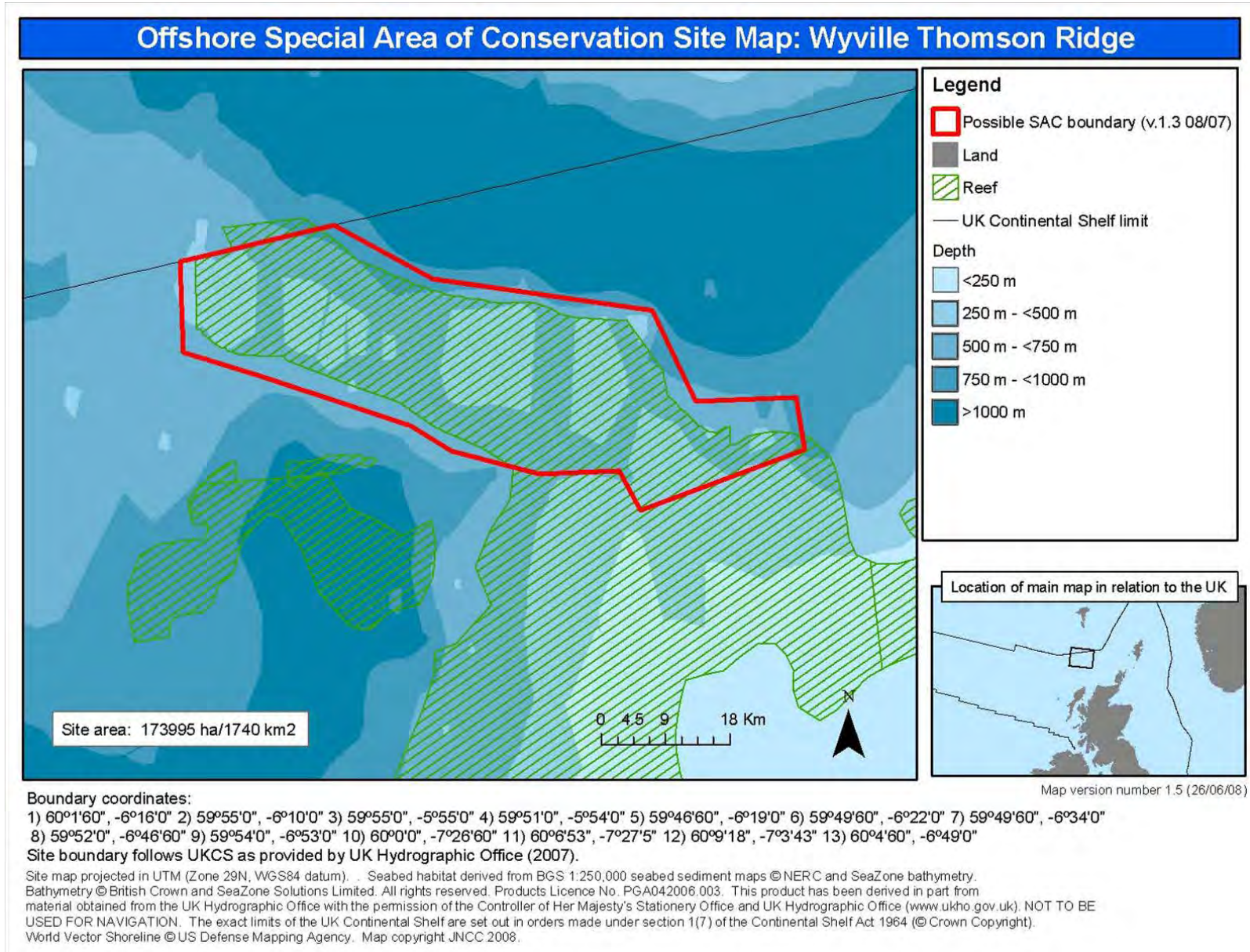
Sites sampled on the south slope of the Wyville Thomson Ridge (within the Scottish Continental Shelf regional sea) were characterised by a mixed rock substratum with boulders, cobbles and gravel infill, which may reflect iceberg ploughmarks. The faunal assemblage was comparable to that found on similarly hard substrata in parts of the Rockall Trough and Bank regional sea (to the west), such as on Rosemary Bank (Howell *et al.*, 2007). Fauna included encrusting and erect sponges, hydroids, pencil urchins (*Cidaris cidaris*), anemones, squat lobsters and fish. Also present were stylasterid, scleractinian (*Lophelia pertusa* and *Madrepora oculata*), and soft corals (Howell *et al.*, 2007 and Masson *et al.*, 2000).

On the northern slope of the Wyville Thomson Ridge (within the Faeroe-Shetland Channel regional sea) sites sampled in 2006 at depths of 650-900m were associated with a 'headland' that juts out from the ridge. This area has a rich faunal community that is very distinct from the communities on similar substrata on the south side of the ridge due to the cold water from the Faeroe-Shetland Channel; a mixture of stony and bedrock reef habitats are found in this area. Suspension feeders are common, influenced by the strong currents around the headlands. The substratum of cobble and pebble lag with occasional boulders supports brittle stars (Ophiuroidea) and zoanthid anemones in high abundance. On the lower reaches of the slope, yellow feather stars (Crinoidea) are abundant. Similarly dense brittlestar and feather star beds are also found in shallower water further west (480-550m) (Howell *et al.*, 2007).

In some locations on the northern slope, sabellid tube worms form dense aggregations on boulders. Other fauna present includes soft corals, cup corals (*Caryophyllia sp.*), tubularid hydroids, burrowing anemones, actinid anemones, which in places densely colonise available rock outcrop, and many types of encrusting, globose and erect sponges. Mobile species include sea stars (*Henricia sp.* and *Crossaster sp.*), basket stars (*Gorgonocephalus sp.*), sea spiders (Pycnogonida), whelks (Gastropoda), octopus (Cephalopoda) and fish. On the upper, steeper reaches of the headland slope, the substrate is carpeted by cup corals and soft corals, which were not recorded at other locations on the ridge (Howell *et al.*, 2007).

In deeper waters (depth 800-1200m) of the northern slope, reef habitats have not been recorded, and instead the seabed is characterised by finer sediment, such as gravels, sands and muds, with fewer cobbles and boulders than higher up the slope. In some cases high densities of stalked sponges and tube worms were recorded (Masson *et al.*, 2000).

Figure 2.1 Map of Wyville Thomson Ridge SAC



2.3 Human activity at the site

Current economic activity at Wyville Thomson Ridge is described below under the following sectors:

- Fisheries – significant activity predominately from French, Scottish and Spanish vessels.
- Defence activities – some classified defence activities
- Cables – two operational cables run through the site
- Renewables - no current or planned activity at the site
- Oil and gas – no current or planned activity at the site
- Aggregate extraction – no current or planned activity at the site

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

Fishing

As this site is adjacent to the recently agreed UK-Faeroese Median Line (S.I. 1999 No. 2031) for seabed resources, there remains confusion as to the precise UK/Faeroese fishing limits in practice.

Landings data extracted from the FIN database by Scottish Government indicates that the most heavily fished rectangle in the region is 48E4 with which the SAC boundary overlaps slightly; over twice as much fish is caught here compared to the other ICES rectangles with which the SAC coincides.

Unfortunately, it was not possible to differentiate landings from UK waters from within an ICES rectangle using the FIN database⁹. As such, estimates of landings are likely to be marginal overestimates as they also include Faroese waters that are covered by the same ICES rectangles.

Using the proportion of the ICES rectangle that overlaps with the SAC, fishing landings from within the SAC boundary were calculated. In 2008, 1,628 tonnes (live weight) were landed from within the Wyville Thomson Ridge SAC which were worth £893k.

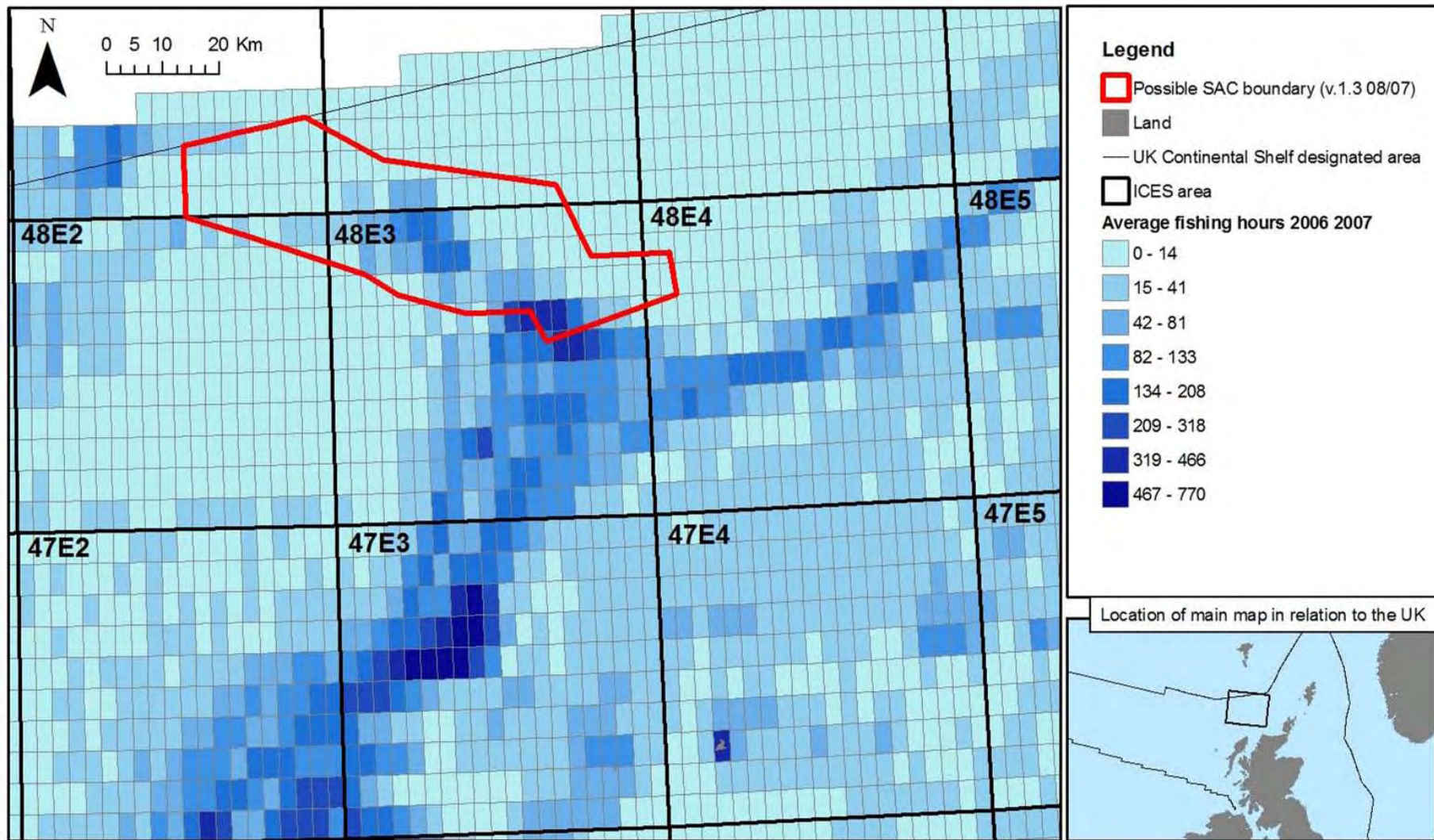
ICES rectangle	Live weight (tonnes)	Value	Overlap with SAC (area)	Live weight (tonnes) from SAC	Value from SAC
48E2	2381.37	664,252	0.035	83.35	23,249
49E2	389.85	405,052	0.12	46.78	48,606
48E3	2925.8	2,286,038	0.29	848.48	662,951
49E3	5179.11	649,092	0.1	517.91	64,909
48E4	8813.99	6,210,096	0.015	132.21	93,151
TOTAL	19690.12	£10,214,529		1628.73	£892,867

To check the reliability of this estimate, the landings were also calculated using effort data from within the ICES rectangles. Here, the proportion of effort inside the SAC compared to the total effort within the ICES rectangle was used to calculate landings. Using this method, in 2008, 3,466 tonnes (live weight) were landed from within the Wyville Thomson Ridge SAC with an estimated value of £1,002k.

⁹

ICES rectangle	Live weight (tonnes)	Value	Overlap with SAC (effort)	Live weight (tonnes) from SAC	Value from SAC
48E2	2381.37	664,252	0.039	92.41	25,778
49E2	389.85	405,052	0.065	25.40	26,396
48E3	2925.8	2,286,038	0.275	805.88	629,663
49E3	5179.11	649,092	0.490	2538.78	318,182
48E4	8813.99	6,210,096	<0.001	3.88	2,737
TOTAL	19690.12	£10,214,529		3466.36	£1,002,756

Figure 1.2 Fishing effort (2006-7) in the region surrounding the Wyville Thomson Ridge SAC. Effort is typically concentrated along the topographical highs of seabed ridges.



The FIN database only considers landings from UK registered vessels to UK ports, UK registered vessels to non-UK ports, and non-UK registered vessels to UK ports i.e. not non-UK registered vessels to non-UK ports. Of the included vessels, those registered in Scotland caught the most fish by weight (40%) and value (51%), followed by France and Spain (by value). Faroese vessels caught the second most fish by weight, but the overall value was low, due to the fact that they were predominately targeting the low value blue whiting.

Country of registration	Live weight (tonnes)	Proportion of total weight (%)	Value	Proportion of total value (%)
GBS	7237.84	36.8	5,211,346	51.0
FRA	3282.00	16.7	2,619,978	25.6
ESP	570.72	2.9	981,480	9.6
FRO	4686.08	23.8	565,399	5.5
IRL	647.08	3.3	424,533	4.2
NOR	1605.52	8.2	217,238	2.1
ISL	1604.50	8.1	144,405	1.4
GBE	56.37	0.3	50,150	0.5

From the data available from the FAD database, the vast majority of landings were made in Scotland, predominately in Lochinver, Lerwick and Peterhead. On two occasions, large amounts of mackerel were landed at unspecified Norwegian ports by Scottish vessels, accounting for the relatively high catch there.

Country	Live weight (tonnes)	Value	Nationality	Live weight (tonnes)	Value
Lochinver	3368.47	3,079,019	GBS	17979.48	9,117,223
Lerwick	9373.54	2,274,122			
Peterhead	3873.16	2,049,553			
Ullapool	562.29	755,257			
Scrabster	414.80	502,791			
Kinlochbervie	250.10	276,631			
Fraserburgh	59.02	88,414			
Stromness	34.13	40,328			
Scalloway and Isles	24.20	27,909			
Macduff	8.91	16,140			
Aberdeen	10.85	7,058			
Unspecified Nor	1196.58	742,126			
Egersound	403.53	252,204			
Ijmuiden	42.26	38,285	NLD	42.26	38,285
Burela	10.27	15,195	ESP	29.42	32,378
Corunna	19.15	17,182			
Hantsholm	38.85	32,314	DNK	38.85	32,314

Midwater otter trawls catch the most fish by value. Scottish vessels use midwater gear to target mackerel and these account for nearly all the catch. Bottom towed otter trawls target numerous demersal fish species and longlines are deployed to catch deepwater species including hake, ling and eels.

Fishing gear	Live weight (tonnes)	Value
Otter trawls – midwater	8094.29	4,040,575
Otter trawls – bottom	9001.11	3,414,303
Set longlines	761.97	1,312,655
Set gillnets (anchored)	466.36	624,809
Pair trawls – midwater	1162.96	590,531
Otter twin trawls	161.99	178,782
Pots	34.13	40,328
Gillnets (not specified)	6.62	11,887
Otter trawls (not specified)	0.69	659

Landings made using towed bottom gear from within the site boundary were also calculated. Estimates show that of £893k of fish landed from within the SAC, £381k came from towed bottom gear (43%).

ICES rectangle	Live weight (tonnes)	Value (£)	Overlap with SAC (area)	Live weight (tonnes) from SAC	Value from SAC (£)
48E2	2081.65	617,103	0.035	72.86	21,599
49E2	389.85	405,052	0.12	46.78	48,606
48E3	1896.63	882,594	0.29	550.02	255,952
49E3	3174.03	343,109	0.1	317.40	34,311
48E4	1621.63	1,345,887	0.015	24.32	20,188
TOTAL	9163.79	3,593,744		1011.39	£380,656

There are a number of species caught around the Wyville Thomson Bank. The most important in by far in terms of value of landing are mackerel and hake. However, there are a number of other species that are landed in large quantities, including saithe, blue whiting, black scabbardfish, ling and anglerfish.

Target fish	Live weight (tonnes)	Live weight (%)	Value (£)	Value (%)
Mackerel	6736.03	34.59	4,241,697	42.2
Hake	930.34	4.78	1,620,129	16.1
Saithe	1945.67	9.99	899,800	8.9
Blue whiting	7345.22	37.72	746,000	7.4
Black scabbard fish	547.39	2.81	525,706	5.2
Ling	368.96	1.89	471,492	4.7
Blue ling	390.78	2.01	435,414	4.3
Monks or Anglers	131.48	0.68	322,328	3.2
Haddock	175.13	0.90	224,373	2.2
Greater Silver Smelt	510.14	2.62	163,914	1.6
Megrim	33.24	0.17	79,612	0.8
Cod	44.98	0.23	78,547	0.8

Defence activities

The site may interact with classified defence activities, but these are not expected to have a detrimental impact on the site features (MoD pers comm.¹⁰).

Wrecks

There are three wrecks located within the SAC boundary. All are vessels that were sunk in the first or second World Wars. Two of the vessels are greater than 60m and exceed 100 gross tonnes in weight.

Telecommunications

The United Kingdom Cable Protection Committee (UKCPC) note that the in-service transatlantic cables TAT 14 and AC1 pass through the centre of this SAC in an east-west direction.

2.4 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.

The main consequence of not designating the site is that the Habitat Regulations would not apply as a matter of law to plans or projects. This would mean that regulatory authorities would not be required to consult JNCC regarding potentially damaging effects on the reef and its typical species. The 'precautionary principle' (see Section 1.2) is an important element of assessment under Regulation 25 which requires that regulatory authorities only consent to a plan or project if they can ascertain that there will be no adverse effect on the habitat (or any other feature of European importance). This effectively places the burden of proof on developers and regulators to show the absence of an effect, rather than requiring those opposing a scheme to show that there would be an effect.

The potential application of the Habitat Regulations to important habitats in the site is clearly a relevant and important consideration when considering the need for an SAC. This is because a range of activities, or changes to current activities, are likely to be proposed in the area. These activities include commercial fishing which could potentially have an adverse impact on the habitat. In the absence of an SAC, and thus without recourse to the Habitat Regulations, it would be difficult to influence the consenting of these activities through, for example, the introduction of effective mitigation measures.

Table 2.2 summarises JNCC's assessment of the site's vulnerability to pressures, which was undertaken for the draft conservation objectives and advice on operations for the site¹¹. It will be updated and revised as necessary to reflect new evidence. The advice on operations assesses the vulnerability of the site's reef to current activities on the site. The vulnerability is determined by a combination of the reefs sensitivity to the specified impacts and current exposure to those impacts. 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.

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 reef to the effects of these categories of activities was assessed on best available advice (as of March 2010).

¹⁰ Email from MoD dated 14th March 2008.

¹¹ NW Rockall Bank SAC Conservation Objectives and Advice on Operations v3.0
http://www.jncc.gov.uk/pdf/NorthWestRockallBank_SelectionAssessment_3.0.pdf

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.

Figure 1.3 Conservation objectives for Wyville Thomson Ridge SAC

List of pressures which may cause deterioration or disturbance (with example activities)		Wyville Thomson Ridge: Cobble and bedrock reefs		
		Sensitivity	Exposure	Vulnerability
Physical Loss	Removal (e.g. aggregate dredging, isolated rock dump, infrastructure development)	•••	None	No known vulnerability: 0
	Obstruction (e.g. permanent constructions [oil & gas infrastructure, windfarms, cables] & wrecks)	•••	Low	Moderate: 3
	Smothering (e.g. drill cuttings)	••	None	No known vulnerability: 0
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)	•••	Medium	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)	••	None	No known vulnerability: 0
	Introduction of non-synthetic compounds (e.g. heavy metals, crude oil spills)	••	None	No known vulnerability: 0
	Introduction of radionuclides (e.g. nuclear energy industry)	?	?	Insufficient information

Non-toxic contamination	Changes in nutrient loading (e.g. outfalls)	••	None	No known vulnerability: 0
	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)	•••	Medium	High: 6

Table 2.2 shows that Wyville Thomson Ridge has: high vulnerability to physical disturbance or abrasion and to the selective extraction of species; moderate vulnerability to obstruction; and low vulnerability to changes in suspended sediment and turbidity. It has not been possible to determine whether the interest feature is vulnerable to the introduction of radionuclides, microbial pathogens or non-native species.

Wyville Thomson Ridge is expected to deteriorate significantly under baseline conditions due to pressures associated with demersal fishing practices. Therefore, in the absence of designation there would be a risk of deterioration, and therefore a risk of not achieving the aims of the Habitats Directive or the Offshore Marine Regulations to maintain or restore Annex I habitats.

The conservation objectives for the management of Wyville Thomson Ridge are to restore the reef to favourable condition, if evidence indicates the effect of the above activities on the reef is significant. 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 the responsible competent authorities. If new information suggests that the condition of the feature at the site is not significantly affected by current activities, then the conservation objective for the reef will be to maintain the features in favourable condition.

In its current condition a range of 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 are described above. Other benefits include option and non-use value: benefits from values associated with potential future use, existence and others' use of the site.

3 APPROACH TO ANALYSIS OF COSTS AND BENEFITS

3.1 Approach

As stated in Section 1.3, this IA presents a quantitative assessment of the potential costs and benefits 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 operators can predict costs 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:

- 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;
- 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.

3.2 Costs

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 reefs 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 designated 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.

Policy costs to the private sector may arise if:

- Consent for a plan or project is granted, but is subject to restrictions on the timing or manner in which the plan or project can be implemented which result in costs to businesses. These restrictions are determined by the competent authority in its assessment under the Habitats Regulations, and
- Consent for an existing or new plan or project is 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.

Administration costs to the private sector

Administration costs include the time and expenditure necessary for the private sector to provide the information and documentation required to comply within the administration requirements of a regulation. They exclude the 'policy costs' which are the time and expenditure necessary to adjust activities (for example 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 the competent authority¹² with more detailed information than would be required if the site was not designated. This is additional information is required to inform the competent authority's assessment of the plan or project under the Habitat Regulations, and
- The costs of undertaking more detailed analysis (such as EIA) and reporting in some cases.

Costs to the public sector

Potential administration costs to the public sector are:

- i. the costs of monitoring the site and maintaining up to date information on its conservation status; and
- ii. the costs of regulating 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 purposes¹³. The benefits are assessed in terms of the impact on ecosystem services provided by the natural environment that benefit humans¹⁴. The following overarching categories of ecosystem services are used¹⁵:

- Provisioning services (such as provision of food);
- Regulating services (such as absorbing waste); and
- Cultural services (such as 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 services (such as cycling of nutrients and photosynthesis) are viewed as essentially being captured by the other benefits listed and so are not examined separately¹⁶. 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 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 techniques¹⁷ and is not analysed further here. However, this does not mean that intrinsic value is regarded as unimportant.

¹² A competent authority is a body which grants consents for regulated activities in the marine area, for example the Department of Energy and Climate Change (DECC) is the competent authority for wind farm, oil and gas licensing.

¹³ 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.

¹⁴ As described in Parliamentary Office of Science and Technology (2007).

¹⁵ These are the categories used in the in the MEA (<http://www.millenniumassessment.org>) which are also used in Defra's guidance on valuing ecosystem services Defra (2007). Identification of the services that fall under these categories draws on Beaumont *et al.* (2006); eftec (2006); and Frid (2008).

¹⁶ 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.

¹⁷ For example, in Millennium Ecosystem Assessments (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 European Commission for designation, in order to achieve the site's Conservation Objectives, Competent Authorities are required to assess the impacts on the reefs and their typical species of any activity they consent and possibly to review some existing consents or permissions. As the site has not yet been submitted, the likely effects on offshore industries operating at or 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 the potential environmental impacts of activities if the site was not designated. They are summarized in Table 4.1 below.

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 minimum management scenario is what would be likely to be needed to 'maintain' the reef feature in favourable condition.

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. This is an estimate of the measures that may be required for the site to achieve the conservation objective of 'restore' the reef feature to favourable condition, if and when more detailed information becomes available, current activities at the site are deemed to be affecting the reef feature.

Table 4.1 Summary of the potential minimum and maximum management scenarios that may be required for Wyville Thomson Ridge SAC.

"Minimum" scenario:	"Maximum" scenario
<p><u>Existing activities:</u> - Ban on mobile demersal fishing over reef.</p> <p><u>Proposed activities:</u> <i>Offshore industry plans or projects which might adversely affect the integrity of the offshore SAC will be subject to AA, and will be refused if there is a significant effect.</i></p> <p><i>Possibility of oil and gas if price makes it viable. 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 Option 1 to ensure no significant effects. Businesses are also likely to invest more in proposal assessment – assume assessment costs 10% more.</i></p>	<p><u>Existing activities:</u> - Ban on all forms of fishing (mobile <i>and</i> static/set gears) within SAC boundary.</p> <p><u>Proposed activities:</u> <i>Offshore industry plans or projects which might adversely affect the integrity of the offshore SAC will be subject to AA, and will be refused if there is a significant effect.</i></p> <p><i>Some adjustments to project proposals are made to minimise interference with features – e.g. prohibition of stabilising rocks on features, detours in pipelines to avoid features. Assume businesses invest 50% more in assessment.</i></p>

4.2 Costs to business

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 neither calculated below nor presented in the summary sheets.

In the Oil and Gas; Aggregates; Renewables; Cables; and Shipping sectors there are no activities present at the site and none is expected in future. Therefore, there are no expected costs as a result of site designation.

Fisheries

The best current estimate of the loss of profit to UK fisheries of enacting management scenarios was calculated using landings data extracted from the FAD database by MMO. Using the proportion of the ICES rectangle that overlaps with the SAC, fishing landings from within the SAC boundary were calculated and categorised according to fishing gear type. From this the net losses of profit from banning mobile demersal fishing and then all fishing (the minimum and maximum management scenarios respectively) within the site boundary were calculated and are shown below. It was deemed appropriately precautionary that where fishing gear type was not specified as either mid or bottom trawling that it be categorised as bottom trawling for the purposes of calculating profit loss under the two different scenarios. It was also assumed that fisheries measures through the CFP would take a minimum of one year to put in place. As such, 2011 was used to begin calculating costs of fishery management measures in order to not underestimate costs.

As shown in Table 4.2 below the direct effect of the maximum scenario may reduce this loss of net profit of £893k by some proportion. Under the minimum scenario, there is assumed to be a complete displacement of fishing using towed bottom gear, estimated to be £381k landings.

A 2005 survey¹⁸ on the profitability of fishing shows that the net profit ratio does not exceed around 30% for any segments of the industry with most segments having much lower ratios. This implies that the total net profit from fishing with these gears is up to £298k¹⁹. The direct effect of the maximum scenario may reduce this net profit of £298k by some proportion. There may also be wider effects as referred to above.

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

<i>“Minimum” scenario</i>	<i>Assumptions</i>	<i>Change in costs</i>
Ban of towed demersal fishing gear over reef feature (assumed to be the entire site)	Loss of profits from fishing activity (towed bottom gear only) displaced by designation (30% of £381k).	£0.127m
<i>“Maximum” scenario</i>	<i>Assumptions</i>	<i>Change in costs</i>
Ban of all fishing gear within site boundary	Loss of profits from fishing activity displaced by designation (30% of £893k).	£0.298m

The estimated cost to fisheries has fallen since the draft IA as with more detailed landings data, it has now been possible to separate out costs to users of specific gear types that will be affected differentially by theoretical management scenarios.

Wider implications

¹⁸ 2005 Economic Survey of the UK fishing fleet. Seafish Industry Authority.

¹⁹ This assumes some proportion of fixed costs as well as variable costs.

This IA is concerned only with the costs to UK vessels. 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. Vessels operating in this area will be larger than in the Stanton Banks area and may have technology that enables them to fish on the reef; this is borne out by VMS data which shows that the reef is fished. A ban over the reef would therefore have a significant effect. The effects of a ban on all forms of demersal fishing (mobile *and* static/set gears) within SAC boundary would be more significant.

All informants interviewed during the development of the IAs for these sites considered that many fishermen would find alternative areas to fish. Some thought that in general all fishermen would find somewhere else to fish and others thought that some would and others would not. One informant provided the view that given increasing regulation and restrictions on fishing in recent years, the first thought that would come to mind of many fishermen would be whether it would be possible to stop fishing. The same informant thought that fishermen would generally only be able to stop fishing if compensated for their vessels and other equipment.

Whether fishermen are able to fish at alternative sites will depend on a number of factors. A key factor will be the availability of suitable grounds. Whether sites are suitable will not only depend on fish stocks but also for example whether static nets could be deployed without disturbance from beam trawls. Another important factor is whether boats have the capacity to reach alternative grounds; smaller vessels may not have the capacity to go further out or to deeper 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. Going further out will mean 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. The Scottish Fishermen's Federation (SFF) states that closing Wyville Thomson Ridge would have the effect of displacing effort to smaller areas and increasing pressure there.

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 fishing activity is reduced there are likely to be indirect social and economic effects particularly on the local and regional economy where catch would have been landed. A recent study²⁰ estimates that an increase in demersal fishing revenue of £1m in Scotland generates an increase in output (direct and indirect) of £2.08m to the regional economy or £3.16m to the UK economy. 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 likely maximum level of direct costs. The profitability of fishing within the area is taken as a proxy for this. This is because in general it can be expected that for each vessel if costs increase, or income reduces such that fishing is no longer profitable, and the vessel can not respond by moving somewhere else, then they will not fish. This maximum will be reached if costs increased or income reduces such that fishing in the area was no longer profitable for any of the visits to the area. There is some evidence that fishermen continue to fish at unprofitable levels but as a general assumption it is

²⁰ *The economic impacts of the UK sea fishing and fish processing sectors: an Input-Output analysis*. The Seafish Industry Authority. March 2007.

reasonable to suggest that they will not. This estimate of profitability is informed by data from the Scottish Fisheries Protection Agency on potential activity within the area and from the 2005 survey²¹ on the profitability of fishing.

A further important issue is that any closures would have to be agreed with other Member States of the European Union through the Common Fisheries Policy for European waters, or by bilateral agreement with the Faroes in the case of parts of Wyville Thomson Ridge where UK and Faroes fishing areas overlap. It is assumed that this process may take three years to carry out and therefore that closures would not be in place until 2011.

Administration costs to business

As fishing is the only industry present in the region and administration costs to this sector are expected to be minimal, it can be assumed that there will be no significant increases in administration costs.

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 management measures. Experience of similar projects suggests that this may require 6 months of officer time plus related expenses. The estimated cost is a one-off £44.6k²².
- ii. *Requirements to assess the implications of any activity they consent.* It is difficult to predict how many proposals the authority will receive each year. This is an area of renewable energy potential, but there are unlikely to be developments within the next 10 years. 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.
- iii. *Monitoring and enforcement.* The Marine and Fisheries Agency (now the Marine Management Organisation, hereafter 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 £38.7k per annum²³. It is assumed that administration of records and other activities is carried out as part of existing duties.

This IA assumes that the costs of Government administration and 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 outcomes from designating the site.

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 'reef' 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 pSAC²⁴.

²¹ 2005 Economic Survey of the UK fishing fleet. Seafish Industry Authority.

²² 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).

²³ This is based on costings provided by the Marine Scotland – Sea Fisheries (pers comm., Mar 2010) of £10.1k per boat day, £1.4k for an hour of air surveillance at 2010 prices.

²⁴ JNCC (2009)

Provisioning services

Fish, shellfish and other crustaceans for human consumption

The region around Wyville Thomson Ridge is fished mainly for mackerel and hake with saithe, blue whiting, black scabbardfish, ling and anglerfish making up large quantities of the UK landings as discussed previously in section 2.3.

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 reefs 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 alternative 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.

Regulating services

Impacts on carbon sequestration and coastal protection are analysed in Table 3 below. It is concluded that they will not be impacted on significantly by the designation of the site. Other regulating services are not mentioned further here as their value is considered to be minimal at a site level²⁵.

Types of value

Option Values

Some people will gain from having the option to benefit in future from conservation of a good example of reef 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 reef habitat still available to conserve in future. Also, some will gain from knowing that it is conserved in case future information reveals that the reef habitat provides important benefits that we are not currently aware of (quasi-option value).

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 reef 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 Wyville Thomson Ridge for the provision of each of the ecosystem services described above is summarised in Table 3 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:

²⁵ De Groot RS, Wilson MA & Boumans RMJ (2002) A typology for the classification, description and valuation of ecosystem functions, goods and services. *Ecological economics* 41: 393-408.

- **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 4.3 Potential significance of ecosystem services improvements for Wyville Thomson Ridge 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>	Low/moderate. Some fishing but less than sites closer to coast.	Moderate. Interruption of lifecycle processes could mean that decline is significant	Nil. Improvement on site offset by corresponding decline as fishing is displaced. Alternatively risk measures will not be effective	Nil. Improvement on site offset by corresponding decline as fishing is displaced.	Moderate. Not higher value than other sites in region	Nil. An increase in fish stocks at the site is likely to be offset by declines elsewhere	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 so less affected by bottom trawling.					
<i>Carbon sequestration</i>	Minimal. The features are likely to have a low effect and small area	Minimal. Unlikely to affect biological pump.	Minimal. Unlikely to affect biological pump	Minimal. Unlikely to affect biological pump	Moderate. – CS is of high value but site plays minimal role	Minimal.	Moderate – biological pump not well understood
<i>Non-use value</i>	Moderate. Evidence that public has preferences for rare/unusual features and visually appealing features	Moderate. Some fisherman reported to avoid reef although this is not supported by VMS data.	Moderate. Improvement over option 1.	Moderate. Improvement over option 1.	Moderate. All UK population is relevant but relatively low value per capita	Moderate.	Moderate. No evidence on non-use values for specific features.
<i>Scientific research</i>	Moderate. Site has long and ongoing oceanographic data.	Moderate. Scientific interest may decline.	Moderate. Improvement over option 1.	Moderate. Improvement over option 1.	Low.	Moderate.	Mod/high
<i>Archaeology</i>	Nil.					Nil.	Mod/ high. Not on shipping path
Total value of changes in ecosystem services			Moderate for both scenarios				Moderate.

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 licences) 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).

4.3 Summary of costs and benefits

Table 4.6 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 4.4 Summary costs and benefits table for option 1: designate

	<i>Minimum Scenario</i>		<i>Maximum Scenario</i>	
	<i>Costs</i>	<i>Benefits</i>	<i>Costs</i>	<i>Benefits</i>
<i>Assessed</i>	Fisheries: direct costs max of £127k pa after 2011 Enforcement: £44.6k one-off and £38.7k pa	Moderate	Fisheries: direct costs max of £298k pa after 2011 Enforcement: £44.6k one-off and £38.7k pa	Moderate
<i>Total Annual</i>	£38.7k (+ £114k after 2011)	Moderate	£38.7k (+ £268k after 2011)	Moderate
<i>Total one-off</i>	£44.6k	0	£44.6k	0
<i>Total (PV)</i>	Max of £1.24m	Moderate	Max of £2.41m	Moderate
<i>Not assessed</i>	- Wider effects of any direct costs to fishing - Costs beyond next 10 years	- Role of feature in wider ecosystem - Intrinsic value of biodiversity improvements - Ecosystem recovery beyond next 10 years	- Wider effects of direct costs to fishing - Costs beyond next 10 years	- Role of feature in wider ecosystem - Intrinsic value of biodiversity improvements - Ecosystem recovery beyond next 10 years

Risk of unintended consequences

The main risks of unintended consequences are assessed to be:

- 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 renewable energy in the long term and hinder the delivery of UK targets on climate change. Although, EIAs would be required regardless of designation and there are no regulatory or statutory requirements for further work in the EIA if it were conducted in an SAC, in reality it would probably necessitate some.

Each of these risks is greater under the maximum scenario. These risks can be mitigated by involving stakeholders in the process of designation through public consultation.

4.4 Impact tests

Consideration has been given within the main body of this assessment to relevant and identifiable environmental impacts and effects on sustainable development of designating Wyville Thomson Ridge pSAC. The further tests specified by the IA guidance are considered here.

Competition assessment

This assessment, shown in Table 4.7 is restricted to the sector where significant potential costs are identified above, namely: fisheries. The Table analyses the impact of the maximum potential management measures that may be required (which represent the maximum impact on activities in the site). The maximum scenario is used to assess whether any significant impact is likely. A more detailed assessment of likely impacts should also take into account the minimum scenario. Cumulative impacts of designation of Natura 2000 sites in the marine environment could have more significant effects on competition in some sectors.

The designation of the site is not expected to have a significant impact on competition.

Table 4.5 Competition assessment

<i>Would the proposal:</i>	<i>Fisheries</i>	<i>Oil and gas</i>	<i>Aggregates</i>
<i>1. Directly limit the number or range of suppliers?</i>	No direct restrictions		
<i>2. Indirectly limit the number or range of suppliers?</i>	<p>The main tests of this are whether the policy is expected to:</p> <ul style="list-style-type: none"> - raise significantly the costs of new suppliers relative to existing suppliers, - raise significantly the costs of some existing suppliers relative to other existing suppliers, or - raise significantly the costs of entering, or exiting, the affected market. <p>In general this should not be the case although if some fishing gear types are considered more damaging than others management measures may impose restrictions on them raising their costs relative to other gear types.</p>		
<i>3. Limit the ability of suppliers to compete?</i>	No restrictions on factors on which suppliers can compete.		
<i>4. Reduce suppliers' incentives to compete vigorously?</i>	No reduction of incentive to compete.		

See: 'Completing competition assessments. Draft guideline for policymakers' Office of Fair Trading. Feb 2007.

Small firms impact test

Small and Medium Enterprises (SMEs) are considered for these purposes to be those with fewer than 250 employees. The industries potentially affected by the designation with a significant number of SMEs are: fishing and development of other renewable forms of energy.

In the fishing industry it is likely that the fishing vessels that may be impacted on by any additional management measures would be owned by SMEs and in most cases the company would not own more than one vessel.

The number of fishing vessels affected would depend on the actual management measures implemented. Small businesses could potentially be affected to the extent that some vessels fishing at

the site need to adapt to any additional fisheries management measures that are required, which may reduce profitability (see fisheries analysis in Section 4.2).

Legal aid

Legal aid is available to individuals with an annual income of less than £12k or with income of between £12k and £21k and disposable income of less than £3.3k where the case is an interest of justice case. It is considered very unlikely that the designation of sites will lead to increased use of legal aid.

Carbon assessment

The main purpose of a carbon assessment is to establish the impact of designating the site on greenhouse gas (GHG) emissions. The management measures required for the Natura 2000 site (Option 1) are unlikely to have a major impact on GHG emissions compared with management of the area if it is not designated. If fishing vessels have to travel longer distances to access fishing grounds this would increase emissions. However, the impacts of this are not expected to be significant as vessels already operate over a variety of fishing grounds reached with different, sometimes lengthy, steaming. The designation of the site may also have a strategic influence on adaptation to and mitigation of climate change and energy issues, as discussed in preceding sections.

Rural proofing

Some of the economic costs identified in relation to fisheries and other sectors may occur in remote coastal communities in predominantly rural areas of the UK. Due to the less diversified nature of their local economies, the potential impacts may be relatively more important as a proportion of economic activity in these locations.

Other impact tests

The effect of designating the site on health, disability, race, gender equality and human rights has been considered and are not thought to have an impact. Consequently, these tests are not examined here.

5 CONCLUSIONS

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

Two scenarios are presented under Option 1. 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 shown under Option 1 (for the 10 years of impact assessment framework):

- For the minimum management scenario there are costs associated with a loss of fishing revenue (£0.127m pa from 2011) and enforcement costs (£0.0446m one-off and £0.0376m pa). The total cost (PV) under the minimum management scenario over the ten year period is estimated to be £1.34m.
- Under the maximum management scenario there are costs associated with a loss of fishing revenue (£0.298m pa from 2011) and enforcement costs (£0.0446m one-off and £0.0376m pa). The total cost (PV) under the maximum management scenario over the ten year period is estimated to be £2.64m.

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 suite of marine Natura 2000 sites will prevent degradation of areas of the marine environment and enable restoration where damage has occurred. This 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, however, 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 benefits of this site in the context of the value of the network of sites.

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APPENDIX A: Summary of cost calculations

Fisheries							
Description			One-off Cost		Annual Cost		
Scenario	Cost Item	Type	Cost £k	Year Experienced	Cost £k	Year Commencing	Average
MINIMUM		Policy			127	2011	114.30
							-
							-
							-
							-
Total		Admin	0		0		-
		Policy	0		127		114.30
		Both	0		127		114.30

MAXIMUM	Reduced catch	Policy		2015	298	2011	268.20
							-
							-
							-
							-
Total		Admin	0		0		-
		Policy	0		298		268.20
		Both	0		298		268.20

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
	966.18	0.00	122.71	118.56	114.55	110.67	106.93	103.31	99.82	96.45	93.18
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	966.18	0.00	122.71	118.56	114.55	110.67	106.93	103.31	99.82	96.45	93.18
Both	966.18	0.00	122.71	118.56	114.55	110.67	106.93	103.31	99.82	96.45	93.18

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
	2267.09	0.00	287.92	278.19	268.78	259.69	250.91	242.42	234.23	226.30	218.65
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	2267.09	0.00	287.92	278.19	268.78	259.69	250.91	242.42	234.23	226.30	218.65
Both	2267.09	0.00	287.92	278.19	268.78	259.69	250.91	242.42	234.23	226.30	218.65

Enforcement							
Description			One-off Cost		Annual Cost		
Scenario	Cost Item	Type	Cost £k	Year Experienced	Cost £k	Year Commencing	Average
MINIMUM	Monitoring and enforcement Policy		44.6	2010	38.7	2010	38.70
			-				-
			-				-
			-				-
			-				-
Total		Admin	0		0.0		-
		Policy	44.6		38.7		38.70
		Both	44.6		38.7		38.70

MAXIMUM	Monitoring and enforcement Policy		44.6	2010	38.7	2010	38.70
			-				-
			-				-
			-				-
			-				-
Total		Admin	0		0		-
		Policy	44.6		38.7		38.70
		Both	44.6		38.7		38.70

		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	
	377.72	83.30	37.39	36.13	34.91	33.72	32.58	31.48	30.42	29.39	28.40	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	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	377.72	83.30	37.39	36.13	34.91	33.72	32.58	31.48	30.42	29.39	28.40	
Both	377.72	83.30	37.39	36.13	34.91	33.72	32.58	31.48	30.42	29.39	28.40	

Cost £k	Present Value	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	377.72	83.30	37.39	36.13	34.91	33.72	32.58	31.48	30.42	29.39	28.40
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	377.72	83.30	37.39	36.13	34.91	33.72	32.58	31.48	30.42	29.39	28.40
Both	377.72	83.30	37.39	36.13	34.91	33.72	32.58	31.48	30.42	29.39	28.40