



## **Offshore Special Area of Conservation: Wyville Thomson Ridge**

### **SAC Selection Assessment**



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**Version 6.0 (20 August 2010)**

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\* Cover photo illustrates boulders covered with yellow feather stars, brittle stars and anemones recorded on Wyville Thomson Ridge

## Introduction

This document provides detailed information about the Wyville Thomson Ridge site and evaluates its interest features according to the Habitats Directive selection criteria and guiding principles.

The advice contained within this document is produced to fulfil requirements of JNCC under Part 2 of the Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007, as amended in the Offshore Marine Conservation (Natural Habitats, & c) (Amendment) Regulations 2010, relating to the conservation of natural habitat types and habitats of species through identification of Special Areas of Conservation (SACs) in UK offshore waters. Under these Regulations, JNCC has an obligation to provide certain advice to Defra to enable the Secretary of State to fulfil his obligations under the Regulations, and to Competent Authorities to enable them to fulfil their obligations under the Regulations.

This document includes information required under Regulation 7 of the Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007 (as amended in 2010), to enable the Secretary of State to transmit to the European Commission the list of sites eligible for designation as Special Areas of Conservation (SACs). JNCC have been asked by Defra to provide this information to Government.

Sites eligible for designation as offshore marine SACs are selected on the basis of the criteria set out in Annex III (Stage 1) to the Habitats Directive and relevant scientific information. Sites are considered only if they host a Habitats Directive Annex I habitat or Annex II species. Moreover, sites for Annex II species must contain a clearly identifiable area representing physical and biological factors essential to these species' life and reproduction to be eligible. Socio-economic factors are not taken into account in the identification of sites to be proposed to the European Commission<sup>1</sup>.

In addition to information on the Annex I habitats and/or Annex II species hosted within the site, this document contains i) a chart of the site, ii) its name, location and extent, and iii) the data resulting from application of the criteria specified in Annex III (Stage 1) to the Habitats Directive. This is in line with legal requirements outlined under Regulation 7. JNCC has adhered to the format established by the Commission for providing site information. This format is set out in the 'Natura 2000 Standard data form' (CEC, 1995) (prepared by the European Topic Centre for Biodiversity and Nature Conservation on behalf of the European Commission to collect standardised information on SACs throughout Europe).

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<sup>1</sup> Following European Court of Justice 'First Corporate Shipping' judgement [C-371/98](#) (7 November 2000)

## Document version control

Version and date	Amendments made	Issued to and date
WyvilleThomsonRidge_SelectionAssessment_V6_0.doc (20 August 2010)	- Site changed to candidate SAC throughout the document	Submission to Europe (20 August 2010)
WyvilleThomsonRidge_SelectionAssessment_V5_0.doc (2 June 2010)	- New map of Special Area inserted (Figure 1)	
WyvilleThomsonRidge_SelectionAssessment_4.0.doc (1 July 2008)	- New site map inserted (boundary unchanged)	Secretary of State (July 2008)
WyvilleThomsonRidge_SelectionAssessment_3.1.doc (13 November 2007)	- Draft SAC changed to possible SAC	Public consultation (December 2007)
WyvilleThomsonRidge_SelectionAssessment_3.0.doc (5 September 2007)	<ul style="list-style-type: none"> <li>- Updated text, map, area figure and supporting information and extended site boundary to incorporate results of DTI/Defra funded surveys in Autumn 2006</li> <li>- Reference to corrected boundary of Rockall Trough and Bank Regional Sea</li> <li>- Additional guiding principles for site selection incorporated under Global Assessment (where relevant)</li> <li>- Conservation Objectives and Advice on Operations moved to separate document</li> <li>-</li> </ul>	UK Marine Biodiversity Policy Steering Group (September 07) and JNCC Committee (December 07)
WyvilleThomsonRidge Dossier_2.0_Draft.doc (26 August 2006)	<ul style="list-style-type: none"> <li>- Draft Conservation Objectives and (revised) Advice on Operations added.</li> <li>- Map layout revised</li> </ul>	Defra, Devolved Administrations, and other Government departments (25 September 2006)
WTR_ProformaFor SubmissionToJNCC.doc (15 December 2004)		Defra (15 December 2004)
Wyville Thomson Ridge Proforma: JNCC 04 P23 (December 2004)		JNCC Committee (December 2004)

## Further information

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

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## Wyville Thomson Ridge: SAC Selection Assessment

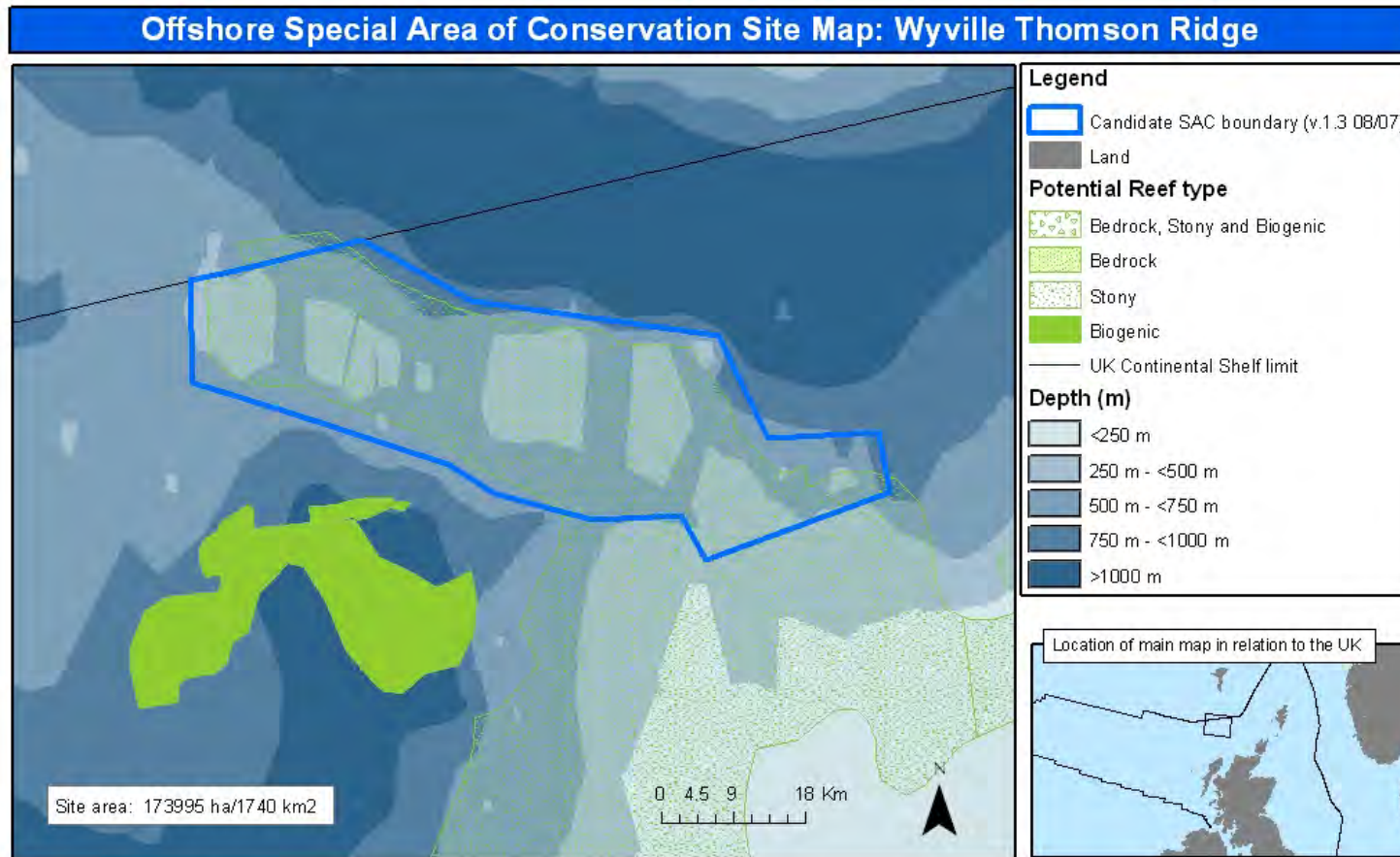
<b>1 Site name</b> Wyville Thomson Ridge	<b>2 Site centre location</b> 59°58'25", -6°-42'-54" (Datum: WGS 1984)
<b>3 Site surface area</b> 173,995 ha/1,740 km <sup>2</sup> (Datum: WGS 1984 UTM Zone 29 North, calculated in ArcGIS)	<b>4 Biogeographic region</b> Atlantic

### 5 Interest feature(s) under the EU Habitats Directive

1170 Reefs

1349 Bottlenose Dolphin (*Tursiops truncatus*) (non-qualifying)

## 6 Map of site



Boundary coordinates:

1) 60°1'60", -6°16'0" 2) 59°55'0", -6°10'0" 3) 59°55'0", -5°55'0" 4) 59°51'0", -5°54'0" 5) 59°46'60", -6°19'0" 6) 59°49'60", -6°22'0" 7) 59°49'60", -6°34'0" 8) 59°52'0", -6°46'60" 9) 59°54'0", -6°53'0" 10) 60°0'0", -7°26'60" 11) 60°6'53", -7°27'5" 12) 60°9'18", -7°3'43" 13) 60°4'60", -6°49'0"

Site boundary follows UKCS as provided by UK Hydrographic Office (2007).

Site map projected in UTM (Zone 29N, WGS84 datum). Seabed habitat derived from BGS 1:250,000 seabed sediment maps © NERC and SeaZone bathymetry. Bathymetry © British Crown and SeaZone Solutions Limited. All rights reserved. Products Licence No. PGA042006.003. This product has been derived in part from material obtained from the UK Hydrographic Office with the permission of the Controller of Her Majesty's Stationery Office and UK Hydrographic Office ([www.ukho.gov.uk](http://www.ukho.gov.uk)). NOT TO BE USED FOR NAVIGATION. The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown Copyright). World Vector Shoreline © US Defense Mapping Agency. Map copyright JNCC 2008.

## 7 Site summary

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 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.

Wyville Thomson Ridge is located on the Scottish continental shelf edge approximately 150km north west of Cape Wrath; it extends in a north westerly direction towards the Faeroe Bank. The Ridge divides the relatively warm water of the Rockall Trough from the cold water of the Faroe-Shetland Channel, and is a transitional area between the two water masses. The site is situated within two Regional seas: the Scottish Continental Shelf Regional Sea and the Faroe-Shetland Channel Regional Sea (JNCC, 2004a; Defra, 2004).

SACs within the Scottish Continental Shelf Regional Sea (JNCC, 2004a; Defra, 2004) for which Reef is a qualifying interest feature are shown below with their characteristic features:

SAC	Notable characteristics of Reef interest feature (JNCC, 2007)
Sanday	Intertidal and subtidal bedrock reefs of low topographic complexity and moderate energy levels. The reefs are in full salinity waters, and are subject to strong coastal influence (SNH pers. comm. 2007). Dense forests of kelp <i>Laminaria</i> spp (to 20m depth) provide a habitat for species-rich, red algal turf communities. Sponges (e.g. <i>Clathrina coriacea</i> ) and ascidians (e.g. <i>Aplidium punctum</i> ) occur on the vertical rock faces. The tide-swept north coast supports a rich fauna of dense bryozoan/hydroid turf and dense brittlestar and horse mussel <i>Modiolus modiolus</i> beds in mixed sediment below the kelp zone.
St Kilda	Extremely wave-exposed bedrock reefs composed of hard, igneous rock, forming steep and vertical faces. These topographically complex reefs extend to depths of 50 m (encompassing the intertidal, infralittoral and circalittoral) and are subject to minimal coastal influence. Dense kelp forests may occur as deep as 35 m due to water clarity. The full salinity circalittoral reefs are dominated by diverse communities of anemones, sponges and soft corals, with different species of sponge, hydroid and bryozoan occurring in surge gullies and caves.

Papa Stour	Very exposed bedrock and boulder reefs (intertidal, infralittoral and circalittoral) reaching depths of more than 30 m. The reefs are in full salinity waters, and are subject to moderate coastal influence (SNH pers. comm. 2007). The underwater terrain is rugged and complex. Extensive kelp forests extend to depths of up to 28 m. Circalittoral communities are dominated by the soft coral <i>Alcyonium digitatum</i> , the featherstar <i>Antedon bifida</i> , encrusting coralline algae and the serpulid worm <i>Pomatoceros</i> , with turfs of the jewel anemone <i>Corynactis viridis</i> , ascidians and bryozoans. Scour-tolerant organisms such as the hydroid <i>Abietinaria abietina</i> and the brittlestar <i>Ophiocomina nigra</i> are also present.
North Rona	A variety of littoral reef habitats extending from the intertidal to the deep circalittoral (> 50 m). The hard bedrock reefs are of low and medium topographic complexity and support rich marine communities characteristic of very exposed, conditions (sponges, anemones, soft corals and ascidians) (SNH, 2006). Kelp forests extend as deep as 35m. The reef is subject to full salinity and has moderate coastal influences upon it (SNH pers. comm. 2007). The influence of the North Atlantic Drift is apparent in the presence of many southern species, but colder sub-arctic water accounts for the northern elements of the fauna and flora (SNH, 2006).

One additional offshore site has been recommended to Defra by JNCC for its reef feature in the Scottish continental shelf Regional Sea. This site is shown below with its characteristic features.

<b>Candidate SAC</b>	<b>Notable characteristics of Reef interest feature (Service &amp; Mitchell, 2004)</b>
Stanton Banks	Stanton Banks are a series of granite rises which outcrop from the seafloor south of the Outer Hebrides. They are deeply fissured and fringed at their edges with boulders and cobbles. The tops of the banks are smooth and characteristically colonised by encrusting red algae and small encrusting sponges. On the slopes, where the rock is less smooth, featherstars, dead mans fingers and hydroids colonise the surface abundantly.

The Wyville Thomson Ridge is very different in character to the above sites due to its topographic type (representative of iceberg ploughmarks, which are a regional variant of stony reefs), its position on the edge of the continental shelf, its depth, hydrographic influences and, consequently, the fauna it supports.

There are no SACs within the Faroe-Shetland Channel Regional Sea.

Although the Wyville Thomson Ridge SAC does not extend into the Rockall Trough and Bank Regional Sea, its proximity to the Regional Sea boundary justifies a comparison with SACs in this adjacent biogeographic region. While there are currently no SACs within the Rockall Trough and Bank Regional Sea, one site has been recommended to Defra by JNCC for Annex I reef in this region and is shown below with its characteristic features.



Candidate SAC	Notable characteristics of the Reef interest feature (Bett, 2001; Masson <i>et al</i> 2003)
The Darwin Mounds	Cold water coral reefs composed principally of the scleractinian coral <i>Lophelia pertusa</i> growing on (hundreds of) cone-shaped sandy mounds at a depth of approximately 1000m. The site covers an area of around 100 km <sup>2</sup> . There are two main 'dense' fields referred to as Darwin Mounds East and Darwin Mounds West. The corals provide a habitat for various species of larger invertebrates such as sponges and brisingiids. The mounds support significant populations of the xenophyophore <i>Syringammina fragilissima</i> .

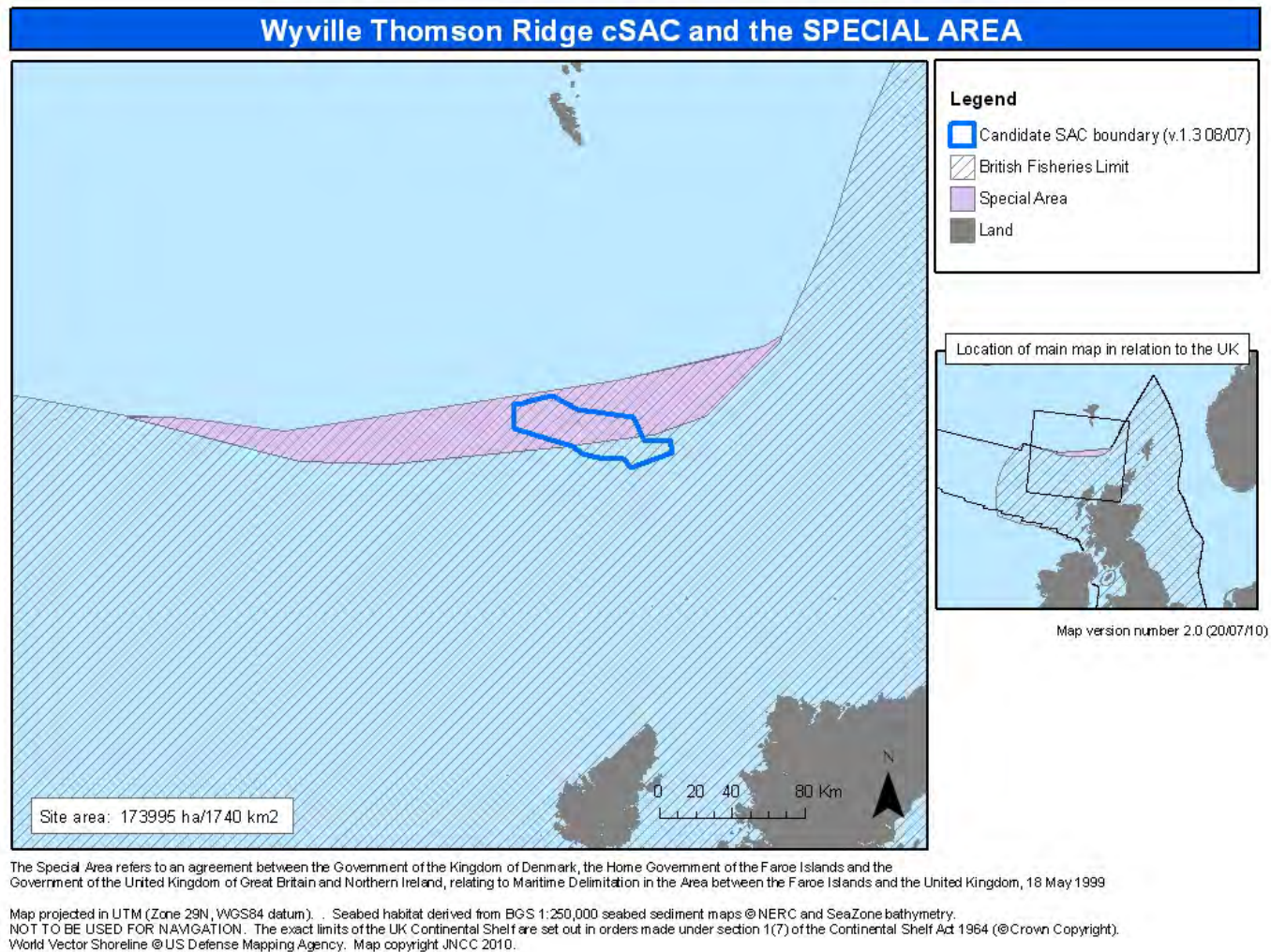
The Wyville Thomson Ridge reef feature is very close to, but differs substantially from the reef present at the Darwin Mounds: it consists of iceberg ploughmarks (stony reef) and bedrock reef, and supports a distinct ecological community due to both its unique hydrographic regime and substratum. Although hard corals occur at both sites, they grow on rock and boulders and do not form distinct biogenic reef structures at Wyville Thomson, whereas they do form biogenic reef structures growing on sandy mounds at the Darwin Mounds.

## 8 Site boundary

The proposed boundary for the Wyville Thomson Ridge site has been defined using JNCC's boundary definition guidelines. These were agreed by the Joint Nature Conservation Committee and modified subsequent to public consultation in 2003 (JNCC, 2004b). As such, the proposed boundary is a simple polygon defined by whole degrees and minutes, fully enclosing the minimum area necessary to ensure protection and following the existing UK Continental shelf limit where appropriate. The habitat feature is drawn from interpolated data from British Geological Survey (Graham *et al* 2001) and interpreted sidescan collected as part of the DTI's oil and gas Strategic Environmental Assessment (SEA) of UK waters in 1999 and 2000. The presence of reef was confirmed by camera tows at a number of stations across the ridge in 1999, 2000 and 2006. Bottom trawling is a threat to the reef and, therefore, the proposed boundary includes a margin to allow for mobile gear on the seabed being at some distance from the location of a vessel at the sea surface. The maximum depth of water around the feature is 850 m, therefore assuming a ratio of 2:1 fishing warp length to depth, the proposed boundary is defined to include a margin of 1700 m from the reef feature.

Note the Special Area shown in Figure 1 overleaf. The Special Area is an agreement made in 1999 between the Government of the Kingdom of Denmark together with the Home Government of the Faroe Islands and the Government of the United Kingdom of Great Britain and Northern Ireland relating to Maritime Delimitation in the Area between the Faroe Islands and the United Kingdom. The Wyville Thomson Ridge site partly overlaps with this Special Area.

Note that the boundary proposed is for the SAC. Any future management measures which may be required under the Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007 will be determined by Competent Authorities in consultation with JNCC, and may have different boundaries to the SAC site boundary.



**Figure 1.** Showing the *Special Area* agreed the Government of the Kingdom of Denmark, the Home Government of the Faroe Islands and the Government of the United Kingdom of Great Britain and Northern Ireland.

## 9 Assessment of interest feature(s) against selection criteria

### 9.1 Reefs

#### Annex III selection criteria (Stage 1A):

##### a) *Representativity*

The Wyville Thomson Ridge site straddles the boundaries of two Regional Seas: the Scottish Continental Shelf and the Faroe-Shetland Channel Regional Seas. This site represents full salinity stony and bedrock reef, subject to moderate/high energy levels and minimal coastal influence. The Ridge is periodically exposed to hydrodynamic conditions associated with the Faroe-Shetland Channel (Borenäs *et al* 2001) and this has led to the development of a unique reef habitat, with species composition varying either side of the ridge (Kerry Howell *et al* 2007). This deep circalittoral reef also represents an excellent example of iceberg ploughmark topography, consisting of ridges of boulders and cobbles formed in otherwise sedimentary areas. The Wyville Thomson Ridge has not been subject to the same degree of sediment infill as some iceberg ploughmark areas on the Scottish continental platform, probably due to its greater distance from terrestrial sources of sediment (Masson, *et al* 2000). The iceberg ploughmarks support diverse biological communities representative of hard substratum in deep water, including a diverse range of sponges; stylasterid, cup and soft corals; brachiopods; cyclostome bryozoans; dense beds of featherstars and brittlestars; sea urchins and sea cucumbers (Masson *et al* 2000; Henry & Roberts, 2004; Howell *et al* 2007; and Brian Bett, pers. comm., 2004). In many cases, particular species present cannot be named since they have not been fully classified. The Representativity grade for the feature is A as it contains well preserved examples of bedrock reef and stony reef formed by iceberg ploughmarks.

##### b) *Area of habitat*

The reef feature is approximately 136,196 hectares in area (flat mapped extent) (Graham *et al* 2001; Howell *et al* 2007), although it should be noted that iceberg ploughmarks are a mosaic habitat consisting of boulders and cobbles in the ridges and granules and sand in the troughs. An estimate of the entire Annex I reef resource (bedrock, cobble and biogenic reef) in UK waters is 5,723,600 hectares (UK Favourable Conservation Status Reporting 2007). This total extent figure gives the following thresholds for the grades of this criterion (CEC, 1995):

- A – extents between 5,723,600 and 858,540 ha (15-100% of total resource)
- B – extents between 858,540 and 114,472 ha (2-15% of total resource)
- C – extents less than 114,472 ha (0-2% of total resource)

This site's feature therefore falls within the '2-15%' bracket for Area of Habitat and is graded B.

##### c) *Conservation of structure and functions*

###### *Degree of conservation of structure*

The biological and physical structure of the habitats on Wyville Thomson Ridge have been affected by mobile demersal fishing, as indicated by Vessel Monitoring System (VMS) data from 2005-2007 provided by the Scottish Fishermen's Federation (2008) and CNPMM

(2008) and onsite observations of habitat scarring from bottom trawling. However, the physical structure of the reef is largely intact to the best of our knowledge. The grading for this sub-criterion is therefore II: structure well conserved.

*Degree of conservation of functions*

The prospects of this feature to maintain its structure in the future, taking into account unfavourable influences and reasonable conservation effort, are good. A mechanism is available through the European Commission’s Common Fisheries Policy regulations to modify fishing activity in the area if this is deemed to be necessary. In addition, regulations are in place to regulate oil and gas activity in and around SACs in the UK Continental Shelf Designated Area, should hydrocarbon exploration/exploitation occur in this area. The laying of submarine cables and pipelines also requires regulatory consent. The ridge is distant from terrestrial sources of pollution. The grading is II: good prospects.

*Restoration possibilities*

Restoration of the biological communities on the Wyville Thomson Ridge would be possible accepting that restoration methods in the offshore area focus on the removal of impacts which should allow recovery where the habitat has not been removed. However, in circumstances where activities destroy the characteristic ploughmark structure of the stony reef and bury the coarse material in finer sediments, recovery would be impossible as ploughmarks are formed through geological and oceanographic processes. The grading is III: restoration difficult or impossible.

*Overall grade*

Due to the first sub-criterion of this criterion being graded II: structure well conserved, and second sub-criterion also being graded II, the overall grading is B: good conservation, regardless of the third sub-criterion.

**d) Global assessment**

The suggested grades for Stage 1A criteria a)-c) are A, B and B respectively. Given these, and that the hydrodynamic regime over the reef is unique in UK waters, the grade for Global Assessment is A (‘excellent conservation value’).

**Summary of scores for Stage 1a criteria**

<b>Area of habitat</b>	<b>Representativity (a)</b>	<b>Relative surface (b)</b>	<b>Structure and function (c)</b>	<b>Global assessment (d)</b>
Wyville Thomson Ridge	A	B	B	A

## 9.2 Bottlenose Dolphin (*Tursiops truncatus*)

### Assessment criteria and additional principles used for site selection:

#### 9.2.1 Proportion of UK population

Data collected since 1997 confirm that bottlenose dolphins may occur seasonally in deep water along the Wyville Thomson Ridge (Pollock *et al* 2000). However, given that survey effort in this remote location has been relatively low, especially at the time of year when bottlenose dolphins appear to be certainly present in the general area (autumn/winter), it is recommended that the species be listed as a non-significant presence for the proposed Wyville Thomson Ridge SAC (Grade D). As such, no other indication is required for the additional evaluation criteria concerning this species within the site.

## 10 Sites to which this site is related

None.

## 11 Supporting scientific documentation

Southampton Oceanography Centre undertook surveys in 1999 and 2000 for the DTI, and obtained samples across the breadth of the ridge to characterise the seabed geology, geomorphology and fauna. Sampling included sidescan sonar for the full extent of the ridge as well as 13 video tows and approximately 20 grab samples analysed for sediments and infauna. Sidescan sonar confirmed the clear expression of iceberg ploughmarks across the majority of the ridge with two distinct areas where bottom current activity has removed the ploughmarks but the seabed is still characterised by a cover of cobbles and gravels with some areas of sand (Masson *et al* 2000). Data from the 2000 survey remains unpublished [but photographs from the video tows have been provided to the JNCC by the National Oceanographic Centre (formerly Southampton Oceanography Centre)].

The Wyville Thomson Ridge was also surveyed in 2006 as part of a collaborative survey programme between the Department of Trade and Industry (DTI) and the Department of Food and Rural Affairs (Defra). An area of approximately 930km<sup>2</sup> on the southern end of the ridge was surveyed using multibeam, and features were identified for groundtruthing by means of a photographic seabed survey (video and stills camera). A total of fifteen successful video tows were obtained and fully analysed, and 207 of the still images taken were also quantitatively analysed (Howell *et al* 2007). Data acquired through survey of the Wyville Thomson Ridge area is summarised in Figure 2.

## 12 Site overview and conservation interest

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*

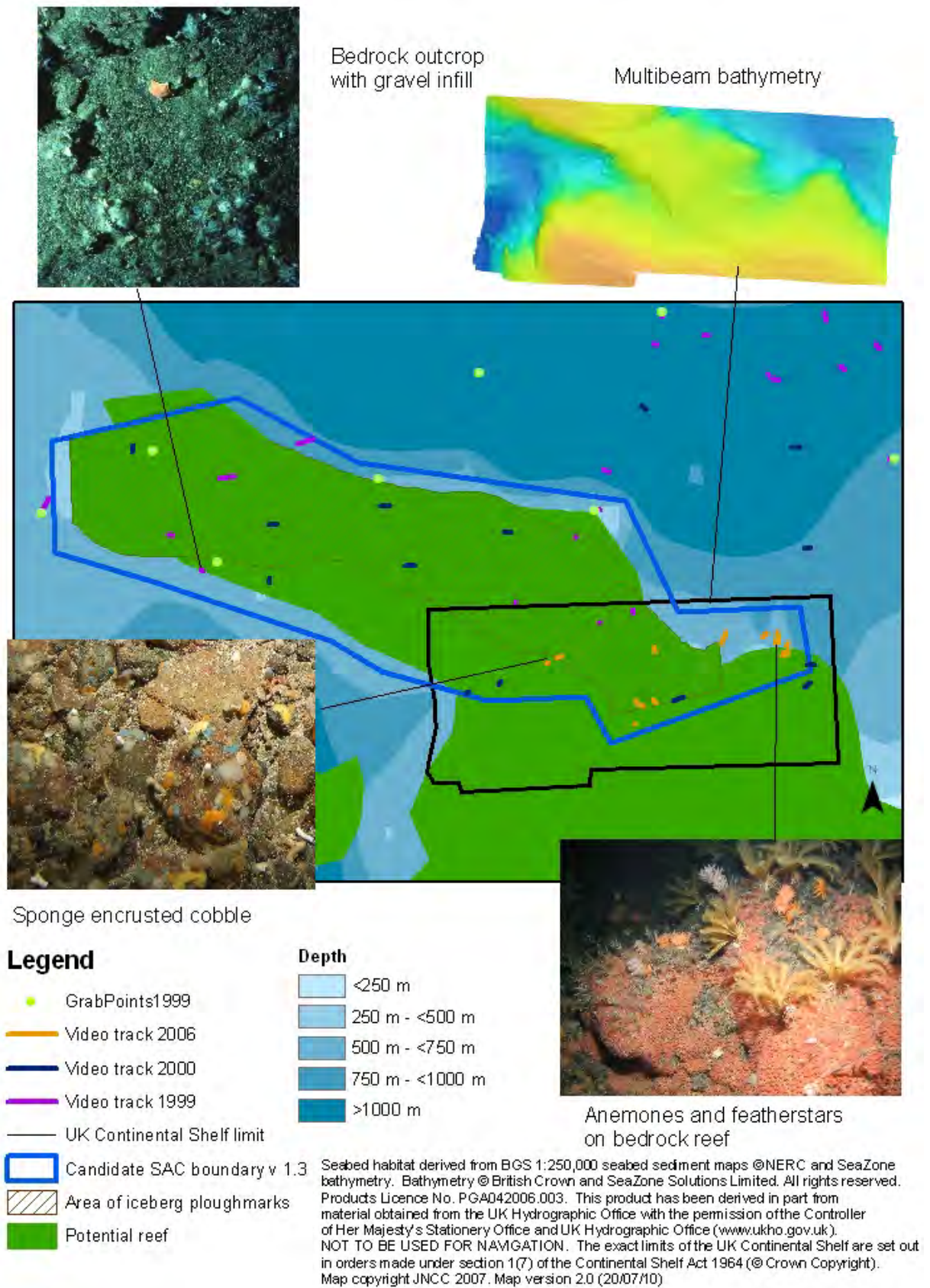
*monstrosa*), bluemouth (*Helicolenus*) and ling (*Molva* sp.) (Howell *et al* 2007 and Masson *et al* 2000). Approximately 10-15 km south east of the UK Continental Shelf limit, the iceberg ploughmarks are strongly expressed and in some places rock outcrops. Encrusting fauna in this location is more 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.** Data on and around the Wyville Thomson Ridge

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