



**Offshore Special Area of Conservation:  
North West Rockall Bank**

**SAC Selection Assessment**



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Version 5.0 (20 August 2010)

\* Cover photo illustrates *Lophelia pertusa* reef patches at the North West Rockall Bank SAC

## Introduction

This document provides detailed information about the North West Rockall Bank 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), 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), 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.

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).

## Document version control

Version and issue date	Amendments made	Issued to and date
NorthWestRockallBank_SelectionAssessment_5_0.doc (20 August 2010)	Site changed to a candidate SAC throughout documentation	Submission to Europe (20 August 2010)
NorthWestRockallBank_SelectionAssessment_4.0.doc (21 June 2010)	Document updated following formal consultation	Secretary of State (Defra) 22 June 2010
NorthWestRockallBank_SelectionAssessment_3.0.doc (23 November 2009)	Site changed to a possible SAC throughout documentation	Formal Consultation Nov09-Feb2010
North West RockallBank_SelectionAssessment_2.1.doc (14 November 2008)	New site map. Update on ICES advice.	UKMBPSG and UK MPA Policy Group, 14 Nov 2008
North West RockallBank_SelectionAssessment_2.0.doc (20 February 2008)	Comments from SNH incorporated	JNCC Committee (March 2008) UK Marine Biodiversity Steering Group 18 June 2008
North West RockallBank_SelectionAssessment_1.2.doc (21 January 2008)	Maps amended Two Appendices added	Internal JNCC
North West RockallBank_SelectionAssessment_1.1.doc (21 September 2007)	Comments from Country Agencies Chief Scientists Group incorporated	JNCC Committee (December 2007)
MN2KPG16_3_NWRockallSAC Selection	None (equivalent to version 1.0)	16 <sup>th</sup> Marine Natura Project Group meeting (13/09/07)
North West RockallBank_SelectionAssessment_1.0.doc (13 September 2007)		Country Agencies Chief Scientists Group

## 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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## North West Rockall Bank: SAC Selection Assessment

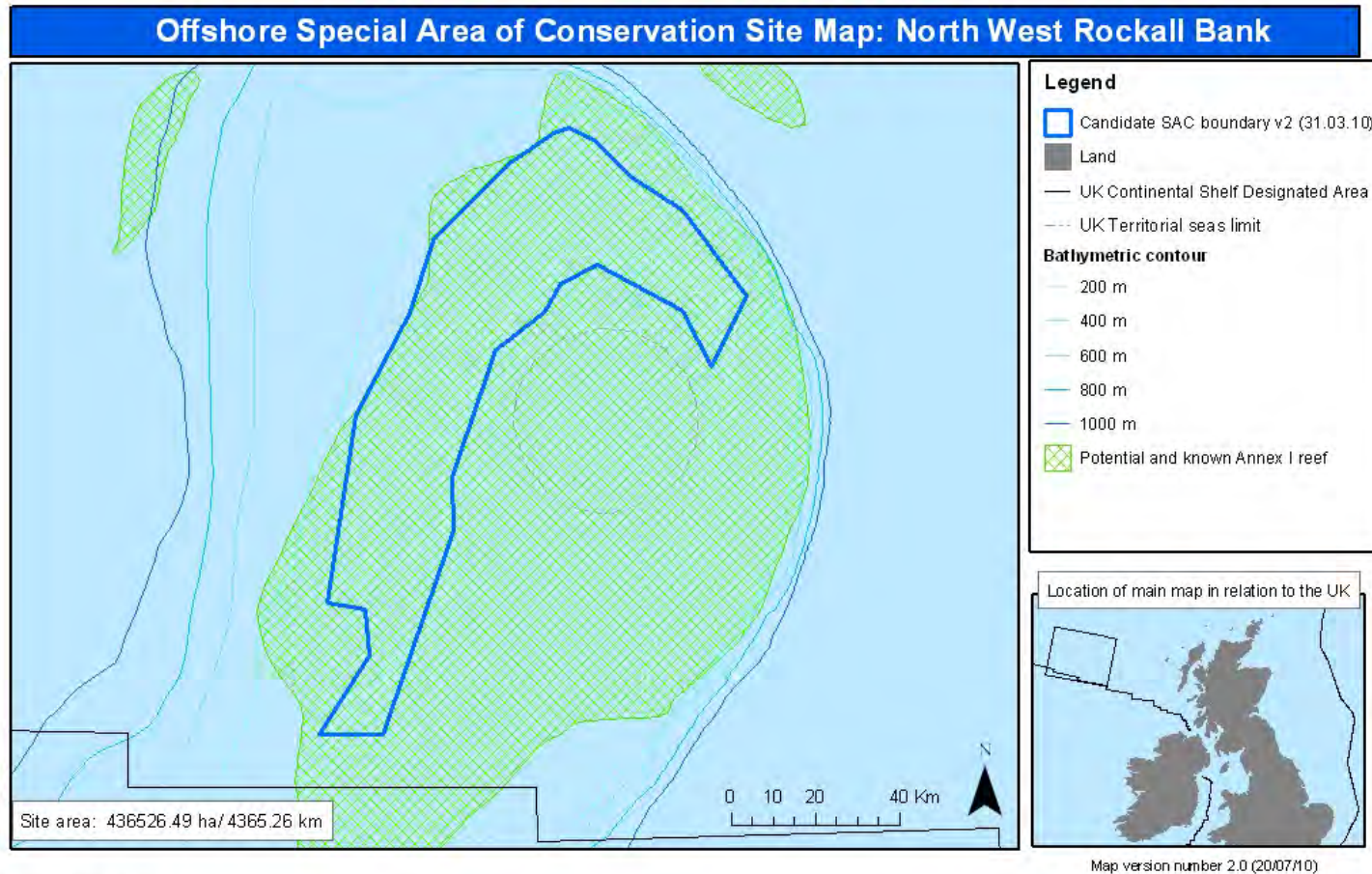
<b>1 Site name</b> North West Rockall Bank	<b>2 Site centre location</b> 57°42'35", -14°10' 4" (Datum: WGS 1984)
<b>3 Site surface area</b> 436,526 ha/ 4,365 km <sup>2</sup> (Datum: WGS 1984 UTM Zone 28 North, calculated in ArcGIS)	<b>4 Biogeographic region</b> Atlantic

### 5 Interest features under the EU Habitats Directive

1170 Reefs

1351 Harbour porpoise (*Phocoena phocoena*) (non-qualifying)

## 6 Map of site



**Boundary coordinates:**

1) -13° 23' 9", 57° 49' 49" 2) -13° 43' 26", 57° 56' 6" 3) -13° 52' 28", 57° 53' 37" 4) -13° 56' 23", 57° 50' 5" 5) -14° 8' 24", 57° 45' 18" 6) -14° 19' 0", 57° 29' 0" 7) -14° 19' 0", 57° 22' 0" 8) -14° 36' 0", 56° 56' 0"  
 9) -14° 51' 0", 56° 56' 0" 10) -14° 39' 0", 57° 6' 0" 11) -14° 40' 0", 57° 12' 0" 12) -14° 49' 10", 57° 12' 55" 13) -14° 42' 0", 57° 37' 0" 14) -14° 28' 44", 57° 50' 15" 15) -14° 23' 11", 57° 59' 35" 16) -14° 3' 49", 58° 9' 30"  
 17) -13° 53' 18", 58° 13' 6" 18) -13° 49' 41", 58° 13' 43" 19) -13° 43' 52", 58° 12' 14" 20) -13° 34' 29", 58° 7' 12" 21) -13° 22' 26", 58° 2' 49" 22) -13° 7' 30", 57° 51' 36" 23) -13° 16' 29", 57° 42' 34"

Site map projected in WGS 84 (Zone 28N). Seabed habitat data derived from BGS 1:250,000 seabed sediment maps ©NERC and SeaZone bathymetry ©British Crown and SeaZone Solutions Limited. All rights reserved. Products Licence No. P/GA042006.003. 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. GEBCO bathymetry © NERC 1994, 1997. Map copyright JNCC 2010.

## 7 Site summary

Rockall Bank is an offshore bank situated in the North East Atlantic, approximately 400 kilometres west of the Outer Hebrides. It is oriented northeast to southwest, and is approximately 450 kilometres in length and 200 kilometres wide (Howell *et al* 2009). Depth ranges from over 1000m at the base of the Rockall Bank, to 200m across much of the top. The centre of the bank breaks the surface forming a rocky island outcrop around 25 metres wide and 20 metres high. On account of their sheer size, oceanic banks such as Rockall cause the deviation of ocean currents along their flanks. This facilitates the colonization of habitat-forming corals which depend on a consistent supply of current-transported organic matter and zooplankton (Freiwald *et al* 2004). Rockall Bank is potentially one of the most extensive sites for biogenic reef formed by cold water coral species in UK waters.

The North West area of the Rockall Bank is covered in a layer of fine sediment, gravel, cobbles and boulders of glacial origin, some of which is shaped into characteristic 'ploughmark' formations by icebergs during the last ice age. These iceberg ploughmarks are a variant of Annex I stony reef and consist of lines of cobbles and boulders with a sediment-filled furrow between (Howell *et al* 2009). The associated biological communities are dependent on this mixed sediment and stony substratum, rather than on the underlying bedrock. Notable species include sessile fauna such as the erect bryozoan *Reteporella* sp., the solitary coral *Caryophyllia* sp, serpulid worms and many types of sponge including globose, tubular, cup and encrusting varieties. Squat lobsters (*Munida rugosa*), sea cucumbers (*Stichopus tremulus*) and the bluemouth red fish (*Helicolenus dactylopterus*) are also present (Howell *et al* 2009).

Inter-dispersed with the stony reef are sizeable patches of Annex I *Lophelia pertusa* reef and associated species, including erect sponges and the pencil urchin *Cidaris cidaris*. Stands of *Madrepora oculata*, another cold water coral species, are also present (Howell *et al* 2009). Evidence from the 1970s suggests that areas of *Lophelia pertusa* reef up to 30m in diameter existed on the North West Rockall Bank (Wilson, 1979; Davies and Roberts, 2006), though more recent surveys (albeit at different locations in this region) have recorded reefs smaller in size (Howell *et al* 2009). Cobble rubble surrounds the living reefs in many places, and supports fauna such as the squat lobster *Munida rugosa*, the holothurian *Stichopus tremulus*, brittle stars and encrusting yellow sponges.

The North West Rockall Bank SAC occurs within the Rockall Trough and Bank Regional Sea (JNCC, 2004a; Defra, 2004). Within this Regional Sea, one area (Darwin Mounds) has been recommended to Government as a SAC for Annex I reef, and is shown below with its characteristic features.

<b>Candidate SAC (cSAC)</b>	<b>Notable characteristics of the Reef interest feature</b> (Southampton Oceanography Centre, 2000; Bett, 2001; Masson <i>et al</i> 2003)
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> .

Lophelia pertusa reefs occur at both the Darwin Mounds and the North West Rockall Bank site; however, the cold water reefs at the Darwin Mounds have developed on a distinctive sandy mound substratum, the structure of which is thought to be unique globally. The size of Rockall Bank also means that it is subject to distinct oceanographic currents. Finally, the North West Rockall Bank site contains areas of stony reef which support different biological communities to those found at the Darwin Mounds site.

Two further areas within the Rockall Trough and Bank Regional Sea are under consideration by JNCC for recommendation as SACs for similar reef subtypes to those found at NW Rockall Bank; East Rockall Bank Area of Search and Anton Dohrn Seamount Area of Search. These are shown below with their characteristic features.

<b>Areas of Search for offshore SACs</b>	<b>Notable characteristics of the Reef interest feature</b>
East Rockall Bank	Historic survey (including more recent survey in July 2009) has recorded bedrock and biogenic reef habitat. This data is currently being interpreted and assessed against site selection criteria (discussed further below table)
Anton Dohrn Seamount	Seamounts are one of the subtidal topographic features included within the Annex I reefs definition. Survey has been undertaken in July 2009, and recorded bedrock and biogenic reef communities. This data is currently being interpreted and assessed against site selection criteria.

Outside the cSAC boundary proposed in this document, Rockall Bank is also known to support biogenic, bedrock and stony reef subtypes on its eastern side. Further survey work of East Rockall Bank Area of Search has been undertaken to determine the extent of such reef, and whether these areas of potential reef adjoin or are separate to the NW Rockall Bank cSAC area. Once this data has been processed and interpreted (anticipated in 2010), JNCC will consider whether to recommend an extension to this NW Rockall Bank cSAC boundary, or an additional SAC for the eastern part of Rockall Bank.

Within adjacent regional seas, Stanton Banks (within the Scottish Continental Shelf Regional Sea) (JNCC, 2004a; Defra, 2004) has been recommended to Government as an SAC for Annex I bedrock and stony reef, and was submitted to the European Commission on [31st August 2008](#). It is shown below with its characteristic features.

<b>Candidate SAC (cSAC)</b>	<b>Notable characteristics of the Reef interest feature (Stewart &amp; Long, 2006; 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. Although rounded by glacial action, they remain deeply fissured and extremely rugged. The inter-connecting gullies are filled with rippled coarse shell sand. 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 man's fingers and hydroids are abundant. At their edges, the banks are fringed with boulders and cobbles.



Wyville Thomson Ridge (situated within both the Scottish Continental Shelf Regional Sea and the Faroe-Shetland Channel Regional Sea) (JNCC, 2004a; Defra, 2004) has been recommended to Government as an SAC and was subject to public consultation in 2007-08. It is shown below with its characteristic features.

<b>Candidate SAC (cSAC)</b>	<b>Notable characteristics of the Reef interest feature (Masson <i>et al</i> 2000; Henry &amp; Roberts, 2004; Howell <i>et al</i> 2007; and Brian Bett, <i>pers. comm.</i>, 2004)</b>
Wyville Thomson Ridge	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 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. Communities on the bedrock reef vary in species composition between the two sides of the ridge due to the influences of different water masses. This combination of water masses in one area is unique in UK waters.

The Wyville Thomson Ridge cSAC has been recommended to Defra for its iceberg ploughmark reefs. These stony reef features are strongly influenced by a unique hydrographic regime found at the intersection of two different water masses at the edge of the continental shelf. The ecological communities associated with the stony reefs at this site are therefore distinct to those at North West Rockall.

One final area recommended to Government as an SAC for Annex I reef is Hatton Bank, situated in the adjacent Atlantic North West Approaches Regional Sea (JNCC, 2004a; Defra, 2004), and is shown below with its characteristic features.

<b>Draft SAC (dSAC)</b>	<b>Notable characteristics of the Reef interest feature (Howell <i>et al</i> 2007)</b>
Hatton Bank	Hatton Bank is a large volcanic bank, situated in the Atlantic North-West Approaches, towards the western extent of the UK Continental Shelf. The vast size and topographic complexity of the Hatton Bank supports a wide diversity of biological communities, each associated with different geomorphological structures and substratum types. The bank supports extensive areas of Annex I bedrock reef (particularly on the ridges along the top of the bank) and stony reef. Also present are elaborate cold water coral reefs, frequently associated with topographically distinct features, including pinnacles and mounds tens of metres in height and hundreds of metres in width.

## 8 Site boundary

The North West Rockall Bank SAC boundary is based on best available information as at March 2010. JNCC reviewed scientific information on the distribution of cold water coral and stony reef in the North West Rockall area, including survey data gathered by JNCC, Marine Scotland Science (formerly Fisheries Research Services) in 2005, 2006, 2007, 2008 and 2009. It should be noted that, due to the size of Rockall Bank and the limited number of scientific surveys undertaken at this site, the records of reef at this site are limited.

JNCC also examined data from electronic vessel monitoring (VMS) required under Common Fisheries Policy regulations, which gave an indication of the spatial distribution of demersal fishing activity on North West Rockall Bank (ICES, 2005a; ICES, 2007a). This was supplemented by further VMS data supplied by Scottish Government (for UK vessels only) indicating vessels displaying 'fishing activity' around Rockall Bank (SG, 2009). It was assumed that where demersal fishing was or has been intensive, presence of coral reef is unlikely or any pre-existing reefs are likely to have been severely damaged.

Fishermen's records of cold water coral occurrences and suspected reef locations supplied by the Scottish Fisheries Federation (SFF, 2009) and J. Hall-Spencer, pers. comm. (ICES, 2005a) were also considered: fishermen will generally avoid dense biogenic reef to minimise gear damage. Despite the limitations of the available data sources, their use in combination provided a sufficiently robust basis for identifying areas by combining i) recorded locations of coral and stony reef, and ii) no or low demersal fishing effort.

The proposed SAC boundary incorporates known intact cold water coral reefs on the North West Rockall Bank, as well as significant areas of Annex I stony reef. British Geological Survey seabed map data (shown as 'potential bedrock reef' in Figures 1, 2 and Appendix 2) have a coarse resolution at this distance from the coast due to lower sampling density offshore, may not show accurately whether rock is actually exposed at the seabed surface, and do not show presence of biogenic reef. They do indicate where Annex I habitat may be present at a coarse resolution, but could not be used to define the boundary for the cSAC in this case.

The SAC follows, for the most part, the boundary of the EU Common Fisheries Policy and North East Atlantic Fisheries Commission demersal fishing closures (EC Regulation No 40/2008, NEAFC Recommendation IX-2008). This closure boundary was recommended by the International Council for the Exploration of the Sea (ICES) in 2005 (ICES, 2005b), with further modifications proposed in 2007 (ICES, 2007b). The demersal fishing closure was due to be in force until 31 December 2009 but has subsequently been extended. The North West Rockall Bank SAC boundary varies from the 2008 CFP/NEAFC fisheries closure in three broad areas (see Figure 1).

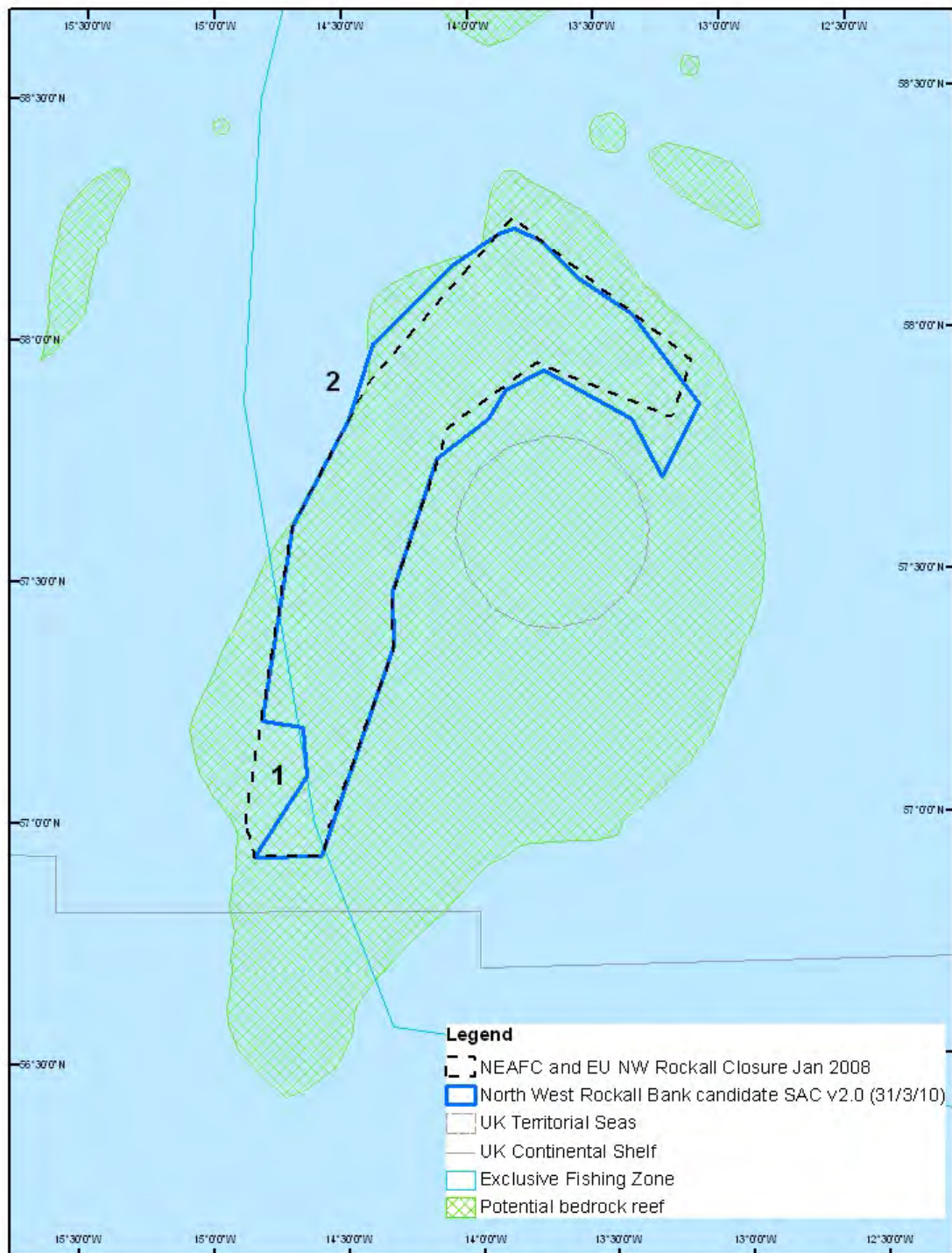
- (i) Boundary modification 1 in Figure 1: The SW section of the site boundary has been modified based on Russian records of cold water coral distribution and Russian VMS data. Specifically, a small area in the SW of the fisheries closure has been excluded from the SAC, as Russian VMS data (1999-2006) indicates that this area is trawled by Russian fleets (Vinnichenko and Khlivnoy, 2007 cited in ICES, 2007a and 2007b). It is therefore unlikely to contain living *Lophelia pertusa* reefs. Furthermore, there is limited data to suggest that extensive Annex I reef habitat is present in this area (see Appendix 1 and 2 for more detail).
- (ii) Boundary modification 2 in Figure 1: The NW boundary of the North West Rockall Bank SAC extends slightly to the west of the fishing closure, but not as far as the area recommended by ICES in 2007. This modification is based on survey

undertaken by JNCC, Marine Scotland Science and University of Plymouth (Howell *et al* 2009) which found evidence of *Lophelia pertusa* biogenic reefs and stony reefs on this part of Rockall Bank (see Appendix 2 for more detail). Additional data on coral records and trawling records supplied by the Scottish Fishermens Federation (SFF 2009) was also used to indicate the extent of coral reefs in this area.

- (iii) Boundary modification 3 in Figure 1: The NE boundary of the North West Rockall Bank SAC has been realigned to the south and east of the existing fishing closure. This modification is based on information supplied by the Scottish Fishermens Federation on the occurrence of cold water corals (SFF 2009).

The boundary modifications outlined above are based on data that became available in 2009 and were recommended by the ICES Working Group on Deep-water Ecology WGDEC10 (ICES, 2010 *in press*). Specifically, the proposed modification to the south-western part of the boundary (No. 1 on Figure 1) was formalised as ICES Advice in 2007 (ICES, 2007b).

It is likely that the modifications to the NW and NE sections (areas 2 and 3 in Figure 1) of the NW Rockall SAC boundary could lead to a modification of the CFP/NEAFC North West Rockall fisheries closure in future. If this is the case, it will match the boundary currently proposed for the SAC in these areas. The recommended change to SW section of the closure has been reviewed by CFP/NEAFC, but not implemented due to fisheries management procedures adjacent to the site but unconnected to this issue.



Map projected in WGS 84 (Zone 28N). Seabed habitat derived from BGS 1:250,000 seabed sediment maps © NERC and SeaZone bathymetry © British Crown and SeaZone Solutions Limited. All rights reserved. Products Licence No. PG/A042008.003. 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. GEB CO bathymetry © NERC 1994, 1997. Map copyright JNCC 2007.  
 Map version 2.0 20/07/10

**Figure 1.** North West Rockall Bank SAC boundary and 2008 CFP/NEAFC fisheries closure highlighting areas where the boundary and closure diverge.

The proposed site boundary for North West Rockall has been defined using JNCC's marine SAC boundary definition guidelines (JNCC, 2008). The resultant SAC boundary is a relatively simple polygon enclosing the minimum area necessary to ensure protection of the Annex I habitats, and is defined by whole degrees, minutes and seconds. The boundary definition guidelines indicate that where interest features are at risk from bottom trawling, a margin should be included in the proposed boundary to ensure their protection. Fishing vessels which are bottom trawling in the region need a minimum topline length of twice the depth of water in which they are fishing (SERAD, 2001). On the western side of the site, coral records occur in approximately 300m water depth, so a margin of twice water depth (600m) was applied to these points. On the eastern side of the site adjacent to Rockall Rock, coral records occur in approximately 200m water depth, so a margin of twice water depth (400m) was applied to these points. Where the SAC boundary follows the existing CFP/NEAFC North West Rockall fisheries closure, a margin 2km in diameter is already included along most of its perimeter (Mark Tasker, pers. comm., 2007). In areas where this margin has not been explicitly set, the SAC will, in any case, incorporate a de facto margin. This is because the boundary has been partially derived using VMS data which cannot pinpoint the exact location of the trawl in relation to the vessel being monitored. There is a strong possibility that the trawls of these vessels have passed inside the boundary, and that the reefs along the inside edge of this proposed SAC will have therefore already been damaged by fishing. As such, there is little merit in delineating an additional margin around the interest features.

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

### **9.1 Reefs**

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

##### **a) Representativity**

The North West Rockall Bank site is located in the Rockall Trough and Bank Regional Sea, and represents stony reef (iceberg ploughmarks) and biogenic *Lophelia pertusa* reef in deep circalittoral waters. The energy levels at this site are moderate, and the reefs are subject to minimal coastal influence. The iceberg ploughmarks support biological communities representative of stony reef in deep water: encrusting, tubular, cup and globose sponges, cyclostome and erect bryozoans (*Reteporella* sp), solitary corals (*Caryophyllia* sp.) and serpulid worms are present. Mobile fauna include squat lobsters (*Munida rugosa*), sea cucumbers (*Stichopus tremulus*) and the bluemouth red fish (*Helicolenus dactylopterus*). The *Lophelia pertusa* reefs support a range of species representative of this biogenic habitat: erect sponges and the pencil urchin *Cidaris cidaris* are closely associated with live coral, while the surrounding coral rubble (consisting of both live and dead coral) supports squat lobsters *Munida rugosa*, the holothurian *Stichopus tremulus*, brittle stars and encrusting yellow sponges.

Given that the site has been subject to some damage from bottom trawling (Howell *et al* 2009) and the reefs are patchy rather than contiguous in nature, the grade for the features is B: good representativity.

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

Given that i) stony and biogenic reefs are mosaic habitats and ii) there are no suitable broad scale survey data, and a limited number of reef sample points for this site, the cSAC boundary is used as a proxy for calculating area of habitat, and is inevitably approximate.

Based on this information, NW Rockall Bank reef features (stony and biogenic sub-types combined) are believed to extend over a maximum of 435,526 hectares. An estimate of the entire Annex I reef resource (bedrock, stony and biogenic reef) in UK waters is 7,180,000 hectares. This total extent figure gives the following thresholds for the grades of this criterion (CEC, 1995):

- A – extents between 7,180,000 and 1,077,000 ha (15-100% of total resource)
- B – extents between 1,077,000 and 143,600 ha (2-15% of total resource)
- C – extents less than 143,600 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 interest features at this site extend over a large area, so the conservation of their structure is variable. While the biological and physical structure of many of the *Lophelia pertusa* reefs are intact, significant areas of broken coral rubble in the north west of the SAC suggest that trawling has damaged their structure. There is some evidence that trawling has also occurred over the iceberg ploughmarks in places, though degradation appears to be minimal (Howell *et al* 2009). Assuming no further damage has occurred to the features, the grading is II: structure well conserved.

#### *Degree of conservation of functions*

The prospects of the reefs to maintain their structure in the future, taking into account unfavourable influences and reasonable conservation effort, are good. NEAFC and the European Commission have closed a significant part of the North West Rockall Bank SAC to demersal fishing, at the recommendation of ICES. However, demersal fishing is currently unregulated in the North West part of the SAC, which lies beyond the fishing closure. Regulations are in place to manage oil and gas activity in and around SACs in the UK Continental Shelf Designated Area, and the laying of submarine cables and pipelines also requires regulatory consent. The site is distant from terrestrial sources of pollution. The grading is II: good prospects.

#### *Restoration possibilities*

Restoration methods in the offshore area focus on the removal of impacts which should allow recovery where the habitat has not been removed. Individual *Lophelia pertusa* colonies can develop over tens of years (Bell and Smith, 1999; Roberts, 2002), however substantial biogenic reef structures have been found to be thousands of years old (Friewald *et al* 2004) and are particularly sensitive to physical damage, particularly if the hard substrata on which they grow are also removed or subject to sediment deposition (Shelton, 1980; Mortensen, 2001). Equally, the characteristic ploughmark structure of the stony reef would not recover from significant structural damage as these features are the result of long-term geological and oceanographic processes. Therefore, the grade is III: restoration difficult or impossible.

#### *Overall grade*

When grade II for the first sub-criterion and grade II for the second sub-criterion are combined, the overall grade for the criterion is B: good conservation.

#### d) **Global assessment**

The suggested grades for Stage 1A criteria a)-c) are B, B and B respectively. Given these evaluations, and taking into account the rarity of the *Lophelia pertusa* reef sub-type in UK waters, the Global Assessment grade is B ('good 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>
North West Rockall Bank	B	B	B	B

#### **Harbour porpoise (*Phocoena phocoena*)**

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

##### **a) Proportion of UK Population**

Harbour porpoise presence has been recorded on the Rockall Bank (Reid *et al* 2003) and further records were obtained during a UK Government sponsored survey of offshore waters in July 2007. The species is therefore listed as a non-significant presence (Grade D) for the proposed North West Rockall Bank SAC.

## **10 Sites to which this site is related**

None.

## **11 Supporting scientific documentation**

Historic records of *Lophelia pertusa* occurrence on Rockall have been collated by Wilson (1979 a and b) and subsequently updated by Rogers (1999). Records include scientific surveys, as well as fishing records, with the majority of records dating from 1961 to 1975. There is wide variability in the reliability of records, both in terms of whether the *L. pertusa* recorded still exists, and in terms of the accuracy of the positions for any given record. Furthermore, negative records have not been similarly collated. In addition, the Scottish Fisheries Federation supplied fishermen's records of coral locations around Rockall Bank (SFF, 2009).

More recently, five surveys on the North West part of Rockall Bank have been conducted by JNCC in collaboration with Marine Scotland Science (formerly FRS) and the University of Plymouth (UoP), during which the presence of Annex I reef habitat was confirmed (Howell *et al* 2009). These surveys were conducted on the FRV Scotia in September of 2005, 2006, 2007, 2008 and 2009. All were biological surveys using towed video and drop-down camera to target potential Annex I reef communities. These surveys confirmed the presence of stony and biogenic reef on the north and western flanks of Rockall Bank.

## **12 Site overview and conservation interest**

Historic coral records in North West Rockall include those first published by Wilson in 1979 (Wilson, 1979a) and later updated by Rogers (1999). Wilson (1979a) lists records of live coral obtained from trawls by the Fisheries Laboratory, Lowestoft (1961 and 1966), Marine

Laboratory, Aberdeen (1976-1975) and recorded on the Institut Scientifique et Technique des Pêches Maritimes Chart (1972 and 1973). Records of live and dead coral were also obtained from dredge and grab samples by the Institute of Oceanographic Sciences (1970 - 1972) (Wilson, 1979a). Observations of *Lophelia pertusa* 'patches' of up to 30m in diameter were made at 152 – 412m depth from the submersible Pisces III in 1973 (Wilson 1979a and b) (See Plates 1 and 2). Video footage from this historic submersible survey has recently been restored by Davies and Roberts (2006), and illustrates the size and density of the reefs discovered in the 1970s. However, except for those observations from Pisces III, these historic records give little information on the nature of the surrounding habitat, or the size of *Lophelia* colonies present.

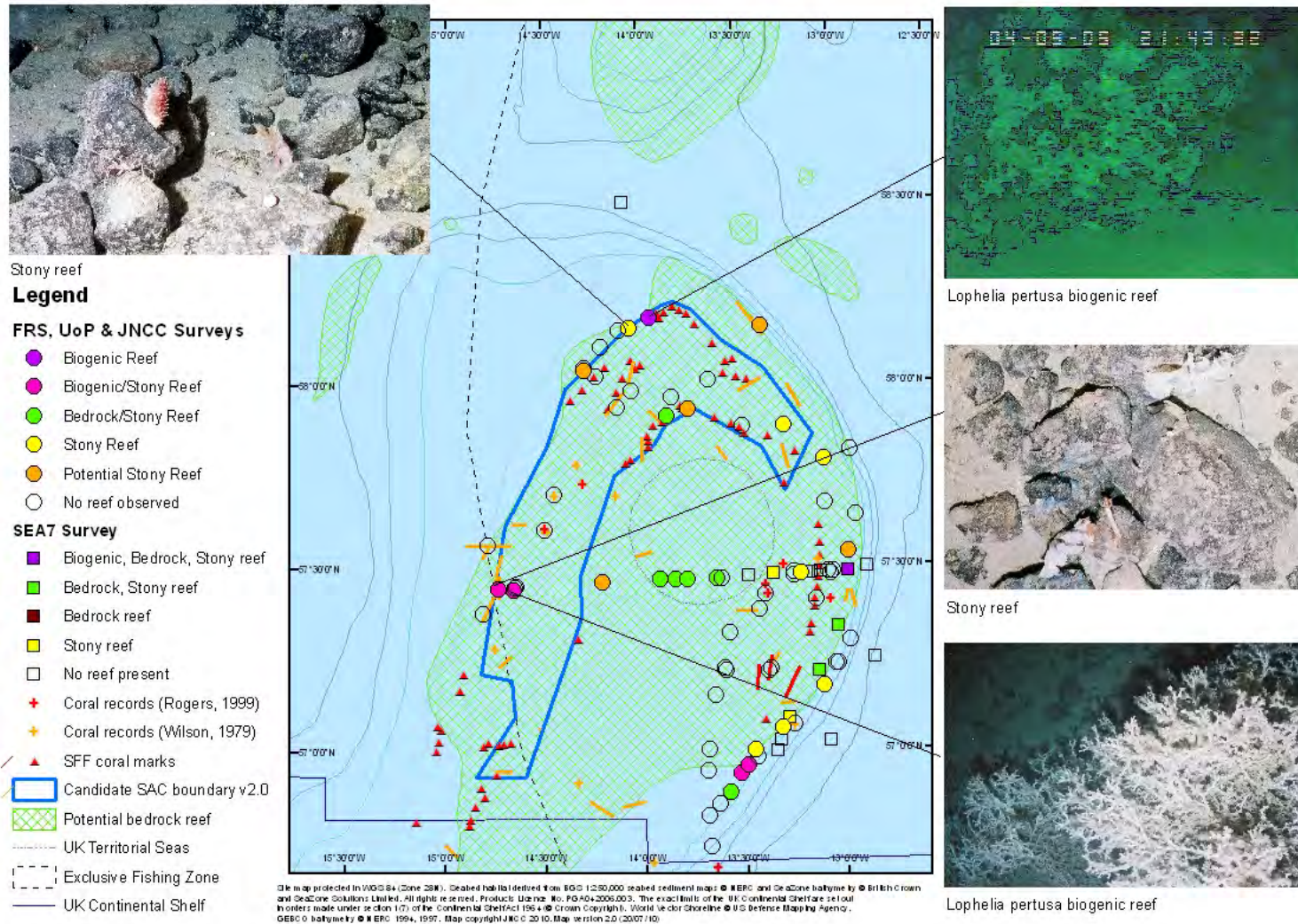
During the FRS/JNCC/UoP surveys (partly reported in Howell *et al* 2009), twelve of the stations sampled were in the northern part of the proposed SAC. Four of these were on the shallow slopes of the bank (200-250m depth), and were characterised by a sandy seabed with some cobbles and pebbles and one area of coral rubble, but with no evidence of Annex I reef habitats. Two stations, at a slightly shallower depth (186m) had either patches of stony reef characteristic of iceberg ploughmarks or areas of bedrock reef colonised by sponges. A further station towards the east of the bank (250m) was similarly characterised by a mixture of stony reef and mixed rock, although with insufficient rock to qualify as bedrock reef. One station located deeper on the slope (approximately 300m) contained some areas of potential Annex I stony reef habitat.

A further two video tows conducted at the same depth (300-330m) revealed patches of *Lophelia pertusa* biogenic reef and iceberg ploughmarks (Howell *et al* 2009). The first video tow covered patches of biogenic reef containing erect sponges and the pencil urchin *Cidaris cidaris*. These reef patches were surrounded by areas of coral rubble which supported fauna such as the squat lobster *Munida rugosa*, the holothurian *Stichopus tremulus*, the pencil urchin *Cidaris cidaris*, and an encrusting yellow sponge that was frequently observed growing on dead coral fragments. The second tow covered areas of iceberg ploughmarks that were characterised by cobbles and boulders on sandy sediment, with fauna such as squat lobsters (*Munida rugosa*), sea cucumbers (*Stichopus tremulus*) and the bluemouth red fish (*Helicolenus dactylopterus*) present. Encrusting and globose sponges, encrusting bryozoans, solitary corals (*Caryophyllia* sp.) and serpulid worms were also observed growing on the cobbles and boulders.

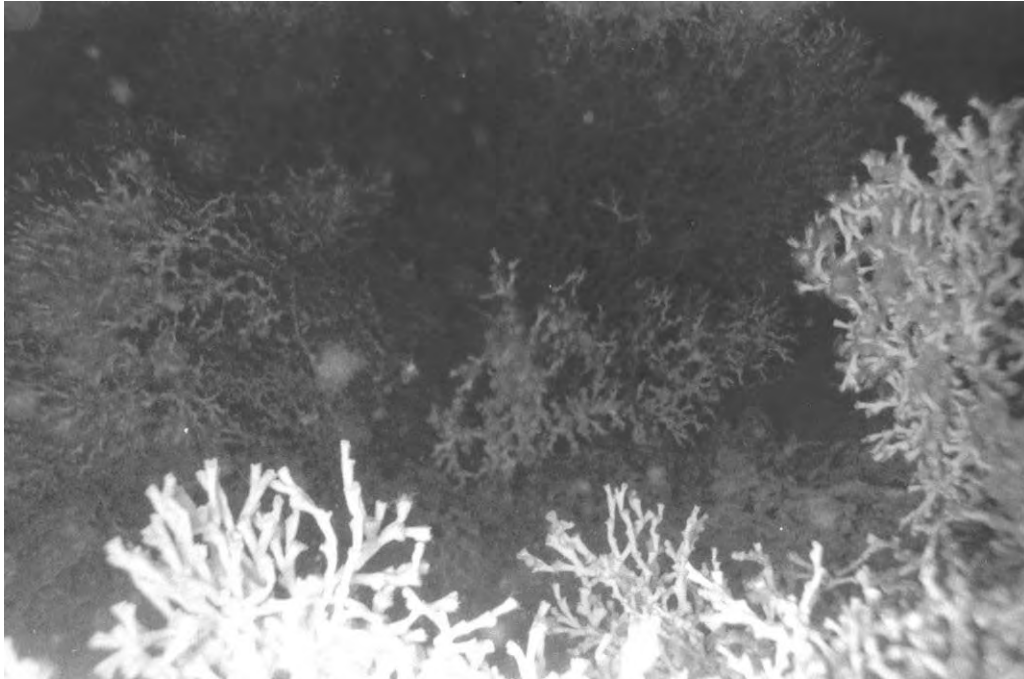
Between the areas of iceberg ploughmarks, patches of *Lophelia pertusa* reef were observed (Howell *et al* 2009). Many of the reef patches were surrounded by coral rubble containing dead and live fragments of *L. pertusa*. Such fringing rubble areas are likely to be due to the natural dynamics of reef habitats. However additional areas were also observed where the seabed was covered by a very high density of coral rubble, suggesting damage to a previous reef habitat rather than natural degradation. The fauna in these areas of damaged reef included the squat lobster (*Munida rugosa*), yellow encrusting sponges and large numbers of brittle stars (possibly *Ophiactis* sp.) living within the dead coral skeleton.

Additional sampling took place during the FRS/JNCC/UoP surveys further south, on the western flank of the bank (Howell *et al* 2009). Two of the stations sampled (270 - 320m depth) contained both biogenic and stony reef habitat. The stony reef habitat contained a mixture of cobbles and boulders on sand, characterised by sessile fauna such as the erect bryozoan *Reteporella* sp., the solitary coral *Caryophyllia* sp, serpulid worms and many types of sponge including globose, tubular, cup and encrusting varieties. Areas of *Lophelia pertusa* biogenic reef habitat included sizeable intact patches, as well as areas with coral rubble, typical of fringing reef. Four other stations sampled in the area were characterised by a mixture of cobbles and boulders on sand, and coral rubble, but without sufficient density of cobbles or boulders to qualify as Annex I reef habitat.



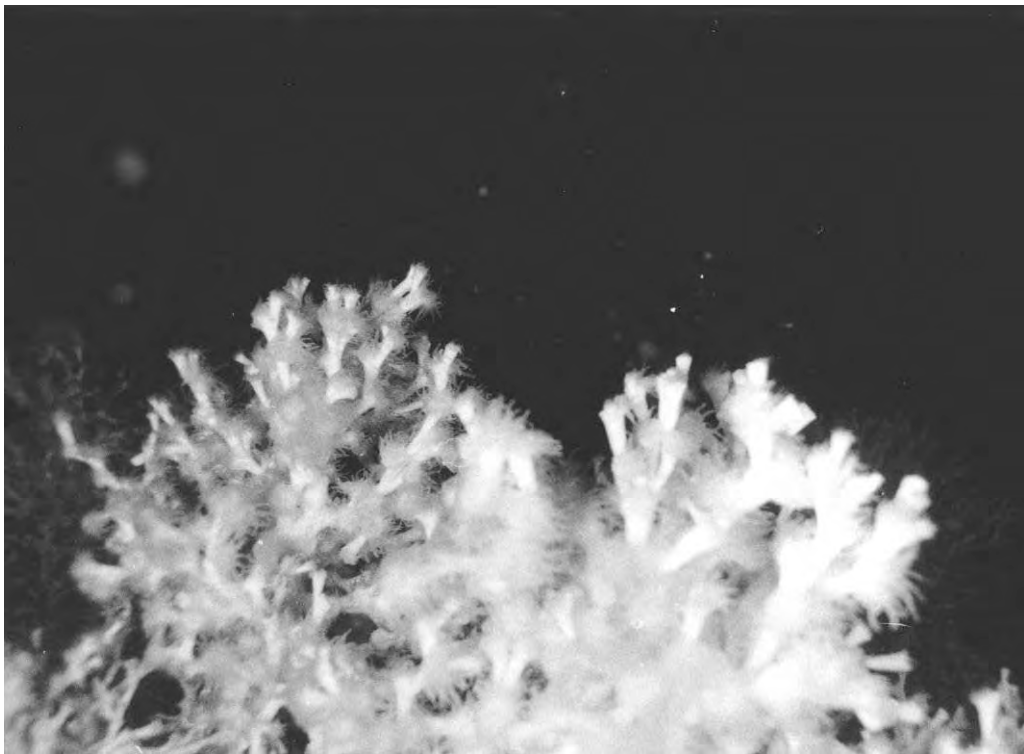


**Figure 2.** Survey data on and around Rockall Bank. Data shown on the map includes that obtained during the FRS/JNCC/UoP surveys described above (Howell *et al* 2009), and for context, samples obtained during the DTI's Strategic Environmental Assessment of Area 7 in 2005 (Narayanaswamy *et al* (2006).)



© J.B. Wilson (1973) downloaded from [www.lophelia.org](http://www.lophelia.org)

**Plate 1:** *Lophelia pertusa* reefs at NW Rockall Bank



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**Plate 2.** Live *Lophelia pertusa* polyps at NW Rockall Bank

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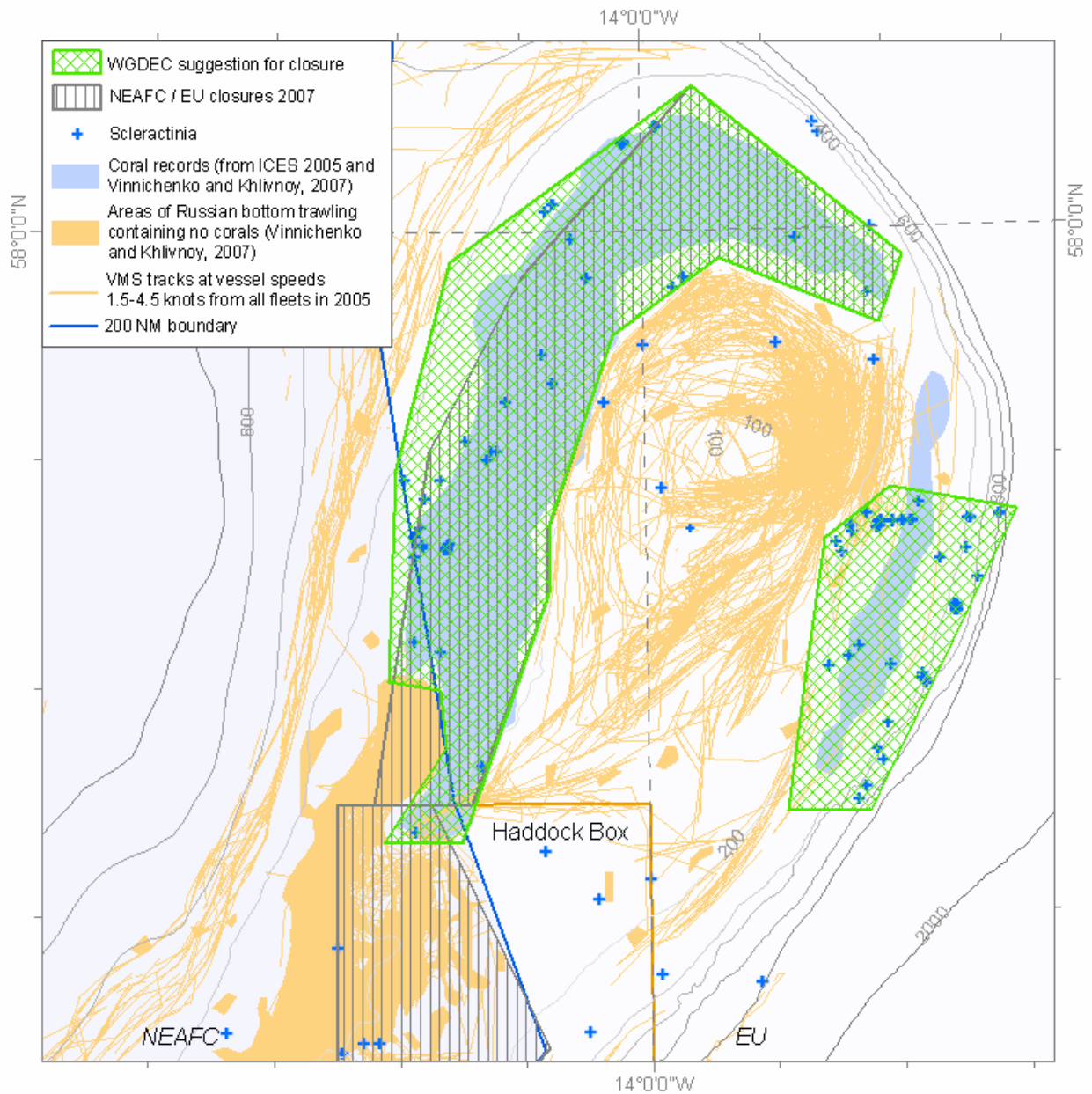
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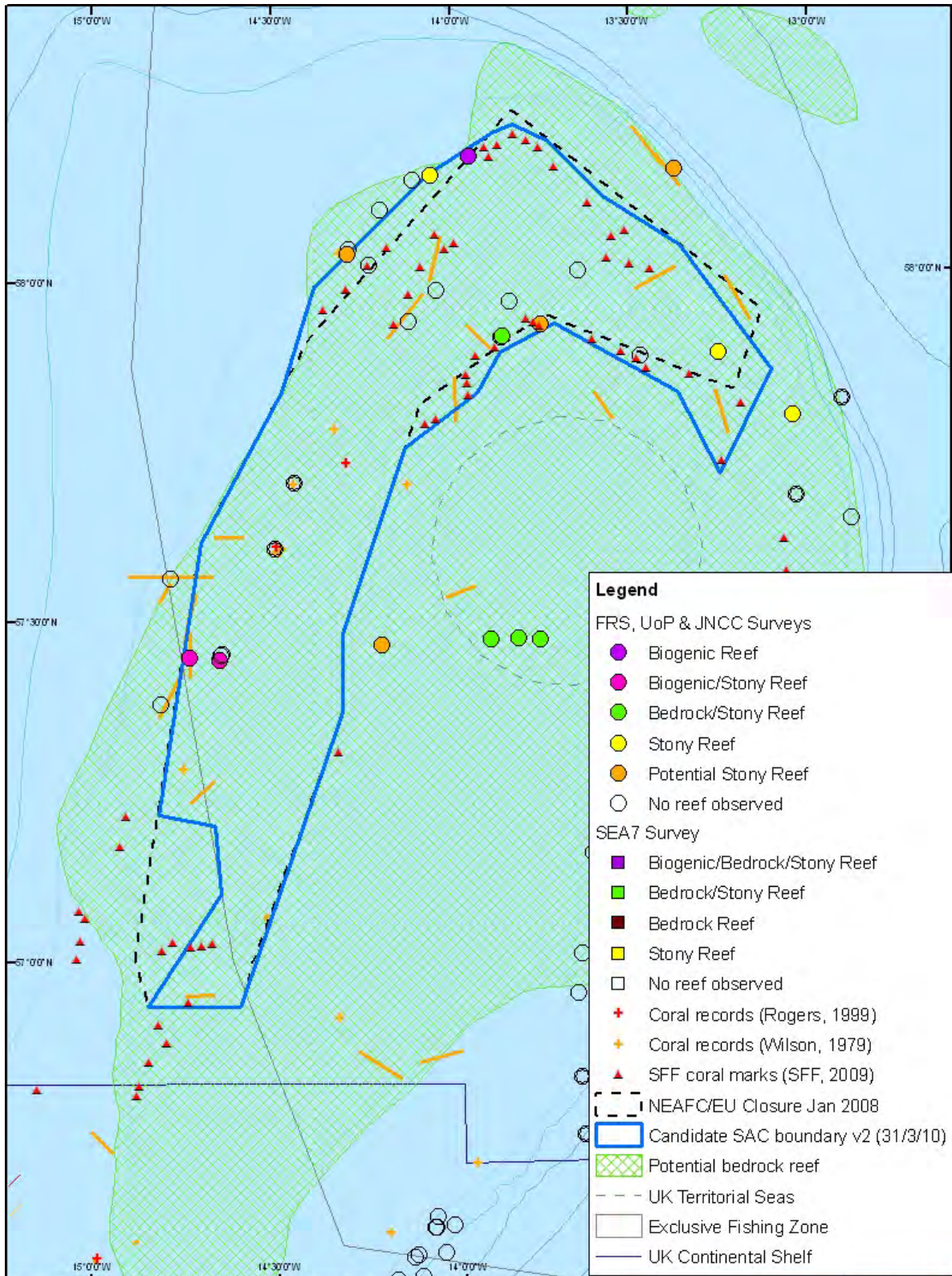
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**Appendix 1: Modification to North West Rockall NEAFC closure as proposed WGDEC in 2007 (ICES, 2007a). Note European VMS data (2005), Russian VMS data (1999-2006) and Russian coral records (2007)**



## Appendix 2: Map showing boundary of NW Rockall Bank candidate SAC, NEAFC/EU fisheries closure and survey data



Site map projected in WGS 84 (Zone 28N). Seabed habitat derived from BGS 1:250,000 seabed sediment maps ©NERC and SeaZone bathymetry ©British Crown and SeaZone Solutions Limited. All rights reserved. Products Licence No. PGA042006.003. 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. GEBCO bathymetry ©NERC 1994, 1997. Map copyright JNCC 2010. Map version 2.0 (20/07/10)