

**Offshore Special Area of Conservation:
Pisces Reef Complex**

SAC Selection Assessment Document



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Version 5.0 (1st June 2011)

¹*Cover photo illustrates Annex I stony reef covered with a faunal turf of hydroids and cup sponges, recorded at Pisces Reef.

Introduction

This document provides detailed information about the Pisces Reef Complex 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
SAC SAD version 5.0 01/06/11	Site changed to possible SAC throughout the document	Public consultation (June 2011)
SAC SAD version 4.0 18.03.11	Edits following comments received from devolved administrations. Re-issued to Government as formal advice.	Defra, Devolved Administrations, and other Govt. departments 18.03.11
SAC SAD version 3.0 (17.01.11)	Formal recommendation to Government	Defra, Devolved Administrations, and other Govt. departments 17.01.11
SAC SAD version 2.0 (20.05.10)		Joint Committee 20.05.10
SAC SAD version 1.0 (18.02.10)	Paper for MPA Technical Group endorsement	MPA TG 18.02.10

Further information

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

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Pisces Reef Complex: SAC Selection Assessment

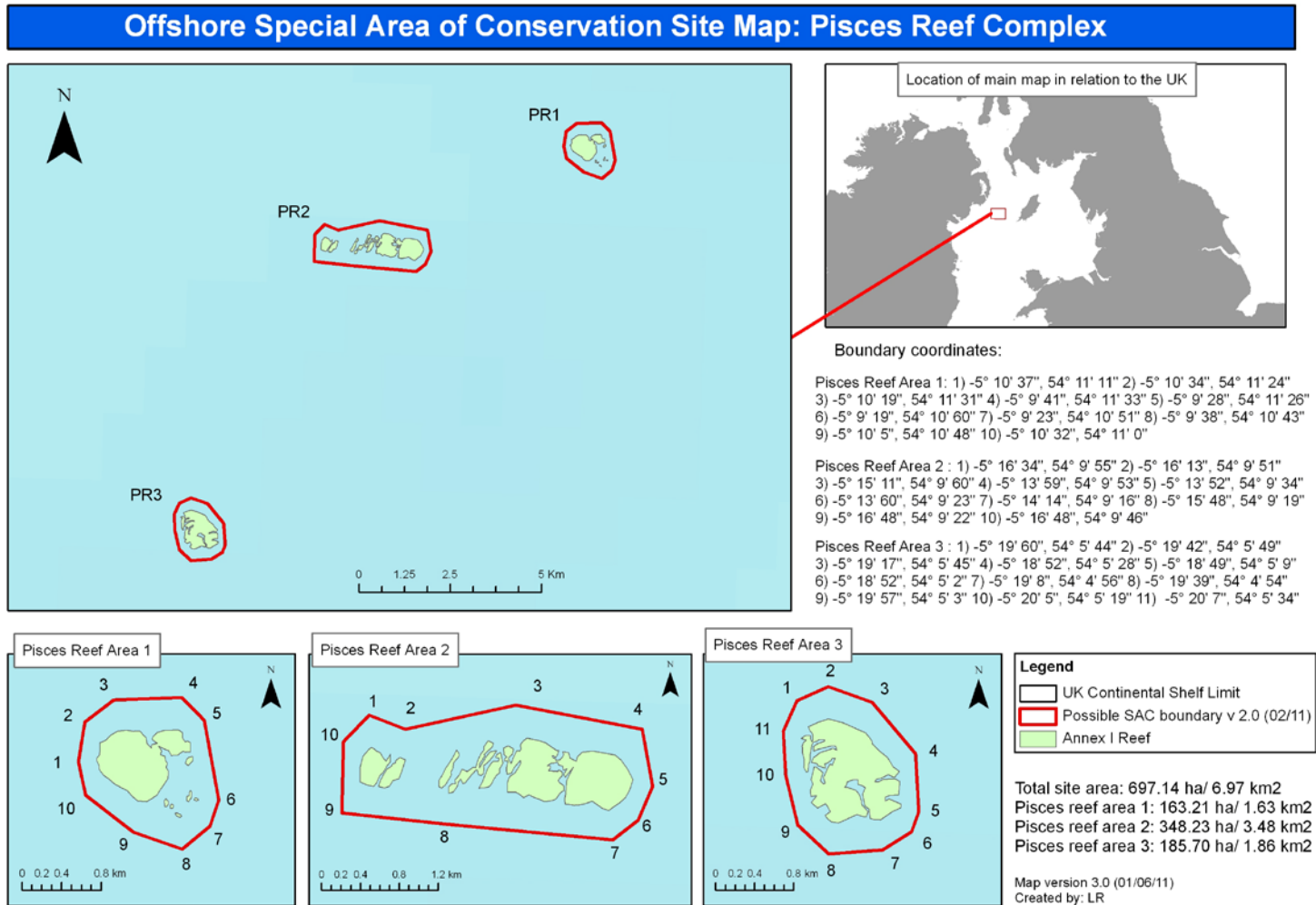
<p>1 Site name</p> <p>Pisces Reef Complex</p>	<p>2 Site centre location</p> <p>Pisces Reef 1: 5°09'57" W, 54°11'10" N Pisces Reef 2: 5°15'18" W, 54°09'37" N Pisces Reef 3: 5°19'29" W, 54°05'21" N (Datum: WGS 1984)</p>
<p>3 Site surface area</p> <p>697.14 ha/ 6.97 km² (Datum: WGS 1984 UTM Zone 30 North, calculated in ArcGIS 9.2)</p>	<p>4 Biogeographic region</p> <p>Atlantic</p>

5 Interest features under the EU Habitats Directive

1170 Reefs

- 1351 Harbour porpoise (*Phocoena phocoena*) (non-qualifying)
- 1364 Grey seals (*Halichoerus grypus*) (non-qualifying)
- 1351 Harbour (common) seals (*Phoca vitulina*) (non-qualifying)

6 Map of site



Site map projected in UTM (Zone 30N, WGS84 datum). Seabed habitat derived from DTI SEA data.
 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).
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7 Site summary

The Pisces Reef Complex is located in the western Irish Sea, in the north-west mud basin. It is approximately midway between the Isle of Man and the coast of Northern Ireland. The area consists of an extensive mud plain through which three areas of Annex I bedrock and boulder reef protrude (Pisces Reef area 1 - PR1, Pisces Reef area 2 - PR2 and Pisces Reef area 3 - PR3). They are situated apart from each other at distances of between 5.5 km and 14 km. While the SAC consists of the three reef features, the boundary has been delineated to exclude the areas of muddy sediment in between (see site map - Section 6). The approximate extents of the reefs are; PR1 - 620 m x 500 m, PR2 - 2070 m x 150 m and PR3 - 750 m x 780 m. The average seabed depth within the site boundary is approximately 100m with a maximum of 130m and a minimum of 70m at the peaks of the rocky reef outcrops. The deepest depths are within the scour pits which encircle the outcropping rocky reefs.

The three extruding reefs are composed of tertiary igneous rock and boulders. They rise 15-35m above the surrounding seabed. The reef tops are composed of silty bedrock, with a patchy veneer of muddy sediment, due to sediment deposition from a localised scouring process. The reefs themselves support a diverse community of brachiopods, ascidians, hydroids, sponges and fish. In particular, the mosaic of bedrock and stony reef provide a myriad of ledges and habitat niches. Of note is the occurrence of the *Diphasia alata* hydroid community. It is not currently included within the Marine Habitat Classification for Britain and Ireland (Connor *et al* 2004) but is considered rare (Picton, 2010 *Pers. Comm.*). The difference in species composition and abundance between the reefs and the surrounding mud plain highlights the importance of the reefs in providing a refuge for numerous species. The area of muddy sediment around the rocky reefs supports a major *Nephrops norvegicus* fishery and a high density of *Nephrops* burrows has been observed.

The site is located within the Irish Sea Regional Sea (JNCC, 2004; Defra, 2004). There are eight SACs within this regional sea for which reef is a qualifying feature. These are shown below, along with their characteristic features:

SAC	Notable characteristics of sandbank/reef/submarine structure made by leaking gases(delete as appropriate) interest feature
Strangford Lough SAC	Moderate and soft bedrock, cobble and biogenic reef (<i>Modiolus modiolus</i>) in shallow and medium-deepwaters with strong coastal influence and exposed to a variability in energy, from low to high.
Pembrokeshire Marine SAC	High to medium topographical complexity of soft to hard bedrock, stony and biogenic reef (<i>Mytilus edulis</i>), in intertidal, shallow and medium-deep waters. Exposed to strong coastal influence, medium to low salinity and variable energy.

Y Fenai a Bae Conwy (Menai Strait and Conwy Bay) SAC	High to medium topographical complexity of soft to hard bedrock and biogenic reef (<i>Mytilus edulis</i>) in intertidal and shallow water. Exposed to a strong coastal influence, medium to low salinity and high energy.
Pen Llyn a'r Sarnau SAC	High to medium topographical complexity of soft to hard bedrock and biogenic reef (<i>Mytilus edulis</i> , <i>Modiolus modiolus</i> & <i>Sabellaria alveolata</i>) in intertidal, shallow and medium-deep waters. Exposed to a strong coastal influence, full salinity and low energy.
Cardigan Bay SAC	Low topographical complexity of stony and biogenic reef (<i>Mytilus edulis</i> & <i>Sabellaria alveolata</i>) in intertidal, shallow and medium-deep waters. Exposed to a strong coastal influence, full salinity and medium energy.
Solway Firth SAC	Biogenic reef (<i>Sabellaria alveolata</i>) in intertidal and shallow waters. Exposed to a strong coastal influence, reduced salinity and medium energy.
Luce Bay and Sands SAC	Low topographical complexity of hard bedrock, stony and biogenic reef (<i>Sabellaria spinulosa</i>) in intertidal, shallow and medium-deep waters. Exposed to a strong coastal influence, full and reduced salinity and medium energy.
Morecambe Bay SAC	Biogenic reef (<i>Sabellaria alveolata</i>) in intertidal and shallow waters. Exposed to a strong coastal influence, reduced salinity and medium energy.

The Pisces Reef Complex differs considerably from the above sites as it is found in the deep circalittoral and is subject to intermediate coastal influence and a low energy environment.

There is an Area of Search for Annex I reef at the North-West Irish Sea mounds, where the feature crosses into Northern Irish territorial seas, but this site is not being progressed further.

8 Site boundary

The proposed site boundary for the Pisces Reef Complex has been defined using JNCC's marine SAC boundary definition guidelines (JNCC, 2008). The proposed boundary is made up of three separate polygons enclosing the minimum area necessary to ensure protection of the Annex I habitats (see site map - Section 6). It does not include the areas of muddy sediment that lie between the reefs.

The bedrock reef features were derived from collating survey data from various detailed acoustic and biological surveys. The areas of bedrock and stony reef that met the definition of Annex I reef (EC, 2007) were delineated based on the interpretation of multibeam echosounder (MBES) bathymetry, with associated backscatter information. The 'hard' backscatter signal returned from the rocky reef areas was in stark contrast to the surrounding muddy sediment, providing a clear indication of the extent of the reef (Figures 4, 5 & 6). This multibeam data was available for all three Pisces Reef areas. Seabed modelling using the Benthic Terrain Modeller (NOAA) was also carried out for all three

areas. In addition, sidescan sonar, seabed imagery (video and stills) and grab samples were also used where available. While no seabed imagery was available for PR3, the multibeam backscatter demonstrated an identical backscatter signal to PR2 (which was validated with seabed imagery composed of Annex I bedrock and stony reef).

As any bottom trawling that occurs in the area may pose a threat to the reef, 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 average depth of water in the SAC is approximately 100m, therefore assuming a ratio of 3:1 fishing warp length to depth, the proposed boundary is defined to include a margin of 300 m from the reef feature. This buffer has been applied individually to each of the reef features of the site.

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

9 Assessment of interest feature against selection criteria

9.1 Reefs - Annex III selection criteria (Stage 1A)

Annex III selection criteria (Stage 1A):

a) *Representativity*

Pisces reef is located in the western Irish Sea, and represents hard bedrock reef and stony reef in the deep circalittoral zone. It is in full salinity waters, subject to low energy levels and an intermediate level of coastal influence. The bedrock reefs range from low to high topographic complexity. Stony reefs formed by cobbles and boulders are also present. The faunal communities present on the bedrock and stony reef are characteristic of low energy deep circalittoral rock. The bedrock reef is an excellent example of deep circalittoral bedrock reef. There is another example of reef habitat within this regional sea, North West Irish Sea Mounds (NWISM) which crosses the 12nm boundary of Northern Ireland and would therefore be partly considered offshore. It is not being progressed by JNCC as the majority of the feature falls inside Northern Irish territorial seas, and Northern Ireland Environment Agency (NIEA) have indicated that they will not be progressing the NWISM as an inshore site.

The grade for this feature is A (excellent representativity).

b) *Area of habitat*

The reef feature is approximately 697.14 ha (6.97 km²) in area (flat mapped extent). This has been estimated from a study of multibeam data, sidescan sonar data, Acoustic Ground Discrimination System (AGDS), sub-bottom profiling and ground truthing by camera, collected from various sources. The data was interpreted and the reef extent was mapped accordingly. Where there was no ground-truthing coverage, extent estimates were based solely on multibeam bathymetry and backscatter interpretation.

An estimate of the entire Annex I reef resource (bedrock, cobble 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 "0-2" bracket for Area of Habitat and is graded C.

c) Conservation of structure and functions

Degree of conservation of structure

The Irish Sea in general supports large demersal fish and *Nephrops norvegicus* fisheries. The Pisces Reef Complex is surrounded by a muddy plain where demersal fishing takes place. VMS data indicates that although the reefs themselves are avoided to protect gear, fishing activities do take place right up to the structures. However, the physical structure of the reefs is intact to the best of our knowledge, and therefore the grade is II: structure well conserved.

The grading is 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 although there are challenges to managing international activities. 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 reef is distant from terrestrial sources of pollution.

The grading is II: good prospects

Restoration possibilities

Restoration of the biological communities in the Pisces Reef Complex 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. It is likely that a similar community to that present now would develop if activities causing damage were removed.

The grade is II: restoration possible with average effort.

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: good prospects, 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, C and B respectively. Taking all the above factors into consideration, the Global Assessment grade is B ('good conservation value').

Summary of scores for Stage 1a criteria

Habitat type	Representativity	Area of habitat	Structure and function	Global assessment
Pisces Reef Complex	A	C	B	B

9.2 Harbour porpoise (*Phocoena phocoena*)

Size and density of the population of the species present on the site (a)

Harbour porpoise (*Phocoena phocoena*) are found throughout the majority of UK Continental Shelf waters (Reid *et al* 2003; SCANS II, 2008). The species is widespread in the Irish Sea, with the species having been recorded in the area of the proposed SAC (Reid *et al* 2003, SCANS II, 2008; Baines and Evans 2009). There is no indication that the size and density of the population within the site's boundaries are particularly significant in relation to other areas within the Irish Sea. It is therefore considered to be grade D, i.e. a non significant presence. As such, no other indication is required for the additional evaluation criteria concerning this species within the site.

9.3 Bottlenose dolphin (*Tursiops truncatus*)

Size and density of the population of the species present on the site (a)

This species is found in many parts of UK waters, on the Continental Shelf and further offshore (Evans *et al* 2003; Reid *et al* 2003; SCANS II, 2008). There are no records of bottlenose dolphin occurrences within the proposed boundary (Reid *et al* 2003; Baines and Evans 2009) therefore the species is not considered a feature of the site. However, they have been recorded in the vicinity of the site (Evans *et al* 2003) and are highly mobile, so this assessment may change if new data become available.

9.4 Grey seals (*Halichoerus grypus*)

Size and density of the population of the species present on the site (a)

Grey seals occur in the wider area and are categorised as a non-significant presence (grade D) in the Strangford Lough SAC, a distance of, approximately 23-27km. From satellite telemetry work, grey seals appear to forage in or very near the area (Baines and Evans, 2009). At this time, however, it is not possible to estimate what proportion of the population of the population utilises the area, or how important the area is with respect to the physical and biological factors essential to their life and reproduction. Additionally, there is no evidence that the Pisces Reef Complex site is any more important for this species than other areas in the Irish Sea. Therefore, grey seals are considered to be grade D, i.e. a non significant presence. This grading may be revised at a later date depending on the outcome of data analyses to be commissioned by JNCC that will enable a more detailed assessment of the importance of areas for seals at sea.

9.5 Harbour (common) seals (*Phoca vitulina*)

Size and density of the population of the species present on the site (a)

The Irish Sea is not a particularly important area for harbour seals. However, they do occur in the wider area, as evidenced by two SACs in the Northern Ireland east coast (between 23 and 32km distance). These are the Murlough and Strangford Lough SACs, where the species is a qualifying feature, but not a primary reason for site selection. The species is highly mobile, regularly travelling 15-30km to forage and has been found to pass through the Pisces Reef Complex site (Sharples *et al* 2005; pers comms - Gary Burrows (DOENI)) therefore they are considered to be grade D, i.e. a non significant presence.

10 Sites to which this site is related

None.

11 Supporting scientific documentation

The information to support this SAC designation comes from a combination of sources (Figure 1). A 1969 IGS (now British Geological Survey: BGS) geophysical survey (Eden *et al* 1971) described the area as a mud plain with protruding igneous rock while in 1971, a manned submersible (*Pisces*) dive, again undertaken by IGS (Eden *et al* 1973) found rocks lying on the seabed in the vicinity of a seabed scarp. Hard and soft substrate associated fauna were also described.

More recently, in 2004 the Department of Trade and Industry (DTI) (now Department of Energy & Climate Change: DECC) Strategic Environmental Assessment (SEA 6) of the Irish Sea included a series of seabed surveys aboard the *SV Meridian* and the *SV Kommander Jack* (Judd, 2004). A range of acoustic techniques were used including multibeam, sidescan sonar and sub-bottom profiler. In addition, still and video imagery was also acquired. The geophysical survey results showed a substantial rocky outcrop lying within an area of soft muddy sediments. Preliminary analysis of the video and still imagery confirmed the presence of bedrock/boulder reef and identified the major faunal communities.

Surrounding the rocky outcrops, scour depressions were recorded (Holmes and Tappin, 2005). Further work on this localised scouring, caused by the reefs increasing the energy of near-bottom currents, was reported by Callaway *et al* (2009). This latter study was part of the wider programme of work undertaken by the MESH North Western Shelf Consortium (formed by Marine Institute, British Geological Survey, Department of Agriculture & Rural Development (now Agri-Food Biosciences Institute: AFBI), Queen's University of Belfast and the University of Ulster).

Two surveys, undertaken under the auspices of the MESH NW Shelf Consortium (AFBI, 2005 and Marine Institute, 2006) provided multibeam (MBES), Acoustic Ground Discrimination System (AGDS), side-scan sonar, sub-bottom profiler and video data in the area of Pisces Reef. Further survey work was also undertaken by AFBI in 2007 and 2008, when acoustic data (multibeam, AGDS and sidescan sonar) were acquired, along with video imagery and seabed grab samples of the surrounding soft sediment. The multibeam data gathered in 2007 was analysed by AFBI using the Benthic Terrain Modeller (NOAA: National Oceanic and Atmospheric Administration) to discriminate between areas of outcropping rock and mud with regard to depth, slope and seabed rugosity. The resulting modelled output was combined with the multibeam bathymetry, multibeam backscatter, information on seabed composition from grab samples and preliminary interpretations from the still and video imagery to produce a broadscale habitat map of the Pisces Reef Complex (Figures 2

& 3). An assessment was also made on the extent of habitat meeting the definition of Annex I reef.

Finally, sub-bottom profiler (sparker) data was supplied by BGS (Long and Wallis, 2008) for a number of seismic lines that run across Pisces Reef Complex, supporting the findings of rocky reef protruding from the seabed.

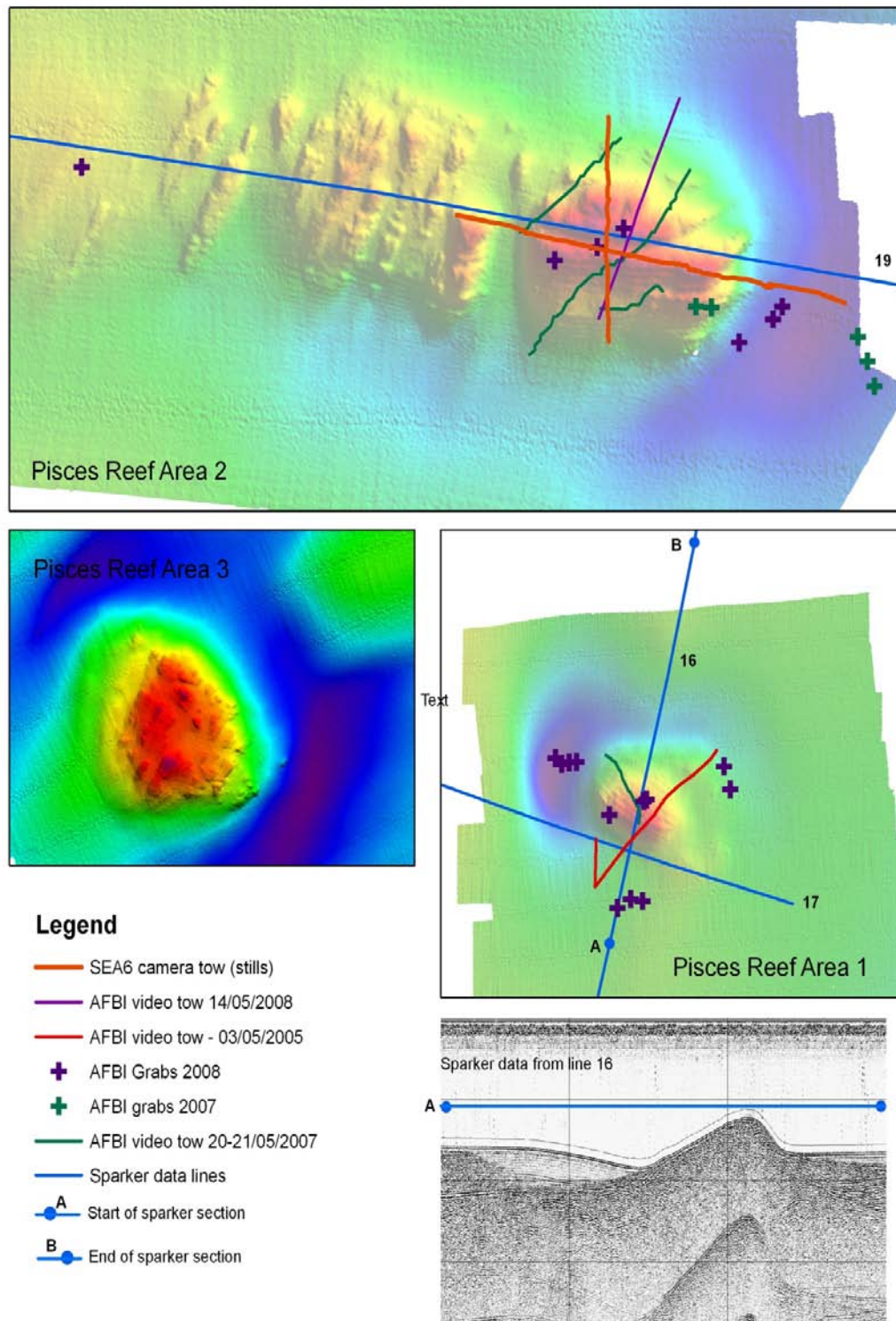


Figure 1. Data map showing locations and sources of the various data used to support delineation of the features.

12 Site overview and conservation interest

Pisces Reef Complex is located within the north-west Irish Sea mud basin, and is composed of a number of bedrock and boulder outcrops with associated scour pits resulting in a pronounced topography of ridges and depressions. The underlying geology has been described for the Irish Sea basins as being typically composed of upper Palaeozoic to Tertiary sediments with Precambrian to Palaeozoic basement blocks and ridges. During the middle to late Pleistocene, the area was subject to periods of intense glaciations and consequent erosion and as such much of the sediment in the Irish Sea is glacial relict (Holt *et al* 1990).

From this underlying rock formation, three main extrusions are prominent and are encompassed by the proposed SAC boundary. Hereon referred to as Pisces Reef area 1 (PR1), Pisces Reef area 2 (PR2) and Pisces Reef area 3 (PR3) (see site map) they are composed of tertiary igneous rock and boulders that together form an angular, non-uniform structure with a high level of variation in gradient. The bathymetry data shows these as arising sharply from the surrounding flat, muddy plain, to a maximum of ~35m. The backscatter from the multibeam data clearly differentiates hard substrate from the surrounding soft sediments, a fact verified by the preliminary interpretation of the video and still imagery that has been undertaken. Visual assessment of PR1 and PR2 from both SEA 6 (Judd, 2004) and AFBI (AFBI, 2007) seabed imagery data, confirmed these areas to be composed of bedrock, boulders and cobbles colonised by a diverse range of biological communities and providing refuge for a broad range of fish species.

The first investigations of Pisces Reef reported faunal communities composed of bryozoans including *Flustra foliacea*, the urchin *Echinus esculentus* and various sponges (IGS report 73/2). More recent surveys by AFBI and SEA 6 have revealed a diverse epifaunal community tolerant to the extremely high silt conditions present at the site. The benthic epifaunal communities observed on the rocky reef share key similarities to the biotope complex CR.LCR.BrAs (Brachipods and ascidians on low energy circalittoral rock) (Connor *et al* 2004). Of note is the occurrence of the *Diphasia alata* hydroid community. It is not currently included within the Marine Habitat Classification for Britain and Ireland (Connor *et al* 2004) but is considered rare (Picton, 2010 *Pers. Comm.*). In addition to the brown deep-water hydroid *D. alata*, the habitat was characterised by a dense faunal turf composed predominantly of the hydroids *Diphasia pinastrum*, *Lytocarpia myriophyllum*, *Nemertesia antennina* and the bryozoan *Bugula* sp. A range of sponges were also recorded including the cup sponge *Axinella infundibuliformis* (often in high densities), *Stelligera stuposa* and *Polymastia boletiformis*. Other species of notable interest include the echinoderms *Porania pulvillus*, and *Henricia* sp. as well as *Hormathiidae* anemones and the crustaceans *Cancer pagurus* and *Munida rugosa* (see Plates I through IV).

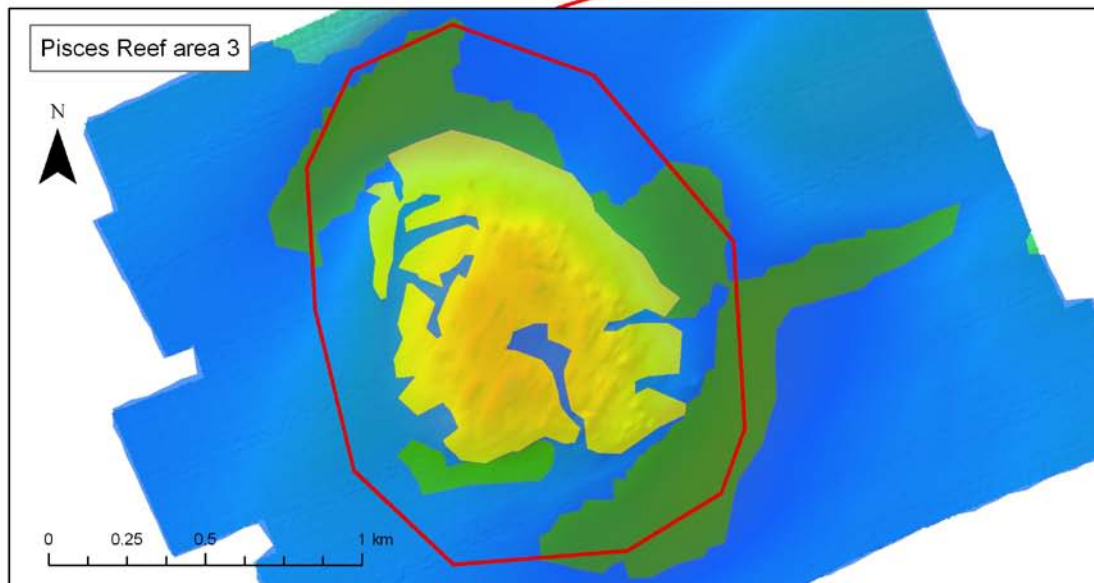
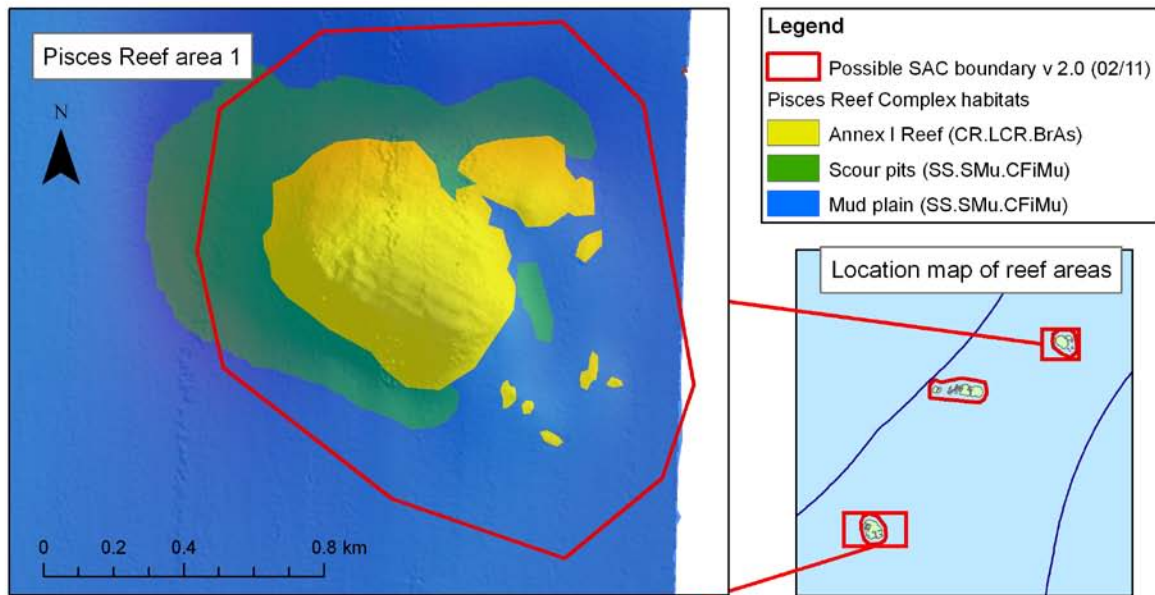
Judd (2004) noted the abundance of juvenile fish species apparent in the underwater imagery. Large shoals of blue whiting were observed, in addition to bib, red gurnard and wrasse. It is likely that the outcropping bedrock and boulder reef provide important shelter and refuge in an otherwise largely featureless muddy plain.

The rocky reef habitat found at Pisces Reef Complex is extremely silty; a symptom of the depositional environment in which the site is located. The majority of interstitial spaces in between the bedrock and boulders are filled with fine mud. Sub-bottom profiler (sparker) data provided by the BGS illustrate that this mud layer is actually a thin covering of postglacial fine mud over rock (Long, 2010 *Pers. Comms*; Holt *et al* 1990). It differs in thickness, ranging from a thin veneer over some of the rocky reef crests to thicker deposits, reaching a maximum of about 80m in the surrounding sediment plains. This is due to the sediment deposition from a scouring process occurring in the area. This long term process

is also the reason for the exposed rock faces. It is caused by near bed currents being obstructed by the reef structures. This weak current lifts and carries sediment, leaving a scour pit around the edges of the reef outcrops, and depositing the sediment elsewhere on the surrounding reef.

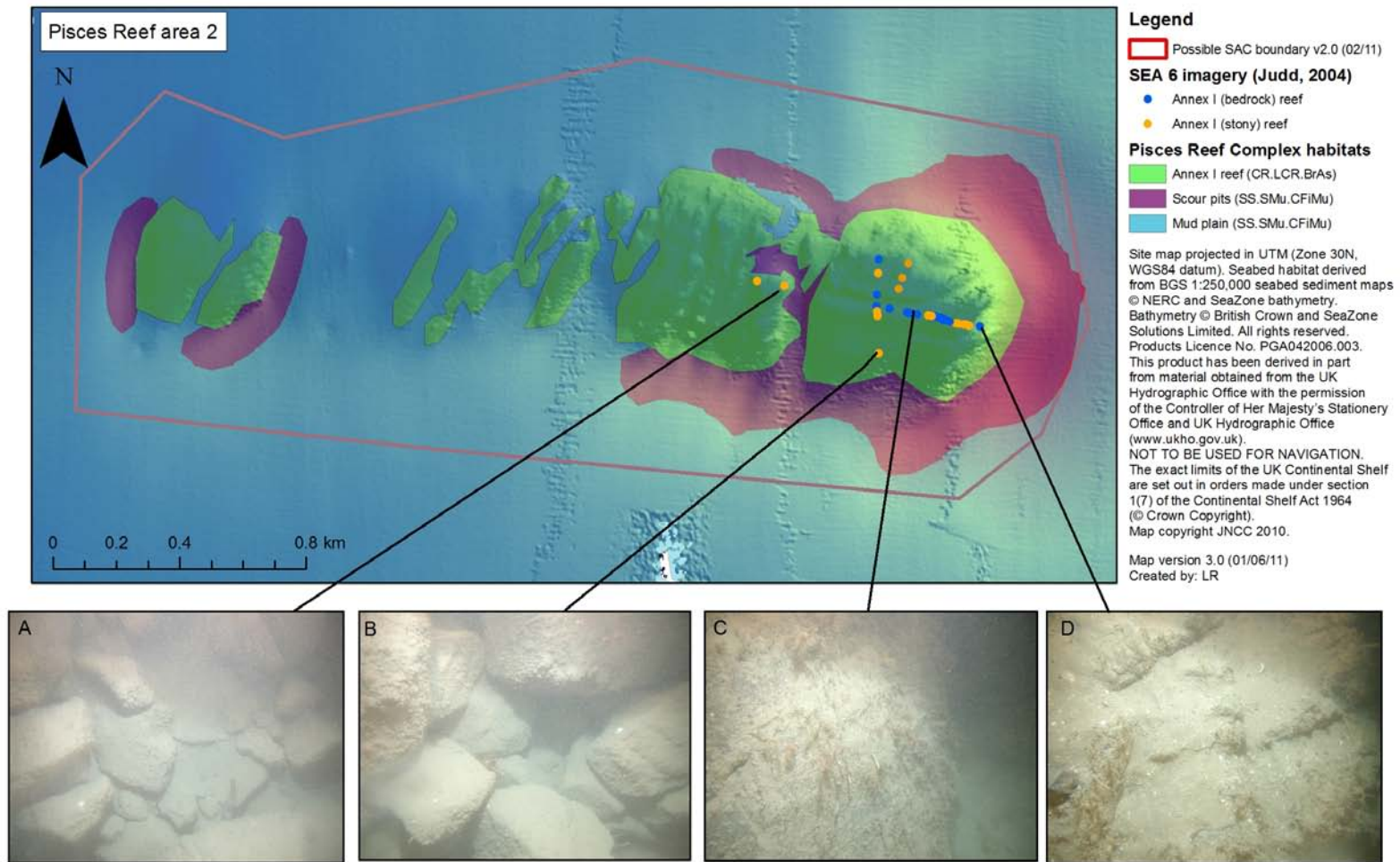
Numerous *Nephrops norvegicus* and *Calocaris sp.* burrows have been observed in the muddy sediment surrounding the rocky reef features; typical of the SS.SMu.CFiMu biotope complex that is recorded in the vicinity. Historically, *N. norvegicus* burrow density has been assessed for the various sediments types. While *N. norvegicus* burrows have been recorded in the interstitial mud of the outcropping bedrock, Callaway *et al* (2004) showed that there were significantly higher densities of *N. norvegicus* burrows in the finer muddy sediments in the surrounding plain, than in either the coarser sediment pockets found on the tops of the outcropping bedrock or the scour pits.

It is noted that while scattered seapens were observed on the 1971 IGS submersible survey, these are no longer present in the same abundance, likely due to that same intensity of fishing pressure that the area is now subjected to. Judd (2004) reported seeing a high density of trawl scars in the soft sediment surrounding the rocky reef outcrops.



Site map projected in UTM (Zone 30N, WGS84 datum). Seabed habitat derived from DTI SEA data. 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). NOT TO BE USED FOR NAVIGATION. The exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown Copyright). Map copyright JNCC 2010. Map version 3.0 (01/06/11) Created by: LR

Figure 2. Broadscale habitat maps for Pisces Reef area 1 and 3 showing Annex I reef feature (CR.LCR.BrAs: brachiopods and ascidians on low energy circalittoral rock) and associated scour pits.



Still images taken on the SEA 6 (Judd, 2004) survey, showing the stony (A & B) and bedrock (C & D) reef habitat recorded on the outcropping rocky reef.

Figure 3. Broadscale habitat maps for Pisces Reef area 2: showing Annex I reef feature (CR.LCR.BrAs: brachiopods and ascidians on low energy circalittoral rock) and associated scour pits. Example photographs illustrate the bedrock and stony reef recorded at the site.

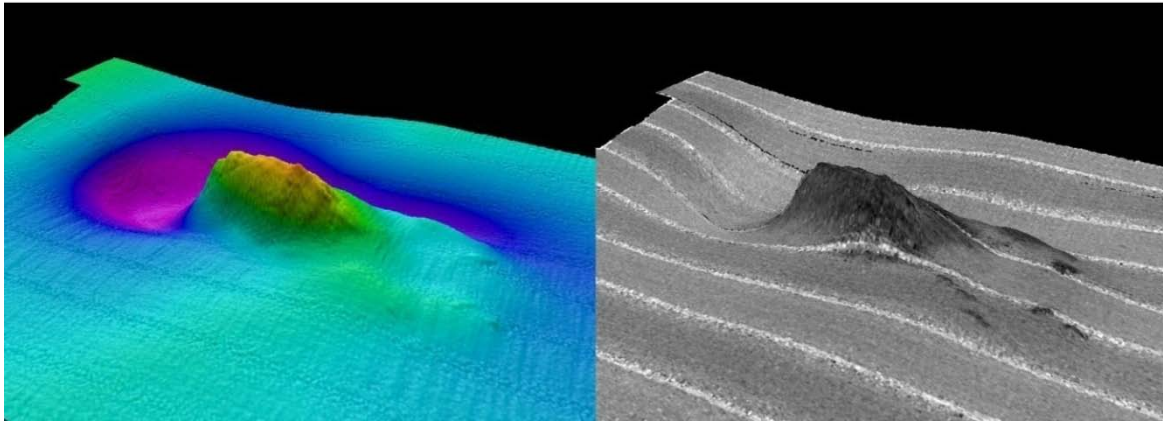


Figure 4. Pisces Reef area 1 (aspect - looking NW) - a 3D view of Pisces Reef area 1 bathymetry complete with drape of multibeam backscatter. Note the hard (dark) backscatter return showing the outcropping bedrock. For scale bar of water depth, see Fig 6 below.

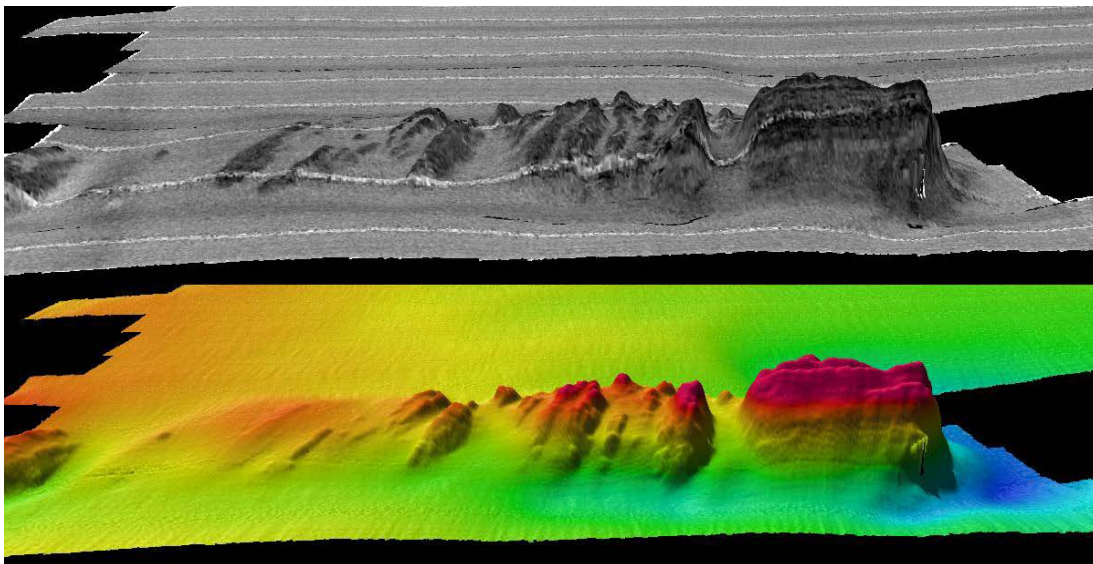


Figure 5. Pisces Reef area 2 (aspect - looking N) - a 3D view of Pisces Reef area 2 bathymetry complete with drape of multibeam backscatter. Note the hard (dark) backscatter return showing the outcropping bedrock. For scale bar of water depth, see Fig 6 below.

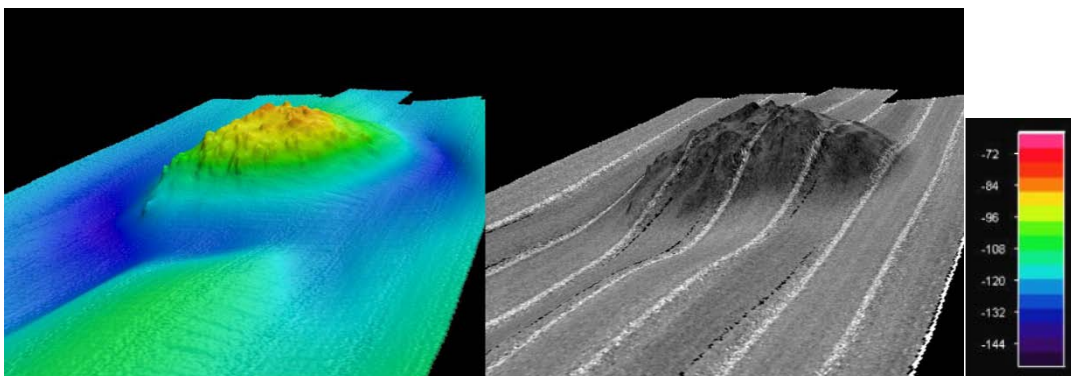


Figure 6: Pisces Reef area 3 (aspect - looking SW) - a 3D view of Pisces Reef area 3 bathymetry complete with drape of multibeam backscatter. Note the hard (dark) backscatter return showing the outcropping bedrock. Scale bar on right shows water depth in metres.

Plate I



An example of silty Annex I bedrock and stony reef, with a dense turf of the hydroid *Diphasia alata*. The cup sponge *Axinella infundibuliformis* is also evident. (© DTi, 2004)

Plate II



An area of bedrock with delicate hydroids, the sponge *Polymastia boletiformis* and the starfish *Asterias rubens* and *Porania pulvillus*. (© DTi, 2004)

Plate III



An image showing an area of steeply sloping bedrock on Pisces Reef area 2, showing the hydroid *Lytocarpia myriophyllum* and the sponge *Stelligera stuposa*. (© DTi, 2004)

Plate IV



An image showing hydroids, the anemone *Urticina* and a shoal of gadoid fish (blue whiting). (© DTi, 2004)

References

Agri-Food and Biosciences Institute of Northern Ireland (AFBI). 2005. Cruise Report Corystes CO 18 2005. MESH NW Shelf Consortium Survey. Available from: <http://www.searchmesh.net/PDF/SurveyReportPhase4%203.16%20MESH%20PERIOD%204%20Activity%20DARD%20-%20Cruise%20Report%20Corystes%20CO%2018%202005%20MESH%20Seabed%20Ma.pdf> [Accessed May 2011].

Agri-Food and Biosciences Institute of Northern Ireland (AFBI). 2007. Irish Sea seabed imagery survey. Cruise report not available.

Baines, M.E. & Evans, P.G.H. 2009. Atlas of the Marine Mammals of Wales. CCW Monitoring Report No. 68.

Callaway, A., Smyth, J., Brown, C.J., Quinn, R., Service, M. & Long, D. 2009. The impact of scour processes on a smothered reef system in the Irish Sea. *Estuarine, Coastal and Shelf Science* 84 (2009) 409-418.

Connor, D.W., Allen, J.H., Golding, N., Howell, K.L., Lieberknecht, L.M., Northen, K.O., Reker, J.B. 2004. The Marine Habitat Classification for Britain and Ireland Version 04.05 JNCC, Peterborough ISBN 1 861 07561 8. Available from: www.jncc.defra.gov.uk/MarineHabitatClassification [Accessed May 2011].

DEFRA. 2004. *Review of Marine Nature Conservation*. Working Group Report to Government [online]. London: Defra. Available from: <http://archive.defra.gov.uk/environment/biodiversity/marine/documents/rmnc-report-0704.pdf> [Accessed May 2011].

EC. 2007. Guidelines for the establishment of the Natura 2000 network in the marine environment. Application of the Habitats and Birds Directive. May 2007.

Eden, R.A.; Deegan, C.E.; Rhys, G.H.; Wright, J.E. & Dobson, M.R. 1973. Geological investigations with a manned submersible in the Irish Sea and off western Scotland 1971: Report of the Institute of Geological Sciences no.73/2, 27p ISBN 0118806025.

Eden, R.A., Arduis, D.A., Binns, P.E., McQuillin, R. & Wilson, J.B. 1971. Geological investigations with a manned submersible off the west coast of Scotland 1969-70: Report of the Institute of Geological Sciences no.71/16, 49p ISBN 0118802119.

Evans, P.G.H., Anderwald, P. & Baines, M.E. 2003. UK Cetacean Status Review. Report to English Nature and the Countryside Council for Wales.

Holmes, R. & Tappin, D.R. 2005. DTI Strategic Environmental Assessment Area 6, Irish Sea, Seabed and Surficial Geology and Processes. British Geological Survey. Commissioned Report, CR/05/057. Available from: http://www.offshore-sea.org.uk/consultations/SEA_6/SEA6_Geology_BGS.pdf [Accessed May 2011].

Holt, R., Fisher, E. & Graham, C. 1990. Coastal Resources of the Irish Sea. In: *The Irish Sea; an environmental review, Part I: Nature Conservation*. Liverpool University Press: ISBN: 085323227X.

- JNCC. 2004. The Irish Sea Pilot Final Report. Report to Defra by The Joint Nature Conservation Committee [online]. Peterborough: JNCC. Available from: <http://www.jncc.defra.gov.uk/page-2767#download> [Accessed May 2011].
- JNCC. 2008. UK Guidance on defining boundaries for marine SACs for Annex I habitat sites fully detached from the coast [online]. Peterborough: JNCC. Available from: http://jncc.defra.gov.uk/pdf/SACHabBoundaryGuidance_2008Update.pdf [Accessed May 2011].
- Judd, A.G. 2004. Strategic Environmental Assessment: Irish Sea. Survey operations in the Irish Sea. Legs 2 and 3 cruise report.
- Long, D. 2010. *Personal Communication*. British Geological Survey, Edinburgh.
- Long, D. & Wallis D. 2008. Cruise report for BGS cruise 2008/02, North Channel. British Geological Survey Internal Report, IR/08/38. 55pp.
- Marine Institute. 2006. R.V. Celtic Voyager Survey Report: Leg CV06_03. MESH NW Shelf Consortium Survey. Available from: http://www.searchmesh.net/pdf/04-06-01%20MarInstCV06_03_.pdf [Accessed May 2011].
- NOAA (National Oceanic and Atmospheric Administration). Available from: <http://www.csc.noaa.gov/digitalcoast/tools/btm/index.html> [Accessed May 2011].
- Picton, B. 2010. *Personal Communication*. National Museums Northern Ireland, Co. Down.
- Reid, Evans & Northridge. 2003. Atlas of Cetacean distribution in the north-west European Waters. JNCC. Available from: <http://www.jncc.defra.gov.uk/page-2713> [Accessed May 2011].
- Sharples, R.J. *et al.* 2005. Distribution and movements of harbour seals around the UK. SCOS Briefing paper 05/5.