



**Inshore Special Area of Conservation (SAC):
Studland to Portland
cSAC Selection Assessment**

Version 4.1

Version Control

Version and date	Amendments made	Issued to and date
Version 1.0 (5 August 2010)	Minor text amendments	Louisa Knights and Gavin Black
Version 1.1 (5 August 2010)	Added data map, minor text amendments	Michael Coyle
Version 2.0 (6 August 2010)	Minor text amendments	James Marsden, Director, Marine. Natural England
Version 3.0 (9 August 2010)		Board Services via Joanna Redgwell. Approved by Executive Board followed by Chair of Natural England August 2010.
Version 3.1 (18 March 2011)	Update to site comparison tables.	Submission to Defra for approval for formal consultation 22nd March 2011
Version 3.2 (3 August 2011)	Reference links added and reference to Wight-Barfleur reef.	Resubmitted to Defra.
Version 3.3 (01 September 2011)	Final reference links added and changed from dSAC to pSAC for publication.	Published on website at formal consultation.
Version 4.0 (29 March 2012)	Post consultation boundary changes, amendments to species and biotopes with associated text change	Director, Marine. Natural England.
Version 4.1 (28 August 2012) Stephanie Ashman	Amendments to reflect submission to EC and cSAC status.	Joanna Redgwell.

1. Introduction

This document provides detailed information about the Studland to Portland candidate SAC (cSAC) 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 Natural England under the Conservation of Habitats and Species Regulations 2010, relating to the conservation of natural habitat types and species through identification of Special Areas of Conservation (SACs) in UK waters (EU, 2003; EC, 2007). Under these Regulations, Natural England is required to provide advice to Defra to enable the Secretary of State and Competent Authorities to fulfil their obligations under the Regulations.

Sites eligible for designation as Special Areas of Conservation (SACs) are selected on the basis of the criteria set out in Annex III (Stage 1) to the Habitats Directive and relevant scientific information. SACs are considered only if they host a Habitats Directive Annex I habitat or Annex II species. Socio-economic factors are not taken into account in the identification of sites to be proposed to the European Commission¹.

In addition to information on the Annex I habitats, this document contains: i) a map of the site, ii) its name, location and extent, iii) the data resulting from application of the criteria specified in Annex III (Stage 1) to the Habitats Directive and iv) a glossary of terms. Natural England 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).

¹ Following European Court of Justice 'First Corporate Shipping' judgement C-371/98 (7 November 2000)

2. Studland to Portland: SAC Selection Assessment

1. Site name Studland to Portland	2. Site centre location Degrees and minutes: 2°10'3"W 50°33'17"N Decimal degrees: 2.16°W 50.55°N (Datum: WGS84)
3. Site surface area 33191.09 ha (UTM Zone 30 Northern hemisphere WGS84)	4. Biogeographic region Atlantic

3. Interest feature(s) under the EU Habitats Directive

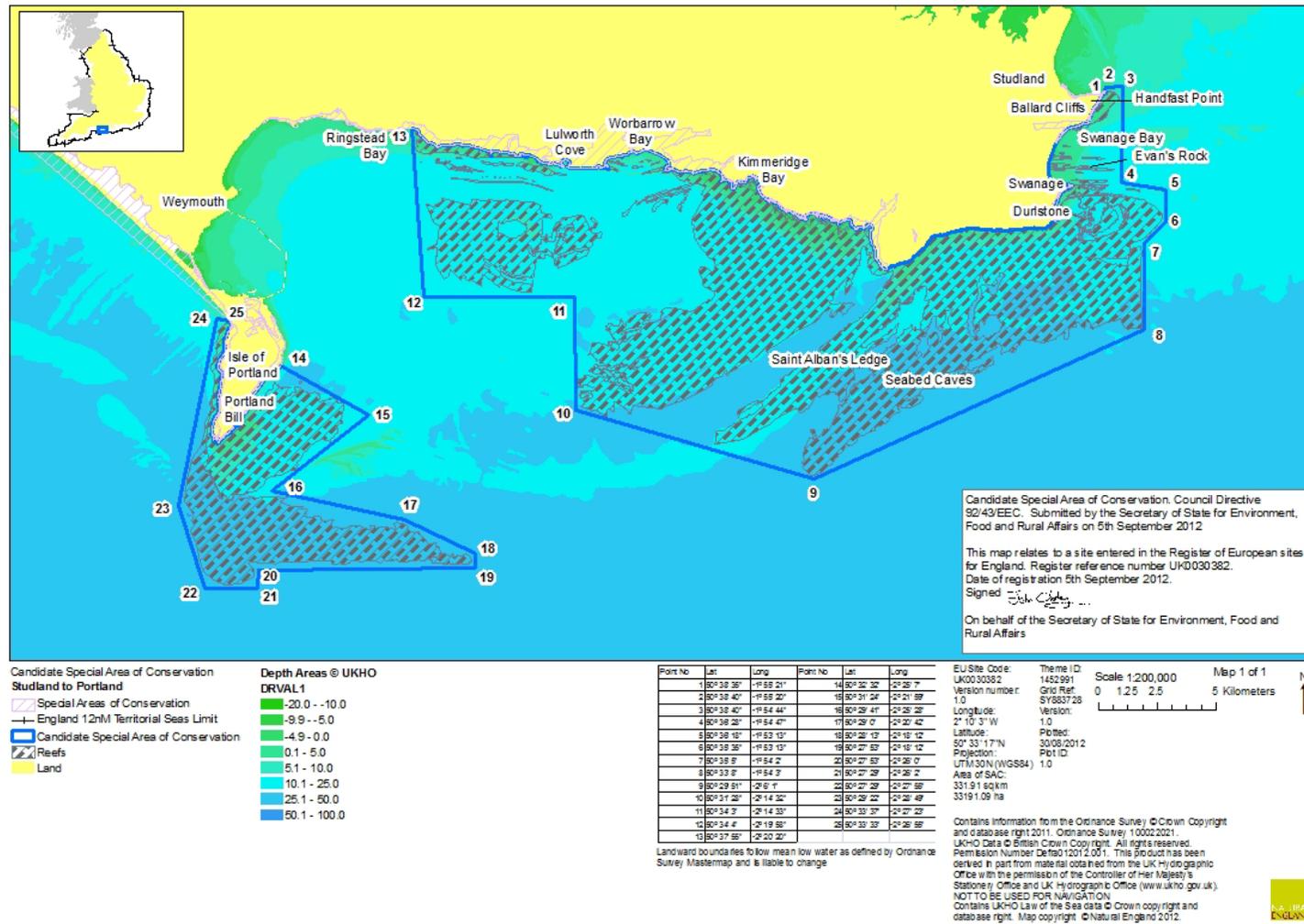
This site is listed for the features set out below. For further information please see European Commission, DG Environment, 2007: Interpretation Manual of European Union Habitats.

EUR 27, July 2007:

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/2007_07_im.pdf

1170 Reefs.

4. Maps of candidate SAC boundary and location of features²



²Larger copies of maps are available on request from Natural England, Regulatory Services, Floor 1 West, Northminster House, Peterborough. PE1 1UA

Location of boundary nodes*

Point No	Latitude (N)	Longitude (W)	Point No	Latitude (N)	Longitude (W)
1	50° 38' 35"	1° 55' 21"	14	50° 32' 32"	2° 25' 7"
2	50° 38' 40"	1° 55' 20"	15	50° 31' 24"	2° 21' 59"
3	50° 38' 40"	1° 54' 44"	16	50° 29' 41"	2° 25' 28"
4	50° 36' 28"	1° 54' 47"	17	50° 29' 0"	2° 20' 42"
5	50° 36' 18"	1° 53' 13"	18	50° 28' 13"	2° 18' 12"
6	50° 35' 35"	1° 53' 13"	19	50° 27' 53"	2° 18' 12"
7	50° 35' 5"	1° 54' 2"	20	50° 27' 53"	2° 26' 0"
8	50° 33' 8"	1° 54' 3"	21	50° 27' 29"	2° 26' 2"
9	50° 29' 51"	2° 6' 1"	22	50° 27' 29"	2° 27' 55"
10	50° 31' 28"	2° 14' 32"	23	50° 29' 22"	2° 28' 49"
11	50° 34' 3"	2° 14' 33"	24	50° 33' 37"	2° 27' 23"
12	50° 34' 4"	2° 19' 58"	25	50° 33' 33"	2° 26' 55"
13	50° 37' 55"	2° 20' 20"			

Between points 25 and 14, and between 13 and 1, the landward boundaries follow Mean Low Water as defined by Ordnance Survey Mastermap, and are liable to change.

5. Site summary

5.1 Reefs

The Studland to Portland site lies off the south coast of the county of Dorset in England. The site comprises a mosaic of two areas containing Annex I reef habitat. The areas are described as (from east to west):

- Studland Bay to Ringstead Bay Reefs; and
- Portland Reefs

Studland Bay to Ringstead Bay Reefs

Numerous areas of reef (in many forms) exist within the Studland Bay to Ringstead Bay area. The reefs exhibit a large amount of geological variety, ranging from exposed chalk bedrock east of Ringstead Bay, through to exposed shales and clays, limestone and cementstone ledges, and boulders around Kimmeridge to Durlston, and back to exposed chalk bedrock between Ballard Cliffs and Handfast Point in the east of the site. A number of features of particular interest are present within this area including:

- A series of limestone ledges (up to 15m across) protruding from a shelly gravel in Worbarrow Bay;
- St Albans ledge, which is a unique reef feature extending out over 10km offshore. The feature is subject to strong tidal action, which has scoured holes down to 60m in some areas;
- An area of large limestone blocks known as the “seabed caves” located east of St Albans ledge;
- Evan’s Rock, which is a gently sloping mound in the outer limits of Swanage Bay. The mound has a flat top covered with small, slab-like boulders and cobbles, separated by small areas of shelly sand.

Portland Reefs

The Portland Reefs area lies off the south, east and west coasts of Portland Bill and is characterised by flat bedrock, limestone ledges (Portland stone), large boulders and cobbles. Diver surveys on the western side of Portland Bill have recorded rugged limestone boulders providing deep gullies and overhangs. These occur where the coastal cliffs extend underwater and are clearly visible as 20m drop offs. *Mytilus edulis* beds are found to occur in very high densities on bedrock associated with strong currents off Portland Bill.

5.2 Studland to Portland Annex I Habitat Comparison

This site is situated mainly within the Eastern English Channel regional sea and partly within the Western English Channel and Celtic Sea Regional Sea (Defra 2004). Listed below are existing SACs within these Regional Seas which contain reef as a qualifying Annex I habitat. The reef types present are summarised in Table 5.1.

Table 5.1 Regional SACs comprising reef habitat

Site	Description of relevant qualifying features
South Wight Maritime SAC	The southern shore of the Isle of Wight, off the coast of southern England, includes a number of subtidal reefs that extend into the intertidal zone. This site is selected on account of its variety of reef types and associated communities, including chalk, limestone and sandstone reefs. To the west and south-west some of the most important subtidal British chalk reefs occur, representing over 5% of Europe's coastal chalk exposures, including the extensive tide-swept reef off the Needles and examples at Culver Cliff and Freshwater Bay. These support a diverse range of species in both the subtidal and intertidal. Other reef habitats within the site include areas of large boulders off the coast around Ventnor. There is a large reef of harder limestone off Bembridge and Whitecliff Bay, where the horizontal and vertical faces and crevices provide a range of habitats. The bedrock is extensively bored by bivalves. Their presence, together with the holes they create, give shelter to other species, which adds further to habitat diversity. Intertidal pools support a diverse marine life, including a number of rare or unusual seaweeds, such as the shepherd's purse seaweed <i>Gracilaria bursa-pastoris</i> . A number of other species reach their eastern limit of distribution along the English Channel at the Isle of Wight (e.g. barnacles <i>Chthamalus stellatus</i> , <i>Chthamalus montagui</i> and the large solitary ascidian <i>Phallusia mammillata</i>).
Isles of Scilly complex SAC	Hard bedrock reef, both infralittoral and circalittoral, in some cases extending well beyond 50 m depth. Exposure levels vary at this site: some reefs are very exposed, others sheltered. The surrounding waters are full salinity and the feature is subject to minimal coastal influence. The topographic complexity of the reefs is low. The south-westerly position of the islands leads to a range of warm-water species being present, including sunset cup-coral <i>Leptopsammia pruvoti</i> , pink sea-fan <i>Eunicella verrucosa</i> , and Weymouth carpet-coral <i>Hoplangia durotrix</i> .
Lundy SAC	A granite and slate reef system, exposed to a wide range of wave action and tidal stream strength. Combined with significant topographical variation, this has resulted in a diverse complex of biological communities. The full salinity reefs are both infralittoral and circalittoral (>50m depth), and are highly influenced by coastal processes. Several communities at their northern limit of distribution occur here. Fragile long-lived species, such as the soft coral <i>Parerythropodium coralloides</i> , pink sea-fan <i>Eunicella verrucosa</i> and erect branching sponges are present, as are all five British species of cup-coral.
Plymouth Sound & Estuaries SAC	Intertidal and subtidal low energy reefs, including some composed of limestone. This relatively soft rock is extensively bored by the bivalve <i>Hiatella arctica</i> and the spionid worms <i>Polydora</i> spp., and harbours a rich fauna. In the sublittoral this steep-sided reef is dominated by a dense hydroid and bryozoan turf with anemones and ascidians. The sublittoral is of particular importance for its kelp- and animal-dominated habitats. Abundant populations of the slow-growing, long-lived, nationally uncommon pink sea-fan <i>Eunicella verrucosa</i> also occur at this site. The reef feature is in full salinity and subject to strong coastal influence.
Fal and Helford SAC	The hard bedrock reefs at this site are of low to medium topographic complexity and exist as patches of sublittoral rock (an uncommon habitat within marine inlets). They are subject to strong coastal influence, with parts of the reef experiencing reduced/variable salinity. The energy levels at this site are moderate. Within the marine inlets, deep sheltered bedrock reef is dominated by sponge and seasquirt communities. On the exposed open coast, dense kelp forests occur in shallower water, along with aggregations of jewel anemones, and Devonshire cup corals. In some deeper locations, pink sea fans occur. The maximum depth of reef systems in the Fal and Helford is around 30m bcd.

Haig Fras has been submitted to, and approved by, the European Commission and is now a Site of Community Importance. It awaits designation by the UK Government as an SAC.

Site	Description of relevant qualifying features
Haig Fras cSAC	The site is an isolated, fully submarine bedrock outcrop located in the Celtic Sea, 95km north west of the Isles of Scilly. The rocky outcrop is approximately 45km long and in one area rises to a peak that lies just 38m beneath the sea surface. It is the only substantial area of rocky reef in the Celtic Sea beyond the coastal margin. The rock is granite, mostly smooth with occasional fissures. It supports a variety of fauna ranging from jewel anemones <i>Corynactis viridis</i> and Devonshire cup coral <i>Caryophyllia smithii</i> near the peak of the outcrop, to encrusting sponges, crinoids and Ross coral <i>Pentapora foliacea</i> (now <i>P. fascialis</i>) towards the base of the rock (where boulders surround its edge). The surrounding seabed is approximately 100m deep.

The following sites have been submitted to the European Commission within the Western English Channel and Celtic Sea Regional Sea.

Site	Description of relevant qualifying features
Lizard Point cSAC	Lizard Point is a geologically and topographically complex area consisting of upstanding sublittoral reefs, flat bedrock reefs and rocky shoals, all skirted by a relatively flat basin. The reef is a moderate to high-energy system with the shallowest areas characterised by red algae and small amounts of kelp, the deeper tide swept slopes by anemones, soft corals, hydroids and echinoderms, and the scour tolerant communities at the slope bases. Lizard Point is fairly unique in terms of its underlying geology.
Land's End and Cape Bank cSAC	The Land's End and Cape Bank site lies to the west of the Land's End peninsula and extends to almost 25 km from the coast. The reefs are fully submarine, upstanding features which are composed of almost entirely of granite. The site has two main reef areas, the coastal margin reefs running along the coast and offshore upstanding reef which extends in a broad, arching crescent roughly aligned with the coastline. The inshore reefs are notable for their topographic complexity, which results in high biological and biotope diversity. The reef is dominated by tide-swept kelp forest and kelp parks with dense foliose red algae. The crescent shaped system of offshore upstanding rocky reefs forms the major feature of conservation interest at the site. The reef is characterised by high biodiversity tide-swept communities such as sponges, faunal and algal turfs and crustose communities.

Site	Description of relevant qualifying features
Start Point to Plymouth Sound and Eddystone cSAC	The site comprises a mosaic of three areas containing Annex I 'reef' habitat. The reef habitats comprise complex outcropping bedrock, boulders and rocky gullies, fissures, crevices and pinnacles. They support a wide variety of reef fauna and flora commonly showing excellent examples of zonation from the infralittoral down to deeper water communities. The site is known to support some species rarely encountered in south-western waters such as the cushion star <i>Porania pulvillus</i> , the slipper lobster <i>Scyllarus arctus</i> and the sea fan anemone <i>Amphianthus dohrnii</i> . Furthermore, the presence of relatively large numbers of warm-water species, e.g. <i>Alcyonium glomeratum</i> and <i>Holothuria forskali</i> , in addition to more typical English Channel fauna indicates the area spans across a biogeographical boundary. The site also supports the most extensive and highest density beds of the pink sea fan <i>Eunicella verrucosa</i> and probably the most extensive and widespread colonies of the nationally rare sunset coral <i>Leptopsammia pruvoti</i> . The Eddystone Reefs area extends down into deep waters and supports good examples of deeper water reef species (such as the starfish <i>Porania pulvillus</i> and the parchment tube worm <i>Phyllochaetopterus anglicus</i>) that may not be so frequent on the more common inshore reefs. The reefs between Prawle Point and Start Point are very diverse and support many species. The reefs around Lannacombe Bay and Start Point consist of slate bedrock and steep cliff faces. In the areas of the site close to the shore, brittlestars and the common mussel are frequently found and there are a number of key species typically associated with defined reef habitat that have been recorded, including for example algae, soft coral (<i>Eunicella verrucosa</i>), bryozoans (e.g. <i>Pentapora foliacea</i>) and hydroids (e.g. <i>Tubularia indivisa</i>).
Lyme Bay and Torbay cSAC	The Lyme Bay and Torbay site lies off the south coast of England. The site comprised from two areas containing Annex I 'reef' and 'sea cave' habitat. The reefs exhibit a large amount of geological variety, ranging from limestone, cementstone ledges, sandstone outcrops, slates and granites as well as areas of boulder and cobble reef. Biogenic reef features comprising of <i>Mytilus edulis</i> reefs also occur within this site. Many of the bedrock reefs exhibit topographic complexity which adds to the habitats created by the features. The sea caves occur in several different rock types, and at levels from above the high water mark of spring tides down to permanently flooded caves lying in the infralittoral zone.

JNCC is proposing the following site within the central English Channel

Site	Description of relevant qualifying features
Wight-Barfleur reef cSAC	Wight-Barfleur Reef is located approximately 21km south of St Catherine's point, the southern tip of the Isle of Wight, and represents soft to hard bedrock reef and stony reef in the circalittoral and deep circalittoral zones. It is in full salinity waters, subject to moderate/high energy levels and an intermediate level of coastal influence. The sandstone, mudstone and siltstone reefs are of moderate topographic complexity, forming a series of ridges. Stony reefs formed by cobbles and boulders are present in the southern area of the site and also in the south-eastern area of the site, within part of a large palaeochannel known as the Northern Palaeovalley. The bedrock and stony reef areas support many types of sponges, from encrusting sponges to larger branching types, tube worms, anemones and tunicates (sea squirts). The extensive bedrock reef is an excellent example of circalittoral bedrock reef, and the only known such example in offshore waters within this regional sea.

6. Site boundary

The boundary around the Studland to Portland cSAC has been drawn using the guidance provided by JNCC (2008) and was defined through GIS mapping with further consideration against the guidelines (see Appendix 1). The key parts of this guidance are that the site boundary should be defined as simply as possible with a minimum number of straight lines, and should include the minimum area necessary to ensure protection for the Annex I habitat of interest. More complex shapes drawn more tightly around feature of interest are favoured over simple square/rectangular boundaries, to reduce the area of 'non-interest-feature' included within the site boundary.

7. Assessment of interest feature(s) against selection criteria

A full explanation of the application of the site selection criteria can be found on JNCC's website at www.jncc.gov.uk/page-4165.

7.1 Reefs

7.1.1 Representativity (a)

Evidence from existing survey data (DORIS 2010 and Haskoning 2007) indicates that the reef features within the Studland to Portland cSAC are Annex I reef habitat. This cSAC contains biologically and topographically diverse areas of reef, and has multiple reef interest features. Video drops of the area (Axelsson et al 2010; Haskoning 2008) reveal rich and varied habitats consisting of bedrock reef as well as boulder and cobble reef with a diverse assemblage of epifaunal species.

The species identified within this area are typically associated with reef habitat including algae, soft coral, bryozoa, and hydroids. There are multiple records of pink sea fan (*Eunicella verrucosa*), particularly on the Worbarrow reefs but also throughout the site (Plate 1).

Video and photographic surveys have provided evidence for a large Annex I biogenic reef consisting of an extensive common mussel (*Mytilus edulis*) bed situated on the southeast reefs off Portland (Axelsson et al 2010). Where mussels were present there were few other species present although Keel worms (*Pomatoceros triqueter*), barnacles (*Balanus sp.*), erect hydroids, and sparse cushions of encrusting sponges were found in spaces between clumps of mussels as well as large crustaceans such as the edible crab (*Cancer pagurus*). Other sub features included Annex I bedrock reef habitat to the west of Portland and Annex I stony reef habitat to the south and east of Portland Bill.

Although the three sandbank habitat sub-features (seagrass, maerl and brittlestar beds) are present within the cSAC, they do not appear to occur in association with sandbank features, but rather in shallow water with sandy and / or mixed sediments. Therefore, they cannot be considered to be representative of Annex I habitat and consequently are not considered further in this assessment.

The Studland to Portland site is graded A (Excellent representativity).

7.1.2 Area of habitat (b)

An evaluation of relative surface area is approximate as no accurate total extent figure is available for Annex I reef habitat for UK waters. The closest approximation available for the entire 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 (Commission of the European Community, 1995):

A – extents between 1,077,000 and 7,180,000 ha (15-100% of total resource)

B – extents between 143,600 and 1,077,000 ha (2-15% of total resource)

C – extents less than 143,600 ha (0-2% of total resource)

The area of Annex I reef habitat enclosed by the site boundary is 19,237.17 hectares, which is 58.32% of the total site area. This value equates to less than 1% of the national extent.

This site contains less than 1% of the national Annex I reef resource and is therefore, graded C for the area of habitats criteria.

7.1.3 Conservation of structure and function (c)

Degree of conservation of structure

Video and photographic analysis (Axelsson et al 2010) combined with extensive diver survey data from both the Portland Reefs and the Studland Bay to Ringstead Bay reefs indicate that the majority of the reef habitat within the cSAC appears to be of good quality and well conserved. Existing survey data does document some damage to pink sea fan colonies having occurred in the Studland Bay to Ringstead Bay reefs area in the past (evident by several colonies growing at an acute angle) although the source of this disturbance is not clear. Ground-truth data suggests that the structure over much of the offshore reef area is in good condition and indicative of excellent reef habitat (Axelsson et al 2010). There are some records of damage / degradation to the areas of reef sub-features associated with the Ross worm (*Sabellaria spinulosa*) features off Swanage. However, despite these structural concerns with some of the sub-features an overall assessment of the structure of Annex I habitat within this area for all features suggests that it is in excellent condition.

The Studland to Portland site is graded i (excellent structure).

Degree of conservation of functions

Evidence from existing data indicates that the reef features within this site support a healthy biological community. A number of areas within the site have been identified for their outstanding diversity and importance (e.g. Studland Bay and Ringstead Bay reefs) and currently their functioning is not compromised.

The Studland to Portland site is graded i (excellent prospects).

Overall grade

The guidance provided in the EU manual indicates that where a structural rating of 'i' is given restoration potential does not need to be assessed. The Studland to Portland site has been graded i for the conservation of structure and function sub-criteria.

The overall grade for the conservation of structure and function criterion is grade A (excellent conservation value).

7.1.4 Global assessment (d)

The Studland to Portland cSAC comprises a wide range of different Annex I reef habitats (which may not be found in areas of single rock type) and consequently the site supports high biodiversity.

The Studland Bay to Ringstead Bay reefs, in particular, represent an excellent example of Annex I reef habitat. This area has been found to contain a large variety of reef habitats including key sub-features such as the biogenic reefs formed from aggregations of mussels. Some of the key species include colonies of the nationally uncommon pink sea fan (*Eunicella verrucosa*), varieties of cup corals, and biogenic reef forming mussels. Moreover, the reef supports a wide variety of species typical of both cold and warm-water environments, such as *Alcyonium glomeratum* and *Holothuria forskali*, as well as more typical English Channel species. At present, the majority of the area appears to have excellent conservation of structure and function.

The Studland to Portland site is graded A (Excellent conservation value).

7.2 Summary of scores for stage 1A criteria

Studland to Portland	Representativity (a)	Relative surface (b)	Structure and function (c)	Global assessment (d)
Reefs	A	C	A	A

8. Sites to which this site is related

None.

9. Supporting scientific documentation

Scientific information on the topography, habitats and species present within the Studland to Portland cSAC boundary are available from a number of sources. These are listed in the table below and displayed in figure 9.1.

Table 9.1 – supporting scientific documentation for Studland to Portland cSAC

Where documentation is publicly available, or Natural England has permission to publish it, the link to the document is shown. It is not possible to link to raw data. For access to sources not linked please email swmarine@naturalengland.org.uk

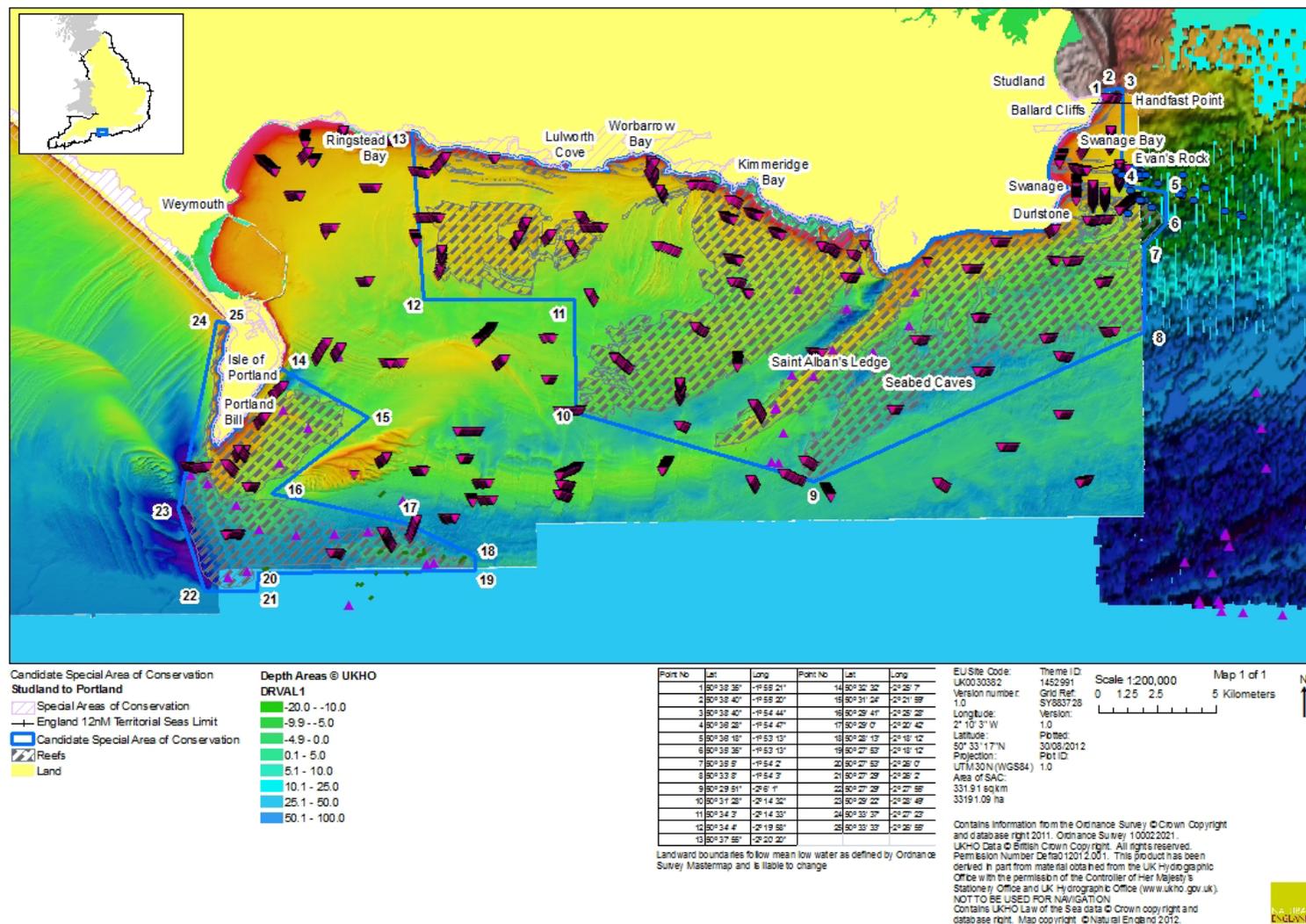
Reference	Description
Collins and Baldock 2010. Evaluation of the Seabed: Balaclava Bay to Grove Point & in Weymouth Bay both within the area of Portland Harbour Authority jurisdiction and the Weymouth and Portland Joint Pilotage Area.	Studies undertaken for Portland Harbour Authority. Comprehensive evaluation of seabed between Balaclava Bay to Grove Point and in Weymouth Bay using video data collected specifically for this report by Marine Ecologists at the University of Southampton.

Digital Survey Bathymetry data (SeaZone Ltd.).	Digital Survey Bathymetry data (east of Studland).
<p>Dorset Integrated Seabed Survey 2010 (DORIS) and analysis by Axelsson et al., (2010).</p> <p><i>Backscatter data and video data is not publically available yet, but can be requested from Dorset Wildlife Trust mail@dorsetwildlifetrust.org.uk.</i></p> <p><i>Bathymetry (low resolution) data http://tinyurl.com/dorismap</i></p> <p><i>Bathymetry (high resolution) from Channel Coastal Observatory cco@channelcoast.org (Free, but requires registration).</i></p> <p>Analysis by Axelsson et al. Drop-down camera (ground truthing) survey report - This is the low res (7MB) October 2010 version (v 02) of the DORIS report, but if a high res version (20MB) is required for printing, etc. contact Dorset Wildlife Trust mail@dorsetwildlifetrust.org.uk. who will send it out on CD.</p>	<p>The project has mapped the extent and distribution of seabed features in an area East of Lyme Bay to Poole Bay. This data set is 778 gigabytes of raw bathymetry and backscatter data covering an area of 800km² ground truthed by 3306 photographs and 85km of video transect recording over 55 hours of film.</p>
Royal Haskoning, 2008. Site Selection Report for the Inshore Marine SACs project; Poole Bay to Lyme Bay. 25 May 2008, 9S0282.	Studies undertaken for Natural England. Specified survey work conducted on Portland, Studland and Ringstead reefs.
<p>RPS 2006. 3.4.1 Offshore Geophysical Survey</p> <p>RPS 2006 3.4.4 Marine Water Quality Sampling Report</p> <p>RPS 2006 3.4.10 Benthic Fauna and Sediment Assessment</p> <p>RPS 2006 3.4.14 Fisheries Deskstudy</p>	Studies undertaken for the Portland Gas Storage Environmental Impact Assessment (EIA) including geophysical data (sidescan and bathymetry), benthic sampling, water quality and fisheries in the vicinity of Balaclava Bay.
<p>Seasearch data 2002 – 2010.</p> <p>All Seasearch reports available at: http://www.seasearch.org.uk/achievements.htm</p> <p>Biodiversity data (including Seasearch) are available at: http://data.nbn.org.uk/ 2010</p>	A regional marine monitoring programme.

data will be there imminently.

Accessed August 2011

Figure 9.1. Studland to Portland cSAC data map



10. Site overview and conservation interest

10.1 Reefs

Studland Bay to Ringstead Bay reefs

Numerous areas of reef (in many forms) exist within the Studland Bay to Ringstead reefs area. The reefs present exhibit a large amount of geological variety, ranging from exposed chalk bedrock east of Ringstead Bay through to exposed shales and clays, limestone and cementstone ledges, and boulders around Kimmeridge to Durlston and back to exposed chalk bedrock between Ballard cliffs and Handfast point in the east of the site.

The reef habitat extends from Ringstead Bay to St Albans Head and is found close to shore (rarely extending beyond 4 to 5 km from the coast). This region of reef habitat from St Albans' Head to Lulworth Cove is characterised by flat bedrock with inshore areas of boulders and gravel, with ross coral *Pentapora foliacea* (now *P. fascialis*) recorded extensively along with other sponges, including *Axinella* sp, bryozoans, (hornwrack, *Flustra foliacea* dominant) deadmans fingers (*Alcyonium digitatum*), hydroids and tunicates (including large patches of *Stolonica socialis*) (Plate 6). Colonies of the pink sea fan *Eunicella verrucosa* (Plate 1) are also recorded in this area. The bedrock in this area is commonly piddock bored, which serves to increase habitat complexity (providing habitat for species such as the daisy anemone *Cereus pedunculatus*) and therefore, species diversity (Plate 4).

Worbarrow Bay reefs comprise a notable series of limestone ledges protruding from shelly gravel. The reefs, up to 15m across, have a very smooth, gently sloping upper surface supporting a rich sponge and sea fan community, with large branching sponges and sea fans up to a density of about 3-4 per 10 square metres. Other sponges here include *Tethya aurantium* and *Polymastia boletiformis* (Dorset Wildlife Trust, 2004). The broken reef edge forms medium to large boulders with encrusting sponges, *Pachymatisma johnstonia*, hydroids and clusters of the trumpet anemone, *Aiptasia mutabilis* (Plate 5). The shoreward edge of these reefs grade into a waved shelly sand with scallops and occasional small rocks or artillery shells, covered in a bryozoan/hydroid turf. The Bay also contains the wreck of the Black Hawk which supports a number of rarely reported coral species, the cup coral, *Caryophyllia inornata* and the Weymouth carpet coral, *Hoplangia durotrix*. The wreck also supports several pink sea fans, *Eunicella verrucosa*, and colonies of jewel anemones, *Corynactis viridis* (Dorset Wildlife Trust, 2004).

The shale reefs extend out off Kimmeridge and support dense concentrations of the brittlestar *Ophiothrix fragilis*. The boundaries for the brittlestar beds are quite distinct and the overall position of the beds appears relatively constant. To the west, in deeper water, there are reports of *Ampelisca* mats (Dorset Wildlife Trust, 2004).

St Albans Ledge is a unique feature in the area, extending out over 10km from the shore. This feature is subject to strong tidal action and the ledge drops in a series of deep steps on the west side, with two deep, scoured holes extending to a depth of around 60m. The reef was identified using multibeam, video and photographs supplied by DORIS and Haskoning (2008). The dominant biotopes found in this area were bryozoan and colonial ascidians on tide swept moderately wave exposed circalittoral rock. This biotope is considered typical of Annex 1 reef habitat ([JNCC correlations table](#)). Tunicates, sponges and encrusting bryozoa indicative of reef habitat also dominated the epifaunal communities.

The shallower inshore sites are characterised by bedrock reef and sparse algal turf (*Mastocarpus stellatus* and *Delesseria sanguinea*) and coralline algal crusts with encrusting barnacles and *Pomatoceros* sp. Further offshore the bedrock reef is replaced with a boulder and cobble reef structure characterised by a diverse and rich habitat with a range of encrusting sponges. The Ross Coral (bryozoan) *Pentapora foliacea* (now *P. fascialis*) and the ascidian *Asciidiella aspersa*, *Flustra foliacea* and *Pomatoceros* sp. are also common.

East of St Albans Ledge an area of large limestone blocks, known as the “seabed caves”, occurs. In places, these blocks lie in a loose jumble with deep overhangs, in other areas they form a level pavement but with deep, narrow fissures in between the blocks. These complex habitats support a wide variety of species dominated by red/brown algal turf, sponges (such as *Polymastia boletiformis*), *Bispira* fanworms, Weymouth carpet Coral *Hoplangia durotrix*, red algae found on the vertical edges and hydroids, bryozoans, sponges and *Flustra foliacea* which are found on the top (Dorset Wildlife Trust 2004).

The outcropping bedrock reef continues east of St Albans Head round to Durlston Head, with the limestone rock being piddock bored (Plate 4). The reef consists of rugged bedrock and jumbled boulders with gullies, overhangs and crevices. Upward facing rocky surfaces are dominated by kelps, including *Laminaria digitata*, *Laminaria hyperborea* and *Saccorhiza polyschides* with red algae including *Calliblepharis ciliata*, *Delesseria sanguinea*, *Drachiella spectabilis*, *Phyllophora crista*, *Plocamium cartilagineum*, *Hypoglossum hypoglossoides* and encrusting coralline algae. Vertical / overhanging surfaces support sponges, and *Bispira* fanworms, sea hares, *Aplysia*, are all common. Records of the scarce cup-coral, *Caryophyllia inornata* exist on these reefs where deep overhangs on rocky reefs are exposed to strong currents (Dorset Wildlife Trust, 2004). There are patches of shelly gravel and rippled sand, often overlying clay or sandstone which is exposed in places. The exposed clay is extensively bored by piddocks and the sandy areas have numerous burrowing anemones, such as *Cerianthus lloydii* and sandmason worms, *Lanice conchilega*.

Within the outer limits of Swanage Bay lies a feature known as Evans Rock, which is a gently sloping mound rising to 9m with a flattish top, covered with small, slab-like boulders and cobbles, separated by small areas of shelly sand. This feature supports a diverse cover of sponges (*Esperiopsis fucorum*, *Hemimycale columella*, *Dysidea fragilis*, *Tethya aurantium*), hydroids (*Nemertesia* sp, *Plumularia setacea*, *Aglaophenia* sp.), bryozoans and tunicates (*Aplidium* sp., *Lissoclinum perforatum*). The fanworm, *Bispira volutacornis* is abundant here, as is the cowrie, *Trivia artica*. The boring phase of the sponge, *Cliona celata*, has been recorded here along with a patch of the horseshoe worm, *Phoronis* sp. Three species of crevice dwelling sea-cucumber have also been recorded (Dorset Wildlife Trust, 2004).

The chalk bedrock occurring between Ballard Cliffs and Handfast Point is encrusted with red algae (*Calliblepharis ciliata* dominant), *Saccorhiza polyschides* and *Dictyota dichotoma* (Plate 3, Section 4). Overhangs provide shelter for a variety of fauna including the sponges *Dysidea fragilis*, *Esperiopsis fucorum*, *Dercitus bucklandii* and *Hemimycale columella*, the fanworm *Bispira volutacornis*, deadmans fingers (*Alcyonium digitatum*), crabs and squat lobsters (*Galathea* sp.) (Dorset Wildlife Trust, 2004).

Studland Bay contains a number of small shallow water reefs, which are commonly characterised by having a silty veneer and surrounded by a sandy seabed. The rocks are covered in a rich turf of brown and red algae (mostly *Cliona celata*), hornwrack (*Flustra foliacea*), sponges, particularly *Esperiopsis fucorum* and *Hemimycale columella*, hydroids, Deadmans fingers (*Alcyonium digitatum*) and bryozoans (*Flustra* and *Bugula*) with the fanworm *Bispira volutacornis* frequently recorded in the crevices. The seabed near the reef

is covered in a dense layer of the slipper limpet, *Crepidula fornicata* (Dorset Wildlife Trust 2004).

Portland reefs

There are records for over 50 SeaSearch dives made on the west side of Portland. The habitat in water depths of less than 25m has been described as rugged with huge angular, limestone boulders providing deep gullies and overhangs between. “Mini caves” are described here with a highly distinctive community dominated by barnacles and encrusting sponges and bryozoa. Boulders are topped with an infralittoral community of kelp with an understory of a range of red algae. Vertical surfaces are typified by mixed faunal turf communities of bryozoans turf with encrusting and massive sponges. The clay seabed beneath these boulders is of soft rock deeply bored by piddocks (Collins and Baldock 2010).

Also, of particular note in this area are the *Mytilus edulis* beds, which are found in high densities on bedrock with strong currents off the eastern side of Portland Bill. Video footage collected as part of the DORIS project show the beds are comprised of predominantly mature mussels but in some areas are dominated by juvenile spat (Plate 2).

10.2 Notable and characterising biotopes recorded in the Studland to Portland cSAC

JNCC 04.05 Biotope Code	EUNIS code	Biotope description
IR.HIR.KFaR.FoR	A3.116	<i>Foliose red seaweeds on exposed lower infralittoral rock</i>
IR.HIR.KSed	A3.12	<i>Sediment-affected or disturbed kelp and seaweed communities</i>
IR.MIR.KR.Ldig	A3.211	<i>Laminaria digitata on moderately exposed sublittoral fringe rock</i>
IR.MIR.KR.LhypT	A3.212	<i>Laminaria hyperborea on tide-swept, infralittoral rock</i>
CR.HCR.XFa.ByErSp	A4.131	<i>Bryozoan turf and erect sponges on tide-swept circalittoral rock</i>
CR.HCR.XFa.FluCoAs	A4.134	<i>Flustra foliacea and colonial ascidians on tide-swept exposed circalittoral mixed substrata</i>
CR.HCR.XFa.Mol	A4.138	<i>Molgula manhattensis with a hydroid and bryozoan turf on tide-swept moderately wave-exposed circalittoral rock</i>
CR.MCR.EcCr.FaAlCr	A4.214	<i>Faunal and algal crusts on exposed to moderately wave-exposed circalittoral rock</i>
CR.MCR.SfR.Pid	A4.231	<i>Piddocks with a sparse associated fauna in sublittoral very soft chalk or clay</i>
CR.MCR.CMus.CMyt	A4.241	<i>Mytilus edulis beds with hydroids and ascidians on tideswept rock</i>
SS.SBR.SMus.MytSS	A5.625	<i>Mytilus edulis beds on sublittoral sediment</i>
SS.SMx.CMx.FluHyd	A5.444	<i>Flustra foliacea and Hydrallmania falcata on tide-swept circalittoral mixed sediment</i>

11. Photographic plates

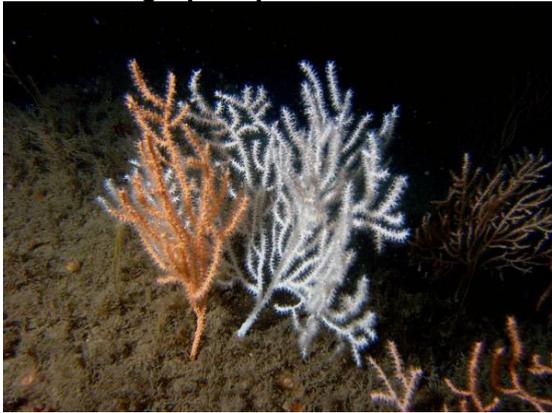


Plate 1 Pink sea fan on Worbarrow reef.
©Keith Hiscock



Plate 2 Spider Crab (*Maia squinado*) feeding on *Mytilus edulis* biogenic reef off Portland Bill.
Source: Dorset Wildlife Trust, 2010.



Plate 3 *Dictyota dichotoma* and red seaweeds on infralittoral rocky reef. Source: Dorset Wildlife Trust, 2004.



Plate 4 Scoured bedrock with piddock holes.
Source: Dorset Wildlife Trust, 2004.



Plate 5 Trumpet anemonies (*Aiptasia mutabilis*), Crater sponge (*Hemimycale columella*), Goosebump sponge (*Dysidea fragilis*) on subtidal reef. Source: Dorset Wildlife Trust, 2010.



Plate 6 Diverse bryozoan community (*Pentapora foliacea* and *Flustra foliacea*) off Lulworth Cove.
Source: Dorset Wildlife Trust, 2010.

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13. Glossary

Acoustic survey A survey undertaken using remote methods to establish the topography and or seabed texture.

Ascidian An ascidian or sea-squirt is a marine animal which lives attached to rocks.

Backscatter The diffuse reflection of signals back to the direction they came from, due to scattering. Multibeam backscatter imagery provides an objective tool to record the extent and condition of the benthic resource.

Benthos Those organisms attached to, or living on, in or near the seabed.

Biodiversity The full range of natural variety and variability within and among living organisms.

Biogenic concretion Feature defined as: concretions, encrustations, corallogenic concretions and bivalve mussel beds originating from dead or living animals, i.e. biogenic hard bottoms which supply habitats for epibiotic species.

Biogeographical boundary A geographical boundary based on biological features.

Biotic Relating to, produced by, or caused by living organisms.

Biotope The physical habitat with its biological community; a term which refers to the combination of physical environment and its distinctive assemblage of conspicuous species.

Bivalves A class of molluscs which are laterally flattened and have a shell made of two hinged valves.

Brittle star bed A dense aggregation (or bed) of brittle stars also called Ophiuroid.

Bryozoans are tiny colonial animals that generally build stony skeletons of calcium carbonate, superficially similar to coral (although some species lack any calcification in the colony and instead have a mucilaginous structure).

Circalittoral The region dominated by sessile animals, found below the algal zone.

Conservation of Species and Habitats Regulations 2010 Also known as 'the Habitats Regulations'. This transposes the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law.

Coral An invertebrate that secretes an internal, hard skeleton structure composed of calcium carbonate, which is absorbed from the surrounding water.

Corallogenic Reef building organisms with calcareous structures.

Crinoids A class of echinoderms having a cup-shaped body with feathery arms, attached to the substratum, sometimes by a stalk.

Crustacea A group of animals with two pairs of antennae and a calcium carbonate exoskeleton e.g. crab or lobster.

Crustose Forming a thin crust on the substratum.

Deadman's fingers A colonial soft coral that forms thick, fleshy and irregular masses, which are often finger-like in appearance.

Demersal Organism living on or close to the sea bed.

Echinoderm Any member of the phylum Echinodermata, a group of exclusively marine invertebrate animals including sea urchins, star fish and brittle stars.

Epifauna A term to describe animals living on the surface of the seabed.

Foliose Bearing leaves or leaf-like structures.

Fauna Animal life in an area.

GIS Geographic Information System.

Grab sample A method of physical surveying to assess the seabed constituents. Sample is collected in a 'bucket' and the contents then analysed for biological / physical purposes.

Habitat The place in which a plant or animal lives.

Hard compact substrata Consolidated seabed sediment comprising rocks (including soft rock, e.g. chalk), boulders and cobbles (generally >64 mm in diameter).

Hydroids Solitary and colonial animals with a cylindrical; body which is closed at one end with a mouth surrounded by tentacles at the other.

Infauna A term to describe animals living within the seabed.

Littoral The intertidal zone.

Maerl Twig-like unattached (free living) calcareous red algae, often a mixture of species and including species which form a spiky cover on loose small stones.

Mollusc A phylum of invertebrates which include modern creatures such as snails, slugs, cockles, and squids.

Multibeam A marine survey technique to establish the bathymetry and identify sea bed features.

Ophiuroid Commonly known as brittle stars. Ophiuroids are a variety of marine organisms of the class Ophiuroidea, related to and resembling the starfish but having long slender arms.

Piddock Type of rock boring mollusc.

Piddock bored A rock that has been bored into by a type of mollusc.

Pink sea fan The term used to describe a particular colony of cnidarians (coral). Pink sea fans are formed from a colony of tiny polyps; they may be a deep pink to white in colour, and attach to the substrate with a broad base.

Polychaete Marine worms of the class Polychaeta of the invertebrate worm order Annelida.

Potting The setting of traps (pots) on the seabed to fish for lobsters, crabs etc.

Seagrass(es) Higher plants (angiosperms) that are adapted to living submerged in seawater.

Sessile Permanently attached or fixed; not free-moving.

Side-scan sonar A geophysical instrument that uses sound waves reflected off the seafloor to image the aerial extent of different bottom types.

Sponge A variety of marine invertebrates, mostly of the phylum Porifera that have a porous skeleton often of silica.

Static gear Any gear which is set in position and not moved during the fishing process.

Sublittoral The marine zone below Mean Low Water (MLW) springs.

Trawling Towing equipment behind a vessel for commercial fishing purposes. Bottom trawls collect demersal fish species and mid-water trawls collect pelagic species. Examples of towed gears include beam trawls, dredges and trawl nets.

Tunicate A primitive marine animal having a saclike unsegmented body and a urochord that is conspicuous in the larva.

Turf A term used to describe a layer of marine organisms growing on a hard substrate.

Zonation The division of a large area into smaller areas based on certain predetermined characteristics.

Appendix 1

Guidelines on drawing boundaries (taken from JNCC 2008)

Introduction

Previous UK guidance on defining SAC boundaries states that “as a general principle, site boundaries have been drawn closely around the qualifying habitat types...for which the sites have been selected, taking into account the need to ensure that the site operates as a functional whole for the conservation of the habitat type...and to maintain sensible management units”. Further “the seaward boundaries of the sites have been drawn as straight lines, to ensure ease of identification on charts and at sea” (Brown *et al*, 1997; McLeod *et al*, 2005). The guidance presented below is an expansion of previous guidance on defining boundaries for marine SACs, specifically for sites which are not connected to the coastline, and which may be in deep water (200m to more than 1000m).

Guidance

Actual site boundaries will be determined on a site specific basis, following the general guidance set out below.

The habitat area of interest will be identified and mapped. In many cases in waters away from the coast, this will involve some form of modelling, such as use of seabed geological data (interpolated from seismic tracks and samples), interpreted sidescan sonar, acoustic and/or bathymetric data.

The minimum area necessary in order to ensure the essential level of protection for the Annex I habitat of interest will be defined. More complex site shapes drawn more tightly around feature of interest are favoured over simple square/rectangular boundaries (to reduce the area of ‘non-interest-feature’ included within the site boundary). However, boundaries should still be as simple as possible, using a minimum number of straight lines and vertices. Contrary to previous JNCC boundary guidance (JNCC, 2004) site boundary co-ordinates do not have to be defined by whole degrees and minutes. It is recommended that site boundary coordinates will be provided in degrees, minutes, and seconds.

Where habitat of interest occurs in a number of separate ‘pieces’ with ‘non-interest-feature’ habitat between, the preference is to include all ‘pieces’ within a site boundary to enable effective conservation of the feature of the site and to maintain its ecological function. However, where small, isolated instances of habitat occur at some distance from the main location of the habitat, these may be excluded from the site if their inclusion would result in large areas of ‘non-interest-feature’ being included within the site boundary.

The area defined under 2 above may then be extended if necessary in the following circumstances:

- i). to ensure an essential level of protection from potentially damaging activities at the site, taking into account water depth at the site and possible location of mobile gear on the seabed in relation to location of a vessel at the sea surface. Activities which are location specific, always subject to prior consent and have clear reliable methods of enforcement are already controlled under existing procedures such as licensing of these activities. Mobile activities which may affect seabed habitats, such as fishing and anchoring, are not subject to prior consent procedures and therefore need special consideration. The length of warp used by boats when trawling is largely determined

by water depth. The following table gives the appropriate distance beyond the seabed extent of the habitat by which the site boundary at the sea surface may be extended (based on generalised trawl warp lengths, SERAD, 2001):

Water Depth	Ratio warp length: depth	Approx. length of trawl warp	Boundary extension to be added to the habitat area of interest
Shallow waters ($\leq 25\text{m}$)	4:1	100m at 25m depth	4 * actual depth
Continental shelf (50-200m)	3:1	600m at 200m depth	3 * actual depth
Deep waters (200 to over 1000m)	2:1	2000m at 1000m depth	2 * actual depth

Note that the margin is incorporated as a minimum measure to reduce the likelihood of habitat damage from demersal fishing. However, these boundaries are SAC boundaries, not management boundaries. Ultimately Competent Authorities are responsible for considering which management actions might need to be taken under the Conservation of Habitats and Species Regulations 2010 to reduce the risk of damage to the features associated with human activities, whether within or outside the site boundary. As a consequence, future management measures may have different boundaries to the SAC site boundary.