



**Inshore Special Area of Conservation (SAC):  
Start Point to Plymouth Sound & Eddystone**  
*Incorporating Prawle Point to Plymouth Sound and Eddystone cSAC and  
Prawle Point to Start Point cSAC*

**SAC Selection Assessment**

**Version 3.7**

## Version Control

Version date	Amendments made	Issued to
3.7 9 <sup>th</sup> September 2011	pSAC changed to cSAC following submission to European Commission	Stakeholders 14 <sup>th</sup> September 2011
3.6 3 <sup>rd</sup> August 2011	References linked	Issued to Defra
3.5 1 <sup>st</sup> June 2011	Amendment of minor typing errors following meeting of Executive Board and Board members on 11 <sup>th</sup> May 2011.	Defra Marine Biodiversity – as Natural England's final recommendation.
3.4 10 <sup>th</sup> March 2011 (re-dated 3 <sup>rd</sup> May 2011 after revision of minor typos)	Revisions following circulation to MPA Technical group and UK Marine Biodiversity Steering Group	James Marsden, Director Marine, for final QA. Minor typos corrected and issued to Guy Thompson, Executive Director sponsor for QA prior to issue to Executive Board for consideration at a meeting on 28 <sup>th</sup> March 2011. Deferred by Executive Board on 28 <sup>th</sup> March 2011 for further consideration. QA by James Marsden and Jim Smyllie, for issue for consideration at a meeting of the Executive Board and Board members on 11 <sup>th</sup> May 2011.
3.3 19 <sup>th</sup> January 2011	Minor typing errors	JNCC for circulation to MPA Technical group and Defra for circulation to UK Marine Biodiversity Steering Group.
3.2 14 <sup>th</sup> January 2011	Minor amendments to text	Natural England Evidence team final review and QA by James Marsden, Director Marine.
3.1 15 <sup>th</sup> December 2010	Minor amendments made to text.	Natural England N2K Project Manager.
3.0 10 <sup>th</sup> December 2010 (Start Point to Plymouth Sound and Eddystone)	Incorporation of Start Point to Prawle Point extension (consulted on August to November 2010). Site name change, map changes (area, boundary and nodes)	Natural England regional lead advisors.
2.3 May 2010	Minor text amendments	Natural England Executive Board for submission of Prawle Point to Plymouth Sound and Eddystone to the European Commission as a candidate SAC on 20 <sup>th</sup> August

		2010, and further consultation on Prawle Point to Start Point pSAC.
2.2 May 2010	Text amendments	Director Marine and Executive Director sponsor for QA.
2.1 May 2010	Text amendments	Internal review.
2.0 26 <sup>th</sup> April 2010	Text amendments following consultation and new map	Internal review.
1.0 December 2008 (Prawle Point to Plymouth Sound and Eddystone).	Drafted for executive Board and submission to Defra for approval for formal consultation	Publicly available at start of informal dialogue July 2009; and for formal consultation November 2009.

## 1. Introduction

This document provides detailed information about the Start Point to Plymouth Sound & Eddystone SAC 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 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 Commission (EC)<sup>1</sup>.

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 mentioned in the text. Natural England has adhered to the format established by the EC for providing site information. This format is set out in the 'Natura 2000 Standard data form' (CEC, 1995) and prepared by the European Topic Centre for Biodiversity and Nature Conservation on behalf of the European Commission to collect standardised information on SACs throughout Europe.

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

## 2. Start Point to Plymouth Sound & Eddystone: SAC Selection Assessment

<b>1. Site name</b>  Start Point to Plymouth Sound & Eddystone	<b>2. Site centre location</b>  Degrees, minutes and seconds: 3° 59' 01"W 50° 12' 36"N Decimal degrees: 3.98° W 50.21° N (Datum: WGS84)
<b>3. Site surface area</b>  <b>34,076 ha; 341 sq km</b> (UTM Zone 30 Northern hemisphere WGS84)	<b>4. Biogeographic region</b>  Atlantic

Note:

Evidence for the Prawle Point to Start Point section of this site came to light during the formal consultation on Prawle Point to Plymouth Sound and Eddystone pSAC November 2009-February 2010. Prawle Point to Start Point was formally consulted on from August to November 2010 and Prawle Point to Plymouth Sound and Eddystone site was submitted to the European Commission on 20th August 2010. The two sites have been brought together following government approval and submission to the European Commission on 9<sup>th</sup> September 2011.

### 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](http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/2007_07_im.pdf)

1170 Reefs.

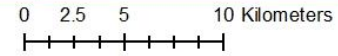
4. Map of SAC boundary<sup>2</sup>



candidate Special Area of Conservation  
**Start Point to Plymouth Sound and Eddystone**  
 [Black outline] candidate Special Area of Conservation  
 [Pink hatched] Special Areas of Conservation  
 [Blue hatched] Reefs  
 [Black line] England 12nM Territorial Seas Limit  
 [Yellow] Land

EU Site Code: UK0030373  
 Version number: 2.2  
 Longitude: 3° 59' 1" W  
 Latitude: 50° 12' 36" N  
 Projection: UTM 30N (WGS84)  
 Area of SAC: 340.76 sq km  
 34076.13 ha

Theme ID: 1452106  
 Grid Ref: SX585383  
 Version: 9.0  
 Plotted: 05/09/2011  
 Plot ID: 7.0



Scale 1:350,000 Map 1 of 1 N

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<sup>2</sup> Larger copies of maps are available on request from Natural England, Regulatory Services, Floor 3, Toughill Close, Peterborough. PE1 1XN

Location of boundary nodes\*

Point No	Lat	Long	Point No	Lat	Long
1	50° 13' 23"	-4° 20' 20"	17	50° 17' 36"	-4° 9' 43"
2	50° 12' 34"	-4° 15' 30"	18	50° 8' 21"	-3° 46' 15"
3	50° 11' 19"	-4° 14' 30"	19	50° 8' 59"	-3° 54' 6"
4	50° 9' 26"	-4° 15' 42"	20	50° 10' 19"	-3° 55' 15"
5	50° 11' 28"	-4° 21' 6"	21	50° 10' 16"	-3° 58' 57"
6	50° 10' 40"	-4° 25' 38"	22	50° 12' 45"	-4° 1' 41"
7	50° 10' 12"	-4° 29' 24"	23	50° 12' 54"	-4° 7' 51"
8	50° 10' 36"	-4° 29' 40"	24	50° 14' 16"	-4° 7' 46"
9	50° 12' 18"	-4° 26' 27"	25	50° 14' 52"	-4° 2' 1"
10	50° 13' 0"	-4° 24' 37"	26	50° 14' 44"	-3° 52' 9"
11	50° 18' 29"	-4° 9' 35"	27	50° 14' 37"	-3° 51' 59"
12	50° 18' 12"	-4° 4' 33"	28	50° 13' 6"	-3° 46' 51"
13	50° 18' 23"	-3° 57' 21"	29	50° 13' 24"	-3° 46' 23"
14	50° 18' 23"	-3° 56' 50"	30	50° 13' 25"	-3° 38' 27"
15	50° 16' 48"	-3° 53' 20"	31	50° 13' 25"	-3° 36' 57"
16	50° 16' 5"	-3° 54' 25"	32	50° 12' 40"	-3° 36' 58"

\*Landward boundaries follow OS mean low water line

## 5. Site summary

### 5.1 Reefs

Start Point to Plymouth Sound & Eddystone lies off the south coast of England off the counties of Devon and Cornwall. The site comprises a mosaic of three areas containing annex I 'reef' habitat. The areas are described as, from east to west:

- Start Point to West Rutts reefs
- Bigbury Bay to Plymouth Sound reefs
- The Eddystone Reefs

#### Start Point to west Rutts reefs

The reefs between Start Point and Prawle Point appear similar in nature to that to the west of Salcombe (i.e. one of high topographic complexity). This large reef habitat comprises outcropping bedrock characterised by boulders and rocky gullies, fissures and crevices in the west of the area from Salcombe around the coast to Start Point. The inshore reefs here support large kelp forests and a variety of other algal species.

#### Bigbury Bay to Plymouth Sound reef

The Bigbury Bay to Plymouth Sound reef area is an extensive area of outcropping bedrock reef characterised by rugged inclines, steep faces, slate ridges and overhangs. Shallow parts of these reefs are dominated by algae including extensive kelp forests whilst, below a depth of about 20m, faunal communities predominate. Reefs are broken, with shale reefs especially having extensive overhangs. The submerged cliff line, between approximately 25m and 35m below chart datum and about 2km south of the Plymouth Sound breakwater, is a geological feature that provides an important habitat for many rare and scarce species, as well as being spectacularly colourful (Hiscock & Breckels, 2007). The Bigbury Bay to Plymouth Sound reefs exhibit similar graphic complexity to that seen inshore, with pinnacles, boulder fields and complex broken geological features being frequently recorded. The area has been subject to detailed investigations commissioned by English Nature in 2005, with a view to assessing the site's potential for supporting Annex I habitat. This was further supported by analysis of a more recent digital survey bathymetry dataset (SeaZone solutions, 2010) which allowed validation of previously mapped reef habitat.

#### The Eddystone Reefs

The Eddystone Rocks which lie some 20 km south of Plymouth Sound (Davies, 1998), are Devonian in age and consist of schist, siltstone and limestone (BGS, 1996) with flat-faced, angular vertical cliffs and overhangs (Irving, 1996). The Eddystone and surrounding reefs represent unusual features within the study area, in that they lie in deep water and rise steeply, and in the case of the Eddystone, break the water's surface. The seabed sediments in the Eddystone Reefs area exhibit a range of deposits, from coarse muddy sand to fine gravel and shelly gravel immediately around Eddystone Rocks (Holme, 1953). The area was subject to detailed investigations commissioned by Natural England in 2005, with a view to assessing the site's potential for supporting Annex I habitat. Surveying has shown the habitat to be fragmented, consisting of five reefs (Eddystone Reef, Hand Deeps, Middle Rock, Phillips Rocks and Hatt Rock (Axelsson *et al*, 2006)). Although the individual reefs are relatively small (both on a national and local scale), they are ecologically diverse and represent a locally significant area (in terms of their size) of permanently submerged reef habitat.



## 5.2 Start Point to Plymouth Sound & Eddystone Annex I Habitat Comparison

This site is situated within the Western English Channel and Celtic Sea Regional Sea (Defra, 2004). Listed below are existing SACs within the Western English Channel and Celtic Sea Regional Sea which contain Reefs as a qualifying Annex I habitat. The type of Reefs present are summarised in Table 5.1.

Table 5.1 Regional SACs and pSACs comprising reef habitat

Site	Notable characteristics of Reef interest feature
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 fans <i>Eunicella verrucosa</i> , and Weymouth carpet-coral <i>Hoplania 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> , 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 important pink sea-fan <i>Eunicella verrucosa</i> also occur at this site. The reef feature is in full salinity waters 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 30 m bcd.

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

SAC	Notable characteristics of Reef interest feature
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> towards the base of the rock (where boulders surround its edge). The surrounding seabed is approximately 100m deep.

The following sites within the Western English Channel and Celtic Sea Regional Sea have been submitted to the EC, and await approval as Sites of Community Importance

Site	Notable characteristics of Reef interest feature
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 25km from the coast. The reefs are fully submarine, upstanding features which are composed 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.
Lyme Bay and Torbay cSAC	The Lyme Bay and Torbay site lies off the south coast of England. The site is 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.

In addition, the following site has been proposed by Natural England, and will be subject to a formal public consultation in 2011.

Studland to Portland dSAC	The Studland to Portland site lies off the south coast of England. The site is comprised of two areas containing Annex 1 "reef". This site contains biologically and topographically diverse areas of reef, and has multiple reef interest features with rich and varied habitats consisting of bedrock reef as well as boulder, cobble and biogenic reef with a diverse assemblage of epifaunal species. The Studland to Portland dSAC spans a biogeographical boundary and therefore may constitute a vital colonisation site for more southerly species which may become increasingly important in the face of marine climate change.
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The reefs at the Start Point to Plymouth Sound & Eddystone site are some of the most biologically diverse in the country and play an important role in supporting species that are considered rare or are occurring at the limit of their biogeographic boundaries. The reefs associated with the Eddystone complex support a number of species that are more commonly associated with deeper water habitats.

## 6. Site boundary

The boundary around the Start Point to Plymouth Sound & Eddystone site has been drawn using the guidance provided by JNCC (2008) and was defined through GIS mapping of survey data with further consideration against the guidelines (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. Where it is justified to protect the features of the site from the effects of mobile gear on the seabed at some distance from a vessel on the surface, a margin in proportion to the water depth may be added to the extent of the feature when defining the site boundary (Appendix 1).

The individual areas within the Start Point to Plymouth Sound & Eddystone mosaic site are named in accordance with their geographical location and the features they contain.

## 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](http://www.jncc.gov.uk/page-4165).

### 7.1 Reefs

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

##### 7.1.1 Representativity (a)

The reef habitat in the Start Point to Plymouth area is assessed as strongly conforming to Annex I reef habitat. Extensive Marine Nature Conservation Review (MNCR, 2006) diver survey records provide detailed substratum and topographic information to support this.

Five types of reef substrate were encountered during the Natural England commissioned site survey in 2007 (PML applications 2008):

- Extensive rocky reef;
- Low lying reef, sometimes covered by silt;
- Boulder reef;
- Hard bedrock with overlying cobbles / gravel; and
- Mixed substrata (patches of rock, boulder, sand and gravel).

In addition to habitat descriptions, a number of key species that are typically associated with defined reef habitat have been identified in the area, including: algae (e.g. *L.hyperborea*, *Meredithia microphylla*), soft corals (e.g. *Alcyonium digitatum*), cup-coral (e.g. *Caryophyllia inornata*), stony corals (e.g. *Hoplangia durotrix*, *Caryophyllia smithii*), pink sea fan (*Eunicella verrucosa*), sponges (e.g. *Cliona celata*, *Esperiopsis fucorum*), bryozoa (e.g. *Pentapora foliacea*) and hydroids (e.g. *Tubularia indivisa*).

The Eddystone Reefs rocky habitat is judged to be a good example of Annex I reef habitat (Johnston *et al*, 2002). The biotope classification for the five reef areas (CR.HCR.XFa.ByErSp.Eun) is defined as '*Eunicella verrucosa* and *Pentapora foliacea* on wave-exposed circalittoral rock'. Dedicated site survey work carried out in 2005 (Axellson, 2006) and MNCR diver survey records, provide detailed substratum and topographic information to support the definition of reef habitat. Furthermore, species records identify a number of key species that are typically associated with defined reef habitat including: algae (e.g. *Alaria esculenta*, *Laminaria hyperborea*, *Dictyota dichotoma*), soft corals (e.g. *Alcyonium digitatum*), cup corals (e.g. *Caryophyllia inornata*), pink sea fans (*Eunicella verrucosa*) and sponges (e.g. *Cliona celata*).

## **The Start Point to Plymouth Sound & Eddystone 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, 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 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 approximately 10, 274 hectares, which is 30% of the total site area. This value equates to significantly less than 1% of the national extent.

**This site contains between 0-2% of the national Annex I reef resource and is therefore graded C.**

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

#### *Degree of conservation of structure*

The structure of the reef in the Start Point and Plymouth area appears from evidence from extensive diver surveying and BGS data to be fairly continuous from Gara Point to Prawle Point.

The Hotspots report (Hiscock & Breckels, 2007) noted that anthropogenic activities/threats focused on the inshore reef area where species may have been affected by Tributyltin (TBT) antifoulants in the 1980s (although this is likely to have been within the Plymouth Sound and not on the open coast). The report documents that mobile fishing gear sometimes 'encounters' reefs and may cause damage to attached species such as pink sea fan *E. verrucosa*. However, records of actual damage are few, and given the high diversity of species consistently found throughout this site it is suggested that the structure has not been notably affected by these activities. Static gear fishing does occur in this area, although, based on the information gathered to date, this does not appear to have significantly damaged the structure of the reef features. The site survey commissioned in 2007 to identify Annex I features did not find any evidence of anthropogenic or natural disturbance, or damage to the structures of the habitats identified (PML Applications, 2008)

Extensive sidescan sonar surveying of the Eddystone Reefs area revealed evidence of trawl scars from commercial fishing activity, particularly in the north, and some damage to reef habitat (Axelsson et al, 2006). The extent of any damage is, however, thought to be very limited and mainly restricted to outside the reef habitats and therefore the overall structure of the reef is well conserved.

### **The Start Point to Plymouth Sound & Eddystone site is graded I (excellent structure)**

#### *Degree of conservation of functions*

Evidence from existing data (section 9) indicates that the reef features within this area support a healthy biological community. A number of areas within the site that have been identified for their outstanding diversity and importance further supports this and, with limited ongoing pressure to these reefs their functioning is not compromised.

### **The Start Point to Plymouth Sound & Eddystone 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 Start Point to Plymouth Sound & Eddystone 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 Start Point to West Rutts and Bigbury Bay to Plymouth Sound reefs are recognized as areas with high species and biotope diversity with 388 species having been recorded in the area (Hiscock & Breckels, 2007). The area's representativity, in terms of European Habitats Directive description of reef, is considered excellent.

The offshore areas are also known to support some species rarely encountered in south-western waters and indicates that the area spans across a biogeographical boundary. Therefore, reefs in this area may constitute an important colonisation site for more southerly species which may become increasingly significant in the face of marine climate change.

The reef features in the area of Eddystone Rocks represent a variety of habitat types which, in turn, support a rich diversity of fauna. Their representativity in terms of the Habitats Directive

description of reef is excellent and they provide an important example of a permanently submerged offshore reef.

The reefs, especially Hatt Rock, are good examples of deeper water reefs that support species (such as the starfish *Porania pulvillus* and the parchment tube worm *Phyllochaetopterus anglicus*) that are unlikely to be so frequent on the more common inshore reefs.

The Eddystone and surrounding reefs represent unusual features within the study area in that they lie in deep water and rise steeply, and in the case of the Eddystone, break the surface.

**The Start Point to Plymouth Sound & Eddystone site is graded A (excellent conservation value)**

## 7.2 Summary of scores for Stage 1A criteria

	Representativity (a)	Area of habitat (b)	Structure and function (c)	Global assessment (d)
Start Point to Plymouth Sound & Eddystone	A	C	A	A

## 8. Sites to which this site is related

Part of the northern boundary of the Bigbury Bay to Plymouth Sound reefs abuts the Plymouth Sound and Estuaries SAC. The details of which are provided below.

Designated site	Key features
Plymouth Sound and Estuaries SAC	This site has been designated for a number of features, including sandbanks which are slightly covered by seawater all the time; estuaries; large shallow inlets and bays; Atlantic salt meadows; and reefs. In addition, the site contains Annex II species - Shore dock ( <i>Rumex rupestris</i> ) and Allis shad ( <i>Alosa alosa</i> ). The reefs include a variety of intertidal and subtidal reef biotopes. Of note, are the limestone reefs running along the northern shore from West Hoe to Batten Bay, which are one of only two coastal areas in south-west Britain with Devonian limestone.

## 9. Supporting scientific documentation

Scientific information on the topography, habitats and species present within the Start Point to Plymouth Sound & Eddystone SAC boundary is available from a number of sources. These are listed in the table below:

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](mailto:swmarine@naturalengland.org.uk)

Reference	Description
1986 Southwest England – data collated by MarLIN	Dataset lists observations of <i>Alcyonium</i>

Reference	Description
Paolo Pizzolla 2008. <i>Alcyonium glomeratum</i> . Red sea fingers. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 02/08/2011]. Raw data held in GIS files - summary available from: <a href="http://www.marlin.ac.uk/speciesinformation.php?speciesID=2443">http://www.marlin.ac.uk/speciesinformation.php?speciesID=2443</a>	<i>glomeratum</i> . This survey was collated by MarLIN as part of a data collation contract for species on the provisional list of nationally important marine features
1990-1996 UK National Marine Monitoring Programme	A National marine monitoring programme Biological data held in GIS files.
PML Applications Ltd, 2008	Survey data (drop down video) and preparation of site briefing statements for possible marine special areas of conservation within the 0-12 Nautical Mile Zone.
2002 - 2010 Seasearch survey All Seasearch reports available at: <a href="http://www.seasearch.org.uk/achievements.htm">http://www.seasearch.org.uk/achievements.htm</a> Biodiversity data (including Seasearch) are available at: <a href="http://data.nbn.org.uk/">http://data.nbn.org.uk/</a> 2010 data will be there imminently.	A regional marine monitoring programme Biological data is recorded on standard Seasearch recorder forms.
Davies, 1998 <a href="#">Western Channel (Durlston Head to Cape Cornwall, including the Isle of Scilly) (MNCR sector 8).</a>	Data includes a site description detailing sediment type and species found.
Axelsson <i>et al</i> , 2006 <a href="#">Survey of the reef habitat around Eddystone Rocks, Plymouth. Seastar Survey Ltd. Report for English Nature</a>	Survey of Eddystone Reef for Annex I habitat assessment. Data is held in GIS files, Excel tables detailing species recorded and an electronic hard copy of the final report
SeaZone Solutions Ltd Bathymetry data, 2010	Digital bathymetry data. Data is held in GIS files.

## 10. Site overview and conservation interest

### 10.1 Reefs

The Start Point to West Rutts and Bigbury Bay to Plymouth Sound reef area is a relatively large site comprised of outcropping bedrock reef characterised by rugged inclines, steep faces, slate ridges and overhangs. These inshore reefs and the Eddystone reefs, whilst different in character, include many nationally uncommon species such as the algae *Carpomitra costata*, pink sea fan *Eunicella verrucosa*, and the corals *Leptopsammia pruvoti* (sunset cup coral), *Hoplangia durotrix* (carpet coral) and *Caryophyllia inornata* as well as a wide variety of species typical of both cold- and warm-water environments. These reefs have been the focus of a recent case study aimed at identifying UK Marine Biodiversity Hotspots, with the Bigbury Bay to Plymouth Sound Reefs ranked highly for species and biotope richness (Hiscock & Breckels, 2007). Bigbury Bay to Plymouth Sound Reefs include the most extensive and highest density beds of the pink sea fan *Eunicella verrucosa* and probably the most extensive and widespread colonies of the nationally rare sunset cup coral (Hiscock & Breckels, 2007). The integrity of the reefs is of critical importance for the

survival of such species and may be a source of larvae for their survival elsewhere (Kinlan and Gaines, 2003).

Around Plymouth, pink sea fans (*Eunicella verrucosa*) are present at several locations and abundant in some areas where they appear to be in good condition. The branching sponge *Axinella dissimilis* is also present, which although not a rare or scarce species, is of concern due to its slow growth rates: no more than 2mm per year on average (Hiscock, 1994). The football sea squirt *Diazona violacea*, which is relatively uncommon in southern Britain, was also recorded (PML Applications, 2008). The submerged cliff-line (the 'Drop-off') offshore of Plymouth Sound is exceptional for the abundance of rare or scarce species including large populations of the nationally rare sunset cup coral *Leptopsammia pruvoti*, of the sponge *Axinella damicornis*, for the forests of sea fans *E. verrucosa* and for the often frequent numbers of other axinellid sponges (especially notable are *Axinella dissimilis* and *Axinella infundibuliformis*), and the football sea squirt *Diazona violacea*. Populations of the trumpet anemones *Parazoanthus axinellae* and *Parazoanthus anguicomus* are also frequent here.

From the Mew Stone to Stoke Point, the nationally rare sea fan anemone *Amphianthus dohrnii* is occasionally seen on *Eunicella verrucosa*. Pink sea fingers *Parerythropodium hibernicum* are often to be found under overhangs together with the Weymouth carpet coral *Hoplanguia durotrix*. The file shell *Limaria hians*, which is unusual in south-west Britain, is found under boulders. The sponge *Axinella damicornis* and the sea anemone *Parazoanthus axinellae* are frequent and the cup coral *Caryophyllia inornata* is sometimes recorded. The sea slug *Tritonia nilsodhneri*, which has suffered a decline in recent years is frequently seen on sea fans. Sea fans are often colonized by the nationally scarce ascidian *Pycnoclavella auriluscens*.

The area off Stoke Point is especially important for the nationally scarce brown seaweed *Carpomitra costata* and the brown seaweed *Sphacelaria mirabilis* has also been encountered. Furthermore, this area has an especially rich community of branching sponges and of sponges that favour areas subject to inundation by sediment including the nationally rare *Adreus fascicularis*. Peppercorn anemones *Isozoanthus sulcatus* occur here. Stoke Point is the only location known for accumulations of dog cockle, *Glycymeris glycymeris* shells which host the unusual pterobranch hemichordate *Rhabdopleura compacta*.

The West Rutts reefs provide a habitat for a distinctly different range of dominant species, probably because the reefs are composed of limestone. Here, the seabed is visually dominated by the antenna hydroid *Nemertesia antennina* but there are areas with abundant *Securiflustra securifrons* which is unusual along this coast (Plate 2). The polychaete *Phyllochaetopterus anglicus* is common in overhangs and the bored rock provides additional habitats for a wide variety of other species. The area is also known for having a high abundance of football sea squirts *Diazona violacea*.

Two nationally rare species (the sea fan anemone *Amphianthus dohrnii* and the sunset cup coral *Leptopsammia pruvoti*) and one species listed on the Wildlife and Countryside Act 1981 (the pink sea fan *Eunicella verrucosa*) have been recorded within the Eddystone Reefs area. The sea fan anemone and sunset cup coral, although not protected by law, are also considered priority species under the UK Biodiversity Action Plan.

A site survey was commissioned for this area in 2007 and comprised a ground-truthing exercise based around information gathered from detailed bathymetry and interpreted sidescan sonar data (Royal Haskoning, 2008). A total of 11 biotopes were identified from the survey work, with 7 of these biotopes being associated with reef habitat. The habitats in the survey area were often



complex and supported a mixture of sediment types within each survey location which led to multiple biotopes being recorded for one station. The biotopes indicative of reef habitat are described in Table 10.1.

Table 10.1 Key reef biotopes

Biotope code	Biotope description
CR.FCR.Cv.SpCup	Sponges, cup corals and anthozoans on shaded or overhanging circalittoral rock.
CR.HCR.Xfa	Mixed faunal turf communities (Plate 1).
CR.HCR.Xfa.ByErSp.Eun	<i>Eunicella verrucosa</i> and <i>Pentapora foliacea</i> on wave-exposed circalittoral rock (Plate 2).
CR.HCR.Xfa.ByErSp.Sag	Mixed turf of bryozoans and erect sponges with <i>Sagartia elegans</i> on tide-swept circalittoral rock.
CR.MCR.EcCr.CarSp.Bri	Brittlestars overlying coralline crusts, <i>Parasmittina trispinosa</i> and <i>Caryophyllia smithii</i> on wave-exposed circalittoral rock.
CR.MCR.EcCr.UrtScr	<i>Urticina felina</i> and sand-tolerant fauna on sand-scoured or covered circalittoral rock.
CR.HCR.FaT.CTub	<i>Tubularia indivisa</i> on tide-swept circalittoral rock

Other biotopes recorded were associated with sublittoral coarse sediments (SS.SCS), mixed sediments (SS.SMx) and sands & muddy sands (SS.SSa). The conspicuous fauna and flora described for these biotopes included the brittlestars *Ophiothrix fragilis*, *Ophiocomina nigra*, the seastar *Marthasterias glacialis*, the sea urchin *E.esculentus*, the pink sea fan *Eunicella verrucosa*, as well as keel worms, hydroids and bryozoans on the coarser sediments.

The Eddystone Reefs comprise five main areas, which form topographic highs in the surrounding area. The presence of such hard substrata allows for the presence of an extremely rich biological community that exhibits classic rocky zonation from deep to shallow water, in what would otherwise be a relatively impoverished fine sediment deep water environment. The dominant biotopes found within the rocky areas are described in Table 10.2:

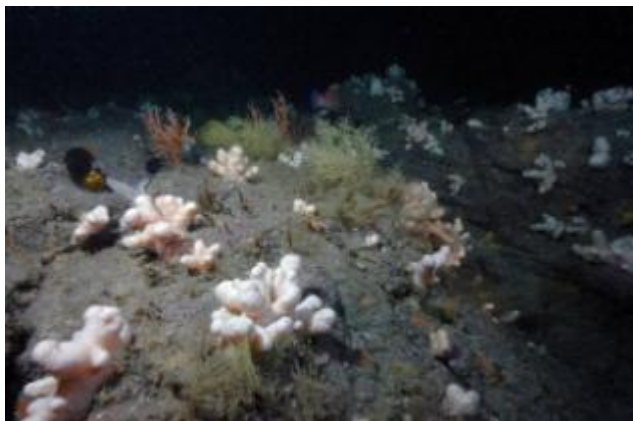
Table 10.2 Dominant rocky area biotopes

Biotope code	Biotope description	Additional information
CR.HCR.XFa.ByErSp.Eun	<i>Eunicella verrucosa</i> and <i>Pentapora foliacea</i> on wave-exposed circalittoral rock (Plate 3)	Characteristic fauna include the pink sea fan <i>Eunicella verrucosa</i> , the soft coral <i>Alcyonium digitatum</i> , the sea cucumber <i>H. forskali</i> , the sea urchin <i>E. esculentus</i> and the sponge <i>Cliona celata</i> . Anemones such as <i>Corynactis viridis</i> and <i>Caryophyllia smithii</i> as well as hydroids such as <i>Nemertesia antennina</i> and <i>N. ramosa</i> were also common on the reef areas (Axelsson <i>et al</i> , 2006).
IR.HIR.KSed.LsacSac	<i>Laminaria saccharina</i> and/or <i>Saccorhiza polyschides</i> on exposed infralittoral rock)	Represents a kelp park biotope found at the shallowest sites (20 to 27 m) of the rocky areas (Axelsson <i>et al</i> , 2006).

CR.HCR.XFa.CvirCri	<i>Corynactis viridis</i> and a mixed turf of crisiids, <i>Bugula</i> , <i>Scrupocellaria</i> , and <i>Cellaria</i> on moderately tide-swept exposed circalittoral rock (Plate 4)	This (jewel anemone) biotope is present in all six reef areas and it is characterised by dense populations of <i>Corynactis viridis</i> but other fauna such as <i>Nemertesia</i> spp., <i>Alcyonium digitatum</i> , <i>Holothuria forskali</i> and <i>Echinus esculentus</i> are also present. It also appears as if this biotope is particularly common on vertical bedrock walls and boulders (Axelsson <i>et al</i> , 2006).
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Some of the reefs further offshore (Eddystone, Hand Deeps, Hatt Rock) do not have a high diversity of species on the pinnacles, although low reefs near the Eddystone are rich in species (Plate 4). These reefs are generally visually dominated by jewel anemones (*Corynactis viridis*) and white dead men's fingers (*Alcyonium digitatum*) but with dense sea fans in good condition especially where there are concavities ('amphitheatres') in the rock. Hatt Rock is of special interest because it seems to attract deeper water species such as the cushion star *Porania pulvillus*, the slipper lobster *Scyllarus arctus*, the sea fan anemone *Amphianthus dohrnii* (which are commonly recorded on many of the *E. verrucosa*) and a parchment tube worm, possibly *Phyllochaetopterus anglicus*. The sunset cup coral *Leptopsammia pruvoti* was recorded in late 2007 for the first time from Phillips Rocks (PML Applications, 2008). The presence of relatively large numbers of warm-water species, e.g. *Alcyonium glomeratum* and *H.forskali*, indicates the area spans across a biogeographical boundary.

## 11. Photographic plates



**Plate 1** CR.HCR.Xfa Mixed faunal turf on flat bedrock of large sponges, dead men's fingers, hydroids and bryozoans (© Keith Hiscock)



**Plate 2** CR.HCR.Xfa.ByErSp.Eun The pink sea fan *Eunicella verrucosa* and red sea fingers *Alcyonium glomeratum* (© Keith Hiscock)



**Plate 3:** Epifaunal communities at Eddystone comprising the pink sea fan, dead men's fingers and erect sponges (© Keith Hiscock)



**Plate 4** CR.HCR.XFa.CvirCri Jewel anemones on tideswept vertical rock (© Keith Hiscock)

## 12. References

Where the reference source is publicly available, or Natural England has permission to publish it, the link to the document is shown. For access to reference sources not shown please email [swmarine@naturalengland.org.uk](mailto:swmarine@naturalengland.org.uk)

AXELSSON M, DEWEY S, CHADDOCK S, and DUKE S, 2006. [Survey of the reef habitat around Eddystone Rocks, Plymouth. Seastar Survey Ltd. Report for English Nature](#) (*link accessed August 2011*)

BGS, 1996. [Offshore geology. Chapter 2.2 in, BARNE J H, ROBSON C F, KAZNOVSKA S S, DOODY J P, DAVIDSON N C and BUCK A L \(eds\), 1996. Coasts and seas of the United Kingdom. Region 10 South-west England: Seaton to the Roseland Peninsula. Peterborough, Joint Nature Conservation Committee.](#) (*link accessed August 2011*)

CEC, 1995. [Natura 2000 Standard Data Form: Explanatory Notes](#). Brussels: European Commission DG Environment. 32pp. (*link accessed August 2011*)

DAVIES J, 1998. [Western Channel \(Durlston Head to Cape Cornwall, including the Isle of Scilly\) \(MNCR sector 8\). In, Marine Nature Conservation Review. Benthic ecosystems of Great Britain and the north-east Atlantic](#), edited by K. Hiscock, 219-229. Peterborough, Joint Nature Conservation Committee (Coasts and seas of the United Kingdom, MNCR series). (*link accessed August 2011*)

DEFRA, 2004. [Review of Marine Nature Conservation. Working Group Report to Government](#) [online]. London: Defra. (*link accessed August 2011*)

EC, 2007. [Interpretation manual of European Union habitats. Version EUR 27](#). European Commission (DG Environment), Brussels. (*link accessed August 2011*)

EU, 2003. The EU Interpretation Manual of European Union Habitats. European Union October 2003. *Superseded by EC, 2007 above*

HISCOCK K, 1994. Marine communities at Lundy – origins, longevity and change. Biological Journal of the Linnean Society, 51, 183-188.

HISCOCK K, BRECKELS M, 2007. [Marine Biodiversity Hotspots in the UK. A report identifying and protecting areas for marine biodiversity](#). WWF 2007.

HOLME N A, 1953. The biomass of the bottom fauna in the English Channel off Plymouth. Journal of the Marine biological Association of the United Kingdom, 32, 1-49.

IRVING, 1996. The sea bed. Chapter 4.2 in, BARNE J H, ROBSON C F, KAZNOVSKA S S, DOODY J P, DAVIDSON N C and BUCK A L (eds), 1996. [Coasts and seas of the United Kingdom. Region 10 South-west England: Seaton to the Roseland Peninsula](#). Peterborough, Joint Nature Conservation Committee. (*link accessed August 2011*)

JOHNSTON C M, TURNBULL C G & TASKER M L, 2002. [Natura 2000 in UK Offshore Waters: Advice to support the implementation of the EC Habitats and Birds Directives in UK offshore waters](#). JNCC report no. 325. (*link accessed August 2011*)

JNCC, 2008. [UK guidance on defining boundaries for marine SACs for Annex I habitat sites fully detached from the coast](#). (*link accessed August 2011*)

KINLAN B P & GAINES S D, 2003. Propagule dispersal in marine and terrestrial environments: A community perspective. *Ecology*, 84, 2007-2020.

MCLEOD C R, YEO M, BROWN A E, BURN A J, HOPKINS J J & WAY S F (eds), 2005. [The Habitats Directive: selection of Special Areas of Conservation in the UK. 2nd edn](#). Joint Nature Conservation Committee, Peterborough. (*link accessed August 2011*)

MNCR, 2006. <http://data.nbn.org.uk/>. (*link accessed August 2011*)

PIZZOLA, P, 2008. *Alcyonium glomeratum*. Red sea fingers. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 02/08/2011]. Available from: <http://www.marlin.ac.uk/speciesinformation.php?speciesID=2443> (*link accessed August 2011*)

PML APPLICATIONS LTD, 2008. Acquisition of survey data and preparation of site briefing statements for draft marine special areas of conservation within the 0-12 Nautical Mile Zone.

ROYAL HASKONING, 2008. Site selection report for the inshore marine SACs project. Salcombe to Yealm & Eddystone site selection. Report No. 9SO282/SSR?Salcombe/01.

SEASEARCH, 2004. 2002 – 2010 Devon Seasearch programme. *All Seasearch reports available at: <http://www.seasearch.org.uk/achievements.htm> Biodiversity data (including Seasearch) are available at: <http://data.nbn.org.uk/> 2010 data will be there imminently.* (*link accessed August 2011*)

SEAZONE SOLUTIONS 2010. SeaZone Solutions Ltd Bathymetry Data 2010

SERAD, 2001. [A fishing industry guide to offshore operators](#). Scottish Executive, Edinburgh, 28. (*link accessed August 2011*)

### 13. Glossary

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

**Anemone** A marine invertebrate that lives attached to rocks, and is related to corals and jellyfish.

**Anthropogenic** Human-induced or resulting from human activities.

**Antifoulant** A type of marine pesticide.

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

**Bathyal** relating to or living in ocean depths between 200 and 2,000m.

**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.

**Biogeographical boundary** A geographical boundary based on biological features.

**Biomass** The weight of living matter, usually given as weight per unit area.

**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.

**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.

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

**Crustaceans** A class of invertebrates which includes crabs, shrimps and barnacles

**Crustose** Forming a thin crust on the substratum.

**Dead men'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.

**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.

**Geogenic origin** – A feature formed by non biogenic substrata.

**GIS (Geographical Information System)** A computer-assisted system that acquires, stores, manipulates, and displays geographic data.

**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 external environment in which an organism or its population lives and grows.

**Hydroid** A type of marine invertebrate (cnidarian) related to anemones, corals and jellyfish.

**Infauna** A term to describe animals living within the seabed.

**Kelp** a brown seaweed with thick broad fronds.

**Littoral** The intertidal zone.

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

**Mytilus reefs** A dense aggregation (or bed) of mussels (blue) that has settled over time.

**Nemertean** A phylum of invertebrate animals also known as *ribbon worms* or *proboscis worms*.

**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.

**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** A class of marine annelid worms.

**Sessile** Permanently attached or fixed; not free-moving.

**Shoaling** localized shallowing of water.

**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. Examples include:

- Gill nets which are set at or below the surface, on the seabed, or at any depth in-between.
- Setting pots on the seabed to capture lobsters and crabs.
- Long lining when a single line is set to capture cod, skate, bass and whiting.

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

**Trawling** Towing equipment behind a vessel for commercial fishing principally for cod, plaice and sole. Bottom trawls collect demersal (living on or near the seabed) species and mid-water trawls collect pelagic (living in the water column) species. Examples of towed gears include beam trawls, dredges and trawl nets.

**Trawl scars** Evidence of damage to the seabed from trawling (mobile fishing) activity.

**Turf** A term used to describe a layer marine organism 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)

#### 1 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” (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).

#### 2 Guidance

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

2.1. 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.

2.2 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, seconds.

2.3 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.

2.4 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 Offshore Marine Conservation (Natural Habitats, &c.) Regulations 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 measure may have different boundaries to the SAC site boundary.

- ii). For mobile habitats (for example, sandbanks), to ensure the minimum area necessary to allow conservation of the structure and functions of the habitat. Such extension will be determined on scientific understanding of the structure and functions of the habitat.