Environmental Baseline Report

Sidmouth and East Beach Management Plan

Prepared for

East Devon District Council

March 2015

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Document history

Environmental Baseline Report

Sidmouth & East Beach Management Plan

East Devon District Council (EDDC)

This document has been issued and amended as follows:

Version	Date	Description	Created by	Verified by	Approved by
1.0	11/03/2014	Initial draft for EDDC comment	N Corne	A Frampton	A Frampton
2.0	16/12/2014	Re-issued draft for EDDC comment	N Corne	A Frampton	A Frampton
3.0	02/02/2015	Draft for Steering Group comment	N Corne	A Frampton	A Frampton
4.0	18/03/2015	Final	N Corne	A Frampton	A Frampton

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Contents

Executive Summary

This document provides the key environmental baseline features within the Sidmouth & East Beach Management Plan area and identifies some preliminary environmental issues/constraints that will require further consideration as the project develops and future management options are appraised.

The information in this document will be used to inform and assess the potential implications of various beach management options that will be developed as part of subsequent stages of this project.

Based upon the information reviewed as part of this Beach Management Plan, the following environmental issues have been identified that will need to be considered when developing possible management options for the BMP area:

- Access and noise/visual disturbance to recreational users in the vicinity of BMP activities, as the beach is used extensively for amenity purposes – all works will need to be programmed to minimise the impact on amenity users by avoiding the peak holiday season, where possible. Also, there is a need to ensure safe public access of any possible recycling/re-profiling works.
- Access and noise/visual disturbance to residents/local businesses.
- Access for the Sidmouth Lifeboat.
- Impact of beach management activities on internationally and nationally designated sites – need to avoid disturbance to notable and protected habitats and species. Potential requirement for Habitats Regulations Assessment to assess impacts of beach management activities on the integrity of the international conservation sites. Early consultation with Natural England during the development of the BMP will be required.
- Impact of the beach management activities the on the AONB and World Heritage Site.
- Access for vehicles and personnel during any construction on to the beach may limit works.

1 Introduction

The purpose of this document is to identify key environmental features within and near the Sidmouth & East Beach Management Plan (BMP) area (refer to Section 2). This is to ensure that appropriate consideration of these features is made when analysing when future management regime for the BMP (including ongoing monitoring and maintenance works and any new works that may be required) in the later stages of the BMP development

The baseline covers the environmental topic as highlighted in the first column of Table 1-1. These topic headings are sourced from the Beach Management Manual 2nd Edition (Roger et al 2010). The second column develops these topics into applicable sub-topics with reference provided in the third column. The final column makes reference to the environmental aspects documented in Annex 4 of the European Union Directive 2011/92/EU '*on the assessment of the effect of certain public and private project on the environment*' (the EIA Directive). This is provided by way of cross reference if the preferred option is determine to present a significant scale or impact as to need a statutory Environmental Statement (ES) to accompany the consent applications.

It should be noted that the level of detail presented in this document allows for an initial appraisal of environmental features to provide for an environmentally sustainable future management regime. This does not negate the requirement for future detailed environmental assessment which may be required to support consent applications or prejudge the scope of the assessment. Background information on possible consenting requirements and legislative drivers are described in Section 17.

Table 1-1 A summary of the environmental topics presented in the baseline.

Environmental topics (with reference to the Beach Management Manual 2nd edition)	Sub-topics	Section reference	Reference to the environmental aspects outlined in Annex 4 of the EIA Directive
Geology and Geomorphology	Geology		Soil
	Designated Geological Sites		
	Geomorphology		
Sediment quality			Soil
Water quality			Water
Ecology	Designated Nature Conservation Sites		Flora and Fauna
	Biodiversity Action Plan Habitats and Species		
	Fish Ecology		
Fisheries	Commercial fisheries		Material Assets including the architectural and archaeological heritage
	Recreational fisheries		
Navigation			Material Assets including the architectural and archaeological heritage
Landscape setting	Designations		Landscape
	Landscape character		
Archaeology and Cultural Heritage			Material Assets
Air quality			Air
Noise			Population
Amenity value			Population

2 Study Area

The town of Sidmouth is located on the East Devon coast approximately 17km south east of Exeter. The River Sid runs through the town separating the main town centre and beaches to the west from Pennington Point and Salcombe Hill to the east (East Beach). Coastal defence structures which include a sea wall, groynes, breakwaters and an imported beach protect the town and beaches. East Beach/Pennington Point is accessed by pedestrians from the main town by Alma Bridge. Salcombe Hill extends to the east of the River Sid and consists of steep sandstone cliffs (Royal Haskoning, 2002).

The Study Area covers the beach frontage from just west of Chit Rocks (Jacobs Ladder), west of the town to East Beach/Pennington Point to approximately 200m east of the River Sid, and includes land directly behind this frontage as illustrated in Figure 2-1 and Figure 2-2.

The inland boundary is based on the Flood Zone 3 i.e. up to 1 in 200 (0.5%) for flooding from the sea and the SMP2 50 – 100 year predicted erosion zones and extends up to the Weir on the River Sid and thus includes the River Sid western wall.

It should be noted the study also includes any adjacent areas beyond these boundaries likely to be impacted by any future works.

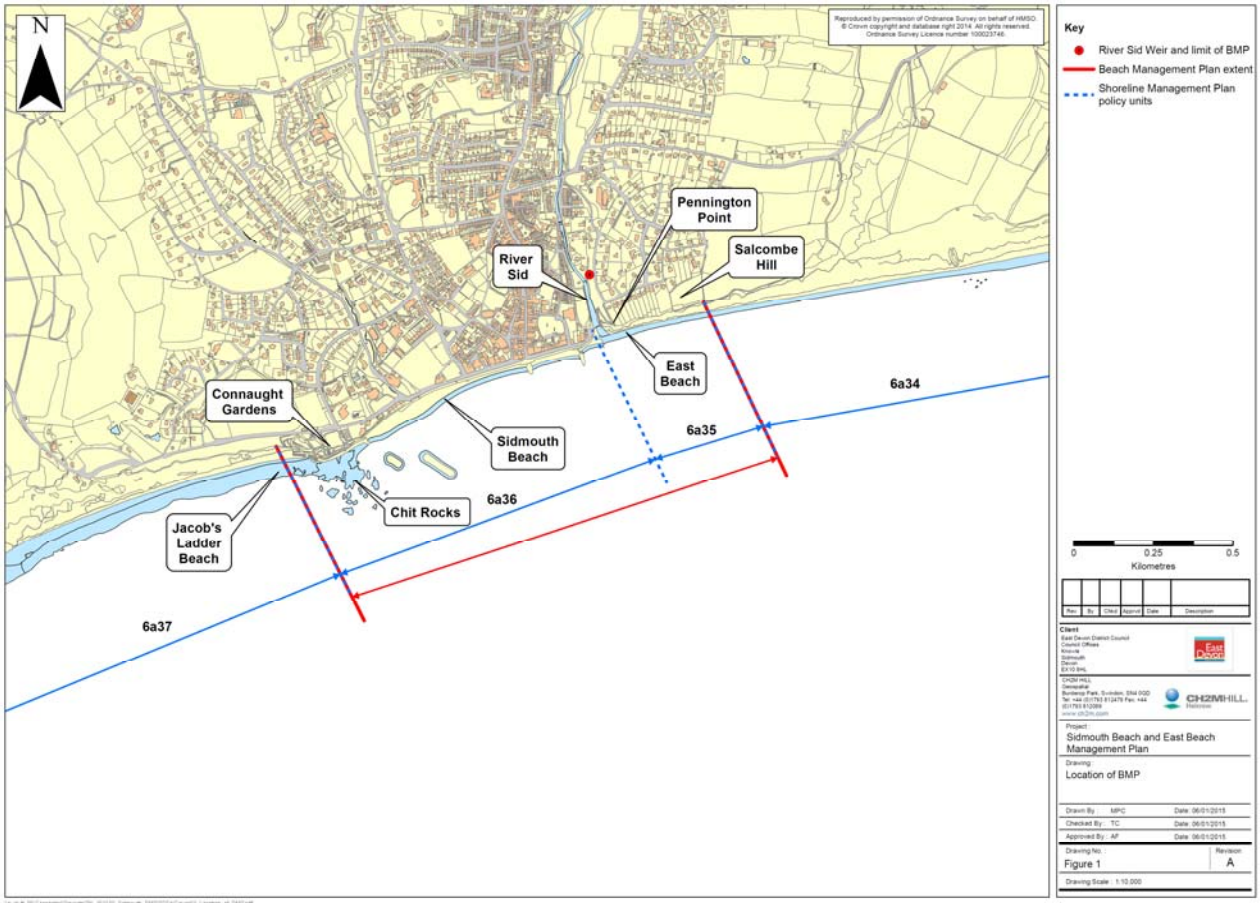


Figure 2-1 BMP extent

Figure 2-2 Key features along the BMP frontage

3 Environmental Setting

The Study Area contains the following environmental and conservation designations. These are important in the consideration of options for beach management, with many having legislative requirements to ensure they are not adversely impacted by human actions, and the foundations of these designations are outlined in the text box below:

- Sidmouth to West Bay Special Area of Conservation (SAC)
- Lyme Bay to Torbay SAC (no SSSI condition assessment available)
- Sidmouth to Beer Coast Site of Special Scientific Interest (SSSI) (most units are at favourable status. Updated 15/08/2012)
- Ladram Bay to Sidmouth SSSI (all units are at favourable status. Updated 09/03/2012)
- Dorset and East Devon United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site (the 'Jurassic Coast').

These features are shown on Figure 3-1.

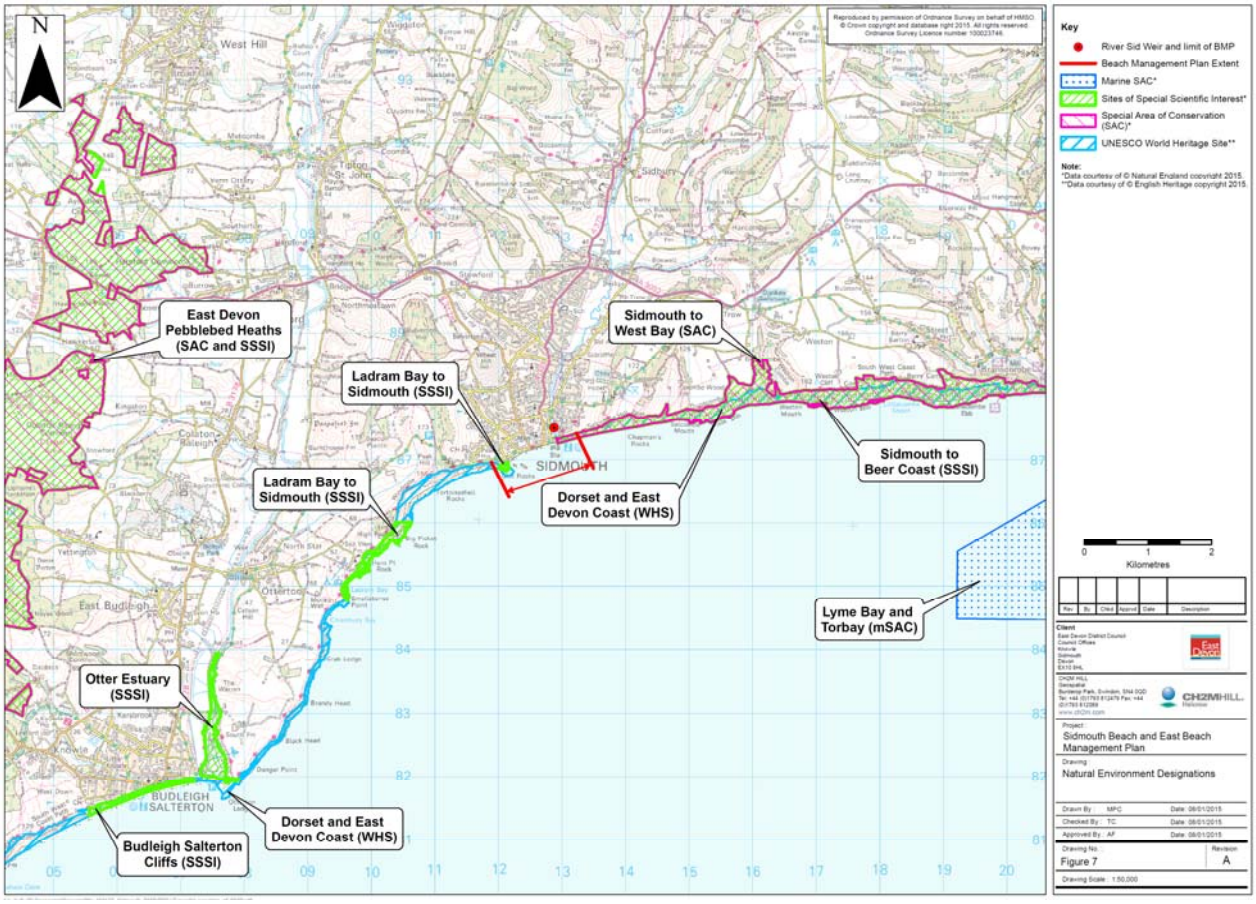


Figure 3-1 Natural environmental designations

Appendix A contains the citations for, or where to find more information on these designated sites. The habitats and geology are discussed further in this document under the Geology and Geomorphology (4) and Ecology sections (7).

Special Area of Conservation (SAC)

The Joint Nature Conservation Committee (JNCC) define SAC as 'strictly protected sites designated under the EC Habitats Directive. The Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds). Of the Annex I habitat types, 78 are believed to occur in the UK. Of the Annex II species, 43 are native to, and normally resident in, the UK.

More information can be found at http://jncc.defra.gov.uk/page-23

Site of Special Scientific Interest (SSSI)

Natural England provide the following commentary on Sites of special scientific interest (SSSIs).'[They] conserve and protect the best of our wildlife, geological and physiographical heritage for the benefit of present and future generations. There are over 4,000 SSSIs in England, covering around 8% of the country.
SSSIs give legal protection to the best sites for wildlife and geology in England under the Wildlife and Countryside Act 1981 (as amended).'

More information can be found at https://www.gov.uk/protected-or-designated-areas

UNESCO World Heritage Sites

More information is contained in Section 19 of this report.

4 Geology and Geomorphology

4.1 Geology

Royal Haskoning (2002) describes the geology of the Study Area as; '*The cliffs on this stretch of coast are the most westerly exposed Cretaceous strata in southern England. The whole succession shows signs of having been deposited in near-shore or shallow marine conditions'.* This description is developed further in Section 4.3 of this report.

4.2 Designated Geological Sites

The geological importance of the region is recognised by the following designations: SSSI and the UNESCO Dorset and East Devon World Heritage Site.

Parts of the Study Area lay within the Sidmouth to Beer Coast SSSI (refer to Figure 3-1 above) which has been designated for both its geological and biological interest. It contains important geological and stratigraphic features and is famous for its fossil deposits. As described by the SSSI citation, *"…These cliff sections provide the finest exposures of the Foxmould Sands and Chert Beds (Upper Greensand) in South-West England…The quality of exposure allows particularly good opportunities to study the sedimentology of Upper Greensand Chert and hardground formation. The site is also of importance as it contains some of the most westerly major Upper Cretaceous exposures in England, which are of great stratigraphic importance."* It should be noted that not all of the features of interest described in the SSSI citation lie within the BMP study area.

The Study Area contains 2 GCR sites; Ladram Bay to Sidmouth (GCR 3215) and Sidmouth (GCR 814). The description of these sites underpins the SSSI and the World Heritage site designations. The geology of this section of coast is outlined in the Ladram Bay to Sidmouth GCR's introduction – *"The coastal cliffs around Ladram Bay and toward Sidmouth preserve an excellent section through the upperpart of the mid Triassic Otter Sandstone Formation. The formation comprises approximately 210m of cross-bedded sandstone associated with gravels, conglomerates and mudstones. These are overlain by red marls of the Mercia Mudstone Group."*

Chit rocks to the west of the Study Area forms part of GCR 814, yielding fossilised remains of internationally rare Middle Triassic fossil fish, amphibians and reptiles. The same GCR includes the cliffs and foreshore of Pennington Point, which also yields these rare fossils.

The cliffs on both side of the town lie within the UNESCO Dorset and East Devon World Heritage Site ('Jurassic Coast') designated by for their geological importance. The cliffs between Exmouth in East Devon and Studland Bay in Dorset contain a nearly complete sequence through the entire Mesozoic period of geological time displaying evidence of 185 million years of evolution from the Triassic, Jurassic and Cretaceous periods. The Jurassic Coast's management plan policies seek to avoid or mitigate any negative impacts of coastal defence works on the natural processes of erosion and exposed geology (see Section 19.3).

4.3 Geomorphology

The Study Area comprises a section of very dynamic section of coast. Sediments are reported to input into this section of coast from contemporary terrestrial sources as described by SCOPAC (2004):

> *'The River Sid discharges to the east of Sidmouth, where its mouth is constrained by a training wall. It is non-tidal and regulated and channelised in its lower course through the town. It has a compact catchment with steeply sloping valley sides and tributary streams. It is estimated to deliver an annual load of approximately 400m^3 of fine sediment and 100m^3 of coarse material with much of this is*

likely to occur during high discharge events. It is considered that this material (sand and gravel) is mobilised [under easterly storm conditions] from a nearshore store [at east beach] that accumulates south and east of the mouth of the Sid..'

It is likely that the supply of sediment from the River Sid is constrained by upstream engineering projects.

There are also sediment inputs from the western end of the frontage. However, these are limited by Chit Rocks and the promontory of Connaught Gardens. This headland prevents the movement of shingle from west to east although finer grained sediment will past this boundary. There is little evidence to support offshore to onshore sediment transport from the supporting reference although a number of authors have speculated on this mechanism including Hydraulic Research (1992).

The beach at Sidmouth was replenished as part of the scheme to construct the offshore breakwaters. SCOPAC reported 185,000 tonnes of gravel were placed behind the breakwater, comprising of flint gravels sourced from a local quarry.

Sediment transport along the frontage is predominantly from the west to the east. This is influenced by south-westerly waves. There are also a less frequent, lower duration, reversal of this transport through the large waves from the south-east during easterly storm conditions. Further details of this transport and the geology and geomorphology are presented in the coastal processes baseline prepared alongside this report as part of developing the Sidmouth and East Beach Management Plan.

5 Sediment Quality

As noted in Rogers et al (2010), sediment quality data is not readily available for beach locations, unless the dredge material was sourced from a capital or maintenance dredges. Andrews (1996, cited in SCOPAC, 2004) describes the material used to replenish the beach at Sidmouth as being: *"comprised of mostly flint gravels sourced from a local inland quarry which produces material similar in size to the indigenous beach sediment.'* However, the chemical composition of this material does not appear to have been recorded.

6 Water Quality

The Environment Agency displays the results of their monitoring activities on the 'What's in your backyard?' section of their website (www.environment-agency.gov.uk) [accessed 22nd January 2014]) and describes the catchment surrounding Sidmouth:

> *"The catchment surrounding Sidmouth is approximately 4200 hectares. The River Sid rises on the edge of Pen Hill Woods above Ottery St Mary and flows south through Sidbury to the sea at Sidmouth 330m east of the Environment Agency monitoring point. The steep catchment means rain runs off rapidly into the River Sid and onto the beach. The Bickwell Brook is approximately 2.3 kilometres long and flows through the western part of Sidmouth to the sea 280m west of the Environment Agency monitoring point. The catchment close to the beach is urban, and in the wider catchment it is mostly agriculture and forestry."*

Sidmouth town water sampling point has been monitored since 1988 in line with the Bathing Water Directive, (1976) and also with the Water Framework Directive, (2003) after 2006.

The Environment Agency displays the results of their monitoring activities on the 'Bathing Water Data Explorer' section of their website (http://www.environment-agency.gov.uk, [accessed 13th December 2014]). In 2014 the results of the water sampling at Sidmouth Town recorded a measure of 'meets higher standards'. This means that the bathing water meets the Bathing Water Directive standards. Figure 6-1 shows the location of the Environment Agency's monitoring points in relation to the BMP area.

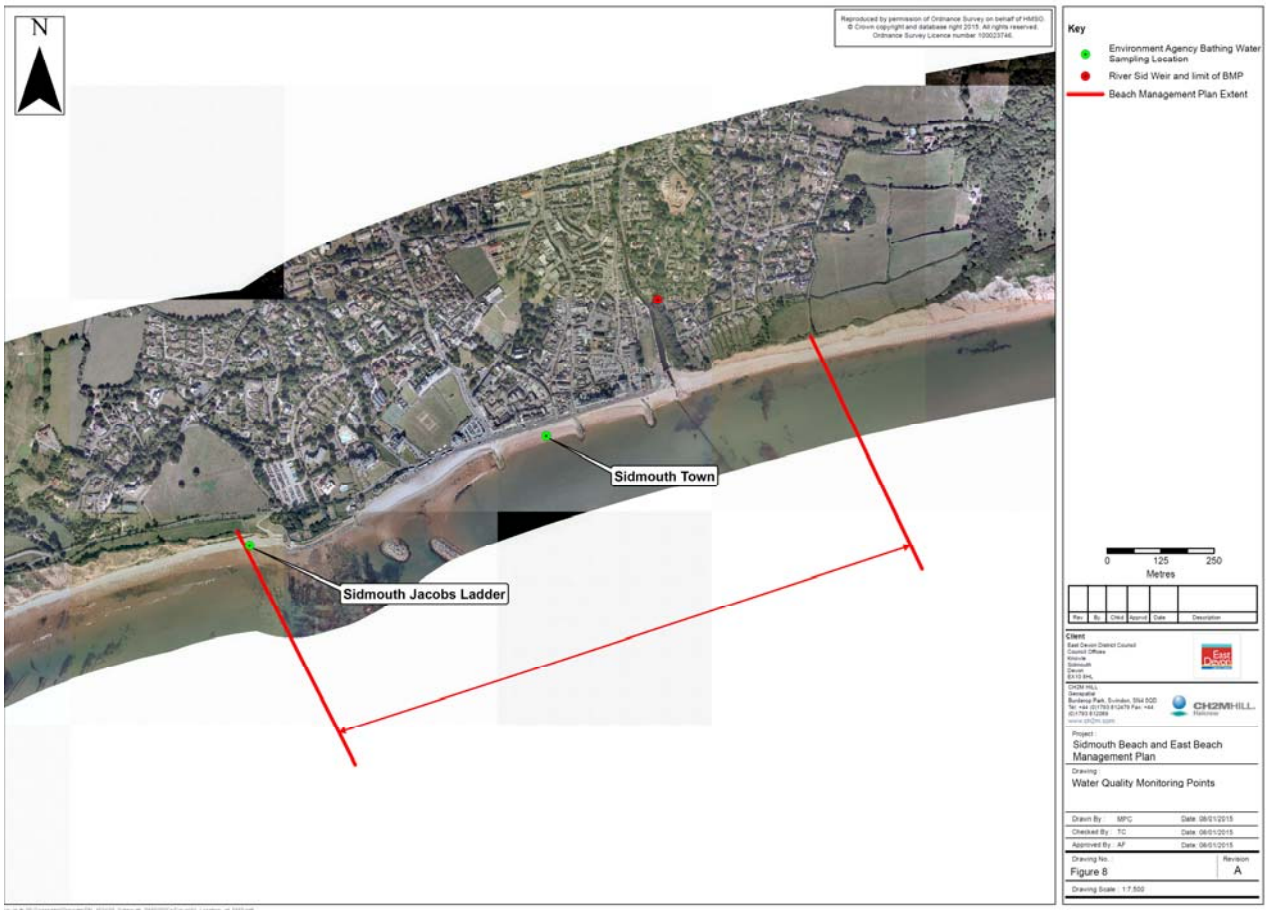


Figure 6-1 Water quality monitoring points

7 Ecology

7.1 Designated Nature Conservation Sites

The following nature conservation designations and their qualifying interest features are all within or lie in close proximity to the Study Area and will require consideration during the development of the BMP:

- **Sidmouth to West Bay SAC**
    - The following Annex 1 habitats (listed under Annex 1 of the EC Habitats Directive) are the primary reasons for the designation; Vegetated sea cliff of Atlantic and Baltic coasts and Tilio-Acerion forests of slopes, screes and ravines (described as a priority feature). Annual vegetation of drift lines are described in the SAC designation as being present but are not the primary reason for the designation. The presence of these habitats within the BMP Study Area (and within this section of the SAC) were identified in the 2002 Ecological Survey and Assessment of Salcombe Hill Cliffs, Sidmouth (SouthWest Ecological Surveys, 2002).This survey was commissioned to support a planning application for a coastal defence structure at Pennington Point. The survey report notes that the vegetation in this section of the SAC is very varied and includes important pioneer communities on recent slips next to more mature vegetation. Vegetated sea cliffs were noted throughout the survey area (from the mouth of the River Sid 1700m east, surveying the cliff top and cliff face), Tilio-Acerion forest and to a lesser extent annual vegetation of drift lines were noted at the eastern section of the survey area. The report also comments that the cliffs are likely to hold significant invertebrate interest.
    - In relation to the vegetated sea cliffs, the survey report noted that '*the plant assemblages on the lower cliffs within the Study Area [as define in this report] do not coincide either with the cliff communities or shingle communities. This suggests that these may be unique to the area or they may in fact be so infrequent that they do not qualify as distinct communities*.' … '*The plants found on the lower cliff faces are obviously sourced from the seeds of the strandline species blowing up from the cliffs and seeds from plants on the cliff top of upper cliff falling down' … 'Condition on much of the cliff faces are extreme and maintained at an early successional stage by the constant erosion'* … '*This assemblage is likely to be unique and is dependent on the continuing erosion and prevalent maritime exposure. The constant erosion keeps large areas in a state of permanent early succession. It is therefore considered to be of very high conservation value and of national importance.'*
    - To date, this survey report is the principal reference to describe the habitats at Pennington Point and eastward towards Salcombe Hill Cliff. The survey report acknowledges a number of limitation included survey timing (later September) and access to the cliffs. Although the timing of the survey could be improved to coincide with the flowering season it is unlikely on the grounds of Health and Safety that a closer inspection of the cliff face could be made. Whilst additional survey effort would improve the underlining dataset and make it more contemporary, it is very unlikely to supersede the key findings of the report.
    - Tilio-Acerion forests of slopes, screes and ravines[1] - This habitat is listed under Annex 1 of the EC Habitats Directive. A mosaic of Tilio-Acerion, sycamore *Acer pseudoplatanus* woodland, mixed scrub, grassland and pioneer communities is present. This mosaic of habitats is rich in invertebrates, especially bees and wasps, such as *Ectemnius ruficornis, Andrena simillima* and *Nomada fulvicornis*. The woodland has a hazel *Corylus avellana* understorey and a ground-flora dominated by ivy *Hedera helix* (with numerous ivy broomrape *Orobanche ederae*) and hart's-tongue *Phyllitis scolopendrium*,

[1] This habitat is labelled as a priority feature in the Sidmouth to West Bay SAC designation sheet.

with abundant dog's mercury *Mercurialis perennis* and tutsan *Hypericum androsaemum*. The Red Data Book lichen *Parmelia quercina* occurs on ash *Fraxinus excelsior* trees.

- Annual vegetation of drift lines - This feature is an Annex 1 habitat, although it is not given in the designation as the primary reason for site selection. Typically where this habitat is found it is likely that the following species would be present: Sea beet *Beta vulgaris ssp*. Maritime and orche *Atriplx ssp,* Sea-kale *Crambe maritime* and sea pea *Lathyrus japonicus* in the stony banks.

- **Lyme Bay and Torbay SAC**
  - Reefs

    The Lyme Bay Reefs area is indicative of offshore reefs, where sea squirts (such as *Ascidiella aspersa* and *Phallusia mammillata*), sponges (such as *Cliona celata*), anemones (such as *Aiptasia mutablilis* and *Urticina felina*), corals (such as *Alcyonium digitatum, Caryophillia smithii* and *Leptopsammia pruvoti*), sea fans (such as *Eunicella verrucosa*) and bryozoans (such as *Pentapora fascialis*) dominate and sustain a wide diversity of other species. The location of these reefs has been charted by NE. The reefs recorded within the Study Area are outside the boundary of the SAC but are likely to representative of the biodiversity recorded within the geographic boundary of the SAC.
  - Submerged or partially submerged sea caves

    These features are characterised by communities of mussels *Mytilus edulis*, barnacles *Balanus crenatus*, cushion sponges, encrusting bryozoans and colonial ascidians. There are no sea caves recorded in the Lyme component of the SAC (NE, SAC Selection Assessment).

- **Sidmouth to Beer Coast SSSI**

  Many of the habitats (as noted below) and species that have given rise to the designation of this site are terrestrial in nature and are unlikely to be found within the defined study area.
  - Species rich chalk grassland
  - Broadleaved woodland
  - Invertebrate fauna

7.2 Biodiversity Action Plan (BAP) Habitats

The following are listed as UK priority BAP habitats and are either represented in the Study Area or are within 1km. Only habitats that are considered relevant to the Study Area, i.e. they are likely to be impacted upon or are likely to have an influence on the proposed scheme, have been described (refer also to Figure 7-1). The associated targets are quoted under them:

- **Maritime cliffs and slopes**
  1. Maintain the existing free-functioning maritime cliff and slope resource;
  2. No overall net loss of cliff and slope functionality as a result of coast protection or engineering works;
  3. Increase the extent of maritime cliff and slopes unaffected by coastal engineering/coast protection;
  4. Increase the area of cliff-top semi-natural habitats; and
  5. Achieve favourable or recovering condition.

- **Coastal Vegetated Shingle**
  1. Ensure no loss in the extent or quality of coastal vegetated shingle;

2. Restore quality of damaged or degraded shingle habitats where natural regeneration is unlikely; and Establish demonstration site.

- ***Sabellaria alveolata* reefs**
  1. Maintain the extent and quality of the existing resource;
  2. Survey to determine the full extent of the habitat;
  3. Ensure water quality is sufficient to maintain habitat;
  4. Re-establish/ restore *Sabellaria alveolata* reefs where they were formerly present;
  5. Continue to survey and monitor to improve our knowledge of the habitat; and
  6. Raise awareness of the wildlife value of the habitat.
- **Sub-littoral sands and gravels**
  1. Maintain the extent and quality of marine priority habitats;
  2. Assess feasibility of restoration of damaged habitats;
  3. Improve understanding by promoting research and survey; and
  4. Promote awareness amongst public, especially divers.

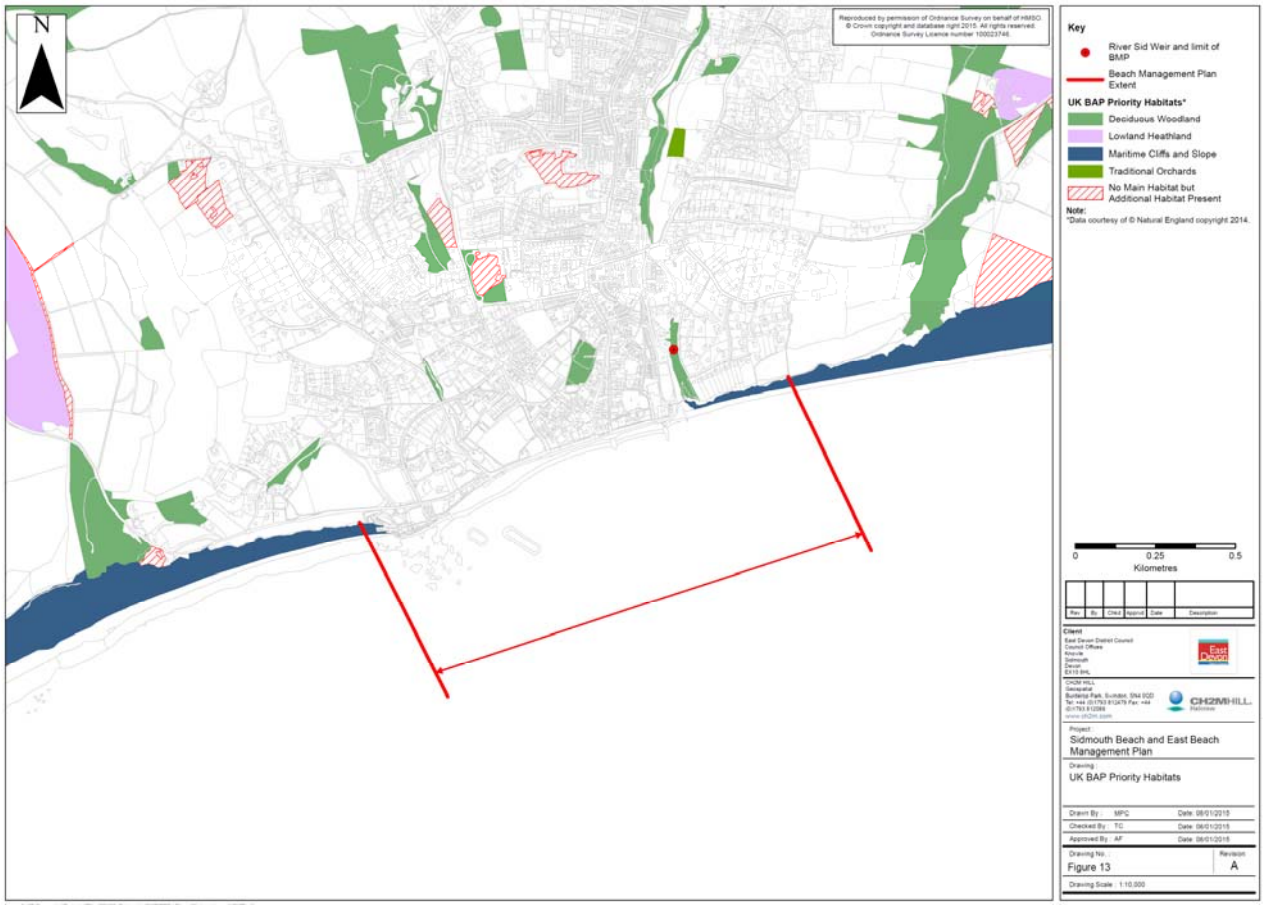


Figure 7-1 UK priority BAP habitats.

8 Fisheries

8.1 Fish Ecology

Cefas's Spawning and Nursery grounds of selected fish species in UK water (Ellis, J.R, *et al*, 2012) reported the following species that utilised the coastal water of Sidmouth for either spawning or nursing:

- *Spurdog Spulaus acanthias* **–** Low intensity nursery area
- Thornback ray *Raja clavata* **-** Low intensity nursery area
- Spotted ray *Raja montagui*- Low intensity nursery area
- Anglerfish Lophius piscatorus - Low intensity nursery area
- Sandeels *Ammodytidae* – Low intensity spawning area
- Mackeral *Scomber scombru* – High intensity nursery area
- Sole *Solea solea* **-** Low intensity spawning area

There are no Shellfish protected areas within the Study Area.

8.2 Commercial Fishing

The Study Area is within the Southern Inshore Fisheries and Conservation Authority's (IFCA) district.

As reported in the site visit, December 2013, there are a number of commercial fishers working from small vessels (less than 12m) stored and launched from the beach at Sidmouth. These fishers are likely to utilise a variety of gear and target locally available species. In the wider context, Lyme Bay commercial fishers are likely utilised trawling, pair trawling, drift/fixed netting, potting, scallop and hook and line.

The offshore commercial fishing activity from Lyme Regis to Portsmouth was reported in the 2009 Navitus Bay offshore windfarm scoping report (ENECO, 2009). This document reported the results of overflight data which identified between 430 and 470 fishing vessels active in this extended area. These vessels target a variety of species depending on the season.

8.3 Recreational Fishing

Sidmouth attracts recreational fishers fishing from the beach. The beaches along this section of coast are well known for catches of bass, smoothound, plaice and rays.

9 Navigation

Royal Haskoning (2002) provides the following information about navigation in and around the Study Area:

> *"A number of small sailing dinghies and open angling boats launch from the beach, many of which are based at the Sidmouth Sailing and Angling Club. Larger recreational craft may pass Sidmouth on route between Exmouth and harbours to the east such as Beer, Axmouth and West Bay. It is possible that these may anchor off the beach for lunch or overnight in settled weather.*
>
> *"Rescue services in the area are provided by the Sidmouth Inshore Rescue Service which is an independent trust operating an inshore lifeboat from Sidmouth beach.*
>
> *"Vessels passing the site are unlikely to pass close in shore as there would be a danger of hitting the beach or running aground. Some hazard to navigation is likely to be already presented around Chit Rocks by the existing offshore breakwaters."*

From discussion held during site visits and engagement events, we believe this information remains valid. In addition, the following points are also of note regarding navigation in and around the study area:

- The Exmouth ferry, which runs regularly throughout the summer, requires access to the shore and a suitable place for disembarkation (to lower a ramp directly onto Sidmouth Beach).
- An increasing number of small pleasure craft launched from holidaymakers on the beach.

10 Landscape Setting

10.1 Designations

The importance of landscape to the Sidmouth area is recognised by the following nationally and regionally important designations and quoted below and the East Devon Local Plan policies listed in Section 19.2:

- The East Devon Area of Outstanding Natural Beauty (AONB) is characterised by vast areas of heathland, small wooded combes, fertile river valleys and outstanding cliffs and hilltops and form the protection setting for the Dorset and East Devon (UNESCO) World Heritage Site.
- The East Devon Heritage Coast, which is included within the East Devon AONB, comprises vivid red sandstone cliffs that are broken by the white chalk headland at Beer and fronted by pebble beaches.
- The Sidmouth Town Centre Conservation Area, which was designated by East Devon District Council under the Listed Buildings and Conservation Areas Act 1990. The area includes the Esplanade from the River Sid to Connaught Gardens which contains features of historical and special architectural interest.
- The Blackdowns National Character Area (NCA) [not to be confused with the Blackdown Hills AONB which is a different designation that is not relevant to the Study Area] is one of 159 distinct natural areas. Natural England (2014) explains that these areas *"are defined by a unique combination of landscape, biodiversity, geodiversity and cultural and economic activity."*

These features are shown in Figure 10-1.

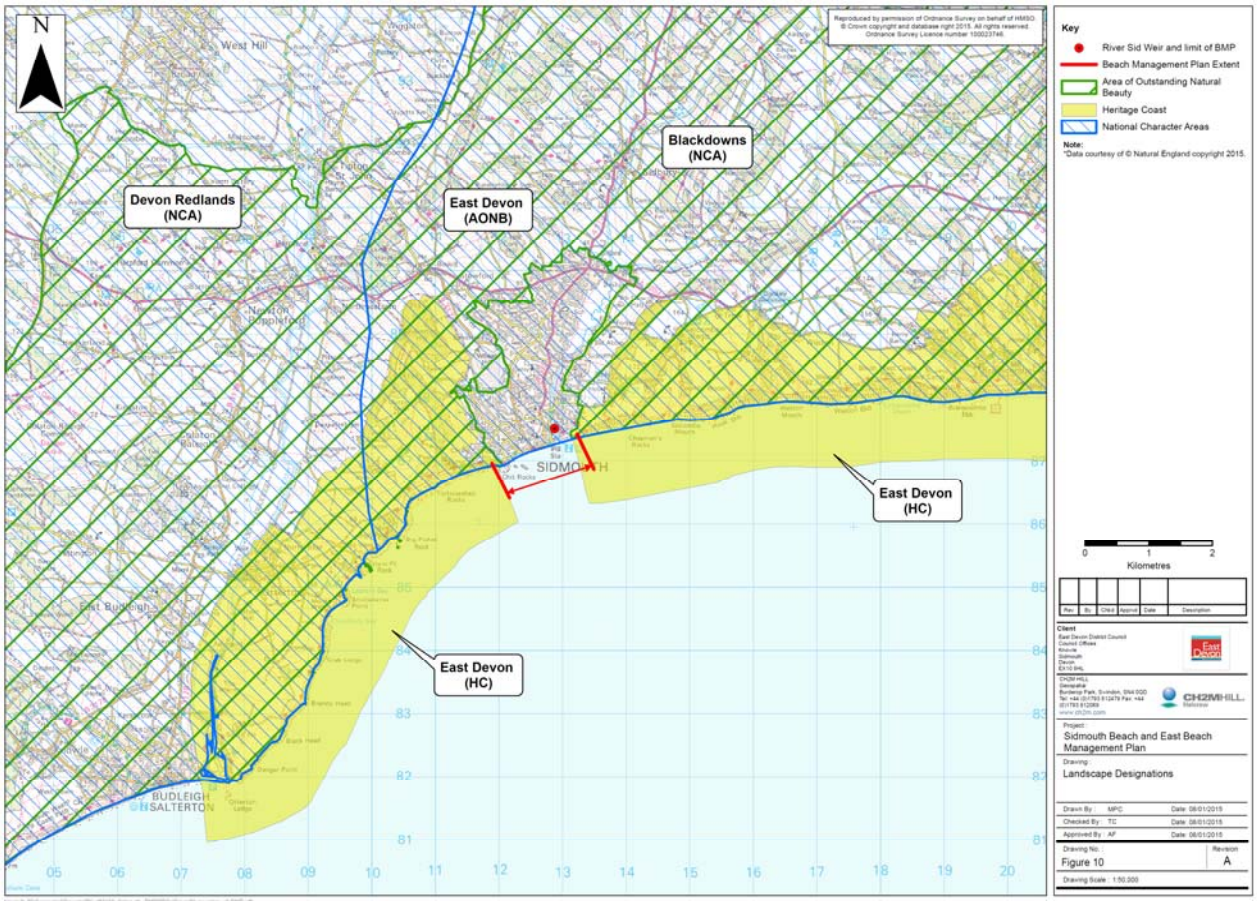


Figure 10-1 Landscape designations

10.2 Landscape character

The Sidmouth and Lyme Bay Coastal Plateau Devon Character Area is described on the Devon County Council's(2014) website as follows:

> *"This area is made up of a variety of landscape types which together give rise to a distinctive coastal landscape, exposed to salt laden winds and comprising open plateau, dramatic cliff, secretive undercliff, steep wooded combe valleys and river estuary. Here the senses are stimulated by stunning scenery and dramatic landform, lofty remoteness on the plateau tops and contrasting dark secretive inaccessible undercliff and intimate picturesque settled combes. Both the plateau top and estuaries have a strong horizontal emphasis and a sense of space and air while from the cliff tops there are distinctive views out to sea and also along the cliffs. In parts the distinctive coastal cliffs are of chalk and limestone and are unique in a Devon context while to the west the cliffs are red sandstone."*

11 Archaeology and Cultural Heritage

The landscape character of Sidmouth is of primary importance due to its distinctive steep red cliffs that as well as being geologically important, attract and maintain high levels of tourism. The Study Area is included within several character areas which include the Blackdown National Character Area, the Sidmouth and Lyme Bay Coastal Plateau Devon Character Area, and the Sidmouth Town Conservation Area. There are no Scheduled Monuments within the Study Area although Connaught Gardens, located near Chit Rocks, is a Registered Parks and Gardens. There are over 100 listed buildings and structures within the town of Sidmouth, along the Esplanade and near to Chit Rocks.

The Sidmouth Folk Festival has been held during the first week of August since 1955 and attracts thousands of visitors to the town.

Detailed information about the archaeology in and around the Study Area can be found in Royal Haskoning (2002). This explains that submerged forests and peat deposits provide evidence of a prehistoric landscape in Sidmouth. There are several scattered finds within the western beach area and possibly as far as the River Sid and East Beach. There is also evidence of Bronze Age and roman activity and habitation although it is likely that these settlement sites have become obscured by extensive urban development.

Fifteen sites of reference to archaeological or historical assets are known near to the Study Area. These include a possible site of medieval harbour, 19th Century commemorative stone, Alma Bridge and an ancient parish boundary. A further 60 sites or references to archaeological or historical assets are located within 1 km.

There is a record of at least one shipwreck in the Sidmouth area and the potential exists for further finds.

Figure 11-1 shows the designated historic environment features within the vicinity of the BMP area, whislt Figure 11-2 shows the non-designated features identified in Devon County Council's Historic Environment Records.

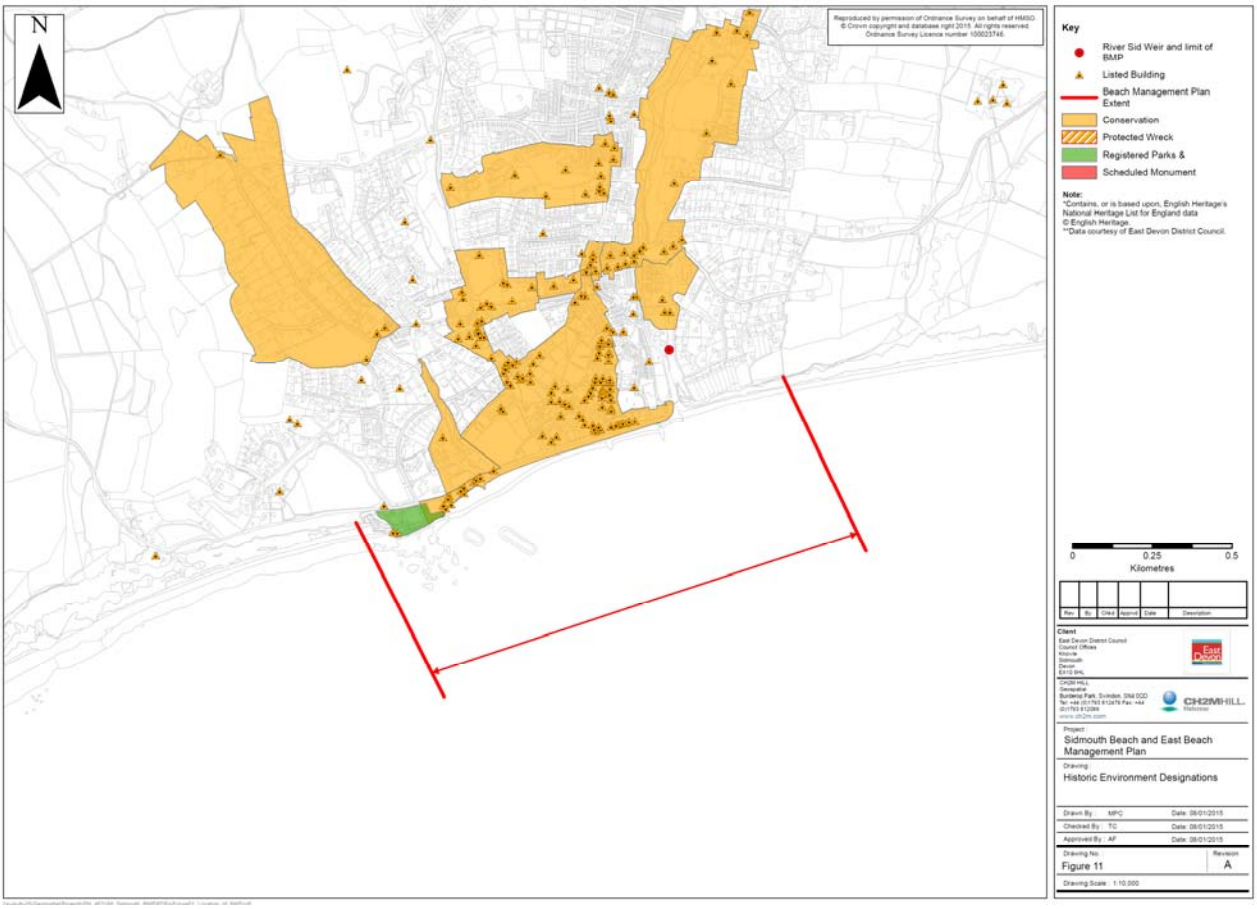


Figure 11-1 Historic environment designations

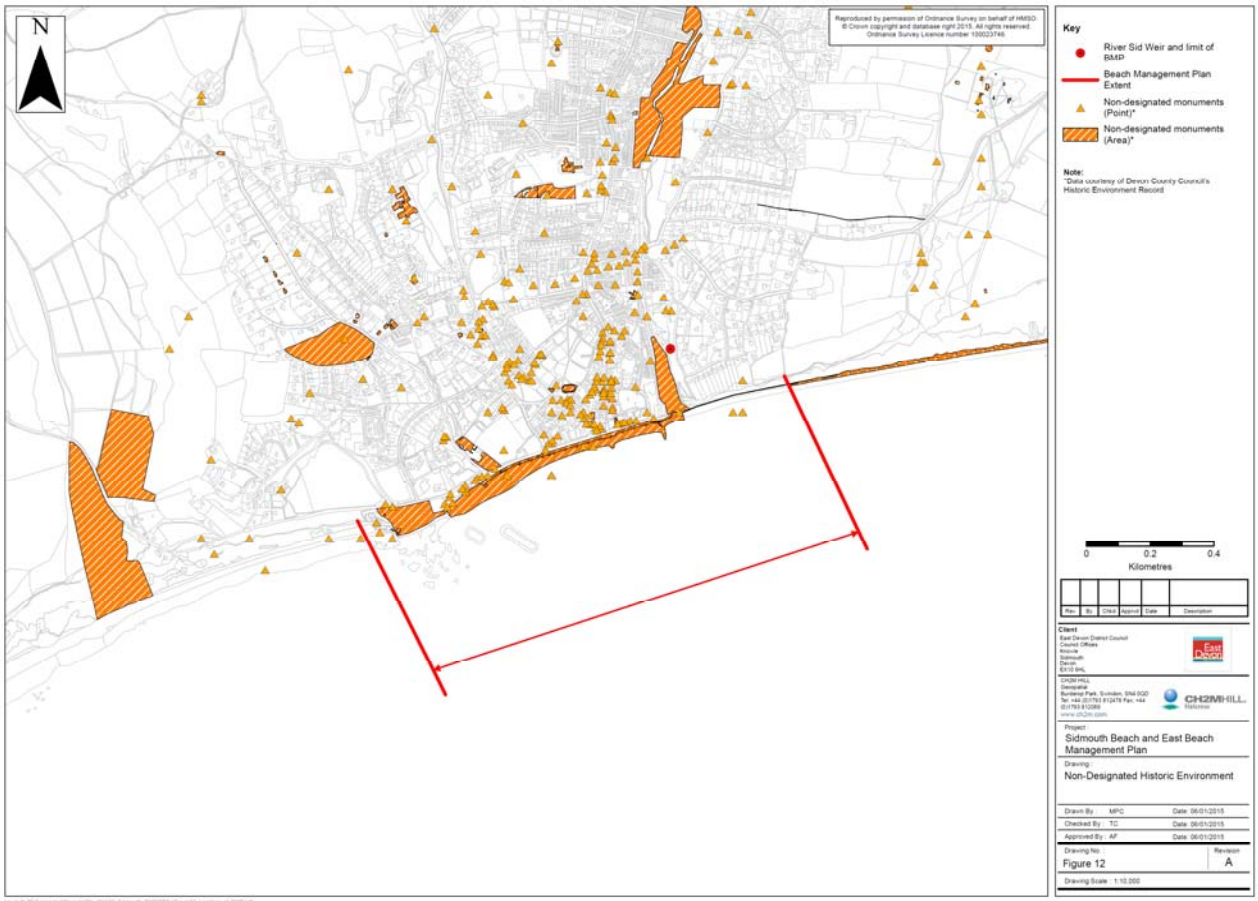


Figure 11-2 Non-designated historic environment features

12 Air Quality

There are no Air Quality Management Areas in the Study Area.

13 Noise

No baseline data on existing background noise level has been sourced for this baseline report. This may be required prior to any management activities depending on their scale and scope to produce elevated levels of noise.

14 Amenity Value

The East Devon coast is a popular tourist destination and as such the local economy is heavily dependent on this source of revenue. There are numerous accommodation facilities in Sidmouth for tourists including approximately 30 hotels, 50 guest houses and 50 self-catering establishments and camping resources. The beach has an amenity value which is likely enhanced at low tide by the sandy tombolas formed between the shingle and the offshore breakwaters. It is popular for a range of activities including dog walking, storm watching, swimming, surfing, kayaking, paddle boarding, fishing/angling, beachcombing, bird watching and fossil hunting. The Sidmouth Sailing Club also uses the beach to launch their boats. The frontage is also used for gig racing and community events such as Folk Week, Sidmouth Sea Fest and Sidmouth Carnival.

The South West Coastal Path is present through the entire Study Area. It follows the promenade and crosses the River Sid at Alma Bridge to the east of the Study Area. It has been reported that the route crossing Alma Bridge provides an important link between residence east of the River Sid and the main town. In addition, walkers from Weston to the east of Sidmouth regularly walk to Sidmouth and access Alma Bridge via steps from East Beach – this being the only access point along the shoreline between Sidmouth and Weston.

Sidmouth seafront is also part of the National Cycle Route number 2.

There is a small rocky area just off shore that provides limited SCUBA diving opportunities in that it's suitable for training.

15 Land Ownership

The BMP area is in a variety of public (East Devon District Council, Devon County Council and Environment Agency) and private (South West Water, National Trust and private individuals) ownership.

In terms of responsibility for managing coastal flood and erosion risk, it is East Devon District Council's responsibility to manage the majority of the BMP frontage with the exception of the River Sid western wall, which is the responsibility of the Environment Agency.

Devon County Council are responsible for Alma Bridge and the public highways, including the road that runs along Sidmouth seafront.

South West Water operate the outfall and pumping station at the mouth of the River Sid.

The National Trust are the landowner for the immediate cliff top area (seawards of individual property ownership) and beach (above Mean High Water) along the section of BMP frontage immediately to the east of the River Sid, with this ownership expanding landwards beyond the eastern limit of the BMP area. It is uncertain how much of this cliff top land owned by National Trust remains. Where land has been eroded, the land that was National Trust reverts to Crown Estate ownership.

In addition, the Crown Estate owns the seabed below Mean Low Water.

16 Highways, Services and Utilities

The Esplanade runs along the beach providing access for local residents and visitors. The Sidmouth Lifeboat Station operates from the eastern end of the Esplanade near the mouth of the River Sid. A tractor is used to transport the lifeboat to the beach in lee of the two western offshore reefs, where it is launched.

The main roads into Sidmouth are the B3176 and the A375 which both reach the Esplanade. Alma Bridge provides pedestrian access for local residents of Cliff Road and Beatlands Road as well as for people using the South West Coast Path. There is a sewage treatment work on the western bank of the River Sid and an outfall pipe discharging offshore of the mouth of the river.

There are four car parks within Sidmouth, the largest of which is at Manor Road just north of Connaught Gardens and offers just under 300 car parking spaces. The three other car parks are in the east of the town near the Ham and together provide an additional 341 spaces.

17 Construction Licensed activities

There are no activities currently licensed for coastal flood and erosion risk management purposes along the BMP frontage.

Construction works proposed below the Mean High Water Spring (MHWS) mark will require an application for a marine licence under the Marine and Coastal Access Act (2009). In the case that further works are considered to be of significant scale or to have significant impact on the environment, consideration of the proposed works will be required under the Marine Work (Environmental Impact Assessment) Regulations (as amended), 2007, to determine whether an environmental impact assessment is required. The Marine Management Organisation would act as the competent authority with the local authority taking the role a statutory consultee.

18 Environmental Monitoring

Environmental monitoring requirements will be considered further following the assessment of beach management options.

19 Links to other relevant documents

19.1 Shoreline Management Plan policy

The specific policy for Sidmouth, as defined by policy units 6a35 and 6a36, is stated in the SMP2 (Halcrow, 2011) as being:

> *"The town is currently defended by a range of defence measures including seawalls, rock groynes and offshore rock breakwaters, supported by ongoing beach management activities. The seawall along this section protects low-lying land from flooding, whilst the shoreline structures, offshore breakwaters and beach management serve to retain beach material in front of the seawall. Defences along the River Sid also provide flood protection to the town of Sidmouth.*
>
> *There are no defences along the coastal frontage of this stretch across the mouth of the River Sid and the easternmost part of Sidmouth. The defences along the Sidmouth frontage have, in part at least, contributed to low beach levels along this section and part of the adjacent coast to the east. This has led to an accelerated rate of cliff recession locally such that there is an increasing risk that the fluvial defences along the River Sid could become exposed to attack from the sea, which they are not currently designed to withstand, and so increase the risk of flooding to Sidmouth.*
>
> *The long term Plan for the section across the mouth of the River Sid is therefore to intervene to the extent that protection to the fluvial defences is provided, whilst providing a transitional zone between the area of 'Hold the Line' to the west and 'No Active Intervention' to the east.*
>
> *This would allow the cliffs to continue to erode, but at a slower rate. As this would not prevent cliff erosion but merely reduce the rate at which is occurs, cliff top properties to the immediate east of the River Sid would be protected for a period of time (expected to be most of the 100 year life of the Plan), but these assets would ultimately be at risk and measures will need to be put in place to manage this. In the very long term (beyond the 100 year life of the Plan), it is expected that more significant intervention to prevent further cliff recession will be required (and be economically justified) to achieve the long term vision to continue to protect the town of Sidmouth. However, if cliff erosion occurs at a faster rate than presently predicted there may be a need for this to be brought forward."*

Table 19-1 summarises the SMP policies that apply to the BMP frontage.

Table 19-1 SMP policies adopted June 2011 (from Halcrow, 2011)

Policy Unit	Short Term (to 2025)	Medium Term (to 2055)	Long Term (to 2105)
6a34 - Beer Head to Salcombe Hill	Allow natural coastal evolution to continue through No Active Intervention.	Allow natural coastal evolution to continue through No Active Intervention.	Allow natural coastal evolution to continue through No Active Intervention.
6a35 - River Sid and Sidmouth (East)	Undertake Managed Realignment through beach management.	Undertake Managed Realignment through beach management.	Undertake Managed Realignment through beach management.
6a36 - Sidmouth	Continue to maintain existing defences under a Hold the Line policy.	Continue to maintain existing defences under a Hold the Line policy.	Continue to maintain existing defences under a Hold the Line policy.

Policy Unit	Short Term (to 2025)	Medium Term (to 2055)	Long Term (to 2105)
6a37 – Chit Rocks to Big Picket Rock	Allow natural coastal evolution to continue through No Active Intervention.	Allow natural coastal evolution to continue through No Active Intervention.	Allow natural coastal evolution to continue through No Active Intervention.

19.2 East Devon District Council planning policy

The following section summarises local planning policies that are relevant for flood and coastal erosion risk management activities defined in this BMP.

19.2.1 The East Devon New Local Plan 2006-26

The East Devon New Local Plan is currently in draft and will supersede the current Local Plan (1995-2011). It has been submitted for examination so the commentary below reports on propose relevant strategies and polices. The introduction to the Plan sets out the aim of the plan to guide where development in East Devon will occur and how the great natural asset will be conserved and enhanced. Pertinent strategies and policies are identified below:

- Strategy 5 – Environment
- Strategy 26 – Development at Sidmouth
- Strategy 44 – Undeveloped coast and coastal Preservation Areas
- Strategy 45 – Coastal erosion
- Strategy 46 – Landscape conservation and enhancement and AoNB
- Strategy 47 – Nature conservation and geology
- Policy EN4 – Protection of Local Nature Reserves, County Wildlife Sites and County Geological Sites
- Policy EN5 – Wildlife habitats and features
- Policy EN6 – Nationally and locally important archaeological sites
- Policy EN7 – Proposal affecting site which may potentially be of archaeological importance
- Policy EN10 – Preservation and enhancement of conservation areas
- Policy EN15 – Environmental impacts, nuisance and detriment to health
- Policy EN18 – Maintenance of water quality and quantity
- Policy EN21- River and coastal flooding
- Policy EN23 – Coastal erosion and surface water run-off
- Policy EN24 – Coastal Defence Schemes
- Policy EN25 – Development affected by coastal change
- Policy TC4 – Footpaths, Bridleways and cycleways.

19.3 World Heritage Site Management Plan 2014 - 2019

The UNESCO Dorset and East Devon Coast World Heritage Site Management Plan defines a number of aims and objectives for the long-term sustainable management of the site. The aim is ‘to protect the Site’s Outstanding Universal Value (OUV)and setting’..

In line with this aim, the management plan sets out a range of policies covering all aspects of coastal management. The following policies are still of particular relevance to the development of future management options for the BMP area:

- Policy 1.1 Protect the OUV of the Site through prevention of developments that might impede natural processes, or obscure the exposed geology, as set out in the GCR / SSSI details, now and in the future
- Policy 1.2 Where developments affecting the Site or setting do take place, avoid or at least mitigate negative impact on the natural processes of erosion and exposed geology
- Policy 1.5 Ensure that the 'South Devon and Dorset', and 'Two Bays' Shoreline Management Plans continue to take full account of the OUV of the Site and the specific geological and geomorphological features in the GCR sites when defining actions for coastal defences

19.4 East Devon Catchment Flood Management Plan (CFMP)

The CFMP acknowledges sources of flooding from rivers in the East Devon Catchment. It describes significant tidal flooding in Sidmouth with risks to people, property and infrastructure. The plan highlights preferred risk management policies for East Devon with a recommended '*sustain the current scale of flood risk'* for Sidmouth.

19.5 East Devon Area of Outstanding Natural Beauty (AONB) Management Strategy 2014 - 2019

The East Devon AONB management strategy contains a number of objectives and policies deriving from three main themes 1. Landscape 2. Sustainability 3. Communication and Management and 12 sub-themes. Objectives and policies relevant to the Sidmouth BMP are detailed below with sub-themes presented in bold. :

- **Coast** – Objective: The conservation and enhancement of the high quality and international significant coastline. Policy: (C 1) Conserve and enhance the tranquil, unspoiled and undeveloped character of the coastline and estuaries and encourage improvements to coastal sites damaged by past poor quality development or intensive recreational pressure.
- **Planning and Development** – Objective Planning development and policy protects the special landscape character and tranquillity of the AONB and will enable appropriate forms of social and economic development that are compatible with the landscape, so conserving and enhancing the environment. (P 3) Encourage the development of guidelines and design guides to support high quality sustainable development which complements and respects the AONB landscape and historic character.

20 References

- Andrews, J., 1996. *The Sidmouth Phase 2 Coast Protection Scheme*. Papers and Proceedings of 31st MAFF Conference on River and Coastal Engineers (Keele), 9.3.1 to 9.3.5.
- Devon County Council website [online], available http://www.devon.gov.uk/dca-50.htm?nocache=1608 [accessed January 7th 2014],
- East Devon Council, 2014. *The East Devon New Local Plan 2006-26* [online] available http://www.eastdevon.gov.uk/localplan [accessed April 9th 2014]
- East Devon AONB, 2014. *AONB Management Strategy* [online], available http://www.eastdevonaonb.org.uk/index.php?page=aonb-management-plan [accessed April 9th 2014]
- Ellis, J.R., Milligan, S.P., Readdy, L., Taylor, N. and Brown, M.J. 2012. *Spawning and nursery grounds of selected fish species in UK waters*. Sci. Ser. Tech. Rep., Cefas Lowestoft, 147: 56 pp.
- ENECO, 2009, Request to the IPC for an Opinion of the scope of the ES of Navitus Wind Park
- Halcrow 2011. *Durlston Head to Rame Head Shoreline Management Plan Review (SMP2)*. South Devon and Dorset Coastal Advisory Group.
- Jurassic Coast World Heritage Site, 2009. *Dorset and East Devon Coast World Heritage Site Management Plan 2009-2014*.[online] available http://jurassiccoast.org/conserving-the-coast/management-files/category/14-managment-plan-current [accessed 4th April 2014]
- Natural England website [online], available http://www.naturalengland.org.uk/publications/nca/blackdowns.aspx [accessed Jan 7th 2014],
- Rogers J, Hamer B, Brampton A, Challinor S, Glennester M, Brenton, P, Bradbury A, 2010, *Beach Management Manual, 2nd edition*. CIRIA
- Royal Haskoning (2002) *Environmental Statement – Coast Protection Pennington Point Sidmouth*. East Devon District Council.
- *Standing Conference on Problems Associated with the Coastline* (SCOPAC) (2004) *Sediment Transport Study*, [online], available http://www.scopac.org.uk [accessed January 7th 2014]
- South West Ecological Survey, 2002, Ecological Survey and Assessment of Salcombe Hill Cliffs, Sidmouth, Commissioned by Royal Haskoning on behalf of East Devon Council

Appendix A Environmental Designation Information

This appendix provides a summary list of natural environment and heritage features that are both within and adjacent to the Study Area of the Sidmouth and East Beach Management Plan.

1. ***Sidmouth to West Bay cSAC and the Lyme Bay to Torbay cSAC***

   Refer to designation summary sheets from Joint Nature Conservation Committee website (copies provided in this appendix).

2. ***Sidmouth to Beer Coast SSSI and Ladram Bay to Sidmouth SSSI***

   Refer to designation summary sheet from Natural England website (copy provided in this appendix)

3. ***Dorset and East Devon UNESCO World Heritage Site (the 'Jurassic coast')***

   The Dorset and East Devon Coast World Heritage Site is England's first natural World Heritage Site - it is known as The Jurassic Coast. It covers 95 miles of truly stunning coastline from East Devon to Dorset, with rocks recording 185 million years of the Earth's history. World Heritage status was achieved because of the site's unique insight into the Earth Sciences as it clearly depicts a geological 'walk through time' spanning the Triassic, Jurassic and Cretaceous periods.

   Further information about the World Heritage site is to be found at http://www.jurassiccoast.com/. Of particular relevance is the WHS management plan that is to be found on these pages.

4. ***East Devon Area of Outstanding Natural Beauty (AONB)***

   Details about the East Devon AONB can be found at http://www.eastdevonaonb.org.uk.

5. ***Blackdowns National Character Area***
   Refer to designation information from Natural England website (Copy provided in this appendix)

6. ***Sidmouth Town Conservation Area***
   Details about the Sidmouth Town Conservation area can be found at http://www.eastdevon.gov.uk.

7. ***Sidmouth and Lyme Bay Coastal Plateau Devon Character Area***
   Details about the Sidmouth and Lyme Bay Coastal Plateau Devon Character Area can be found at http://www.devon.gov.uk.

8. ***East Devon Heritage Coast***
   Details about the Heritage Coast can be found on the Natural England website http://naturalengland.org.uk.

9. ***Connaught Gardens – Registered Parks and Gardens***
   Details about Connaught Gardens can be found at http://www.english-heritage.org.uk and http://www.eastdevon.gov.uk.

10. ***Listed Buildings***

    Information on Listed Buildings is available as GIS layers having been obtained from English Heritage website http://www.english-heritage.org.uk.

European Site Conservation Objectives for Sidmouth to West Bay Special Area of Conservation Site code: UK0019864

With regard to the natural habitats and/or species for which the site has been designated ('the Qualifying Features' listed below);

Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features.

Subject to natural change, to maintain or restore:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species;
- The distribution of qualifying species within the site.

Qualifying Features:

H1210. Annual vegetation of drift lines

H1230. Vegetated sea cliffs of the Atlantic and Baltic coasts

H9180. *Tilio-Acerion* forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes*

* denotes a priority natural habitat or species (supporting explanatory text on following page)

This is a European Marine Site

This site is a part of the Sidmouth to West Bay European Marine Site. These conservation objectives should be used in conjunction with the Regulation 35 Conservation Advice Package, for further details please contact Natural England's enquiry service at enquiries@naturalengland.org.uk, or by phone on 0845 600 3078, or visit the Natural England website at: http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx

* Priority natural habitats or species

Some of the natural habitats and species listed in the Habitats Directive and for which SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Directive and the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Directive or the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

European Site Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive 1992. They are for use when either the appropriate nature conservation body or competent authority is required to make an Appropriate Assessment under the relevant parts of the respective legislation.

These conservation objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site can be said to demonstrate a high degree of integrity and the site itself makes a full contribution to achieving favourable conservation status for those features.

This document is also intended for those who are preparing information to be used for an appropriate assessment by either the appropriate nature conservation body or a competent authority. As such this document cannot be definitive in how the impacts of a project can be determined. Links to selected sources of information, data and guidance which may be helpful can be found on Natural England's website. This list is far from exhaustive.

Inshore Special Area of Conservation (SAC): Lyme Bay and Torbay

SAC Selection Assessment

Version 2.5

Version Control

Version and Issue date	Amendments made	Issued to and date
2.5 6th August 2010	Text amendments from pSAC to cSAC status	Submission to Europe (9th August 2010)
2.4 14th May 2010	Minor text amendments	Natural England Executive Board
2.3 6th May 2010	Text amendments	To JM and GT to QA
2.2 5th May 2010	Text amendments	
2.1 29th April 2010	New maps and text amendments	
2.0 21st April 2010	New document for Lyme Bay and Torbay SAC drafted following formal consultation on Poole Bay to Lyme Bay cSAC	N2K Project manager and JB

1. Introduction

This document provides detailed information about the Lyme Bay and Torbay 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 Commission[1].

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 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. Lyme Bay and Torbay: SAC Selection Assessment

1. Site name Lyme Bay and Torbay	**2. Site centre location** Degrees and minutes**: 2° 58' 11"W 50° 39' 04"N** Decimal degrees: **2.96°W 50.63° N** (Datum: WGS84)
3. Site surface area (Mackerel Cove to Dartmouth and Lyme Bay reefs) **31,248 ha; 312 sq km** (UTM Zone 30 Northern hemisphere WGS84)	**4. Biogeographic region** Atlantic

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

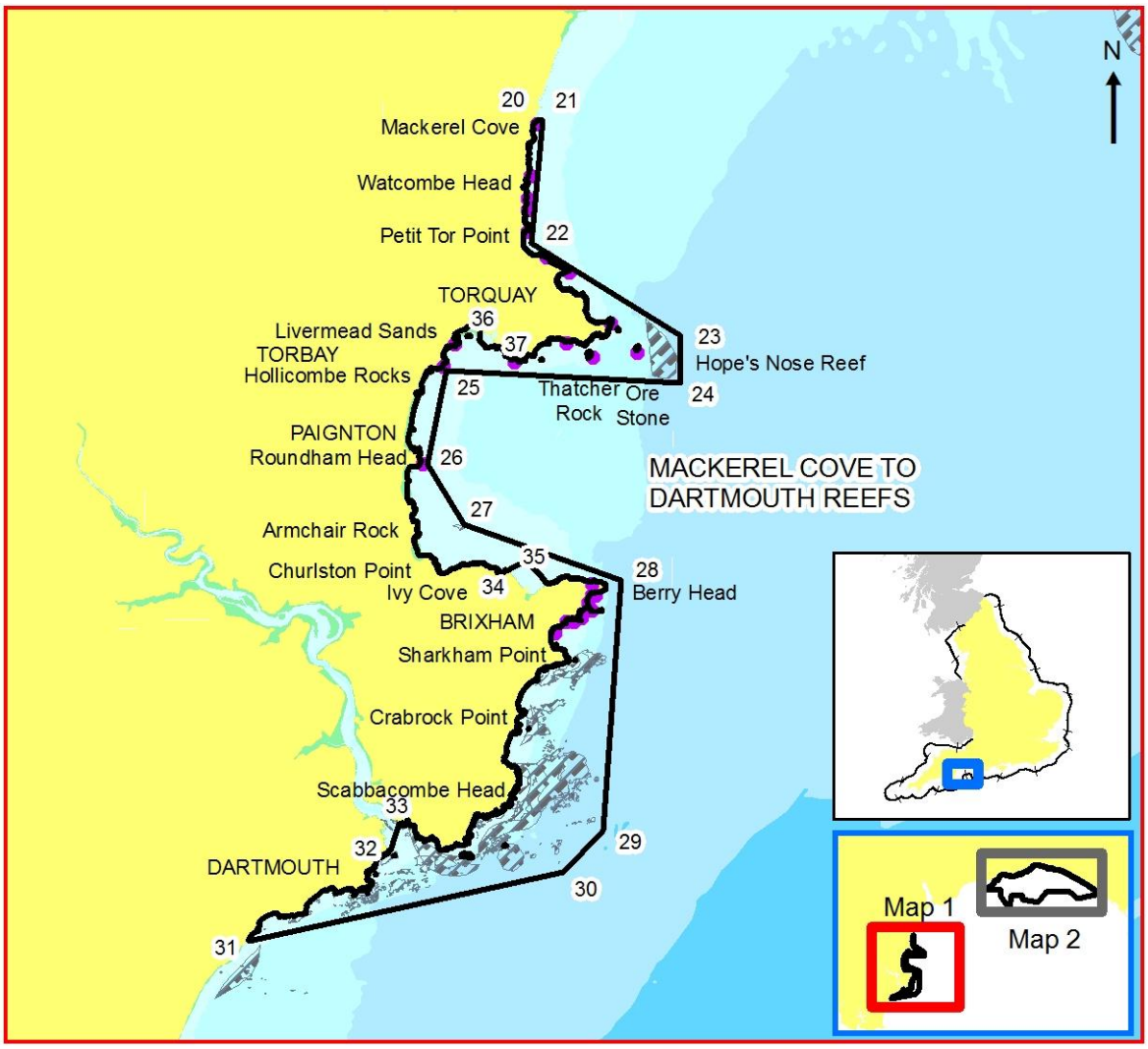
This site is listed for the features set out below. For further information please see European Commission, DG Environment, 2007: Interpretation Manual of European Union Habitats. EUR 27, July 2007:

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

1170 Reefs.

8330 Submerged or partially submerged sea caves.

4. Maps of candidate SAC boundary and location of features[2]



candidate Special Area of Conservation
Lyme Bay and Torbay
candidate Special Area of Conservation
Reefs
Sea caves
Special Areas of Conservation
England 12nM Territorial Seas Limit
Depth Areas
Drying
<=10m
<=20m
<=50m
<=100m
Land

EU Site Code: UK0030372
Version number: 2.0
Longitude: 2° 56' 11" W
Latitude: 50° 39' 4"N
Projection: UTM 30N (WGS84)
Area of SAC: 312.47 sq km 31247.79 ha
Theme ID: 1452105
Grid Ref: SY314821
Version: 9.0
Plotted: 22/07/2010
Plot ID: 6.0

Scale 1:200,000 Map 1 of 2
0 1.25 2.5 5 Kilometers

Candidate Special Area of Conservation Directive 92/43/EEC
Submitted to the EC by the Secretary of State for Environment, Food and Rural Affairs. Date: 20/08/2010
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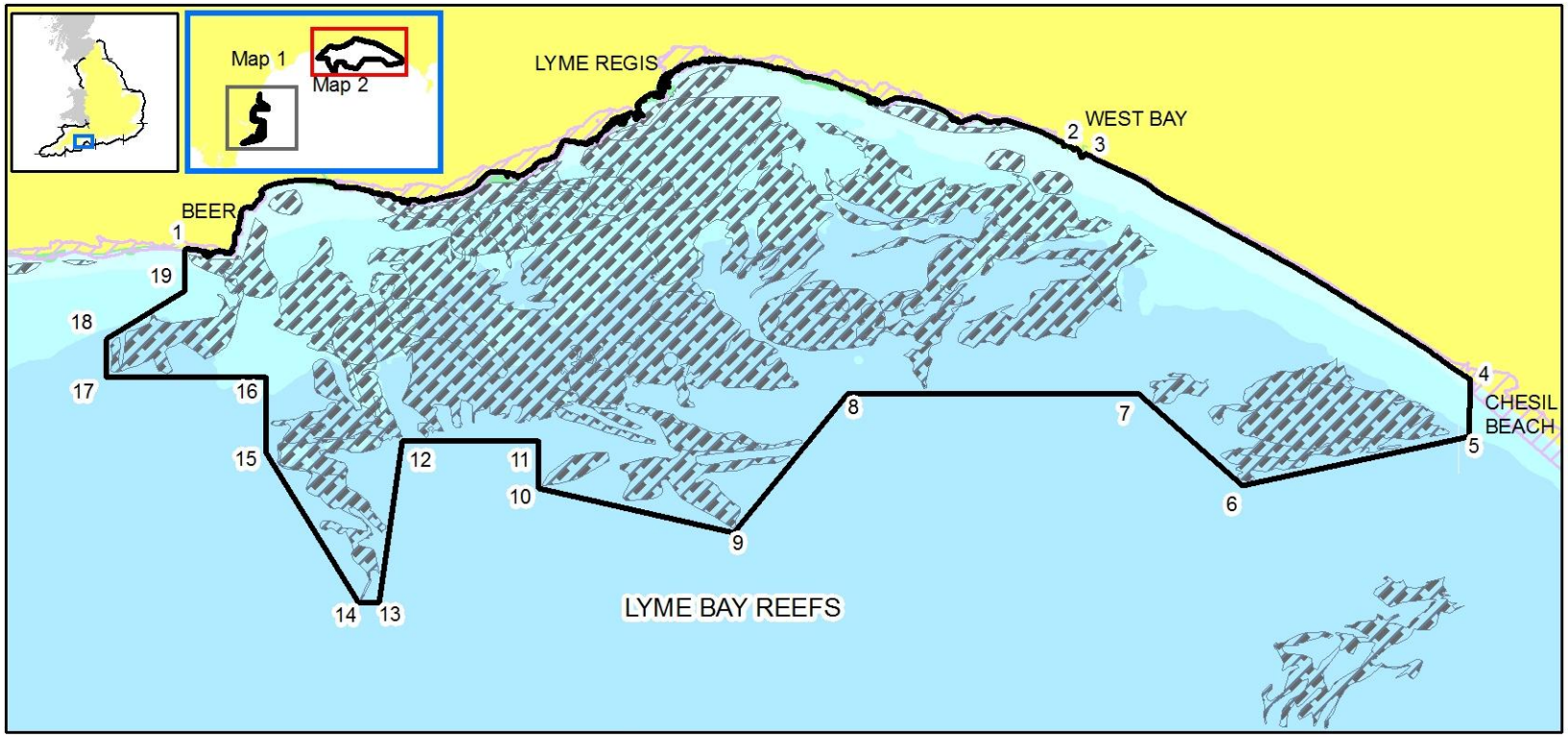
[2] Larger copies of maps are available on request from Natural England, Regulatory Services, Floor 1 West, Northminster House, Peterborough. PE1 1UA



candidate Special Area of Conservation
Lyme Bay and Torbay

- candidate Special Area of Conservation
- Special Areas of Conservation
- Reefs
- England 12nM Territorial Seas Limit

Depth Areas

- Drying
- <=10m
- <=20m
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- <=100m
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Scale 1:200,000 Map 2 of 2 N

Candidate Special Area of Conservation Directive 92/43/EEC. Submitted to the EC by the Secretary of State for Environment, Food and Rural Affairs. Date: 20/08/2010

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Location of boundary nodes*

Point No	Lat	Long	Point No	Lat	Long
1	50º 41' 10''	-3º 6' 50''	20	50º 30' 44''	-3º 30' 34''
2	50º 42' 31''	-2º 45' 50''	21	50º 30' 44''	-3º 30' 28''
3	50º 42' 32''	-2º 45' 49''	22	50º 28' 57''	-3º 30' 42''
4	50º 39' 12''	-2º 36' 48''	23	50º 27' 37''	-3º 27' 17''
5	50º 38' 21''	-2º 36' 51''	24	50º 26' 56''	-3º 27' 16''
6	50º 37' 38''	-2º 42' 8''	25	50º 27' 6''	-3º 32' 37''
7	50º 39' 0''	-2º 44' 32''	26	50º 25' 44''	-3º 33' 1''
8	50º 39' 1''	-2º 51' 20''	27	50º 24' 52''	-3º 32' 10''
9	50º 36' 57''	-2º 53' 60''	28	50º 24' 4''	-3º 28' 37''
10	50º 37' 37''	-2º 58' 33''	29	50º 20' 26''	-3º 28' 58''
11	50º 38' 19''	-2º 58' 33''	30	50º 19' 50''	-3º 29' 52''
12	50º 38' 19''	-3º 1' 45''	31	50º 18' 47''	-3º 36' 59''
13	50º 35' 55''	-3º 2' 17''	32	50º 20' 7''	-3º 33' 48''
14	50º 35' 55''	-3º 2' 45''	33	50º 20' 30''	-3º 33' 36''
15	50º 38' 9''	-3º 4' 55''	34	50º 24' 20''	-3º 30' 47''
16	50º 39' 16''	-3º 4' 55''	35	50º 24' 11''	-3º 31' 12''
17	50º 39' 16''	-3º 8' 39''	36	50º 27' 28''	-3º 31' 44''
18	50º 39' 50''	-3º 8' 39''	37	50º 27' 26''	-3º 31' 44''
19	50º 40' 33''	-3º 6' 49''			

*Landward boundaries follow OS mean low water line

Location of sea caves

Name	Grid reference
Mackerel Cove Sea Caves	SX 930 691
Watcombe Sea Caves	SX 928 677
Smuggler's Hole	SX 927 671
Shag Cliff Caves	SX 927 668
Petit Tor Caves	SX 927 662
Babbacombe Sea Cave	SX 932 655
Long Quarry Point Caves	SX 938 651
Hope's Nose Submarine Caves	SX 949 637
Ore Stone Cave	SX 956 629
Thatcher Rock Sea Cave	SX 944 628
Kilmorie Sea Cave	SX 937 632
London Bridge Sea Caves	SX 923 627
Corbyn's Head Sea Caves	SX 907 632
Livermead Head Sea Caves	SX 904 626
Roundham Head Sea Caves	SX 898 600
Berry Head Quarry Caves	SX 943 567
Southside Caves	SX 944 564
Compass Cave	SX 943 564
Berry Head Sea Cave no.1	SX 942 562
Oxley Head Cave	SX 943 560
North Durl Head caves	SX 940 558
Slater's Cave	SX 938 557
Durl Head Cave	SX 936 557
St Mary's Bay Cave	SX 933 554

5. Site summary

5.1 Reefs

The Lyme Bay and Torbay site lies off the south coast of England off the counties of Dorset and Devon. The site comprises of two main areas containing Annex I 'reef' and 'sea cave' habitat. The areas are described as (from east to west):

- Lyme Bay Reefs; and
- Mackerel Cove to Dartmouth Reefs.

Lyme Bay Reefs
The seabed in the Lyme Bay Reefs area is found to comprise a wide variety of reef features including:

- outcropping bedrock (including igneous, chalk, mudstone and limestone examples); and
- pebbles, cobbles and boulders.

The reef features extend over a large area. Unlike other sites within the Lyme Bay and Torbay site, they do not extend directly out from the coast but occur as outcropping bedrock slightly offshore. The softer sediment habitats are commonly found between the bedrock or cobble / boulder areas.

Mackerel Cove to Dartmouth Reefs
The reefs in the Mackerel Cove to Dartmouth area exhibit great geological variety. Between Dartmouth and Scabbacombe Head slate reef is present with occasional granite outcrop. The slate reefs represent complex topographic features characterised by steeply inclined bedrock rising vertically with deep gullies. The reefs present between Crabrock Point and Sharkham Point are formed from mud ledges which form 2m high rock ridges. The reef features surrounding Berry Head principally comprise limestone ridges, boulders and pinnacles. The complex reef features, including ridges, vertical drop-offs, pinnacles and deep gullies, support rich species assemblages. Within Torbay, the reefs comprise discrete areas associated with the many headlands and coves (and include from south to north: Brixham to Ivy Cove reefs, Churston Point, Armchair Rock, Roundham Head and Hollicombe rocks to Livermead sands). The reefs in Torbay have a more diverse composition with limestone outcrops recorded in the southern half of the bay, and sandstone in the upper half of the bay. Hope's Nose reef (including Thatcher Rock and the Ore Stone) are large areas of limestone reef extending around the northern headland of Torbay.
All of the reefs features present within this area are extensions of the coastal geology.

5.2 Sea Caves

A large number of infralittoral sea caves have been identified within Torbay and the surrounding coastline from Mackerel Cove in the north, to Sharkham Point in the south. Examples of the classical wave-eroded sea caves are found at all the sites (Proctor, 2009). They 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.

5.3 Lyme Bay and Torbay Annex I Habitat Comparison

5.3.1 Reef habitats

This site is situated mostly within the Western English Channel and Celtic Regional Sea (Defra, 2004). Listed below are existing SACs within these Regional Seas 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 comprising reef habitat

Site	Description of relevant qualifying features
Isles of Scilly complex SAC	Hard bedrock reef, both infralitttoral and circalittoral, in some cases extending well beyond 50 m depth. Exposure levels vary at this site: some reefs and 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 *Leptopsammia pruvoti*, pink sea-fans *Eunicella verrucosa*, and Weymouth carpet-coral *Hoplangia durotrix*.
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 *Parerythropodium coralloides*, sea-fan *Eunicella verrucosa* 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 *Hiatella arctica* and the spionid worms *Polydora* 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 Eunicella verrucosa 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 *Corynactis viridis* and Devonshire cup coral *Caryophyllia smithii* near the peak of the outcrop, to encrusting sponges, crinoids and Ross coral *Pentapora foliacea (now P. fascialis)* towards the base of the rock (where boulders surround its edge). The surrounding seabed is approximately 100m deep.

Natural England are proposing Lizard Point cSAC, Prawle to Plymouth Sound and Eddystone cSAC and Land's End to Cape Bank cSAC 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.
Prawle Point to Plymouth Sound & 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 *Porania pulvillus*, the slipper lobster *Scyllarus arctus* and the sea fan anemone *Amphianthus dohrnii*. Furthermore, the presence of relatively large numbers of warm-water species, e.g. *Alcyonium glomeratum* and *Holothuria forskali*, 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 sea fan *Eunicella verrucosa* and probably the most extensive and widespread colonies of the nationally rare sunset coral *Leptopsammia pruvoti*. The Eddystone Reefs area extends down into deep waters and supports good examples of deeper water reef species (such as the starfish *Porania pulvillus* and the parchment tube worm *Phyllochaetopterus anglicus*) that may not be so frequent on the more common inshore reefs.

5.3.2 Sea cave habitats

The only sea cave habitat within an existing SAC in the Western English Channel and Celtic Sea Regional Seas occur within the Lundy SAC (Defra, 2004). However they do not form a primary feature of the SAC and are listed as Grade C (Examples of the feature which are of at least national importance (i.e. usually above the threshold for SSSI/ASSI notification on terrestrial sites) but not significantly above this, also these features are not the primary reason for SACs being selected). No detailed account of the features are given.

Within the Eastern English Channel Regional Sea, sea caves are primary features within one SAC, the features of which are detailed below.

Table 5.2 Regional SACs comprising sea cave habitat

SAC	Description of relevant qualifying features
South Wight Maritime	The southern shore of the Isle of Wight, off the coast of southern England, includes a number of either submerged or partially submerged sea caves. The exposure of the south coast of the island to high wave energy has allowed the erosion of the Cretaceous calcareous hard cliffs to form sea caves. Examples of this habitat can be found from the Needles along the south-west coast of the Island, and also in Culver Cliff on the south-east coast of the Island. This site also contains the only known location of subtidal chalk caves in the UK. The large littoral caves in the chalk cliffs are of ecological importance, with many hosting rare algal species, which are restricted to this type of habitat. The fauna of these sea caves includes a range of mollusc species such as limpets *Patella* spp. and the horseshoe worm *Phoronis hippocrepia.*

6. Site boundary

The boundary around the Lyme Bay and Torbay site 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. 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.

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)

The evidence from survey data (Royal Haskoning, 2008) indicates that the reef features within the Mackerel Cove to Dartmouth area are indicative of Annex I reef habitat. They represent a broad range of the habitat, with examples of igneous, sandstone, mudstone and limestone reefs, as well as supporting biogenic reef features (in the form of *S.alveolata* beds). The information gathered on the ecology of these features shows that they support a wide variety of species that typify reef habitat (such as hydroids, algae, sponges and corals) and include a number of nationally important species (such as the pink sea fan *Eunicella verrucosa*).

The Lyme Bay Reefs area comprises rock, cobbles, pebbles and boulders all of which fall under the classification of Annex I reef habitat. The site is indicative of offshore reef, where sea squirts (such as *Ascidiella aspersa* and *Phallusia mammillata*), sponges (such as *Cliona celata*), anemones (such as *Aiptasia mutablilis* and *Urticina felina*), corals (such as *Alcyonium digitatum, Caryophillia smithii* and *Leptopsammia pruvoti*), sea fans (such as *Eunicella verrucosa*) and bryozoans (such as *Pentapora foliacea (now P. fascialis)*) dominate and sustain a wide diversity of other species. Furthermore, diver accounts indicate that the areas of exposed bedrock include mudstone, sandstone, limestone (which is commonly piddock bored) and igneous rock. These different rock types all create a range of different habitats which subsequently adds to the site's

diversity, and increases its representativity over a wider range of criteria. A recent study undertaken by Hiscock & Breckels (2007) has identified this area has having particularly high species richness and identified it as a marine biodiversity "hot spot".

The Lyme Bay and Torbay 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 (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 14,289 hectares, which is 46% 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
The structure of the Annex I habitats found within the Mackerel Cove to Dartmouth area vary to some extent, with the majority of the reef habitats appearing to have a good structure and conforming to the Annex I habitat description. The reef around Hope's Nose especially where close to the main areas of human activity has reports of anthropogenic impacts (as detailed below). However, none of these impacts are considered significant enough to warrant concern regarding the feature's structure.

Within the Lyme Bay Reefs area fishing activity, namely scallop dredging, has been widely undertaken and concerns over the impacts of this activity on the important species inhabiting the reefs led to the statutory closure of the area in July 2008. (http://www.defra.gov.uk/marine/pdf/biodiversity/lyme-bay-closure.pdf).

Fishing activity has occurred extensively in this area up until July 2008 as a result of increases in the commercial value of scallops (Devon Wildlife Trust, *pers.comm*.). The effect of scallop dredging has resulted in the degradation of reef structure as well as biota. The effects are significant in terms of impacts on the ecology; as shown by the studies undertaken by Marine Bio-images where video footage exists before and after dredging activity. (http://pinkseafan.wildlifetrusts.org/threats.html). The physical structure of the majority of the reef habitat within this area is considered to be in relatively good condition. However, in areas where scallop dredging has coincided with softer bedrock and areas of boulder / pebble reef degradation to the structure has occurred.

The Lyme Bay and Torbay site is therefore, graded II (structure well conserved)

In accordance with the EU manual (EC, 2007), where anything below the highest ranking is given to the Structure, then an assessment should be made of the sites function.

Degree of conservation of functions
The function of the Annex I habitats outside of Torbay is considered to be good due to the general lack of anthropogenic threats. Impacts from the discharge of sewage around Hope's Nose have been reported.

The functioning of the reef habitat with the Lyme Bay Reefs area is dependent on a lack of disturbance and there is now plenty of evidence for the damaging effect of this fishery on the marine life over large parts of Lyme Bay (Seasearch, 2006). The key, indicative reef species are commonly delicate slow growing, species that rely on recruitment from the immediate surrounding waters. Therefore, any direct disturbance to an area may not only result in direct mortality but also impact on the success of the surrounding population.

The conservation effort until July 2008 had focused on the establishment of voluntary closed areas to mobile gear. These closures were non-statutory and believed to be insufficient in keeping all the dredging activity out of the closed areas. In addition, and as mentioned previously, the Annex I Habitat extends well beyond the small voluntary closed areas. However, following the establishment of statutory closed areas and introduction of conservation measures, the site should be able to restore its structure and function over time. The voluntary exclusion zones provided an example of this, where nine months after the agreement was signed, three of the five key species were up to 10 times more abundant in the protected zones compared with fished areas (Hiddink *et al*, 2007). Importantly the recovery of species included some of the key reef species such as *Alcyonium digitatum* and *Eunicella verrucosa*.

The Lyme Bay and Torbay site is therefore, graded II (good prospects)

As the site is not considered to have the lowest ranking for either 'Structure' or 'Function' there is no requirement to assess the 'Restoration Potential' of the site (in accordance with guidance set out in the EU manual (EC, 2007)).

Overall grade
The Lyme Bay and Torbay site has been graded II for the conservation of structure sub-criterion, and II for the conservation of function sub-criterion.

The overall grade for the conservation of structure and function criterion is grade B (good conservation).

7.1.4 Global assessment (d)

The Mackerel Cove and Dartmouth site is comprised of a wide range of different Annex I reef habitats and consequently the area supports a high level of biological diversity that is represented by the reef features that may not be found in areas of single rock type.

The reef habitat in the Lyme Bay Reefs area represents a significant proportion of the total regional area of reef habitat. Furthermore, the site comprises a number of different types of reef habitat. The reefs are nationally renowned for their dense floral and faunal assemblages, and are known to support significant populations of a number of nationally important species. Fishing activity has resulted in damage to the structure and functioning of many parts of the reef. However, statutory measures have recently been put into place to exclude scallop dredging and trawling from the reefs and evidence from studies of an area following fishing activity indicates that the site shows good recovery potential.

The Lyme Bay and Torbay site is graded A (excellent conservation value)

7.2 Sea Caves

7.2.1 Representativity (a)

The requirements for sea caves to be considered 'representative' of Annex I habitat are less detailed than for reefs.

The indicative features of sea caves as set out by the JNCC includes:

- Submerged sea caves and also partially submerged caves which are only exposed to the sea at high tide.
- Caves vary in size, and include tunnels or caverns with one or more entrances, in which vertical and overhanging rock faces provide the principal marine habitat.
- Caves are typically colonised by encrusting animal species but may also support shade-tolerant seaweeds near their entrances.
- Caves that are subject to strong wave surge are characterised by communities of mussels *Mytilus edulis*, barnacles *Balanus crenatus*, cushion sponges, encrusting bryozoans and colonial ascidians, depending on the degree of water movement and scour at particular points in the cave system.
- Caves that occur in deeper water are subject to less water movement from the surrounding sea, and silt may accumulate on the cave floor. The sponges, soft corals, solitary ascidians, bryozoans and sessile larvae of jellyfish are characteristic of deeper cave systems. These caves may also provide shelter for crabs, lobsters *Homarus gammarus*, crawfish *Palinurus elephas*, and fish such as leopard-spotted goby *Thorogobius ephippiatus*.

Whilst not all the sea caves in this area have been fully documented, Proctor (2009) describes the presence of many indicative species and physical characteristics as outlined above. Therefore, it is considered that sea caves between Sharkham Point and Mackerel Cove are representative according to the guidelines.

The Lyme Bay and Torbay site is graded A (good representativity)

7.2.2 Area of habitat (b)

Sea caves are found around the UK coastline. However, no comprehensive mapping of the features has been undertaken, and therefore it is difficult to draw any conclusion in terms of the relative surface area taken up by the caves both within the Area of Interest and on a UK wide scale. However, due to large numbers found in a relatively small area it is felt that the Torbay caves represent a well developed example of this feature.

Given the lack of national context, it is not possible at present to grade this feature.

7.2.3 Conservation of structure and function (c)

Degree of conservation of structure
The evidence available on the sea caves does not note any structural damage.

The Lyme Bay and Torbay site is therefore, graded I (excellent prospects)

Degree of conservation of functions
The evidence available on the sea caves does not note any damage, furthermore there is indication of some caves supporting self-sustaining communities which would indicate that the functioning of the features is in good condition (Proctor, 2009).

The Lyme Bay and Torbay site is therefore, graded I (excellent prospects)

Overall grade
Given the highest ranking for structure, no assessment of the restoration potential, is required in accordance with EU guidance (EC, 2007).

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

7.2.4 Global assessment (d)

The sea caves are the least well understood feature of the Annex I habitat types present, in both a local and national context. It can be concluded that the site supports a large number of caves that can be considered representative of Annex I habitat. Some of these caves have been found to support a number of nationally important species.

The Lyme Bay and Torbay site is graded B (good conservation value)

NB. This feature has not been graded as A, as, whilst clearly representative, is not considered as significant as chalk caves (given the rarity of the latter feature).

7.3 Summary of scores for Stage 1A criteria

Lyme Bay and Torbay	Representativity (a)	Relative surface (b)	Structure and function (c)	Global assessment (d)
Reefs	**A**	**C**	**B**	**A**
Sea caves	**A**	**N/A**	**A**	**B**

8. Sites to which this site is related

None.

9. Supporting scientific documentation

Scientific information on the topography, habitats and species present within the Lyme Bay and Torbay candidate SAC boundary is available from a number of sources. These are listed in the table below:

Reference	Description
2002 - 2009 Seasearch survey	A regional marine monitoring programme.
2005 Devon Biological Records Centre Lyme Bay Substrate Map.	Substrate mapping exercise.
2005 Start Bay side scan sonar survey conducted by Ambios Ltd.	Detailed site survey to fully characterise areas where data gaps lie in the Lyme Bay mapping study.

Reference	Description
DBRC, 2005. Lyme Bay sampling programme.	Lyme Bay drop video and grab sampling were undertaken to produce a biotope map of the benthic habitats of Lyme Bay. Grab samples from 133 sites.
DBRC, (1977-1998). Devon Eunicella verrucosa records.	DBRC collated records for the Pink sea fan Eunicella verrucosa.
DWT, (2001-2006). Lyme Bay Reefs Monitoring work.	The dataset compiles information on the status of the Lyme Bay reefs from 2001 to 2004.
DERC, (1995 – 2004). Dorset Seasearch.	Seasearch diver survey programme for the period of 1995 to 2004.
Lyme Bay Environmental Study Volume 3. Subtidal benthic ecology: Epibenthos. Report for Kerr McGee Oil (UK) Plc. Cleator, (1995).	A report on the hard substratum communities in the eastern section of Lyme Bay (Lyme Regis to Portland Bill).
Lyme Bay Environmental Study ROV Video Survey (Appendix 2 Volume 3). Report for Kerr McGee Oil (UK) Plc. Munro 1995.	An ecological report from ROV survey for Oil and Gas exploration. 29 ROV sampling stations.
Proctor (2009) sea cave study.	A study to record and describe the sea cave habitats within Torbay.
2003 Reef Research. Climate change impacts on sea fan populations. Munro, 2003.	A study into the effects of climate change on sea fan populations.
2003 Reef Research. East Tennants reef sea fan study. Interim report. Munro, 2003.	A status report on the sea fans within The East Tennants Reef.
Davies J, 1998. Western Channel (Durlstone Head to Cape Cornwall, including the Isles of Scilly) (MNCR Sector 8).	Provides a summary of Dorset Underwater Survey carried out in the 1970's and 1987-present Devon MNCR surveys.

10. Site overview and conservation interest

10.1 Reefs

The Lyme Bay Reefs area is one of the most heavily surveyed and studied areas on the south coast of England. The seabed in this area is found to comprise a wide variety of reef features including:

- outcropping bedrock (including igneous, chalk, mudstone and limestone)
- Pebbles, cobbles and boulders.

These reef areas are interspersed with patches of gravel & coarse sands (commonly supporting maerl) and sands & muddy sediments. Given the high sediment complexity, a diverse range of seabed habitats occur in the area; with over nine biotopes having been recorded from MNCR diver records alone (MNCR, 2009). Studies carried out in the area have mapped the biotopes across the area, and biotopes found are described in the table below:

Biotope Code	Biotope description
CR.HCR.Xfa and SS.SMx.CMx	Mosaic of mixed faunal turf communities and sublittoral mixed sediment
CR.HCR.Xfa.ByErSp.Eun	*Eunicella verrucosa* and *Pentapora foliacea* on wave-exposed circalittoral rock
CR.HCR.Xfa	Mixed faunal turf communities
CR.FCR.Cv.SpCp	Sponges, cup corals and anthozoans on shaded or overhanging circalittoral rock
SS.SCS.CCS	Circalittoral coarse sediment
SS.SCS.CCS.MedLumVen	Venerid bivalves in circalittoral coarse sand
SS.SCS.CCS.PomB	Cobbles and pebbles covered with keel worms and barnacles
SS.SCS.CCS.Blan	*Branchiostoma* in coarse sediment
SS.SMx.CMx.ClloMx	Burrowing anemones in muddy mixed sediment
SS.SMx.CMx.OphMx	Brittlestar beds
SS.SSa and SS.SMu.CSaMu	Mosaic of sublittoral sands and muddy sands
SS.SSa.CMuSa.AalbNuc	Bivalves in muddy mixed sediment
SS.SSa	Sublittoral fine sand or mud

The Mackerel Cove and Dartmouth area comprises a number of discrete features of interest. The reefs between Dartmouth and Scabbacombe Head are thought to represent slate reef with occasional granite outcrop. The slate reefs represent complex topographic features characterised by steeply inclined bedrock rising vertically with deep gullies. The reefs have extensive algal coverage of both kelp and red algae and within the littoral and infralittoral zones support large numbers of the mussel *Mytilus edulis* (Plate 3). Faunal communities are noted for their richness (especially in areas where the rock strata drops vertically off). These deeper rock and tide swept ridges have recorded abundant assemblages of hydroids, particularly *Nemertesia* spp and other species such as the sponge *Cliona celata* and anemone *Actinothoe sphyrodeta*, soft corals and crustacea. The sandy sediments between the rock outcrops have also been noted for their unusually high species richness for such substrates. A number of records of important species (i.e., BAP & protected species) such as *Eunicella verrucosa* exist on these reefs.

The reefs present between Crabrock Point and Sharkham Point are formed from mud ledges which form 2m high rock ridges. These are heavily silted and colonised with much sessile flora and fauna such as *Laminaria* spp, and anemones (such as *Metridium senile*).

The reefs surrounding Berry Head principally comprise limestone ridges, boulders and pinnacles. The complex reef features, including ridges, vertical drop-offs, pinnacles and deep gullies, support rich species assemblages, with dense kelp, red algae recorded along with many records of other sessile fauna such as hydroids, anemones and cnidarians.

The reefs within Torbay comprise discrete areas associated with the many headlands and coves (and include from south to north; Brixham to Ivy Cove reefs, Torbay ridges, Churston Point, Armchair Rock, Roundham Head and Hollicombe rocks to Livermead sands). The reefs in Torbay have a more diverse composition with limestone outcrops recorded in the southern half of the bay, and sandstone in the upper half of the bay. All the reefs support rich species assemblages, with piddocks adding to the habitat complexity in the limestone outcrops in the south, and vertical faces and deep fissures in the sandstone providing a diverse range of habitats in the northern reefs. The reefs also support mussel (*Mytilus edulis*) beds and honeycomb worm (*Sabellaria alveolata*) reefs

(Torbay Council, 2004) although there is poor information available on the extent and status of these.

Hope's Nose reef (including Thatcher Rock and the Ore Stone) is a large area of limestone reef extending around the northern headland of Torbay. Accounts of the reef indicate that it is stepped, with abundant sessile species (such as algae, anthozoa and hydroids) present. Off the Ore Stone a mat of mussels and carpet anemones dominates the seabed, which is also known to support the locally rare sea slug *Okenia elegans*. The seabed at Hope's Nose itself (to the north of the headland) has been surveyed as part of the MNCR surveys that described the presence of an impoverished faunal and floral community as a result of localised pollution from a sewer outfall. However, this was in 1977 and in the intertidal zone, therefore may not be representative of the offshore reef nor its current status.

The pink sea fan *Eunicella verrucosa* is found throughout the site, with key assemblages occurring within the Lyme Bay Reefs area where densities are notably high. The fan is a species of soft coral which occurs on rocky reefs on the Southwest and on the western seaboard of Ireland, and whilst it is not a key feature of the Annex I habitat, it is statutorily protected at a national level under the Wildlife and Countryside Act 1981. It is also considered a priority species under the UK Biodiversity Action Plan (http://www.ukbap.org.uk/UKPlans.aspx?ID=292) and is described as 'vulnerable' on the EU Red list category. Other important species include the nationally rare sponge *Adreus fascicularis* and the nationally rare sunset cup coral *Leptopsammia pruvoti* have been recorded, as well as the sponges *Axinella dissimilis* and *Axinella ddamicormis*.

10.2 Sea Caves

A large number of sea caves have been identified within Torbay and the surrounding coastline but only caves that have an infralittoral (below mean low water; MLW) element are considered here. Infralittoral sea caves are found throughout the Area of Interest from Mackerel Cove in the north, to Sharkham Point in the south (Section 4). Many of these caves are large and complex, and contain rich marine (and sometimes also terrestrial) faunas. Of particular importance is the high diversity of these caves. Of the classical wave-eroded sea caves, there are examples at all the sites listed above (Proctor, 2009). They 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. Many of the caves have a rich fauna, which varies considerably between caves (as is to be expected given the high diversity of the sites), however, most sites have not yet been comprehensively surveyed and this needs to be completed before their significance can be properly assessed (Proctor, 2009).

Despite the limited survey effort on these caves a number of nationally significant species have been found within these caves as detailed in **Table 10.1**.

Table 10.1 Nationally significant species in sea caves (Source: Seasearch, 2006).

Species	Common name	National importance
Thymosia guernei	Sponge	Rare
Alcyonium hibernicum	Pink sea fingers	Scarce
Edwardsia sp	Burrowing anemones	Occasional/rare
Caryophyllia inornata	Southern cup coral	Rare
Hoplangia durotrix	Weymouth carpet coral	Rare
Galathea nexa	Squat lobster	Rare (S Britain)

11. Photographic plates

Plate 1 Ross coral, erect sponges and a hydroid/bryozoan truf with some red algae Source: Devon Wildlife Trust

Plate 2 *Dictyota dichotoma* & red seaweeds Source: Dorset Wildlife Trust, 2004

Plate 3 Mussel beds off Dartmouth (© Keith Hiscock)

12. References

BROWN A E, BURN A J, HOPKINS J J & WAY S F (eds), 1997. The Habitats Directive: selection of Special Areas of Conservation in the UK. Joint Nature Conservation Committee Report 270, Peterborough, 295pp.

CEC, 1995. *Natura 2000 Standard Data Form: Explanatory Notes.* Brussels: European Commission DG Environment. 32pp.

DAVIES J, 1998. Western Channel (Durlstone Head to Cape Cornwall, including the Isles of Scilly) (MNCR Sector 8). In: *Marine Nature Conservation Review. Benthic Marine Ecosystems of Great Britain and the north-east Atlantic,* ed. by K. Hiscock, 219-253. Peterborough, Joint Nature Conservation Committee.

DEFRA, 2004. Review of Marine Nature Conservation. Working Group Report to Government [online]. London: Defra. Available from: http://www.defra.gov.uk/marine/pdf/biodiversity/rmnc-report-0704.pdf [Accessed March 2007].

DORSET WILDLIFE TRUST, 2004. Seasearch survey Report 1995 – 2004.

EC, 2007. Interpretation manual of European Union habitats. Version EUR 27. European Commission (DG Environment), Brussels.

EU, 2003. The EU Interpretation Manual of European Union Habitats. European Union October 200.

HIDDINK J, KAISER M, HINZ H & RIDGEWAY A, 2007. Quantification of epibenthic fauna in areas subjected to different regimes of scallop dredging activity in Lyme Bay, Devon. School of Ocean Sciences, College of Natural Sciences, Bangor University.

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

JNCC, 2008. UK guidance on defining boundaries for marine SACs for Annex I habitat sites fully detached from the coast.

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.

MNCR, 2009. 1987 - 2009 Devon MNCR surveys

PROCTOR C J, 2009. The Coastal Caves of Torbay. Report to Torbay Coast and Countryside Trust and Natural England. Volumes I and II.

ROYAL HASKONING, 2008. Identification of Annex I Habitat suitable for SAC designation within the Lyme Bay and Torbay area.

SEASEARCH, 2006. Berry Head Survey 2005 – 2006.

SERAD, 2001. A fishing industry guide to offshore operators. Scottish Executive, Edinburgh, 28.

TORBAY COUNCIL, 2004. Tor Bay Marine Biodiversity Action Plan

13. Glossary

Abiotic Devoid of life

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

Amphipods are shrimp-like crustaceans ranging from 1 mm to 140 mm in length Marine amphipods may be pelagic (living in the water column) or benthic (living on the seabed). Pelagic amphipods are eaten by seabirds, fish, and marine mammals.

Anthropogenic Human-induced or resulting from human activities.

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

Banner Banks are generally only a few kilometres in length with an elongated pear-shaped form (Dyer and Huntley, 1999). They commonly lie in the lee of fixed obstacles such as headlands, islands, submerged rock shoals and gaps in rock ridges. They are sometimes paired on either side of the obstacle, with one larger than the other indicating a net direction of sand transport (Stride, 1982). Banner banks may also occur in areas with rapid deepening of water away from the coast and are less evident off coasts with a low offshore slope (Dyer and Huntley, 1999). Examples occur in the English Channel, Irish Sea and North Sea.

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

Bedforms Ripples moulded by a flow of water. Bedforms range in size from ripples in the sand, a few centimetres apart, to 'dunes' tens of metres in length.

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.

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.

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 (Natural Habitats, &c.) Regulations 1994 (as amended) 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.

Environmental Statement The formal document produced following the undertaking of an environmental impact assessment, in order to acquire consent for an activity.

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

Estuary mouth Dyer and Huntley, 1999: "…in general linear sand ridges are associated with the mouths of macro-tidal estuaries (wide mouth), and tidal deltas are associated with meso-tidal or micro-tidal estuaries (narrow mouth)." The banks are generally "aligned with the tidal current flow and migrate away from their steeper face." Examples include Long Sand and Gunfleet Sand (in the Thames Estuary) and banks in The Wash.

Foliose Bearing leaves or leaf-like structures.

Fauna Animal life in an area.

Geogenic origin A feature formed by non biogenic substrata.

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).

Headland associated sandbanks Dyer and Huntley, 1999: "Tidal eddies produced by headlands can create 'banner banks, but when the headland is retreating 'alternating ridges' can be formed which can become isolated from the coast as it recedes." "With very slow retreat the surplus sand

will accumulate as a banner bank in a position of convergence. With coastline retreat, a series of alternating banks will result with each successive one more distant from the shoreline." Banner banks are only a few km in size and have an elongated pear-shaped form with the broad end being orientated towards the tip of the headland. Alternating ridges may be linear or V or S shaped.

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.

Linear Sandbanks are elongated banks which can be up to tens of kilometres long and less than ten kilometres wide. They lie generally parallel or at a slight angle to peak tidal currents. They can be found in open seas but are also common in large estuaries such as the Thames Estuary.

Littoral The intertidal zone.

Long lining A commercial fishing technique that uses hundreds or even thousands of baited hooks hanging from a single line.

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.

Maintenance dredging Required to maintain water depths in areas where sedimentation occurs, particularly shipping channels to maintain a safe depth for the passage of vessels. It involves the removal of recent unconsolidated sediments, such as mud, sand and gravel.

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.

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

Open shelf ridge Dyer and Huntley, 1999: 'Nearly all shallow tidal seas, where currents exceed about 05 m s-1 and where sand is present, have ridges. These can be up to 80km long, and typically average 13km width and tens of metres in height. Their spacing tends to be proportional to their width. The bank crests are flat in shallow water, but are sharp when water depth is large enough to limit wave effects.' Examples include South Falls and Indefatigables.

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.

Pterobranchs Small marine filter feeders in the phylum Hemichordata.

Sand wave A large, ridge-like structure resembling a water wave on the upper surface of a sedimentary bed that is formed by water currents. Also known as sand ridge.

Sandy mounds Distinct sandbanks (i.e. elongated, rounded or irregular 'mound' shapes) which cannot be categorised as any of the other types.

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

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.

Sinuous Banks are 'S' or 'V' shaped sandbanks and are common off the Norfolk coast and in the southern North Sea. They are large scale features and may occur in extensive groups which can include linear banks.

Sinusoidal having a succession of waves or curves

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.

Submarine cables Cables which are laid beneath the seabed to carry telecommunications or power to offshore installations or different countries.

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

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.

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

Turbidity This is a measure of the attenuation of light in the water column and can be caused by the light adsorption properties of the water, plankton, suspended particulate organic matter and dissolved colour.

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" (Brown *et al*, 1997; McLeod *et a*l, 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 (≤ 25m)	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

CITATION

COUNTY: DEVON SITE NAME: SIDMOUTH TO BEER COAST

DISTRICT: EAST DEVON

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 as amended

Local Planning Authority: DEVON COUNTY COUNCIL, East Devon District Council

National Grid Reference: SY 130873, SY 235895 Area: 239.0 (ha.) 590.5 (ac.)

Ordnance Survey Sheet 1:50,000: 192 1:10,000: SY 18 NW, SY 18 NE, SY 28 NW

Date Notified (Under 1949 Act): 1952 Date of Last Revision: 1976
(minor boundary amendments)

Date Notified (Under 1981 Act): 1985 Date of Last Revision: 1989

Other Information:
In East Devon Area of Outstanding Natural Beauty and Lyme Bay Heritage Coast. Parts owned by or covenanted to the National Trust. Parts managed as Nature Reserves by Devon Wildlife Trust. Boundary modified by a minor extension at the 1989 revision.

Descriptions and Reasons for Notification:
This stretch of Devon coastline supports the most westerly example of species-rich chalk grassland in England and a diverse invertebrate fauna is associated with the site. There are also important geological and stratigraphic features displayed here.

Extending for approximately 12km the site consists mainly of south-facing cliffs with occasional coastal valleys. The cliffs are generally very steep and in places rise to 160m above the shingle foreshore. In the west New Red Sandstone with a capping of Greensand occurs, but as the strata dip eastward chalk beds appear beneath an overlay of clay-with-flints.

The grassland of the cliff tops and ledges is characteristically species-rich with many plants typical of calcareous soils present. These include Purging flax *Linum catharticum*, Squinancywort *Asperula cynanchica*, Carline Thistle *Carlina vulgaris*, Small Scabious *Scabiosa columbaria*, Common Rockrose *Helianthemum nummularium*, Ploughman's Spikenard *Inula conyza* and Salad Burnet *Sanguisorba minor*. Several species of orchid occur including Pyramidal Orchid *Anacamptis pyramidalis* and Autumn Lady's-tresses *Spiranthes spiralis*. The site also supports the nationally rare Purple Gromwell *Lithospermum purpurocaeruleum* and the nationally scarce Tree Mallow *Lavatera arborea*, Nottingham Catchfly *Silene nutans* and Sea Kale *Crambe maritime*.

In the coastal valleys woodland occurs with Ash *Fraxinus excelsior* and Pedunculate Oak *Quercus robur* forming the canopy in the drier parts and Alder *Alnus glutinosa* and Willows *Salix* spp. in the wet valley bottoms. In sheltered areas and along sections of the

cliffs a rich scrub community forms dense thickets. This includes Dogwood *Cornus sanguinea*, Wayfaring Tree *Viburnum lantana*, Wild Privet *Ligustrum vulgare*, Blackthorn *Prunus spinosa* and Hawthorn *Crataegus monogyna*. Associated climbers are Traveller's-joy *Clematis vitalba* and Madder *Rubia peregrina*.

The wide variety of aspects and habitats supports an equally varied invertebrate fauna. Butterflies, grasshoppers and crickets are numerous. The nationally scarce Rufous Grasshopper *Gomphocerippus rufus*, Grey Bush-cricket *Platycleis denticulata* and Bog Bush-cricket *Metrioptera brachyptera* have been recorded. In some of the streams the rare caddis flies *Plectronemia brevis*, *Adicella filicornis* and *Ernodes articularis* occur. A seasonally flooded pool supports a population of the nationally rare Fairy Shrimp *Chirocephalus diaphanus*, a species listed on Schedule 5 of the Wildlife and Countryside Act. The uncommon Brackish Water-crowfoot *Ranunculus baudotii* has also been recorded here.

These cliff sections provide the finest exposures of the Foxmould Sands and Chert Beds (Upper Greensand) in South-West England. The site may be used as the type locality for these members, and the section is of critical importance as a standard with which to compare and contrast inland exposures. The quality of exposure allows particularly good opportunities to study the sedimentology of Upper Greensand Chert and hardground formation. The site is also of importance as it contains some of the most westerly major Upper Cretaceous exposures in England, which are of great stratigraphic importance. They show the intriguing lateral thickness and facies variations of the Cenomanian Limestone, containing an abundant and in part rare fauna. The *Neocardioceras* Hardground at the tip of the Cenomanian yields ammonites that are scarcely known elsewhere in Britain at this horizon. The site beautifully displays the basal Turonian or Beer Stone, a large echinoderm-rich calcarenite lens and also the major erosional truncation of the Lower Turonian and Cenomanian. A unique site for its sedimentology and stratigraphically-important fossil horizons.

File ref:

County: Devon **Site Name: Ladram Bay to Sidmouth**

District: East Devon

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act, 1981, as amended.

Local Planning Authority: Devon County Council, East Devon District Council

National Grid Reference: SY 096847 to 106860 **Area:** 18.4 (ha) 45.5 (ac)

Ordnance Survey Sheet 1:50,000: 192 **1:10,000:** SY 08 SE, NE; SY 18 NW

Date Notified (Under 1949 Act): 1952 (part) **Date of Last Revision:** 1976

Date Notified (Under 1981 Act): 1986 **Date of Last Revision:** –

Other Information:
Amended from previous Windgate Cliffs SSSI by extension and deletion.
In East Devon Area of Outstanding Natural Beauty (above HWM), and Heritage Coast.

Description and Reasons for Notification:
Ladram Bay is an important site for coastal geomorphology. A series of well-developed cliffs, stacks and shore platforms cut in the red sandstones of the Keuper represent one of very few assemblages of such forms in southern Britain. Moreover, they are unique in Britain in being formed in the relatively easily eroded sandstone, and owe their preservation largely to the relatively low energy regime in which they occur. The shore platforms are structurally controlled to the extent that some surfaces coincide with joint plates, while erosion along near-vertical joints has played a major role in isolating stacks from the mainland.

The cliffs below High Peak and Chit Rocks at Sidmouth, have yielded remains of Middle Triassic fossil fish, amphibians and reptiles. Specimens of the labyrinthodont *Mastodonsaurus* (including type material) and the rhynchosaur *Rhynchosaurus* are closely similar to forms from the Warwick and Bromsgrove area in the Midlands, and allow correlation between the two areas. The remains from High Peak are disarticulated but well preserved, and fresh cliff falls will almost certainly yield more material. The best fauna of Middle Triassic fossil vertebrates in southern Britain.

Home (/)

NCA Profile:147 Blackdowns (NE566)

This record was published on 28 May 2014.

General publications (/category/8005) | National Character Areas (/category/587130)

Long, dark ridges, deep valleys and dynamic cliffs are the essence of the Blackdowns National Character Area (NCA). The ridges create prominent backdrops from afar and offer far-reaching views. Flat plateaux, large, regular fields and long, straight roads create a sense of openness and uniformity on the ridges. Beech hedgerows and avenues enclose the grazed landscape,although areas of remnant common, lowland heath and scrub still exist, providing open access.
Woodland, much of semi-natural origin, dominates the steep valley tops, creating sinuous dark edges to the ridges; some conifer plantations also exist and intrude onto the plateaux. Below the wooded edge pastoral valleys feature with a medieval field pattern of small, irregular fields bounded by dense species-rich hedgebanks and hedgerow trees, creating an enclosed, tranquil setting. A myriad of springs and streams flow south through the valleys and can often be traced by semi-natural habitats: springline mires, rush pasture and carr woodland. Some valley floors widen and provide an opportunity for arable production, notably the Axe Valley which is characterised by a much wider flood plain. The entire River Axe within the NCA is designated for its biodiversity value, notably lamprey and bullhead fish.
Further information (https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making)

Downloads available for this record

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Location

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