Lyme Bay and Torbay candidate Special Area of Conservation

Formal advice under Regulation 35(3) of The Conservation of Habitats and Species (Amendment) Regulations 2012

Version 2.2 (April 2013)

Document version control

Version	Author	Amendments made	Issued to and date
2.2	Joana Smith	Removed '*Crepidula fornicata'* from species lists. Combined sensitivity assessment for Lyme Bay and Torbay units. Amended advice on operations and summary of pressures. Updated stony reef communities section.	
2.1	Joana Smith	Amended description of IPA in section 5.1.2 following feedback from MMO.	Natural England website 14/09/2012
2.0	Joana Smith	Update references to Habitats Regulations throughout to reflect recent Amendment of Regulation; addition of text explaining review process; amendments to standard text in section 2.2 and 2.3.	Relevant Authorities 31/08/2012
1.5	Joana Smith	Amendments following technical QA panel review including: Changes to section 4 to improve consistency in terminology, addition of 'non-physical disturbance' heading and text to section, changes to standard text and headings.	Caroline Cotterell, SRO Conservation Advice 16/08/2012
1.4	Joana Smith	Minor grammatical amendments and consistency of terminology; amendments to section 5.2.1; amended error in Appendix D-Summary of pressures table.	Samantha King, Senior Adviser (Reg 35 Conservation Advice) 19/07/2012
1.3	Joana Smith / Louisa Knights	Amended to include new survey data from 2011 & 2012; addition of subfeature stony reef. changes to vulnerability assessment; changes made for national consistency.	Marine Management Team 28/06/2012
1.2	Louisa Knights	Amendments made following consultation with Relevant Authorities; other minor changes made for national consistency.	Paul Duncan, Senior Advice (Reg 35 Conservation Advice) 05/04/2012
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Please note: As a result of the 2009/10 public consultation on the Poole Bay to Lyme Bay proposed Special Area of Conservation (pSAC), the Lyme Bay component was renamed Lyme Bay and Torbay; and the Poole Bay component was renamed Studland to Portland. The Studland to Portland component was subject to further public consultation from 1 September to 24 November 2011. As a consequence of splitting the sites, this document supersedes all previous draft conservation advice for Poole Bay to Lyme Bay pSAC version: Poolebay_to_lymebay_cons_obs_101109 in addition to any previous versions of the conservation advice for Lyme Bay and Torbay cSAC.

Further information

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Lyme Bay and Torbay candidate Special Area of Conservation

Formal advice under Regulation 35(3) of The Conservation of Habitats and Species (Amendment) Regulations 2012 (S.I., 2012)[1]

Contents

[1] http://www.legislation.gov.uk/uksi/2012/1927/made

1. Introduction

This document contains Natural England's formal advice for the Lyme Bay and Torbay candidate Special Area of Conservation (cSAC) given under Regulation 35(3) of The Conservation of Habitats and Species (Amendment) Regulations 2012. It supersedes the previous draft conservation advice for Lyme Bay and Torbay cSAC. It also supersedes draft advice on the Poole Bay to Lyme Bay proposed Special Area of Conservation (pSAC). As a result of the 2009/10 public consultation on the Poole Bay to Lyme Bay pSAC, the Lyme Bay component was renamed Lyme Bay and Torbay; and the Poole Bay component was renamed Studland to Portland.

Lyme Bay and Torbay was formally submitted by the Government to the European Commission as a cSAC on 20th August 2010. The European Commission adopted the site in November 2011 and it became a Site of Community Importance (SCI). The Government has six years from the date of adoption to designate the site as a Special Area of Conservation (SAC).

The cSAC is subject to full protection under the Habitats Directive[2] (transposed through the Conservation of Habitats and Species (Amendment) Regulations 2012[3] and the Offshore Marine Conservation Regulations (Natural Habitats, &c.) (Amendment) Regulations 2012 (herein referred to as the 'Habitats Regulations'). Amongst other things, the Habitats Regulations place an obligation on relevant authorities[4] to put in place measures to protect sites from damage or deterioration.

This document fulfils Natural England's duty under Regulation 35(3)[5] of The Habitats Regulations, to advise relevant authorities as to (a) the conservation objectives for Lyme Bay and Torbay: and (b) any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which Lyme Bay and Torbay cSAC has been designated.

The advice is based on best available information at the time of writing and will be reviewed to take account of new information.

This formal conservation advice constitutes one element of Natural England's advisory role in relation to this site. Relevant authorities can use the information to explore and put in place management measures (if required) and competent authorities[6] can fulfil their duties under the Habitats Regulations in making the necessary determinations on the impact of activities on the site. If relevant authorities or competent authorities require any further advice, they are not limited to taking account of Natural England's formal conservation advice contained here, and would be expected to make further enquiries as required in order to make determinations or implement management measures. Further information/reference should be made to the SAC Selection Assessment Document[7] for Lyme Bay and Torbay cSAC.

An independent review[8] of Natural England's marine SAC selection process carried out in 2011 made a number of recommendations as to how Defra and Natural England should

[2] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

[3] http://www.legislation.gov.uk/uksi/2012/1927/introduction/made

[4] as defined under Regulation 6 of The Conservation of Habitats and Species (Amendment) Regulations 2012

[5] http://www.legislation.gov.uk/uksi/2010/490/regulation/35/made

[6] as defined under Regulation 7 of The Conservation of Habitats and Species (Amendment) Regulations 2012

[7] http://www.naturalengland.org.uk/Images/LBT-sad_tcm6-21650.pdf

[8] http://www.defra.gov.uk/publications/files/pb13598-graham-bryce-independent-review-marine-sacs-110713.pdf

modify their approach to future evidence based work. This resulted in Natural England adopting the Government Chief Scientific Adviser's (GCSA) guidelines[9] on using evidence, through the development of a suite of Evidence Standards[10]. Implementation of these standards has included Natural England working with JNCC to develop a protocol[11], which has been subject to independent expert review, setting out the processes and requirements for the development of conservation advice packages, to ensure that these fully comply with the GCSA's guidelines. Whilst the conservation advice provided here was developed prior to the finalisation of the protocol, it has been assessed for compliance with the protocol and a detailed report can be found on our website[12].

During 2011/12 Government instigated a review of the implementation of the Habitats and Wild Birds Directive. The review concluded that all conservation objectives (marine and terrestrial) should be up-to date, accessible and allow applicants to assess the impact of their proposed development against them. The report[13] requested Natural England with the Joint Nature Conservation Committee (JNCC) to develop a new approach to improve the information contained in conservation objectives. Natural England has committed to review and update its conservation objectives for all European Marine Sites to make them more definitive and explicit. We will be consulting with stakeholders on the approach, as well as how we can make the formal conservation advice we provide under Regulation 35 more accessible and easier to use. The review of conservation advice will then begin in 2013 on a prioritised basis. We will use this review to update the advice contained within this document, to take account of new evidence that subsequently becomes available, and improved scientific understanding.

2. Roles and responsibilities

2.1 Natural England's role

The Habitats Regulations transpose the Habitats and Birds Directive into law in England and Wales. They give Natural England a statutory responsibility to advise relevant authorities as to the conservation objectives for cSACs, SACs and SPAs in English territorial waters (0-12nm) and to advise relevant authorities as to operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species for which the sites have been designated.

Natural England will provide additional advice as required for each site to relevant and competent authorities in order for them to fulfil their duties under the Habitats Regulations, such as a competent authority assessing the implications of any plans or projects on a cSAC, SAC or SPA.

[9] http://www.bis.gov.uk/assets/goscience/docs/g/10-669-gcsa-guidelines-scientific-engineering-advice-policy-making.pdf

[10] http://www.naturalengland.org.uk/ourwork/research/default.aspx

[11] http://www.naturalengland.org.uk/Images/R35ConservationAdvicePackageProtocol_tcm6-33228.pdf

[12] http://www.naturalengland.org.uk/ourwork/marine/mpa/ems/submitted.aspx

[13] http://www.defra.gov.uk/publications/2012/03/22/pb13724-habitats-wild-birds-directives/

2.2 The role of relevant and competent authorities

A **competent** authority is any statutory body or public office that exercises legislative powers on land or sea. All competent authorities must have regard for the requirements of the Habitats Directive in the exercise of their functions (regulation 9(3)).

Competent authorities have specific duties and powers under the Habitats Regulations. Where a decision is being considered within or affecting a Natura 2000 site, then the competent authority must follow the procedures in Regulations 61 & 62. Competent authorities also have duties under Regulations 69 & 70 for the review of decisions that have already been made. These Regulations refer back to the procedures set out in Regulation 61.

A **relevant** authority is a competent authority whose powers and functions have, or could have, an impact on the Natura 2000[14] series. The Habitats Regulations require relevant authorities to exercise their functions so as to secure compliance with the Habitats Directive. Relevant authorities must, within their areas of jurisdiction, have regard to both direct and indirect effects on interest features of the site. This may include consideration of issues outside the boundary of the site.

The relevant authority is responsible for determining whether a plan or project is likely to have a significant effect on a site, and carrying out an appropriate assessment. Regulation 61(2) makes it clear that the applicant has to supply the necessary information for the relevant authority to make the assessment. When carrying out the assessment, the relevant authority **must** consult Natural England in accordance with the Habitats Regulations.

Regulation 36[15] of the Habitats Regulations, permits relevant authorities to develop management schemes for sites. This should be based on the advice in this package.

Nothing within a Regulation 35 package will require relevant authorities to undertake any actions or ameliorate changes in the condition of interest features if it is shown that the changes result wholly from natural causes. Having issued Regulation 35 advice for this site, Natural England will work with relevant authorities and others to agree, within a defined time frame, a protocol for evaluating observed changes to baselines and to develop an understanding of natural change and provide further guidance as appropriate and possible. This does not, however, preclude relevant authorities from taking any appropriate action to prevent deterioration to the interest features, and indeed such actions should be undertaken when required.

2.3 The role of conservation objectives

The conservation objectives set out what needs to be achieved for the interest feature to be contributing effectively to Favourable Conservation Status of the interest feature across the Natura 2000 network.

Conservation objectives are the starting point from which management schemes and monitoring programmes may be developed as they provide the basis for determining what is currently causing or may cause a significant effect, and they inform the scope of appropriate assessments.

[14] SACs and SPAs are together referred to as Natura 2000 sites or (in the marine environment) European Marine Sites.

[15] http://www.legislation.gov.uk/uksi/2010/490/regulation/36/made

Conservation objectives also inform the scope and nature of any 'appropriate assessment' which the Directive requires to be undertaken for plans and projects (Regulations 61 and 63 and by Natural England under Regulation 21 of the Habitats Regulations).

2.4 The role of advice on operations

The advice on operations set out in Section 5 of this document provides the basis for discussion about the nature and extent of the operations taking place within or close to the site and which may have an impact on its interest features. The advice should also be used to help identify the extent to which existing measures of control, management and forms of use are, or can be made, consistent with the site's conservation objectives, and thereby focus the attention of relevant authorities and surveillance to areas that may need management measures.

This advice on operations may need to be supplemented through further discussions with the relevant authorities and any advisory groups formed for the site.

2.5 Precautionary principle

All forms of environmental risk should be tested against the precautionary principle; this means that where there are real risks to the site, lack of full scientific certainty should not be used as a reason for postponing measures that are likely to be cost effective in preventing such damage. It does not imply that the suggested cause of such damage must be eradicated unless proved to be harmless and it cannot be used as a licence to invent hypothetical consequences. Moreover, it is important, when considering whether the information available is sufficient, to take account of the associated balance of likely costs, including environmental costs, and benefits (DETR & the Welsh Office, 1998).

3. Conservation objectives

3.1 Background to conservation objectives

The conservation objectives and definitions of favourable condition for features on the site may inform the scope and nature of any 'appropriate assessment' required under the Habitats Regulations[16]. An appropriate assessment will also require consideration of issues specific to the individual plan or project.

The scope and content of an appropriate assessment will depend upon the location, size and significance of the proposed plan or project. Natural England will advise on a case by case basis.

Following an appropriate assessment, relevant authorities are required to ascertain the effect on the integrity of the site. The integrity of the site is defined in paragraph 20 of ODPM Circular 06/2005 (DEFRA Circular 01/2005)[17] as the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified. The determination of favourable condition is separate from the judgement of effect upon integrity. For example, there may be a time-lag between a plan or project being initiated and a consequent adverse effect upon integrity becoming manifest in the condition assessment. In such cases, a plan or project may have an adverse effect upon integrity even though the site remains in favourable condition, at least in the short term.

[16] Regulation 61 and 63 by a competent authority and Regulation 21 by Natural England
[17] http://www.communities.gov.uk/documents/planningandbuilding/pdf/147570.pdf

The conservation objectives for this site are provided in accordance with paragraph 17 of ODPM Circular 06/2005 (DEFRA Circular 01/2005) which outlines the appropriate assessment process. The entry on the Register of European Sites gives the reasons for which the site was classified.

3.2 Lyme Bay and Torbay cSAC conservation objectives

The formal conservation objectives for Lyme Bay and Torbay cSAC interest features are provided below. These are high-level objectives for the site features and Natural England may refine them in future as our understanding of the features improves and further information becomes available, such as new survey work. They should be read in the context of other advice given, particularly:

- the Selection Assessment Document for Lyme Bay and Torbay cSAC which provides more detailed information about the site and evaluates its interest features according to the Habitats Directive selection criteria and guiding principles;

- the favourable condition table (Appendix A) providing information on how to recognise favourable condition for each of the features and which will act as a basis from which the monitoring programme will be developed; and

- the attached maps (Appendix B) which show the known locations of the interest features.

3.2.1 Importance of features

The Lyme Bay and Torbay cSAC has been formally submitted to the European Commission by the Government as a cSAC for its Annex I **Reef** features and **Submerged and Partially Submerged Sea Cave** features.

The Lyme Bay and Torbay cSAC comprises of two sections: Lyme Bay Reefs and Mackerel Cove to Dartmouth Reefs. It covers 31,248 ha and includes 14,162 ha of reef and 85 known sea caves. The reefs in the site have a much greater diversity of habitats (geologically and topographically) than is found in other existing SACs in the Western English Channel and Celtic Sea.

The Lyme Bay reef habitat is unique due to its complex substrata comprising a variety of bedrock with locally occurring stony reef consisting of boulders and cobbles, mixed with interstitial finer sediments. This type of reef habitat is not commonly found in the region (Cork et al. 2008; Atrill et al. 2011; Vanstaen & Eggleton, 2011). The Lyme Bay reefs have particularly high species richness and have been identified as a marine biodiversity 'hotspot' (Hiscock & Breckels, 2007).

The dominant habitat complex across the Lyme Bay reefs is high energy circalittoral rock populated by hydroids (*Nemertesia antennina* and *N.ramosa*), bryozoans (*Pentapora fascialis),* anemones (*Urticina felina and Sagartia elegans)*, sea squirts such as *Phallusia mammilata,* erect sponges including *Axinella dissmilis* and corals (*Alcyonium digitatum, Carophyllia smithii)* (Vanstaen & Eggleton 2011; Atrill et al. 2011). The area is host to pink sea fans (*Eunicella verrucosa)* and the nationally rare sunset cup coral (*Leptopsammia pruvoti),* which are both priority Biodiversity Action Plan (BAP) species (Cork et al. 2008). Lyme Bay is one of only five areas in the British Isles where the sunset cup coral is known to occur. The nationally scarce sponge (*Adreus fascicularis*) is also resident on these reefs.

'Fragile sponge and anthozoan communities on rock habitats', a habitat included in the UK BAP list of priority habitats; UKBAP 2008 is widely distributed in the Lyme Bay unit of the Lyme Bay & Torbay cSAC (Vanstaen & Eggleton, 2011).

The Mackerel Cove to Dartmouth Reefs exhibit diverse geology (including limestone reefs and outcrops, sandstone, slate reef, granite outcrops, mud ledges and stony reef) and groupings of species assemblages including piddocks and biogenic reefs of blue mussel (*Mytilus edulis*) (Cork et al., 2008; Vanstaen & Eggleton, 2011; Ross, 2011). Bedrock reef is predominantly concentrated in the Berry Head to Dartmouth area of the site (Ross, 2011). The shallower reefs are characterised as having extensive algal coverage of kelp and red alga and support large numbers of mussels (*M. edulis)*. Deeper reefs are dominated by rich animal communities, particularly near vertical drop offs where boring sponge (*Cliona celata*), sandalled anemone (*Actinothoe sphyrodeta*), soft corals and crustaceans can be found (Ross, 2011; Cork et al., 2008). The pink sea fan (*Eunicella verrucosa*), a priority species under the UK Biodiversity Action Plan is found throughout the site (Ross, 2011; Cork et al., 2008) and the nationally rare southern cup coral (*Carophyllia inornata*) can be found in small crevices (Ross, 2011).

The Mackerel Cove to Dartmouth Reefs area also contains a diversity of wave-eroded **sea caves** in different rock types, and solution caves occur in limestone from high water to fully submerged (Cork et al., 2008). Only caves with an element below mean low water (MLW) are included in the conservation objectives of the site. The sea caves in this site are geographically different to those in existing SACs. Solution caves are formed by the dissolution of calcium carbonate and are therefore only found in limestone. Freshwater follows narrow fissures, dissolving the rock, which overtime enlarges them to become caves. These caves are usually more complex than sea caves and may penetrate far into the rock (Cork et al., 2008). They occur at Babbacombe to Hopes Nose and Broad Sands to Berry Head. Caves in the site support a richness of animal life including many nationally significant species such as sponges, pink sea fingers (*Alcyonium hibernicum*), burrowing anemones, southern cup coral (*Caryophyllia inornata*), Weymouth carpet coral (*Hoplangia durotrix*), and the squat lobster (*Galathea nexa*) (Cork et al., 2008). The animals found vary between caves and many of the caves are large and complex. Solution caves are not usually associated with the sea, however, in Torbay, where freshwater and saltwater mix in these caves, there are some of the best examples of coastal solution caves in the UK (Cork et al., 2008).

The current evidence base shows the following Annex I habitats and features to be present in the areas:

- Lyme Bay
    - Bedrock reef;
    - Stony reef.
- Mackerel Cove to Dartmouth Reefs
    - Bedrock reef;
    - Stony reef;
    - Biogenic reef;
    - Submerged or partially submerged sea caves.

3.2.2 Reefs

Definition

Reefs are structures that rise from the seabed and can be formed of either biogenic concretions (i.e. a structure created by the animals themselves, such as mussels), or of geogenic origin (i.e. where animal or plant communities grow on raised or protruding rock). They are predominantly subtidal, but may extend as an unbroken transition into the intertidal (littoral) zone, where they are exposed to the air at low tide. A variety of subtidal seafloor features are included in the reef habitat complex, such as hydrothermal vent habitats, sea mounts, vertical rock walls, horizontal ledges, overhangs, pinnacles, gullies, ridges, sloping or flat bedrock, broken rock and boulder and cobble fields. Reefs may support a zonation of seafloor communities of algae and animal species. Only a few invertebrate species are able to develop biogenic reefs, which are therefore restricted in distribution and extent (Brown et al., 1997).

Rocky reef types are extremely variable, both in structure and in the communities they support. The specific communities that occur vary according to a number of factors. Exposure to wave action has a major effect on community structure, as does rock type with communities on the granite reefs being markedly different to those occurring on chalk reefs. Light intensity, which varies with depth, also has a major effect on community structure. Consequently, shallow water communities are dominated by seaweeds, whilst deeper rock surfaces are colonised purely by attached animals. Another major factor affecting reef communities is the turbidity of the water. In turbid waters, light penetration is low and algae can occur only in shallow depths or in the intertidal zone. In such conditions, animals have a plentiful supply of suspended food and filter-feeding species may be abundant. In addition, in the UK there is a marked geographical trend in species composition related to seawater temperature, with warm, temperate species such as the sea fan *Eunicella verrucosa* and the coral *Leptopsammia pruvoti* (both found within Lyme Bay and Torbay cSAC) only occurring in southern waters (Hiscock 2007; Jackson 2008).

There are three main types of Annex I reef: bedrock reef; stony reef[18] (bedrock and stony reef are collectively referred to as geogenic reef); and biogenic reef. Current evidence shows bedrock reef, stony reef and biogenic reef to be present within Lyme Bay and Torbay cSAC (Cork et al. 2008, Atrill et al. 2011, Ross 2011, Vanstaen & Eggleton 2011, Munro & Baldock, 2012).

3.2.3 Key reef sub-features of Lyme Bay and Torbay cSAC

Sub-features have been identified based on the following reports: Cork et al. (2008), Atrill et al. (2011), Ross (2011), Vanstaen & Eggleton (2011), Munro & Baldock (2012).

[18] To qualify as a stony reef, 10% or more of the seabed substratum should be composed of particles greater than 64mm across, i.e. cobbles and boulders. The remaining supporting 'matrix' could be of smaller sized material. The reef may be consistent in its coverage or it may form patches with intervening areas of finer sediment. Stony reefs are dominated by epifaunal communities rather than infaunal species and are elevated from the seabed and stable (Irving, 2009). By its nature, stony reef is more vulnerable to being moved than bedrock reef, but due to the interstitial spaces and hard surfaces of coarse particles, is capable of harbouring a rich variety of species, including corals, anemones, and sponges.

Bedrock reef communities

Bedrock reef communities are areas of protruding rock, colonised by a suite of flora and fauna. A transition of communities can occur from the near surface sunlit zone, dominated by plants, such as kelp forests and red seaweeds, to the deeper waters where a variety of fauna inhabit, including echinoderms, sponges, corals, anemones, bryozoans and crustaceans. Bedrock reef communities are the most dominant reef type through the Lyme Bay and Torbay cSAC (Vanstaen & Eggleton, 2011), being present in both the Lyme Bay and Torbay areas in a variety of forms including limestone reefs and outcrops, sandstone, slate reef, granite outcrops and mud ledges (Cork et al., 2008). These different rock types all create a range of habitats which subsequently adds to the site's diversity.

The reefs in the Lyme Bay region are good examples of tide-swept and wave-exposed reefs of the circalittoral and infralittoral. Shallower rocky reefs are dominated by a dense turf of foliose red and brown seaweeds and low-encrusting fauna such as anthozoans (*Alcyonium digitatum*) and sponge crusts (*Cliona celata*) (Vanstaen & Eggleton, 2011). The majority of bedrock areas are characterised by mixed faunal turf communities comprised of bryozoans (*Flustra foliacea, Bugula plumosa*), sea squirts (*Ascidiella aspersa*, *Phallusia mammilata),* hydroids (*Nemertesia* spp.), corals (*Alcyonium digitatum* and *Carophyllia smithii*), anemones (*Urticina felina*) and sponges (*Axinella disimillis*, *Raspailia* spp. and *Stelligera* spp.) (Vanstaen & Eggleton, 2011; Atrill et al. 2011; Marine Recorder database). Pink seafans *Eunicella verrucosa* and the bryozoan Ross coral *Pentapora fascialis* dominate on steeper bedrock slopes and rocky outcrops (Vanstaen & Eggleton, 2011).

The Mackerel Cove and Dartmouth reefs consist of shallower reefs exposed to moderate or low energy and deeper reefs subject to wave action and tidal streams. Kelp *Laminaria hyperborea* encrusted with ascidians, hydroids and bryzoans dominate the shallower reefs, which support abundant mussels (*Mytilus edulis)* and common starfish (*Asterias rubens)* (Vanstaen & Eggleton, 2011; Ross. 2011). The rock surface here is characterised by a rich fauna of hydroids (*Electra pilosa)*, sponges (*Pachymatisma johnstoni)* and deadman's fingers (*Alcyonium digitatum)* (Vanstaen & Eggleton, 2011; Ross, 2011). Deeper reefs are inhabited by mixed faunal turf communities consisting of a diverse range of hydroids including *Tubularia indivisa,* anemones (*Actinothoe sphyrodeta*, *Corynactis viridis*), bryozoans carpets (*Cellaria fistulosa*), sponges (*Cliona celata*, *Haliclona cinerea*) interspersed with southern cup corals (*Caryophyliia inornata)* occupying crevices (Vanstaen & Eggleton, 2011; Ross, 2011). Dense populations of crinoids *Antedon bifida* occur on reef pinnacles (Ross, 2011).

Stony reef communities

Stony reef communities are areas of stable cobbles and boulders, sometimes surrounded by a matrix of smaller sized material, elevated from the seabed and dominated by epifaunal species. By its nature, stony reef is more vulnerable to being moved than bedrock reef, but due to the interstitial spaces and hard surfaces of coarse particles, is capable of harbouring a rich variety of species, including corals, anemones, and sponges (Irving, 2009).

In the Lyme Bay Reefs a large area south of Lyme Regis, including part of Lanes Ground has been identified as an area of mixed bedrock and stony reef habitat (Vanstaen & Eggleton, 2011). The biological communities in this area are typical of tide-swept circalittoral reef habitats and are dominated by bryozoan turf and erect sponges (Vanstaen & Eggleton, 2011). Typical species to be found include deadman's fingers (*Alcyonium digitatum),* characteristic erect sponges (*Axinella dissimillis*, *Raspailia ramosa* and *Stelligera* spp.) and bryozons (*Pentapora fascialis*) (Vanstaen & Eggleton, 2011; Munro & Baldock, 2012). *Eunicella verrucosa* has also been recorded on stony reefs (Munro & Baldock, 2012). Other

notable species present include Devonshire cup coral (*Carophyllia smithii)* and sandelled anemone (*Actinothoe sphyrodeta).*

In the Mackerel Cove to Dartmouth Reefs area, drop down video surveys have identified stony reef occurring north-west of Hope's Nose (Ross, 2011). In this area cobbles encrusted with keel worm (*Pomatoceros triqueter*) are host to abundant slipper limpets (*Credipdula fornicata*), hydroids (*Halecium halecium*), snakelocks anemones (*Anemonia viridis*) and turret shell molluscs (*Turritella communis*) (Ross, 2011). The stony reef here appears to be degraded and would be considered to be in unfavourable condition. Further survey work is needed to better understand the extent and condition of stony reef in this area.

Acoustic surveys have identified additional areas of stony reef occurring alongside bedrock reef in the Lyme Bay and Torbay cSAC, however confidence in the underlying evidence is low and it is recommended that further work is undertaken to groundtruth these areas (Vanstaen & Eggleton, 2011). The Devon and Severn Inshore Fisheries and Conservation Authority is currently (2012) conducting drop down video surveys in the Lyme Bay & Torbay cSAC specifically targeting the areas of bedrock and stony reef identified in the Vanstaen & Eggleton report as having lower confidence (Devon and Severn IFCA, pers. comm. 2012). The results of this research should inform the current evidence of the presence of stony reef and associated communities.

Biogenic reef communities

The most important biogenic reef forming species in inshore British waters are *Sabellaria alveolata*, *Sabellaria spinulosa*, *Mytilus edulis*, *Modiolus modiolus* and *Serpula vermicularis* (Holt et al., 1998). Of these species, current evidence shows *Mytilus edulis* beds to be present in the Torbay area of the site (Cork et al., 2008). Further survey work may be conducted in the future (possibly during 2012 or 2013) to identify the full extent of biogenic reefs within the Mackerel Cove to Dartmouth section of the Lyme Bay and Torbay cSAC. Biogenic reefs can have a number of important effects on the physical environment: they often stabilise sands, gravels and stones; the shells or tubes of the organisms themselves provide hard substrata for attachment of sessile organisms; they may provide a diversity of crevices, surfaces and sediments for colonisation; and accumulated faeces, pseudofaeces and other sediments may be an important source of food for other organisms (Holt, et al., 1998). For these reasons many biogenic reefs have a very rich associated fauna and flora, which at least in terms of macrofauna is often much richer and more diverse than in surrounding areas (Holt et al., 1998).

3.2.4 Sea Caves

Definition

Submerged or partially submerged sea caves are caves situated under the sea or opened to it, at least at high tide. Their bottom and sides harbour communities of marine invertebrates and algae. The UK has the most varied and extensive sea caves on the Atlantic coast of Europe. Sea caves include tunnels, caverns and arches on the shore or below the sea surface, in which vertical or overhanging rock provides surfaces for cave communities. Caves vary in size, from only a few metres, to more extensive systems which may extend hundreds of metres into the rock. Caves in the intertidal and shallow subtidal are frequently subject to conditions of strong wave surge and scour by coarse sediment (JNCC, 2004). They are typically colonised by encrusting animal species but may also support shade-tolerant algae near their entrances and roofs (JNCC, 2004). As on rocky shores, the presence of pits, crevices and marine flora within cave habitats, leads to an increase in

microhabitats and a higher diversity of species. Water movement allows nutrients and larvae to be transported, as well as maintaining levels of dissolved oxygen and preventing siltation of organisms. Water movement can also result in a sand-scoured environment with the potential to dislodge organisms. The degree of immersion and exposure to wave action are key determinants in the distribution of marine organisms in cave habitats. Some of the caves are submerged at all stages of the tide whilst others dry out at low water, or are heavily influenced by wave splash and salt spray from the sea. Only those sea caves with an element below mean low water are included in the Lyme Bay and Torbay cSAC.

Cave community structure will also vary considerably depending on the formation and extent of the cave system, the degree of exposure to scour and surge, and the nature of the bedrock. Physical conditions, such as inclination, wave surge, scour and shade, change rapidly from cave entrance to the inner parts of a cave and this often leads to a marked zonation in the communities present within the caves (JNCC, 2004). Light availability and immersion gradients are the principal factors influencing the distribution of the lichen and algal communities which themselves are a significant source of food for grazing marine animals such as limpets and sea snails.

3.2.5 The conservation objectives for Lyme Bay and Torbay Annex 1 Reefs:

Subject to natural change[19], maintain[20] or restore[21] the **reefs** in/to favourable condition[22], in particular the subfeatures:

- Bedrock reef communities
- Stony reef communities
- Biogenic reef communities

[19] **Natural change** refers to changes in the habitat which are not a result of human influences. Human influence on the interest features is acceptable provided that it is proved to be/can be established to be compatible with the achievement of the conditions set out under the definition of favourable condition for each interest feature. A failure to meet these conditions, which is entirely a result of natural process will not constitute unfavourable condition, but may trigger a review of the definition of favourable condition. Features should not necessarily be considered in unfavourable condition when caused by the short term disappearance of a particular community due to natural processes.

[20] **Maintain** implies that existing evidence suggests the feature to be in favourable condition and will, subject to natural change, remain at its condition at designation. Existing activities are therefore generally considered to be sustainable and be unlikely to adversely affect the condition of the feature *if current practices are continued at current levels.* However, it must be borne in mind that gradually damaging activities can take time to show their effects. If evidence later shows an activity to be negatively affecting the conservation objectives of the site, then the site will be deemed to be in unfavourable condition and restorative action will needed.

[21] **Restore** implies that the feature is degraded to some degree and that activities will have to be managed to reduce or eliminate negative impact(s). Restoration in the marine environment generally refers to natural recovery through the removal of unsustainable physical, chemical and biological pressures, rather than intervention (as is possible with terrestrial features).

[22] **Favourable condition** relates to the maintenance of the structure, function, and typical species for that feature within the site. Areas of the infralittoral, such as the kelp forests, are currently believed to be in favourable condition and will therefore have a conservation objective of 'maintain', whereas some areas of circalittoral bedrock are known to have experienced damage through towed demersal fishing gear (Royal Haskoning, 2008). Where damage is known to have occurred then a conservation objective of 'restore' will be applied.

3.2.6 The conservation objectives for Lyme Bay and Torbay Annex 1 Submerged or partially submerged sea caves:

Subject to natural change, maintain the submerged or partially submerged **sea caves** in favourable condition.

Favourable condition of the reefs and sea caves will be determined through assessment that the following are maintained in the long term in the site:

1. Extent of the habitat
2. Diversity of the habitat and it's component species
3. Community structure of the habitat (e.g. population structure of individual notable species and their contribution to the functioning of the ecosystem)
4. Natural environmental quality (e.g. water quality, suspended sediment levels, etc.)
5. Natural environmental processes (e.g. biological and physical processes that occur naturally in the environment, such as water circulation and sediment deposition should not deviate from baseline at designation)

The site survey commissioned in 2008 to identify Annex I features found the physical structure of the reef habitats within Lyme Bay and Torbay cSAC to be in relatively good condition. However, in areas where scallop dredging had recently coincided with reef habitat the survey indicated that the ecological structure of the reef was significantly damaged (Cork et al., 2008). In these areas the reef was considered to be average or partially degraded. In areas unaffected by scallop dredging, the reef structure was considered excellent (Cork et al., 2008). There is also some evidence of anthropogenic impacts in the Mackerel cove to Dartmouth reefs area, including impacts from sewage discharge (Natural England 2010) and impacts from trawling and dredging (Ross, 2011). The Lyme Bay & Torbay cSAC Annex I reefs currently have a conservation objective of 'maintain' or 'restore' to reflect this divergence. Recent survey work in Lyme Bay indicates that the areas which have now been closed to mobile benthic gear are in a state of recovery (Atrill et al., 2011). Future survey work will further refine the evidence base for this site and will help to determine whether any changes to the conservation objectives for the site are needed in future.

3.3 Background to favourable condition tables

The favourable condition table is the principle source of information that Natural England will use to assess the condition of an interest feature and as such comprises indicators of condition. The favourable condition table can be found at Appendix A.

On many terrestrial European sites, we know sufficient about the required condition of qualifying habitats to be able to define favourable condition with confidence. In contrast, understanding the functioning of large, varied, dynamic marine and estuarine sites, which experience a variety of pressures resulting from historic and current activities, is much more difficult, and consequently it is much harder to define favourable condition so precisely in such sites. In general, in the absence of contrary intelligence, the conservation objectives provided are based on a *working* assumption that the *current* condition of the features is favourable for most attributes. Nevertheless, there are instances where this assumption does not apply, in particular some of the reef habitats of Lyme Bay have been subject to significant damage due to scallop dredging in the recent past (Cork et al., 2008). In such instances, where existing problems have been identified, this is reflected within the favourable condition table. Damaging activities can take time to show their effects. If evidence later shows an activity to be negatively affecting the conservation objectives of the

site, then condition of qualifying habitats will be reassessed in light of this new information and restorative management action may be needed.

Where there are more than one year's observations on the condition of marine habitats, information will need to be analysed to determine, where possible, any natural environmental trends at the site. This will provide the basis for judgements of favourable condition to be determined in the context of natural change. Where it becomes clear that certain attributes may indicate a cause for concern, and if further investigation indicates this is justified, restorative management action will need to be taken. The aim of such action would be to return the interest feature to favourable condition from any unfavourable state. This document will be revised in light of ongoing and future monitoring of the condition of designated features within the site. This will be linked with any developments in understanding of the structure and functioning of features and the pressures they are exposed to.

This advice also provides the basis for discussions with relevant authorities, and as such the attributes and associated measures and targets may be modified over time. The aim is to have a single agreed set of attributes that will be used as a basis for monitoring in order to report on the condition of features. Condition monitoring of the attributes may be of fairly coarse methodology, underpinned by more rigorous methods on specific areas within the site. Common Standards Monitoring (JNCC, 2004) requires mandatory monitoring of some attributes of a designated feature, while other attributes are considered discretionary (or site-specific) and are incorporated to highlight local distinctiveness. Priority will be given to measuring attributes that are at risk from anthropogenic pressure and for which changes in management may be necessary. This information may be generated by Natural England or collected by other organisations through agreements.

Whilst the favourable condition table is the key source of information of condition for site features, additional sources of information may also be selected to inform our view about the integrity and condition of the site. For example, a part of risk based monitoring activity data (as collected by the relevant authorities) will give an indication as to the levels of pressure that may impact on the site features.

The condition monitoring programme will be developed through discussion with the relevant / competent authorities and other interested parties, ideally as part of the management scheme process. Natural England will be responsible for collating the information required to assess condition, and will form a judgement on the condition of each feature within the site. The condition assessment will take into account all available information, including other data on site integrity / condition that has been gathered by others for purposes such as appropriate assessment, licence applications etc. using the favourable condition table to guide the process.

4. Advice on operations

4.1 Background

Natural England has a duty under Regulation 35(3)(b) of the Habitats Regulations (2012) to advise other relevant authorities as to any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated.

As part of its advice on operations Natural England has considered the pressures that may be caused by activities and the vulnerability of the site's interest features to those pressures.

The following sections provide information to help relate general advice to each of the specific interest features for the Lyme Bay and Torbay cSAC to current levels of human usage. This is aimed at being a broad assessment of pressures and the vulnerability of features.

This advice relates to the vulnerability of the interest features and sub-features of the Lyme Bay and Torbay cSAC. The process of deriving and scoring relative vulnerability is provided at Appendix C. A summary of the operations which may cause deterioration or disturbance is given at Appendix D, and detailed in Appendix E. Further explanation of the sensitivity of the interest features or sub-features follows with examples of their exposure and therefore their vulnerability to damage or disturbance from the listed categories of pressures. This enables links to be made between the categories of pressure and the ecological requirements of the features.

4.2 Purpose of advice

The aim of this advice is to enable all relevant authorities to direct and prioritise their work on the management of activities that pose the greatest potential threat to the favourable condition of interest features at Lyme Bay and Torbay cSAC. The advice is linked to the conservation objectives for interest features and will help provide the basis for detailed discussions between relevant authorities enabling them to formulate and agree a management scheme for the site should one be deemed necessary.

The advice given here will inform, but is given without prejudice to, any advice provided under Regulation 61 or Regulation 63 on operations that qualify as plans or projects within the meaning of Article 6 of the Habitats Directive.

4.3 Methods for assessment

To develop this advice on operations Natural England has used a three step process involving:

- an assessment of the **sensitivity** of the interest features or their component sub-features to operations;

- an assessment of the **exposure** of each interest feature or their component sub-features to operations; and

- a final assessment of **current vulnerability** of interest features or their component sub-features to operations.

This three step process builds up a level of information necessary to manage activities in and around the site in an effective manner. Through a consistent approach, this process enables Natural England to both explain the reasoning behind our advice and identify to competent and relevant authorities those operations which pose the most current threats to the favourable condition of the interest features on the site.

A number of different biotopes and species are present within the site. For the purpose of assessment, site-specific data on biotopes and species associated with the Annex I features or sub-features were used, according to best available site-specific information at the time of writing (Appendix F).

4.3.1 Sensitivity assessment

The sensitivity assessment used is an assessment of the relative sensitivity of the interest features or the component sub-features, i.e. bedrock reef; stony reef; biogenic reefs; and sea caves to the broad categories of human activities.

In relation to this assessment, sensitivity has been defined as the intolerance of a habitat, community or individual (or individual colony) of a species to damage, or death, from an external factor (Hiscock, 1996). Sensitivity is dependent on the intolerance of a species or habitat to damage from an external factor and the time taken for its subsequent recovery. For example, a very sensitive species or habitat is one that is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, 'high' intolerance) and is expected to recover over a long period of time, i.e. >10 or up to 25 years ('low' recoverability).

The sensitivity of the interest features was based on the sensitivities of their component biotopes and species, where sensitivity assessments were available (Appendix F). Biotope and species sensitivities were derived from the Marine Life Information Network (MarLIN) biology and sensitivity database (Tyler-Walters & Hiscock, 2003). Biotope and species sensitivities were assessed using the MarLIN approach (Hiscock & Tyler-Walters, 2006; Tyler-Walters & Hiscock, 2005; Tyler-Walters et al., 2001). Sensitivities are available from the MarLIN website[23].

4.3.2 Exposure assessment

This has been undertaken for Lyme Bay and Torbay cSAC by assessing the relative exposure of the interest features or their component sub-features on the site to the effects of broad categories of human activities currently occurring on the site. These assessments were made on the basis of the best available information and advice.

Appendix E shows the relative exposure of the Lyme Bay and Torbay cSAC's sub-features to physical, chemical and biological pressures. This assessment is based on known human activities operating in or adjacent to the site, and the anticipated pressures associated with these activities.

4.3.3 Vulnerability assessment

The third step in the process is to determine the vulnerability of interest features or their component sub-features to operations. This is an integration of sensitivity and exposure. Only if a feature is both sensitive and exposed to a human activity will it be considered vulnerable. In this context therefore, 'vulnerability' has been defined as the exposure of a habitat, community or individual (or individual colony) of a species to an external factor to which it is sensitive (Hiscock, 1996).

4.4 Format of advice

The advice is provided within six broad categories of operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species. This approach therefore:

- enables links to be made between human activities and the ecological requirements of the habitats or species, as required under Article 6 of the Habitats Directive;

[23] www.marlin.ac.uk

- provides a consistent framework to enable relevant authorities in England to assess the effects of activities and identify priorities for management within their areas of responsibility; and

- is appropriately robust to take into account the development of novel activities or operations which may cause deterioration or disturbance to the interest features of the site and should have sufficient stability to need only infrequent review and updating by Natural England.

These broad categories provide a clear framework against which relevant authorities can assess activities under their responsibility.

4.5 Update and review of advice

Information as to the operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated, is provided in light of what Natural England knows about current and recent activities and patterns of usage at Lyme Bay and Torbay cSAC. Natural England expects that the information on activities and patterns of usage will be refined as part of the process of developing the management scheme and through continued discussion with the relevant authorities. As part of this process the option of identifying a number of spatial zones with different activity levels may be appropriate. It is important that future consideration of this advice by relevant authorities and others takes account of changes in the usage patterns that have occurred at the site, over the intervening period, since the information was gathered. In contrast, the information provided in this advice on the sensitivity of interest features or sub-features is relatively stable and will only change as a result of an improvement in our scientific knowledge, which will be a relatively long term process. Advice for sites will be kept under review and will be periodically updated through discussions with relevant authorities and others to reflect significant changes in our understanding of sensitivity together with the potential effects of plans and projects on the marine environment.

5. Specific advice on operations for Lyme Bay and Torbay cSAC

The following sections provide information to help relate general advice to each of the specific interest features for Lyme Bay and Torbay cSAC.

This advice relates to the vulnerability of the interest features and sub-features of the Lyme Bay and Torbay cSAC as summarised in Appendix D and detailed in Appendix E. Further explanation of the sensitivity of the interest features or sub-features follows with examples of their exposure and therefore their vulnerability to damage or disturbance from the listed categories of operations. This enables links to be made between the categories of operation and the ecological requirements of the features.

This advice relates to the vulnerability of the interest features and sub-features of the Lyme Bay and Torbay cSAC to current levels of human usage.

5.1 Reefs (bedrock, stony & biogenic reefs)

5.1.1 Physical loss

All reef subfeatures (bedrock, stony and biogenic) are moderate to highly sensitive to loss through direct removal or smothering. The loss of any of the reef communities would be of concern due to their ecological importance within the reef habitat and their long recovery

times to this form of disturbance. Many communities that use the reef habitats are interdependent upon the ecological functioning of others (for example, invertebrate communities and fish) and it is important that this potential indirect effect is considered when the effects of removal or smothering are assessed. Where species such as *Pentapora fascialis* or *Antedon bifida* occur, they are likely to be more sensitive as smothering will interfere with their feeding structures (Hiscock & Tyler-Walters, 2006). The biogenic reefs (*Mytilus edulis*) are moderately sensitive to physical loss due to removal as re-establishment of the reef may take considerable time (Hiscock & Tyler-Walters, 2006).

The Lyme Bay and Torbay cSAC bedrock and stony reefs are considered to be highly sensitive to physical loss. The use of demersal towed gear has in recent years been greatly restricted in the Lyme Bay and Torbay cSAC and the bedrock reefs are therefore considered not vulnerable to removal at current exposures. Some areas of stony reef in the Mackerel Cove to Dartmouth area may still be exposed to low levels of physical loss as a result of demersal towed fishing gear operating and therefore the vulnerability of stony reef to removal has been assessed as moderate. Physical loss due to smothering can be caused by demersal towed gear operating in adjacent sediment areas and the vulnerability of bedrock and stony reefs to smothering is assessed as moderate at current levels of exposure. At current levels of exposure biogenic reefs are considered not vulnerable to removal.

Overall the **vulnerability of reef sub-features** within the Lyme Bay and Torbay cSAC to **physical loss** is considered to be **none - moderate**.

5.1.2 Physical damage

The Lyme Bay and Torbay cSAC bedrock and stony reefs are considered highly sensitive to physical damage as a result of siltation, abrasion and selective extraction. Physical damage can result in the degradation of the physical and ecological structure of reef habitat (Cork et al., 2008; Natural England 2010). The key indicative reef species occurring in the cSAC are commonly delicate slow growing species that rely on recruitment from the immediate surrounding waters. Any direct disturbance to an area may not only result in direct mortality but also impact on the success of the surrounding population. Lyme Bay reef habitats include occurrences of pink seafan biotopes (CR.HCR.Xfa.ByErSp.*Eu*n), branching sponge *(Axinella dissimili)* and the sunset cup coral (*Leptopsammia pruvoti*), which are particularly sensitive to abrasion (Hiscock & Tyler-Walters 2006). Physical damage from abrasion may result from shipping activities, anchoring, or deployment/recovery of fishing gear. The biogenic reefs (*Mytilus edulis*) have a low sensitivity to physical damage, although re-establishment of the reef following damage may take considerable time.

There is evidence of significant damage to certain areas of reef habitat in Lyme Bay as a result of scallop dredging and the reef in these areas is considered partially degraded (Cork et al., 2008). Recent surveys also identified visible impacts of dredge and trawl activity in the Mackerel Cove to Dartmouth reefs area (Ross, 2011).

Since the introduction of the Lyme Bay Designated Area (Fishing Restrictions) Order 2008 and through management measures initiated by the Marine Management Organisation (MMO[24]) the use of demersal towed gear (including scallop dredging) has been restricted within most of the cSAC boundary, reducing the exposure of bedrock and stony reef subfeatures to abrasion caused by demersal towed gear. The area south of Berry Head (within the Mackerel Cove to Dartmouth section) is not currently under these MMO management measures but is within the Inshore Potting Agreement (IPA) Area 3. The IPA is a fishery management system designed by inshore fishers to reduce conflict between static gear (pots and nets) and towed gear (trawl and dredge) and is regulated through a fishing licence condition. This mechanism affords some protection to the reef through delineated potting areas, although towed gear including scallop dredging is still permitted to operate within Area 3 subject to specific technical constraints.

Certain areas of stony reef within the Mackerel Cove to Dartmouth reefs area as identified through drop video surveys (Ross, 2011) and acoustic surveys (Vanstaen & Eggleton, 2011) are not covered by the MMO management measures and are potentially exposed to physical damage as a result of demersal towed gear. Ross (2011) presents evidence of stony reef occurring north-west of Hope's Nose, but there is low confidence in the evidence base for the stony reef occurring in other areas (Vanstaen & Eggleton, 2011). Further groundtruthing work is required to better characterise the nature of the seabed in these areas (Vanstaen & Eggleton, 2011). The drop down video work being conducted by the Devon and Severn IFCA during 2012 may provide additional data to verify the habitat type (Devon and Severn IFCA pers. comm.).

Potting and netting could result in some abrasion of the seabed or displacement of species. These low impact activities are generally considered to be sustainable and unlikely to adversely affect the condition of the feature, *if continued at current levels* (based on the level of activity occurring when the SAC Selection Document was written in August 2010). However, there has been a significant increase in the use of static gear within the Lyme Bay Designated Area since its inception in 2008 (Mangi et al. 2011). The effect, if any, of this increase of static gear on the reef features is currently unclear. If evidence later shows an activity to be negatively affecting the conservation objectives of the sites, then the condition assessment of the site will need to be reviewed and restorative action will be needed.

Given the restrictions placed on the use of demersal towed gear within the Lyme Bay and Torbay cSAC over recent years, the exposure of the bedrock and stony reefs to physical damage through abrasion is therefore assessed as low. Exposure of the Lyme Bay and Torbay bedrock, stony and biogenic reefs to physical damage through selective extraction is considered to be none. Physical damage can also occur through siltation, but bedrock, stony and biogenic reefs within this site are only exposed to low levels of siltation.

Overall the vulnerability of the bedrock and stony reefs to physical damage from siltation and abrasion is considered to be moderate. Biogenic reef is considered not vulnerable to siltation and has low vulnerability to abrasion. Although sensitive to selective extraction, at current exposure levels, the bedrock, stony and biogenic reefs are considered not vulnerable to selective extraction.

[21]The MMO working together with Defra, the Devon & Severn and Southern Inshore Fisheries and Conservation Authorities (IFCAs), The South West Inshore Fishermen's Association (SWIFA) and Natural England, has introduced management measures to reduce the exposure of the reefs to physical damage from demersal towed gear. This involved the identification of 'sensitive' reef areas which must be avoided by fishermen using demersal towed gear. Compliance is monitored through compulsory use of a Vessel Monitoring System for the boats using bottom towed gear within the cSAC. Further information about these measures can be found on the MMO website http://marinemanagement.org.uk/protecting/conservation/lyme_bay.htm

Overall the **vulnerability of reef sub-features** within the Lyme Bay and Torbay cSAC to **physical damage** is considered to **none – moderate.**

5.1.3 Non- physical disturbance

The Lyme Bay & Torbay reefs are not considered to be sensitive to non-physical disturbance and are exposed to low levels of this pressure. Overall the **vulnerability of the reefs (bedrock, stony & biogenic)** within the Lyme Bay and Torbay cSAC to **non-physical contamination** is considered to be **none.**

5.1.4 Toxic contamination

The dominant reef biotopes are likely to be of intermediate intolerance to chemical contamination and recover relatively quickly once the contamination is removed. However, where red algae dominated communities occur in the bedrock reefs, sensitivity is likely to be higher as red algae are noted to be sensitive to chemical contamination (Hiscock & Tyler-Walters 2006).

Shipping accidents still occur leading to pollution and physical wreckage. Given the amount of shipping in the site, potential exposure to toxic contamination from shipping is considered to be moderate, as there are known to be large ships anchoring adjacent to the Mackerel Cove to Dartmouth part of the cSAC, and both sections of the cSAC contain busy fishing harbours.

There is insufficient information on the sensitivity of the species and biotopes within the cSAC to the introduction of radionucleotides, however the exposure and vulnerability of the cSAC features to this pressure is considered to be none.

Overall the **vulnerability of the reefs (bedrock, stony & biogenic)** within the Lyme Bay and Torbay cSAC to **toxic contamination** (other than via the introduction of radionucleotides) is considered to be **low - moderate.**

5.1.5 Non-toxic contamination

Discharges of pollution from the land could potentially impact on interest features in the site by causing changes in physico-chemical conditions of the overlying water, such as changes in temperature, turbidity, salinity, and increases in nutrient and organic matter.

The dominant biotopes are likely to be of low sensitivity to nutrient enrichment but where red algae dominated communities occur on the bedrock reefs, sensitivity is likely to be higher (Hiscock & Tyler-Walters 2006). The sensitivity of the bedrock and stony reefs to organic enrichment (causing oxygenation) is considered to be high. Some biotopes within the sub-features are sensitive to increases in turbidity (loss of light) caused by inputs from land, or agitation of sediment. The dominant kelp communities are unlikely to be particularly sensitive, except where faunal and algal turfs occur sensitivity is likely to be higher. The long-lived, fragile species of the bedrock reef are intolerant of reduced oxygenation due to organic enrichment and are therefore considered highly sensitive to non-toxic contamination (Hiscock & Tyler-Walters 2006).

The reef biotopes show low-high sensitivity to changes in thermal regime. However, there is no known activity in the cSAC that would cause a change in thermal regime, and exposure

to this pressure and subsequently vulnerability, is considered none. Sensitivity to changes in salinity is also assessed as high but the reefs are not exposed to this pressure.

Due to the proximity of the reef sub-features to the coast, they are currently exposed to low levels of non-toxic contamination from land based discharges, and therefore the overall **vulnerability of reef sub-features** within the Lyme Bay and Torbay cSAC to **non-toxic contamination** is considered to be **none - moderate**.

5.1.6 Biological disturbance

Biological disturbance includes the introduction of pathogens or non-native species as well as selective extraction of species from the ecosystem. For many reef communities, insufficient information is available to determine their sensitivity to microbial pathogens. Echinoderm populations have been reported to be adversely affected by diseases, although no reports of mass mortality have been recorded in the UK (MarLIN, 2011). A precautionary sensitivity of low has been suggested for the introduction of microbial pathogens, with a low exposure to this factor. Vulnerability is therefore considered to be low for all three subfeatures.

There is currently insufficient information to determine the sensitivity of many reef communities and species to the introduction of non-native species. Concern has increased over recent years about the potential impacts of the alien sea squirt *Didemnum vexillum*, which can overgrow most hard substrata in the sub-tidal zone and can include bedrock, pebbles, cobbles, gravel, boulders, biogenic reef and other hard bodied sessile animals and plants. Main transport pathways of *Didemnum vexillum* include recreational boating and aquaculture (Laing et al., 2010). The slipper limpet *Crepidula fornicata* has also been recorded within the Lyme Bay and Torbay cSAC reef communities. Due to the proximity of the Mackerel Cove to Dartmouth unit of the Lyme Bay & Torbay cSAC to the Dart estuary (a recreational boating and aquaculture area), the exposure of the bedrock, stony and biogenic reefs to the introduction of non-native species and translocation has been assessed as moderate.

Selective extraction refers to the removal of the species or community. This includes either the removal of a specific species/community/keystone species in a biotope, or the removal of a required host or prey for the species under consideration. Any effects of the extraction process on the habitat itself are addressed under other factors, e.g. displacement, abrasion and physical disturbance, and substratum loss. *Eunicella verrucosa* (present in both areas of the cSAC) is considered highly sensitive to selective extraction, due to its slow growth and low recovery rates (Hiscock & Tyler-Walters 2006). This species is not known to be specifically targeted for extraction in the site.

Removal of fish species and larger molluscs and crustaceans can have significant impacts on the structure and functioning of benthic communities over and above the physical effects of fishing methods. The cSAC is actively used for fishing with moderate- high levels of static gear fishing occurring throughout the year and seasonal mobile gear operating within parts of the Mackerel Cove to Dartmouth area. Exposure to biological disturbance through selective extraction of species is considered to be moderate. The vulnerability of bedrock reefs, stony reefs and biogenic reefs to biological disturbance from selective extraction is assessed as low- moderate.

Overall the **vulnerability of reef sub-features** within the Lyme Bay and Torbay cSAC to **biological disturbance** is considered to be **low- moderate**.

5.2 Sea Caves

5.2.1 Physical loss

The sea cave communities are highly sensitive to physical loss, both through removal via harvesting or coastal development and to smothering. There is no exposure of the sea caves to either of these pressures, within the Mackerel Cove to Dartmouth area, so the **vulnerability of the sea caves** within Lyme Bay and Torbay cSAC to **physical loss** is considered to be **none**.

5.2.2 Physical damage

Physical damage to caves can either occur in the form of siltation or abrasion. Whilst the communities are highly sensitive to abrasion, exposure to an activity which would cause abrasion is considered to be low. A few instances of vandalism to accessible caves have been reported, and recently a potential heightened awareness of the caves through new publications detailing their locations has increased the risk of light abrasion through coasteering and kayaking. A precautionary approach gives a vulnerability of the sea caves to abrasion as moderate.

Due to the proximity of the caves to the coast, some siltation will occur, which may cause some smothering of the communities. The communities are considered not sensitive to siltation and exposure is considered to be low.

The sea cave communities are highly sensitive to selective extraction, but the exposure to this pressure is none, so they are not considered vulnerable to selective extraction.

Overall the **vulnerability of the sea caves** within the Lyme Bay and Torbay cSAC to **physical damage** is considered to be **none - moderate**.

5.2.3 Non- physical disturbance

The Lyme Bay & Torbay sea caves are not considered to be sensitive to non-physical disturbance and are not exposed to this pressure. Overall the **vulnerability of the sea caves** within the Lyme Bay and Torbay cSAC to **non-physical contamination** is considered to be **none.**

5.2.4 Toxic contamination

Sea cave communities are exposed to some toxic contamination (e.g. from pollution incidents or chronic inputs), but there is currently insufficient information regarding their sensitivity to this pressure (Hiscock & Tyler-Walters, 2006). The sensitivity of the communities to some forms of toxic contamination is not well characterised, and there is therefore **insufficient information to determine the sea caves overall vulnerability**.

5.2.5 Non-toxic contamination

Due to the proximity of the sea caves to the coast, they are currently exposed to low levels of non-toxic contamination from land based discharges. Some of the filter feeding organisms present in the sea cave communities are intolerant of reduced oxygenation due to organic enrichment and are therefore considered highly sensitive to non-toxic contamination.

Many sea caves in the Mackerel Cove to Dartmouth area have specific and varied salinities and have a high level of sensitivity to changes in salinity. However, their exposure to such changes is not currently well defined.

Overall the **vulnerability of the sea caves** within the Lyme Bay and Torbay cSAC to **non-toxic contamination** is considered to be **none - moderate**.

5.2.6 Biological disturbance

Biological disturbance includes the introduction of pathogens or non-native species as well as selective extraction of species from the ecosystem. Exposure to the introduction of non-native species (through ballast discharge etc) is considered to be low for sea caves, and there is also a low level of sensitivity to this. The sensitivity to selective extraction of species is high within sea caves, however there is currently no exposure to this. At present, there is insufficient information to determine the sensitivity of sea cave communities to the introduction of microbial pathogens.

Overall the **vulnerability** of **sea caves** within the Lyme Bay & Torbay cSAC to **biological disturbance** is considered to be **none - low.**

6. References

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Appendix A

Favourable Condition Table (FCT) for Lyme Bay and Torbay cSAC
Common Standards Monitoring (CSM) attributes were selected from JNCC (2004). Additional attributes were selected on a discretionary basis.

Favourable Condition Table for <u>Lyme Bay component</u> of Lyme Bay and Torbay cSAC

(See Appendix F for description of biotope codes used)

Feature: Reefs (Lyme Bay)
Sub-feature: General (applicable to all subfeatures)

Attribute	Measure	Target	Comment
Extent of reefs (Mandatory CSM attribute)	Overall area (ha) of reefs (bedrock and stony) measured periodically throughout the reporting cycle.	No decrease in extent from established baseline, subject to natural change. *Baseline established by Natural England (2010) and Channel Coastal Observatory and Maritime & Coastguard Agency 2010 acoustic data (Vanstaen & Eggleton, 2011). Further survey work needed to groundtruth bedrock reef areas with low confidence as identified in Vanstaen & Eggleton, 2011. Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.*	Extent of reef is a reporting requirement of the Habitats Directive. While changes in extent may be unlikely due to removal of the rock reef itself, loss of extent may occur due to excessive smothering by sediment as part of natural coastal processes or anthropogenic activity.
Water Clarity (Discretionary CSM attribute)	Average light attenuation measured periodically throughout the reporting cycle.	Average light attenuation should not deviate significantly from an established baseline, subject to natural change.	Water clarity is a key process influencing algal/plant dominated biotopes. Changes in water clarity could be caused, for example, by an increase in suspended material due

Attribute	Measure	Target	Comment
		Baseline to be established. Data from EA may assist.	to organic enrichment.
Water Density (Discretionary CSM attribute)	Average temperature and salinity measured periodically in the subtidal, throughout the reporting cycle.	Average temperature and salinity should not deviate significantly from an established baseline, subject to natural change. *Baseline to be established. Data from EA may assist.*	Temperature and salinity are characteristic of the overall hydrography of the area, indicating predominance of coastal or oceanic water. Changes in temperature and salinity may influence the presence and distribution of species (along with recruitment processes and spawning behaviour) particularly those species at the edge of their geographic ranges. Where changes in temperature or salinity through adverse impacts e.g. thermal discharge plumes, industrial discharges, water abstraction etc. cause a severe loss or shift in community structure such that the conservation interest is adversely affected then condition should be judged as unfavourable. Where changes in temperature or salinity are due to natural processes such as severe winter temperatures, then this will be an acceptable change to the feature.
Sedimentation rate (Discretionary CSM attribute)	Average sedimentation rate measured periodically in the subtidal, throughout the reporting cycle	Average sedimentation rate should not deviate significantly from an established baseline, subject to natural change.	Where adverse anthropogenic impacts such as dredging, disposal of dredge spoil or changed water flows due to artificial structures cause a change in sedimentation rate

Attribute	Measure	Target	Comment
		Baseline to be established.	leading to severe smothering of the rock habitat, or an adverse shift in community structure, then condition should be judged as unfavourable. Where changes in sedimentation rate are attributable to natural processes such as storm events, changed tidal movements or dynamics, or natural erosion, then this will be an acceptable change to the feature unless the conservation interest is lost.

Feature: Reefs (Lyme Bay)
Sub-feature: Bedrock reefs

Attribute	Measure	Target	Comment
Extent of bedrock reefs (Mandatory CSM attribute)	Overall area (ha) of bedrock reefs measured periodically throughout the reporting cycle.	No decrease in extent from established baseline, subject to natural change. *Baseline established by Natural England (2010), Channel Coastal Observatory and Maritime & Coastguard Agency 2010 acoustic data (Vanstaen & Eggleton, 2011). Further survey work needed to groundtruth bedrock reef areas with low confidence as identified in Vanstaen & Eggleton, 2011. Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop*	Extent of reef is a reporting requirement of the Habitats Directive. While changes in extent may be unlikely due to removal of the bedrock reef itself, loss of extent may occur due to excessive smothering by sediment as part of natural coastal processes or anthropogenic activity.

Attribute	Measure	Target	Comment
		video surveys may assist.	
Biotope composition of bedrock reefs (Mandatory CSM attribute)	Presence and/or abundance of a variety of bedrock reef biotopes (from Table 1) at specified locations throughout the site, measured once during summer, within the reporting cycle.	Maintain the full variety of biotopes identified for the site to an established baseline, subject to natural change. *Biotopes identified by Cork et al. (2008), Ross, (2011), Vanstaen & Eggleton (2011), Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data.*	This attribute aims to measure the overall variety of communities throughout the site. It will be expected to find the suite of target biotopes within the combined results of the survey for the site. Absence of a biotope from the subset will result in an unfavourable assessment for the feature. Measuring biotope composition throughout the whole site is challenging. It is therefore appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Where changes in biotope composition are known to be attributable to natural processes (e.g. winter storm events, changes in supporting processes or mass recruitment or dieback of characterising species) then the target value should accommodate this variability. Where a change in biotope composition occurs outside the expected variation, or a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Distribution and spatial pattern of bedrock reef biotopes	Distribution and spatial arrangement of selected bedrock reef biotopes	Maintain the distribution and spatial pattern of bedrock reef biotopes	The distribution and spatial pattern of biotopes at specified locations is an

Attribute	Measure	Target	Comment
(Mandatory CSM attribute)	(from Table 1) at specified locations. Measure during summer, once during reporting cycle.	identified for the site, to an established baseline, allowing for natural change. *Biotopes identified by Cork et al. (2008), Ross, (2011), Vanstaen & Eggleton (2011), Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data.*	essential component of the feature, representing the structure and particularly the function of the reef. Distribution refers to the geographic location of biotopes throughout the feature. Spatial pattern refers to the local zonation or juxtaposition of biotopes at specified locations. This attribute complements an assessment of the 'biotope composition' attribute by ensuring that the distribution of the conservation interest is maintained throughout the feature. Unlike *Biotope Composition* this attribute is concerned with the presence or absence of biotopes at specific locations and their spatial relationship to one another. Measuring the full distribution and spatial pattern of the biotopes is challenging. It is therefore appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Changes in the distribution and spatial arrangement may indicate long-term changes in the prevailing physical conditions at the site. Where changes in distribution/spatial pattern are known

Attribute	Measure	Target	Comment
			to be clearly attributable to cyclical succession or an expected shift in distribution then the target value should accommodate this variability. Where a change in biotope distribution/spatial pattern occurs outside the expected variation or a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Extent of representative / notable bedrock reef biotopes (Discretionary CSM attribute)	Extent of representative / notable bedrock reef biotopes, including CR.HCR.XFa.ByErSp.Eun, CR.FCR.Cv.SpCup, CR.HCR.XFa.ByErSp, IR.HIR.KFaR.FoR and IR.HIR.KFaR.Lhyp.R, measured once during summer, within the reporting cycle.	No change in the extent of representative / notable bedrock reef biotopes, from an established baseline, allowing for natural change. *Biotopes identified by Cork et al. (2008), Vanstaen & Eggleton (2011), Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data.*	The extent of the representative/notable biotopes listed are an important structural aspect of the sub-feature and therefore the bedrock reef habitat. Changes in extent and distribution may indicate long-term changes in the physical conditions at the site. Notable biotopes selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Where a change in extent outside the expected variation occurs or a change in the structure of the biotope leading to a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Presence of representative / notable bedrock reef biotopes	Presence and/or abundance of representative / notable bedrock reef	Presence of biotopes at specified locations, should not deviate	Notable biotopes selected owing to their national significance, sensitivity,

Attribute	Measure	Target	Comment
(Discretionary CSM attribute)	biotopes, including CR.HCR.XFa.ByErSp.Eun, CR.FCR.Cv.SpCup, CR.HCR.XFa.ByErSp, IR.HIR.KFaR.FoR and IR.HIR.KFaR.Lhyp.R at specified locations. Measure during summer, once during reporting cycle.	significantly from an established baseline, allowing for natural change. *Biotopes identified by Cork et al. (2008), Vanstaen & Eggleton (2011), Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data.*	or representativity as a typical biotope for the biological zone. CR.FCR.Cv.SpCup and CR.HCR.XFa.ByErSp.Eun are both nationally significant and potentially sensitive to abrasion or changes in physical conditions. Cr.HCR.XFa.ByErSp is typically found in the circalittoral zone on bedrock or boulders and is potentially sensitive to abrasion or changes in physical conditions. IR.HIR.KFaR.Lhyp.R and IR.HIR.KFaR.FoR are representative biotopes of the infralittoral zone and support species rich communities. Where a biotope is lost from a baseline known area of presence (outside expected natural variation), leading to a loss of the conservation interest of the site, then condition should be considered unfavourable.
Species composition of representative or notable bedrock reef biotopes (Discretionary CSM attribute)	Frequency and occurrence of component species of representative or notable bedrock biotopes including: CR.HCR.XFa.ByErSp.Eun CR.FCR.Cv.SpCup, CR.HCR.XFa.ByErSp, IR.HIR.KFaR.FoR and IR.HIR.KFaR.Lhyp.R, measured once, during summer, within the reporting cycle.	No decline in bedrock reef biotope quality due to change in species composition or loss of notable species, from an established baseline, allowing for natural change. Where declines in biotope quality have occurred these declines will need to be reversed. *Biotopes identified by Cork et al. (2008), Vanstaen & Eggleton (2011),*	Notable biotopes selected owing to their national significance, sensitivity, and representativity as a typical biotope for the biological zone. Species composition is an important contributor to the structure of a biotope and therefore the reef as a whole. The presence and abundance of a characterising species gives an indication of the

Attribute	Measure	Target	Comment
		Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data.	quality of a biotope, and any change in composition may indicate a cyclic change or trend in the reef community. Where changes in species composition are known to be clearly attributable to natural succession, known cyclical change or mass recruitment or dieback of characterising species, then the target value should accommodate this variability. Where there is a change in biotope quality outside the expected variation or a loss of the conservation interest of the site, then condition should be considered unfavourable.
Presence and/or abundance of specified bedrock reef species (Discretionary CSM attribute)	Bedrock species may include: *Aiptasia mutabilis, Actinothoe sphyrodeta, Alcyonium digitatum, Ascidiella aspersa, Axinella dissimilis, Caryophyllia smithii, Cliona celata, Eunicella verrucosa, Leptopsammia pruvoti, Urticina felina, Laminaria hyperborea, Metridium senile, Nemertesia spp., Pentapora fascialis, Phallusia mammillata.* Measured once, in summer, during the reporting cycle.	Maintain presence and/or abundance of species from an established baseline, allowing for natural change. *Species identified by Cork et al. (2008), Atrill* et al. *(2011), Vanstaen & Eggleton (2011), Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data.*	Changes in presence and/or abundance of a species can critically affect the physical and functional nature of the habitat, leading to unfavourable condition. The species selected should serve an important role in the structure and function of the biological community. Where the field assessment judges changes in the presence and/or abundance of specified species to be unfavourable, and subsequent investigation reveals the cause is clearly attributable to natural succession and known cyclical change (such as mass recruitment

Attribute	Measure	Target	Comment
			and dieback of characterising species), the final assessment will require expert judgement to determine the reported condition of the feature. The feature's condition could be declared favourable where the expert judgement by Natural England officers is certain that the conservation interest of the feature is not compromised by the failure of this attribute to meet its target condition. Where there is a change outside the expected variation or a loss of the conservation interest of the site, (e.g. due to anthropogenic activities or unrecoverable natural losses) then condition should be considered unfavourable.

Feature: Reefs (Lyme Bay)
Sub-feature: Stony reefs

Attribute	Measure	Target	Comment
Extent of stony reefs (Mandatory CSM attribute)	Overall area (ha) of stony reefs measured periodically throughout the reporting cycle.	No decrease in extent from established baseline, subject to natural change. *Baseline established by Channel Coastal Observatory and Maritime & Coastguard Agency 2010 acoustic data (Vanstaen & Eggleton, 2011). Further survey work needed to groundtruth stony reef areas with low*	Extent of reef is a reporting requirement of the Habitats Directive. While changes in extent may be unlikely due to removal of the reef itself, loss of extent may occur due to excessive smothering by sediment as part of natural coastal processes or anthropogenic activity.

Attribute	Measure	Target	Comment
		confidence as identified in Vanstaen & Eggleton, 2011. Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.	
Biotope composition of stony reefs (Mandatory CSM attribute)	Presence and/or abundance of a variety of stony reef biotopes (from Table 2) at specified locations throughout the site, measured once during summer, within the reporting cycle.	Maintain the full variety of biotopes identified for the site to an established baseline, subject to natural change. *Baseline to be fully established. Biotopes identified by Vanstaen & Eggleton (2011) & Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data. Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.*	This attribute aims to measure the overall variety of communities throughout the site. It will be expected to find the suite of target biotopes within the combined results of the survey for the site. Absence of a biotope from the subset will result in an unfavourable assessment for the feature. Measuring biotope composition throughout the whole site is challenging. It is therefore appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Where changes in biotope composition are known to be attributable to natural processes (e.g. winter storm events, changes in supporting processes or mass recruitment or dieback of characterising species) then the target value should accommodate this variability. Where a change in biotope composition occurs outside the expected variation, or a loss of the conservation interest of the site is

Attribute	Measure	Target	Comment
			identified, then condition should be considered unfavourable.
Distribution and spatial pattern of stony reef biotopes (Mandatory CSM attribute)	Distribution and spatial arrangement of selected stony reef biotopes (from Table 2) at specified locations. Measure during summer, once during reporting cycle.	Maintain the distribution and spatial pattern of stony reef biotopes identified for the site, to an established baseline, allowing for natural change. *Baseline to be fully established. Biotopes identified by Vanstaen & Eggleton (2011) & Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data. Devon & Severn IFCA drop video surveys may assist.*	The distribution and spatial pattern of biotopes at specified locations is an essential component of the feature, representing the structure and particularly the function of the reef. Distribution refers to the geographic location of biotopes throughout the feature. Spatial pattern refers to the local zonation or juxtaposition of biotopes at specified locations. This attribute complements an assessment of the 'biotope composition' attribute by ensuring that the distribution of the conservation interest is maintained throughout the feature. Unlike *Biotope Composition* this attribute is concerned with the presence or absence of biotopes at specific locations and their spatial relationship to one another. Measuring the full distribution and spatial pattern of the biotopes is challenging. It is therefore appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Changes in the distribution and spatial arrangement may

Attribute	Measure	Target	Comment
			indicate long-term changes in the prevailing physical conditions at the site. Where changes in distribution/spatial pattern are known to be clearly attributable to cyclical succession or an expected shift in distribution then the target value should accommodate this variability. Where a change in biotope distribution/spatial pattern occurs outside the expected variation or a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Extent of representative / notable stony reef biotopes (Discretionary CSM attribute)	Extent of stony reef biotope CR.HCR.XFa.ByErSp, measured once during summer, within the reporting cycle.	No change in the extent of representative / notable mixed bedrock and stony reef biotopes, from an established baseline, allowing for natural change. *Baseline to be fully established. Biotopes identified by Vanstaen & Eggleton (2011) & Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data. Devon & Severn IFCA drop video surveys may assist.*	The extent of the representative/notable biotopes listed are an important structural aspect of the sub-feature and therefore the stony reef habitat. Changes in extent and distribution may indicate long-term changes in the physical conditions at the site. Notable biotopes selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Where a change in extent outside the expected variation occurs or a change in the structure of the biotope leading to a loss of the conservation interest of the site is identified, then

Attribute	Measure	Target	Comment
			condition should be considered unfavourable.
Presence of representative / notable stony reef biotopes (Discretionary CSM attribute)	Presence and/or abundance of representative / notable stony reef biotopes, including CR.HCR.XFa.ByErSp at specified locations. Measure during summer, once during reporting cycle.	Presence of biotopes at specified locations, should not deviate significantly from an established baseline, allowing for natural change. *Baseline to be fully established. Biotopes identified by Vanstaen & Eggleton (2011) & Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data. Devon & Severn IFCA drop video surveys may assist.*	Notable biotopes selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. CR.HCR.XFa.ByErSp is typically found in the circalittoral zone on bedrock or boulders and is potentially senstivie to abrasion or changes in physical conditions. Where a biotope is lost from a baseline known area of presence (outside expected natural variation), leading to a loss of the conservation interest of the site, then condition should be considered unfavourable.
Species composition of representative or notable stony reef biotopes (Discretionary CSM attribute)	Frequency and occurrence of component species of representative or notable stony reef biotopes including CR.HCR.XFa.ByErSp measured once, during summer, within the reporting cycle.	No decline in stony reef biotope quality due to change in species composition or loss of notable species, from an established baseline, allowing for natural change. Where declines in biotope quality have occurred these declines will need to be reversed. *Baseline to be fully established. Biotopes identified by Vanstaen & Eggleton (2011) & Munro & Baldock (2012) and to be supplemented by University of Plymouth 2012 drop camera survey data. Devon & Severn IFCA drop video surveys may assist.*	Notable biotopes selected owing to their national significance, sensitivity, and representativity as a typical biotope for the biological zone. Species composition is an important contributor to the structure of a biotope and therefore the reef as a whole. The presence and abundance of a characterising species gives an indication of the quality of a biotope, and any change in composition may indicate a cyclic change or trend in the reef community. Where changes in species composition are known to be

Attribute	Measure	Target	Comment
			clearly attributable to natural succession, known cyclical change or mass recruitment or dieback of characterising species, then the target value should accommodate this variability. Where there is a change in biotope quality outside the expected variation or a loss of the conservation interest of the site, then condition should be considered unfavourable.
Presence and/or abundance of specified stony reef species (Discretionary CSM attribute)	Stony reef species may include: *Alcyonium digitatum, Axinella dissimiils, Caryophyllia smithii, Chaetopterus variopodedatus, Eunicella verrucosa*, *Raspailia spp., Stelligera spp., Pentapora fascialis and Phallusia mammilata.* Measure once, in summer, during the reporting cycle.	Maintain presence and/or abundance of species from an established baseline, allowing for natural change. *Baseline to be fully established. Species identified by Vanstaen & Eggleton (2011), Munro & Baldock (2012) and the Marine Recorder database and to be supplemented by University of Plymouth 2012 drop camera survey data. Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.*	Changes in presence and/or abundance of a species can critically affect the physical and functional nature of the habitat, leading to unfavourable condition. The species selected should serve an important role in the structure and function of the biological community. Where the field assessment judges changes in the presence and/or abundance of specified species to be unfavourable, and subsequent investigation reveals the cause is clearly attributable to natural succession and known cyclical change (such as mass recruitment and dieback of characterising species), the final assessment will require expert judgement to determine the reported condition of the feature. The feature's condition

Attribute	Measure	Target	Comment
			could be declared favourable where the expert judgement by Natural England officers is certain that the conservation interest of the feature is not compromised by the failure of this attribute to meet its target condition. Where there is a change outside the expected variation or a loss of the conservation interest of the site, (e.g. due to anthropogenic activities or unrecoverable natural losses) then condition should be considered unfavourable.

Favourable Condition Table for <u>The Mackerel Cove to Dartmouth component</u> of Lyme Bay and Torbay cSAC

(See Appendix F for description of biotope codes used)

Features: Reefs (Mackerel Cove to Dartmouth)
Sub-feature: General

Attribute	Measure	Target	Comment
Extent of reefs (Mandatory CSM attribute)	Overall area (ha) of reefs (bedrock, stony and biogenic) measured periodically throughout the reporting cycle.	No decrease in extent from established baseline, subject to natural change. *Baseline established by Natural England (2010) and Channel Coastal Observatory and Maritime & Coastguard Agency 2010 acoustic data (Vanstaen & Eggleton, 2011).*	Extent of reef is a reporting requirement of the Habitats Directive. While changes in extent may be unlikely due to removal of the rock reef itself, loss of extent may occur due to excessive smothering by sediment as part of natural coastal processes or anthropogenic activity.

Attribute	Measure	Target	Comment
		Further survey work needed to groundtruth reef areas with low confidence in Mackerel Cove to Dartmouth as identified in (Vanstaen & Eggleton, 2011). Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.	
Water Clarity (Discretionary CSM attribute)	Average light attenuation measured periodically throughout the reporting cycle.	Average light attenuation should not deviate significantly from an established baseline, subject to natural change. *Baseline to be established. Data from EA may assist.*	Water clarity is a key process influencing algal/plant dominated biotopes. Changes in water clarity could be caused, for example, by an increase in suspended material due to organic enrichment.
Water Density (Discretionary CSM attribute)	Average temperature and salinity measured periodically in the subtidal, throughout the reporting cycle.	Average temperature and salinity should not deviate significantly from an established baseline, subject to natural change. *Baseline to be established. Data from EA may assist.*	Temperature and salinity are characteristic of the overall hydrography of the area, indicating predominance of coastal or oceanic water. Changes in temperature and salinity may influence the presence and distribution of species (along with recruitment processes and spawning behaviour) particularly those species at the edge of their geographic ranges. Where changes in temperature or salinity through adverse impacts e.g. thermal discharge plumes, industrial discharges, water abstraction etc. cause a severe loss

Attribute	Measure	Target	Comment
			or shift in community structure such that the conservation interest is adversely affected then condition should be judged as unfavourable. Where changes in temperature or salinity are due to natural processes such as severe winter temperatures, then this will be an acceptable change to the feature.
Sedimentation rate (Discretionary CSM attribute)	Average sedimentation rate measured periodically in the subtidal, throughout the reporting cycle	Average sedimentation rate should not deviate significantly from an established baseline, subject to natural change. *Baseline to be established. Data from EA may assist.*	Where adverse anthropogenic impacts such as dredging, disposal of dredge spoil or changed water flows due to artificial structures cause a change in sedimentation rate leading to severe smothering of the rock habitat, or an adverse shift in community structure, then condition should be judged as unfavourable. Where changes in sedimentation rate are attributable to natural processes such as storm events, changed tidal movements or dynamics, or natural erosion, then this will be an acceptable change to the feature unless the conservation interest is lost.

Feature: Reefs (Mackerel Cove to Dartmouth)
Sub-feature: Bedrock reefs

Attribute	Measure	Target	Comment
Extent of bedrock reefs (Mandatory CSM attribute)	Overall area (ha) of bedrock reefs measured periodically throughout the reporting cycle.	No decrease in extent from established baseline, subject to natural change. *Baseline established by Natural England (2010) and Channel Coastal Observatory and Maritime & Coastguard Agency 2010 acoustic data (Vanstaen & Eggleton, 2011).*	Extent of reef is a reporting requirement of the Habitats Directive. While changes in extent may be unlikely due to removal of the bedrock reef itself, loss of extent may occur due to excessive smothering by sediment as part of natural coastal processes or anthropogenic activity.
Biotope composition of bedrock reefs (Mandatory CSM attribute)	Presence and/or abundance of a variety of bedrock reef biotopes (from table 3) at specified locations throughout the site, measured once during summer, within the reporting cycle.	Maintain the full variety of biotopes identified for the site to an established baseline, subject to natural change. *Biotopes identified by Ross (2011) and (Vanstaen & Eggleton, 2011).*	This attribute aims to measure the overall variety of communities throughout the site. It will be expected to find the suite of target biotopes within the combined results of the survey for the site. Absence of a biotope from the subset will result in an unfavourable assessment for the feature. Measuring biotope composition throughout the whole site is challenging. It is therefore appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Where changes in biotope composition are known to be

Attribute	Measure	Target	Comment
			attributable to natural processes (e.g. winter storm events, changes in supporting processes or mass recruitment or dieback of characterising species) then the target value should accommodate this variability. Where a change in biotope composition occurs outside the expected variation or a loss of the conservation interest of the site is identified, and then condition should be considered unfavourable.
Distribution and spatial pattern of bedrock reef biotopes (Mandatory CSM attribute)	Distribution and spatial arrangement of selected bedrock reef biotopes (from table 3) at specified locations. Measure during summer, once during reporting cycle.	Maintain the distribution and spatial pattern of bedrock reef biotopes identified for the site, to an established baseline, allowing for natural change. *Biotopes identified by Ross (2011) and (Vanstaen & Eggleton, 2011).*	The distribution and spatial pattern of biotopes at specified locations is an essential component of the feature, representing the structure and particularly the function of the reef. Distribution refers to the geographic location of biotopes throughout the feature. Spatial pattern refers to the local zonation or juxtaposition of biotopes at specified locations. This attribute complements an assessment of the 'biotope composition' attribute by ensuring that the distribution of the conservation interest is maintained throughout the feature. Unlike *Biotope Composition* this attribute is concerned with the presence or absence of biotopes at specific

Attribute	Measure	Target	Comment
			locations and their spatial relationship to one another. Measuring the full distribution and spatial pattern of the biotopes is challenging. It is therefore appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Changes in the distribution and spatial arrangement may indicate long-term changes in the prevailing physical conditions at the site. Where changes in distribution/spatial pattern are known to be clearly attributable to cyclical succession or an expected shift in distribution then the target value should accommodate this variability. Where a change in biotope distribution/spatial pattern occurs outside the expected variation or a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Extent of representative / notable bedrock reef biotopes (Discretionary CSM attribute)	Extent of representative/notable bedrock reef biotopes, including CR.HCR.Xfa, IR.MIR.KR.LhypT and IR.HIR.KFaR.FoR, measured once during summer, within the reporting cycle.	No change in the extent of representative / notable bedrock reef biotopes, from an established baseline, allowing for natural change. *Biotopes identified by Ross (2011)*	The extent of the representative/notable biotopes are an important structural aspect of the sub-feature and therefore the bedrock reef habitat. Changes in extent and distribution may indicate long-term changes in

Attribute	Measure	Target	Comment
		and (Vanstaen & Eggleton, 2011).	the physical conditions at the site. Notable biotopes should be selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Where a change in extent outside the expected variation occurs or a change in the structure of the biotope leading to a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Presence of representative / notable bedrock reef biotopes (Discretionary CSM attribute)	Presence and/or abundance of representative / notable bedrock reef biotopes, including: CR.HCR.Xfa, IR.MIR.KR.LhypT and IR.HIR.KFaR.FoR at specified locations. Measure during summer, once during reporting cycle.	Presence of biotopes at specified locations, should not deviate significantly from an established baseline, allowing for natural change. *Biotopes identified by Ross (2011) and (Vanstaen & Eggleton, 2011).*	Notable biotopes should be selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. IR.MIR.KR.LhypT and IR.HIR.KFaR.FoR are both representative biotopes of the infralittoral zone and support species rich communities. Where a biotope is lost from a baseline known area of presence (outside expected natural variation), leading to a loss of the conservation interest of the site, then condition should be considered unfavourable.

Attribute	Measure	Target	Comment
Species composition of representative or notable bedrock reef biotopes (Discretionary CSM attribute)	Frequency and occurrence of component species of representative or notable bedrock biotope including: CR.HCR.Xfa, IR.MIR.KR.LhypT and IR.HIR.KFaR.FoR, measured once, during summer, within the reporting cycle.	No decline in bedrock reef biotope quality due to change in species composition or loss of notable species, from an established baseline, allowing for natural change. Where declines in biotope quality have occurred these declines will need to be reversed. *Species identified by Cork et al. (2008), Ross (2011), (Vanstaen & Eggleton, 2011) and Marine Recorder database.*	Notable biotopes should be selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Species composition is an important contributor to the structure of a biotope and therefore the reef as a whole. The presence and abundance of a characterising species gives an indication of the quality of a biotope, and any change in composition may indicate a cyclic change or trend in the reef community. Where changes in species composition are known to be clearly attributable to natural succession, known cyclical change or mass recruitment or dieback of characterising species, then the target value should accommodate this variability. Where there is a change in biotope quality outside the expected variation or a loss of the conservation interest of the site, then condition should be considered unfavourable.
Presence and/or abundance of specified bedrock reef species (Discretionary CSM attribute)	Bedrock species may include: *Actinothoe sphyrodeta, Alcyonium digitatum, Antedon bifida, Caryophyllia inornata, Cliona celata,*	Maintain presence and/or abundance of species from an established baseline, allowing for natural change.	Changes in presence and/or abundance of a species can critically affect the physical and functional nature of the habitat, leading to

Attribute	Measure	Target	Comment
	Corynactis viridis, Eunicella verrucosa, Laminaria hyperborea, Metridium senile, Mytilus edulis, Nemertesia spp. Tubularia indivisa. Measure once, in summer, during the reporting cycle.	*Species identified by Cork et al. (2008), Ross (2011), (Vanstaen & Eggleton, 2011) and Marine Recorder database.*	unfavourable condition. The species selected should serve an important role in the structure and function of the biological community. Where the field assessment judges changes in the presence and/or abundance of specified species to be unfavourable, and subsequent investigation reveals the cause is clearly attributable to natural succession and known cyclical change (such as mass recruitment and dieback of characterising species), the final assessment will require expert judgement by Natural England advisers to determine the reported condition of the feature. The feature's condition could be declared favourable where the expert judgement by Natural England advisers is certain that the conservation interest of the feature is not compromised by the failure of this attribute to meet its target condition. Where there is a change outside the expected variation or a loss of the conservation interest of the site, (e.g. due to anthropogenic activities or unrecoverable natural losses) then condition should be considered unfavourable.

Feature: Reefs (Mackerel Cove to Dartmouth)
Sub-feature: Stony reefs

Attribute	Measure	Target	Comment
Extent of stony reefs (Mandatory CSM attribute)	Overall area (ha) of stony reefs measured periodically throughout the reporting cycle.	No decrease in extent from established baseline, subject to natural change. *Baseline established by Channel Coastal Observatory and Maritime & Coastguard Agency 2010 acoustic data (Vanstaen & Eggleton, 2011). Further survey work needed to groundtruth stony reef areas in Mackerel Cove to Dartmouth as identified in (Vanstaen & Eggleton, 2011). Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.*	Extent of reef is a reporting requirement of the Habitats Directive. While changes in extent may be unlikely due to removal of the reef itself, loss of extent may occur due to excessive smothering by sediment as part of natural coastal processes or anthropogenic activity.
Biotope composition of stony reefs (Mandatory CSM attribute)	Presence and/or abundance of a variety of stony reef biotopes (baseline to be established) at specified locations throughout the site, measured once during summer, within the reporting cycle.	Maintain the full variety of biotopes identified for the site to an established baseline, subject to natural change. *Baseline to be established through future surveys. Further survey work is needed to groundtruth stony reef areas identified in Vanstaen & Eggleton (2011) in order to establish a baseline of representative stony reef biotopes for the area. Devon & Severn Inshore Fisheries &*	This attribute aims to measure the overall variety of communities throughout the site. It will be expected to find the suite of target biotopes within the combined results of the survey for the site. Absence of a biotope from the subset will result in an unfavourable assessment for the feature. Measuring biotope composition throughout the whole site is challenging. It is therefore

Attribute	Measure	Target	Comment
		Conservation Authority (IFCA) drop video surveys may assist.	appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Where changes in biotope composition are known to be attributable to natural processes (e.g. winter storm events, changes in supporting processes or mass recruitment or dieback of characterising species) then the target value should accommodate this variability. Where a change in biotope composition occurs outside the expected variation, or a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Distribution and spatial pattern of stony reef biotopes (Mandatory CSM attribute)	Distribution and spatial arrangement of selected stony reef biotopes (baseline to be established) at specified locations. Measure during summer, once during reporting cycle.	Maintain the distribution and spatial pattern of stony reef biotopes identified for the site, to an established baseline, allowing for natural change. *Baseline to be established through future surveys. Further survey work is needed to groundtruth stony reef areas identified in Vanstaen & Eggleton (2011) in order to establish a baseline of representative stony reef biotopes for the area. Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.*	The distribution and spatial pattern of biotopes at specified locations is an essential component of the feature, representing the structure and particularly the function of the reef. Distribution refers to the geographic location of biotopes throughout the feature. Spatial pattern refers to the local zonation or juxtaposition of biotopes at specified locations. This attribute complements an assessment of the 'biotope composition' attribute by ensuring that the distribution of the conservation interest is maintained

Attribute	Measure	Target	Comment
			throughout the feature. Unlike *Biotope Composition* this attribute is concerned with the presence or absence of biotopes at specific locations and their spatial relationship to one another. Measuring the full distribution and spatial pattern of the biotopes is challenging. It is therefore appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Changes in the distribution and spatial arrangement may indicate long-term changes in the prevailing physical conditions at the site. Where changes in distribution/spatial pattern are known to be clearly attributable to cyclical succession or an expected shift in distribution then the target value should accommodate this variability. Where a change in biotope distribution/spatial pattern occurs outside the expected variation or a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Extent of representative / notable stony reef biotopes (Discretionary CSM attribute)	Extent of stony reef biotopes (baseline to be established), measured once during summer, within the reporting cycle.	No change in the extent of representative / notable mixed bedrock and stony reef biotopes, from an established baseline,	The extent of the representative/notable biotopes listed are an important structural aspect of the sub-feature and

Attribute	Measure	Target	Comment
		allowing for natural change. *Baseline to be established through future surveys. Further survey work is needed to groundtruth stony reef areas identified in Vanstaen & Eggleton (2011) in order to establish a baseline of representative/notable stony reef biotopes for the area. Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.*	therefore the stony reef habitat. Changes in extent and distribution may indicate long-term changes in the physical conditions at the site. Notable biotopes selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Where a change in extent outside the expected variation occurs or a change in the structure of the biotope leading to a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Presence of representative / notable stony reef biotopes (Discretionary CSM attribute)	Presence and/or abundance of representative / notable stony reef biotopes (baseline to be established) at specified locations. Measure during summer, once during reporting cycle.	Presence of biotopes at specified locations, should not deviate significantly from an established baseline, allowing for natural change. *Baseline to be established through future surveys. Further survey work is needed to groundtruth stony reef areas identified in Vanstaen & Eggleton (2011) in order to establish a baseline of representative stony reef biotopes for the area. Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.*	Notable biotopes selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Where a biotope is lost from a baseline known area of presence (outside expected natural variation), leading to a loss of the conservation interest of the site, then condition should be considered unfavourable.
Species composition of	Frequency and occurrence of	No decline in stony reef biotope	Notable biotopes selected owing to

Attribute	Measure	Target	Comment
representative or notable stony reef biotopes (Discretionary CSM attribute)	component species of representative or notable stony reef biotopes (baseline to be established) measured once, during summer, within the reporting cycle.	quality due to change in species composition or loss of notable species, from an established baseline, allowing for natural change. Where declines in biotope quality have occurred these declines will need to be reversed. *Baseline to be established through future surveys. Further survey work is needed to groundtruth stony reef areas identified in Vanstaen & Eggleton (2011) in order to establish a baseline of representative stony reef biotopes for the area. Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.*	their national significance, sensitivity, and representativity as a typical biotope for the biological zone. Species composition is an important contributor to the structure of a biotope and therefore the reef as a whole. The presence and abundance of a characterising species gives an indication of the quality of a biotope, and any change in composition may indicate a cyclic change or trend in the reef community. Where changes in species composition are known to be clearly attributable to natural succession, known cyclical change or mass recruitment or dieback of characterising species, then the target value should accommodate this variability. Where there is a change in biotope quality outside the expected variation or a loss of the conservation interest of the site, then condition should be considered unfavourable.
Presence and/or abundance of specified stony reef species (Discretionary CSM attribute)	Measure once, in summer, during the reporting cycle. **Stony reef species to be determined**	Maintain presence and/or abundance of species from an established baseline, allowing for natural change. *Baseline to be established through future surveys. Further survey work is needed to groundtruth stony reef*	Changes in presence and/or abundance of a species can critically affect the physical and functional nature of the habitat, leading to unfavourable condition. The species selected should serve an important role in the structure and function of

Attribute	Measure	Target	Comment
		areas identified in Vanstaen & Eggleton (2011) in order to establish a baseline of stony reef species for the area. Devon & Severn Inshore Fisheries & Conservation Authority (IFCA) drop video surveys may assist.	the biological community. Where the field assessment judges changes in the presence and/or abundance of specified species to be unfavourable, and subsequent investigation reveals the cause is clearly attributable to natural succession and known cyclical change (such as mass recruitment and dieback of characterising species), the final assessment will require expert judgement to determine the reported condition of the feature. The feature's condition could be declared favourable where the expert judgement by Natural England officers is certain that the conservation interest of the feature is not compromised by the failure of this attribute to meet its target condition. Where there is a change outside the expected variation or a loss of the conservation interest of the site, (e.g. due to anthropogenic activities or unrecoverable natural losses) then condition should be considered unfavourable.

Feature: Reef
Sub-feature: Biogenic reef

Attribute	Measure	Target	Comment
Extent of biogenic reefs (Mandatory CSM attribute)	Overall area (ha) of biogenic reefs (*Mytilus edulis*) measured periodically throughout the reporting cycle.	No decrease in extent from established baseline, subject to natural change. *Baseline to be established through future surveys. Presence of Mytilus edulis beds at specific locations identified by Torbay Council, 2004.*	Extent of reef is a reporting requirement of the Habitats Directive. The extent of a biogenic reef is an important attribute in relation to the viability of the reef and therefore should be measured at each assessment.
Biotope composition of biogenic reefs (Mandatory CSM attribute)	Presence and/or abundance of a variety of biogenic reef biotopes (biotopes to be determined) at specified locations throughout the site, measured once during summer, within the reporting cycle.	Maintain the full variety of biotopes identified for the site to an established baseline, subject to natural change. *Baseline to be established through future surveys.*	This attribute aims to measure the overall variety of communities throughout the site. It will be expected to find the suite of target biotopes within the combined results of the survey for the site. Absence of a biotope from the subset will result in an unfavourable assessment for the feature. Measuring biotope composition throughout the whole site is challenging. It is therefore appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Where changes in biotope composition are known to be attributable to natural processes (e.g. winter storm events, changes in

Attribute	Measure	Target	Comment
			supporting processes or mass recruitment or dieback of characterising species) then the target value should accommodate this variability. Where a change in biotope composition occurs outside the expected variation, or a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Distribution and spatial pattern of biogenic reef biotopes (Mandatory CSM attribute)	Distribution and spatial arrangement of biogenic reef biotopes (to be determined) at specified locations. Measure during summer, once during reporting cycle.	Maintain the distribution and spatial pattern of biogenic reef biotopes identified for the site, to an established baseline, allowing for natural change. *Baseline to be established through future surveys.*	The distribution and spatial pattern of biotopes at specified locations is an essential component of the feature, representing the structure and particularly the function of the reef. Distribution refers to the geographic location of biotopes throughout the feature. Spatial pattern refers to the local zonation or juxtaposition of biotopes at specified locations. This attribute complements an assessment of the 'biotope composition' attribute by ensuring that the distribution of the conservation interest is maintained throughout the feature. Unlike *Biotope Composition* this attribute is concerned with the presence or absence of biotopes at specific locations and their spatial relationship to one another.

Attribute	Measure	Target	Comment
			Measuring the full distribution and spatial pattern of the biotopes is challenging. It is therefore appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Changes in the distribution and spatial arrangement may indicate long-term changes in the prevailing physical conditions at the site. Where changes in distribution/spatial pattern are known to be clearly attributable to cyclical succession or an expected shift in distribution then the target value should accommodate this variability. Where a change in biotope distribution/spatial pattern occurs outside the expected variation or a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Extent of representative / notable biogenic reef biotopes (Discretionary CSM attribute)	Extent of representative / notable biogenic reef biotopes (biotopes to be determined), measured once during summer, within the reporting cycle.	No change in the extent of representative / notable biogenic reef biotopes, from an established baseline, allowing for natural change. *Baseline to be established through future surveys .Presence of Mytilus edulis beds at specific locations identified by Torbay Council, 2004.*	The extent of the representative/ notable biotopes are an important structural aspect of the sub-feature and therefore the biogenic reef habitat. Changes in extent and distribution may indicate long-term changes in the physical conditions at the site.

Attribute	Measure	Target	Comment
			Notable biotopes should be selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Where a change in extent outside the expected variation occurs or a change in the structure of the biotope leading to a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Presence of representative / notable biogenic reef biotopes (Discretionary CSM attribute)	Presence and/or abundance of representative / notable biogenic reef biotopes (biotopes to be determined) at specified locations. Measure during summer, once during reporting cycle.	Presence of biotopes at specified locations, should not deviate significantly from an established baseline, allowing for natural change. *Baseline to be established through future surveys. Presence of Mytilus edulis beds at specific locations identified by Torbay Council, 2004.*	Notable biotopes should be selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Where a biotope is lost from a baseline known area of presence (outside expected natural variation), leading to a loss of the conservation interest of the site, then condition should be considered unfavourable.
Species composition of representative or notable biogenic reef biotopes (Discretionary CSM attribute)	Frequency and occurrence of component species of representative or notable biogenic reef biotopes (to be determined), measured once, during summer, within the reporting cycle.	No decline in biogenic reef biotope quality due to change in species composition or loss of notable species, from an established baseline, allowing for natural change. Where declines in biotope quality have occurred these declines will	Notable biotopes should be selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Species composition is an important

Attribute	Measure	Target	Comment
		need to be reversed. *Baseline to be established through future surveys.*	contributor to the structure of a biotope and therefore the reef as a whole. The presence and abundance of a characterising species gives an indication of the quality of a biotope, and any change in composition may indicate a cyclic change or trend in the reef community. Where changes in species composition are known to be clearly attributable to natural succession, known cyclical change or mass recruitment or dieback of characterising species, then the target value should accommodate this variability. Where there is a change in biotope quality outside the expected variation or a loss of the conservation interest of the site, then condition should be considered unfavourable.
Presence and/or abundance of specified biogenic reef species (Discretionary CSM attribute)	Biogenic reef species to be determined. Measured once, in summer, during the reporting cycle.	Maintain presence and/or abundance of species from an established baseline, allowing for natural change. *Baseline to be established through future surveys.*	Changes in presence and/or abundance of a species can critically affect the physical and functional nature of the habitat, leading to unfavourable condition. The species selected should serve an important role in the structure and function of the biological community. Where the field assessment judges changes in the presence and/or

Attribute	Measure	Target	Comment
			abundance of specified species to be unfavourable, and subsequent investigation reveals the cause is clearly attributable to natural succession and known cyclical change (such as mass recruitment and dieback of characterising species), the final assessment will require expert judgement by Natural England advisers to determine the reported condition of the feature. The feature's condition could be declared favourable where the expert judgement by Natural England advisers is certain that the conservation interest of the feature is not compromised by the failure of this attribute to meet its target condition. Where there is a change outside the expected variation or a loss of the conservation interest of the site, (e.g. due to anthropogenic activities or unrecoverable natural losses) then condition should be considered unfavourable.
Population structure of *Mytilus edulis* biogenic reefs (Discretionary attribute)	Measurement of the age structure of this feature is challenging in the subtidal, but may be possible by direct observation at very low tides. Measure once during summer, within the reporting cycle.	Maintain age/size class structure of individual species to an established baseline, allowing for natural change. Different phases of population, from newly settled spat through to older individuals are present.	In a stable or increasing population all age phases are likely to be present (although it must be noted that juvenile beds often exist separately from adult beds). The presence of areas of variable stages of growth is important in ensuring

Attribute	Measure	Target	Comment
		Baseline to be established through future surveys.	larval supply and also enhances the species diversity of the reefs as a whole.

Feature: Sea caves
Sub-feature: General

Attribute	Measure	Target	Comment
Extent of caves (Discretionary CSM attribute)	Internal dimensions of each designated cave within the SAC, measured once during the reporting cycle.	No change in dimensions of a cave, allowing for natural change that are part of a wider coastal geomorphological management regime. *Baseline partially established by Proctor, 2009 and to be supplemented by seacave surveys during 2012.*	Where changes in extent/dimensions are clearly attributable to cyclical natural processes such as erosion causing rock falls, then the final assessment will require expert judgement by Natural England advisers to determine the reported condition of the feature. Although the site extends to MLW, it is expected for the cave as a whole to be monitored and reported to determine favourable condition, as changes in physical structure (e.g. to non-submerged cave roofs and walls) will likely reflect changes to the cave as a whole.
Number of caves in the site (Discretionary CSM attribute)	No reduction in the number of caves within a site, allowing for natural change.	No reduction in the number of caves, from an established baseline (Table 7), within a site allowing for natural change.	Where caves are irrevocably lost due to natural processes such as erosion, the attribute will be considered partially destroyed, or even

Attribute	Measure	Target	Comment
		Baseline established by Proctor, 2009.	destroyed, however if due to natural erosion dynamics this would still be considered as a natural succession.
Biotope composition of sea caves (Discretionary CSM attribute)	Presence and/or abundance of composite sea cave biotopes at specified locations, in particular those biotopes listed in Table 6. Measure during summer, once during reporting cycle	Maintain the full variety of biotopes identified for the sea caves, to an established baseline, subject to natural change. *Baseline partially established by Proctor, 2009 and to be supplemented by seacave surveys during 2012.*	This attribute aims to measure the overall variety of communities throughout the site. It will be expected to find the suite of target biotopes within the combined results of the survey for the site. Absence of a biotope from the subset will result in an unfavourable assessment for the feature. Measuring biotope composition throughout the whole site is challenging. It is therefore appropriate to measure the presence of the biotopes at a number of specified known locations throughout the site. Biotope composition of a cave is tightly linked to the prevailing physical and environmental conditions of the cave. It will vary between caves and therefore no single generic target can be specified for the entire feature where this includes multiple caves. Where changes in biotope composition are known to be attributable to natural processes (e.g. winter storm/flood events, changes in supporting

Attribute	Measure	Target	Comment
			processes or mass recruitment or dieback of characterising species) then the target value should accommodate this variability. Where changes occur outside natural processes (e.g. as a result of anthropogenic changes to water quality or wave exposure) then the condition should be considered unfavourable. The final assessment will require expert judgement by Natural England advisers to determine the reported condition of the feature.
Presence of representative/ notable sea cave biotopes (Discretionary CSM attribute)	Presence and/or abundance of representative / notable sea cave biotopes CR.FCR.Cv.SpCup, IR.FIR.SG.CrSpAsAn, and IR.FIR.SG.FoSwCC at specified locations. Measure during summer, once during reporting cycle.	Presence of biotopes at specified locations, should not deviate significantly from an established baseline, allowing for natural change. *Baseline partially established by Proctor, 2009 and to be supplemented by seacave surveys during 2012.*	Notable biotopes should be selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Where a biotope is lost from a baseline known area of presence (outside expected natural variation), leading to a loss of the conservation interest of the site, then condition should be considered unfavourable.
Species composition of representative/ notable sea cave biotopes (Discretionary CSM attribute)	Frequency and occurrence of component species of representative or notable sea cave biotopes CR.FCR.Cv.SpCup, IR.FIR.SG.CrSpAsAn, and IR.FIR.SG.FoSwCC, measured once, during summer, within the reporting	No decline in sea cave biotope quality due to change in species composition or loss of notable species, from an established baseline, allowing for natural change. *Baseline partially established by*	Notable biotopes should be selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. Species composition is an important

Attribute	Measure	Target	Comment
	cycle.	*Proctor, 2009 and to be supplemented by seacave surveys during 2012.*	contributor to the structure of a biotope and therefore the sea cave as a whole. The presence and abundance of a characterising species gives an indication of the quality of a biotope, and any change in composition may indicate a cyclic change or trend in the reef community. Where changes in species composition are known to be clearly attributable to natural succession, known cyclical change or mass recruitment or dieback of characterising species, then the target value should accommodate this variability. Where there is a change in biotope quality outside the expected variation or a loss of the conservation interest of the site, then condition should be considered unfavourable.
Presence and/or abundance of specified species (Discretionary CSM attribute)	Occurrence and frequency of species, in particular; *Alcyonium hibernicum, Caryophyllia inornata, and Hoplangia durotrix*, at known locations. Measure during summer, once during reporting cycle.	No decline in abundance of specified species from an established baseline, allowing for natural change. *Baseline partially established by Proctor, 2009, and Seasearch, 2006 and to be supplemented by seacave surveys during 2012.*	Changes in presence and/or abundance of a species can critically affect the physical and functional nature of the habitat, leading to unfavourable condition. The species selected should serve an important role in the structure and function of the biological community. Where the field assessment judges changes in the presence and/or abundance of specified species to be unfavourable, and subsequent investigation reveals the cause is

Attribute	Measure	Target	Comment
			clearly attributable to natural succession and known cyclical change (such as mass recruitment and dieback of characterising species), the final assessment will require expert judgement by Natural England advisers to determine the reported condition of the feature. The feature's condition could be declared favourable where the expert judgement of Natural England advisers is certain that the conservation interest of the feature is not compromised by the failure of this attribute to meet its target condition. Where there is a change outside the expected variation or a loss of the conservation interest of the site, (e.g. due to anthropogenic activities or unrecoverable natural losses) then condition should be considered unfavourable.
Spatial pattern of characteristic sea cave biotopes (Discretionary attribute)	Identity and spatial arrangement of characteristic sea cave biotopes within a cave. Measure during summer, once during reporting cycle.	Maintain the distribution of biotopes identified for the site (Table 6), allowing for natural change. *Baseline partially established by Proctor, 2009 and to be supplemented by seacave surveys during 2012.*	The relative distribution of biotopes is an important structural aspect of the site. The spatial arrangement of biotopes within a cave is normally a reflection of the prevailing physical conditions, and thus any change may indicate other physical changes within the cSAC. This should be measured both within an individual cave, and throughout all sea caves in the cSAC. Where changes in distribution/spatial pattern are known to be clearly attributable to cyclical succession or an expected shift in distribution then the target value

Attribute	Measure	Target	Comment
			should accommodate this variability. Where a change in biotope distribution/spatial pattern occurs outside the expected variation or a loss of the conservation interest of the site is identified (e.g. as a result of anthropogenic changes to water quality or wave exposure), then condition should be considered unfavourable.

Table 1

Lyme Bay Reef Communities

Lyme Bay Bedrock Reef Communities **Source: Cork et al., 2008; Atrill et al. 2011, Vanstaen & Eggleton, 2011; Marine Recorder database**	
Key Biotopes	**Definition**
CR.HCR.Xfa.ByErSp.Eun	*Eunicella verrucosa* and *Pentapora fascialis* on wave-exposed circalittoral rock.
CR.FCR.Cv.SpCp	Sponges, cup corals and anthozoans on shaded overhanging circalittoral rock.
CR.HCR.XFa.ByErSp	Bryozoan turf and erect sponges on tide-swept circalittoral rock
IR.HIR.KFaR.Lyhp.R	*Laminaria hyperborea* with dense foliose red seaweeds on exposed infralittoral rock.
IR.HIR.KFaR.FoR	Foliose red seaweeds on exposed lower infralittoral rock.
Key Species	**Common name**
Actinothoe sphyrodeta	Sandalled anemone
Adreus fascicularis	A sponge
Aiptasia mutabilis	Trumpet anemone
Alcyonidium diaphanum	Sea chervil
Alcyonium digitatum	Dead man's fingers
Amphilectus fucorum	A sponge
Ascidia mentula	A sea squirt
Ascidiella aspersa	A sea squirt
Asterias rubens	Common starfish
Axinella dissimilis	A branching sponge
Axinella damicornis	An erect sponge
Bispira volutacornis	Twin fan worm
Botryllus schlosseri	Star ascidian
Buccinum undatum	Common whelk
Bugula flabellata	An erect bryozoan
Bugula plumosa	A bryozoan
Calliostoma zizyphinum	Painted top shell
Cancer pagurus	Edible crab
Caryophyllia smithii	Devonshire cup coral
Cellaria fistulosa	A bryozoan
Cellepora pumicosa	An erect bryozoan
Chaetopterus variopedatus	Parchment worm
Ciocalypta penicillus	A sponge
Ciona intestinalis	A sea squirt
Clavelina lepadiformis	Lightbulb sea squirt
Cliona celata	A boring sponge
Delesseria sanguinea	Sea beech
Dendrodoa grossularia	Baked bean ascidian
Dercitus bucklandi	An encrusting sponge
Dictyota dichotoma	A brown seaweed
Diplosoma spongiforme	A sea squirt
Dysidea fragilis	A sponge
Echinus esculentus	Edible sea urchin
Eunicella verrucosa	Pink sea fan

Flustra foliacea	Hornwrack
Halecium halecinum	Herring-bone hydroid
Halichondria panicea	Breadcrumb sponge
Hemimycale columella	A massive sponge
Henricia oculata	Bloody Henry starfish
Hinia reticulata	Netted dog whelk
Homarus gammarus	European lobster
Hydrallmania falcata	A hydroid
Hypoglossum hypoglossoides	A red foliose seaweed
Inachus sp.	A spider crab
Leptopsammia pruvoti	Sunset cup coral
Lissoclinum perforatum	A colonial sea squirt
Maja squinado	Common spider crab
Marthasterias glacialis	Spiny starfish
Metridium senile	Plumose anemone
Necora puber	Velvet swimming crab
Nemertesia antennina	Sea beard
Nemertesia ramosa	A hydroid
Pachymatisma johnstonia	A sponge
Pagurus bernhardus	A hermit crab
Parablennius gattorugine	Tompot blenny
Pentapora fascialis	Ross
Phallusia mammillata	Solitary tunicate
Pisidia longicornis	Long-clawed porcelain crab
Polymastia bolitiformis	A sponge
Pseudosuberites sulphureus	A sponge
Raspailia hispida	A branching sponge
Raspailia ramosa	A branching sponge
Sagartia elegans	A sea anemone
Spirorbis spirorbis	A tubeworm
Stelligera rigida	A branching sponge
Stelligera stuposa	A branching sponge
Stolonica socialis	Orange sea grapes
Suberites carnosus	A sponge
Tethya aurantium	Golfball sponge
Thorogobius ephippiatus	Leopard spotted goby
Urticina felina	Dahlia anemone

Listed species and biotopes may be reviewed to reflect new evidence / survey results.

Table 2

Lyme Bay Stony Reef Communities **Source: Vanstaen & Eggleton, 2011; Munro & Baldock, 2012; Marine Recorder database**	
Key Biotopes	**Definition**
CR.HCR.xFA.ByErSP	Bryozoan turf and erect sponges on tide-swept circalittoral rock
Key Species	**Common name**
Abietinaria abietina	A hydroid
Actinothoe sphyrodeta	Sandalled anemone
Aglaophenia sp.	A colonial hydroid
Alcyonidium diaphanum	Sea chervil
Alcyonium digitatum	Dead man's fingers
Amphilectus fucorum	A sponge
Anomia sp.	A bivalve mollusc
Anotrichium furcellatum	A red seaweed
Aplidium sp.	A colonial seasquirt
Apoglossum ruscifolium	A red seaweed
Archidoris pseudoargus	Sea lemon
Ascidia virginea	A sea squirt
Ascidia mentula	A sea squirt
Aslia lefevrei	Brown sea cucumber
Asterias rubens	Common starfish
Axinella dissimilis	A branching sponge
Axinella sp.	A sponge
Baeria johnstoni	A sponge
Balanus crenatus	An acorn barnacle
Botryllus schlosseri	Star ascidian
Bugula flabellata	An erect bryozoans
Bugula plumosa	A bryozoans
Bugula turbinata	An erect bryozoans
Calliactis parasitica	Parasitic anemone
Calliostoma zizyphinum	Painted top shell
Cancer pagurus	Edible crab
Caryophyllia smithii	Devonshire cup coral
Cellaria sp.	A bryozoans
Cellepora pumicosa	An erect bryozoans
Chaetopterus variopodetus	Parchment worm
Ciocalypta penicillus	A sponge
Ciona intestinalis	A sea squirt
Clathrina coriacea	A sponge
Clavelina lepadiformis	Lightbulb sea squirt
Compsothamnion thuyoides	A red algae
Corella parellelogramma	A sea squirt
Crisiidae sp.	A bryozoans
Crimora papillata	A sea squirt
Didemnum maculatum	A colonial sea squirt
Didemnum sp.	A sea squirt
Diplecogaster bimaculata	Two-spotted clingfish
Diplosoma spongiforme	A sea squirt
Disporella sp.	A bryozoans
Doto sp.	A sea slug
Dysidea fragilis	A sponge
Epizoanthus couchi	An anemone

Eunicella verrucosa	Pink sea fan
Filograna implexa	A filigree worm
Galathea sp.	A squat lobster
Gastrochenaea dubia	A bivalve mollusc
Gibbula cineraria	Grey top shell
Gobius niger	Black goby
Guancha lacunosa	A sponge
Halecium halecinum	Herring-bone hydroid
Haliclona fistulosa	A sponge
Haliclona oculata	A branching sponge
Hemimycale columella	A massive sponge
Hinia reticulata	Netted dog whelk
Hydrallmania falcata	A hydroid
Hymeniacidon perleve	A sponge
Hypoglossum hypoglossoides	A red foliose seaweed
Inachus sp.	A spider crab
Jorunna tomentosa	A sea slug
Leucosolenia sp.	A sponge
Lissoclinum perforatum	A colonial sea squirt
Myxilla incrustans	A sponge
Necora puber	Velvet swimming crab
Nemertesia sp.	A hydroid
Obelia sp.	A hydroid
Ocenebra erinacea	Oyster drill
Ocnus lacteus	A sea cucumber
Pachymatisma johnstonia	A sponge
Paguridae sp.	A hermit crab
Pagurus bernhardus	A hermit crab
Parablennius gattorugine	Tompot blenny
Parasmittina trispinosa	A bryozoans
Pentapora fascialis	Ross
Phallusia mammillata	Solitary tunicate
Phorbus plumosum	A sponge
Pisidia longicornis	Long-clawed porcelain crab
Polymastia bolitiformis	A sponge
Polymastia penicillus	A sponge
Polycarpa sp.	A tunicate
Polycera faeroensis	A sea slug
Pomatoceros sp.	A tubeworm
Protula tubularia	A bristleworm
Pseudosuberites sp.	A sponge
Pterothamnion plumula	A red algae
Raspailia ramosa	A branching sponge
Rhodymenia ardissonei	A red algae
Sabella sp.	A worm
Salmacina dysteri	A coral worm
Scalpellum scalpellum	A stalked barnacle
Schizobrachiella sanguinea	A bryozoans
Scypha ciliata	A sponge
Sertularella gayi	A hydroid
Sertularella polyzonias	A hydroid
Sidnyum elegans	A colonial seasquirt

Stelligera rigida	A branching sponge
Stelligera sp.	A branching sponge
Stolonica socialis	Orange sea grapes
Suberites carnosus	A sponge
Suberites pagurorum	A sponge
Tethya citrina	A sponge
Thorogobius ephippiatus	Leopard spotted goby
Thyone roscovita	A sea cucumber
Trapania pallida	A sea slug
Tritonia lineata	A sea slug
Tritonia nilsodhneri	A sea slug
Trivia monacha	Spotted cowrie

Listed species and biotopes may be reviewed to reflect new evidence / survey results.

Table 3

Mackerel Cove to Dartmouth Bedrock Reef Communities

Mackerel Cove to Dartmouth Bedrock Reef Communities Source: Cork et al., 2008; Ross, 2011; Vanstaen & Eggleton, 2011	
Key Biotopes	**Definition**
CR.HCR.XFa	Mixed faunal turf communities on circalittoral rock
IR.MIR.KR.LhypT	*Laminaria hyperborea* on tide swept infralittoral rock
IR.HIR.KFaR.FoR	Foliose red seaweeds on exposed lower infralittoral rock.
Key Species	**Common name**
Abietinaria abietina	A hydroid
Actinothoe sphyrodeta	Sandalled anemone
Alcyonium digitatum	Dead man's fingers
Amphilectus fucorum	A sponge
Antedon bifida	Rosy feather star
Asterias rubens	Common starfish
Buccinum undatum	Common whelk
Caryophyllia inornata	Southern cup coral
Cellaria fistulosa	A bryozoan
Cereus pedunculatus	Daisy anemone
Chaetoptera sp.	A worm
Cliona celata	A boring sponge
Corynactis viridis	Jewel anemone
Didemnum sp.	A sea squirt
Electra pilosa	A bryozoan
Eunicella verrucosa	Pink sea fan
Halecium halecinum	Herring-bone hydroid
Haliclona cinerea	A sponge
Laminaria sp.	Kelp
Laminaria hyperborea	Tangle or Cuvie
Macropodia tenuirostris	Spiny spider crab
Maja squinado	Common spider crab
Metridium senile	Plumose anemone
Mytilus edulis	Common mussel
Necora puber	Velvet swimming crab

Nemertesia antennina	Sea beard
Nemertesia ramosa	A hydroid
Nemertesia sp.	A hydroid
Obelia sp.	A hydroid
Okenia elegans	Yellow skirt slug
Pachymatisma johnstonia	A sponge
Parasmittina trispinosa	A bryozoan
Phycodrys rubens	A red seaweed
Rhodophyta sp.	A red algae
Tubularia indivisa	Oaten pipes hydroid
Urticina felina	Dahlia anemone

Listed species and biotopes may be reviewed to reflect new evidence / survey results.

Table 4

Mackerel Cove to Dartmouth Stony Reef Communities

Mackerel Cove to Dartmouth Stony Reef Communities	
Key Biotopes	**Definition**
NB: Biotopes to be determined	
Key Species	**Common name**
NB: Species to be determined	

Listed species and biotopes may be reviewed to reflect new evidence / survey results.

Table 5

Mackerel Cove to Dartmouth Biogenic Reef Communities

Mackerel Cove to Dartmouth Biogenic Reef Communities	
Key Biotopes	**Definition**
NB: Biotopes to be determined	
Key Species	**Common name**
Mytilus edulis	Common mussel

Listed species and biotopes may be reviewed to reflect new evidence / survey results.

Table 6

Mackerel Cove to Dartmouth Sea Cave Communities

Mackerel Cove to Dartmouth Sea Cave Communities **Source: Vanstaen & Eggleton, 2011; Cork et al., 2008**	
Key Biotopes	**Definition**
CR.FCR.Cv.SpCup	Sponges, cup corals and anthozoans on shaded or overhanging circalittoral rock
IR.FIR.SG.CC	Coralline crusts in surge gullies and scoured infralittoral rock
IR.FIR.SG.CC.BalPom	*Balanus crenatus* and/or *Pomatoceros triqueter* with spirorbid worms and coralline crusts on severely scoured vertical infralittoral rock
IR.FIR.SG.CC.Mo	Coralline crusts and crustaceans on mobile boulders

	or cobbles in surge gullies
IR.FIR.SG.CrSp	Crustose sponges on extremely wave-surged infralittoral cave or gully walls
IR.FIR.SG.CrSpAsAn	Anemones, including *Corynactis viridis*, crustose sponges and colonial ascidians on very exposed or wave surged vertical infralittoral rock
IR.FIR.SG.CrSpAsDenB	Crustose sponges and colonial ascidians with *Dendrodoa grossularia* or barnacles on wave-surged infralittoral rock
IR.FIR.SG.DenCor	*Dendrodoa grossularia* and *Clathrina coriacea* on wave-surged vertical infralittoral rock
IR.FIR.SG.FoSwCC	Foliose seaweeds and coralline crusts in surge gully entrances
Key Species	**Common name**
Alcyonium hibernicum	Pink sea fingers
Caryophyllia inornata	Southern cup coral
Edwardsia sp	An anemone
Hoplangia durotrix	Weymouth carpet coral
Thymosia guernei	A sponge

Listed species and biotopes may be reviewed to reflect new evidence / survey results.

Table 7

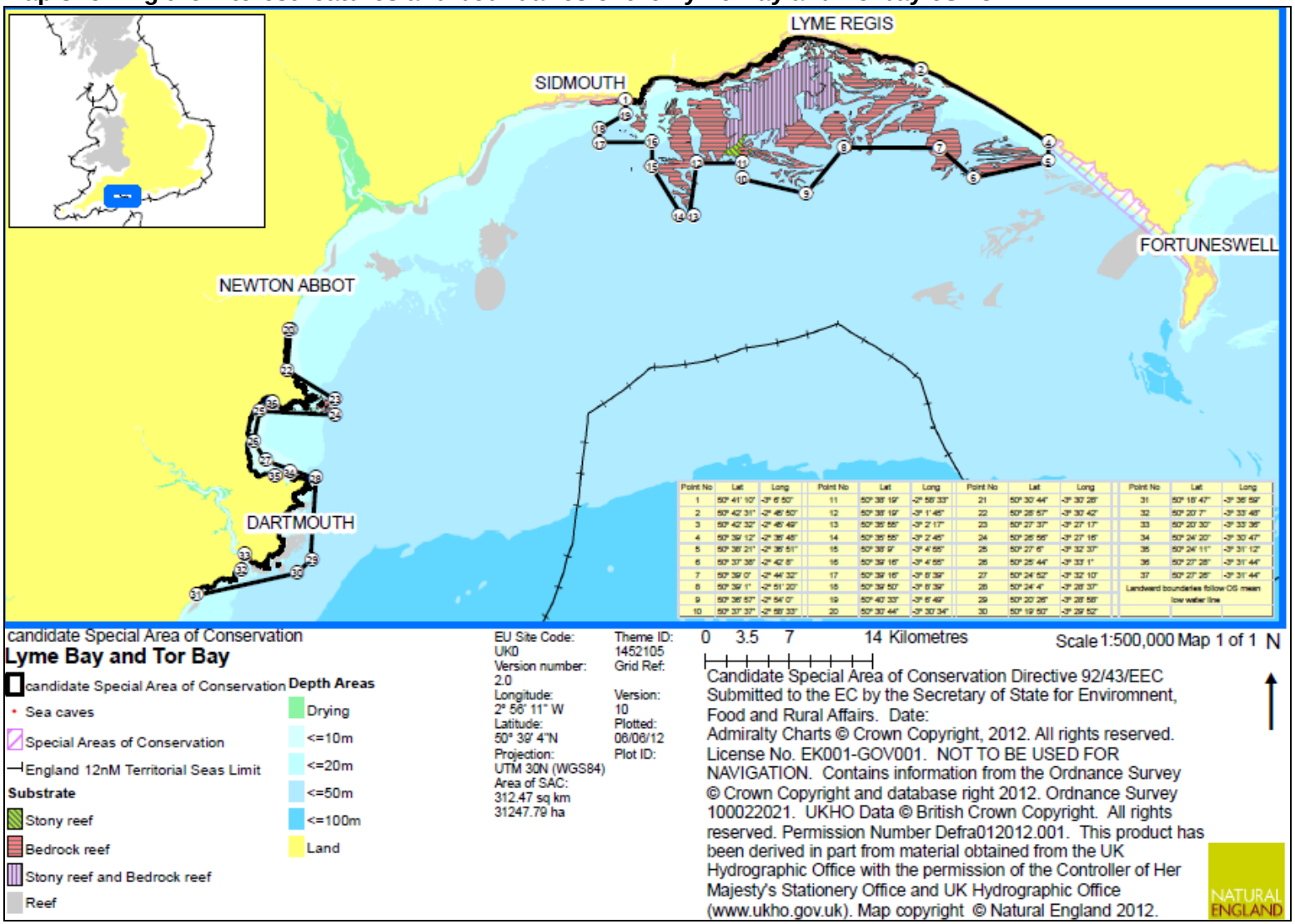
Mackerel Cove to Dartmouth Sea Caves

Mackerel Cove to Dartmouth Sea Cave Locations	
Name	**Grid Reference**
Mackerel Cove Sea Caves	SX 930 691
Watcombe Sea Caves	SX 928 677
Smugglers Hole	SX 927 671
Shag Cliff Caves	SX 927 668
Petit Tor Caves	SX 927 662
Babbacombe Sea Caves	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

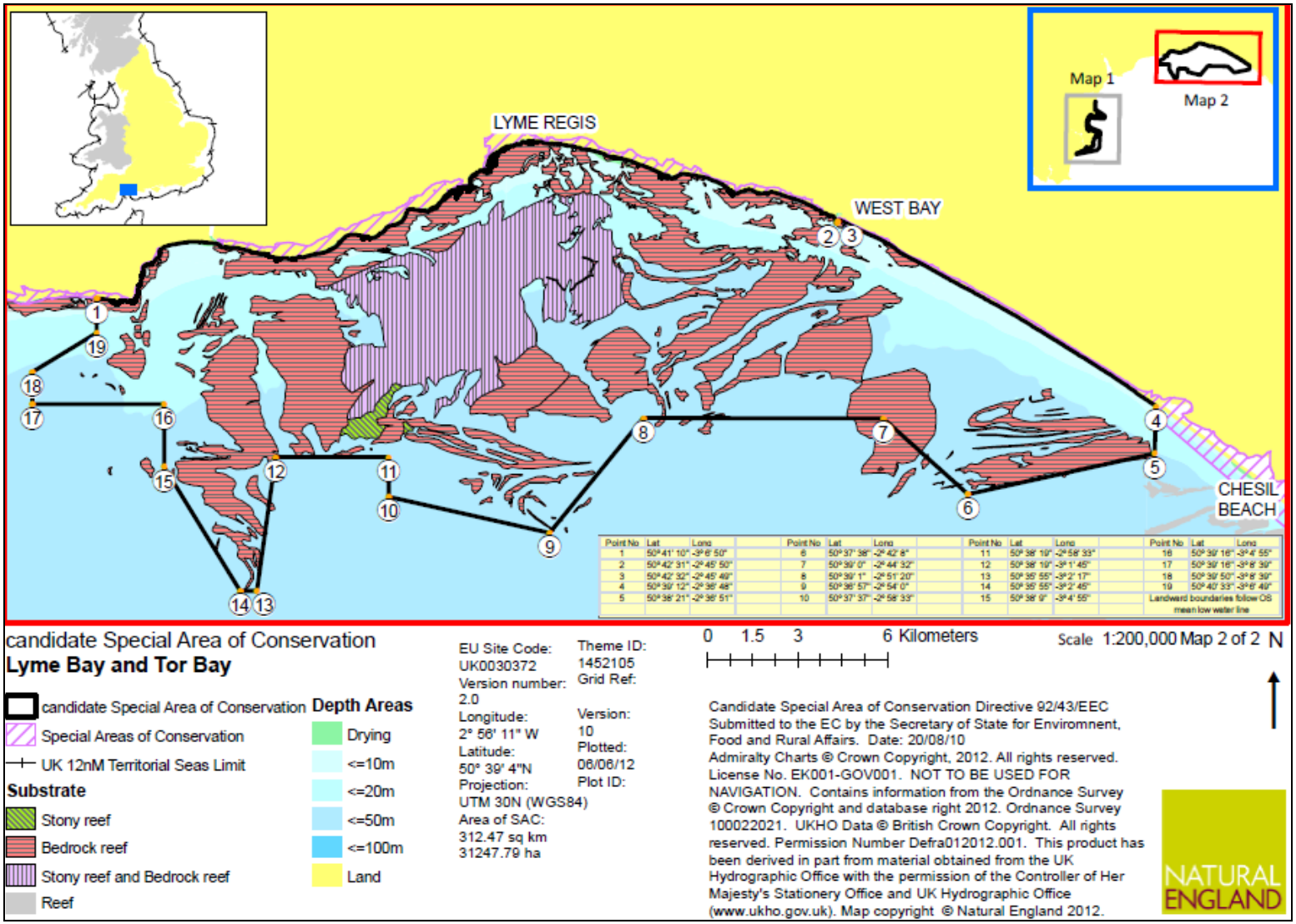
Stated sea caves reflect the sea caves listed in Lyme Bay and Torbay Selection Assessment Document (Natural England, 2010). Caves represent those caves in the site with an element below MLW. Twenty four caves are listed, but many represent a cave complex, rather than one individual cave. The sea caves within the cSAC will be subject to further survey work in 2011.

Appendix B

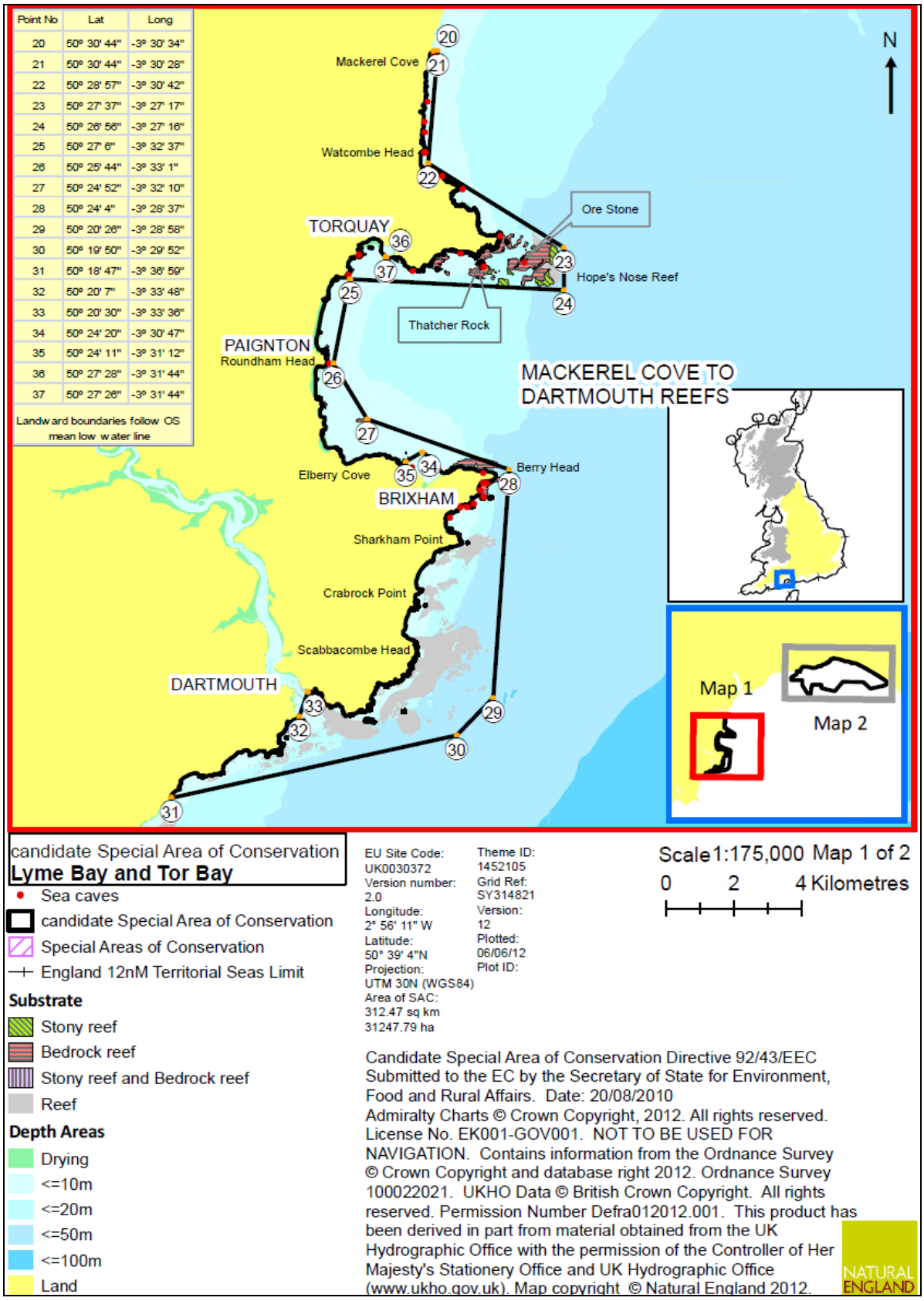
Map showing the interest features and boundaries of the Lyme Bay and Torbay cSAC



Map showing the interest features within Lyme Bay



Map showing the interest features within Torbay



Appendix C

Methods for deriving vulnerability

Sensitivity[25]	
None	-
Low	•
Moderate	••
High	•••

Exposure	
None	-
Low	+
Medium	++
High	+++

Vulnerability
None detectable
Low
Moderate
High

The relative vulnerability of an interest feature or sub-feature is determined by multiplying the scores for relative sensitivity and exposure, and classifying that total into categories of relative vulnerability. For the reef sub-features the sensitivity is as defined by MarLIN (2011). The sensitivity assessment for each activity in Appendix D for the sub-feature uses the highest (i.e. most precautionary) sensitivity for the range of biotopes and species used to define this sub-feature, where more than one biotope or species is related to a sub-feature (see Appendix F for list of biotopes and species sub-features consist of, and for which sensitivity assessments are available for).

		Relative sensitivity of the interest feature			
		High (3)	**Moderate (2)**	**Low (1)**	**None detectable (0)**
Relative exposure of the interest feature	**High (3)**	9	6	3	0
	Medium (2)	6	4	2	0
	Low (1)	3	2	1	0
	None (0)	0	0	0	0

Categories of relative vulnerability	
High	6-9
Moderate	3-5
Low	1-2
None detectable	0

[25] Where sensitivities in MarLIN are defined as 'Very Low' they are classified here as 'Low'. Where sensitivities in MarLIN are defined as 'Very High' they are classified here as 'High'.

Appendix D

Summary of pressures which may cause deterioration or disturbance to Lyme Bay and Torbay cSAC

Pressures which may cause deterioration or disturbance	Lyme Bay & Torbay reefs (Bedrock, Stony & Biogenic)	Mackerel Cove to Dartmouth Sea Caves
Physical loss		
Removal (e.g. capital dredging, offshore development)	✓	
Smothering (e.g. by aggregate dredging, disposal of dredge spoil)	✓	
Physical damage		
Siltation (e.g. run-off, channel dredging, outfalls)	✓	
Abrasion (e.g. boating, anchoring, demersal fishing)	✓	✓
Selective extraction (e.g. aggregate dredging)		
Non-physical damage		
Noise (e.g. boat activity)		
Visual (e.g. recreational activity)		
Toxic contamination		
Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs)	✓	**(✓)**
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	✓	**(✓)**
Introduction of radionucleotides	**(✓)**	**(✓)**
Non-toxic contamination		
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	✓	**(✓)**
Changes in organic loading (e.g. mariculture, outfalls)	✓	✓
Changes in thermal regime (e.g. power stations)		
Changes in turbidity (e.g. run-off, dredging)	✓	
Changes in salinity (e.g. water abstraction, outfalls)		(✓)
Biological disturbance		
Introduction of microbial pathogens	✓	**(✓)**
Introduction of non-native species and translocation	✓	✓
Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	✓	

(✓) represents where there is currently insufficient information to either determine the sensitivity of the habitat or the exposure of the habitat to the stated operation.

Appendix E

Assessment of the relative vulnerability of interest features and sub-features of the Lyme Bay and Torbay cSAC to different categories of pressures (see Appendix C for key).

Relative sensitivity of the interest feature

Relative exposure of the interest feature	**High (3)**	**Moderate (2)**	**Low (1)**	**None detectable (0)**
High (3)	9	6	3	0
Medium (2)	6	4	2	0
Low (1)	3	2	1	0
None (0)	0	0	0	0

Pressures which may cause deterioration or disturbance	**Lyme Bay & Torbay Annex 1 Reefs**									**Torbay Annex 1 Sea Caves**		
	Bedrock reef			**Stony reef**			**Biogenic reef**			**Sea Caves**		
	Sensitivity	**Exposure**	**Vulnerability**	**Sensitivity**	**Exposure**	**Vulnerability**	**Sensitivity**	**Exposure**	**Vulnerability**	**Sensitivity**	**Exposure**	**Vulnerability**
Physical loss												
Removal (e.g. harvesting, coastal development)	●●●	-	-	●●●	+	Moderate	●●	-	-	●●●	-	-
Smothering (e.g. by artificial structures, disposal of dredge spoil)	●●●	+	Moderate	●●●	+	Moderate	●	+	Low	●●●	-	-
Physical Damage												
Siltation(e.g. run off, channel dredging, outfalls)	●●●	+	Moderate	●●●	+	Moderate	-	+	-	-	+	-

	Bedrock reef			Stony reef			Biogenic reef			Sea caves		
Physical damage cont.	**Sensitivity**	**Exposure**	**Vulnerability**	**Sensitivity**	**Exposure**	**Vulnerability**	**Sensitivity**	**Exposure**	**Vulnerability**	**Sensitivity**	**Exposure**	**Vulnerability**
Abrasion (e.g. boating, anchoring, trampling)	•••	+	Moderate	•••	+	Moderate	•	+	Low	•••	+	Moderate
Selective extraction (e.g. aggregate dredging)	•••	-	-	•••	-	-	•	-	-	•••	-	-
Non Physical Damage												
Noise (e.g. boat activity)	-	+	-	-	+	-	-	+	-	-	-	-
Visual (e,g, recreational activity)	-	+	-	-	+	-	-	+	-	-	-	--
Toxic Contamination												
Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs)	••	++	Moderate	••	++	Moderate	•	++	Low	Insufficient information	++	Insufficient information
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	••	++	Moderate	••	++	Moderate	•	++	Low	Insufficient information	++	Insufficient information
Introduction of radionucleotides	•	-	-	•	-	-	Insufficient information	-	-	Insufficient information	-	Insufficient information
Non-toxic Contamination												
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	••	+	Low	•	+	Low	•	+	Low	Insufficient information	+	Insufficient information

	Bedrock reef			Stony reef			Biogenic reef			Sea Caves		
	Sensitivity	**Exposure**	**Vulnerability**	**Sensitivity**	**Exposure**	**Vulnerability**	**Sensitivity**	**Exposure**	**Vulnerability**	**Sensitivity**	**Exposure**	**Vulnerability**
Changes in organic loading (e.g. mariculture, outfalls)	•••	+	Moderate	•••	+	Moderate	•	+	Low	•••	+	Moderate
Changes in thermal regime (e.g. power stations)	•••	-	-	•	-	-	•	-	-	-	-	-
Changes in turbidity (e.g. run-off, dredging)	••	+	Low	•	+	Low	•	+	Low	-	+	-
Changes in salinity (e.g. water abstraction, outfalls)	•••	-	-	•••	-	-	•	-	-	•••	Insufficient information	Insufficient information
Biological Disturbance												
Introduction of microbial pathogens	•	+	Low	•	+	Low	•	+	Low	Insufficient information	-	-
Introduction of non-native species and translocation	••	++	Moderate	••	++	Moderate	••	++	Moderate	•	+	Low
Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	•••	+	Moderate	••	++	Moderate	•	++	Low	•••	-	-

Appendix F

Lyme Bay and Torbay cSAC Species and Biotopes used to determine site sensitivity

Lyme Bay and Torbay cSAC Species and Biotopes used to determine site sensitivity	
Bedrock Reefs	**Description / Common name**
CR.HCR.Xfa.ByErSp.Eun	*Eunicella verrucosa* and *Pentapora fascialis* on wave-exposed circalittoral rock
IR.HIR.Kfar.LhypR	*Laminaria hyperborea* with dense foliose red seaweeds on exposed infralittoral rock
IR.HIR.KFaR.FoR	Foliose red seaweeds on exposed lower infralittoral rock
CR.FCR.Cv.SpCup (CR.FCR.Cv used)	Circalittoral caves and overhangs
Alcyonium digitatum	Dead man's fingers
Antedon bifida	Rosy feather-star
Asterias rubens	Common starfish
Axinella dissimilis	A branching sponge
Botryllus schlosseri	Star ascidian
Ciona intestinalis	A sea squirt
Clavelina lepadiformis	Lightbulb sea squirt
Delesseria sanguinea	Sea beech
Echinus esculentus	Edible sea urchin
Eelctra pilosa	A bryozoan
Eunicella verrucosa	Pink sea fan
Flustra foliacea	A bryozoan
Halichondria panicea	Breadcrumb sponge
Henricia oculata	Bloody Henry starfish
Laminaria hyperborea	Tangle / Cuvie
Leptopsammia pruvoti	Sunset cup coral
Metridium senile	Plumose anemone
Mytilus edulis	Common mussel
Nemertesia ramosa	A hydroid
Pentapora fascialis	Ross
Pisidia longicornis	Long-clawed porcelain crab
Urticina feline	Dahlia anemone
Stony reefs	
Alcyonium digitatum	Dead man's fingers
Asterias rubens	Common starfish
Axinella dissimilis	A branching sponge
Balanus crenatus	Acorn barnacle
Botryllus schlosseri	Star ascidian
Bugula turbinata	An erect bryozoan
Ciona intestinalis	A sea squirt
Clavelina lepadiformis	Lightbulb sea squirt
Eunicella verrucosa	Pink sea fan

Pentapora fascialis	Ross
Mackerel Cove to Dartmouth Biogenic Reefs	
Mytilus edulis	Common mussel
Mackerel Cove to Dartmouth Sea caves	
CR.FCR.Cv.SpCup (CR.FCR.Cv used)	Sponges, cup corals and anthozoans on shaded or overhanging circalittoral rock