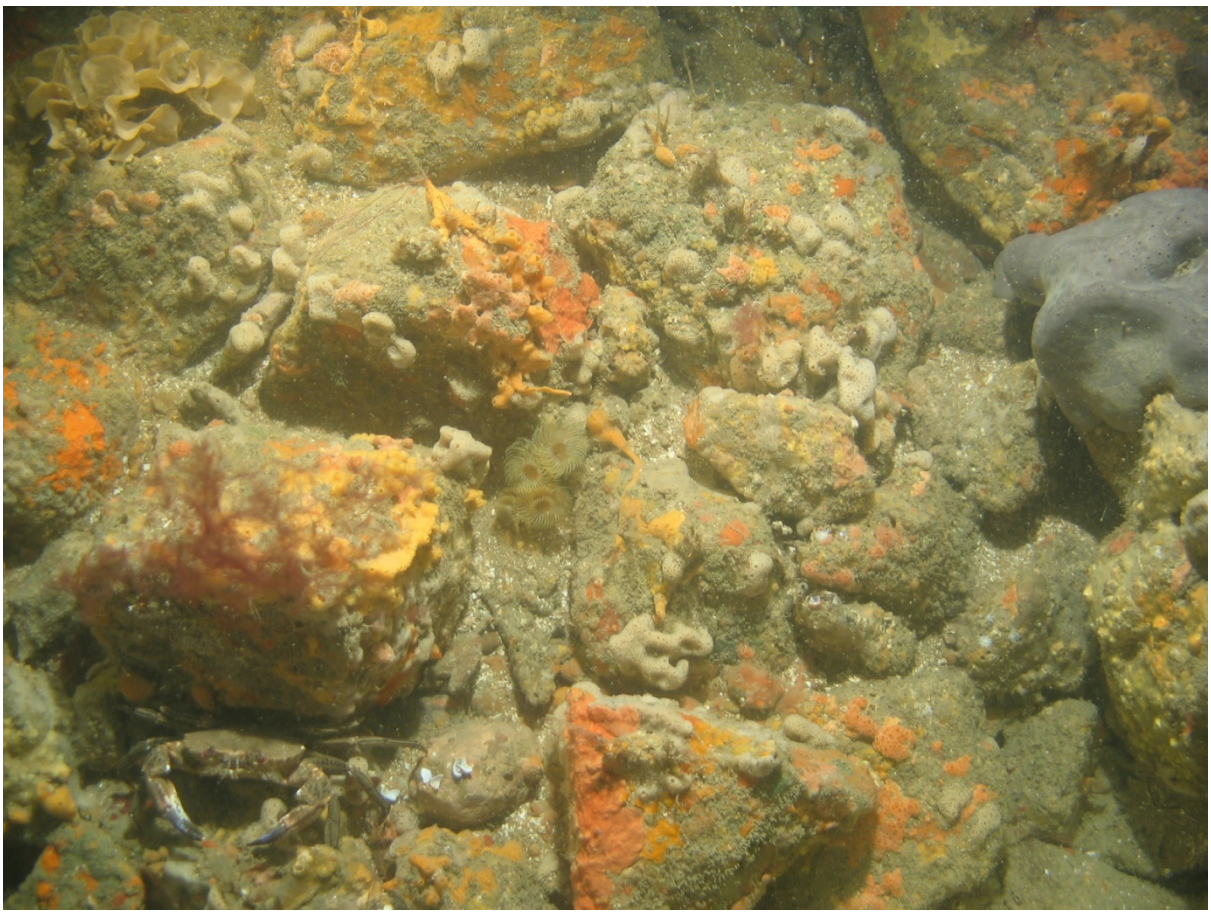
Studland to Portland candidate Special Area of Conservation

Formal Advice under Regulation 35 (3) of the Conservation of Habitats and Species Regulations 2010 (as amended)



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Version	Author	Amendments made	Issued to and date
6.5	Stephanie Ashman	Changes made to incorporate sign off comments.	Publication on website.
6.4	Stephanie Ashman	Changes made to incorporate IER comments.	Caroline Cotterell for sign off., 26th March 2013.
6.3	Stephanie Ashman	Minor changes made to incorporate QA comments.	Independant Expert Review – Matthew Frost & Roger Morris. February 2013.
6.2	Stephanie Ashman	Reconfiguration of sub-features (following further analysis of evidence) and incorporation of mussel beds into bedrock reef sub-feature.	Mark Duffy for Internal QA 30th January 2013
6.1	Stephanie Ashman	Changes made to incorporate QA comments.	Relevant and competent authorities for informal dialogue.
6.0	Stephanie Ashman	Changes to definition of sub-features following further analysis of evidence, alterations to FCTs and amendment of text to reflect cSAC status of site.	Mark Duffy, Kathryn Dawson and Chris Pirie 30th November 2012
5.1	Stephanie Ashman	Updated to incorporate QA comments, ensure consistency with Lyme Bay to Torbay Reg 35 package and amendments to the Reg 35 protocol, altered to reflect August 2012 amendments to Habs Regs.	
5.0	Stephanie Ashman	Post consultation boundary changes, amendments to species and biotopes with associated text change.	Mark Duffy for QA 1st June 2011
4.0		Minor changes. Minor changes also following issue to Director Marine, then dated 22/03/2011 and submitted to Defra.	James Marsden Director Marine, 16th February 2011. Issued to Defra 22/03/2011
3.0		Reflects Studland to Portland site only. Update biotopes and removal of stony reef and sea caves from attributes table (not found in Studland to Portland site). Updated format to reflect that for revised Lyme Bay and Torbay conservation advice.	Joanna Redgwell (N2K project manager) and Robert Enever (Evidence team) 21st January 2011
Poolebay_to_lymebay_cons_obs_101109		Change in status from dSAC to pSAC	Formal consultation November 2009
Poolebay_to_lymebay_cons_obs_110609		-	Informal dialogue (11/06/09)

Please note:

As a result of the 2009/10 public consultation exercise on the Poole Bay to Lyme Bay possible Special Area of Conservation (pSAC), the site was split into two separate sites. The Lyme Bay component was renamed Lyme Bay and Torbay; the Poole Bay component renamed Studland to Portland and was subject to further public consultation from 1st September to 24th November 2011. Consequently, this document, along with the Lyme Bay & Torbay cSAC Regulation 35 package, supersedes all previous draft conservation advice for Poole Bay to Lyme Bay pSAC in addition to any previous versions of the conservation advice for Studland to Portland pSAC.

Further information

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Studland to Portland candidate Special Area of Conservation

Formal Advice under Regulation 35 (3)

Contents

1. Introduction

This document contains Natural England's formal advice for Studland to Portland candidate Special Area of Conservation (cSAC) given under Regulation 35(3)[1] of the Conservation of Habitats and Species Regulations 2010[2] (as amended[3]). It supersedes the previous draft conservation advice for Studland to Portland cSAC and 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 original site was split into two separate sites[4]. The Lyme Bay component was renamed Lyme Bay and Torbay; and the Poole Bay component renamed Studland to Portland. A formal public consultation for this site was carried out in 2011.

Studland to Portland was formally submitted by the Government to the European Commission as a cSAC on 5th September 2012. Once the site is adopted by the European Commission it will become a Site of Community Importance (SCI). The UK Government then 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[5] (transposed through the Conservation of Habitats and Species Regulations 2010 (as amended) and the Offshore Marine Conservation Regulations (Natural Habitats, &c.) (Amendment) Regulations 2012[6] (herein referred to as the 'Habitats Regulations'). Amongst other things, the Habitats Regulations place an obligation on relevant authorities[7] to put in place measures to protect sites from damage or deterioration.

This document fulfils Natural England's duty under Regulation 35(3)[8] of The Habitats Regulations, to advise relevant authorities as to (a) the conservation objectives for Studland to Portland: and (b) any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which Studland to Portland is 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[9] can fulfil their duties under the Habitats Regulations in making the necessary determinations on the impact of

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

[2] http://www.legislation.gov.uk/uksi/2010/490/contents/made

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

[4] Studland to Portland pSAC was originally a component of Poole Bay to Lyme Bay pSAC that was consulted on from November 2009 until February 2010. During the consultation, evidence came to light that the boundary of the site should be changed. The site was split into two and the westerly part, Lyme Bay and Torbay candidate SAC (cSAC), was submitted to the EC for designation in August 2010. Because significant boundary changes were proposed to the easterly part of the site, Studland to Portland, Natural England recommended that it should be made available for further consultation.

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

[6] http://www.legislation.gov.uk/uksi/2012/1928/contents/made

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

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

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

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[10] for Studland to Portland cSAC.

An independent review[11] 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 modify their approach to future evidence based work. This resulted in Natural England adopting the Government Chief Scientific Adviser's (GCSA) guidelines[12] on using evidence, through the development of a suite of Evidence Standards[13]. Implementation of these standards has included Natural England working with JNCC to develop a protocol[14], 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[15].

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[16] 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 the summer of 2013 on a prioritised basis. In due course we will use the 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 Directives into law in England and Wales. They give Natural England a statutory responsibility to advise relevant authorities on (i) the conservation objectives for cSACs, SACs and SPAs in England and (ii) operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species for which the sites have been designated.

[10] http://publications.naturalengland.org.uk/file/3284332

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

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

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

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

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

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

Natural England will provide additional advice for each site, as required, to relevant authorities 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.

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)[17]).

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[18] & 62[19]. Competent authorities also have duties under Regulations 69[20] & 70[21] 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[22] 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[23] 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.

[17] http://www.legislation.gov.uk/uksi/2010/490/regulation/9/made
[18] http://www.legislation.gov.uk/uksi/2010/490/regulation/61/made
[19] http://www.legislation.gov.uk/uksi/2010/490/regulation/62/made
[20] http://www.legislation.gov.uk/uksi/2010/490/regulation/69/made
[21] http://www.legislation.gov.uk/uksi/2010/490/regulation/70/made
[22] SACs and SPAs are together referred to as Natura 2000 sites or (in the marine environment) European Marine Sites.
[23] http://www.legislation.gov.uk/uksi/2010/490/regulation/36/made

2.3 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. They 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 Role of advice on operations

The advice on operations, set out in Sections 4 and 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 will 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 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 further supplemented through ongoing 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. 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

As explained above, the conservation objectives and definitions of favourable condition for features on the site may inform the scope and nature of any 'appropriate assessment' under the Habitats Regulations[24]. 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.

[24] Regulation 61 and 63 by a competent authority and Regulation 21 by Natural England

Following an appropriate assessment, relevant authorities are required to ascertain the effect of proposals on the integrity of the site. The integrity of the site is defined in paragraph 20 of ODPM Circular 06/2005 (ODPM 2005) [25] 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.

The conservation objectives for this site are provided in accordance with paragraph 17 of ODPM Circular 06/2005 (ODPM 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 Studland to Portland cSAC conservation objectives

The conservation objectives for Studland to Portland cSAC interest features are provided in Section 3.2.4. These are high-level objectives for the site features, and Natural England may refine them in the future as our understanding of the features improves and further information becomes available, such as survey data. They should be read in the context of other advice given, particularly:

- the Selection Assessment Document for the Studland to Portland 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 map (Appendix B), which show the known locations of the interest features.

3.2.1 Importance of features

Studland to Portland cSAC has been formally submitted to the European Commission for its Annex 1 reef features.

Video and photographic analysis (Axelsson et al., 2011) combined with extensive diver survey data[26] indicate that the majority of the reef habitat within the site is of excellent quality and structure. Although the Annex 1 reef within the site comprises less than 1% of the UK extent, it was identified for designation due to the outstanding diversity of its reef habitats and the excellent conservation value these provide on an international scale[27].

The site is very geologically diverse and there are numerous reef forms within the cSAC area. The site boundary encloses 33,191.09 hectares (ha), comprising an area of Annex 1 reef habitat of approximately 19,368.83 ha, which is 58.36% of the total site area (see Appendix B).

[25] http://www.communities.gov.uk/documents/planningandbuilding/pdf/147570.pdf

[26] Seasearch survey data 1995-2011

[27] Studland to Portland cSAC Selection Assessment Document Version 4.1

The Studland to Portland cSAC comprises of two sections (see map in Appendix B) with varying yet distinct geology and geomorphology:

- Studland Bay to Ringstead Bay Reefs
- Portland Reefs

Studland Bay to Ringstead Bay Reefs

Numerous areas of reef (in many forms) exist within the Studland Bay to Ringstead Bay area. The reefs exhibit a large amount of geological variety, ranging from exposed chalk bedrock between Ballard Cliffs and Handfast Point in the east of the site, through to exposed shales and clays, limestone and cementstone ledges, boulders around Kimmeridge to Durlston, and back to exposed chalk bedrock east of Ringstead Bay. The range in rock type and character provides for a variety of reef habitat, including:

- Soft chalk bedrock reef occurring between Ballard Cliffs and Handfast Point;
- Evan's Rock, which is a gently sloping mound in the outer limits of Swanage Bay. The mound has a flat top covered with small, slab-like boulders and cobbles, separated by small areas of shelly sand.
- St. Albans ledge, which is a unique reef feature extending out over 10km offshore. The feature is subject to strong tidal action, which has scoured depressions up to 60m deep in some areas;
- An area of large limestone blocks known as the "seabed caves" located east of St Albans ledge;
- A series of limestone ledges (up to 15m across) south of Worbarrow Bay that supports populations of the pink sea fan *Eunicella verrucosa*;
- A distinct area of reef known as Lulworth Banks comprising a mosaic of habitat types, including rocky ledges, sediment covered rock and mixed sediments.

Portland Reefs

The Portland Reefs area surrounds Portland Bill and is characterised by flat bedrock, limestone ledges (Portland stone), large boulders and cobbles. Diver surveys[28] on the western side of Portland Bill have recorded very large, rugged limestone boulders on flat bedrock with mixed sediments. The mosaic of habitats provides deep gullies and overhangs, which support a diverse range of marine life including cup corals, sponges, anemones, nudibranchs and hydroids. The boulders and ledges occur where the eroded coastal cliffs of Portland extend underwater.

South of Portland Bill, another steep, dramatic drop off has been formed which runs south west of the Bill and extends to depths of over 80m. These reefs are exposed to extremely strong tides and scour action.

Dense mussel (*Mytilus edulis*) beds are found to occur on bedrock associated with strong currents off the eastern side of Portland Bill. *Mytilus edulis* also occurs in high numbers in the infralittoral zones of the eastern reefs amongst kelp forests.

3.2.2 Reefs

Habitats Directive Definition

Reefs are defined as 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

[28] Seasearch survey data 1995-2011

transition into the intertidal (littoral) zone, where they are exposed to the air at low tide. A variety of subtidal seafloor features may be 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, therefore restricting their distribution and extent (Brown *et al*., 1997).

Geogenic reef types are extremely variable, both in structure and in the communities they support. The specific communities that occur are dependent on four key forcing factors:

(i) Exposure: scour and disturbance due to wave and tidal action have a major effect on community structure;

(ii) Lithology (rock type): for example, communities on hard granite reefs will be markedly different to those occurring on softer chalk reefs whose surface may erode more quickly but will offer more opportunities for species which bore into rock, such as anemones, piddocks and some species of sponge;

(iii) Light intensity: this decreases with depth so will have a major effect on which groups of marine life dominate the communities, i.e. seaweeds rely on light for photosynthesis. Consequently, shallow water communities are dominated by seaweeds, whilst deeper rock surfaces where light levels are low are colonised purely by sessile (attached) animals.

(iv) Turbidity: in turbid waters, light penetration is low and algae can occur only in shallow depths or in the intertidal zone. However, 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 relative to seawater temperature, with warm temperate species such as *Eunicella verrucosa* (found within the Studland to Portland cSAC) only occurring in southern waters[29].

There are three main types of Annex I reef: bedrock reef; stony reef[30] (bedrock and stony reef can be collectively referred to as geogenic reef); and biogenic reef.

Current evidence shows bedrock reef and stony reef are present within Studland to Portland cSAC (Cork *et al.,* 2008; Axelsson *et al*., 2011).

3.2.3 Key reef sub-features of Studland to Portland cSAC

The Studland to Portland sub-features have been identified from the following reports: Cork et al., 2008 and Axelsson *et al.,* 2011.

Sub-feature 1: Bedrock reef

Bedrock reef are areas of raised or protruding rock colonised by a suite of plants and animals. A transition of communities can occur from the near surface sunlit zone, dominated by plants such as kelp and red seaweeds, to the deeper waters where a variety of animals inhabit the reef, including echinoderms, sponges, corals, anemones, bryozoans and crustaceans. Bedrock reef is the dominant reef type throughout the Studland to Portland

[29] http://jncc.defra.gov.uk/protectedsites/sacselection/habitat.asp?FeatureIntCode=H1170

[30] 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.

cSAC. It occurs in a variety of complex geomorphologic forms, including exposed chalk bedrock; exposed shales and clays; limestone and cementstone ledges; flat bedrock; areas of fragmented rock; and rugged limestone boulders providing deep gullies and overhangs (Axelsson *et al.,* 2011; Cork *et al.,* 2008), creating a range of diverse habitats.

The biological communities in these areas of bedrock reef are dominated by bryozoans, hydroids, sponges and sea squirts (Axelsson *et al.,* 2011) with extensive and diverse algae communities in the shallower regions. The reefs support a diverse range of species, including the pink sea fan (*Eunicella verrucosa*) - a long-lived, slow growing coral - as well as the pink sea fan sea slug (*Tritonia nilsodhneri)*; the large potato crisp bryozoa (*Pentapora fascialis);* and a range of cup coral species. The rocky ledges in the St Albans and Kimmeridge area, which are composed of hard rock undercut by softer geology, support communities of diverse, dense red algae, burrowing piddocks (*Pholadidae.)* and anemones such as the daisy anemone (*Cereus pedunculatus)* and the nationally scarce but locally frequent trumpet anemone (*Aiptasia mutabilis*). A wide variety of both encrusting and erect branching sponges have been recorded on the bedrock reef, species include the elephant hide sponge (*Pachymatisma johnstonia),* the locally very frequent goosebump sponge (*Dysidea fragilis*) as well as a variety of erect branching sponges such as the yellow staghorn sponge (*Axinella dissimilis)*, *Raspailia hispida* and *Raspailia ramosa,* as well the rarely recorded *Adreus fascicularis*. See Table 2 in appendix A for a full list of key biotopes and species. Other biological communities of interest include Ampelisca amphipod mats on Evans Rock in Swanage Bay, and between Broad Bench and Kimmeridge Bay (Axelsson *et al.,* 2011). Brittlestar beds dominated by *Ophiothrix fragilis* have also been recorded off of Broad Bench and St Alban's Ledge (Axelsson *et al.,* 2011).

Extensive mussel (*Mytilus edulis*) beds are present in the Portland reefs area of the site (Cork *et al.,* 2008; Axelsson *et al*., 2011; Collins, K., 2012). Video footage (Axelsson *et al.,* 2011 and Collins, K., 2012) show the beds are comprised of predominantly mature mussels but in some areas are dominated by juvenile spat. Associated species include the common starfish (*Asterias rubens*) and very large whelks (*Buccinium undatum*).

Sub-feature 2: Stony reef

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

Colourful encrusting sponges form a large component of the communities on the stony reefs. Bryozoans are abundant in this habitat and include colourful bryozoan crusts as well as the larger, foliose potato crisp bryozoan (*Pentapora fascialis).* In addition to the important sponge crusts found binding the stony reef together, there are occasional, erect branching species and low growing sponges such as the elephant hide (*Pachymatisma johnstonia)*, goosebump sponge (*Dysidea fragilis*) and pink crater sponge (*Hemimycale columella)*. Tunicates with a covering of sediment are also a key group in the faunal turf that covers the stony reef, as are hydroids, barnacles and keel worms. Anemones are occasionally present as are filamentous red algae, small scallops and tube forming polychaete worms such as the double spiral worm (*Bispira volutacornis).* See Table 2 in appendix A for a full list of key biotopes and species.

3.2.4 The conservation objectives for Studland to Portland cSAC Annex I Reefs:

Subject to natural change[31], maintain[32] the reefs in favourable condition[33], in particular the sub-features:

- Bedrock reef communities
- Stony reef communities

Favourable condition of the reefs will be determined by assessing that the following are maintained within the site, subject to natural change:

1. Extent of the habitat.
2. Diversity of the habitat and 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)

3.3 Background to favourable condition tables

A 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 in appendix A.

On many terrestrial European sites, we know sufficient information 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, makes it much more difficult to define favourable condition precisely. In general the conservation objectives provided are based on a working assumption that the current condition of the features is favourable for most attributes. Nevertheless there may be instances where the assumption may not apply and will need to be tested as further empirical evidence on feature condition is collected.

[31] **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. For example, storm events are known to regularly result in the breakdown of reef kelp forest communities..

[32] **Maintain** implies that existing evidence suggests the feature is 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 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 be required.

[33] **Favourable condition** relates to the maintenance of the structure, function, and typical species for that feature within the site.

Where there are more than one year's observations on the condition of marine habitats, all available 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 actions will need to be taken. The aim of such action would be to return the interest feature to favourable condition. Future editions of the advice within this document will revise the current assumptions about feature condition in light of ongoing and future monitoring. This will be linked with any developments in our understanding of the structure and functioning of features and the pressures they are exposed to.

This advice will form 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 an attribute in its entirety may be relatively broad, but underpinned by more rigorous methods at specific areas within the site. Common Standards Monitoring (JNCC, 2004) requires mandatory monitoring of some attributes of a designated feature, while monitoring of other attributes is considered discretionary (or site specific) and may be incorporated to highlight local distinctiveness. Priority will initially be given to those attributes that demonstrate an interest feature to be at risk from anthropogenic pressure and for which changes in management may need to be considered. This information may be generated by Natural England or collected by other organisations through agreements.

The favourable condition table will be an important, but not the only, driver of the site monitoring programme. Other data, such as results from compliance monitoring (assessing the conduct of activities in relation to licence conditions, conducted by relevant / competent authorities and their statutory advisors), together with data obtained to inform appropriate assessments, will also have an important role in assessing condition. 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 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 (2010 as amended) 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 on each of the specific interest features (sub-features) for the Studland to Portland cSAC to current levels of human usage. This intends to provide a broad assessment of those operations that may cause deterioration or disturbance, and the sensitivity of sub-features present.

The process of deriving and scoring relative vulnerability is set out in Appendix C. A summary of the operations that may cause deterioration or disturbance is given in Appendix D, and the results of the vulnerability assessment for Studland to Portland cSAC are detailed in Appendix E.

4.2 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 sub-features to operations;
- an assessment of the current **exposure** of the sub-features to operations; and
- a final assessment of current **vulnerability** of sub-features to operations.

This three step process builds up a level of information necessary to inform management of 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[34] 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).

4.2.1 Sensitivity assessment

The sensitivity assessment used is an assessment of the relative sensitivity of the sub-features, (i.e. bedrock reef and stony reef) of the Studland to Portland cSAC site, to the effects of broad categories of human activities.

In relation to this assessment, sensitivity has been defined as the intolerance of a habitat, community or individual species (or individual colony of a species) to damage, or death, from an external factor (Hiscock, 1996), 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 (i.e. killed/destroyed, 'high' intolerance) and is expected to recover over a very long period of time, i.e. >10 or up to 25 years ('low' recoverability).

The sensitivity of the sub-feature has been determined by the sensitivities of the component biotopes and key 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, 2005, 2006; Tyler-Walters *et al*. 2001). Sensitivities are available from the MarLIN website (www.marlin.ac.uk).

[34] An area that is uniform in environmental conditions and in its distribution of animal and plant life.

4.2.2 Exposure assessment

This has been undertaken for Studland to Portland cSAC by assessing the relative exposure of the sub-features within the site to the effects of broad categories of human activities currently occurring on the site.

The relative exposure of sub-features within Studland to Portland cSAC to physical, chemical and biological pressures is summarised in Appendix D and detailed in Appendix E. This assessment is based on known human activities operating in or adjacent to the site, and the anticipated pressures associated with these activities. This assessment was made using local adviser knowledge and informal dialogue with relevant authorities on the basis of the best available information at the time of writing.

4.2.3 Vulnerability assessment

The third step in the process is to determine the vulnerability of the sub-features to operations. This is an integration of sensitivity and exposure. 'Vulnerability' has been defined as the exposure of a habitat, community or individual species (or individual colony of a species) to an external factor to which it is sensitive (Hiscock, 1996). The process of deriving and scoring relative vulnerability is illustrated in Appendix C.

4.3 Format of advice on operations

The operations advice is split into six broad categories that may cause deterioration and/or disturbance of habitats/ species. This approach:

- 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;

- 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 that may cause deterioration or disturbance to the interest features of the site and should have sufficient stability to need only infrequent review / updating by Natural England.

4.4 Update and review of advice

Information regarding operations that may cause deterioration / disturbance of natural habitats/species, for which the site has been designated, is provided on the basis of Natural England's current knowledge of activities and patterns of usage within the Studland to Portland cSAC. Natural England expects that the information on activities and patterns of usage may be refined as part of the process of developing the management scheme and through discussion with the relevant authorities. 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 Studland to Portland cSAC

An explanation of the sensitivity of the Studland to Portland cSAC sub-features follows, with examples of their exposure and therefore their vulnerability to deterioration or disturbance from the listed categories of operations. This information is also summarised in Appendices D and E.

5.1 Annex 1 Reef: Bedrock and stony reef sub-features

5.1.1 Physical loss

Both the bedrock and stony reef sub-features are sensitive to loss through direct removal or smothering. The loss of reef communities through this form of disturbance would be of concern due to their ecological importance within the reef habitat and/or their long recovery times. 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 the potato crisp bryozoa (*Pentapora fascialis*) occur, they are likely to be more sensitive as smothering will interfere with their feeding structures (Hiscock & Tyler-Walters, 2006).

The bedrock reefs are highly sensitive to physical loss through removal and/or smothering. The stony reefs have moderate to low sensitivity to physical loss through removal and/or smothering.

A seed mussel fishery operates within the Portland reefs section of the cSAC. However, at current levels, the exposure of the reef and associated mussel beds to physical loss from removal is considered to be low. Both the bedrock and stony reef sub-features are also considered to be exposed to low levels of physical loss due to smothering from demersal trawling that currently occurs in adjacent areas of sediment.

Overall the **vulnerability** of the Studland to Portland **bedrock reefs to physical loss** through removal and/or smothering is **moderate**. The **vulnerability** of the **stony reefs to physical loss** through removal and/or smothering is considered to be **low**.

5.1.2 Physical damage

Physical damage from abrasion may result from shipping activities, anchoring, and the deployment/recovery of fishing gear. This kind of physical damage can result in the degradation of the physical and ecological structure of reef habitat (Cork *et al*., 2008). Key bedrock reef species are commonly delicate, slow growing and rely on recruitment from the immediate surrounding waters. Therefore, any physical disturbance to an area may result in direct mortality to individual organisms directly impacted, and may also impact on the overall resilience of the surrounding population.

Studland to Portland bedrock reef habitats include the bryozoan and pink sea fan biotope and species such as the branching sponge *Axinella dissimilis*, which are particularly sensitive to abrasion.

The Studland to Portland bedrock reef sub-features are considered highly sensitive to physical damage from siltation, abrasion and selective extraction. The stony reef sub-features are considered to have low sensitivity to physical damage through siltation and/or abrasion, and are moderately sensitive to selective extraction of the substrate.

Static gear fishing (potting and netting) is known to occur within the site, particularly around the Isle of Portland and in the Ringstead to Studland area, as well as anchoring of both commercial and recreational vessels. At current levels of activity, the exposure of Studland to Portland bedrock and stony reefs to physical damage through siltation and abrasion is considered to be low. Exposure to physical damage through selective extraction is considered to be nil.

Overall the **vulnerability of bedrock reef** to **physical damage** within the Studland to Portland cSAC is considered to be **moderate**. Overall the **vulnerability of stony reef** to **physical damage** within the Studland to Portland cSAC is considered to be **low**.

5.1.3 Non-physical disturbance

The Studland to Portland reefs are not considered to be sensitive to disturbance caused by noise or visual operations. At current levels, it is considered that the reef sub-features are exposed to low levels of non-physical disturbance within the site.

Overall, the **vulnerability of reef sub-features** within Studland to Portland cSAC to **non-physical disturbance** is **nil**.

5.1.4 Toxic contamination

The dominant reef biotopes are likely to be of moderate intolerance to chemical contamination and recover relatively quickly once the contamination is removed. However, where red algae dominated communities occur sensitivity is likely to be higher as red algae are noted to be sensitive to chemical contamination (Hiscock & Tyler-Walters, 2006). Although the kelp *Laminaria hyperborea* is relatively tolerant, the sensitivity suggested reflects the intolerance of the red algae.

Shipping accidents still occur, leading to pollution and physical wreckage. Shipping activity occurs in the vicinity of the site boundary, although at current levels the exposure of the reef sub-features to toxic contamination is considered to be low.

There is insufficient information on the sensitivity of the key reef species and biotopes within the cSAC to the introduction of radionuclides. A decommissioned nuclear reactor at Winfrith still emits a small discharge into the cSAC, yet annual monitoring shows very low levels of radioactivity in the area[35].

Overall the **vulnerability of reef sub-features** within Studland to Portland cSAC to **toxic contamination** is considered to be **low**.

5.1.5 Non-Toxic contamination

The dominant biotopes of the Studland to Portland reefs are likely to be of low sensitivity to non-toxic contamination but where faunal and algal turfs occur sensitivity is likely to be higher. The moderate sensitivity of the bedrock reef sub-features to changes in organic loading and salinity reflects the intolerance of these communities. Some biotopes within the stony reefs are also moderately sensitive to changes in salinity. The long-lived, fragile species of bedrock reef (such as erect branching sponges and the pink sea fan) are highly intolerant to changes in salinity, changes in temperature and reduced oxygenation due to organic enrichment.

[35] http://www.cefas.defra.gov.uk/publications/scientific-series/radioactivity-in-food-and-the-environment-(rife).aspx

Discharges of pollution from land could potentially impact on the Studland to Portland reefs by causing changes in the temperature, turbidity and/or salinity of the overlying water; and/or increases in nutrient and organic matter. The Studland to Portland reef sub-features are currently considered to be exposed to low levels of non-toxic contamination given the present level of land-based discharges and the proximity of the reef sub-features to the coast. The reef sub-features are currently not thought to be exposed to any activity causing changes in temperature.

Overall the **vulnerability of bedrock reef** within the Studland to Portland cSAC to **non-toxic contamination** is considered to be **moderate** for changes in organic loading and salinity, **low** for changes in nutrient loading and changes in turbidity, and **nil** for changes in thermal regime.

Overall the **vulnerability of stony reef** within the Studland to Portland cSAC to **non-toxic contamination** is considered to be **low** for changes in nutrient loading, changes in turbidity and changes in salinity. The vulnerability of stony reef to changes in thermal regime is currently considered to be **nil**, and there is insufficient information available to determine the vulnerability of stony reefs to changes in organic loading.

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. However, the community of faunal and algal crusts with keel worms (*Pomatoceros sp.*) and dead men's fingers (a soft coral, *Alcyonium digitatum*) found within the Studland to Portland cSAC, is considered to be moderately sensitive to microbial pathogens.

Similarly, there is insufficient information available to determine the sensitivity of many reef communities and species to the introduction of non-native species. However, concern has increased in recent years regarding the potential impacts of the alien sea squirt *Didemnum vexillum*, which can overgrow most hard substrata in the sub-tidal zone including bedrock, boulders, cobbles, pebbles, gravel, and hard bodied sessile animals and plants.

Selective extraction refers to the removal of species or community. This includes either the removal of a specific species / community / key 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 operations). 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. Sensitivity of reef sub-features to such selective extraction is considered to be moderate for both bedrock and stony reef.

Pathways for introduction of *Didemnum vexillum* include recreational boating (Laing *et al*., 2010), which occurs within the cSAC and specifically in the Studland Bay to Ringstead Bay Reefs area. The exposure of the Studland to Portland reef sub-features is currently considered to be low, although there is insufficient information to be able to determine the sensitivity of stony reefs to the introduction of non-native species and translocation.

Commercial fishing activity occurs in this area and there is a relatively high incidence of static gear fishing using pots and nets within the cSAC. Recreational fishing activity also occurs, including sea-angling and spear fishing. The overall exposure of the reef sub-features to selective extraction is currently considered to be moderate (Walmsley & Pawson, 2007).

Overall the **vulnerability of reef sub-features** within the Studland Bay to Portland cSAC to **biological disturbance** is considered to be **moderate** for selective extraction and **low** for other forms of biological disturbance.

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Appendix A

Favourable Condition Table (FCT) for Studland to Portland cSAC
Attributes were selected from JNCC's common standards monitoring (2004). Additional attributes were selected on a discretionary basis, and are indicated as such.

Table 1

Interest Feature: Reefs			
Attribute	**Measure**	**Target**	**Comments, including explanation and definitions.**
Extent of reefs (Mandatory CSM attribute)	Overall area of reefs (bedrock and stony) measured periodically throughout the reporting cycle.	No decrease in extent from established baseline, subject to natural change. *Identified by Cork et al., 2008 and Axelsson et al., 2011.* *Baseline of 19368.83 ha established by Natural England, 2012.*	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. *Baseline to be established.* *Data provided by EA may assist with establishing baseline and monitoring targets, however further analysis is required*	Water clarity is a key factor influencing algal/plant dominated biotopes. Changes in water clarity could be caused, for example, by an increase in suspended material..
Water Density (Discretionary CSM attribute)	Average temperature and salinity measured periodically in the subtidal, throughout	Average temperature and salinity should not deviate significantly from an established baseline, subject to natural change.	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

Interest Feature: Reefs			
Attribute	**Measure**	**Target**	**Comments, including explanation and definitions.**
	the reporting cycle at specified locations.	*Baseline to be established.* *Data provided by EA may assist with establishing baseline and monitoring targets, however further analysis is required*	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 at specified locations.	Average sedimentation rate should not deviate significantly from an established baseline, subject to natural change. *Baseline to be established.* *No data currently available.*	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, abnormal tidal dynamics, or natural erosion, then this will be an acceptable change to the feature unless the conservation interest is lost.

Interest Feature: Reefs			
Sub-feature 1: Bedrock Reef			
Attribute	**Measure**	**Target**	**Comments**
Extent of bedrock	Overall area of	No decrease in extent from established	Extent of reef is a reporting requirement of the Habitats Directive.

Interest Feature: Reefs			
Sub-feature 1: Bedrock Reef			
Attribute	**Measure**	**Target**	**Comments**
reef (Mandatory CSM attribute)	bedrock reef measured periodically throughout the reporting cycle.	baseline, subject to natural change. *Identified by Cork et al., 2008 and Axelsson et al., 2011.* *Baseline of 19294.99 ha established by Natural England, 2012.*	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 at specified locations throughout the site, measured once during summer, within the reporting cycle.	Maintain the full variety of bedrock reef biotopes identified for the site to an established baseline, subject to natural change. *Biotopes identified by Cork et al., 2008 and Axelsson et al., 2011.* *Refer to key biotope list in Table 2.*	Biotope composition aims to measure the overall variety of communities throughout the site. The range of target biotopes should be found to be present following analysis of the combined survey results. 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 across the bedrock reef sub-feature. 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, and then condition should be considered unfavourable.
Distribution and spatial pattern of bedrock reef biotopes (Mandatory CSM	Distribution and spatial arrangement of bedrock reef biotopes at specified locations. Measure during summer, once during	Maintain the distribution and spatial pattern of bedrock reef biotopes identified for the site, to an established baseline, allowing for natural change. *Identified by Cork et al., 2008 and*	The distribution and spatial pattern of biotopes at specified locations is an essential component of the sub-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.

Interest Feature: Reefs			
Sub-feature 1: Bedrock Reef			
Attribute	**Measure**	**Target**	**Comments**
attribute)	reporting cycle.	*Axelsson et al., 2011.* *Refer to key biotope list in Table 2.*	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 across 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 the *Mytilus edulis* biotopes, measured once during summer, within the reporting cycle.	No change in the extent of the *Mytilus edulis* biotopes, from an established baseline, allowing for natural change. *Identified by Cork et al., 2008; Axelsson et al., 2011; Collins, K., 2012. Baseline of 1972.50 ha established by Natural England, 2012.*	The extensive mussel beds (*Mytilus edulis*) to the southwest of Portland Bill are an important structural aspect of the sub-feature. Changes in extent and distribution may indicate long-term changes in 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.

Interest Feature: Reefs			
Sub-feature 1: Bedrock Reef			
Attribute	**Measure**	**Target**	**Comments**
			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.
Population structure of *Mytilus edulis* beds (Discretionary attribute)	Measurement of the age structure of this feature is challenging in the subtidal, but may be possible using drop down video survey. 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. *Identified by Cork et al., 2008; Axelsson et al., 2011; Collins, K., 2012.*	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 larval supply and also enhances the species diversity of the reefs as a whole.
Species composition of representative or notable bedrock reef biotopes (Discretionary CSM attribute)	Frequency and occurrence of component species of representative or notable bedrock biotopes, 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. *Identified by Cork et al., 2008 and Axelsson et al., 2011.* *Refer to key biotope and species list in Table 2.*	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 bedrock 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.

Interest Feature: Reefs			
Sub-feature 1: Bedrock Reef			
Attribute	**Measure**	**Target**	**Comments**
Presence and/or abundance of specified bedrock reef species (Discretionary CSM attribute)	Presence and/or abundance of specified bedrock reef species throughout the site, measured once during summer, within 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 and Axelsson et al., 2011.* *Refer to key species list in Table 2.*	Changes in presence and/or abundance of a species can critically affect the physical and functional nature of the bedrock reef sub-feature, 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 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 irrecoverable natural losses) then condition should be considered unfavourable.

Feature: Reef			
Sub-feature 2: Stony reef			
Attribute	**Measure**	**Target**	**Comments**
Extent of stony reef (Mandatory CSM attribute)	Overall area of stony reef measured periodically throughout the reporting cycle.	No decrease in extent of stony reef from established baseline, subject to natural change. *Baseline of 73.84 ha established by Natural England, 2012.*	Extent of reef is a reporting requirement of the Habitats Directive. The extent of stony reef is an important attribute in relation to the viability of the reef and therefore should be measured at each assessment.
Biotope composition of stony reefs (Mandatory CSM attribute)	Presence and/or abundance of a variety of stony reef biotopes 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 and Axelsson et al., 2011.* *Refer to key biotope list in Table 2.*	This attribute aims to measure the overall variety of communities throughout the site. The range of target biotopes should be found to be present following analysis of the combined survey results. Absence of a biotope from the subset will result in an unfavourable assessment for the feature. Measuring biotope composition across all of the stony reef sub-feature 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 stony reef biotopes (Mandatory CSM	Distribution and spatial arrangement of stony reef biotopes at specified locations. Measure during summer, once during	Maintain the distribution and spatial pattern of stony reef biotopes identified for the site, to an established baseline, allowing for natural change. *Identified by Cork et al., 2008 and*	The distribution and spatial pattern of biotopes at specified locations is an essential component of the sub-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.

Feature: Reef			
Sub-feature 2: Stony reef			
Attribute	**Measure**	**Target**	**Comments**
attribute)	reporting cycle.	*Axelsson et al., 2011.* *Refer to key biotope list in Table 2.*	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 sub-feature. 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.
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, 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. *Identified by Cork et al., 2008 and*	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 stony reef sub-feature 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

Feature: Reef			
Sub-feature 2: Stony reef			
Attribute	**Measure**	**Target**	**Comments**
		Axelsson et al., 2011. *Refer to key biotope and species list in Table 2.*	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.

Table 2

Studland to Portland Reef Communities

Studland to Portland Bedrock Reef Sub-feature Communities Sources: Royal Haskoning, 2008; Axelsson *et al*., 2011.		
Key Biotopes (JNCC 04.05 code)	**Definition**	**EUNIS Code**
IR.HIR.KFaR.FoR IR.HIR.KFaR.FoR.Dic	Foliose red seaweeds on exposed lower infralittoral rock Foliose red seaweeds with dense *Dictyota dichotoma* and/or *Dictyopteris membranacea* on exposed lower infralittoral rock	A3.116 A3.1161
IR.HIR.KSed IR.HIR.KSed.XKHal	Sediment-affected or disturbed kelp and seaweed communities *Halidrys siliquosa* and mixed kelps on tide-swept infralittoral rock with coarse sediment	A3.12 A3.126
IR.MIR.KR.Ldig	*Laminaria digitata* on moderately exposed sublittoral fringe rock	A3.211
IR.MIR.KR.LhypT.Pk	*Laminaria hyperborea* park with hydroids, bryozoans and sponges on tide-swept lower infralittoral rock	A3.2122
CR.HCR.XFa.ByErSp	Bryozoan turf and erect sponges on tide-swept circalittoral rock	A4.131
CR.HCR.XFa.FluCoAs CR.HCR.XFa.FluCoAs.SmAs	*Flustra foliacea* and colonial ascidians on tide-swept exposed circalittoral mixed substrata *Flustra foliacea*, small solitary and colonial ascidians on tide-swept circalittoral bedrock or boulders	A4.134 A4.1342
CR.HCR.XFa.Mol	*Molgula manhattensis* with a hydroid and bryozoan turf on tide-swept moderately wave-exposed circalittoral rock	A4.138
CR.MCR.EcCr.FaAlCr CR.MCR.EcCr.FaAlCr.Flu CR.MCR.EcCr.FaAlCr.Adig CR.MCR.EcCr.FaAlCr.Pom	Faunal and algal crusts on exposed to exposed to moderately wave-exposed circalittoral rock *Flustra foliacea* on slightly scoured silty circalittoral rock *Alcyonium digitatum*, *Pomatoceros triqueter*, algal and bryozoan crusts on wave-exposed circalittoral rock Faunal and algal crusts with *Pomatoceros triqueter* and sparse *Alcyonium digitatum* on exposed to moderately wave-exposed circalittoral rock	A4.214 A4.2141 A4.2142 A4.2145

CR.MCR.SfR.Pid	Piddocks with a sparse associated fauna in sublittoral very soft chalk or clay	A4.231
SS.SMx.CMx.FluHyd	*Flustra foliacea* and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment	A5.444
CR.MCR.CMus.CMyt	*Mytilus edulis* beds with hydroids and ascidians on tide-swept exposed to moderately wave-exposed circalittoral rock	A4.241
SS.SBR.SMus.MytSS	*Mytilus edulis* beds on sublittoral sediment[36]	A5.625

Key Species	**Common name**	**Comments[37]**
Aiptasia mutabilis	Trumpet anemone	Notable
Alcyonium digitatum	Dead man's fingers (soft coral)	Representative
Axinella sp.	Sponges	Notable
Dysidea fragilis	Goosebump sponge	Representative
Eunicella verrucosa	Pink sea fan	Notable
Flustra foliacea	Hornwrack (a bryozoa)	Representative
Halichondria sp.	Sponges	Notable
Hoplangia durotrix	Weymouth carpet coral	Notable
Hymedesmia paupertus	Blue sponge	Notable
Laminaria hyperborea	Tangle or cuvie (brown algae / seaweed)	Representative
Mytulis edulis	Blue mussel	Representative
Oscarella lobularis	A sponge	Notable
Pachymatisma johnstonia	Elephant hide sponge	Representative
Pentapora fascialis	Ross coral/ Potato crisp bryozoa	Representative
Raspailia sp.	Erect branching sponges	Notable
Saccorhiza polyschides	Furbelows (brown algae / seaweed)	Representative
Stelligera sp.	Erect branching sponges	Notable
Zanardinia typus	Penny weed (brown algae / seaweed)	Notable

[36] In marginal areas the mussel beds extend onto sediment, although current evidence is unclear whether this is overlying bedrock.

[37] **Representative** species (in this context) are species that often occur within the sub-feature and help to distinguish the biotope communities. They are characteristic of the habitat at the biotope level.

Notable species are essentially 'species of note', i.e. they could be locally rare and/or threatened, nationally rare and/or threatened, or scarce and may feature on Biodiversity Action Plan (BAP) lists or OSPAR.

Studland to Portland Stony Reef Sub-feature Communities Sources: Royal Haskoning, 2008; Axelsson *et al*., 2011.		
Key Biotopes	**Definition**	**EUNIS Code**
CR.HCR.XFa.FluCoAs	*Flustra foliacea* and colonial ascidians on tide-swept exposed circalittoral mixed substrata	A4.134
CR.HCR.XFa.FluCoAs.SmAs	*Flustra foliacea*, small solitary and colonial ascidians on tide-swept circalittoral bedrock or boulders	A4.1342
SS.SMx.CMx.FluHyd	*Flustra foliacea* and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment	A5.444

Key Species	**Common name**	**Comments**[38]
Ascidiacea sp.	Sea squirts	Notable
Cirripedia sp.	Barnacles	Representative
Dysidea fragilis	Goosebump sponge	Representative
Flustra foliacea	Hornwrack (a bryozoa)	Representative
Hymedesmia paupertus	Blue sponge	Notable
Nemertesia anteninna	Sea beard (a hydroid)	Notable
Pachymatisma johnstonia	A sponge	Notable
Pentapora fascialis	Ross coral/ Potato crisp bryozoa	Representative
Pomatoceros sp.	Keel worm	Representative

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

[38] **Representative** species (in this context) are species that often occur within the sub-feature and help to distinguish the biotope communities. They are characteristic of the habitat at the biotope level.
Notable species are essentially 'species of note', i.e. they could be locally rare and/or threatened, nationally rare and/or threatened, or scarce and may feature on Biodiversity Action Plan (BAP) lists or OSPAR.

Appendix B

Maps showing the interest features of the Studland to Portland cSAC

Fig 1. Studland to Portland Annex 1 Reef

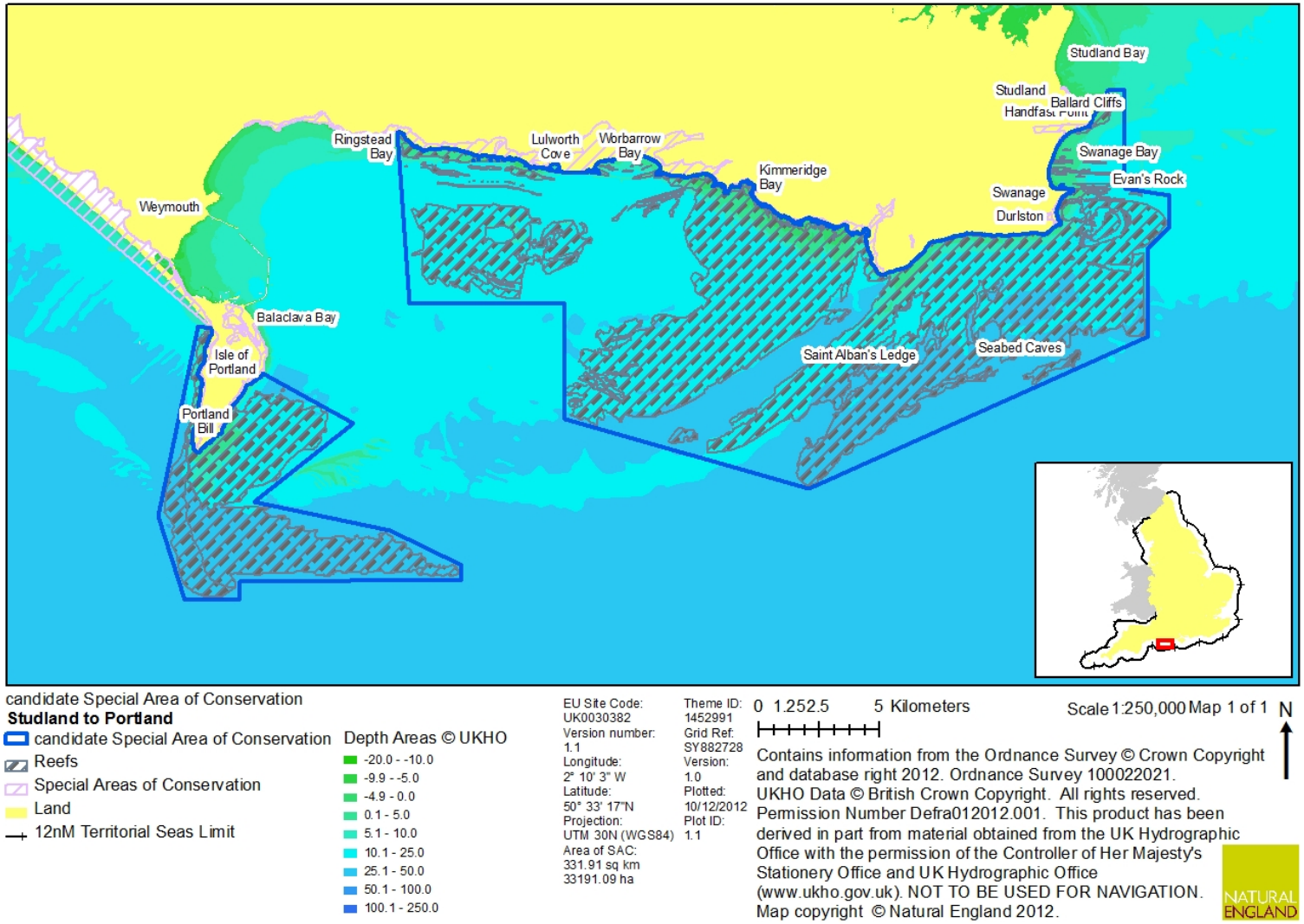
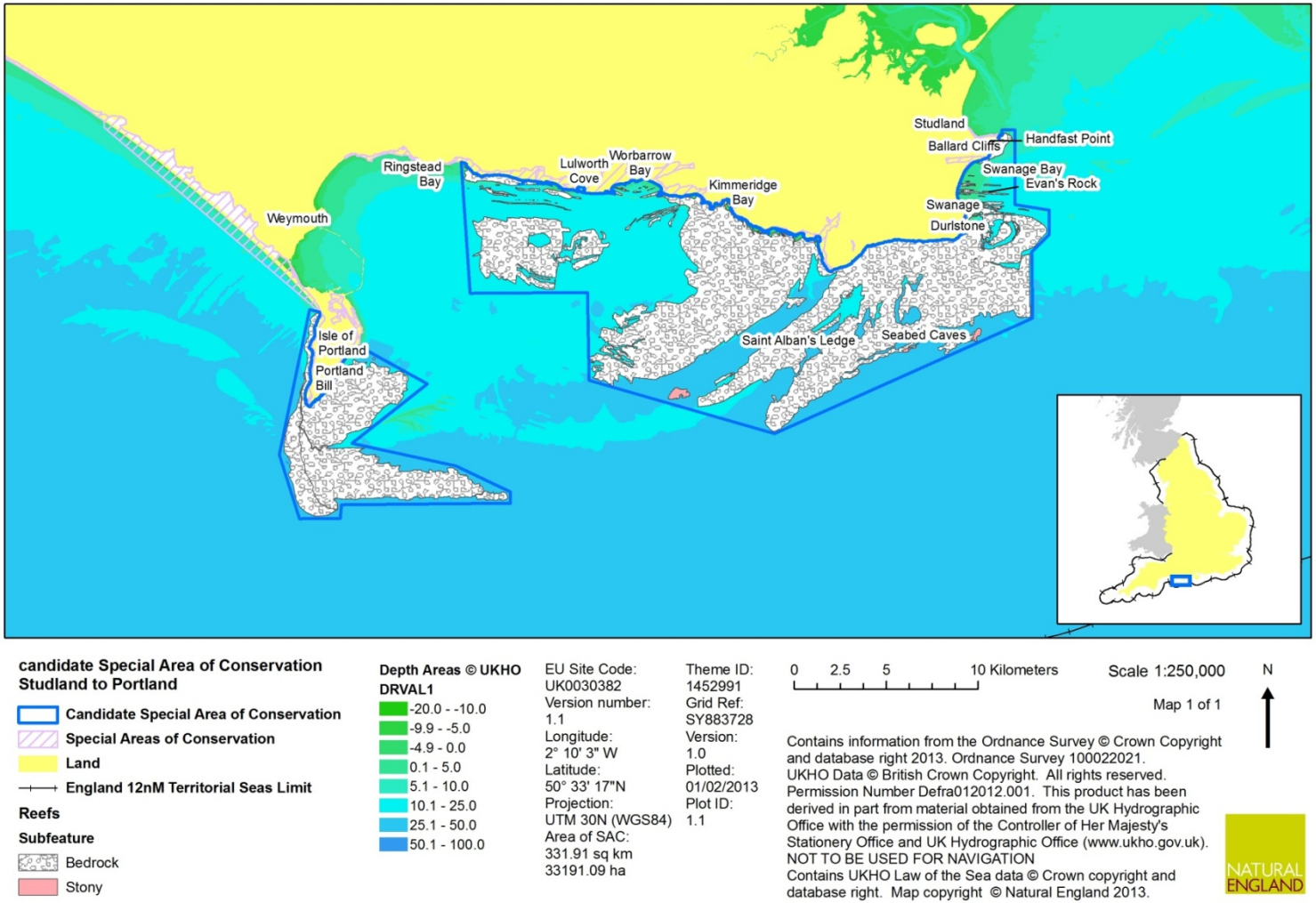


Fig 2. Studland to Portland Sub-features: bedrock reef and stony reef



Appendix C

Methods deriving vulnerability

Sensitivity	
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.

		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

Appendix D

Summary of operations which may cause deterioration or disturbance of Studland to Portland cSAC interest features at current levels of use

The advice below is not a list of prohibitions but rather a checklist for operations which may need to be subject to some form of management measures(s) or further measures where actions are already in force. Examples of activities under relevant authority jurisdiction are also provided. Operations marked with a ✓ indicate the features (or some component of them) that are considered to be exposed to the effects of the operations.

Operations which may cause deterioration or disturbance	Studland to Portland cSAC reefs
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 disturbance	
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 radionuclides	✓
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)	✓

Appendix E

Assessment of the relative vulnerability of the Studland to Portland cSAC reef sub-features to different categories of operations (for key see appendix C).

Operations which may cause deterioration or disturbance	Bedrock reef			Stony reef		
	Sensitivity	Exposure	Vulnerability	Sensitivity	Exposure	Vulnerability
Physical loss						
Removal (e.g. harvesting, coastal development)	•••	+	Moderate	••	+	Low
Smothering (e.g. by artificial structures, disposal of dredge spoil)	•••	+	Moderate	•	+	Low
Physical damage						
Siltation (e.g. run-off, channel dredging, outfalls)	•••	+	Moderate	•	+	-
Abrasion (e.g. boating, anchoring, trampling)	•••	+	Moderate	•	+	Low
Selective extraction (e.g. aggregate dredging)	•••	-	-	••	-	-
Non-physical disturbance						
Noise (e.g. boat activity)	-	+	-	-	+	-
Visual (e.g. recreational activity)	-	+	-	-	+	-
Toxic contamination						
Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs)	••	+	Low	••	+	Low
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	••	+	Low	•	+	Low
Introduction of radionuclides	Insufficient information	+	Insufficient information	Insufficient information	-	Insufficient information
Non-toxic contamination						
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	••	+	Low	•	+	Low
Changes in organic loading (e.g. mariculture, outfalls)	•••	+	Moderate	Insufficient information	+	Insufficient information
Changes in thermal regime (e.g. power stations)	•••	-	-	•	-	-

Operations which may cause deterioration or disturbance	Bedrock reef			Stony reef		
	Sensitivity	Exposure	Vulnerability	Sensitivity	Exposure	Vulnerability
Changes in turbidity (e.g. run-off, dredging)	••	+	Low	•	+	Low
Changes in salinity (e.g. water abstraction, outfalls)	•••	+	Moderate	••	+	Low
Biological disturbance						
Introduction of microbial pathogens	••	+	Low	•	+	Low
Introduction of non-native species and translocation	•	++	Low	Insufficient information	++	Insufficient information
Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	••	++	Moderate	••	++	Moderate

Appendix F

Studland to Portland cSAC species and biotopes used to determine site sensitivity
(as per the methodology detailed in section 4.2.1)

Bedrock reef biotopes	**Description**
CR.HCR.XFa.FluCoAs	*Flustra foliacea,* small solitary and colonial ascidians on tide-swept circalittoral bedrock or boulders
CR.HCR.Xfa.Mol	*Molgula manhattensis* with a hydroid and bryozoan turf on tide-swept moderately wave-exposed circalittoral rock
CR.MCR.SfR.(Pid)	Piddocks with a sparse associated fauna in sublittoral very soft chalk or clay
CR.MCR.EcCr.FaAlCr.Pom	Faunal and algal crusts with *Pomatoceros triqueter* and sparse *Alcyonium digitatum* on exposed to moderately wave-exposed circalittoral rock
IR.HIR.KFaR.FoR	Foliose red seaweeds on exposed lower infralittoral rock
IR.HIR.KSed.XKHal	*Halidrys siliquosa* and mixed kelps on tide-swept infralittoral rock with coarse sediment.
CR.MCR.CMus.CMyt	*Mytilus edulis* beds with hydroids and ascidians on tide-swept exposed to moderately wave-exposed circalittoral rock
SS.SBR.SMus.MytSS	*Mytilus edulis* beds on sublittoral sediment
Bedrock reef species	**Common name**
Alcyonium digitatum	Dead man's fingers
Axinella dissimilis	A branching sponge
Eunicella verrucosa	Pink sea fan
Flustra foliacea	Hornwrack
Halichondria panicea	Breadcrumb sponge
Laminaria hyperborea	Tangle or Cuvie
Mytulis edulis	Blue mussel
Stony reef biotopes	**Description**
CR.HCR.XFa.FluCoAs	*Flustra foliacea,* small solitary and colonial ascidians on tide-swept circalittoral bedrock or boulders
Stony reef species	**Common name**
Flustra foliacea	Hornwrack

Sources: Royal Haskoning, 2008; Axelsson *et al*., 2011; Tyler-Walters & Hiscock, 2003.