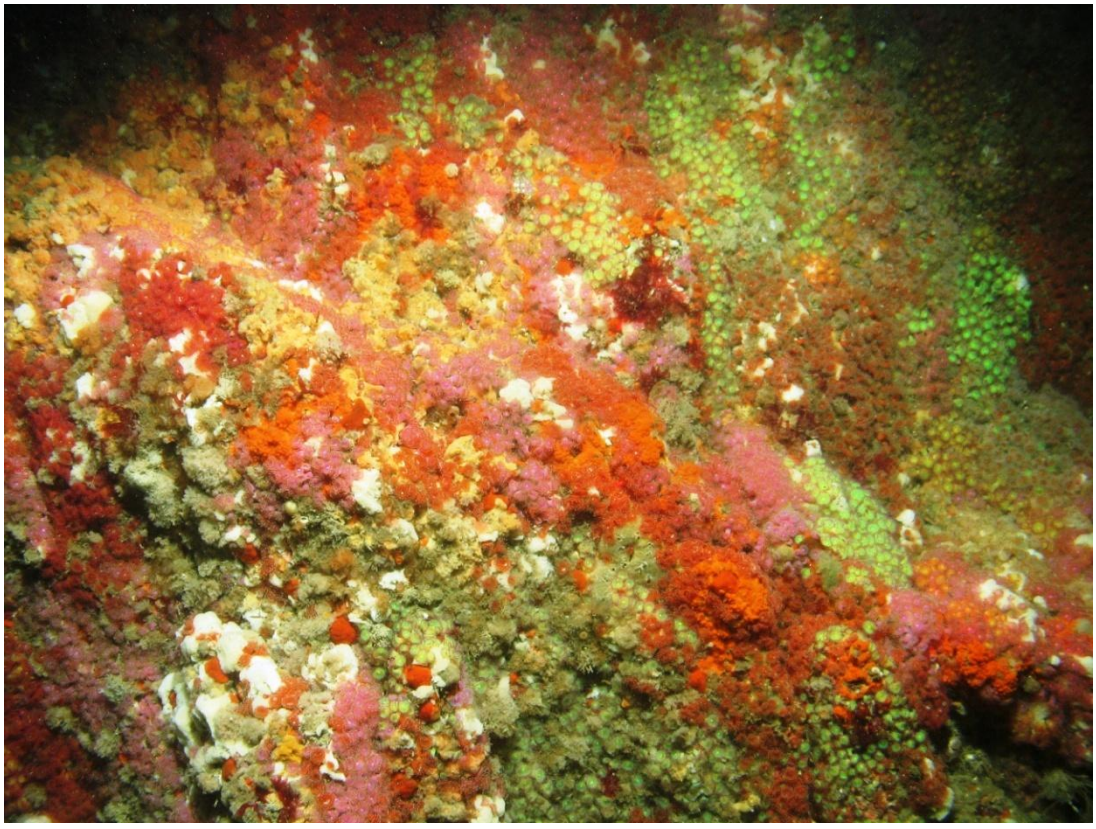
Lands End & Cape Bank candidate Special Area of Conservation

Formal advice under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010



Version 2.0 (July 2012)

Document version control

Version	Author	Amendments made	Issued to and date
2.0	Rhiannon Pipkin	Amendments to version control; incorporation of text changes from MMT. **Standard text updates to bring consistency between packages,** i.e. hyperlinks added to section 1; section 2.3 minor text amendments, including appropriate assessment footnote and hyperlink; minor text changes to section 3.2 and hyperlink to SAD added; formatting changes to section 3.2.4, including update of footnotes; removal of paragraph from section 4.3; section 5 – sentence added referring to Appendix; section 5.1 – paragraph added outlining process adopted; Table 1 and 2 format changes; footnote amendment to Appendix C; Appendix E - removal of key, formatting changes, and inclusion of 'non-physical disturbance', include footnotes, and updated definitions; Appendix F – formatting changes and footnote added. Page numbers updated. Section 5.1.1; vulnerability amended from 'low – moderate' to 'low' to bring consistency with appendix E; Appendix D updated in line with amendments to Appendix E.	Relevant Authorities 24/07/2012
1.4	Rhiannon Pipkin	Clarifications in section 3.3 to use of favourable condition tables following Chief Scientist review. Minor amendments for national consistency.	Caroline Cotterell (MMT) 11/6/2012
1.3	Rhiannon Pipkin	Minor grammatical changes following MMT sign off.	Tim Hill (Director of Evidence) 25/04/2012
1.2	Rhiannon Pipkin	Amendments to exposures for the offshore reefs for; smothering; siltation; nutrient loading; and organic loading, following relevant authority comments. Amendments made in section 5 and Appendix E.	Marine Management Team (MMT) and Director Marine for sign off 11/04/2012
1.1	Joana Smith	Minor changes made for national consistency	Paul Duncan 05/04/2012
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0.5	Rhiannon Pipkin	Minor amendments to favourable condition table and version control table following MMT review.	Marine Management Team 08/07/2011
0.4	Rhiannon	Minor amendments following comments from	Marine Management

	Pipkin	national team Paul Duncan. Text in section 2.2 adjusted.	Team 06/07/2011
0.3	Rhiannon Pipkin	Minor amendments following evidence QA by Rob Enever and James Bussel. Footnotes added to introduction, removal of reference to Birds Directive in introduction, 'background to favourable condition table' text updated, and new paragraph in section 4.3.2 to mirror other conservation objectives.	Paul Duncan 21/06/2011
0.2	Rhiannon Pipkin	Date and minor text amendments. Incorporation of final survey data.	Evidence team (Rob Enever and James Bussel) 18/05/2011
0.1	Louisa Knights	Update of Lands End & Cape Bank draft conservation objectives; text updated, full FCT table included, appendices added.	Rob Enever and Rhiannon Pipkin 01/04/2011

Further information

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Lands End & Cape Bank candidate Special Area of Conservation

Formal advice under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010 (S.I., 2010)[1]

Contents

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

1. Introduction

This document contains Natural England's formal advice for Lands End & Cape Bank candidate Special Area of Conservation (cSAC) given under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010. This document supersedes the previous draft conservation advice for Lands End & Cape Bank proposed SAC (pSAC).

Lands End & Cape Bank was formally submitted by the Government to the European Commission as a cSAC on 20 August 2010. Lands End & Cape Bank cSAC is with the European Commission awaiting 'moderation' (that is an assessment alongside all the other sites submitted by other Member States). If the European Commission approves the site, it becomes a Site of Community Importance and Government then has six years to designate it as a SAC.

The cSAC is subject to full protection under the Habitats Directive[2] (transposed through the Conservation of Habitats and Species Regulations 2010[3] and the Offshore Marine Conservation Regulations (Natural Habitats, &c.) (Amendment) Regulations 2010 (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 Lands End & Cape Bank; and (b) any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which Lands End & Cape Bank has been designated.

This advice is based on best available information at the time of writing.

This formal conservation advice constitutes one element of our advisory role in relation to this site. Relevant authorities can use the current 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. However, should 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 Selection Assessment Document (Natural England, 2010a)[7] for Lands End & Cape Bank pSAC which is still relevant to the cSAC.

An independent review 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 on using evidence , through the development of a suite of Evidence Standards. Implementation of these standards has included Natural England working with JNCC to develop a protocol, which has been subject to independent expert review, setting out the processes and requirements for

[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/2010/490/contents/made
[4] as defined under Regulation 6 of The Conservation of Habitats and Species Regulations 2010
[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 Regulations 2010
[7] http://www.naturalengland.org.uk/Images/LECB-sad_tcm6-21669.pdf

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 (http://www.naturalengland.org.uk/Images/R35ConservationAdvicePackageProtocol_tcm6-33228.pdf).

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.

2.2 The role of relevant and competent authorities

A **competent** authority is a public authority whose decision making may have an impact on the Natura 2000[8] series and therefore needs to be subject to the Regulations. All competent authorities are required to have regard for the requirements of the Habitats Directive in the exercise of their functions (regulation 3(4)).

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.

The competent authority carries out the appropriate assessment and makes a decision on integrity rather than the proponent of the plan or project or Natural England. Regulation 61(2) makes it clear that the applicant has to supply the necessary information for the competent authority to make the assessment. The competent authority can require the proponent to provide sufficient information to inform the assessment. When carrying out the assessment, the competent authority **must** consult Natural England in accordance with the Habitats Regulations.

The Habitats Regulations require relevant authorities to exercise their functions so as to secure compliance with the Habitats Directive. A single management scheme, which the relevant authorities may draw up under Regulation 36[9] of the Habitats Regulations, will provide a framework through which this could be done and it should be based on the advice

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

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

in this package. 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.

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 Role of conservation objectives

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.

The conservation objectives set out what needs to be achieved for the site to make the appropriate contribution to the conservation status of the features for which the site is designated and thus deliver the aims of the Habitats Directive.

In addition, this advice will inform the scope and nature of any 'appropriate assessment[10]' which the Directive requires to be undertaken for plans and projects (Regulations 61 and 63 and of the Habitats Regulations for inshore waters).

2.4 Role of advice on operations

The advice on operations set out in Section 4 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 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 which 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

[10] Assessment of implications for European sites and European offshore marine sites

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' under the Habitats Regulations[11]. 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, competent 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)[12] 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 (DEFRA Circular 01/2005) which outlines the appropriate assessment process. The entry on the Register of European Sites gives the reasons for which a site was classified or designated.

3.2 Lands End & Cape Bank cSAC conservation objectives

The formal conservation objectives for Lands End & Cape Bank 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 survey work. They should be read in the context of other advice given, particularly:

- the Selection Assessment Document[13], 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 and Table 4.1) 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

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

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

[13] http://www.naturalengland.org.uk/Images/LECB-sad_tcm6-21669.pdf

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

3.2.1 Importance of features

Lands End & Cape Bank has been formally submitted to the European Commission by the Government as a cSAC for its Annex I Reef features. Ecological subdivisions for Annex I Reef include bedrock, stony, and biogenic reefs (JNCC, 2009). Variations of bedrock reefs include; upstanding reefs, defined as 'high to medium topographic complexity' (for example reefs with gullies, strong vertical features, or which are undulating); and flat reefs of 'low topographic complexity' (JNCC, 2009). 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.

The site covers 30,172 ha and includes 24,938 ha of reef. The south-westerly position on the British coast means that the sublittoral zone is exposed to the full force of the waves, strong tidal currents and oceanic swells coming in from the Atlantic. This has the effect of protecting the habitats found there to some degree, by limiting the regularity that the area is safely accessible (Axelsson & Dewey, 2011). The site is found in a fully marine environment, as there are no major freshwater run-off sources from the land (Birchenough et al., 2008). The influence of the relatively warm waters from the Gulf Stream and to a lesser extent the Lusitanian current from the south, give a distinct character to many communities with species such as sea fans, cup corals and soft corals, some of which are of high conservation importance (Irving, 1996).

The cSAC comprises two main areas of reef that are almost entirely granite (Axelsson & Dewey, 2011; Birchenough et al., 2008); an area of reef fringing the coast (the Lands End part of the cSAC - the coastal upstanding reef sub-feature) and an area of upstanding reef further offshore in a broad, arching crescent that is roughly aligned with the coastline (the Cape Bank part of the cSAC - the offshore upstanding reef sub-feature).

The coastal region of Land's End is characterised by tide-swept kelp forests and sparse kelp parks of *Laminaria hyperborea* with a lower layer of dense foliose red, green and brown algae including *Dictyopteris polypodioides*, *Palmaria palmata*, *Delesseria sanguinea* and *Drachiella spectabilis*, in the infralittoral zone. The spiny sea star *Marthasterias glacialis* is the most conspicuous member of the epifauna in this zone, although a diverse assemblage of encrusting fauna, including ascidians *Stolonica socialis*, jewel anemones *Corynactis viridis*, and soft corals, such as dead-man's fingers *Alcyonium digitatum,* are also present (Axelsson & Dewey, 2011).

Beyond the kelp-dominated assemblage, bryozoan and hydroid turf communities, as well as areas grazed by echinoderms are present together with Ross coral *Pentapora fascialis*, the echinoderm *Echinus esculentus* and the rock-boring sponge *Cliona celata* (Birchenough *et al.*, 2008a). Water movement by currents and wave action also encourages dense growths of sponges, sea squirts, anemones and soft corals (Irving, 1996).

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. However, in such conditions, animals have a plentiful supply of suspended food and filter-feeding species may be abundant.

There are three main types of Annex I reef: bedrock reef; stony reef[14] (bedrock and stony reef can collectively be referred to as geogenic reef); and biogenic reef. Current evidence shows that geogenic reef is present within the Lands End & Cape Bank cSAC (Axelsson & Dewey, 2011; Birchenough et al., 2008).

3.2.3 Key reef sub-features of Lands End & Cape Bank cSAC

Sub-features have been identified based on the reports of Axelsson & Dewey, 2011 and Birchenough et al., 2008.

Coastal upstanding reef communities

The upstanding rocky reef system in the coastal margin stretches for about 25 km along the coast. There are two prominent features of interest in the southern part; the nearshore islands and the Longships reef off Land's End and "The Brisons" off Cape Cornwall. These features are notable for their topographic complexity, providing a variety of different habitats from sheltered shaded walls and overhangs to reef crests that are exposed to waves and tides and sunlight, each of which are able to support very different communities of animals and seaweeds resulting in a highly diverse range of marine life (Axelsson & Dewey, 2011). The reef is dominated by tide-swept kelp forest and kelp parks with dense foliose red algae (Birchenough et al., 2008). Within a kilometre or two of the shore much of the seabed is at a depth of 30 metres and includes areas of sand in patches between the rock outcrops and which stretch out from the major bays.

[14] 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.

Offshore upstanding reef communities

The crescent shaped system of offshore upstanding rocky reefs forms the major feature of conservation interest at the Lands End and Cape Bank site. It measures about 35 km along its central spine and 12 km at its widest point. The reef is characterised by high biodiversity tide-swept communities such as sponges, faunal and algal turfs and crustose communities. It comprises three ridges of rock that sit on a platform of rock that is 45 to 55 metres below the surface of the sea. The ridges rise to heights of up to 25 metres high from this base, have steep slopes, are over a kilometre wide in places and cover a total of over 100 km^2 (Axelsson & Dewey, 2011). The most abundant biotope in the offshore area is *Caryophyllia smithii* and sponges with *Pentapora fascialis*, *Porella compressa* and crustose communities on wave-exposed circalittoral rock (CR.MCR.EcCr.CarSp.PenPcom).

3.2.4 The conservation objectives for Lands End & Cape Bank Annex 1 Reefs:

Survey work was commissioned in 2010 to develop the baseline data for Lands End & Cape Bank cSAC and to assess the condition of the Annex I reefs for which the site has been designated. These new surveys support the findings of Birchenough et al. (2008), of excellent structure and conservation of function, with no evidence of habitat damage as a result of anthropogenic activity (Axelsson & Dewey, 2011). A number of stations surveyed by Birchenough et al. (2008) were also revisited in 2010. These showed no evidence of any anthropogenic impacts and the biological habitat to be similar in 2010 to those seen in 2007. The conclusion from these comparisons is that the reef features identified remain unchanged and are all in excellent condition (Axelsson & Dewey, 2011).

Therefore, based on the results of Birchenough et al. (2008) and Axelsson & Dewey (2011), Lands End & Cape Bank cSAC Annex I reefs have been given the following conservation objective of ***maintain***. 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.

Subject to natural change[a], maintain[b] the reefs in favourable condition[15]**,** in particular the sub-features**:**

[15] **Explanation of terms used in the Conservation Objectives**

a) 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.

b) 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.

c) Favourable condition relates to the maintenance of the structure, function, and typical species for that feature within the site.

d) 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

Coastal upstanding reef
Offshore upstanding reef

Favourable condition of the reefs 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 favourable condition table (Appendix A) further defines favourable condition for the interest features/sub-features of the site.

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. 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 reassessed in light of this new information and restorative action put in place if needed.

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 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 our understanding of the structure and functioning of features and the pressures they are exposed to.

removal of unsustainable physical, chemical and biological pressures, rather than intervention (as is possible with terrestrial features).

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 source 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 (S.I., 2010) 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 sites interest features to those pressures.

The following sections provide information to help relate general advice to each of specific interest features for the Lands End & Cape Bank 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 Lands End & Cape Bank cSAC. The process of deriving and scoring relative vulnerability is provided in Appendix C. A summary of the pressures which may cause deterioration or disturbance is given 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 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 Lands End & Cape Bank 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.

4.3.1 Sensitivity assessment

The sensitivity assessment used is an assessment of the relative sensitivity of the interest feature (i.e. coastal upstanding reef and offshore upstanding reef) 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, listed in Appendix F. Biotope sensitivities were derived from the Marine Life Information Network (MarLIN)[16] biology and sensitivity database (Tyler-Walters and Hiscock,

[16] www.marlin.ac.uk

2003) and the JNCC. Biotope sensitivities were assessed using the MarLIN approach (Hiscock and Tyler-Walters, 2005, 2006; Tyler-Walters et al., 2001). Sensitivities are available from the MarLIN and JNCC websites (www.marlin.ac.uk, www.jncc.defra.gov.uk).

4.3.2 Exposure assessment

This has been undertaken for Lands End & Cape Bank 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 Lands End & Cape Bank 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;
- 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 Lands End & Cape Bank 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/or through 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 Lands End & Cape Bank cSAC

The following sections provide information to help relate general advice to each of the specific interest features for Lands End & Cape Bank cSAC.

This advice relates to the vulnerability of the interest features and sub-features of the Lands End & Cape Bank cSAC as summarised in Appendix D and detailed in the 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 Lands End & Cape Bank cSAC to current levels of human usage.

Appendix E shows the vulnerability assessments for the sub-features of the Lands End & Cape Bank cSAC.

5.1 Annex I habitat Reefs

The sensitivity of the two site subfeatures has been assessed using evidence for the biotopes and species present in the site (as outlined in Appendix F) and information available on the MarLIN website. The biotopes and species listed in Appendix F were recorded on the noted subfeatures of this site (Axelsson & Dewey, 2011; Birchenough et al., 2008).

5.1.1 Physical loss

Both the offshore and coastal upstanding bedrock reef sub-features are highly sensitive to loss through direct removal, however they are not currently exposed to any activities causing this, and therefore are not vulnerable to physical loss through removal. The coastal reefs have a low exposure to smothering and the offshore reefs are ‘not exposed’, giving a vulnerability of low for the coastal reef and ‘not vulnerable’ for the offshore reef. 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 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.

Overall the **vulnerability of reef sub-features** within the Lands End & Cape Bank cSAC to **physical loss** is considered to be **low**.

5.1.2 Physical damage

Physical damage to bedrock reef can result in degradation to the structure of the reef. Therefore bedrock reef communities are considered to be highly sensitive to physical damage through abrasion or selective extraction (i.e. displacement of the organism from the substratum and from its original position). The key, indicative bedrock reef species are commonly delicate slow growing, species that rely on recruitment from the immediate surrounding waters. Therefore, any direct disturbance to an area may not only result in direct mortality but also impact on the success of the surrounding population. Both sub-features include occurrences of the pink sea fan *Eunicella verrucosa,* whilst the offshore contains the erect sponge species *Axinella polypoides.* Due to their erect structures both species will be vulnerable to abrasion. Due to its poor recoverability, *E. verrucosa* biotopes will be markedly more sensitive to physical damage where it occurs.

Some fishing activity occurs in the Lands End & Cape Bank cSAC, but this is generally small scale and seasonal, working pots, gill nets and handlines (Natural England, 2010b), and the exposure to physical damage through abrasion is therefore low in the inshore area. Handlining will not result directly in abrasion (abrasion could potentially only occur through anchoring of the vessel), but potting and netting could result in some abrasion of the seabed or displacement of species. Physical disturbance to reefs could be significant if targeted by towed fishing gears such as scallop dredges. There is currently very little trawling or dredging at the site, although non-UK vessels operate in the area around the offshore site, where Belgium and French vessels have historical rights to operate beyond 6 nm (Natural England, 2010b). Exposure to abrasion in the offshore reef area is therefore believed to be moderate. Overall exposure to physical damage through abrasion and physical selective extraction is therefore considered to be moderate.

Shipping has the potential to impact the site in a detrimental way for despite the many measures provided to promote and assist shipping safety (e.g. lighting, buoyage and a traffic separation scheme) accidents still occur leading to pollution and physical damage.

The exposure to siltation (through run-off or channel dredging) is also considered low as the adjacent coast (to the coastal reefs area) is not heavily populated or farmed, and there is no known channel dredging. The sensitivity to siltation of the two features (offshore and coastal reefs) is different due to the known presence of the erect sponge species *Axinella polypoides* in the offshore reef. This species is highly sensitive to siltation (MarLIN, 2011). However, due to their great distance from the coast, the offshore reefs are considered 'not exposed' to siltation. The vulnerability of the offshore reefs to siltation is therefore considered 'not vulnerable', and the coastal reefs are considered to have a 'low vulnerability' to siltation. Neither the offshore nor the coastal reefs are exposed to selective extraction (such as aggregate dredging) and therefore they are not vulnerable to this activity.

Overall the **vulnerability of bedrock reef sub-features** within the Lands End & Cape Bank cSAC to **physical damage** is considered to be **not vulnerable - moderate, or high** where *Eunicella verrucosa* and *Axinella polypoides* occurs.

Monitoring undertaken in 2010 demonstrates the reef sub-features to be in excellent condition (Axelsson & Dewey, 2011), with delicate species such as *Pentapora fascialis* abundant across the features, and a conservation objective of maintain has therefore been given. Existing low impact 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.* 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.

5.1.3 Toxic contamination

The dominant reef biotopes are moderately sensitive to the introduction of synthetic and non-synthetic compounds. Shipping accidents still occur leading to pollution and physical wreckage. There is a large amount of shipping in or near the site, however oil pollution incidents are relatively infrequent and therefore potential exposure (and therefore vulnerability) to toxic contamination from shipping is considered to be low for both the coastal and offshore reef areas. There is insufficient information on the sensitivity of the reefs to the introduction of radionucleotides, and thus it is not possible to establish the vulnerability.

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 offshore and coastal upstanding reefs, sensitivity is likely to be higher as red algae are noted to be sensitive to chemical contamination. Although the kelp *Laminaria hyperborea* is relatively tolerant (Holt et al., 1995), the sensitivity suggested reflects the intolerance of the red algae.

Overall the **vulnerability of reef sub-features** within the Lands End & Cape Bank cSAC to **toxic contamination** is considered to be **low.**

5.1.4 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 reef biotopes have a high sensitivity to changes in organic loading and salinity in both the coastal and offshore areas (the long-lived fragile species of the bedrock reef are intolerant of reduced oxygenation). Changes in organic loading can cause changes in oxygenation. Reef communities in the cSAC show generally low-moderate sensitivity to this factor, however this is higher in regions where *Eunicella verrucosa* is present. Some biotopes within the sub-features are sensitive to increases in turbidity (loss of light) caused by inputs from land, for example IR.HIR.KFaR.FoR, as photosynthetic capability would be reduced for algae, and reduce the food available to suspension feeders. Faunal and algal turfs are also likely to have higher sensitivities. The offshore reefs also have a 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 therefore exposure to this operation and subsequently vulnerability, is considered negligible/none.

The offshore reefs have a low sensitivity to changes in nutrient loading, but are moderately sensitive to changes in turbidity. The coastal reefs are moderately sensitive to changes in nutrient loading, thermal regime and turbidity. The dominant biotopes are likely to be of low sensitivity to nutrient enrichment but where kelp dominated communities occur (e.g. IR.HIR.KFaR.LhypR.Ft) sensitivity is likely to be higher, as eutrophication is associated with a reduction in the depth range of this species (Birkett et al., 1998).

Due to the proximity of the coastal reef sub-features to the coast, they are currently exposed to low levels of non-toxic contamination from land based discharges, and therefore have a low-moderate vulnerability to non-toxic contamination. However, the high dilution that any

land-based discharge is likely to receive would reduce the risk of these having an impact. The offshore reefs, due to their distance from land, are considered 'not exposed' and therefore 'not vulnerable' to non-toxic contamination.

However exposure to all forms of non-toxic contamination is considered to be nil to low for both the coastal and offshore areas,

The overall **vulnerability of reef sub-features** within the Lands End & Cape Bank cSAC to **non-toxic contamination** is considered to be **not vulnerable-moderate**.

5.1.5 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 both subfeatues, giving them a low vulnerability.

With regards to the introduction of non-native species, there is currently insufficient information available to determine the sensitivity of many reef communities and species to this effect. Concern has increased over recent years however for 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). However, none of these activities occur to a high level in the cSAC, and exposure is therefore considered to be low, giving a low vulnerability.

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. Both the coastal and offshore reefs are highly sensitive to selective extraction of species. *Eunicella verrucosa* (present on both sub-features is considered highly sensitive to selective extraction, due to its slow growth and low recovery rates. However, this species is not known to be specifically targeted for extraction in the site.

Removal of fish species and larger molluscs can have impacts on the structure and functioning of benthic communities over and above the physical effects of fishing methods. For example, removal of urchin predators such as lobsters or crawfish has been implicated in increases in urchin populations and therefore the creation of 'urchin barrens' and the loss of kelp beds (Birkett et al., 1998). However, the evidence is equivocal as sea urchin barrens occur in areas where lobsters are not found (Birkett et al., 1998), and it is likely that there is a complex interaction between sea urchin recruitment and predation (MarLIN, 2011). Communities in the site that could be impacted by these potential effects include the *Laminaria hyperborea* forests and parks, which have a moderate sensitivity to selective extraction. The cSAC is actively used for; potting for lobsters and crabs; netting mainly for bass; and handlining targeting bass and mackerel during spring and summer months

(Natural England, 2010b). Exposure to these activities is considered low in the inshore area, (where boats are often seasonally restricted), and moderate in the offshore area, where pots are worked all year around. The vulnerability is therefore moderate in the inshore area and high in the offshore area.

However, monitoring undertaken in 2010 demonstrates the reef sub-features to be in excellent condition (Axelsson & Dewey, 2011), including regions where *Eunicella verrucosa* or kelp forests are present, and a conservation objective of maintain has therefore been given. Existing low impact 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.* 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.

The overall **vulnerability of reef sub-features** within the Lands End & Cape Bank cSAC to **biological disturbance** is considered to be **low to high**.

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Appendix A

Favourable Condition Table (FCT) for Lands End & Cape Bank cSAC
Common Standards Monitoring (CSM) attributes were selected from JNCC (2004). Additional attributes were selected on a discretionary basis.

(See Appendix F for description of biotope codes used)

Feature: Reefs
Sub-feature: General

Attribute	Measure	Target	Comment
Extent of reefs (Mandatory CSM attribute)	Overall area (ha) of reefs (bedrock) measured periodically throughout the reporting cycle.	No decrease in extent from established baseline, subject to natural change. *Baseline established by Birchenough et al. (2008) and supplemented by Axelsson & Dewey (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. The chart in appendix B shows the mapped extent of the feature.
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

Attribute	Measure	Target	Comment
			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. *Baseline to be established.*	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
Sub-feature: Coastal upstanding bedrock reefs

Attribute	Measure	Target	Comment
Extent of coastal upstanding reefs (Mandatory CSM attribute)	Overall area (ha) of coastal upstanding reefs measured periodically throughout the reporting cycle.	No decrease in extent from established baseline, subject to natural change. *Baseline established by Birchenough et al. (2008) and supplemented by Axelsson & Dewey (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. The chart in appendix B shows the mapped extent of the sub-feature.
Biotope composition of coastal upstanding reefs (Mandatory CSM attribute)	Presence and/or abundance of a variety of coastal upstanding reef biotopes (Table1) 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 Birchenough et al. (2008) and Axelsson & Dewey (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 attributable to natural processes (e.g. winter storm events, changes in supporting processes or mass

Attribute	Measure	Target	Comment
			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 coastal upstanding reef biotopes (Mandatory CSM attribute)	Distribution and spatial arrangement of coastal upstanding reef biotopes (Table 1) at specified locations. Measure during summer, once during reporting cycle.	Maintain the distribution and spatial pattern of coastal upstanding reef biotopes identified for the site, to an established baseline, allowing for natural change. *Biotopes identified by Birchenough et al. (2008) and Axelsson & Dewey (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 locations and their spatial relationship to one another. Measuring the full distribution and

Attribute	Measure	Target	Comment
			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 coastal upstanding reef biotopes (Discretionary CSM attribute)	Extent of coastal upstanding reef biotopes CR.HCR.XFa.ByErSp.Eun, CR.MCR.EcCr.CarSp.PenPcom, CR.HCR.Xfa.CVirCri IR.HIR.KFaR.FoR.Dic, IR.HIR.KFaR.LhypR.Ft, IR.HIR.KFaR.LhypR.Pk, and IR.HIR.Ksed.Sac, measured once during summer, within the reporting cycle.	No change in the extent of representative/notable coastal upstanding reef biotopes, from an established baseline, allowing for natural change. *Biotopes identified by Birchenough et al. (2008) and Axelsson & Dewey (2011).*	The extent of the representative/notable biotopes listed are an important structural aspect of the sub-feature and therefore the coastal upstanding 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,

Attribute	Measure	Target	Comment
			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 coastal upstanding reef biotopes (Discretionary CSM attribute	Presence and/or abundance of coastal upstanding reef biotopes CR.HCR.XFa.ByErSp.Eun, CR.MCR.EcCr.CarSp.PenPcom, CR.HCR.Xfa.CVirCri, IR.HIR.KFaR.FoR.Dic, IR.HIR.KFaR.LhypR.Ft, IR.HIR.KFaR.LhypR.Pk, and IR.HIR.Ksed.Sac 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 Birchenough et al. (2008) and Axelsson & Dewey (2011).*	Notable biotopes selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. For example,IR.HIR.KFaR.LhypR.Ft and IR.HIR.KFaR.Lhyp.R.Pk are representative biotopes of the infralittoral and supports species rich communities, whilst CR.HCR.XFa.ByErSp.Eun is nationally significant and potentially sensitive 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 coastal upstanding reef biotopes	Frequency and occurrence of component species of representative or notable bedrock biotopes including: CR.HCR.XFa.ByErSp.Eun,	No decline in coastal upstanding reef biotope quality due to change in species composition or loss of	Notable biotopes selected owing to their national significance, sensitivity, and representativity as a typical

Attribute	Measure	Target	Comment
(Discretionary CSM attribute)	CR.MCR.EcCr.CarSp.PenPcom, CR.HCR.Xfa.CVirCri, IR.HIR.KFaR.FoR.Dic, IR.HIR.KFaR.LhypR.Ft, IR.HIR.KFaR.LhypR.Pk, and IR.HIR.Ksed.Sac, measured once, during summer, within the reporting cycle.	notable species, from an established baseline, allowing for natural change. *Biotopes identified by Birchenough et al. (2008) and Axelsson & Dewey (2011).*	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 coastal upstanding reef species (Discretionary CSM attribute)	Coastal upstanding reef species may include: *Alcyonium digitatum, Antedon bifida, Cliona celata, Corynactis viridis, Palmaria palmata, Dictyota dichotoma, Saccorhiza polyschides,* and *Laminaria hyperborea,;* and should include*; Eunicella verrucosa, Alcyonium glomeratum*, *Pentapora fascialis,* and	Maintain presence and/or abundance of species from an established baseline, allowing for natural change. *Species identified by Birchenough et al. (2008) and Axelsson & Dewey (2011).*	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.

Attribute	Measure	Target	Comment
	Stolonica socialis. Measure once, in summer, during the reporting cycle.		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: Reefs
Sub-feature: Offshore upstanding bedrock reefs

Attribute	Measure	Target	Comment
Extent of offshore upstanding reefs	Overall area (ha) of offshore	No decrease in extent from	Extent of reef is a reporting

Attribute	Measure	Target	Comment
(Mandatory CSM attribute)	upstanding reefs measured periodically throughout the reporting cycle.	established baseline, subject to natural change. *Baseline established by Birchenough et al. (2008) and supplemented by Axelsson & Dewey (2011).*	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. The chart in appendix B shows the mapped extent of the sub-feature.
Biotope composition of offshore upstanding reefs (Mandatory CSM attribute)	Presence and/or abundance of a variety of offshore upstanding reef biotopes (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. *Biotopes identified by Birchenough et al. (2008) and Axelsson & Dewey (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 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

Attribute	Measure	Target	Comment
			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 offshore upstanding reef biotopes (Mandatory CSM attribute)	Distribution and spatial arrangement of offshore upstanding reef biotopes (Table 2) at specified locations. Measure during summer, once during reporting cycle.	Maintain the distribution and spatial pattern of offshore upstanding reef biotopes identified for the site, to an established baseline, allowing for natural change. *Biotopes identified by Birchenough et al. (2008) and Axelsson & Dewey (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 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

Attribute	Measure	Target	Comment
			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 offshore upstanding reef biotopes (Discretionary CSM attribute)	Extent of offshore upstanding reef biotopes CR.HCR.XFa.ByErSp.Eun, CR.HCR.Xfa.CVirCri, CR.MCR.EcCr.CarSp.PenPcom, and IR.HIR.KFaR.FoR, measured once during summer, within the reporting cycle.	No change in the extent of representative / notable offshore upstanding reef biotopes, from an established baseline, allowing for natural change. *Biotopes identified by Birchenough et al. (2008) and Axelsson & Dewey (2011).*	The extent of the representative/notable biotopes listed are an important structural aspect of the sub-feature and therefore the offshore upstanding 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.

Attribute	Measure	Target	Comment
			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 offshore upstanding reef biotopes CR.HCR.XFa.ByErSp.Eun, CR.HCR.Xfa.CVirCri, CR.MCR.EcCr.CarSp.PenPcom, 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 Birchenough et al. (2008) and Axelsson & Dewey (2011).*	Notable biotopes selected owing to their national significance, sensitivity, or representativity as a typical biotope for the biological zone. CR.HCR.XFa.CvirCri is characteristic and representative of the offshore circalittoral reef area, whilst IR.HIR.KFaR.For is characteristic of the offshore infralittoral reef area. The most abundant biotope in the offshore is *Caryophyllia smithii* and sponges with *Pentapora foliacea, Porella compressa* and crustose communities on wave-exposed circalittoral rock (CR.MCR.EcCr.CarSp.PenPcom). 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 offshore upstanding reef biotopes (Discretionary CSM attribute)	Frequency and occurrence of component species of representative or notable offshore upstanding reef biotopes including: CR.HCR.XFa.ByErSp.Eun,	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.	Notable biotopes selected owing to their national significance, sensitivity, and representativity as a typical biotope for the biological zone.

Attribute	Measure	Target	Comment
	CR.HCR.Xfa.CVirCri, CR.MCR.EcCr.CarSp.PenPcom, and IR.HIR.KFaR.FoR, measured once, during summer, within the reporting cycle.	*Biotopes identified by Birchenough et al. (2008) and Axelsson & Dewey (2011).*	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)	Offshore upstanding reef species may include: *Alcyonium digitatum, Caryophyllia smithii, Cliona celata, Corynactis viridis, Antedon bfida, and Plocamium cartilagineum* should include*; Eunicella verrucosa, Alcyonium glomeratum, Stolonica socialis* and *Pentapora fascialis.* Measure 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 Birchenough et al. (2008) and Axelsson & Dewey (2011).*	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 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.

Table 1

Lands Ends & Cape Bank Coastal Reef Communities

Lands End Reef Communities **Sources: Birchenough et al. (2008); Axelsson & Dewey (2011)**	
Key Biotopes	**Definition**
CR.HCR.XFa	Mixed faunal turf communities
CR.HCR.Xfa.CvirCri	*Corynactis viridis* and a mixed turf of crisiids, *Bugula, Scrupocellaria*, and *Cellaria* on moderately tide-swept exposed circalittoral rock
CR.HCR.XFa.ByErSp	Bryozoan turf and erect sponges on tide-swept circalittoral rock
CR.HCR.XFa.ByErSp.Eun	*Eunicella verrucosa* and *Pentapora fascialis* on wave-exposed circalittoral rock
CR.HCR.XFa.SpNemAdia	Sparse sponges, Nemertesia spp. and Alcyonidium diaphanum on circalittoral mixed substrata
CR.HCR.XFa.FluCoAs.(Paur)	Flustra foliacea and colonial ascidians on tide-swept moderately wave-exposed circalittoral rock (Polyclinum aurantium and Flustra foliacea on sand-scoured tide-swept moderately wave-exposed circalittoral rock)
CR.MCR.EcCr.CarSp	*Caryophyllia smithii*, sponges and crustose communities on wave-exposed circalittoral rock
CR.MCR.EcCr.UrtScr	*Urticina felina* and sand-tolerant fauna on sand-scoured or covered circalittoral rock
CR.MCR.EcCr.CarSp.PenPcom	Caryophyllia smithii and sponges with Pentapora foliacea, Porella compressa and crustose communities on wave-exposed circalittoral rock
CR.MCR.EcCr.FaAlCr	Faunal and algal crusts on exposed to moderately wave-exposed circalittoral rock
CR.MCR.EcCr.FaAlCr.Flu	*Flustra foliacea* on slightly scoured silty circalittoral rock
IR.HIR.Ksed	Sediment-affected or disturbed kelp and seaweed communities
IR.HIR.Ksed.XKHal	*Halidrys siliquosa* and mixed kelps on tide-swept infralittoral rock with coarse sediment
IR.HIR.KFar.FoR	Foliose red seaweeds on exposed lower infralittoral rock
IR.HIR.KFar.FoR.Dic	Foliose red seaweeds with dense *Dictyota dichotoma* and/or *Dictyopteris membranacea* on exposed lower infralittoral rock
IR.HIR.KFaR.LhypR	*Laminaria hyperborea* with dense foliose red seaweeds on exposed infralittoral rock
IR.HIR.KFaR.LhypR.Ft	*Laminaria hyperborea* forest with dense foliose red seaweeds on exposed upper infralittoral rock
IR.HIR.KFaR.LhypR.Pk	*Laminaria hyperborea* park with dense foliose red seaweeds on exposed lower infralittoral rock
IR.HIR.KFaR.LhypRVt	*Laminaria hyperborea* and red seaweeds on exposed vertical rock
IR.HIR.KSed.XKScrR	Mixed kelps with scour-tolerant and opportunistic foliose red seaweeds on scoured or sand-covered infralittoral rock
IR.HIR.Ksed.Sac	*Saccorhiza polyschides* on exposed unstable and scoured infralittoral rock

IR.HIR.KFaR	Kelp with cushion fauna
IR.MIR.KR	Kelp with red seaweeds
Key Species	**Common name**
Alcyonium digitatum	Dead man's fingers
Alcyonium glomeratum	Red sea fingers
Alcyonidium diaphanum	Sea chervil
Antedon bifida	Rosy feather-star
Calliblepharis ciliata	A bryozoan
Cliona celata	Boring sponge
Corynactis viridis	Jewel anemone
Delesseria sanguinea	Sea beech
Dendrodoa grossularia	Baked-bean ascidian
Dictyopteris membranacea	Sea fern
Dictyota dichotoma	Forkweed (a brown alage)
Drachiella spectabilis	A red algae
Echinus esculentus	Common sea urchin
Eunicella verrucosa	Pink sea fan
Holothuria forskali	Cotton spinner (sea cucumber)
Laminaria hyperborea	Kelp
Luidia ciliaris	Seven-armed starfish
Marthasterias glacialis	Spiny starfish
Ophiothrix fragilis	Common brittlestar
Palmaria palmata	Dulse
Pentapora fascialis	Ross coral
Plocamium cartilagineum	A red algae
Saccorhiza polyschides	A brown seaweed (kelp)
Stolonica socialis	A sea squirt; Orange sea grapes
Urticina felina	Dahlia anemone

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

Table 2

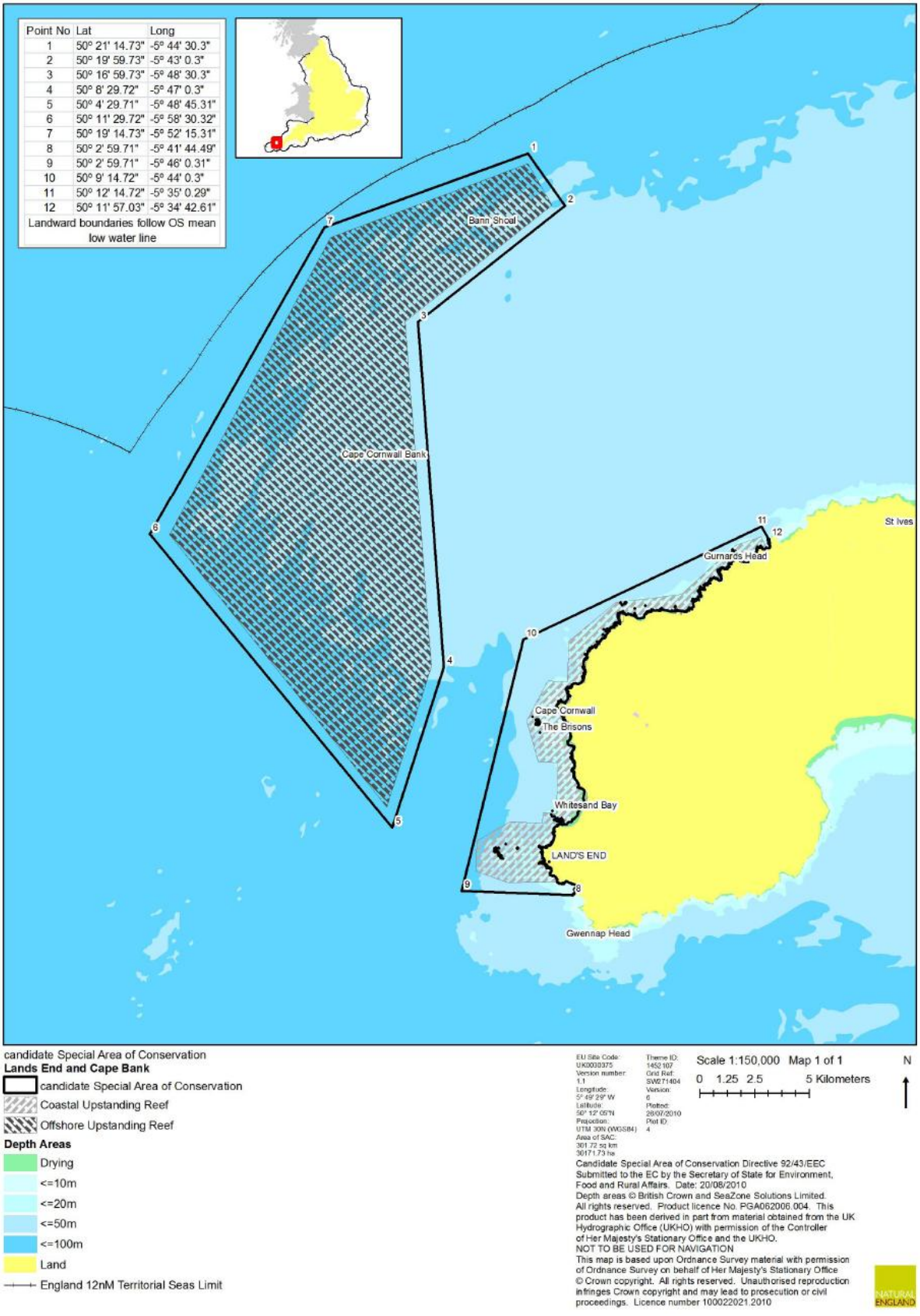
Lands End & Cape Bank Offshore Reef Communities

Cape Bank Reef Communities **Sources: Birchenough et al. (2008); Axelsson & Dewey (2011)**	
Key Biotopes	**Definition**
CR.HCR.XFa	Mixed faunal turf communities
CR.HCR.Xfa.CvirCri	*Corynactis viridis* and a mixed turf of crisiids, *Bugula, Scrupocellaria*, and *Cellaria* on moderately tide-swept exposed circalittoral rock
CR.HCR.XFa.ByErSp	Bryozoan turf and erect sponges on tide-swept circalittoral rock
CR.HCR.XFa.ByErSp.Eun	*Eunicella verrucosa* and *Pentapora fascialis* on wave-exposed circalittoral rock
CR.HCR.Xfa.SpAnVt	Sponges and anemones on vertical circalittoral rock
CR.HCR.XFa.SpNemAdia	Sparse sponges, Nemertesia spp. and Alcyonidium diaphanum on circalittoral mixed substrata
CR.MCR.EcCr	Echinoderms and crustose communities
CR.MCR.EcCr.CarSp	*Caryophyllia smithii*, sponges and crustose communities on wave-exposed circalittoral rock
CR.MCR.EcCr.CarSp.Bri	Brittlestars overlying coralline crusts, Parasmittina trispinosa and Caryophyllia smithii on wave-exposed circalittoral rock
CR.MCR.EcCr.CarSp.PenPcom	Caryophyllia smithii and sponges with Pentapora foliacea, Porella compressa and crustose communities on wave-exposed circalittoral rock
CR.MCR.EcCr.FaAlCr	Faunal and algal crusts on exposed to moderately wave-exposed circalittoral rock
CR.MCR.EcCr.FaAlCr.Bri	Brittlestars on faunal and algal encrusted exposed to moderately wave-exposed circalittoral rock
IR.HIR.KFar.FoR	Foliose red seaweeds on exposed lower infralittoral rock
Key Species	**Common name**
Actinothoe sphyrodeta	Sandalled anemone
Alcyonium digitatum	Dead men's fingers
Alcyonium glomeratum	Red sea fingers
Alcyonidium diaphanum	Sea chervil
Antedon bifida	Rosy feather-star
Asterias rubens	Common starfish
Axinella polypoides	Branching sponge
Cancer pagurus	Edible crab
Caryophyllia smithii	Devonshire cup coral
Cliona celata	Boring sponge
Corynactis viridis	Jewel anemone
Dendrodoa grossularia	Baked-bean ascidian
Drachiella spectabilis	Red algae
Echinus esculentus	Common sea urchin
Eunicella verrucosa	Pink sea fan
Holothuria forskali	Cotton spinner (sea cucumber)
Homarus gammarus	European lobster
Luidia ciliaris	Seven-armed starfish
Marthasterias glacialis	Spiny starfish

Munida rugosa	Squat lobster
Necora puber	Velvet swimming crab
Nemertesia antennina	Sea beard
Nemertesia ramosa	A hydroid
Ophiocomina nigra	Black brittlestar
Ophiothrix fragilis	Common brittlestar
Palinurus elephas	Spiny lobster
Pentapora fascialis	Ross coral
Plocamium cartilagineum	Red algae
Polymastia boletiformis	A sponge
Stolonica socialis	A sea squirt

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

Appendix B Map showing the interest sub-features of Lands End & Cape Bank cSAC



Appendix C Methods for deriving vulnerability[17].

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. 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

[17] 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 Lands End & Cape Bank cSAC

Pressures which may cause deterioration or disturbance	Lands End & Cape Bank cSAC offshore reefs	Lands End & Cape Bank cSAC coastal 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)		
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)	✓	✓

(✓) 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 Lands End & Cape Bank cSAC to different categories of pressures (see Appendix C for key).

Pressures which may cause deterioration or disturbance	Annex I Reefs					
	Offshore Upstanding Reef			Coastal Upstanding Reef		
	Sensitivity	Exposure	Vulnerability	Sensitivity	Exposure	Vulnerability
Physical loss						
Removal[18] (e.g. capital dredging, offshore development)	***	-	-	***	-	-
Smothering (e.g. by aggregate dredging, disposal of dredge spoil)	***	-	-	**	+	Low
Physical damage						
Siltation (e.g. run-off, channel dredging, outfalls)	***	-	-	*	+	Low
Abrasion (e.g. boating, anchoring, demersal fishing)	***	++	High	***	+	Moderate
Selective extraction[19] (e.g. aggregate dredging)	***	-	-	***	-	-
Non-physical disturbance						
Noise (e.g. boat activity)	-	-	-	-	-	-

[18] This is equivalent to 'Substratum loss' in MarLIN sensitivity analysis
[19] This is equivalent to 'Displacement' in MarLIN sensitivity analysis

Pressures which may cause deterioration or disturbance	Annex I Reefs					
	Offshore Upstanding Reef			Coastal Upstanding Reef		
	Sensitivity	Exposure	Vulnerability	Sensitivity	Exposure	Vulnerability
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 radionucleotides	Insufficient information	-	-	Insufficient information	-	-
Non-Toxic Contamination						
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	*	-	-	**	+	Low
Changes in organic loading (e.g. mariculture, outfalls)	***	-	-	***	+	Moderate
Changes in thermal regime (e.g. power stations)	***	-	-	**	-	-
Changes in turbidity (e.g. run-off, dredging)	**	-	-	**	+	Low
Changes in salinity (e.g. water abstraction, outfalls)	***	-	-	***	+	Moderate
Biological Disturbance						
Introduction of microbial pathogens	**	+	Low	*	+	Low

Pressures which may cause deterioration or disturbance	Annex I Reefs					
	Offshore Upstanding Reef			Coastal Upstanding Reef		
	Sensitivity	Exposure	Vulnerability	Sensitivity	Exposure	Vulnerability
Introduction of non-native species and translocation	Insufficient information	+	Insufficient information	**	+	Low
Selective extraction of species (e.g. bait digging, wildfowling, commercial and recreational fishing)	***	++	High	***	+	Moderate

Appendix F Lands End & Cape Bank cSAC Species and Biotopes used to determine site sensitivity

Lands End & Cape Bank cSAC Species and Biotopes[20] used to determine site sensitivity	
Offshore reef	
CR.HCR.XFa.ByErSp.Eun	*Eunicella verrucosa* and *Pentapora fascialis* on wave-exposed circalittoral rock
CR.MCR.EcCr.CarSp.Bri	Brittlestars overlying coralline crusts, *Parasmittina trispinosa* and *Caryophyllia smithii* on wave-exposed circalittoral rock
IR.HIR.KFar.FoR	Foliose red seaweeds on exposed lower infralittoral rock
Alcyonium digitatum	Dead man's fingers
Antedon bifida	Rosy feather-star
Asterias rubens	Common starfish
Axinella polypoides	Branching sponge
Cancer pagurus	Edible crab
Echinus esculentus	Common sea urchin
Eunicella verrucosa	Pink sea fan
Nemertesia ramosa	A hydroid
Ophiothrix fragilis	Common brittlestar
Palinurus elephas	Spiny lobster
Pentapora fascialis	Ross coral
Coastal reef	
CR.HCR.XFa.ByErSp.Eun	*Eunicella verrucosa* and *Pentapora fascialis* on wave-exposed circalittoral rock
CR.HCR.XFa.FluCoAs.(Paur)	*Flustra foliacea* and colonial ascidians on tide-swept moderately wave-exposed circalittoral rock (*Polyclinum aurantium* and *Flustra foliacea* on sand-scoured tide-swept moderately wave-exposed circalittoral rock)
IR.HIR.Ksed.XKHal	*Halidrys siliquosa* and mixed kelps on tide-swept infralittoral rock with coarse sediment
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
Alcyonium digitatum	Dead man's fingers
Antedon bifida	Rosy feather-star
Delesseria sanguina	Sea beech
Echinus esculentus	Common sea urchin
Eunicella verrucosa	Pink sea fan
Laminaria hyperborea	Kelp
Ophiothrix fragilis	Common brittlestar
Palmaria palmata	Dulse
Pentapora fascialis	Ross coral
Saccorhiza polyschides	A brown seaweed (kelp)
Urticina felina	Dahlia anemone

[20] Biotopes used are according to MarLIN 2004 codes (see www.marlin.ac.uk). These listed biotopes and species may be reviewed to reflect new evidence/survey results.