



# **Inshore Special Area of Conservation: Lands End and Cape Bank**

## **Draft Conservation Objectives and Advice on Operations**



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## Document version control

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## Further information

Please return comments or queries to:

Peter Clement  
Natural England  
Northminster House,  
Northminster Rd,  
Peterborough,  
PE1 1UA

Email: [europeanmarinesites@naturalengland.org.uk](mailto:europeanmarinesites@naturalengland.org.uk)

Tel: +44 (0)300 0601089

Fax: +44 (0)1733 568834

Website: <http://www.naturalengland.org.uk>

## **1. Lands End and Cape Bank pSAC: Draft conservation objectives and operations advice**

### **1.1 Natural England's role**

The Conservation (Natural Habitats &c.) Regulations 1994 transpose the Habitats Directive into law in Great Britain. It gives Natural England a statutory responsibility to advise relevant authorities as to the conservation objectives for European marine sites in England 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. This information will be a key component of the management schemes which may be developed for these sites.

This document is the foundation for Natural England's advice for the Lands End and Cape Bank pSAC which will be issued in fulfilment of Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994 (the 'Regulation 33 package') on adoption of the site as a candidate SAC by UK government.

In addition to providing such advice, the Regulation 33 package will inform the scope and nature of any 'appropriate assessment' which the Directive requires to be undertaken for plans and projects (Regulations 48 & 50 and by Natural England under Regulation 20). Natural England may also provide more detailed advice to competent and relevant authorities assessing the implications of any such plans or projects.

This advice is also required under the Offshore Petroleum Activities (Conservation of Habitats) Regulations (as amended in 2007); the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) Regulations 2007.

### **1.2 The role of relevant authorities**

The Conservation (Natural Habitats &c.) Regulations 1994 require competent 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 34 for the European marine site provides a framework through which this could be done and it should be based on the advice 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.

### **1.3 Activity outside the control of relevant authorities**

Nothing within a Regulation 33 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<sup>1</sup>. Having issued Regulation 33 advice for European marine sites, Natural England will work with relevant authorities and others to agree, within a defined time frame, a protocol for evaluating all 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 action to prevent deterioration to the interest features, and indeed such actions should be taken when required.

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<sup>1</sup> Determination of what constitutes natural change will be based on the best available information and scientific opinion at the time.

#### **1.4 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 or may cause a significant effect, and they inform the scope of appropriate assessments of plans or projects. The conservation objectives set out what needs to be achieved and thus deliver the aims of the Habitats Directive.

#### **1.5 Role of advice on operations**

The advice on operations set out in Section 3 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 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 operations advice may need to be supplemented through further discussions with the relevant authorities and any advisory groups formed for the SAC.

#### **1.6 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 however imply that the suggested cause of such damage must be eradicated unless proved to be harmless and it cannot be used as a licence to invent hypothetical consequences. Moreover, it is important, when considering whether the information available is sufficient, to take account of the associated balance of likely costs, including environmental costs, and benefits (DETR & the Welsh Office, 1998).

## **2. Conservation objectives**

### **2.1 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. An appropriate assessment will also require consideration of issues specific to the individual plan or project. The habitat quality definitions do not by themselves provide a comprehensive basis on which to assess plans and projects as required under:

- Regulations 20-21; 24; 48-50 and 54 – 85 of the Conservation (Natural Habitats &c.) Regulations 1994;
- Regulation 5 (1 – 4) of the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001
- Regulations 6; 13(1); 18(3); 13(3); 19(3); 24 & Schedule 3 of the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland Regulations 2007).

The scope and content of an appropriate assessment will depend upon the location, size and significance of the proposed 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) 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 European Sites under the Habitats Regulations 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 European Site was classified or designated.

### **2.2 Lands End and Cape Bank pSAC Conservation objectives**

Under Regulation 33(2)(a) of the Conservation (Natural Habitats &c.) Regulations 1994, Natural England has a duty to advise other relevant authorities as to the conservation objectives for the European marine site. The draft conservation objectives for the Lands End and Cape Bank pSAC 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. They and should be read in the context of other advice given, particularly:

- the Site Assessment Document which provides more detailed information about the site and evaluates its interest features according to the Habitats Directive selection criteria and guiding principles;

- the summary favourable condition table, which further defines favourable condition for the interest feature.

### The draft conservation objective for Annex 1 Reefs

Subject to natural change, maintain the **Reefs** in favourable condition<sup>2</sup>, in particular:

- Offshore upstanding reefs
- Inshore upstanding reefs

### 2.3 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. Favourable condition tables will be drafted in detail on designation of the SAC and its adoption as a European marine site. This will involve the collation and quantification of a number of indicators of condition 'Attributes' which is a considerable task. For these draft objectives, an indication of the Attributes<sup>3</sup> to be included in the condition table are given in table 2.2, and this will form the basis for the condition monitoring process as described below.

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, consequently it is much harder to define favourable condition so precisely in such sites. In general the conservation objectives provided are based on a *working* assumption that the *current* condition of the features is favourable for most attributes.

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. Future editions of the advice within this document, produced by Natural England, will revise the current assumptions about feature condition in light of ongoing and future monitoring. This will be linked with any developments in our understanding of the structure and functioning of features and the pressures they are exposed to.

This advice 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. To meet UK common standards, Natural

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<sup>2</sup> The summary favourable condition table outline in table 2.2 further defines favourable condition of the interest feature

<sup>3</sup> Selected characteristic of an interest feature/sub-feature which provides an indication of the condition of the feature to which it applies.

England will be committed to reporting on each of the attributes listed in the final version of the table. This information may be generated by Natural England or collected by other organisations through agreements.

The favourable condition table will be an important, but not the only, driver of the site monitoring programme. Other data, such as results from compliance monitoring, (assessing the conduct of activities in relation to licence conditions, conducted by relevant / competent authorities and their statutory advisors), together with data obtained to inform appropriate assessments, will also have an important role in assessing condition. The condition monitoring programme will be developed through discussion with the relevant / competent authorities and other interested parties, ideally as part of the management scheme process. Natural England will be responsible for collating the information required to assess condition, and will form a judgement on the condition of each feature within the site. The condition assessment will take into account all available information using the favourable condition table to guide the process.

**Table 2.1 indication of attributes to be used in defining favourable condition for the Lands End and Cape Bank pSAC**

Favourable condition tables will be drafted in detail on designation of the SAC and its adoption as a European marine site.

Attribute	Target	Comments
Extent	No change in extent of reef allowing for natural change.	While changes in extent may be unlikely due to low / removal of the bedrock reef itself, loss of extent may occur due to excessive smothering by sediment as part of natural coastal processes or anthropogenic activity.
Biotope composition of the reefs	Maintain the full variety of biotopes identified for the site (see table 2.2), allowing for natural succession or known cyclical change.	Where changes in biotope composition are known to be attributable to natural processes (e.g. winter storm/flood events, changes in supporting processes or mass recruitment or dieback of characterising species) then the target value should accommodate this variability. Where a change in biotope composition occurs outside the expected variation, or a loss of the conservation interest of the site is identified, then condition should be considered unfavourable.
Distribution of biotopes: Spatial arrangement of bedrock reef biotopes at specified locations	Maintain the distribution of biotopes, allowing for natural succession/known cyclical change	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 sub-feature or representative /notable biotopes.	No change in the extent of the biotope(s) allowing for natural succession/known cyclical change	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.
Species composition of representative or notable biotopes	No decline in biotope quality due to change in species composition or loss of notable species	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

Attribute	Target	Comments
	allowing for natural succession/ known cyclical change.	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.
Species population measures: Population structure of individual species.	Maintain age/size class structure of individual species.	<p>Whilst some change in community structure over time is expected (for example, as part of cyclic changes or successional trends) changes in the overall nature of reef communities, including mobile species e.g. fish, crustacean species etc, may indicate deterioration in the condition of the biodiversity of the reef community.</p> <p>Species selected for monitoring should reflect the specific biological characteristics or key conservation interest of the designated site.</p>

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**Table 2.2 Reef communities which occur within the Lands End and Cape Bank pSAC**

Biotope (from Connor <i>et al</i> 2004)		Upstanding Reef	
		Offshore	Coastal
CR.HCR.Xfa.CvirCri	<i>Corynactis viridis</i> and a mixed turf of crisiids, <i>Bugula</i> , <i>Scrupocellaria</i> , and <i>Cellaria</i> on moderately tide-swept exposed circalittoral rock	*	*
CR.MCR.EcCr	Echinoderms and crustose communities	*	
CR.MCR.EcCr.CarSp	<i>Caryophyllia smithii</i> , sponges and crustose communities on wave-exposed circalittoral rock		*
CR.MCR.EcCr.CarSp.Bri	Brittlestars overlying coralline crusts, <i>Parasmittina trispinosa</i> and <i>Caryophyllia smithii</i> on wave-exposed circalittoral rock	*	
CR.MCR.EcCr.CarSp.PenPcom	<i>Caryophyllia smithii</i> and sponges with <i>Pentapora foliacea</i> , <i>Porella compressa</i> and crustose communities on wave-exposed circalittoral rock	*	*
CR.MCR.EcCr.FaAICr	Faunal and algal crusts on exposed to moderately wave-exposed circalittoral rock	*	*
CR.MCR.EcCr.FaAICr.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	*	
IR.HIR.KFar.FoR.Dic	Foliose red seaweeds with dense <i>Dictyota dichotoma</i> and/or <i>Dictyopteris membranacea</i> on exposed lower infralittoral rock		*
IR.HIR.KFaR.LhypR	<i>Laminaria hyperborea</i> with dense foliose red seaweeds on exposed infralittoral rock		*
IR.HIR.KFaR.LhypR.Ft	<i>Laminaria hyperborea</i> forest with dense foliose red seaweeds on exposed upper infralittoral rock		*
IR.HIR.KFaR.LhypR.Pk	<i>Laminaria hyperborea</i> park with dense foliose red seaweeds on exposed lower infralittoral rock		*
IR.HIR.KSed.XKScrR	Mixed kelps with scour-tolerant and opportunistic foliose red seaweeds on scoured or sand-covered infralittoral rock		*

### 3. Advice on operations

Natural England has a duty under Regulation 33(2)(b) of the Conservation (Natural Habitats &c.) Regulations 1994 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.

The advice is provided in summary form in Table 3 with more detail in Appendix B. Sections 3.6.1 to 3.6.5 provide advice in relation to specific interest features and their sub-features.

#### 3.1 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 on the Lands End and Cape Bank pSAC. 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 without prejudice to, any advice given under Regulation 48 or Regulation 50 on operations that qualify as plans or projects within the meaning of Article 6 of the Habitats Directive.

#### 3.2 Methods for assessment

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

- an assessment of the **sensitivity** of the 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 European marine 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.

All the scores of relative sensitivity, exposure and vulnerability are derived using best available scientific information and informed scientific interpretation and judgement. The process uses sufficiently coarse categorisation to minimise uncertainty in information, reflecting the current state of our knowledge and understanding of the marine environment.

### **3.2.1 Sensitivity assessment**

The sensitivity assessment used is an assessment of the relative sensitivity of the interest features or the component sub-features of the Lands End and Cape Bank pSAC, i.e. Inshore and Offshore upstanding reef, to the effects of broad categories of human activities. In relation to this assessment, sensitivity has been defined as the intolerance of a habitat, community or individual (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 very long period of time, i.e. >10 or up to 25 years ('low'; recoverability). The sensitivity of the interest sub-features was based on the sensitivities of their component biotopes, listed in Table 2.3. Biotope sensitivities are derived from the Marine Life Information Network (MarLIN) biology and sensitivity database (Tyler-Walters & Hiscock, 2003). Biotope sensitivities were assessed using the MarLIN approach (Hiscock & Tyler-Walters, 2005, 2006; Tyler-Walters et al., 2001). Sensitivities are available from the MarLIN website ([www.marlin.ac.uk](http://www.marlin.ac.uk)).

### **3.2.2 Exposure assessment**

This has been undertaken for the Lands End and Cape Bank pSAC 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 (as at July 2008). These assessments were made on the best available advice.

### **3.2.3 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). The process of deriving and scoring relative vulnerability is provided in Appendix A.

## **3.3 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.

### 3.4 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 activities and patterns of usage at the Lands End and Cape Bank pSAC. Natural England expects that the information on current activities and patterns of usage (which was used to derive Table 3) will be refined as part of the process of developing the management scheme and 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.

### 3.5 Plans and Projects

Under the following regulations:

- Regulation 48(1) of the Conservation (Natural Habitats, &c.) Regulations 1994,
- Regulation 5 of the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 and
- Schedule 3, paragraph 2 of the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland) Regulations 2007,

an appropriate assessment needs to be undertaken in respect of any plan or project which:

- a. either alone or in combination with other plans or projects would be likely to have a **significant effect** on a European Site; and
- b. is not directly connected with the management of the site for nature conservation.

A site that is being considered for designation as a SAC under the Habitats Directive becomes a European site for the purposes of the above Regulations at the point in time at which it is proposed to the Commission by the secretary of State or a Devolved Administration as a site eligible for designation as a SAC. On submission, the site becomes known in the UK as a candidate SAC (cSAC).

Whilst there is no obligation in domestic law to make this assessment in respect of a site prior to it becoming a cSAC, it should be considered a matter of good practice for Competent Authorities, before deciding to undertake or permit a plan or project, to assess its implications for sites such as this, whose proposed details are in the public domain, in accordance with the process described in Article 6.3 of the Habitats

Directive. In doing so, a Competent Authority will be reducing the likelihood of the UK jeopardising the fulfilment of its obligations under the Habitats Directive. Further, without pre-judging any review of extant consents that may be required by the Habitats Regulations, undertaking *such an assessment* and determining any consents in accordance with it, will reduce the uncertainty for developers who are granted consent but have not fully implemented it by the time the site becomes a cSAC.

#### 4. Specific advice on operations for the Lands End and Cape Bank pSAC

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

This advice relates to the vulnerability of the interest feature and sub-features of the Lands End and Cape Bank pSAC as summarised in Table 3 and detailed in the Tables in appendix B. Further explanation of the sensitivity of the sub-features follows with examples of their exposure and therefore their vulnerability to damage or disturbance from the listed categories of operations. This enables links to be made between the categories of operation and the ecological requirements of the features.

This advice relates to the vulnerability of the interest features and sub-features of the Lands End and Cape Bank pSAC to current levels of human usage (as at July 2008).

**Table 3: Summary of operations which may cause deterioration or disturbance of Lands End and Cape Bank pSAC interest features at current levels of use**

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

Operations which may cause deterioration or disturbance	Lands end and Cape Bank pSAC reefs
<b>Physical loss</b>	
Removal (e.g. harvesting, coastal and offshore development)	
Smothering (e.g. by artificial structures, disposal of dredge spoil)	✓
<b>Physical damage</b>	
Siltation (e.g. run-off, outfalls)	✓
Abrasion (e.g. boating, trawling)	✓
Selective extraction (e.g. aggregate dredging)	
<b>Non-physical disturbance</b>	
Noise (e.g. boat activity)	
Visual (e.g. recreational activity)	
<b>Toxic contamination</b>	
Introduction of synthetic compounds (e.g. shipping)	✓

Operations which may cause deterioration or disturbance	Lands end and Cape Bank pSAC reefs
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	✓
Introduction of radionuclides	
<b>Non-toxic contamination</b>	
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. agricultural run-off)	✓
Changes in salinity (e.g. outfalls)	✓
<b>Biological disturbance</b>	
Introduction of microbial pathogens	✓
Introduction of non-native species and translocation	✓
Selective extraction of species (e.g. commercial & recreational fishing)	✓

## 4.1 Reef

### 4.1.1 Physical loss

Both reef sub-features: Offshore and Inshore upstanding reef are sensitive to loss through direct removal or smothering. The loss of any of the reef communities would be of concern due to their ecological importance within the reef habitat and their long recovery times to this form of disturbance. Many communities that use the reef habitats are interdependent upon the ecological functioning of others (for example, invertebrate communities and fish) and it is important that this potential indirect effect is considered when the effects of removal or smothering are assessed. Where brittlestars beds occur, they are likely to be more sensitive (high sensitivity) as smothering will interfere with their feeding structures.

Although the reef sub-features are sensitive to physical loss, at current levels of exposure they are not currently considered vulnerable to removal. The reef features are considered to be exposed to low levels of physical loss due to smothering.

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

### 4.1.2 Physical damage

Both reef sub-features are sensitive to physical damage. A number of the reef biotopes are slightly sensitive to increased siltation, however they can withstand some level of siltation as has been observed on the site. Both reef sub-features are also moderately sensitive to physical damage by abrasion which may result from shipping activities such as anchoring, as well as from a variety of fishing techniques.

Shipping accidents may occur leading to physical wreckage. The construction and operation of a Wave Hub off St Ives is likely to increase the amount of shipping traffic using the area and so increases the potential risk of physical disturbance. Physical damage to reefs due to abrasion could be significant if they are targeted by towed

fishing gears such as scallop dredges, however this is relatively unlikely for upstanding reef as the reef topography tends to prevent the use of such gear types. The extent of trawling taking place in the area of reef has not been ascertained, though discussion with local fishermen's representatives and observations made during recent survey (CEFAS 2008) did not indicate that trawling was an issue, as the majority of boats fishing this area used static gear which is generally perceived to cause a relatively low degree of abrasion. Overall taking into account the current levels of activities the level of exposure is considered to be low.

Overall the vulnerability of reef sub-features within the Lands End and Cape Bank pSAC to physical damage is considered to be moderate.

#### **4.1.3 Toxic contamination**

The dominant reef biotopes are likely to be of intermediate intolerance to chemical contamination and recover relatively quickly once the contamination is removed. However, where red algae dominated communities occur in the offshore upstanding reefs, sensitivity is likely to be higher as red algae are noted to be particularly sensitive of chemical contaminants. Although the kelp *Laminaria hyperborea* is relatively tolerant, the sensitivity suggested reflects the overall sensitivity of the communities including the relative intolerance of the red algae.

Shipping accidents still occur leading to pollution and physical wreckage. In the long term, the area seems to be resilient to even major incidents such as the Torrey Canyon, which spilt oil after grounding on the adjacent Seven Stones reef in 1967. However, given the amount of shipping in the vicinity of the site boundary, potential exposure to toxic contamination is considered to be low.

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

#### **4.1.4 Non toxic contamination**

Some biotopes within the sub-features are sensitive to increases in turbidity (loss of light) caused by inputs from land. The dominant kelp communities are unlikely to be particularly sensitive to nutrient enrichment, however where faunal and algal turfs occur sensitivity is likely to be higher. The *Laminaria hyperborea* dominated biotopes are likely to be of moderate sensitivity to increases in turbidity.

Due to the proximity of the inshore upstanding reef to the coast, these reef sub-features are currently exposed to low levels of non-toxic contamination from land based discharges, the offshore reefs are likely to have very low levels of exposure.

Overall the vulnerability of reef sub-features within the Lands End and Cape Bank pSAC to non-toxic contamination is considered to be low.

#### **4.1.5 Biological disturbance**

Biological disturbance includes the introduction of pathogens or non-native species as well as selective extraction of species from the ecosystem. Removal of fish species and larger molluscs can have significant impacts on the structure and functioning of benthic communities over and above the physical effects of fishing methods. Thus both reef sub-features are considered to be moderately sensitive to selective extraction of species.

Echinoderm populations have been reported to be adversely affected by diseases. Although no evidence of disease within brittlestars have been reported a precautionary sensitivity of low have been suggested for the introduction of pathogens.

It is known that that the area is fished by static gear (crab /lobster pots) on a seasonal basis, mainly from May to November (Cefas, 2008). However the intensity of fishing during this period can be relatively high particularly inshore. Thus the overall level of exposure to selective extraction due to fishing is considered to be moderate for the inshore upstanding reef and low for the offshore upstanding reef.

Overall the vulnerability of reef sub-features within the Lands End and Cape Bank pSAC to biological disturbance is considered to be low to moderate.

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## 5. References

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**6. Appendix A Methods deriving vulnerability.**

Sensitivity		Exposure		Vulnerability	
None	-	None	-	None detectable	
Low	•	Low	+	Low	
Moderate	••	Medium	++	Moderate	
High	•••	High	+++	High	

The relative vulnerability of an interest feature or sub-feature is determined by multiplying the scores for relative sensitivity and exposure, and classifying that total into categories of relative vulnerability.

**Relative sensitivity of the interest feature**

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

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

## Appendix B

Assessment of the relative vulnerability of interest features and sub-features of the Lands End and Cape Bank pSAC to different categories of operations (for key see appendix A)

Operations which may cause deterioration or disturbance	Annex I Reefs					
	Offshore Upstanding Reef			Inshore Upstanding Reef		
	Sensitivity	Exposure	Vulnerability	Sensitivity	Exposure	Vulnerability
<b>Physical loss</b>						
Removal (e.g. harvesting, coastal development)	••	-	-	••	-	-
Smothering (e.g. by artificial structures, disposal of dredge spoil)	•	+	Low	•	+	Low
<b>Physical damage</b>						
Siltation (e.g. run-off, channel dredging, outfalls)	•	+	Low	•	+	Low
Abrasion (e.g. boating, anchoring, trampling)	••	+	Low	••	+	Low
Selective extraction (e.g. aggregate dredging)	-	-	-	-	-	-
<b>Non-physical disturbance</b>						
Noise (e.g. boat activity)	-	+	-	-	+	-
Visual (e.g. recreational activity)	-	+	-	-	+	-
<b>Toxic contamination</b>						
Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs)	•	+	Low	•	+	Low
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	•	+	Low	•	+	Low
Introduction of radionuclides	Insufficient information	-	-	Insufficient information	-	-
<b>Non-toxic contamination</b>						
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	••	+	Low	••	+	Low
Changes in organic loading (e.g. mariculture, outfalls)	••	+	Low	••	+	Low
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)	•	+	Low	••	+	Low
<b>Biological disturbance</b>						
Introduction of microbial pathogens	•	+	Low	•	+	Low
Introduction of non-native species and translocation	Insufficient information	+		•	+	Low

Operations which may cause deterioration or disturbance	Annex I Reefs					
	Offshore Upstanding Reef			Inshore Upstanding Reef		
	Sensitivity	Exposure	Vulnerability	Sensitivity	Exposure	Vulnerability
Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	••	+	Low	••	++	Moderate

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