

Offshore Special Area of Conservation: Braemar Pockmarks

Draft Conservation Objectives and Advice on Operations



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Version 3.0 (10th September 2007)

* Cover photo illustrates carbonate cemented rock slab with wolf-fish, Buccinid egg mass and epifauna including the anemone *Bolocera tuediae* at the Braemar Pockmarks site

Document version control

Version and date	Amendments made	Issued to and date
BraemarPockmarks_ConservationObjectives+Advice onOperations_3.0.doc (10 th September 2007)	<ul style="list-style-type: none">- Stand alone Conservation Objectives and Advice on Operations (SAC Selection Assessment moved to separate document)- Sensitivity, exposure and vulnerability assessments modified- Summary of Advice on Operations moved to front of document	UK Marine Biodiversity Policy Steering Group and Competent Authorities (September 07)
BraemarPockmarksDossier_2.0_Draft.doc (26 th August 2006)	<ul style="list-style-type: none">- Document structure modified: Conservation objectives and Advice on Operations combined with SAC selection assessment.- Map layout revised (boundary not changed)- Sensitivity/exposure/vulnerability assessments added (<i>former document contained provisional management statements only</i>)- Advice on Operations amended	Defra (25 th September 2006)
Braemar Pockmarks selection assessment and provisional management action statements: JNCC 05 P10 (September 2005)		JNCC Committee (September 2005)

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Summary of Draft Advice on Operations for Braemar Pockmarks Special Area of Conservation (SAC)

This advice is based on information on the SAC presented in JNCC's 'Braemar Pockmarks: SAC Selection Assessment' (version 3.0 May 2007). JNCC's Advice on Operations is site and feature specific, and has been developed using best available scientific information and expert interpretation as at September 2007. The Advice is generated through a coarse grading of sensitivity and exposure of site interest features to physical, chemical and biological pressures associated with human activity. Sensitivity and exposure have been combined to give a measure of the vulnerability of an interest feature to operations which may cause damage or deterioration, and which therefore require management.

The exact impact of any operation will be dependent upon the nature, scale, location and timing of events. This Advice on Operations for the Braemar Pockmarks site will be kept under review and will be periodically updated to reflect changes in both sensitivity and exposure.

Management actions should enable the biological communities associated with the Braemar Pockmarks' Submarine structures made by leaking gases to achieve their full natural biological diversity, and the underlying physical structure of the interest features to be maintained. This will require assessment and management of human activities likely to affect these adversely, and of activities likely to impact the functioning of natural processes upon which the features are dependent.

To fulfil the conservation objectives for the **Annex I Submarine structures made by leaking gases**, the competent authorities for this area are advised to manage human activities within their remit such that they do not result in deterioration or disturbance of this feature through any of the following:

- i) **Physical damage** by Changes in suspended sediment (demersal fishing), or Physical disturbance or abrasion (demersal fishing);
- ii) **Toxic contamination** by Introduction of Synthetic and/or Non-synthetic compounds (pollution from oil and gas industry);
- iii) **Non-toxic contamination** by Changes in turbidity (demersal fishing);
- iv) **Biological disturbance** by Selective extraction of species (demersal fishing).

Within the Braemar Pockmarks SAC, the following offshore activity is likely to result in damage to the interest features, and is not subject to prior authorisation or licensing. It is, therefore, currently considered to pose a high risk of damage to the interest features of the SAC:

- **Demersal fishing**

Competent Authorities are advised to consider management actions that might need to be taken to reduce the risk of damage to the features associated with this activity.

The above list is not a catalogue of prohibitions but rather indicates where some form of management measure(s) may be required or further measures where actions are already in force. This advice is indicative and does not remove the need for formal consultation on individual plans and projects.

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Braemar Pockmarks SAC: Draft Conservation Objectives and Advice on Operations

Introduction

Under the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007, JNCC is required to notify Competent Authorities of the conservation objectives for offshore Special Areas of Conservation and to advise them of operations which may adversely affect the integrity of the site. This requirement applies once a site has been advised to the European Commission. 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) Conservation Objectives for Braemar Pockmarks SAC interest features

The following Conservation Objectives set out what needs to be achieved at the site in order to fulfil the aims of the Habitats Directive. They are a starting point from which management of activities and monitoring of the conservation features of the site may be developed. Only qualifying interest features are considered in this section.

The Conservation Objectives for the Braemar Pockmarks ‘Submarine structures made by leaking gases’ are:

Subject to natural change, maintain* the Submarine structures made by leaking gases in favourable condition, such that:

- The natural **environmental** and **ecological processes** of Submarine structures made by leaking gases are maintained.
- The **extent, distribution, diversity** and characteristic species composition of biological communities representative of Submarine structures made by leaking gases in the northern North Sea are maintained.

* Maintain implies restoration if the feature is currently not in favourable condition

Definition of terms:

- **Environmental processes:** the natural processes which may affect the water quality, turbidity or physical systems of the site
- **Ecological processes:** the biological interactions within communities and the overall productivity and diversity of the biological system
- **Extent:** the area covered by the habitat and communities
- **Distribution:** the geographical location of habitats and communities within the site
- **Diversity:** the number of different biological communities

Conservation objectives for inshore SACs have been provided in association with a ‘favourable condition’ table, which outlines how to recognise favourable condition status for the interest features in question. However, for offshore sites, there is presently insufficiently detailed information on i) the existing conditions of qualifying interest features and ii) the preferred or target condition of interest features in offshore waters. This currently limits the identification of measures and associated targets for condition monitoring. It is anticipated that further information on the condition of interest features will be obtained through baseline surveys and

monitoring.

In the case of the Braemar Pockmarks SAC, there is some evidence to date that, due to damage caused by bottom trawling (John Hartley, pers. comm., 2005), the Annex I features may not be in favourable condition and might require restoration where possible. As outlined, further information will be required to assess and monitor favourable condition of Submarine structures made by leaking gases at this offshore SAC.

2) Advice on operations

JNCC's Advice on Operations outlines our current knowledge of the nature and extent of activities taking place within or close to the site which may significantly impact on interest feature(s) for which the site has been proposed (Annex I Submarine structures made by leaking gases). We aim to link human activities and the ecological requirements of Annex I/II habitats or species, as required under Article 6 of the Habitats Directive. This advice will help focus the attention of the competent authorities on those activities that pose the greatest potential threat to the favourable condition of the Braemar Pockmarks site's interest features. In addition, a risk assessment has been conducted to assess the risk, under current management regimes, of offshore activities damaging the features for which a SAC is selected. It is important to note that this advice is only a starting point for assessing impacts and will be further developed over the coming years. Moreover the provision of this advice does not remove the need for formal consultation on individual plans and projects. JNCC will provide more detailed advice to competent authorities to enable them to assess the implications of any given plan or project at the time it is being considered.

Six broad Pressure Categories which may cause i) deterioration of natural habitats or the habitats of species, or ii) disturbance of species, (either alone or in combination), are considered in this document:

- Physical Loss
- Physical Damage
- Non-physical disturbance
- Toxic contamination
- Non-toxic contamination
- Biological disturbance

Example sources of pressures are provided (See Table 1), although these examples are not inclusive of all potentially detrimental activities.

A three-step process is used to assess the vulnerability of the site's features (**Submarine structures made by leaking gases**) to the above pressures (see flow diagram in Appendix I):

- An assessment of the **sensitivity** of the interest feature to the listed pressures;
- An assessment of the current **exposure** of the interest feature to the pressures; and
- An assessment of the **vulnerability** of the interest feature to the pressures. Vulnerability occurs where sensitivity to a given pressure is combined with exposure to that pressure.

This approach is sufficiently robust to take into account the effects of new activities or changes in patterns of usage, and by assessing sensitivity, exposure and vulnerability independently, the reasoning behind current (and any future) advice is made clear. If an interest feature is known or thought to be sensitive to a particular pressure category, new activities or changes in patterns of activities which result in that pressure are likely to cause deterioration or disturbance.

All the scores of relative sensitivity, exposure and vulnerability are derived using best available scientific data and expert judgement. This method uses a coarse categorisation system, reflecting the current state of our understanding of the marine environment. It should be recognised that data for offshore habitats are sparse and assessments are likely to need revision in light of new research.

a) Sensitivity assessment

This assessment evaluates the relative sensitivity of the features of the Braemar Pockmarks SAC to the effects of the aforementioned pressures. Sensitivity is defined here as ‘the intolerance of a habitat, community or individual (or individual colony) of a species to damage, or death, from an external factor and the time taken for its subsequent recovery’ (MarLIN, 2006). 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) (MarLIN, 2006). The sensitivity of interest features (and scientific understanding of sensitivity) may change over time; hence an operation which is not currently deemed to have a negative effect may do so in the future.

Table 1 (column 3) shows the sensitivity assessments for the features of the Braemar Pockmarks SAC. They are drawn principally from MarLIN's (2000) evaluation of the sensitivity of the following biotope (which is comparable to that present within the SAC):

- **Faunal and algal crusts, *Echinus esculentus*, sparse *Alcyonium digitatum* and grazing-tolerant fauna on moderately exposed circalittoral rock (MCR.FaAIC)**

The applicability of the MarLIN assessments of sensitivity is dependent on the quality of available scientific information on these biotopes and their characterising species. In addition, both the biotope classification system and the MarLIN sensitivity assessments primarily rely on inshore biological data, so although they are applicable to habitats in offshore waters, confidence in these assessments in an offshore context is necessarily lower. JNCC have in some cases, therefore, adjusted the assessments of sensitivity to be more precautionary. Further detail on our approach to evaluating sensitivity can be provided on request.

Interest feature sensitivity to physical, chemical and biological pressures:

The interest features and associated biological communities of the Braemar Pockmarks site are sensitive to: **Physical loss, Physical damage, Toxic and Non-toxic contamination, and Biological disturbance**, resulting from a range of activities. Further detail on sensitivities of the Submarine structures made by leaking gases is provided in Table 1.

b) Exposure assessment

Table 1 (column 4) shows the relative exposure of the Braemar Pockmarks' interest 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.

As offshore sites cover a relatively large geographical area and precise information on operations within SAC boundaries is not yet available, assigning scores for exposure carries certain assumptions about the spatial extent, frequency and intensity of the pressures associated with offshore activities. Expert judgement was used to determine where onsite activities are likely to affect interest features physically, chemically and/or biologically. Spatial data on offshore industry activities has been provided by the Crown Estate for aggregate extraction and windfarm development, UK Deal for oil and gas industry activities and the United Kingdom Cable Protection Committee for submarine cable distribution. UK-wide fisheries data for offshore waters are not yet available to JNCC at sufficient resolution to enable a full assessment of exposure to different types of fishing activities. Availability of Vessel Monitoring System (VMS) data combined with logbook and/or vessel registration data for all European vessels across UK waters on an annual basis would allow the spatial extent and intensity of physical and biological pressures associated with demersal fishing to be evaluated more thoroughly. We are not aware of an adequate methodology to assess the distribution of static/set demersal gear use, or the intensity of its physical and biological impacts. Interest feature exposure and vulnerability to static/set demersal gears have therefore not been assessed.

It is likely that over the coming years, more detailed information on the levels of pressures associated with activities at the Braemar Pockmarks site will be collected or collated, and this may lead to modification of the advice on operations presented here.

Interest feature exposure to physical, chemical and biological pressures

The interest features and associated biological communities of the Braemar Pockmarks site are exposed to the following pressures.

- **Physical damage:** The Submarine structures made by leaking gases are exposed to **Changes in suspended sediment** and **Physical disturbance or abrasion** at unknown levels (demersal fishing)
- **Toxic contamination:** The Submarine structures made by leaking gases are likely to be exposed to both **Synthetic** and **Non-synthetic compounds** at unknown levels (due to onsite oil and gas industry activities)
- **Non-toxic contamination:** The Submarine structures made by leaking gases are exposed to **Changes in turbidity** at unknown levels (demersal fishing)
- **Biological disturbance:** The Submarine structures made by leaking gases are exposed to **Selective extraction of species** at unknown levels (demersal fishing).

It has not been possible to determine whether the interest features are exposed to **Noise (acoustic)**, **Introduction of radionuclides**, **Introduction of microbial pathogens** or **Introduction of non-native species**.

c) Vulnerability assessment

The vulnerability of the interest feature to external pressures is determined by integrating the sensitivity evaluation with that of exposure. Only if a feature is both sensitive *and* exposed to a human activity is it considered vulnerable (see Appendix II). In this context, therefore, ‘vulnerability’ has been defined as the exposure of the habitat, community or individual (or individual colony) of a species to an external factor to which it is sensitive (Hiscock, 1996). An assessment of interest features’ vulnerability (column 5 in Table 1) helps to guide site management decisions by highlighting potentially detrimental activities that may need to be managed (or continue to be managed) by the competent authorities.

The vulnerability of the SAC to climate change is not considered in the tables below, given the uncertainties surrounding the effects of global change on the oceans. Possible effects of climate change, based on best available information are set out in Appendix III.

Interest feature vulnerability to physical, chemical and biological pressures

The **Braemar Pockmarks’ Submarine structures made by leaking gases** and associated biological communities are vulnerable to:

- **Changes in suspended sediment** (demersal fishing), **Physical disturbance or abrasion** (demersal fishing), **Introduction of synthetic compounds and non-synthetic compounds** (oil and gas activities), **Changes in turbidity** (demersal fishing) and **Selective extraction of species** (demersal fishing).

The vulnerability of the Submarine structures made by leaking gases to these pressures cannot be quantified at present.

Vulnerability to **Noise (acoustic)**, **Introduction of radionuclides**, **Introduction of microbial pathogens** and **Introduction of non-native species** remains unknown for both interest features.

d) Risk Assessment

JNCC has assessed the risk posed by offshore industries to SAC interest features as part of our Advice on Operations. Risk is defined in terms of the likelihood of an event occurring and its associated impact. Probability of damage or disturbance to interest features of the SAC is based on existing knowledge of industry activities on-site and the spatial extent of their associated pressures. With regard to industries which are location specific, are always subject to prior consent and have clear reliable methods of enforcement, there is generally a lower likelihood of causing damage or disturbance to interest features. This includes the activities of the oil and gas, aggregates and renewable energy industry sectors. Industries which are not location specific and not subject to prior consent procedures are more likely to cause damage/disturbance to the interest feature. These industries include fishing and shipping. Not all activities associated with these industries are detrimental to interest features (e.g. most pelagic fisheries cause minimal harm to Annex I features). The severity of impact is assessed independently, and will vary according to feature sensitivities. If an activity results in more than one (physical, chemical or biological) pressure, the sensitivities to each pressure are taken into consideration. Overall risk to interest features is determined by combining evaluations of probability of occurrence with

severity of damage. Only high or medium-high risk activities are noted here.

Within the Braemar Pockmarks site, the following offshore activity is currently considered to pose a high risk to the interest features:

- **Demersal fishing**

Competent Authorities are advised to consider management actions that might need to be taken to reduce the risk of damage associated with this activity to the SAC features.

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Table 1: Sensitivity, exposure and vulnerability of the Braemar Pockmarks' Submarine structures made by leaking gases to physical, chemical and biological pressures

Sensitivity key: ●●● = High sensitivity ●● = Moderate sensitivity ● = Low sensitivity, ○ = No known sensitivity* and ? = Insufficient information to make assessment (*Meaning: 'Sensitivity of the feature has been researched and no evidence of sensitivity to this pressure has been found')

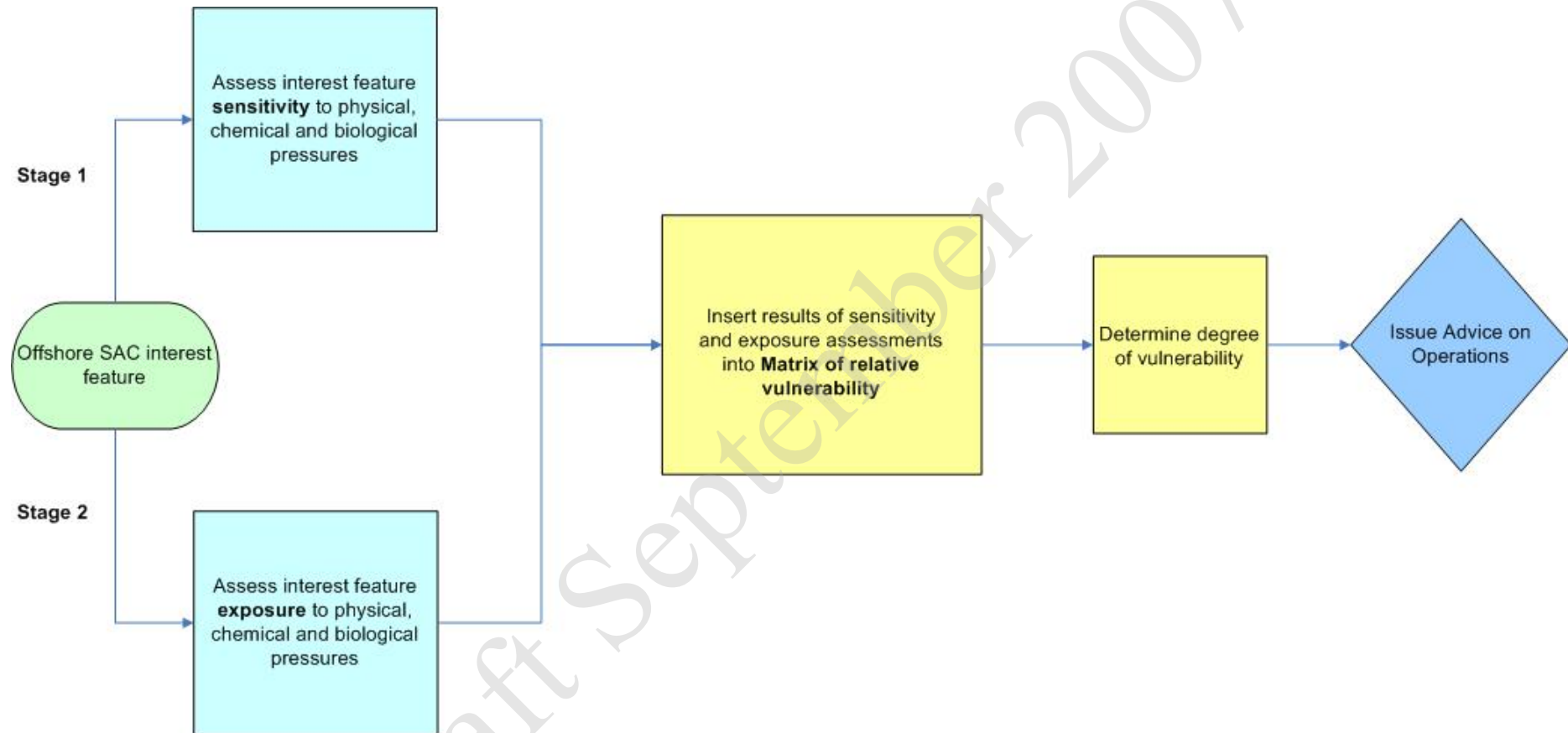
Exposure key: High = High exposure, Medium = Medium exposure, Low = Low exposure, None = No known exposure, Unknown level = Exposure of an unknown level and ? = Insufficient information to make assessment.

List of pressures which may cause deterioration or disturbance (with example activities)		Braemar Pockmarks: Submarine structures made by leaking gases		
		Sensitivity	Exposure	Vulnerability
Physical Loss	Removal (e.g. aggregate dredging, isolated rock dump, infrastructure development)	●●●	None	No known vulnerability
	Obstruction (e.g. permanent constructions [oil & gas infrastructure, windfarms, cables] & wrecks)	●●●	None	No known vulnerability
	Smothering (e.g. drill cuttings)	●●	None	No known vulnerability
Physical Damage	Changes in suspended sediment (e.g. screening plumes from aggregate dredging)	●	Unknown level	Vulnerability (not quantifiable)
	Physical disturbance or abrasion (e.g. mobile benthic fishing, anchoring, windfarm scour pits, pipeline burial, potting)	●●●	Unknown level	Vulnerability (not quantifiable)
Non-physical disturbance	Noise (e.g. boat activity, seismic)	○	?	No known vulnerability
	Visual presence (e.g. recreational activity)	○	None	No known vulnerability
Toxic contamination	Introduction of synthetic compounds (e.g. TBT, PCBs, industrial chemical discharge, produced water, fuel oils)	●●●	Unknown level	Vulnerability (not quantifiable)
	Introduction of non-synthetic compounds (e.g. heavy metals, crude oil spills)	●●●	Unknown level	Vulnerability (not quantifiable)
	Introduction of radionuclides (e.g. nuclear energy industry)	?	?	Insufficient information
Non-toxic contamination	Changes in nutrient loading (e.g. outfalls)	●●	None	No known vulnerability
	Changes in thermal regime (e.g. cooling water discharges)	●●	None	No known vulnerability
	Changes in turbidity (e.g. laying of pipelines, aggregate dredging)	●	Unknown level	Vulnerability (not quantifiable)
	Changes in salinity (e.g. outfalls from rigs, ships)	●●	None	No known vulnerability
Biological disturbance	Introduction of microbial pathogens (e.g. outfalls)	?	?	Insufficient information
	Introduction of non-native species and translocation (e.g. ballast water, hull fouling)	?	?	Insufficient information
	Selective extraction of species (e.g. bioprospecting, scientific research, demersal fishing)	●●●	Unknown level	Vulnerability (not quantifiable)

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Appendix I: Flow diagram illustrating process of determining vulnerability of interest features



Appendix II: Matrix of relative vulnerability

The relative vulnerability of an interest feature is determined by combining the sensitivity and exposure assessments according to the table below.

Relative exposure of the interest feature at the site	Relative sensitivity of the interest feature				
		High ●●● (3)	Moderate ●● (2)	Low ● (1)	None detectable ○ (0)
High (3)		9	6	3	0
Medium (2)		6	4	2	0
Low (1)		3	2	1	0
Exposure at an unknown level					0
None (0)		0	0	0	0

Note that if there is insufficient information to assess either the exposure OR sensitivity of a given interest feature, vulnerability will always be categorised 'insufficient information to make any assessment'.

Categories of relative vulnerability

High vulnerability	6 to 9
Moderate vulnerability	3 to 5
Low vulnerability	1 to 2
Vulnerability identified, but not quantified as level of exposure unknown.	
No known vulnerability	0
Insufficient information to make any assessment	

Appendix III: The effects of climate change on the Braemar Pockmarks site

According to the UKCIP (2002), sea temperatures in this area may rise by between 0.5-1°C by the 2020s, and by 0.5-2 °C by the 2080s (under low and high emissions scenarios respectively). These variations need to be considered in relation to the relatively stable conditions experience at this site. This site is heavily influenced by Atlantic inflow and may be affected by changes in ocean circulation patterns; or by changes in the frequency and location of passage of storms. Significant changes in ocean acidity are also likely to be felt at this site by the end of this century (The Royal Society, 2005). The biological outcomes of climatic changes are difficult to forecast: specific ecosystem impacts of changes in temperature, salinity, nutrient levels remain unknown (Stephen Dye (FRS), Pers. Comm., February 2006). Any expressions of biological change are expected to occur slowly, over the 100 years or so. There is a low risk of rapid shifts in benthic communities at this site because of the stabilising influence of the North Atlantic. Nevertheless, the carbonate structures (resulting from methane seeps) may be particularly sensitive to ocean acidity change (and subsequent alterations in local ocean chemistry processes), potentially lowering their ecological resilience (The Royal Society, 2005).

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