European Community Directive
on the Conservation of Natural Habitats
and of Wild Fauna and Flora
(92/43/EEC)

Second Report by the United Kingdom under Article 17

on the implementation of the Directive from January 2001 to December 2006

Conservation status assessment for :

H8330: Submerged or partially submerged sea caves

H8330 Submerged or partially submerged sea caves

Audit trail compiled and edited by JNCC and the UK Inter-Agency Marine Monitoring Group

This paper and accompanying appendices contain background information and data used to complete the standard EC reporting form (Annex D), following the methodology outlined in the commission document "Assessment, monitoring and reporting under Article 17 of the Habitats Directive, Explanatory Notes and Guidelines, Final Draft 5; October 2006". The superscript numbers below cross-reference to the headings in the corresponding Annex D reporting form. This supporting information should be read in conjunction with the UK approach for habitats (see 'Assessing Conservation Status: UK Approach').

1. National-biogeographic level information

1.1 General description & correspondence with National Vegetation Classification (NVC) and other habitat types

Table 1.1.1. provides a summary description of H8330 and its relations with UK classifications.

This Annex I type includes submerged sea caves and also partially submerged caves which are only exposed to the sea at high tide. Caves vary in size, from only a few metres to more extensive systems, which may extend hundreds of metres into the rock. There may be tunnels or caverns with one or more entrances, in which vertical and overhanging rock faces provide the principal marine habitat. They are typically associated with 1170 Reefs (Jackson and McLeod 2000, 2002).

Table 1.1.1 Summary description of habitat H8330 and its relations with UK vegetation/habitat classifications.

Classification	Correspondence with Annex I type	Comments
EU Interpretation Manual	= H8330	Caves situated under the sea or opened to it, at least at high tide, including partially submerged sea caves. Their bottom and sides harbour communities of marine invertebrates and algae (European Commission, 2003).
Common Standards Monitoring (CSM)	Submerged or partially submerged sea caves	None
Biodiversity Action Plan (BAP) priority habitat type	Not applicable	Not applicable

2. Range [2.3]

2.1 Current range

Range surface area[2.3.1]: 22,500 km²
Date calculated[2.3.2]: May 2007
Quality of data [2.3.3]: Poor

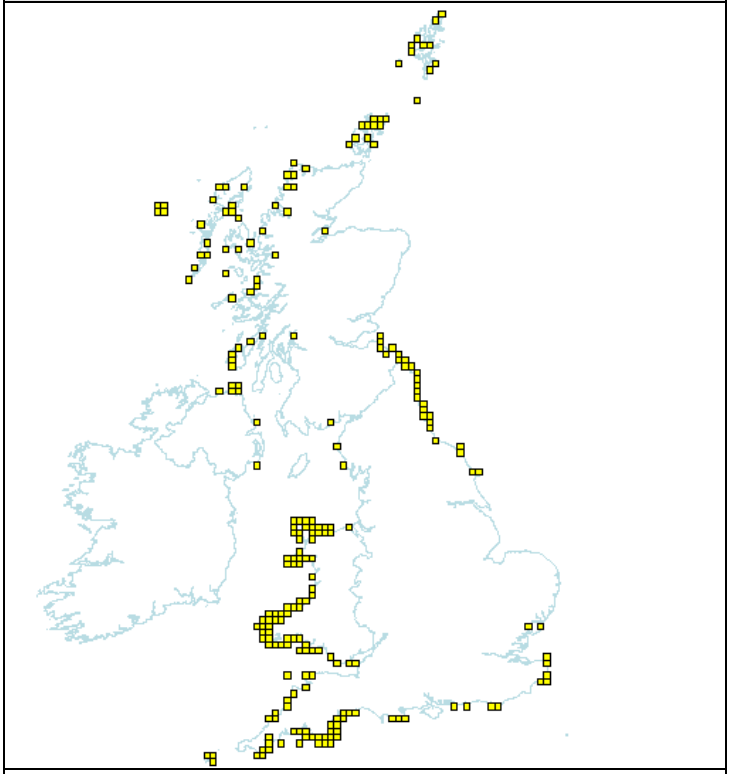
Map 2.1.1 shows the range and distribution of habitat H8330 in the UK.

The map shows where sea caves have been recorded; the 10-km square count is 225. However, much of the UK coast is unsurveyed, and thus the map considerably under-represents the true distribution of this Annex I type. There are no comprehensive data available for the UK, but the concentration of caves in

Wales, where a comprehensive intertidal survey has been conducted, give an indication of the degree to which the national picture may, at present, be under-represented.

Caves are associated with reefs. Given the definition of caves as anything from an overhang to large caverns it is reasonable to say that wherever there is rocky reef there are likely to be caves.

Map 2.1.2 Habitat range[1.1]/distribution[1.2] map for H8330 *Data source: Marine Recorder 2007*



Each blue square represents a 10x10km square of the National Grid and shows the known and/or predicted occurrence of this habitat.

2.2 Trend in range since c.1994

Trend in range[2.3.4]: **Unknown**
Trend magnitude[2.3.5]: **Not applicable**
Trend period[2.3.6]: **1994-2006**
Reasons for reported trend[2.3.7]: **Not applicable**

Much of the UK coast is unsurveyed, and thus there are no comprehensive data available. The only figures available are for incidental records and there are no trend data for this feature.

2.3 Favourable reference range

Favourable reference range[2.5.1]: **Unknown**

The feature is defined by its physiographic type rather by a specific biological community; and its range is therefore determined by physical and geological processes. While the number of caves may have declined due to local pressures the geographic spread and distribution of feature type has not been reduced. In addition, many of the species found in caves are found on the adjacent reefs and are not specialised to the cave habitat, therefore many of the associated communities will be able to function whether they are in true caves or not.

Rocky caves are unlikely to reduce in range due to the nature and UK–wide spread of rocky coasts. Existing chalk caves are at risk from erosion which may be increased due to climate change. However,

this process will also create new caves. Therefore, it is not possible to assess at this stage how this will affect range.

2.4 Conclusions on range

Conclusion[2.6.i]: Favourable

While individual areas with caves in them may have been affected by coastal processes and development there has been no overall decline in the geographic spread of the feature.

3. Area [2.4]

3.1 Current area

Total UK extent [2.4.1]: Unknown
Date of estimation [2.4.2]: May 2007
Method [2.4.3]: Not applicable
Quality of data [2.4.4]: Poor

Table 3.1.1 provides information on the area of H8330 in the UK. There are no comprehensive data available for the UK. The only figures available are for incidental records of sea caves and tunnels from field surveys listed in Marine Recorder, which give no indication of the extent of the cave systems; furthermore much of the coast is unsurveyed, so the data are very incomplete (Jackson and McLeod 2000, 2002).

Table 3.1.1 Area of H8330 in the UK

	Area (ha)	Method [2.4.3]	Quality of data [2.4.4]
England	Unknown	Not applicable	Not applicable
Scotland	Unknown	Not applicable	Not applicable
Wales	Unknown	Not applicable	Not applicable
Northern Ireland	Unknown	Not applicable	Not applicable
Total UK extent [2.4.1]	Unknown	Not applicable	Poor

Method used to estimate the habitat surface area: 1 = only or mostly based on expert opinion; 2 = based on remote sensing data; 3 = ground based survey. Only the most relevant class is given if more than one applies.
Quality of habitat surface area data: 'Good' e.g. based on extensive surveys; 'Moderate' e.g. based on partial data with some extrapolation; 'Poor' e.g. based on very incomplete data or on expert judgement

The European Commission Interpretation Manual of European Union Habitats (European Commission 2003) does not state the lower size limit for a cave – when does a large crevice or overhang count as a cave? Bunker and Holt (2003) took the pragmatic approach of defining a cave as "being large enough to get a surveyor fully into the cave, turn around and exit without damaging the attached flora and fauna". This would include large overhangs, tunnels, blow holes and archways. Clearly on this definition it is reasonable to propose that caves will occur on the majority of reefs. However, direct extrapolation from area of reef to number/area of caves is not possible as this is dependent on geology and erosion. While some inventories of caves have been done for specific Special Areas of Conservation (SACs) (e.g. Berwickshire (ERT 1997), Flamborough Head (Howson 2000)) these are not guaranteed to be accurate and a large cave extending back into the cliff would be counted as equal to anything greater than an overhang – therefore the number of caves gives no indication of area. There is no accepted proxy for determining or estimating cave area.

The following is taken from Pembrokeshire Marine Regulation 33 advice (Countryside Council for Wales (CCW) 2005):

"submerged and partially submerged sea caves are widely distributed throughout and around the length of the rocky coast. The distribution of partially submerged sea caves is reasonably well known, though that of submerged sea-caves within the site is not. The extent of partially submerged sea-cave habitat is poorly known and of submerged sea-caves almost completely unknown. Although large caves occur within the site, the extent of sea cave habitat is small relative to the size of the site and the reef feature."

The distribution of submerged sea caves is poorly known; the few that have been documented have been the result of opportunistic discovery. Submerged sea-caves are known from depths of c.20 m. However, as sea levels were up to 40 m below present during previous glacial periods it is inferred that many more sea-caves would have been formed during those periods in locations with suitable geological exposures, typically along the coast where intertidal cliff extends directly into the sublittoral, and that sea-caves are likely to be distributed more widely and extend to greater depths than those known (CCW 2005).

3.2 Trend in area since c.1994

Trend in area[2.4.5]: **Unknown**
Trend magnitude[2.4.6]: **Not applicable**
Trend period[2.4.7]: **1994-2006**
Reasons for reported trend[2.4.8]: **Not applicable**

There are no area trend information for this feature. There is potential for caves as defined in 3.1 to be found anywhere within the reefs of the UK. However, there is no way of practically estimating the area that this represents. Although, there has been a substantial loss of chalk cliffs in Thanet which represents 20% of the UK coastal chalk (Titley *et al.* 1998). Of 23 km of chalk cliff only 5.9 km remain unprotected by sea defences and only a small proportion of that supports well developed cave communities (Titley *et al.* 1998). Elsewhere in England, coastal chalk remains in a largely natural state (UKBAP 2006). At present, there is no way to ascertain how this relates to the percentage of actual caves lost or what percentage of the total area of sea caves are made up from chalk caves.

In north Wales many caves in the Pen Lleyn SAC have been in-filled to prevent the collapse of a coastal railway line. This accounted for two/three of the caves surveyed (Burdon and Boyes unpublished). While this may be a problem locally there is no information on how widespread the infilling of caves is, and thus no judgement is possible on the loss to the overall feature as a result of this impact.

3.3 Favourable reference area

Favourable reference area[2.5.2]: **Unknown**

3.4 Conclusions on area covered by habitat

Conclusion[2.6.ii]: **Unknown**

The feature is not fully recorded. In addition the feature is subject to natural change in extent due to the processes of erosion. While the area of the parent feature (reefs) could be estimated there is no reliable estimate for the area of feature itself and, due to the significant logistical problems of surveying caves, this is likely to remain the case.

4. Specific structures and functions **(including typical species)**

4.1 Main pressures [2.4.10]

950 Biocenotic evolution
960 Interspecific faunal relations
970 Interspecific floral relations
974 genetic pollution
400 Urbanised areas, human habitation
410 Industrial or commercial areas

503 railway lines, TGV
504 port areas
871 sea defense or coast protection works
720 Trampling, overuse
860 Dumping, depositing of dredged deposits
290 Hunting, fishing or collecting activities not referred to above
800 Landfill, land reclamation and drying out, general
952 eutrophication
420 Discharges
700 Pollution
709 other forms or mixed forms of pollution
701 water pollution

- Non-Indigenous Species (954, 960, 970, 974)
- Coastal development (400, 410, 503, 504, 871)
- Other physical impacts (720, 860, 290, 800, 871)
- Water Quality (952, 420, 700, 701, 709)

See 5.1 for full descriptions.

4.2 Current condition

4.2.1 CSM condition assessments

Condition assessments based on CSM (see http://www.jncc.gov.uk/page-2199) provide a means to assess the structure and functioning of H8330 in the UK. The CSM assessments relevant to this feature were made using some of the following attributes:

- Extent.
- Biotope Composition.
- Distribution and spatial pattern of biotopes.
- Presence of representative/notable biotopes.
- Presence of representative/notable species.

All the attributes are currently deemed discretionary until further field survey provides sufficient data to formulate advice on those attributes which apply to all sites. An attribute should only be selected where it reflects the conservation interest of the individual feature on a site (JNCC 2004).

SAC condition assessments

Table 4.2.1 and Map 4.2.1 summarise the CSM condition assessments for UK SACs supporting habitat H8330. These data were collated in January 2007. The maps give an impression of the overall spread of where unfavourable and favourable sites exist (summary statistics for the map are given in Section 7.2). The combined assessments show that of the SACs assessed:

- An unknown % of the area and 98 % of the number of assessments was unfavourable; and
- An unknown % of the total UK habitat area was in unfavourable condition.

Sites for SACs have been selected to encompass the range of structural, geological and ecological variation of sea caves and to cover their geographic range in the UK. Selection was confined to well-developed cave systems, with extensive areas of vertical and overhanging rock and extended, which are likely to support a wider range and higher diversity of plants and animals (Jackson and McLeod 2000, 2002). Sites in which there are well-developed gradations in community composition from the cave entrance to the inner parts of a cave have been favoured. Because of the European importance of chalk caves, emphasis has been given to this sub-type within the SAC series (Jackson and McLeod 2000, 2002).

Surveys themselves are a product of practicality, with many caves only accessible in calm conditions, which also implies a seasonal bias in any results (Howson 2000; Bunker and Holt 2003). Howson (2000) listed 183 caves in Flamborough Head of which 11 were surveyed in detail. Caves selected for survey/monitoring have been chosen as "best examples" (in terms of representivity, extent and species richness) so there is inherent bias in published results towards "good" sites.

As there are no data for the extent of caves throughout the UK outside of the SAC network it is thus impossible to extrapolate how much of the total resource is actually in favourable condition. However, the biota of littoral and sublittoral caves is adapted to survival in conditions with a great deal of disturbance from surge and scour. It is therefore likely that cave dwelling species are inherently robust (ERT 1997).

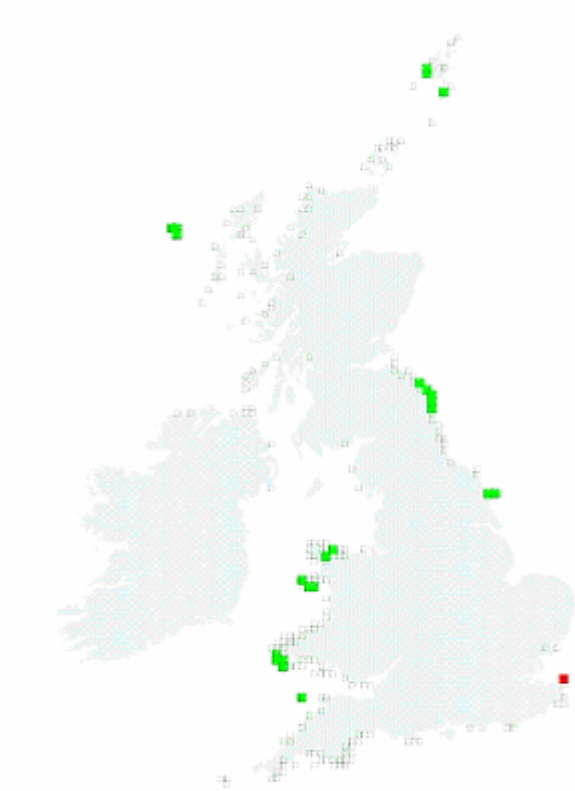
Table 4.2.1 CSM condition assessment results for UK SACs supporting H8330. See notes below table for details. Information on the coverage of these results is given in Section 7.2.

Condition	Condition sub-categories	Area (ha)	Number of site features
Unfavourable	Declining		
	No change		
	Unclassified		
	Recovering	28	1
	Total	28	1
	% of all assessments	***1%***	***8%***
	% of total UK resource	***unknown%***	***unknown***
Favourable	Maintained	1,843	9
	Recovered		
	Unclassified	1,688	3
	Total	3,531	12
	% of all assessments	***99%***	***92%***
	% of total UK resource	***unknown%***	***unknown***

Notes

1. Data on features that have been partly-destroyed have been excluded from this table because they are not relevant to the consideration of present condition.
2. The data included are from CSM assessments carried out between April 1998 and March 2005, as used for the JNCC Common Standards Monitoring Report 2006.

Map 4.2.1 Current Condition of H8330 based on CSM condition assessments: SAC assessments (See Sections 4.2 and 7.2 for further information)



Key:
Red = unfavourable, i.e. the square contains at least one SAC where this habitat feature is present and has been judged to be unfavourable
Green = favourable, i.e. the square contains at least one SAC where this habitat feature is present and has been assessed as favourable but there are no unfavourable SAC features
Blue = SAC not assessed, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported
Transparent = SAC feature not present, i.e. the square does not contain any SAC features of this habitat type

4.3 Typical species

Typical species[2.5.3]: **None used**
Typical species assessment[2.5.4]: **Not applicable**

The feature is not defined by the presence of particular species, nor is it structurally dependent upon particular species. Caves are habitat complexes which comprise an interdependent mosaic of subtidal and intertidal habitats and span the full geographic range of the UK. In addition, many of the communities within caves are not exclusively found in the feature and may be found as extensions of communities in contiguous locations. The following information is provided for context only and has not been transferred to Annex D.

Sea cave communities vary considerably depending on the structure and extent of the cave system, their degree of submergence and of exposure to sand scour and wave-surge, and their geology. Caves are typically colonised by encrusting animal species but may also support shade-tolerant seaweeds near their entrances. Physical conditions, such as inclination, wave surge, scour and shade, change rapidly from cave entrance to the inner parts of a cave, and this often leads to a marked gradation in the communities present (Jackson and McLeod 2000, 2002).

Sea caves around the UK coast display a wide range of structural and ecological variation, depending on the prevailing physical and geological conditions. Cave systems, with extensive areas of vertical and

overhanging rock, and those that extend deeply into the rock, generally support the widest range and highest diversity of plants and animals (George *et al.* unpublished).

The type of rock in which the cave is formed has an important influence on its shape and qualities as a substrate for plants and animals. In chalk caves in south-east England bands of microscopic algae occur, including Chrysophyceae and *Pilinia maritima*, that are highly specific to this habitat type (Jackson and McLeod 2000, 2002).

4.4 Conclusions on specific structures and functions (including typical species) [2.6.iii]

Unknown

There is a fundamental lack of data upon which to base judgements. In addition, we do not know what proportion of the resource is encompassed by the SAC series and thus by the data from CSM reporting.

There are no surveillance data relating to trends in any of the species/communities listed in 4.3. It is therefore not possible to assess the status of 'Typical Species' for this feature.

5. Future prospects

5.1 Main factors affecting the habitat

5.1.1 Conservation measures

H8330 is designated as a primary feature for seven SACs and a qualifying feature at a further eight, with targets to maintain the resource.

5.1.2 Main future threats[2.4.11]

The most obvious major future threats to H8330 are listed below, several of which are referred to in Section 4.1

900 Erosion
930 Submersion
943 collapse of terrain, landslide
954 invasion by a species
960 Interspecific faunal relations
970 Interspecific floral relations
974 genetic pollution
400 Urbanised areas, human habitation
410 Industrial or commercial areas
503 railway lines, TGV
504 port areas
720 Trampling, overuse
860 Dumping, depositing of dredged deposits
290 Hunting, fishing or collecting activities not referred to above
800 Landfill, land reclamation and drying out, general
952 eutrophication
420 Discharges
700 Pollution
709 other forms or mixed forms of pollution
701 water pollution

- Climate change (900, 930, 943)

There is at present no general agreement about the degree of physical change that might be acceptable in the marine environment. It is therefore not currently possible to define what is acceptable coastal erosion

and coastal flooding risk. Shoreline areas will be affected by increased storminess and windiness, which may affect friable chalk habitats (Brooker and Young 2005; George *et al.* unpublished).

There has already been a major change in the plankton species and abundance since the early 1980s (Hays *et al.* 2005). This affects a large area of the North Atlantic and appears to be linked to changes in the North Atlantic Oscillation and climate (Defra 2005).

Patterns of species response to climate change are not straightforward, due to factors such as current flow and barriers to species movement. The positive effects of increased temperatures, for example increased primary productivity may be offset by the negative impacts of increased disturbance from wave and storm surge action (Brooker and Young 2005). All of these effects will undoubtedly change the structure and function of caves; however, uncertainties exist with respect to predictions including: species specific responses to climate change; the possible influx of new invasive species; the impact of increasing ocean acidity due to absorption of atmospheric CO_2 (Defra 2005). Sea level rise and post-glacial land adjustment will submerge a greater area of littoral chalk platform (UKBAP 2006).

Sea level rise may affect the area available for seal haul outs and may lead to their displacement from caves to other locations.

- Non-Indigenous Species (954, 960, 970, 974)

Non-indigenous species (NIS) present a significant threat to the marine environment and their effects can have both economic and ecological ramifications, including biodiversity loss. The deleterious impacts of NIS have been shown across global regions, habitat types, and taxonomic groups worldwide. In marine ecosystems, ships' ballast water and fouled hulls are the primary mechanisms for the transport and introduction of non-indigenous marine species to ports worldwide (Cohen and Carlton 1998). Given the continued growth of global trade and the complexity of shipping patterns globally, it is clear that NIS will continue to be transferred to UK waters for the foreseeable future.

There are some measures currently in process to reduce the introduction of NIS via Ballast Water through the International Maritime Organisation (International Maritime Organisation 2004). This legislation aims to limit the number of viable organisms within ballast tanks upon arrival in port. Though this will in theory reduce the risk of introduction via shipping, the techniques to reduce density are still in the research and development phase and therefore the effectiveness of this legislation in the long term remains to be seen. Due to this uncertainty, NIS remain a grave concern for Annex 1 features.

Our capacity to predict invasions is severely limited by the complexity of the process, which is influenced by numerous factors associated with introduction, establishment and subsequent growth and range expansion of introduced species. Because of our limited predictive capacity in relation to NIS, it is difficult to identify those features that are at greatest risk, and thus we must consider all of them to be threatened to some degree by NIS (Ruiz *et al.* 1997; Cohen and Carlton 1998).

- Coastal development (400, 410, 503, 504)

There is a presumption against coastal development in GB (not in Northern Ireland) which is described by the following planning policy documents; NPPG 13 (Scotland) (Scottish Executive 2006) TAN 14 (Wales) (Welsh Assembly Government 1998) PPG 20 (England) (Department of Environment 1992) – the following is taken from NPPG 13:

"The presumption against development includes projects for which a coastal location is not required; projects that are approved should be accommodated on the developed coast, reuse available and suitable brownfield land, incorporate conservation interests and work within natural processes at work on the coast. In addition where potential damage to the environment is both uncertain and significant, a precautionary approach is required and the criteria required by the various bodies responsible for environmental protection should be met".

A recent survey of chalk cliffs throughout England revealed that 56% percent of coastal chalk in Kent and 33% in Sussex have been modified by coastal defence and other works. On the Isle of Thanet this increases to 74% and has resulted in the loss of a wide range of micro-habitats on the upper shore and the removal of splash-zone communities. There has been less alteration of chalk at lower shore and subtidal levels, although large ports have been developed at Dover and Ramsgate with harbour developments at Margate, Folkestone, Newhaven and Brighton Marina. Elsewhere in England, coastal chalk remains in a largely natural state (UKBAP 2006).

- Other physical impacts (720, 860, 290, 800)

Partially submerged (i.e. intertidal) caves, especially on chalk shores are susceptible to human disturbance especially by trampling, stone-turning and damage to rocks through removal of piddocks (UKBAP 2006). Chalk, especially the soft type found in Kent, is more likely to fragment and collapse than other rocks (except clay) because it is relatively easily eroded by rock-boring animals, wave action and tidal streams carrying sand and stones. These are natural processes, but damage could also be inflicted by physical disturbances (George *et al.* unpublished).

Caves are generally unsuitable areas for fishing and are therefore unlikely to be damaged or deteriorate as a direct result of fishing activity. However, an indirect impact from fishing litter, if washed into caves, could cause abrasion of epifauna and a possible tangle hazard for mobile species (Sewell and Hiscock 2005). Sewell and Hiscock (2005) found no references on the effects of fishing activity on caves.

Sessile organisms colonising sublittoral sites at the eastern end of the English Channel already have to contend with fairly high levels of siltation but may be vulnerable to increases in turbidity and levels of sedimentation from fishing, aggregate extraction and spoil dumping (Centre for Environment, Fisheries and Aquaculture Science (CEFAS) 2001).

- Water Quality (952, 420, 700, 701, 709)

The deterioration of water quality by pollutants and nutrients has caused the replacement of fucoid dominated biotopes by mussel-dominated biotopes, and the occurrence of nuisance *Enteromorpha spp.* blooms (UKBAP 2006).

5.2 Future condition **(as regards range, area covered and specific structures and functions)**

5.2.1 CSM condition assessments

The CSM condition assessments reported in Sections 4.2.1-2 provide a basis to predict the potential future condition of H8330 in the UK. This involved treating all assessments currently identified as either favourable or unfavourable recovering as future-favourable: remaining categories were treated as future-unfavourable – see Table 5.2.1.1. There are a number of caveats to this approach, which are set out beneath this table.

SAC condition assessments

Table 5.2.1 and Map 5.2.1 summarise the predicted potential future condition of H8330 on UK SACs. This is based on the approach described above. The maps give an impression of the overall spread of where future-unfavourable and future-favourable sites are predicted to occur (summary statistics for the map are given in Section 7.2). The combined assessments show that of the SACs assessed:

- An unknown % of the area and 100 % of the number of assessments fall within the future-favourable category; and
- An unknown % of the total UK habitat area falls within the future-favourable category.

Table 5.2.1 Predicted future condition of UK SACs supporting H8330 based on current CSM condition assessments. See notes below table for details. Information on the coverage of these results is given in Section 7.2.

Future condition	Present condition	Area (ha)	Number of site features
Future-unfavourable	Unfavourable declining		
	Unfavourable no change		
	Unfavourable unclassified		
	Total		
	% of assessments	***0%***	***0%***
	% of total UK extent	***unknown%***	***Unknown***
Future-favourable	Favourable maintained	1,843	9
	Favourable recovered		
	Unfavourable recovering	28	1
	Favourable unclassified	383	2
	Total	2,254	12
	% of assessments	***100%***	***100%***
	% of total extent	***unknown%***	***Unknown***

Note that the scenario presented above is based on the same information as used to construct the Table in section 4.1. It is based on the following premises:
(i) the unfavourable-recovering condition assessments will at some point in the future become favourable;
(ii) all unfavourable-unclassified sites will remain unfavourable, which is probably overly pessimistic;
(iii) sympathetic management will be sustained on sites already classified as favourable and these will not be seriously damaged by any unforeseen events.

IMPORTANT NOTE: We do not have information on the timescale of the predicted recovery, which may be influenced by many past, natural and human related factors. A sustained, sympathetic management regime is more likely to result in 'favourable' condition being attained.

Map 5.2.1 Predicted Future Condition of H8330 based on CSM condition assessments: SAC assessments (See Sections 4.2 and 7.2 for further information)

Key:
Red = future-unfavourable, i.e. the square contains one or more SACs where this habitat feature is present and has been predicted to be future-unfavourable
Green = future-favourable, i.e. the square contains at least one SAC where this habitat feature is present and has been predicted to be future-favourable
Blue = SAC not assessed, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported
Transparent = SAC feature not present, i.e. the square does not contain any SAC features of this habitat type

5.3 Conclusions on future prospects **(as regards range, area covered and specific structures and functions)**

Conclusion[2.6.iv]: Unknown

There are many potential threats to sea caves, but these are unquantified. In the case of sea level rise, more caves may be created by increased erosion, while caves that are currently intertidal may simply become subtidal. It is not possible therefore to make a valid judgement on this other than unknown

6. Overall conclusions and judgements on conservation status

Conclusion[2.6]: Unknown

With the exception of the Range, which has been identified as Favourable, all parameter conclusions are Unknown. Therefore in accordance with EU Commission guidance, the overall conclusion is also Unknown.

Table 6.1 Summary of overall conclusions and judgements

Parameter	Judgement	Grounds for Judgement	Confidence in judgement*
Range	Favourable	While individual areas with caves in them may have been affected by coastal processes and development there has been no overall decline in the geographic spread of the feature.	3
Area covered by habitat type within range	Unknown	The data coverage is not sufficient to make a judgement at a national level. The feature is not fully recorded. In addition the feature is subject to natural change in extent due to the processes of erosion. While the area of the parent feature (reefs) could be estimated there is no reliable estimate for the area of feature itself and, due to the significant logistical problems of surveying caves, this is likely to remain the case.	3
Specific structures and functions (including typical species)	Unknown	The data coverage is not sufficient to make a judgement at a national level. There is a fundamental lack of data upon which to base judgements. In addition, we do not know what proportion of the resource is encompassed by the SAC series and thus by the data from CSM reporting. There are no surveillance data relating to trends in any of the species/communities listed in 4.3. It is therefore not possible to assess the status of 'Typical Species' for this feature.	3
Future prospects (as regards range, area covered and specific structures and functions)	Unknown	The data coverage is not sufficient to make a judgement at a national level. There are many potential threats to sea caves, but these are unquantified. In the case of sea level rise, more caves may be created by increased erosion, while caves that are currently intertidal may simply become subtidal. It is not possible therefore to make a valid judgement on this other than unknown.	3
Overall assessment of conservation status	Unknown	More than one Unknown combined with Favourable.	3

Key to confidence in judgement: 1 = High; 2 = Medium; 3 = Low

7. Annexed material **(including information sources used 2.2)**

7.1 References

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7.2 Further information on CSM data as presented in Sections 4.2 and 5.2

Table 7.2.1 Summary of grid square map data shown in Maps 4.2.1-3 and 5.2.1-3

Data	Value
Number of SACs supporting feature (a)	16
Number of SACs with CSM assessments (b)	13
% of SACs assessed (b/a)	81
Extent of feature in the UK – hectares (c)	Unknown
Extent of feature on SACs – hectares (d)	3,939
Extent of features assessed – hectares (e)	3,559
% of total UK hectarage on SACs (d/c)	Unknown
% of SAC total hectarage that has been assessed (e/d)	90
% of total UK hectarage that has been assessed (e/c)	Unknown