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

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Conservation status assessment for the habitat:

H8330 - Submerged or partially submerged sea caves

UNITED KINGDOM

IMPORTANT NOTE - PLEASE READ

- The information in this document represents the UK Report on the conservation status of this habitat, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- It is based on supporting information provided by the geographically-relevant Statutory Nature Conservation Bodies, which is documented separately.
- The 2019 Article 17 UK Approach document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Maps showing the distribution and range of the habitat are included (where available).
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the UK assessments. Further underpinning explanatory notes are available in the related country-level and/or UK offshore-level reports.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; and/or (ii) completion of the field was not obligatory.
- The UK-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 17 for Annex I habitat types (Annex D)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK**
1.2 Habitat code	**8330 - Submerged or partially submerged sea caves**

2. Maps

2.1 Year or period	1975-2018
2.3 Distribution map	Yes
2.3 Distribution map Method used	Based mainly on extrapolation from a limited amount of data
2.4 Additional maps	No

BIOGEOGRAPHICAL LEVEL

3. Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	**Marine Atlantic (MATL)**
3.2 Sources of information	England Brazier, D. P., Davies, J., Holt, R. H. F. and Murray, E. 1998. Marine Nature Conservation Review Sector 5. South-east Scotland and north-east England: area summaries: Joint Nature Conservation Committee (Coasts and Sea of the United Kingdom MNCR Series). British Museum of Natural History (BMNH). 1985. Kent & Sussex littoral chalk-cliff algal survey: BMNH. Bunker, F., Mercer, T. and Howson, C. 2005. South Wight European Marine Site Sublittoral Monitoring 2003-2004: Aquatic Survey & Monitoring Ltd. http://www.emodnet-seabedhabitats.eu/pdf/09-04-02 NE IOWReportNov2005b_Mesh.pdf Cork, M., McNulty, S. and Gaches, P. 2008. Site Selection Report for the Inshore Marine SACs Project: Natural England. Crabbe, R. and Whiteman, J. 2010. The Solent Diffuse Water Pollution Plan: Environment Agency; Natural England. English Nature (EN). 2000. English Nature's advice for the Flamborough Head European marine site given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994.: English Nature.http://publications.naturalengland.org.uk/file/3295646 Environment Agency (EA). 2014. WFD - Surface Water Classification Status and Objectives [Online]. Environment Agency. [Accessed 20/03/15]. http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml Environment Agency (EA). 2015-2018. EA Catchment Data Explorer [Online]. https://environment.data.gov.uk/catchment-planning/ Environment Agency (EA). 2016. Winter DIN Assessment (Nov 2010 - Feb 2016 data) - SACs and SCIs, version 1: Environment Agency (EA). European Commission (EC). 2017. ENERGY Projects of common interest - Interactive map [Online]. http://ec.europa.eu/energy/infrastructure/transparency_platform/map-viewer/main.html Fowler, S. L. and Tittley, I. 1993. The Marine Nature Conservation of British Coastal Chalk Cliff Habitats: English Nature Fugro EMU Ltd. 2013. Pilot Study to Develop Monitoring Methodologies and

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4. Range

4.1 Surface area (in km²)	48900	
4.2 Short-term trend Period	2007-2018	
4.3 Short-term trend Direction	Stable (0)	
4.4 Short-term trend Magnitude	a) Minimum	b) Maximum

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4.5 Short-term trend Method used	Based mainly on expert opinion with very limited data	
4.6 Long-term trend Period		
4.7 Long-term trend Direction		
4.8 Long-term trend Magnitude	a) Minimum	b) Maximum
4.9 Long-term trend Method used		
4.10 Favourable reference range	a) Area (km²)	48900
	b) Operator	
	c) Unknown	No
	d) Method	The favourable reference range is likely to remain the same as the actual range given the physiographic nature of the feature. Caves are unlikely to reduce in range due to the nature and UK-wide spread of rocky coasts. Therefore, the current range is, considered to be the favourable reference range. The known range has increased due to improved knowledge and this has led a change in the Favourable reference range.
4.11 Change and reason for change in surface area of range	Improved knowledge/more accurate data	
	The change is mainly due to:	Improved knowledge/more accurate data
4.12 Additional information	4.1-Sea caves are physiographic features and so their range is determined primarily by geomorphological and hydrographic processes occurring over long time-scales and is not related to biological communities or processes supported by communities. Therefore, the range was considered equivalent to the distribution and was calculated from the distribution map (2.2), but additionally included areas that had the potential for the habitat to occur based on an understanding of seabed geology. The same approach was taken in the 2013 report. 4.3-The short-term trend is thought to be stable. The occurrence of this habitat is defined by physiographic processes over long time-scales. While the surface area of some of these individual habitats may have declined due to localised pressures, the geographic spread and distribution of features is not thought to have been reduced. 4.11-Due to improved mapping of the habitat, the surface area of range is larger than the figure reported in 2013. For further details see 2019 UK Approach Document on JNCC website.	

5. Area covered by habitat

5.1 Year or period			
5.2 Surface area (in km²)	a) Minimum	b) Maximum	c) Best single value
5.3 Type of estimate			
5.4 Surface area Method used	Insufficient or no data available		
5.5 Short-term trend Period	2007-2018		
5.6 Short-term trend Direction	Uncertain (u)		
5.7 Short-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.8 Short-term trend Method used	Insufficient or no data available		
5.9 Long-term trend Period			
5.10 Long-term trend Direction			

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5.11 Long-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.12 Long-term trend Method used			
5.13 Favourable reference area	a) Area (km²) b) Operator c) Unknown No d) Method		
5.14 Change and reason for change in surface area of range	Improved knowledge/more accurate data The change is mainly due to: Improved knowledge/more accurate data		
5.15 Additional information	5.1-The data sources used to produce this map of sea cave locations ranged from 1975 to 2018. 5.4-An unknown conclusion is reported because we are unable to make an estimate of the resource of sea cave habitats in UK waters. While some inventories of caves have been done for specific Special Areas of Conservation (SACs) these are not guaranteed to be accurate, therefore the number of caves gives no indication of area. There is no accepted proxy for determining or estimating sea cave area. 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 around 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 cliffs extend 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). 5.6-There is not enough data to establish the surface area of the feature in UK waters, therefore, a surface area short-term trend cannot be determined. For further details see the 2019 UK Approach Document on JNCC website.		

6. Structure and functions

6.1 Condition of habitat	a) Area in good condition (km²)	Minimum	Maximum
	b) Area in not-good condition (km²)	Minimum	Maximum
	c) Area where condition is not known (km²)	Minimum	Maximum
6.2 Condition of habitat Method used	Insufficient or no data available		
6.3 Short-term trend of habitat area in good condition Period	2003-2018		
6.4 Short-term trend of habitat area in good condition Direction	Stable (0)		
6.5 Short-term trend of habitat area in good condition Method used	Based mainly on expert opinion with very limited data		
6.6 Typical species	Has the list of typical species changed in comparison to the previous reporting period? No		
6.7 Typical species Method used			
6.8 Additional information	6.1- The area of sea caves is not fully mapped in the UK due to inaccessibility of the habitat. Therefore, it was not possible to determine the area of the habitat in good and not good condition. As an alternative the number of sea caves in good		

and not good condition were calculated and used to conclude on the structure and functions parameter. 12% of sea caves (365 caves) were in not good condition, 46% of sea caves (1378 caves) were in good condition and 41% of sea caves (1227 caves) were in unknown condition. It should be noted that if a number of sea caves (>13%of the total number of sea caves) in unknown condition were deemed to be in unfavourable 'not good' condition, this would result in an unfavourable-bad conclusion for this parameter.
6.4-The short-term trend of habitat in good condition was assessed by the four countries and the results were aggregated (see 2019 UK Approach Document). England has the largest proportion of UK Sea caves and reported a stable short-term trend along with Scotland. Improved knowledge has allowed the trend to be determined, whereas the trend was unknown in 2013.
For details on the approaches used in this section see JNCC website for the 2019 UK Approach Document and country-level reporting information.

7. Main pressures and threats

7.1 Characterisation of pressures/threats

Pressure	Ranking
Sports, tourism and leisure activities (F07)	M
Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defences or coastal protection works and infrastructures) (F08)	H
Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, Styrofoam) (F22)	H
Industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, Styrofoam) (F23)	H
Mixed source marine water pollution (marine and coastal) (J02)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	M
Sea-level and wave exposure changes due to climate change (N04)	M
Change of species distribution (natural newcomers) due to climate change (N08)	M

Threat	Ranking
Wind, wave and tidal power, including infrastructure (D01)	M
Sports, tourism and leisure activities (F07)	M
Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defences or coastal protection works and infrastructures) (F08)	H

Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, Styrofoam) (F22)	H
Industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, Styrofoam) (F23)	H
Other invasive alien species (other then species of Union concern) (I02)	M
Mixed source marine water pollution (marine and coastal) (J02)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	M
Sea-level and wave exposure changes due to climate change (N04)	M
Change of species distribution (natural newcomers) due to climate change (N08)	M

7.2 Sources of information

7.3 Additional information

There were often more than ten pressures, threats (of high or medium importance), or conservation measures identified, and an aggregation method was used to identify the top ten of each. As a result the top ten lists for the habitat may not correspond with each other. For example, a pressure may be in the reported top ten list, but the corresponding conservation measure might not appear in the top ten list of conservation measures. This does not mean that the measure is not in place, but instead it is in the extended list of measures that did not make the top ten but are detailed in the additional information section.
The following threats were identified as medium importance, however, a maximum of ten could be reported: A28-Agricultural activities generating marine pollution, N05-Change of habitat location, size, and / or quality due to climate change, E01-Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels).
For details on approaches used in this section see JNCC website for 2019 UK Approach Document and relevant country-level reporting information.

8. Conservation measures

8.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified and taken
8.2 Main purpose of the measures taken	Maintain the current range, population and/or habitat for the species	
8.3 Location of the measures taken	Both inside and outside Natura 2000	
8.4 Response to the measures	Medium-term results (within the next two reporting periods, 2019-2030)	
8.5 List of main conservation measures		

Reduce/eliminate marine pollution from agricultural activities (CA13)
Reduce impact of transport operation and infrastructure (CE01)
Manage/reduce/eliminate marine pollution from transport (CE04)

Reduce/eliminate marine pollution from industrial, commercial, residential and recreational areas and activities (CF07)

Reduce/eliminate marine contamination with litter (CF08)

Manage changes in hydrological and coastal systems and regimes for construction and development (CF10)

Reduce impact of mixed source pollution (CJ01)

8.6 Additional information	There were often more than ten pressures, threats (of high or medium importance), or conservation measures identified, and an aggregation method was used to identify the top ten of each. As a result the top ten lists for the habitat may not correspond with each other. For example, a pressure may be in the reported top ten list, but the corresponding conservation measure might not appear in the top ten list of conservation measures. This does not mean that the measure is not in place, but instead it is in the extended list of measures that did not make the top ten but are detailed in the additional information section. The following conservation measures were also identified. CC03- Adapt/manage renewable energy installation, facilities and operation, CF03- Reduce impact of outdoor sports, leisure and recreational activities, CI03- Management, control or eradication of other invasive alien species, CN01- Adopt climate change mitigation measures. For details on approaches used in this section see JNCC website for 2019 UK Approach Document and relevant country-level reporting information.

9. Future prospects

9.1 Future prospects of parameters	a) Range	Good
	b) Area	Unknown
	c) Structure and functions	Poor
9.2 Additional information	Future trends for each parameter were selected by the four countries and then aggregated to give a future trend for the UK (see 2019 UK Approach Document). Table 32 in the EU Guidelines was used to bring the future trend and conservation status of each parameter together to conclude on future prospects. 9.1a)Future prospects are good because the future trend for range is thought to be stable and the conclusion for range is favourable. Future prospects were also good in 2013. 9.1b)Future prospects are unknown because the future trend for area is unknown and the conclusion for area is unknown. Future prospects were also unknown in 2013. 9.1c)Future prospects were unknown in 2013, however, improved knowledge has enabled them to be determined for 2019. Future prospects are poor because the future trend for structure and functions is thought to be stable and the conclusion for structure and functions is unfavourable-inadequate. For further details see JNCC website for 2019 UK Approach Document and relevant country-level reporting information.	

10. Conclusions

10.1. Range	Favourable (FV)
10.2. Area	Unknown (XX)
10.3. Specific structure and functions (incl. typical species)	Unfavourable - Inadequate (U1)
10.4. Future prospects	Unfavourable - Inadequate (U1)

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10.5 Overall assessment of Conservation Status	Unfavourable - Inadequate (U1)
10.6 Overall trend in Conservation Status	Stable (=)
10.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status Improved knowledge/more accurate data Use of different method The change is mainly due to: Improved knowledge/more accurate data b) Overall trend in conservation status Improved knowledge/more accurate data The change is mainly due to: Improved knowledge/more accurate data
10.8 Additional information	10.1- Conclusion on Range reached because: (i) the short-term trend direction in Range surface area is stable; and (ii) the current Range surface area is approximately equal to the Favourable Reference Range. 10.2-Conclusion on Area covered by habitat reached because: (i) the short-term trend direction in Area is uncertain; and (ii) the current Area and Favourable Reference Area are uncertain. 10.3-Conclusion on Structure and functions reached because habitat condition data indicates that between 5-25% of the habitat is in unfavourable (not good) condition. The area of sea caves is uncertain, therefore, the number of sea caves in good and not good condition was used to conclude on this parameter. 12% of sea caves (365 caves) were in not good condition, 46% of sea caves (1378 caves) were in good condition and 41% of sea caves (1227 caves) were in unknown condition. It should be noted that if a number of sea caves (>13%of the total number of sea caves) in unknown condition were deemed to be in unfavourable 'not good' condition, this would result in an unfavourable-bad conclusion for this parameter. 10.4-Conclusion on Future prospects reached because: (i) the Future prospects for Range are good; (ii) the Future prospects for Area covered by habitat are unknown; and (iii) the Future prospects for Structure and functions are poor. The conclusion changed from unknown (2013) to Unfavourable-inadequate as a result of improved knowledge. 10.5-Overall assessment of Conservation Status is Unfavourable-inadequate because one or more of the conclusions are Unfavourable-inadequate. It should be noted that if a number of sea caves (>13%of the total number of sea caves) in unknown condition were deemed to be in unfavourable 'not good' condition, this could result in an unfavourable-bad conclusion for the structure and functions parameter and would result in the overall assessment of Conservation Status being unfavourable-bad. 10.6-Overall trend in Conservation Status is based on the combination of the short-term trends for Range - stable, Area covered by habitat - uncertain, and Structure and functions - stable. 10.7-The overall assessment of Conservation Status has changed between 2013 and 2019 because the conclusion for structure and functions has changed from unknown to unfavourable-inadequate. It was not possible to assess the area in good and not good condition, instead the number of sea caves in good and not good condition was assessed. It is also a result of a change in the future prospects conclusion, which changed from unknown (2013) to unfavourable-inadequate due to improved knowledge.

11. Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types

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11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (in km² in biogeographical/ marine region)	a) Minimum b) Maximum c) Best single value
11.2 Type of estimate	
11.3 Surface area of the habitat type inside the network Method used	Insufficient or no data available
11.4 Short-term trend of habitat area in good condition within the network Direction	Stable (0)
11.5 Short-term trend of habitat area in good condition within network Method used	Based mainly on expert opinion with very limited data
11.6 Additional information	11.1-An unknown conclusion is reported because we are unable to make an estimate of the resource of sea cave habitats in UK waters. While some inventories of caves have been done for specific Special Areas of Conservation (SACs) these are not guaranteed to be accurate, therefore the number of caves gives no indication of area. There is no accepted proxy for determining or estimating sea cave area. 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 around 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 cliffs extend 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). For further details of approaches taken please see JNCC website for 2019 UK Approach Document and relevant country-level report information.

12. Complementary information

12.1 Justification of % thresholds for trends	
12.2 Other relevant information	

Distribution Map

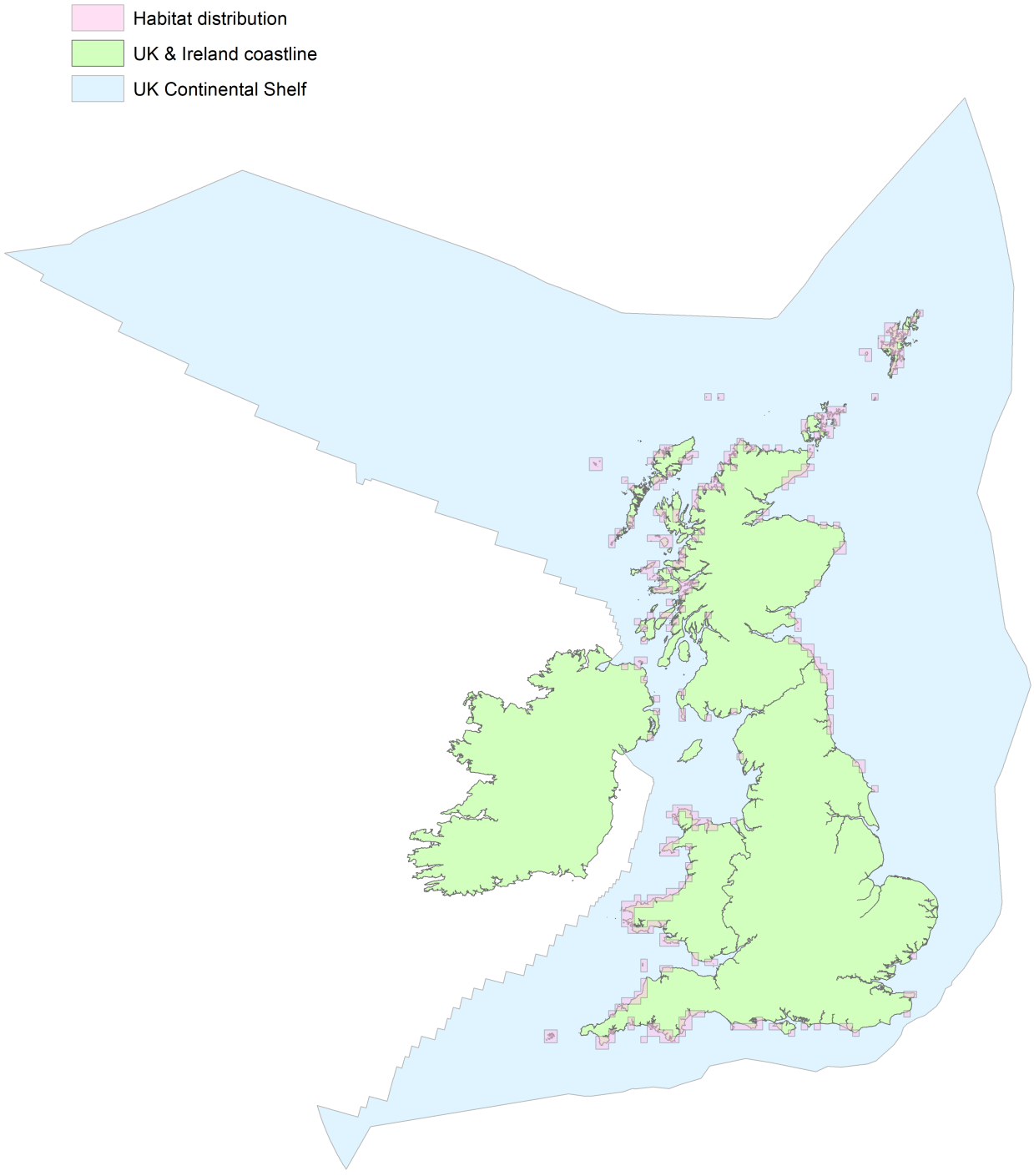

Figure 1: UK distribution map for H8330 - Submerged or partially submerged sea caves.

The 10km grid square distribution map is based on available habitat records which are considered to be representative of the distribution within the current reporting period. For further details see the 2019 Article17 UK Approach document.

Range Map

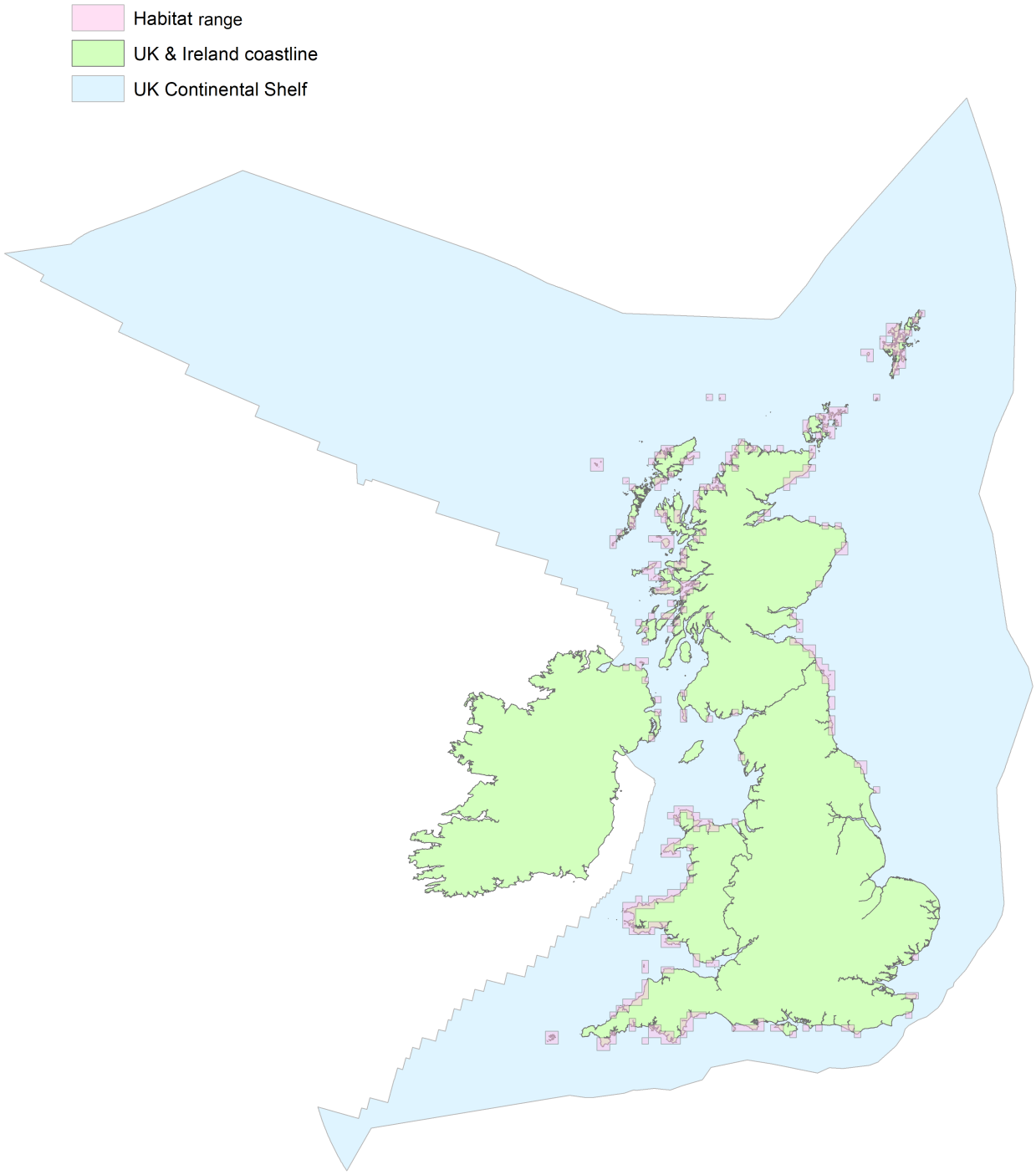

Figure 2: UK range map for H8330 - Submerged or partially submerged sea caves.

Sea caves are physiographic features and so their range is determined primarily by geomorphological and hydrographic processes occurring over long time-scales and is not related to biological communities or processes supported by communities. Therefore, the range was considered equivalent to the distribution and was calculated from the distribution map, but additionally included areas that had the potential for the habitat to occur based on an understanding of seabed geology.

Explanatory Notes

Habitat code: 8330

Field label	Note
2.1 Year or period	The data sources used to produce this map ranged from 1975 to 2018.
2.3 Distribution map; Method used	The point layer of sea caves was gridded to create the distribution map. The 2013 UK Article 17 area data for Annex I caves were revised at a UK level by the JNCC following updates submitted by the UK Country Agencies. For further details see JNCC website (JNCC 2018a).

Habitat code: 8330 Region code: MATL

Field label	Note
4.1 Surface area	Sea caves are physiographic features and so their range is determined primarily by geomorphological and hydrographic processes occurring over long time-scales and is not related to biological communities or processes supported by communities. Therefore, the range was considered equivalent to the distribution and was calculated from the distribution map (2.2), but additionally included areas that had the potential for the habitat to occur based on an understanding of seabed geology. The same approach was taken in the 2013 report.
4.3 Short term trend; Direction	The short-term trend is thought to be stable. The occurrence of this habitat is defined by physiographic processes over long time-scales. While the surface area of some of these individual habitats may have declined due to localised pressures, the geographic spread and distribution of features is not thought to have been reduced.
4.5 Short term trend; Method used	See 4.3
4.11 Change and reason for change in surface area of range	Due to improved mapping of the habitat, the surface area of range is larger than the figure reported in 2013.
5.1 Year or period	The data sources used to produce this map of sea cave locations ranged from 1975 to 2018.
5.4 Surface area; Method used	An unknown conclusion is reported because we are unable to make an estimate of the resource of sea cave habitats in UK waters. While some inventories of caves have been done for specific Special Areas of Conservation (SACs) these are not guaranteed to be accurate, therefore the number of caves gives no indication of area. There is no accepted proxy for determining or estimating sea cave area. 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 around 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 cliffs extend 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).
5.6 Short term trend; Direction	There is not enough data to establish the surface area of the feature in UK waters, therefore, a surface area short-term trend cannot be determined.
5.8 Short term trend; Method used	See 5.6
5.14 Change and reason for change in surface area	It is not possible to calculate the surface area of sea caves in the UK.

6.1 Condition of habitat	The area of sea caves is not fully mapped in the UK due to inaccessibility of the habitat. Therefore, it was not possible to determine the area of the habitat in good and not good condition. As an alternative the number of sea caves in good and not good condition were calculated and used to conclude on the structure and functions parameter. 12% of sea caves (365 caves) were in not good condition, 46% of sea caves (1378 caves) were in good condition and 41% of sea caves (1227 caves) were in unknown condition. It should be noted that if a number of sea caves (>13%of the total number of sea caves) in unknown condition were deemed to be in unfavourable 'not good' condition, this would result in an unfavourable-bad conclusion for this parameter.
6.4 Short term trend of habitat area in good condition; Direction	The short-term trend of habitat in good condition was assessed by the four countries and the results were aggregated (see 2019 UK Approach Document). England has the largest proportion of UK Sea caves and reported a stable short-term trend along with Scotland. Improved knowledge has allowed the trend to be determined, whereas the trend was unknown in 2013.
9.1 Future prospects of parameters	Future trends for each parameter were selected by the four countries and then aggregated to give a future trend for the UK (see 2019 UK Approach Document). Table 32 in the EU Guidelines was used to bring the future trend and conservation status of each parameter together to conclude on future prospects.
9.1a Future prospects of parameters - Range	Future prospects are good because the future trend for range is thought to be stable and the conclusion for range is favourable. Future prospects were also good in 2013.
9.1b Future prospects of parameters - Area	Future prospects are unknown because the future trend for area is unknown and the conclusion for area is unknown. Future prospects were also unknown in 2013.
9.1c Future prospects of parameters - Structure and functions	Future prospects were unknown in 2013, however, improved knowledge has enabled them to be determined for 2019. Future prospects are poor because the future trend for structure and functions is thought to be stable and the conclusion for structure and functions is unfavourable-inadequate.
11.1c Surface area of the habitat type inside the pSCIs, SCIs and SACs network (in km2 in biogeographical/ marine region) - Best single value	An unknown conclusion is reported because we are unable to make an estimate of the resource of sea cave habitats in UK waters. While some inventories of caves have been done for specific Special Areas of Conservation (SACs) these are not guaranteed to be accurate, therefore the number of caves gives no indication of area. There is no accepted proxy for determining or estimating sea cave area. 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 around 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 cliffs extend 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).